

Summary: The NPA 2015 Meeting hosted by the University of Maryland, Baltimore was very well attended, and offered a variety of sessions that were beneficial to postdoctoral scholars, associations, and offices. The networking opportunities at the meeting were extensive, with representation from academic and research institutions, industry, and postdoctoral advocacy groups. The poster presented on PAW's Mental Health and Wellness (MH&W) Initiative was well accepted, and connections were made with other associations and administrations that were interested in starting a similar MH&W strategy. The following report describes the details of each of the sessions that I attended, along with my thoughts for possible implementation with Western postdocs (**).

Friday 13th March 2015

Welcome Presentation: State of the NPA

Dr. Keith Micoli, (Chair of NPA, Board of Directors)

Dr. Micoli gave an overview presentation on the state and progress of the NPA over the past year. Overall, 2014 was a productive year for the NPA, where Dr. Micoli presented at 12 national research meetings, participated in over 20 meetings with federal agencies, and completed dozens of interviews on behalf of NPA. National participation in the NPA has increased, which was evident by the increased number of registrants for the NPA meeting. There are presently 196 sustaining members, which is a 40% increase over the last 4 years. Additionally, participation in Postdoctoral Appreciation Week has increased, with 98 institutions partaking in 2014. With regards to the cash flow of the NPA, the majority of revenue is obtained from membership (40%) and the annual meeting (38%), with 18% from grants and 4% from donations. The NPA expenditures primarily go to salaries.

Dr. Micoli discussed the major initiatives taken on by the NPA over the last year, which included:

- *Mentoring Resource:* A dedicated mentoring section on their website with information on finding good mentors, as well as building and cultivating a mentoring team.
- *NPA Institutional Policy Report:* Data acquired to advocate for real changes across institutions. Additionally, NPA can do custom reports based on this data.
- *Postdoc Symposium Toolkit:* Provides practical advice and templates for creating postdoc symposiums. The toolkit can be found on the NPA website.
- *Elsevier's Woman's Clearing House:* NPA has been working with institutions to support the advancement of postdoc women in academic careers through the [NPA ADVANCE](#) project funded by the National Science Foundation and Elsevier Foundation. Elsevier Foundation examined promising practices found in professional societies and associations that aim to help postdoc women successfully transition into academic careers. Through a screening survey, NPA was able to identify the main challenges faced by postdoctoral women: career-life balance, lack

of mentoring, lack of childcare and family obligations. Participants included individuals who worked at research institutions, postdocs, and tenure track-seekers.

- *My PDO monthly*: A webinar forum for connecting PDO's to offer mentorship in addressing common concerns and challenges.
- *NEW NPA Website and Newsletter*: The new website is expected in Spring 2015 and the re-designed newsletter 'The Postdocket' will be introduced in Winter 2015.

*** All of the described initiatives can be accessed on NPA's website, and can be promoted or used by PAW for developing specific resources, workshops and programs. ***

Keynote Address: Rosina Bierbaum

From the lab to the White House and back: bridging the Science-Policy Gap

Dr. Rosina Bierbaum (University of Michigan)

Dr. Rosina Bierbaum is a professor and expert in natural resources and environmental policy at the University of Michigan. In 2009, she was appointed to the President's Council of Advisors on Science and Technology (PCAST). The council consists of the top scientists and engineers, who advise the President to assist with policy making in science, technology and innovation. Her role included translating science for public and policy makers. In particular, she worked on federal reports on Climate Change Adaptation in the United States, and is the lead author on a PCAST report prepared for the President, recommending action to address climate change and for sustaining environmental capital.

Her keynote presentation described her career progression from scientist to policy maker, along with the lessons learned along the way. However, the main take-away from the presentation was the similarity between her description of the climate crisis, and the predicaments encountered in scientific research systems. She suggested that the strategy used to assess and advocate for policy change could be similarly applied for scientific work, since expected outcomes and goals are similar in their intent. She offered key features to consider in such assessments:

- Stakeholder involvement
- Scientific integrity
- Explicit identification of uncertainty
- Synthesis

Overall, Dr. Bierbaum's talk was informative and inspiring, shining light on the importance of scientists in policy making decisions.

Teaching focused professional development for postdocs

Dr. You-Geon Lee & Julia N. Savoy (Wisconsin Center for Education Research);

Lucas Hill (Michigan State University)

The session focused on the results of a longitudinal study on the short and long term effects of teaching development (TD) on STEM Doctorate recipients, many of who continued on to postdoctoral positions. In addition, the session provided self-assessment tools that are useful to postdocs, postdoc offices and postdoc associations in support of teaching development at institutions. However, no specific tools or tips for teaching development programs were provided.

The longitudinal study tracked a panel of late stage STEM PhD students (Arizona State University, University of Washington Seattle, and University of Wisconsin-Madison) using three surveys over a five year period as they moved from grad school to employment. The findings presented also highlight findings for PhD's who moved into postdoc positions.

The research found:

- Teaching focused professional development positively affect participants belief and confidence to teach undergraduate courses
- Factors that most encourage TD participation are department requirements, student's interest in teaching and learning and his or her career goals
- TD activities helped participants clarify their career interests and and successfully compete for a wider range of academic jobs.
- When career paths of participants were tracked, many of them moved on to research or research admin positions with institutions and government organizations
- For year 3 postdocs followed to year 5, most were still postdocs, some tenure track or non tenure track faculty.
- For year 5 respondents: 63% had some teaching experience
- Roles of postdocs: 31% were instructors, 77% research mentor, 44% guest lecturer, 4% had other duties

Overall, the study found that TD programs promote teaching self-confidence and competencies, and assist doctoral students with identifying their career goals to match the academic job market, including faculty positions available outside of research universities. Therefore it was advised that institutions, departments and postdoc programs should consider expanding the support for TD programs, by coordinating TD programs and encouraging participation.

***PAW can run a similar analysis of teaching proficiency among members using the assessment tool provided, and can be extended to postdocs outside of STEM-specific disciplines. Results from such a structured assessment can be used to determine the teaching needs of postdocs, and plan teaching development programs (with assistance of Teaching Support Center) and provide on-campus resources, accordingly. ***

Promoting Community, Education and Leadership: How Associations and Societies Develop Postdocs

This session focused on the importance of professional/scientific societies in the development of postdoctoral careers through professional opportunities and networking. The various speakers addressed the resources and programs available through their society for postdocs, and discussed ways in which other societies can offer professional, mentoring and career development to postdocs.

ACS Grad and Postdoc office. www.acs.org/grad/careers (American Chemical Society)

- Career navigation
- Newsletter with resources
- Networking opportunities- meetings at international and national levels
- Career workshops—postdoc to faculty, academic employment initiative, preparing for life after graduate school

Postdoctoral Initiatives at the American Sociological Association (ASA)

- Active Postdoctoral Fellowship Program
- Provide ASA research brief on postdocs in Sociology

Postdoctoral Initiatives at the Association for Women in Science (AWiS)

- Advocacy and policy for advancing women in Science
- Research and provide data on women in science
- Publications and media relations with regards to AWiS
- Workshops on work-life balance
- Career Centre webpage that allows you to post your resume
- Many chapters and affiliate groups across North America
 - Special Rate \$65 for postdoc, and chapter typically waive the fee for fellows

*** The resources offered on the different associations' websites could be used as a template for PAW, when considering programs, workshops, events, online tools etc. for the career and professional development of postdocs at Western.***

Saturday 14th March 2015

Ensuring Future Success: Addressing Challenges Facing Women Postdocs

Dr. Belinda Lee Huang (Exec Director NPA);

Cynthia Simpson (Association for Women in Science)

NPA has been working to advance and promote postdoc women in academic careers through the NPA ADVANCE project (funded by NSF and Elsevier Foundation). Additionally, the Elsevier Advancing Postdoctoral Women program focused on examining the promising practices, programs and resources found in associations that allowed for the advancement of women postdocs in academia or other careers. Through focus groups and a survey of 200 professional societies, key challenges facing women postdocs were identified:

- 1) Career-life satisfaction
- 2) Mentoring and support
- 3) Childcare resources and family obligations
- 4) Career Development and Professional Development

Ideas generated from this session to address the key challenges:

- Workshop and professional development for women; how to find the balance between work and home life, while still being successful
- Training for mentors to be: mentoring women and supporting their roles
- Structured Mentoring Program: different women from different career paths share their experience on path to academia, industry
- Childcare support: subsidized costs for childcare eg. Bringing people with you

Issues faced by women postdocs have not been specifically addressed by PAW. I think it would be a good opportunity to consider the issues discussed in this session, along with those determined from surveying our female postdocs at Western, and incorporate action plans into PA-week, research forum, or Happy Hour Info Sessions.

The Future of Research: How Postdocs Can Lend Their Voice To The Scientific Endeavour

Dr. Kearney Gunsalus & Dr. Gary Steven McDowell (Tufts University);

Dr. Kristin Krukenberg & Dr. Jessica Polka (Harvard Medical)

A recent research symposium was held at Boston University to give grad students and postdocs an opportunity to voice their opinion on policies that shape the scientific establishment, as well as issues concerned with senior academics. Four workshops were held based on training, workforce stability, funding structure, and metrics/incentives in place in the research system. Based on these findings, a recent paper was published: <http://f1000research.com/articles/3-291/> (**Attached in Appendix**)

The session at the NPA conference was geared at finding solutions to the problems brought up from the symposium. The intent was actionable items generated from group discussions, which can be implemented at institutions:

- *Problems identified:* lack of training for postdocs, lack of transparency, structure of workforce, funding mechanisms for postdoc independent research, funding priorities to certain fields, hyper competitiveness

Recommendations:

- Connectivity among junior scientist and between all stakeholders
- Transparency in the definition of postdoc, number of postdocs, career outcomes after postdoc
- Investment in separate funding for research grants accessible to postdocs
- Increased accountability of training- recordable and cv-usable

Mentoring (Diversity) Matters

Dr. Audrey Murrell (School of Business, University of Pittsburgh);

Amri Johnson (Novartis Institutes for BioMedical Research)

The presentation focused on the findings of mentorship research, and in particular, the role of mentoring in diverse groups. Overall findings showed a strong correlation between good mentors and more robust experiences for people from backgrounds different than the pre-dominant group(s).

Multiple types of diversity:

- Knowledge and expertise: scientific discipline, work experience, training/education
- Innovation Styles: personality styles, thinking styles
- Demographics and identity: gender, race, nationality, age, ethnicity etc.

Mr. Johnson focused his section of the presentation on emphasizing that diversity matters and is an eminent part of the research culture. With that in mind, he suggested that we should be using diverse knowledge, innovation styles and demographics/identity to our advantage in academic settings. However, he noted that diversity alone will not be the ultimate solution, since it has to be paired with inclusion. Mentoring offers that opportunity for inclusion of diverse groups.

Dr. Murrell focused on mentoring as a strategic tool for cultivating diversity. She emphasized that different mentoring solutions should be considered in order to find the right mentoring fit. Her research found that people who had extensive mentoring turned out to be more successful, where mentoring was advantageous in two functions (Kram's Mentoring Functions); career development and psychosocial development. Dr. Murrell noted, however, that many times similar people are drawn to one another, which does not help with getting the maximal benefits out of mentoring. ***Therefore, a more structured mentoring program is advised to be in place, where pairings based on goal oriented outcomes will be more useful.*** She suggests that organizations assess different mentorship roles and how mentorship relationships can work to benefit both the mentor and mentee.

Literature and Resources (Attached in Appendix)

- *Interorganizational formal mentoring: Breaking the concrete ceiling sometimes requires support from the outside*

Audrey J. Murrell, Stacy Blake-Beard, David M. Porter Jr. and Addie Perkins-Williamson

Available at: <http://onlinelibrary.wiley.com/doi/10.1002/hrm.20212/abstract>

- *Gender and Diversity in Organizations: Past, Present, and Future Directions*

Audrey J. Murrell, Erika Hayes James

Available at: <http://link.springer.com/article/10.1023%2FA%3A1014393312588>

How to Avoid Self Sabotage and Win at Salary Negotiations

Dara Wilson-Grant (Associate Director, Postdoctoral Affairs, UNC Chapel Hill)

The negotiation process is one of the most stressful parts of a job interview, with many academics not prepared or trained for such a discussion. This session was aimed at providing resources for ensuring that participants were prepared for the various stages of the negotiation process. From the session's feedback, it was apparent that many postdocs felt that negotiation was the most uncertain part of the interview process, with many saying they were not confident in their ability to negotiate. With that in mind, the following tips were given with regards to common mistakes made during negotiations.

Mistakes made during negotiations

1. *Failing to prepare ahead of time*

You should know prior to negotiation stage what the salary is for similar positions. E.g. how much variation in salary is based on experience etc.

Website resources for the numbers:

- Salary.com
- Indeed.com: gives you the approximate salary #, and tells you the trend
- Simplyhired.com
- Salaryexpert.com
- Association of American universities
- HigherED jobs

2. *Discussing salary before the interview*

No company or institution should discuss salary before an interview is requested. Many include these in their application process to determine if they can afford you, or if it is possible to bring you in at a lower salary point. It is suggested that you decline commenting on salary until the formal interview.

3. *Failure to recognize when you have the least and most amount of power*

It is important to know when a suitable time for negotiation is. It is advised that negotiations be done at the end of an interview. That way you can promote your qualifications and demonstrate that you are an indispensable resource, which will only benefit your negotiation terms.

4. *Failure to negotiate*

Many job applicants do not negotiate, and accept offers immediately. Many employers start on the low end and expect negotiations from applicants. However, if salary cannot be adjusted, many other items can be negotiated and included in the contract.

What to negotiate on:

- Salary
- Leave
- Moving expenses

- Health Benefits
- Teaching load
- Telecommuting
- Professional development
- Equipment
- Space
- Signing bonus

This was an informative workshop. A similar one would be useful to execute with Western postdocs, since negotiation discussions are applicable to both academic and non-academic jobs.

Poster Session

Poster presented on behalf of PAW

Yara Hosein (PAW Mental Health and Wellness Representative)

Development of a Mental Health and Wellness Initiative for Postdoctoral Scholars at Western University (***Attached in Appendix***)

The poster session was a great networking opportunity. PAW's poster got great feedback, with PDA's and PDO's interested in developing a similar initiative. Many poster visitors asked the reasoning behind the development of a MH&W initiative at Western. It was explained that the MH&W program was a proactive approach to addressing and promoting wellness of Western's postdocs. Future reactive steps would be to identify MH&W needs of Western postdocs (through surveys etc.) to target specific areas and plan programs accordingly.

Cindy Simpson (Association for Women in Science-AWIS) was impressed that PAW took an active role in addressing MH&W. She gave her contact info and offered her association's assistance with finding resources or presentations on topics related to MH&W.

APPENDICES



OPINION ARTICLE

REVISED **Shaping the Future of Research: a perspective from junior scientists [v2; ref status: indexed, http://f1000r.es/4yc]**

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Abstract

The landscape of scientific research and funding is in flux as a result of tight budgets, evolving models of both publishing and evaluation, and questions about training and workforce stability. As future leaders, junior scientists are uniquely poised to shape the culture and practice of science in response to these challenges. A group of postdocs in the Boston area who are invested in improving the scientific endeavor, planned a symposium held on October 2nd and 3rd, 2014, as a way to join the discussion about the future of US biomedical research. Here we present a report of the proceedings of participant-driven workshops and the organizers' synthesis of the outcomes.

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REVISED Amendments from Version 1

We would like to thank Dr. Gibbs and Dr. Stephan for their kind comments and suggestions on our manuscript. We have made a number of changes in response to the suggestions from Dr. Gibbs. We feel that these changes significantly improve the focus and tone of the paper. First, we have moved the pre-registration survey, exit survey, and media response sections to the supplemental material. They can now be found in Appendices 1, 3, and 4 in Dataset 1, respectively. The remainder of the text has been organized as suggested into three main sections: background and context; the symposium itself; and conclusions and recommendations. In the symposium section, we have used charts to summarize the outcomes of each of the four workshops. We find that this significantly improves the readability of these sections and appreciate the suggestions. We have left the original text in these sections as we felt that the charts alone did not provide all the information the reader required.

As to the comments on tone, we have clarified when we are sharing an opinion and when we are presenting established fact. We have ensured that all facts are supported with appropriate references. We have also made clear when we are providing the opinion of the organizers versus the participants of the symposium. Finally, we have changed the wording in the abstract and executive summary to reflect the fact that we are not presenting a uniform view but multiple views and ideas from the attendees of the Future of Research Symposium.

See referee reports

Executive summary

The Future of Research Symposium, held in Boston in October 2014, was born out of a desire on the part of junior scientists to influence discussions about the future of biomedical research in the United States. We the organizers believe that current trainees in academic research represent a talented pool of people contributing to scientific progress. This pool, however, is far larger than the current academic system is able to support in the long term. As structural forces governing the funding and administration of science push many graduate students and postdocs out of research, the public funds supporting their training are poorly repaid.

While scientists continue to advocate for increased funding, they must also create a scientific enterprise that is sustainable with the current resources. A sustainable long-term investment in science, including the young people who carry it out, is essential to the long-term economic and social interests of the US. In the experience of the organizers, the current hyper-competitive environment stunts scientific curiosity and productivity, breeds fabrication and carelessness in the publication of data, and leads to a waste of valuable resources and intellectual capital. In all of our discussions of these problems, we have kept two goals in mind: to maximize the potential for wide-ranging and fundamental scientific discovery; and to minimize the loss of talented young researchers who can contribute greatly to science.

In addition to voicing our concerns, we junior scientists recognize that we need to become more aware of the issues facing the research enterprise, comprised of academia, industry, publishing, and government. To accomplish this, the initial sessions of the symposium consisted of a series of talks and panel discussions from leaders

who have been outspoken about the challenges that science faces. These were followed by workshops designed to elicit the opinions and ideas of participants, largely postdocs and graduate students, on problems and solutions surrounding training, the structure of the research workforce, funding, and incentives and rewards in science. We present the outcomes of those discussions in this report, conveying in aggregate many young biomedical scientists' concerns about the sustainability of the research enterprise and our hopes for change.

From the many ideas presented in the workshops and continued discussions among the organizers, we have distilled the following three principles to guide future activities towards scientific reform:

1. We recommend increased **connectivity** among junior scientists and other stakeholders to promote discussions on reforming the structure of the scientific enterprise.
2. We advocate for increased **transparency**. This includes the number and career outcomes of trainees, as well as the expectations of the balance between employment and training in individual postdoctoral appointments.
3. We call for an increased **investment** in junior scientists, with increased numbers of grants that provide financial independence from Principal Investigator (PI) research grants, and increased accountability for the quality of training as a requirement of funding approval.

As the engine of academic research, junior scientists must claim a voice fitting their role as major stakeholders in the scientific enterprise. Equally, junior scientists must be educated about their role so that they have the context necessary to make a well-informed contribution and to effectively advocate for their interests. By bringing our concerns into the conversation that guides policy, the dialogue will be enriched with diversity and fresh perspectives. We encourage our peers to continue this conversation, engage their colleagues, and to get involved in shaping the Future of Research.

Context for the Future of Research Symposium

“The government should provide a reasonable number of undergraduate scholarships and graduate fellowships in order to develop scientific talent in American youth. The plan should be designed to attract into science only that proportion of the youthful talent appropriate to the needs of science in relation to the other needs of the nation’s high priority”. And I think that is one of the places where we have in biomedical science gone astray”.

Shirley Tilghman, quoting Vannevar Bush, at a meeting of the President’s Council of Advisors on Science and Technology (PCAST), [September 19 2014](#), (“PCAST Meeting 2014”, 2014).

A large portion of the nation’s science and engineering research is carried out by graduate students and postdocs. Because of this, the current culture of training places a heavy emphasis on research and publications, at the expense of “soft skill acquisition” or career development.

In the US, pre-doctoral training in the biomedical sciences takes 6.5 years on average (Figure 3 of (Biomedical Research Workforce Working Group, 2012)), and includes research experience culminating in a PhD dissertation. This process is overseen by a committee of 3–5 faculty members and requires the development of some core skills.

In contrast, it is notoriously difficult to determine how many postdoctoral scholars there are, let alone what kind of training they are or should be receiving. The National Institutes of Health (NIH) and the National Science Foundation (NSF) define a postdoctoral scholar as “an individual who has received a doctoral degree (or equivalent) and is engaged in a temporary and defined period of mentored advanced training to enhance the professional skills and research independence needed to pursue his or her chosen career path” (Bravo & Olsen, 2007). Most postdoctoral “trainees” conduct research under the supervision of a single Principal Investigator (PI), and there are no explicit guidelines to determine what training a postdoc should receive or when this training is complete. In reality, postdoctoral research is often not a training period at all, but a time when experienced junior researchers contribute significantly to the goals of a PI’s grant. There is no expectation of specific training, and no defined period in which the training takes place: “training” ends only when the postdoc takes another job.

In spite of the number of years spent in pre- and postdoctoral training, the organizers perceive that many scientists feel that they are inadequately prepared for any job other than conducting research. Many feel they are unaware of what jobs they should be training for, let alone what skills those jobs require. One common complaint we hear among our colleagues is that scientists are not being prepared for non-faculty positions, yet in the organizer’s experience many new faculty appear unprepared for their non-research responsibilities (such as managing employees and budgets or teaching and we feel that we are not even being properly trained to become future faculty.

Where did all the graduate students and postdocs come from?

While the number of US graduate students in biomedical science have increased from about 46,500 in 1993 (Table B-18 in (National Science Foundation, 1994)) to almost 71,000 in 2012 (Table 16 in (National Science Foundation, 2014)), the fraction of PhDs in life sciences in a tenure-track position 5 years post-PhD decreased from 17.3% (1993) to 10.6% (2010) (Table 3–18 in (National Science Board, 2014)). There has also been a tremendous shift in the job market outside of academia over the past decades, with a general slowdown and even contractions in government and industry. This situation has long been deemed unsustainable by many senior academics (Bourne, 2013a; Stephan, 2012a; Stephan, 2012b; Teitelbaum, 2008).

With the number of graduate students increasing faster than the number of faculty positions (Figure 1 in (Schillebeeckx *et al.*, 2013)), it is unsurprising that the NIH estimates that the number of postdoctoral researchers also doubled during that time. However, estimates of the number of postdocs vary drastically. The National Research Council puts the number of postdocs at just over 50,000

(National Research Council (US) Committee to Study the National Needs for Biomedical, Behavioral, and Clinical Research Personnel, 2011), but the NIH states that this could be under-estimated by as much as a factor of two (Biomedical Research Workforce Working Group, 2012). According to a recent report by the National Postdoctoral Association (NPA), the NPA’s 167 member institutions alone estimate that their postdoc offices serve about 79,000 postdocs (Ferguson *et al.*, 2014).

Where do graduate students and postdocs actually go?

Data from the NSF Survey of Doctorate Recipients suggests that the US-trained biomedical PhDs “who do the longest postdocs are the ones who go on to tenure-track academic research careers” (Rockey, 2012). However, in spite of the number of scientists remaining in long postdocs in the hopes of landing a tenure-track faculty position, the data show clearly that academia is an “alternative” career, not the default. In 2010, less than 15% of US-trained science, engineering and health sciences postdocs had obtained a tenure-track faculty position within 5–7 years of completing their PhD (Sauermann & Roach, 2012). The rest of the job market encompasses many fields that are expanding and that we the organizers believe can benefit from the trained minds of PhDs and postdocs. These include (but are not limited to): consulting for life sciences, biotech and biopharmaceutical industries, sales and marketing of technologically advanced products, regulatory affairs, science policy, science communications, and intellectual property.

Even though the majority of postdocs will do something other than become tenure-track faculty members, the default assumption of many PIs (and their mentees) remains that graduate students and postdocs will follow their mentors’ career trajectory and acquire an academic faculty position at a research-intensive institution (Sauermann & Roach, 2012). The data show that by the end of their PhD training, only 50% of graduate students want to become academics, and that expectations change over time: a faculty position becomes less attractive over the course of a PhD, in spite of active encouragement by advisors (Sauermann & Roach, 2012).

Thus, many junior scientists want, and most will obtain, non-faculty jobs. However, we the organizers feel that few young scientists and their faculty mentors know what careers are actually available, let alone what skills those jobs require or how to obtain them. The mismatch between scientists’ career expectations and the realities of the job market has led to extended occupancy of postdoc positions (Biomedical Research Workforce Working Group, 2012) and we believe this leads to highly inflated expectations from academic employers for prior productivity.

How does the funding system contribute to workforce and training problems?

In the US, the funding system has had a profound impact on the structure of universities and academic and applied research departments, and how the time of principal investigators and young scientists is spent.

As early as 2003, the rapid increase in funds over the previous decade was generating questions about where trainees would end up in the absence of a concomitant increase in academic positions

(Russo, 2003). In response to these concerns, there have been calls for institutions to become more responsible for funding “hard-money” faculty positions, and to increase NIH incentives for doing so, rather than relying on external sources of funding for “soft-money” positions (Alberts, 2010). These problems were left unresolved, however, and now that there has been a contraction in funding they have become immediate. For institutions and individual researchers attempting to make long-term decisions, financial uncertainty makes planning very challenging. It is clear that simply putting more money into the system would provide only a temporary fix, not a long-term solution to the systemic problems with academic research (Alberts *et al.*, 2014; Martinson, 2007). Among these problems is an implication (expressed through the growth of, and reliance on, graduate student and postdoc populations) that the enterprise will grow exponentially. In the face of stagnant funding, this growth has instead intensified competition for jobs, grants, and publications (Alberts *et al.*, 2014).

What's wrong with competition?

An assumption of many industries is that increased competition between groups or individuals yields largely beneficial results. However, academic science in the US was essentially founded on Vannevar Bush's principle of the “supreme importance of affording the prepared mind complete freedom for the exercise of initiative” (Bush, 1945). These two principles are incompatible.

Indeed, we organizers believe that the problems caused by the current unsustainable workforce are threatening the very foundations of scientific research. The high stakes and low expectations of success prevalent throughout biomedical research, from grant applications to hiring decisions, promote academic dishonesty (Lang, 2013). Also, success in grant applications and career progression relies heavily on publications (van Dijk *et al.*, 2014). This can lead to hyper-competition for “high-impact” publications and in some recent cases, a lack of truth in publishing (Nosek *et al.*, 2012; Sovacool, 2008). Competition also encourages scientists to present data in the most optimistic light, and to include only data that lead to a clean and understandable conclusion. As postdocs, we see and experience these pressures first-hand. The pressure to publish needs to be balanced with incentives for rigorous and honest scientific communication.

However, dishonesty is not the only problem threatening the integrity of academic literature. Part of the scientific endeavor is to provide checks and balances, reproduce results, and highlight when reproducibility fails. However, it is difficult (and unrewarding) to publish the results of replicative experiments or negative data, and there is a worrying trend in the lack of reproducibility in some forms of analysis; this issue was recently highlighted with regard to the widely-used technique of fluorescence-activated cell sorting (Hines *et al.*, 2014). Some journals have made a call specifically for papers reporting negative data, and there are indications that the NIH may be looking to drive more studies testing whether data can be reproduced (Collins & Tabak, 2014).

Hyper-competition can also discourage creative thinking and risk-taking, strong foundations of the scientific endeavor (Alberts *et al.*, 2014). Rather than grant applications for innovative, breakthrough

science, we have observed that hyper-competition results in “safe” applications, driving incremental, slow improvements on existing knowledge (Alberts *et al.*, 2014). It blunts the blade of science, preventing it from piercing through existing ideas and paradigms to expose new frontiers.

Junior scientists must join the debate

A range of problems with the biomedical research system in particular have been the subject of increasing alarm in the scientific community (Alberts *et al.*, 2014; Bourne, 2013a; Bourne, 2013b; Bourne, 2013c). While the focus has mostly been on US academic science, many of the problems are universal. These issues are not just relevant to those inside academia: due to their importance to national competitiveness, they are increasingly featured in the popular media as well (Harris, 2014a; Harris, 2014b; Harris, 2014c; Harris, 2014d).

The public debate surrounding these issues has so far been led by senior members of academia (Alberts *et al.*, 2014). One group that has yet to contribute significantly to the discussion is the largest group of researchers affected: graduate students and postdocs. Boston-area postdocs organized the Future of Research Symposium to raise awareness of the difficulties faced by young scientists and to provide a venue for further discussion and problem-solving during a set of interactive workshops.

We issued a call-to-arms to our peers to announce what we were doing, and to emphasize our view that young researchers should have a say in shaping the future direction of the research endeavor (McDowell *et al.*, 2014a). To achieve our goal of giving a voice to the aspirations of young researchers, we synthesized the current issues that have been identified as obstructing the progress of scientific research into four focus areas: funding for biomedical research, training of the scientific workforce, the structure of the workforce, and incentives and rewards for scientists (McDowell *et al.*, 2014c). Interactive problem-solving workshops honed in on each topic to explore the problems and propose solutions with the aim of formulating a response that we can provide to the larger scientific community. This document is the first to begin disseminating that response to foster and foment further discussion and action. Here we present the problems identified and tentative solutions suggested by participants in the workshops. We then discuss areas identified through ongoing discussions as requiring the most urgent action from young scientists to improve the Future of Research.

“To be creative...emphasize new possibilities by disclosing those hidden episodes of the past when, even if in brief flashes, people showed their ability to resist, to join together, occasionally to win”.

Howard Zinn (Zinn, 2014)

Symposium organization

The Future of Research Symposium was organized by a group of postdoctoral scholars from universities in the Boston area, including Boston University, Harvard University, Harvard Medical School, Tufts University, Brigham and Women's Hospital, the Massachusetts Institute of Technology, Brandeis University, and the Dana Farber Cancer Institute. The symposium was hosted at

Boston University through a partnership with Boston University's Graduate Women in Science and Engineering (GWISE).

Speakers from academia and industry who have led national discussions participated. Henry Bourne opened the symposium with a keynote outlining the changes he thinks must be made to the scientific infrastructure. A panel comprising Sibby Anderson-Thompkins (Director, Office of Postdoctoral Affairs, University of North Carolina at Chapel Hill), Galit Lahav (Associate Professor, Harvard Medical School), Graham Walker (American Cancer Society Professor, HHMI Professor, Massachusetts Institute of Technology), David Glass (Executive Director, Novartis Institutes for Biomedical Research), and Richard Roberts (Chief Scientific Officer, New England Biolabs) summarized weaknesses and potential improvements in the current training system. A second panel comprising Marc Kirschner (John Franklin Enders University Professor of Systems Biology, Harvard Medical School), Michael Teitelbaum (Senior Research Associate, Harvard Law School), Naomi Rosenberg (Dean of the Sackler School of Graduate Biomedical Sciences, Tufts University), and Cynthia Furhmann (Dean of Career & Professional Development in the Graduate School of Biomedical Sciences, University of Massachusetts Medical School) discussed issues pertaining to the scientific workforce and their implications for the future of science in the United States.

While we did not strictly monitor the attendance at the symposium, registration data suggested that the majority of participants were postdocs and graduate students. Of 658 registrants, 344 were postdocs, 140 were graduate students, and the remainder included a mix of professors, instructors, journalists, administrators, research technicians, and research scientists from both academia and industry.

For detailed information on the requirements for preparing a symposium please see: *The Logistics of Organizing the Future of Research Symposium* (Mazzilli et al., 2014).

Participant-led workshops at the Future of Research Symposium

In order to focus the aims of the workshops, participants were invited to complete an anonymous survey of their ideas about how science should be conducted and supported, and the problems they identified with the current system. The results of this survey can be found in Appendices 1A & 1B in [Dataset 1](#).

We considered the results of the survey as indicative of a general dissatisfaction with the current research paradigm, but not necessarily prescriptive of specific and comprehensive solutions. The output of this survey is informative in gauging the general opinion of educated, disciplined, and curious people pursuing science in the US.

Symposium workshops were designed to allow participants to discuss issues identified as obstructing the progress of scientific research as well as to provide opportunities to discuss potential solutions.

Each workshop was overseen by three to four moderators from the organizing committee who provided some background on the

current system and posed the specific objective for each session. The four objectives were to ask:

- How can trainees be better prepared for careers in science in 2014?
- How should the supply of postdocs and graduate students be matched to the demand for jobs in order to create a sustainable workforce?
- How can the funding of academic research be structured to promote desired outcomes such as the discovery of basic knowledge, finding applications of knowledge for the betterment of society, and training the next generation of scientists?
- How can the current system of incentives be fixed so that scientists and institutions are rewarded for the behaviors that are believed to support good science?

Workshops were broken down into two separate 90-minute sessions. The number of participants per topic per session was typically between 20 and 30. Individual participants were asked to write down the perceived problems with the current system on post-it notes and to post them on the wall. Working as a group, participants categorized these individual responses and identified major themes. Participants were then asked to individually write down possible solutions to the identified problems. This was once again done on post-it notes. Solutions were categorized according to the level of implementation, ranging from actions that can be accomplished by individual graduate students and postdocs to those requiring action from society as a whole. If time permitted, participants voted on solutions they found most compelling and discussed the pros and cons of these solutions further. Generally, there was not sufficient time to discuss any potential solutions in depth. We view these sessions primarily as a way to begin debate, not to end it.

The workshops identified a large number of problems and potential solutions, many of which were raised repeatedly, though the immediate topic of conversation varied. In the following sections, we summarize the identified problems and proposed solutions in [Chart 1–Chart 4](#). We also list the identified problems and proposed solutions in more detail, without necessarily endorsing each possible solution, together with a few common themes distilled from each workshop. The raw data for each workshop can be found in [Appendices 2A–D](#).

At the end of each workshop, participants were asked to fill out a short exit survey (full text in [Appendix 3](#); individual comments from each workshop in [Appendices 3A–D](#) in [Dataset 1](#)). The survey was designed to address three objectives; 1) to assess how well the workshop format was working and how it could be improved; 2) to determine whether or not participants felt they had reached a consensus during the workshop, and to gauge the importance participants placed on reaching consensus about these issues; and 3) to solicit specific suggestions they might have about next steps to be taken after the symposium. The results of the survey are summarized in [Appendix 3](#) in [Dataset 1](#).

Training for careers in science in 2014



Chart 1. Summary of the outcomes of the training workshop

The outcome of this workshop highlighted that the current culture of training places heavy emphasis on research and publications, leaving little time for "soft skill" or career development. Postdoctoral "training" is a misnomer: as one participant put it,

"If you're going to call me a trainee, then train me". Rather than force everyone to be trained for the same (academic) career path, institutions should provide opportunities for trainees to acquire skills that are useful in multiple career paths, and PIs should be required to allow trainees access to these training opportunities.

Postdocs were consistently called “the lost people” and “the invisible people”. Postdocs do not yet have a coherent voice, and we must change this. Postdoctoral associations should be advocating for access to training, both in provision and time allowance, in their institutions. The National Postdoctoral Association should have a stronger voice in advocating for postdoctoral training at a national level. Trainees should involve themselves with their learned societies to influence policy. Finally, researchers should be involving the wider public: to describe what can be given to society, to demonstrate their value, and also to highlight the waste of human capital and taxpayer money that goes into funding inadequate training (Chart 1).

Problems identified

Participants identified problems with the current training system in the following key areas (Appendix 2A in Dataset 1):

Culture of academia-focused training: The prevailing view of training focuses heavily on academia, where few scientists can obtain positions. This creates a sense of failure for those leaving academia.

“[Young scientists have the] feeling there is no way to exit [academia] positively”.

Absence of awareness of non-academic job opportunities: Scientists have limited knowledge of careers outside of academia that require scientific training. They are not aware of the kinds of jobs they may be qualified for; the skills these different jobs may require; and how to successfully apply for these jobs.

“[Scientists are] unaware that careers in science exist (outside of academia)”.

PIs are not equipped to advance their mentees’ careers: PIs have little incentive to act as a mentor for a trainee’s career development, and limited training that would make them competent to do so.

“For a lot of mentors, it’s not a priority to engage in your career path”.

Informal training leads to inconsistent training: There is a lack of standardized training for any scientific career, be it academic or non-academic. PIs require multiple skills learned only from experience; current training was described as “spotty” and “overly specialized”. Training standards are highly variable between institutions and research groups.

“Training is not formalized (expected to pick up stuff along the way)”.

Lack of professional skills training: Current training fails to teach skills that can be applied to both academic and non-academic careers, including people management, networking, writing, and presentation skills. Scientists learn to conduct research, but not to manage a research group.

“Lack of “real world” professional skills”.

Little or no training on transitioning to industry: There is a dearth of training about how to transition from academia to industry. There are too few internship programs providing experience in industry.

“You need to know someone in industry to get a job there”.

Proposed solutions

Individual graduate students and postdocs

- Graduate students and postdocs can identify the skills they need to develop (such as via the [my Individual Development Plan \(myIDP\)](#) tool (Fuhrmann *et al.*, n.d.)), then collaborate with each other and with graduate programs and postdoctoral offices to acquire training.
- Postdocs should advocate for themselves, network with each other, and provide mentorship to each other.

PIs and research groups

- We must correct the misconception that all scientists will pursue an academic career.
- PIs should allow time for career development; recent data suggests this will not detract from research productivity (Rybarczyk *et al.*, 2011; Strategic Evaluations, Inc., 2014).

Institutions

- Institutions should make adequate, appropriate training available and insist that PIs allow attendance. “Adequate, appropriate training” should enhance the professional skills that graduate students and postdocs have identified as important for their chosen careers.
- Institutions should develop teaching and industry opportunities.
- Institutions could create networks that allow for past, current and future trainees to communicate about careers.

Funding agencies and the scientific community

- Availability of adequate, appropriate training should be mandated across all institutions.
- Grant incentives should be used to encourage PIs to facilitate adequate training.

Towards a sustainable workforce

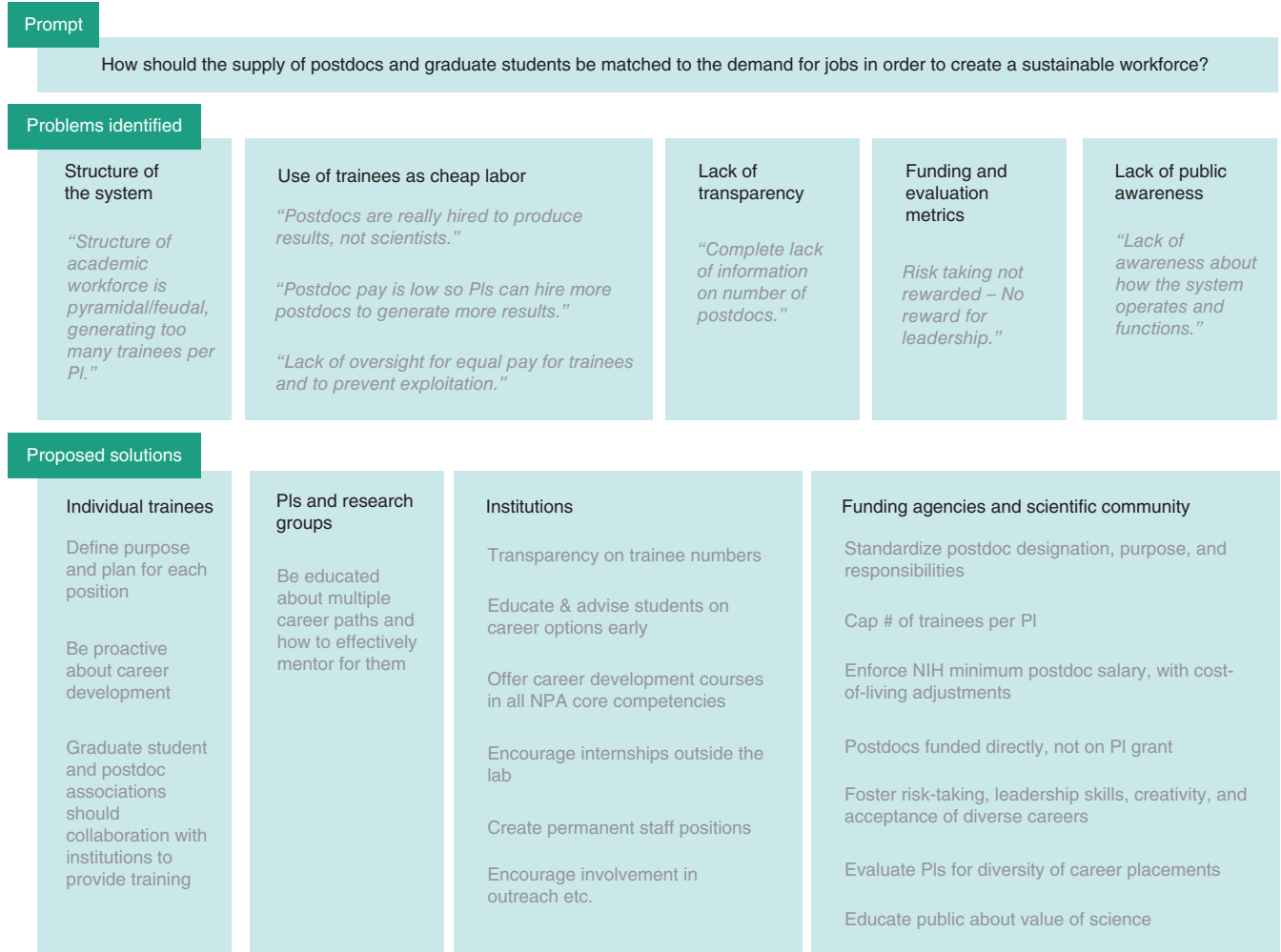


Chart 2. Summary of the outcomes of the workforce workshop.

There is a clear imbalance between the number of young scientists and the number of jobs available in research. This schism has been widening for the past few decades and producing stress on the scientific workforce which, if unaddressed, will result in a decline in the number of productive young scientists. The fundamental structural flaws in the system need to be addressed; otherwise, as we have seen in the past, simply increasing funding will only postpone and worsen the problem.

Young scientists need to be engaged in the debate about these changes and advocate for them. They need to come together in collaboration with institutions and the federal government to enforce and implement these changes with a clear discussion of all possible outcomes of these changes.

Ultimately the scientific enterprise will grow if the workforce supply and demand are balanced in a sustainable and dynamic fashion, with complete transparency. We can build a highly efficient and

productive scientific enterprise if scientists, institutions, governments and industry are all involved and invested in making the necessary changes to the workforce ([Chart 2](#)).

Problems identified

Participants identified problems with the structure of the workforce in the following key areas ([Appendix 2B](#) in [Dataset 1](#)):

Structure of the system: PIs currently train junior scientists (multiple trainees per PI) in their own image, that is, for a career in academia, though only a small minority will obtain tenure-track faculty positions. Most PIs know little about non-academic careers, even though these comprise the majority of future careers for today’s postdocs. These non-faculty careers are often still looked down upon by those in academia. There is little attention given to training for the careers that the majority of junior scientists will eventually pursue.

"Structure of academic workforce is pyramidal/feudal, generating too many trainees per PI".

Use of graduate students and postdocs as cheap labor: Junior scientists are primarily treated as cheap labor rather than as participants in a well-rounded training program that prepares participants for a range of clearly identified career options. Postdocs are conflictingly defined as trainees and employees in different situations, which is made possible by the lack of a standardized designation for postdocs and of a clear definition of their duties and responsibilities. There is also no oversight over the number of graduate students and postdocs and whether that number is appropriate given the perceived job market demand. Additionally, there was consensus that funding postdocs through research grants puts them in a vulnerable position and encourages low postdoc salaries allowing for the use of funds elsewhere.

“Postdocs are really hired to produce results, not scientists”.

“Postdoc pay is low so PIs can hire more postdocs to generate more results”.

“Lack of oversight for equal pay for trainees and to prevent exploitation”.

Lack of transparency: Problems with workforce sustainability are perpetuated by a lack of information and awareness about the situation, particularly amongst incoming graduate students who seek the increasingly rare academic careers that are still treated as the default career choice by many graduate programs.

“Complete lack of information on number of postdocs”.

Funding and evaluation metrics: Current metrics of evaluation, which are based on the number and impact factor of publications, have resulted in a culture of hyper-competitiveness which discourages creativity, co-operation, risk-taking and original thinking.

“Risk taking not rewarded – No reward for leadership”.

Lack of public awareness: Participants also felt a pressing need to make the general public aware of what a scientist really is and what she does, and to more effectively communicate the value of science to the US economy and to humanity as a whole.

“Lack of awareness about how the system operates and functions”

Proposed solutions

Individual graduate students and postdocs

- Each postdoctoral position should have a defined purpose, including a plan for enhancing the professional skills required in that postdoc’s chosen career path.
- Graduate students and postdocs should be proactive about getting career information and carrying out self-evaluation, and discussing these with their mentors. They could also assemble their own career development committee, made up of mentors from various careers of interest.

- Graduate student and postdoc associations should collaborate within and between institutions to provide career information and training.

PIs and research groups

- PIs should be educated about career paths and trends in the biomedical workforce and how to effectively mentor students and postdocs for available jobs.

Institutions

- Institutions should be transparent about the number and funding source of graduate students and postdocs.
- Admission of graduate students could take into consideration their career path and the objective of their training.
- Incoming graduate students should be educated about career options and provided with career development advisors.
- Institutions should offer career development courses in all areas of the National Postdoctoral Association core competencies ([The National Postdoctoral Association Core Competencies Committee, n.d.](#)).
- Permanent staff scientist positions should be created with funding structures that remove the competition between the staff scientist and cheaper postdocs or graduate students.
- Scientists’ involvement in outreach, politics, and entrepreneurship should be encouraged.

Funding agencies and the scientific community

- There should be a standardized designation for all postdocs, irrespective of funding source.
- The purpose and responsibilities of postdocs should be clearly defined.
- Caps should be placed on the number of junior scientists per PI.
- All postdocs should receive at least the NIH minimum salary, with a geographical cost-of-living adjustment ([US Office of Personnel Management, n.d.](#)), and certain basic benefits.
- Funding for postdocs should not be tied to PI research grants.
- The hyper-competitive publish-in-high-impact-journals-or-perish culture should be discouraged and risk-taking, leadership skills and creativity fostered instead.
- As a community, scientists should campaign to educate the public about who scientists are, what they do, and the value of their work.
- Within the academic scientific community, we should foster acceptance of non-academic career path choices.
- PIs should be positively evaluated for diversity of successful career paths taken by their trainees, and not just on the number of trainees that they have placed in research-track careers.

Funding innovation and training



Chart 3. Summary of the outcomes of the funding workshop. Overall, we would characterize the output of this workshop as a call by young researchers for an increase in the efficiency and reproducibility of science by developing new measures of the quality

of research output and of individual researchers' productivity, and incorporating these criteria into the approval of grants. Participants seemed to agree that this approach, along with some of the other recommendations indicated, would more adequately reflect

the priorities of federally-funded science and encourage young researchers to continue careers in basic research (Chart 3).

Problems identified

Participants identified problems with funding in the following key areas (Appendix 2C in Dataset 1):

Funding mechanisms were considered insufficiently diverse:

Many participants were in favor of extending the time scales of awarded grants, and cited a need for alternative mechanisms to workhorse grants like the R01, that might permit research projects with alternative aims and organization. In addition, the NIH grant review cycle was seen as inefficiently slow and too bureaucratic to effectively support innovative work. Participants were frustrated at the way that funding agencies were considered to encourage incremental steps in research, thereby discouraging paradigm shifts. They also expressed concern that current funding mechanisms “kill novel ideas by emphasizing preliminary results”.

“Postdocs should be allowed to apply for grants [directly]”

“Evaluation of grants [is] tied to outdated/improper metrics”

Funding priorities fail to select for long-term productivity:

Congressional and institutional trends heavily influence how research money is distributed, such that too much of the available funding is oriented towards ephemerally popular topics, while mature, yet important, research fields are neglected. Concerns were also raised that recent trends in funding favor applied research at the expense of basic research. These priorities undermine the quality and reproducibility of science that is vital to US interests.

“Funding rewards mainly ‘high impact’ publications, [producing] hypercompetitive and dishonest results”.

“Emphasis on translation and the best ‘new’ idea, not reproducibility”

Grant evaluation processes disadvantage young researchers:

Institutional leanings in funding agencies were perceived as resulting in funds that are highly centralized; with large grants being awarded to large, well-established labs.

“Bigger names/labs get multiple ROIs whereas young/new PIs can’t even get one”.

“Grant success depends maybe too much on previous success; making it much harder for young scientists”

Funding allocation is not subject to post-award review of efficacy:

Participants voiced concerns that the current funding paradigm does not lend itself to quantitative, objective analysis of the productivity or quality of research investments. Name recognition and impact factors were reported as weighing too heavily in single-blind study sections, resulting in funds being allocated unscientifically, with few studies of efficacy or predictors of outcome.

“Poorly audited”

“Money spent inefficiently (lack of negotiation, duplication of equipment)”

Approaches to funding were reported as contributing to problems in training and workforce sustainability:

Participants noted an insufficient level of direct funding support for postdocs and graduate students, such as through training grants. They also indicated that, by focusing on research productivity alone, funding mechanisms fail to select for graduate and postgraduate education that would aid trainees in developing the skills that would contribute to success in academia or other environments. Funding agencies were also seen as contributing to the negative way that non-academic careers are viewed.

“[The] NIH considers non-academic careers a sign of failure”.

“Students/postdocs used for cheap labor”

“Trainees are often viewed as ‘robots’, leading to burn-out/mental health/work-life balance problems”

Grant application and administration processes are problematic:

There was frequent concern regarding the bureaucracy and paperwork involved in applying for and administering grants. Participants characterized the level of effort required to complete auxiliary sections of grant proposals (i.e., outside of specific aims and experimental design) as inefficient, as well as the number of specialized personnel required to submit, review, and administer federal research grants. In addition, several participants found the current peer review system to be insufficiently transparent, and reported that study sections give too little feedback.

“Too much time spent by highest-level scientists writing grants”.

Proposed solutions

Individual scientists and research groups

- Scientists should interact more directly with the public and the government to communicate the benefits of investment in research.

Institutions

- Staff scientists should be supported by grants in order to improve the continuity and accountability of research results within academic labs.
- Core facilities should be developed to reduce the resources and specialized expertise required in each lab, allowing smaller lab sizes.

Funding agencies and the scientific community

- We should analyze basic science funding and outcomes to determine how funding award mechanisms affect science.
- A greater diversity of funding mechanisms serving smaller labs, younger faculty, and even science enthusiasts within the general public, with an emphasis on encouraging shared, collaborative workspace and core facilities, should be developed.
- New metrics evaluating scientific productivity beyond simple impact factor should be established, along with more post-peer-review and scrutiny of results.

Incentivizing good science

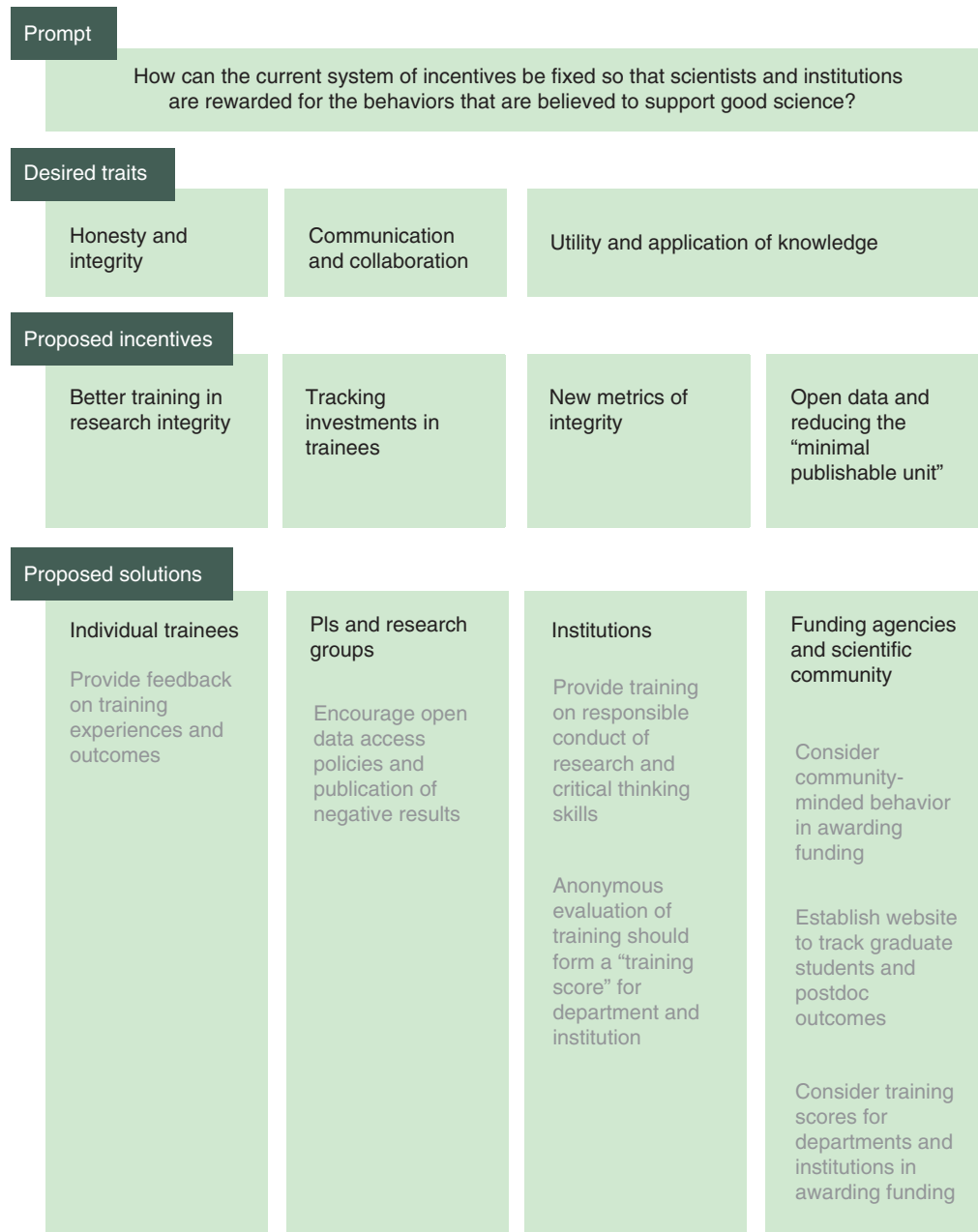


Chart 4. Summary of the outcomes of the incentives workshop.

The output of this workshop was a call by young researchers for incentivization of transparency and honesty in science by developing new metrics and possibly incorporating these criteria into funding mechanisms. In particular, we propose the creation of a website for trainees to anonymously publish feedback on their training experiences and outcomes, ideally using the IDP (Fuhrmann *et al.*, n.d.) as a framework. Trainees might complete an IDP, then later return to the site to report on their progress. Data, aggregated

at the departmental or program level, would form part of a training score for the department and institution. This would permit prospective students and fellows to factor this information into their career decisions, thereby rewarding institutions that place an emphasis on training with improved student and fellow recruitment. Incorporating this score into the grant review process would encourage departments to invest in training. The website could also facilitate publication of institutions' training plans that outlines available career development opportunities. This could encourage the creation of *de facto* universal standards for training (Chart 4).

What we want from scientists and science

Participants identified three major classes of behaviors they wished to see in science (in order of popularity, Appendix 2D in Dataset 1):

Honesty and integrity: Scientists should pursue the discovery of truth with honesty and integrity, and to the best of their ability; and should continue pushing the boundaries of human knowledge and asking new questions.

Communication and collaboration: Scientists should share information and ideas freely, both among the scientific community and outside of it. Transparency, openness, sharing, the free exchange of ideas and open dialogue among scientists were all identified as key attributes.

Utility and application of knowledge: Science should produce useful knowledge that can be applied in beneficial ways, with a responsibility to taxpayers to conduct this research with the greatest efficiency possible.

Participants proposed incentives to encourage the above behaviors:

Better training in research integrity: Responsible conduct of research education should begin early in graduate school, and ethics discussions should be commonplace.

Tracking investments in trainees: Funding agencies should maintain centralized information on trainee outcomes and make these data available to prospective trainees to encourage investment in students' and fellows' education.

New metrics of integrity: While current publication metrics encourage flashy publications, metrics should be created to reward integrity and honesty. These measures could include peer review contributions (whether pre- or post-publication); whether qualitative or quantitative, these could influence grant and job applications.

Open data and reducing the “minimal publishable unit”: Journals could require data uploads prior to publication and raw data access during revision and/or following publication. This would encourage careful record-keeping and unbiased analysis through the scientific process. Furthermore, many results (especially negative and contradictory results) could be published under new models that do not require the time and resource investment of a traditional paper.

Proposed solutions

Individual graduate students and postdocs

- Graduate students and postdocs should be able to anonymously provide feedback on their training experiences and outcomes, ideally using the IDP as a framework.

PIs and research groups

- Open data access policies and publication of negative results should be encouraged.

Institutions

- Adequate training on the responsible conduct of research and critical thinking skills should be provided.
- Anonymous evaluation of available training by graduate students and trainees should be aggregated at the departmental level and used to form part of a training score for the department and institution.

Funding agencies and the scientific community

- Metrics of community-minded behavior (publishing negative results, peer review activity) should be taken into account when awarding grants.
- A website should be established to track graduate student and postdoc outcomes across institutions.
- A training score for departments and institutions should be considered during grant review.

Media response and online discussion

The symposium received a wide variety of feedback and responses during and after the event, from both social media and the press, which continues to foster discussion. There has been significant discussion on twitter ([#FORsymp](#), [@FORsymp](#)), in the popular press ([Johnson, 2014](#)), and in scientific journals (2014). For more on the responses to the Future of Research Symposium see Appendix 4 in [Dataset 1](#).

Dataset 1. Update 1. Dataset of Future of Research Symposium

<http://dx.doi.org/10.5256/f1000research.5878.d41494>

Legends describing each file can be found in the text file provided. Two new files have been added (Appendices 1A and 4), one file has been renamed (Appendix 1 has become Appendix 1B) and one file has been modified (Appendix 3).

Conclusion

The workshops represented an opportunity for junior scientists to come together and discuss problems with the current scientific enterprise, and they produced an abundance of suggested solutions. Given the limited time of the workshops and the varied background of the participants in terms of their perspective on the current system and its challenges, a consensus on specific steps to be taken was not achieved. There were, however, certain common themes that require further discussion; because of the interconnected nature of these issues, effecting change will require a deeper understanding of both the causes of the problems and the effects of the proposed solutions. As a starting point for a larger and longer discussion, we the organizers have distilled three main proposals that can be implemented at all levels, from individual postdocs to institutions such as the NIH.

First, we recommend increased **connectivity** among junior scientists as well as between junior scientists and other segments of the

scientific community. Postdocs and graduate students frequently conduct their research in isolation, as their work is rewarded primarily upon the basis of its novelty and independence, and as they are all competitors for a vanishingly small pool of advanced academic positions. The sense of isolation is particularly strong among postdocs, as many uproot themselves from their professional networks to take positions in geographically distant institutions without an accompanying cohort (such as in graduate school). This isolation precludes awareness of larger institutional issues and makes it more difficult for postdocs to advocate for themselves and bring about positive change. Postdocs and graduate students also must connect with other stakeholders in science so as to participate in the ongoing discussions about changes in training, funding, and other important policy issues. Finally, postdocs and graduate students should come together to define their position as major stakeholders in the research enterprise. While as individuals, junior scientists are temporary, replaceable, and largely anonymous, together they constitute the engine of the academic workforce. As such, they need to take collective action to ensure that their interests are protected as they work to maximize scientific output and efficiency (Cain *et al.*, 2014). Only by bringing all stakeholders together will science be able to effectively grow and adapt to current and future challenges.

Second, we recommend increased **transparency** in trainee numbers and outcomes. Currently, national conversations decrying the “STEM shortage”, as well as a lack of accessible information about the state of the workforce, create skewed perceptions regarding the demand for PhDs among many beginning biomedical graduate students. Students may become aware of the pyramidal structure of the academic workforce only late in their training. To remedy this, the number of graduate students and postdocs at all institutions should be made publicly available, together with information on career outcomes. Collecting and publishing information on career outcomes should be made a condition of an institution receiving NIH funding. Many institutions already collect this information at regular intervals, but lack a centralizing node to distribute it, and to compare the effect of their leadership. These organizations have a moral imperative to share this information; its dissemination will enable informed career and policy decisions. In addition, former students and postdocs should have a forum in which to anonymously report the outcomes of their training and subsequent career moves. Furthermore, there is a significant need to better define the role and purpose of the postdoc position. We advocate for transparency in terms of defining expectations of the balance between employment and training in individual postdoc appointments.

Finally, we call for increased **investment** in postdocs through financial independence from PI research grants and increased accountability for the quality of postdoc training. Currently, many postdocs have little power to freely pursue creative research directions and individual professional development plans, or to negotiate for necessary employment benefits. We propose two possible mechanisms for increasing postdoc autonomy. First, postdocs should not be supported by research grants, but rather exclusively by individual training fellowships. With this increased intellectual

independence, postdocs would be allowed to pursue projects of mutual interest to themselves and their mentors. This creates a much-needed line between staff scientists and technicians, who may be paid and directed by research grants, and postdoctoral scholars, who should be focused on training and development. Second, the institutions employing, and the agencies funding, postdocs should seek increased accountability for their training through direct postdoc feedback to the funding agency. These reports of training experience and support given by PIs, departments, and institutions should be used in evaluating grants for award and renewal. Furthermore, some of this information, properly anonymized and aggregated, could be used to create a publicly accessible “training score” for departments; this metric would incentivize excellence in mentoring to maintain competitiveness in recruitment of young, talented scientists.

As the source of future scientific leadership, postdocs and graduate students are uniquely placed to influence the direction and culture of the research enterprise. To be most effective, however, we must educate ourselves about the prevailing conditions affecting the workforce and sustainability of research, and their historical and institutional bases. The voices of junior researchers must command a greater audience in the present discussion; additionally, as we take our places as the next generation of independent academic scientists, we can influence the culture, efficiency, and integrity of research from within. From both the attendance at the symposium and the ongoing coverage of the event and issues discussed, it is clear that junior scientists are invested in and passionate about these issues. We all must now rise to the challenge of taking action to build a sustainable, productive, and equitable scientific community.

Data availability

F1000Research: Dataset 1. Update 1. Dataset of Future of Research Symposium, [10.5256/f1000research.5878.d41494](https://doi.org/10.5256/f1000research.5878.d41494) (McDowell *et al.*, 2014d).

Author contributions

All authors were involved in the preparation and revision of the manuscript and have agreed to the final content.

Competing interests

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INTERORGANIZATIONAL FORMAL MENTORING: BREAKING THE CONCRETE CEILING SOMETIMES REQUIRES SUPPORT FROM THE OUTSIDE

**AUDREY J. MURRELL, STACY BLAKE-BEARD, DAVID
M. PORTER JR., AND ADDIE PERKINS-WILLIAMSON**

Our research explores the idea that formal mentoring relationships that cut across traditional organizational boundaries may facilitate positive interactions among an increasingly diverse workforce. We present interview, Web-survey, and focus-group data across an eight-month period from a pilot test of an interorganizational formal mentoring (IOFM) program sponsored by the Executive Leadership Council (ELC). Results indicate that IOFM provides valuable access to mentoring relationships that include trust and psychosocial support, access to legitimate organizational power, and the sharing of social capital across traditional organizational boundaries. The benefits and challenges of this approach to mentoring and diversity are examined. © 2008 Wiley Periodicals, Inc.

While modern organizations are more diverse today than three decades ago (Bell, 2007; Cox & Blake, 1991; Thomas & Ely, 1996), leaders continue to grapple with how to support and enable relationships among people who are engaged in a common enterprise but “who do not share a common history or culture” (Caproni, 2005, p. 269). While lower ranks within the organization may be used as examples of effective human resource policies and programs for enhancing diversity, a lack of diversity exists within senior leadership in most organizations that has been attributed, in part, to systemic barriers facing underrepresented demo-

graphic groups, including women and people of color (Eagly & Carli, 2007). A key human resource strategy that has been suggested as a catalyst for addressing barriers to advancement and developing more diverse leadership is formal mentoring (Hardy, 1998; Tyler, 2007). In this article, the concept of interorganizational formal mentoring (IOFM) is introduced as a valuable tool for the leadership development of people of color within organizations as they attempt to break through into top levels within their organizations. Before focusing explicitly on the experiences of African Americans, it is instructive to explore the diversity context that influences the empirical work presented here.

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Setting the Diversity Context

While diversity in workforce participation is increasing, a glass ceiling still effectively keeps the top levels absent of the same diversity that exists throughout the middle and lower levels of organizations (Cotter, Hermsen, Ovadia, & Vanneman, 2001; Federal Glass Ceiling Commission, 1995a). The glass ceiling has been defined as an “unseen, yet unbreachable barrier that keeps minorities and women from rising to the upper rungs of the corporate ladder, regardless of

their qualifications or achievements” (Federal Glass Ceiling Commission, 1995b, p. 4). The glass ceiling has been recast as the concrete ceiling for African Americans (Hayes, 2006; Thomas & Gabarro, 1999), the adobe ceiling for Hispanics (Blancero & Del-Campo, 2005; Foley, Kidder, & Powell, 2002), and the bamboo ceiling for Asians (Curry, 2006; Hyun, 2005) to reflect the unique barriers facing people of color.

Work by Thomas (Thomas & Alderfer, 1989; Thomas & Gabarro, 1999) illustrates the power of mentoring in helping people of color (in their work, specifically African Americans) “break through” to senior levels

within the organization. Thus, understanding the intersection of diversity and mentoring may outline a process for changing the dynamics of power and break down the barriers that keep people of color from attaining leadership positions within organizations. In addition, Thomas’s research (1989, 1993) makes clear that the nature and outcomes of interracial dynamics embedded within the organization’s culture can provide revealing information about the state of racial affairs within the firm. In fact, some argue that people of color may act as a miner’s canary—an indicator of conditions that are challenging not only for numerical minorities but also for majority groups in that same organization (Guinier & Torres, 2002). The presence of dissatisfaction, frus-

tration, and high turnover among people of color is perhaps a precursor to future problems that will be experienced by majority group members if the issues facing these more vulnerable groups are not resolved. Thus, the impact of mentoring on diversity in organizations is important to understand because it may provide a mechanism for altering interracial dynamics in the workplace and increasing the overall health and strength of the organization.

Diversity and Mentoring Relationships

Mentoring has gained attention as a powerful tool to enable the careers of those advancing through the ranks in organizations (Blake-Beard, Murrell, & Thomas, 2007; Dreher & Ash, 1990; Murrell, Crosby, & Ely, 1999; Thomas & Gabarro, 1999). A mentor is generally defined as a more senior individual who uses his or her influence and experience to help with the advancement of a mentee (Kram, 1983). Those with access to mentoring have been consistently shown to benefit from their involvement in these relationships; they report higher salaries, increased promotion rates, greater career satisfaction, higher organizational commitment, and less intention to leave the organization as well as lower levels of turnover (Blake-Beard, 1999; Crosby, 1999; Dreher & Cox, 1996; O’Neill, 2002; Ragins, 1999; Wanberg, Welsh, & Hezlett, 2003).

However, the picture becomes more complicated when exploring people of color’s ability to develop mentoring relationships with mentors who share the same racial group (or racial identity group) membership. Gaining access to mentors of the same race may be difficult for people of color because of their low numbers within higher levels in the organization (Catalyst, 1996; Sims, 2002). Thomas (1990, 1993) found that when mentoring relationships were present, white males predominated as mentors for white females, black males, and black females. The presence of white males in leadership positions is such that they are the primary group poised and positioned to act as

A mentor is generally defined as a more senior individual who uses his or her influence and experience to help with the advancement of a mentee.

mentors. Dreher and Cox posit that “a significant part of the influence differential between White men and mentors of other genders or racial groups derives from differences in legitimate power that is embedded in organizational position” (Dreher & Cox, 1996, p. 298). In order for mentees of color to gain access to mentors of color, they have to go outside of their own department/unit (Thomas, 1990) and these were frequently informal relationships that provided primarily psychosocial support.

Thus, gaining access to individuals who provide career-focused mentoring functions means that people of color are thrust into interracial dynamics embedded within the organization to a greater degree than whites (Sims, 2002; Thomas, 1990). Access to mentors of the same race is not as available to people of color within the organization without crossing additional boundaries such as level, location, or function, or seeking these relationships outside of their own organization. With little formal support or legitimacy, there is an additional burden, or what Blake-Beard, Murrell, and Thomas (2007) call a “mentoring tax,” on these developmental relationships that is a function of dimensions of diversity such as race.

Access to people who share the same race may be important for building trust, but access to people in leadership positions is equally important given the power dynamics of a mentoring relationship. As Thomas (1989, p. 284) writes, “The power imbalance is reinforced, as blacks tread lightly, carefully, and Whites go comfortably about their business. The powerful can choose what to ignore.” These findings highlight power dynamics and axes of privilege that benefit whites, often at the expense of people of color within organizations (Corsun & Costen, 2001). As Ragins notes, the powerful seek to preserve their power “and may do so by supporting policies, practices, and prescriptions that exclude other groups” (Ragins, 1995, p. 97). Thus, formal mentoring relationships must not simply be about matching individuals across diverse boundaries (e.g., race, ethnicity, gender); they must also be about creating access to power and the development of

trust among those who traditionally have been excluded from the knowledge and resources that will support their success and the success of the organization.

While diverse mentoring relationships within a single organization may have many advantages that are critical for individual and organizational outcomes, the reality is that these relationships are complex, more likely to produce conflict, and may not meet all of the needs of people of color within organizations, particularly those seeking to “break through” to senior-level leadership positions (Thomas & Gabarro, 1999). This statement is based on the wide variety of empirical and theoretical work that shows race, as one aspect of diversity, to be embedded within the organizational context (Alderfer & Thomas, 1988), a consistent driver of work attitudes and outcomes (Murrell & Hayes-James, 2001), and a moderator of the return on investment employees received from training and other developmental activities (Hayes-James, 2000). Thus, attention should be devoted to how the experience of mentoring relationships shapes our ability to develop a diverse cadre of managers who create meaningful change and cultivate diversity both across and within organizations.

We argue that interorganizational formal mentoring can be one powerful tool for enhancing diversity, strengthening the pipeline of diverse leadership, and providing people of color access to both career and psychosocial support that may not be afforded by traditional formal mentoring efforts within a single organization. The case advanced here for IOFM is quite consistent with Ragins’s (1997) notion of “diversified mentoring relationships.” Using the lens of power dynamics within organizations, Ragins suggests that there is an inextricable link between mentoring and diversity. She writes that “micro-theories for each marginalized group ignore the

Access to people who share the same race may be important for building trust, but access to people in leadership positions is equally important given the power dynamics of a mentoring relationship.

implications of multiple group membership, and take a limited piecemeal perspective toward explaining diversity in mentoring relationships" (p. 483). Ragins's notion of the diversified mentoring relationship raises the critical issue of power dynamics and the role they play in shaping mentoring relationships within traditional formal organization-based programs. In this study, we examine IOFM as one strategy for organizations seeking to increase diversity within leadership ranks in their organizations.

Interorganizational Formal Mentoring

...establishing formal mentoring programs or opportunities that give individuals legitimate access to power and social capital is a key benefit of interorganizational formal mentoring.

The primary goal of this article is to validate the use of interorganizational formal mentoring and the contribution it may make for professional development among people of color and for the enhancement of diversity and leadership development within organizations. We define IOFM as *formal mentoring activities, programs, or experiences that cut across traditional organizational boundaries and target the unique developmental needs of a specific stakeholder or identity group.*

The notion of IOFM and its ties to diversity are quite consistent with recent conceptual work of Higgins and Kram (2001) and their construct of "mentoring

constellations." Regardless of whether one considers mentoring relationships that are primary or secondary, single or multiple, hierarchical or peer, the importance of IOFM as part of the mentoring constellation is that it may provide a dual benefit; individuals can have mentoring relationships that provide access to individuals in positions of power *and* who share an affinity based on key social identity groups. This latter point is supported by Friedman's work on affinity or social network groups and race. He shows that the strength of ties among African Americans that extend *outside* of their current organization has a positive impact on careers

and work attitudes *inside* of their current organization (Friedman, 1996; Friedman, Kane, & Cornfield, 1998).

Further, IOFM provide the ability for people of color to cultivate valuable "social capital" that may not be developed within a traditional organization-specific formal program. As Raider and Burt (1996) write, social capital is "generally important, but more important for people at the social frontier—people at the interface of different social worlds" (p. 189). In fact, Burt and his colleagues would argue that IOFM gives people of color the ability to span "structural holes," an ability that already has been shown to drive positive career outcomes for majority individuals within organizations (Burt, 1992). Thus, establishing formal mentoring programs or opportunities that give individuals legitimate access to power and social capital is a key benefit of interorganizational formal mentoring.

While some would argue that mentoring relationships that cut across organizations are more effective if these relationships are informal rather than formal (e.g., Raabe & Beehr, 2003), there can and should be a rethinking of this assumption. A key aspect of the conceptualization of IOFM is the *legitimacy* that is provided by formal mentoring relationships that extend outside the boundaries of the traditional organization. Burt's work on social networks is relevant to this supposition (Burt, 1992). For example, he argues that women are unable to duplicate the networks of men because they lack legitimacy within the organization. In order to be successful, women need to effectively "borrow" the social network of a male sponsor who is influential in the organization. This borrowing of social power makes other organizational members recognize someone (e.g., a woman) that they are dealing with is legitimate because he/she is being treated as a proxy source of organizational power. Burt's research found that women who are connected to the social network of their male manager were promoted more quickly than women who attempted to develop their own networks (Burt, 1998). In fact, "borrowing" or leveraging the social capital of an influen-

tial white male sponsor was also an effective strategy for African Americans who broke through to senior levels within organizations, according to work by Thomas and Gabarro (1999).

Furthermore, IOFM is a developmental process akin to other dimensions of mentoring relationships that have been studied previously. For example, Scandura and Schriesheim (1994) define supervisory career mentoring (SCM) as “a transformational career activity involving a mutual commitment by mentor and mentee to the latter’s long-term development, as a personal, extra-organizational investment in the mentee by the mentor, accomplished by the sharing of values, knowledge, experience and so forth” (p. 1589). However, the traditional SCM relationship does not take into account the need for managers of color to connect on issues of values and experiences that are context-bound and related to issues of race, ethnicity, gender, or other dimensions of diversity. Nor does the traditional view of SCM provide a response to Burt’s claim that individuals who traditionally are left out of the power circles within organizations need to “borrow” social capital to facilitate their own career success. While a number of these programs exist to develop and support various target groups (e.g., women, African Americans, Latinos, engineers, MBAs, etc.), we focus on one particular program as a model for the potential of IOFM to increase the pipeline of future managers and leaders of color in organizations.

This study utilizes a longitudinal, multi-method study of a pilot formal mentoring program sponsored by the Executive Leadership Council (ELC) to show how interorganizational formal mentoring may provide valuable access to mentoring relationships that include trust and psychosocial support, access to legitimate organizational power, critical connections to social identity-relevant role models, and the sharing of social capital across traditional organizational boundaries. Results are synthesized from a review of interview, survey, and focus-group data collected over an eight-month period that explores the experience mentees within the ELC program have with career and psy-

chosocial mentoring functions through this IOFM program. To add to the understanding of the importance of formal mentoring for the development of African American leadership, the potential impact of IOFM is examined by asking several descriptive research questions:

1. Is there an exchange of career and psychosocial mentoring functions within IOFM relationships?
2. What is the relevant frequency of career versus psychosocial mentoring functions within IOFM mentoring relationships?
3. What are the different types of advice and knowledge shared across IOFM relationships?

A core focus of the ELC programs and mission is for every ELC member to help others establish career goals and to develop the necessary skills to reach top levels within corporations as a deliberate strategy for increasing the diversity of organizations.

Methods

Research Setting

The Executive Leadership Council is an independent, nonpartisan, nonprofit corporation that was founded in 1986 by a group of 19 African-American corporate executives. The ELC has more than 340 members, one-third of them are women. Individuals who qualify for membership should be within three levels to the CEO and the focus is on U.S.-based companies and multinational organizations. A core focus of the ELC programs and mission is for every ELC member to help others establish career goals and to develop the necessary skills to reach top levels within corporations as a deliberate strategy for increasing the diversity of organizations. As part of this focus, the role of mentoring has been inextricably linked to accomplishing these diversity goals.

The ELC Interorganizational Formal Mentoring Program

One central aspect of ELC’s mentoring activities is the inclusion of an interorganiza-

tional formal mentoring program. For our study, this effort included three half-day training sessions on three dimensions of mentoring relationships: fundamentals of effective mentoring, peer mentoring, and becoming an effective mentor. Each session presented current research and practice in the relevant area of formal mentoring, as well as exercises that helped participants apply this knowledge. All sessions were facilitated by research-oriented, university-level faculty and were an integral part of the overall curriculum that focused on leadership development among African American managers.

A key goal of the matching process was to provide each mentee with a mentor who had expertise or experience within the function, industry, or level of his/her desired professional goal or aspiration.

A total of 30 participants were recruited from both member and nonmember companies and included managers in private, public, and non-profit organizations; however, most participants (95%) worked in the private sector.

In addition to the curriculum content, each participant was matched with a senior-level African American manager from a different organization. All mentors recruited were ELC members, and the matching process focused on key information provided by the mentees during the program application process. Criteria used for the matching process included three categories: career factors (industry, function), personal factors (gender, marital status, age), and geographic region.

A key goal of the matching process was to provide each mentee with a mentor who had expertise or experience within the function, industry, or level of his/her desired professional goal or aspiration.

Data Collection

The methodological approach utilized a multimethod, longitudinal design. Data were collected via phone interviews, a Web-based survey, and in-person focus groups across an eight-month period. All data collection involved participants within the ELC formal

mentoring program. As part of the structure of the program, mentees were asked to attend all sessions, while the mentors were present only during initial matching, which occurred during session one. The first follow-up took place three months after the initial contact between the mentor-mentee pairs. A faculty coach was assigned to each pair and conducted an hourlong telephone interview with each mentor and mentee. The focus of this initial contact was to determine the status of the relationship and frequency of contact since our initial workshop and to conduct an initial assessment of the types of activities and interaction taking place within the relationship. Interview questions were taken from previous measures of mentoring contact and functions developed by Ragins and McFarlin (1990) and Thomas (1999).

The second follow-up involved telephone contact with each mentee within each of the pairs. Mentees were asked to complete a Web-based survey to examine the nature of their mentoring experience since the first follow-up. Several questions from the initial check-in were repeated to allow an assessment of the change in relationships over time.

The third follow-up involved face-to-face, small focus-group (four or five people) interviews with a majority of the mentees. A set of questions was developed that addressed their overall evaluation of the mentoring experience, as well as their feedback on the structure, design, and execution of the formal mentoring program. Some similarity in questions from the first two interviews was included to allow for comparisons to be made over time.

Measures

Study measures focused on the mentoring experience from the perspective of the program participant or the mentee.¹ Questions included how frequently they interacted with their mentoring partner and how satisfied they were with the mentoring experience. Several items also examined the specific type of advice or information that was being shared between the mentoring pairs.

These questions were used during both the interviews (first follow-up) and the Web survey (second follow-up) and utilized items from the mentoring scale developed by Ragins and McFarlin (1990). These items used a 1 to 5 scale (disagree to agree); specific items are provided in Table I. Focus-group items (third follow-up) consisted of a series of open-ended questions on the overall experience of the IOFM program and were developed by the researchers. A few items from the earlier data-collection points (e.g., overall effectiveness of the mentoring experi-

ence) were repeated during the focus groups for comparison purposes.

Results

The study data consists of both qualitative and quantitative information provided by the participants across the three distinct phases of data collection. While a number of different research questions can be examined with these data, the presentation of results herein will focus on some of the key factors within each of the mentor-mentee pairs and

TABLE I Architecture for Intangibles

Question: In your contact with your mentoring partner, please tell me how often you have engaged in the following activities:	First Follow-Up (% who said sometimes/often)	Second Follow-Up (% who said sometimes/often)
<p>Career Factors:</p> <ul style="list-style-type: none"> • Shared knowledge about organizations, their culture, and politics and how to be effective? • Talked about strategies to solve work-related problems, conflicts, or concerns? • Discussed ways to enhance their visibility within the organization or the professional networks? • Collaborated on a common project or work-related activities? • Shared technical assistance, expertise, or financial resources as part of collaboration on a project? • Discussed specific information about performance review or formal feedback given to you? 	<p style="text-align: center;">81%</p> <p style="text-align: center;">84%</p> <p style="text-align: center;">75%</p> <p style="text-align: center;">16%</p> <p style="text-align: center;">27%</p> <p style="text-align: center;">54%</p>	<p style="text-align: center;">94%</p> <p style="text-align: center;">100%</p> <p style="text-align: center;">88%</p> <p style="text-align: center;">24%</p> <p style="text-align: center;">41%</p> <p style="text-align: center;">76%</p>
<p>Personal Factors:</p> <ul style="list-style-type: none"> • Talked about your own personal experiences related to career or life success and satisfaction? • Shared personal stories about family or non-work-related interests or problems? • Shared personal interests, leisure activities, or hobbies outside of the work context? 	<p style="text-align: center;">86%</p> <p style="text-align: center;">76%</p> <p style="text-align: center;">59%</p>	<p style="text-align: center;">94%</p> <p style="text-align: center;">76%</p> <p style="text-align: center;">83%</p>
<p>Identity-Based Factors:</p> <ul style="list-style-type: none"> • Shared knowledge about the importance of race and how to be effective as a person of color? • Provided networking opportunities with other people within ELC? • Provided networking opportunities with other people outside of ELC? • Provided networking opportunities with other people inside your own organization? • Contacted one of the faculty or staff from the ELC program for advice and/or assistance? 	<p style="text-align: center;">67%</p> <p style="text-align: center;">17%</p> <p style="text-align: center;">19%</p> <p style="text-align: center;">11%</p> <p style="text-align: center;">5%</p>	<p style="text-align: center;">83%</p> <p style="text-align: center;">19%</p> <p style="text-align: center;">18%</p> <p style="text-align: center;">19%</p> <p style="text-align: center;">6%</p>

how these relationships develop and change over time. First, the data from each follow-up is reviewed. The study concludes with some overall findings and a discussion of implications for both research and practice.

First Follow-Up

A total of 37 interviews from the 41 participants were completed during the first follow-up (90%). During this initial phase of the mentoring relationship, most participants reported having “occasional or frequent” (78%) interaction. This interaction typically occurred via telephone (43%) or some combination of telephone and e-mail (49%). The majority of our mentoring pairs tended to focus their initial interactions on career-related activities, particularly developmental action plans (56%). In addition, the overall level of satisfaction within this initial phase was quite high. A majority of participants (81%) reported that their relationship was either “effective” or “very effective.”

The majority of our mentoring pairs tended to focus their initial interactions on career-related activities, particularly developmental action plans (56%).

Both mentors and mentees responded to a series of questions on the types of activities and/or information they shared during their contact. These data are summarized in Table I. This initial phase of the mentoring

experience involved a fair amount of attention to sharing career-focused experience. Activities that involved sharing advice on career success, knowledge about organizational dynamics and politics, and how to solve workplace problems or conflicts were among the most frequently reported activities during this initial phase (see Table I). Some of the pairs also reported talking about personal issues such as family or non-work-related interests and problems, but these activities occurred less frequently among the pairs during this early stage of relationship cultivation.

A number of open-ended questions were included to further explore the overall

impressions of the dynamics of the mentoring relationship during this initial phase. Examination of these qualitative data revealed three general themes. The first theme noted was the importance of the matching or the fit between mentors and mentees. As one mentor commented:

A lot of whether or not a pair is going to make it is dependent on how they engage one another, how they click. I think the program did a nice job setting people up. I wonder what might happen if even more attention was placed on the match. My protégé and I have a lot of interesting things in common with one another—so it is fairly easy for us to have conversations with one another. But I’d be curious to see how this plays out across our whole cohort.

The second theme reflected the challenges surrounding relationship cultivation, such as the need to allocate time and effort for mentoring to be effective during this early stage. For example, one of the mentors provided the following insight:

Really time for me to initiate and reach out to my mentee. When my mentee has reached out to me, I have been very responsive. So I’ve had to become more conscious about putting our time on my calendar. In fact, if I am being accurate, it isn’t time. It is around scheduling and how is it that I schedule in time with my mentee in the same way that I do other important things. We intended to talk and then the time got away from us. What my mentee and I had to do was put a stake in the ground around this relationship.

This theme was most frequently echoed by comments about the commitment needed in order to effectively build the relationship such as “Making the time to talk (Holidays were tough). Failure to document past conversations means that we often lose where we are.” Another participant indicated, “Establishing focus and task to work

on with roadmap. Knowing when we have achieved goals and when to change or terminate relationship.”

Frequently, the issue of balancing the mentoring relationship with other work demands was identified, as seen in one mentee’s comment:

Just the natural challenge of two busy people trying to schedule time. This is a standing challenge. We try to use alternative ways to communicate and to brief when we are working together. We’ve also been trying to meet face to face once a month. In addition to the face-to-face meetings, we use frequent e-mail and phone calls to touch bases with one another quickly.

Similarly, one of the mentees discussed challenges facing him in developing the mentoring relationship. He reflected:

Initially it was schedule of the mentor. I did the follow-through after the initial workshop. I never got a response—logistical problems in connecting. After making some contact, we have not had consistency in contact. We did get things accomplished when we were able to connect mostly via telephone. A key obstacle has been conflict in schedules, mentor’s accessibility, and protégé getting a new position. We have made some commitments to stay on a bi-weekly schedule.

Related to the challenges during the relationship cultivation phase, several specific comments reflected the need to have face-to-face interaction between the mentor and mentee. This category involved comments that most often reflected how important that face-to-face interaction was seen for building open communication and trust during this early phase of the mentoring relationship. For example, one of the participants commented:

Would love to have more face to face.
We talk frequently via telephone and e-

mail. Face to face is important in building a relationship. We have developed a friendship. It would be enhanced by having more personal and social contact.

The use of electronic methods of communication was seen as being useful, but limited. For example, one mentee noted that it was “difficult to stay connected. Being able to spend time face to face is better; e-mail and telephone are not as good.” The limits of electronic communication, especially during the early phase of the relationship, were reflected by another comment:

*The use of
electronic methods
of communication
was seen as being
useful, but limited.*

Comfort level is both an obstacle and a challenge. Time is another issue. Distance is also a barrier. I am a totally touchy-feely person. I like looking at someone, feeling that person because this is where I get my comfort with them. I do better when I can socialize. When we do phone calls, it is just about what are we supposed to be talking about. Sometimes I just want to chitchat. If we could do some of our meetings face to face, that would help.

Several comments focused on personal challenges in cultivating mentoring relationships, though they were mentioned less frequently. For example, some participants reflected on their own personal growth and development as they tried to meet the demands of cultivating a new relationship. This sentiment was most frequent among mentees, as one person commented:

Well, I really started navigating on my own and I really didn’t touch base with my mentor for the first 6–8 weeks. Then we did talk and I caught him up on all that I was doing. My mentor said, “Hey, why didn’t you call me earlier? I could have offered some advice and guidance.” I guess. I am a little

cynical and skeptical—just because people say they mean you well, that is not always the case. And I also didn't want to bother him. But his response was that "Hey, I can really help." I think I discounted how engaged he would be.

Another mentee shared the following:

During the training that we had, one of the topics that was discussed was introverts vs. extroverts. I am an introvert. So when I first meet people, I can be reserved unless I get good vibes. I need to open up more—this will help me get more from relationships. I also need to

reduce the amount of intimidation that I feel. I know we've been told that this is a mentoring relationship and we should get the most from it. But you don't want to harass the other person. So I don't want to overstep the boundaries.

There was a great

deal of similarity in

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the early phase

compared to the

middle phase.

Second Follow-Up

A total of 18 of the possible 21 mentees (86%) completed the Web survey during our second follow-up. This follow-up occurred at the halfway point during the formal mentoring program. A majority of participants still reported interacting occa-

sionally or frequently (81%). However, the percentage of those responding that they had "frequent" interaction with their mentors declined compared to our observations during the initial phase. Participants were still quite positive in terms of the overall effectiveness of the mentoring experience. Most of the mentees felt that their mentoring relationship was either effective or very effective (65%) during the subsequent cultivation phase.

There was a great deal of similarity in the types of activities and information sharing between the pairs in the early phase compared to the middle phase. During both peri-

ods, a great deal of time was spent in sharing career-related advice. As during the initial contact with the mentoring pairs, issues such as knowledge about organizational politics, solving work-related problems or conflicts, and sharing career advice were frequently reported. However, during this later period in the relationship, the mentees reported more activities involving specific support on performance feedback, technical assistance or collaboration on work projects, and support to enhance their visibility within professional networks. These types of activities reflect that greater trust and disclosure of personal issues (e.g., performance review, specific work projects) were taking place in the relationship (see Table I).

While some discussion surrounding issues of race and how to be effective as a person of color in the organization was reported during our initial follow-up, the frequency of this activity increased during the second point of contact. This increase is perhaps further evidence of a shift or expansion of focus among the mentoring pairs into more difficult, personal, or challenging areas that they have in common as part of the same demographic group (in this case, as African Americans). Sharing race-related information was the one dimension of these identity-related activities that showed an increase between our first and second contacts (see Table I).

In an examination of the open-ended responses, information was gained about several of the key factors that mentees felt were most beneficial about their mentoring experience. Most of the respondents discussed key characteristics of the mentor. These qualities included technical or functional knowledge. For example, one of the mentees commented, "Mentor's background and current line of business has helped in my personal development and has enabled me to work through issues at work." However, more frequently, the qualities that mentees reflected as being important for the mentoring relationship were interpersonal and psychosocial in nature. For example, "Honest feedback, good relationship, lots of areas to relate; good listening and honest feedback."

Another participant reported that an effective mentor has “[b]rutal honesty that challenges our thinking and rationale so as to contemplate all possibilities—not just one.”

In addition, the theme of a “fit” or match between the mentor and the mentee was reflected in the comments received during this second phase. However, rather than a match in terms of functional area or expertise that was present during Wave 1, these later comments focused more on the interpersonal fit or the match between the mentor and the mentee. For example, when asked about the strengths of the relationship with her mentor, one participant commented, “Interest, caring, and concern. We have a good feel for each other. My mentor is definitely someone whose perspectives I value a lot.” On this occasion, this fit was articulated as a complementary relationship with a mentor who is similar to the mentee on key dimensions, such as age and personal disposition.

As in the first follow-up, issues such as scheduling time for contact, having a regularly scheduled time for connecting (e.g., regular conference calls), and taking advantage of work-related travel that puts them in close proximity to the partner were prominent. For example, one participant shared that the major challenges facing him in building his relationship with his mentor is “Making the time to keep connected; due to physical locations/distance, all communications have been via phone or e-mail.” Another participant told us, “Scheduling and sticking to the assigned meeting times can be a challenge but the great thing is we always try to make time.” One other participant highlighted similar challenges with their mentor, identifying time restraints, personal transitions, and keeping the relationship fresh when there is not a crisis.

Clearly, issues of contact and overall effectiveness were among the frequently mentioned themes in both the first and second follow-up periods. To further examine the differences in mentoring relationships between the first and second follow-up, correlations between the frequency of contact reported and the overall perceived effectiveness of the mentoring relationships were ex-

amined. Frequency of contact and perceived effectiveness are more highly correlated in the later cultivation phase ($r = .733$) than in the early cultivation phase ($r = .236$). This higher association may reflect learning between the mentoring pairs on the importance of taking time to connect and cultivate the relationships. While frequency of initial contact was not significantly correlated to perceived effectiveness during the later mentoring phase ($r = -.250$), the perceived effectiveness reported in the early phase was significantly correlated with frequency of contact later on ($r = .564$). This finding suggests that some initial perceived success may be a strong motivator for the establishment and maintenance of the mentoring relationship. In fact, this initial success may be more important than the absolute amount of contact during the initial phase of the relationship.

Third Follow-Up

A total of 18 of the possible 21 mentees (86%) attended the final session, which took place as part of a closing face-to-face workshop. For this final session, small focus groups (four or five people in each) of all mentees who participated in the formal mentoring program were conducted. A number of the questions that were asked from the first and second follow-ups were included to help compare the change that had taken place over the year-long program. This final follow-up session focused on suggestions from the mentees on how to improve the mentoring experience with the senior mentor and how it differed from other formal mentoring relationships they experienced.

Based on responses across the focus-group discussion, several themes emerged. First, on the issue of advantages, mentees’ responses could be grouped into one core theme that had several important dimensions: *validation*. In general, mentees talked about the key benefit of the IOFM program

Clearly, issues of contact and overall effectiveness were among the frequently mentioned themes in both the first and second follow-up periods.

as providing validation by a more experienced mentor who helped them to both examine and in many cases confirm their perspectives, or aspirations, with an unbiased view that was, as one participant told us, “biased by the corporate culture.” This access to senior African American executives to whom they would not have been connected otherwise was a critical resource for confirmation and validation among these future corporate leaders. The notion of having a relationship external to the firm provided a safety net for sharing of problems and concerns on both

The overall perception of the mentoring experience among mentees (and mentors) was quite positive and remained positive across the yearlong program.

the professional and personal dimensions. One participant commented, “It can be a safe haven—because they have no skin in the game.”

The advantage of validation was also reflected in issues of trust, honesty, and shared experience. Mentees frequently commented that being able to access advice on work-related problems or conflicts with someone outside of their organizations whom they could trust to provide a nonthreatening and safe discussion was an important benefit. One individual commented that the IOFM relationship provided a “safe place to have an unbiased discussion about corporate culture” for African Americans. One partici-

participant commented that it was a strength of his IOFM relationship to have access to a mentor who “is only interested in your success and benefit”—that is, a mentor who has no hidden agenda in terms of the internal politics of the organization.

Frequent comments about the advantages of the IOFM experience included “unbiased perspective” or “checking and validating from a different viewpoint.” A number of mentees also commented that an advantage of their IOFM relationship was that it gave them access to honest feedback about themselves and how to improve as they developed as leaders. Comments such as an “objective opinion” and an “unbiased ear” and “no

backlash from discussions” are examples of how respondents felt that IOFM provided important support absent from formal mentoring relationships internal to their organizations. In addition, access to experienced leaders who shared common experiences as African Americans was another advantage to IOFM. This dimension frequently was expressed by the comment “common experience,” or as one participant put it, an “unusual mirror.” Many participants also suggested that expanding one’s social network, particularly among experienced and influential African American executives within the ELC, was an important benefit.

Some of the same dimensions mentioned as strengths of IOFM were also cited as some its limitations. While having access to African American mentors outside of their organization has a number of advantages, one limitation that a number of mentees mentioned was their mentors’ lack of familiarity with their organizations as an obstacle for certain types of career advice. Issues such as “lack of knowledge of key players” and “no understanding of the corporate culture” were frequently mentioned by the focus-group participants. Also, “not understanding the structure” and differences across particular aspects of the industry between the mentor and mentee were mentioned. Thus, while having access to a different perspective outside of the organization was an important advantage of IOFM among our participants, the issue of having to do a lot of “translating” for the mentor was a disadvantage of this external mentoring relationship.

Summary

The overall perception of the mentoring experience among mentees (and mentors) was quite positive and remained positive across the yearlong program. This research indicates that both career and psychosocial functions were provided in these relationships, and participants were appreciative of the opportunity to get both career and psychosocial support from senior African-American executives. In addition, there was a change

in the type of information that was shared between the pairs as they cultivated their developmental relationship. While the pairs reported most frequently talking about their own personal experiences related to career or life success and satisfaction early on, later discussions seem to shift toward more specific career and personal development concerns (e.g., culture, dealing with conflict, race issues). Lastly, our research findings did show that some types of advice received substantial attention in the mentoring relationship, while other types of advice were not addressed. The strength of IOFM relationships was clearly in gaining access to influential mentors outside the mentees' organizations who can provide safe, honest, and confidential feedback that may not be available from internal formal mentoring relationships.

Discussion

The literature is clear that mentoring relationships have great benefits for individuals and for organizations. Those who have mentors are found to enjoy more job security, higher salaries, higher-level positions in organizations, enhanced political skills, more work satisfaction, and lower job turnover than those who do not have mentors (Catalyst, 1996; Dreher & Ash, 1990; Fagenson, 1989; Johnson & Scandura, 1994; Lankau & Scandura, 2002). Recent work has started to capture some of the negative mentoring experiences by both the mentor and the mentee (e.g., Eby & McManus, 2004; O'Neill & Sankowsky, 2001).

However, there is still debate over whether formal versus informal mentoring relationships provide greater support for individual career outcomes and overall organizational effectiveness. There are a number of benefits to be gained from offering interorganizational formal mentoring programs; there are also several challenges that should be considered. These benefits and challenges can affect participants and sponsoring organizations at any one of three levels: individual, group, or organization. In the following section, benefits and challenges, as well as suggestions for proactively addressing po-

tential barriers to effective interorganizational formal mentoring relationships, will be discussed.

Benefits of IOFM Program

The benefits of the ELC approach are threefold. First, sponsorship by the mentee's organization provided legitimacy to their participation in this IOFM program. Second, the partnering of senior African American executives with high-potential managers provided the opportunity for mentees to access influential leaders with whom strong career and psychosocial support could occur. Given that mentors and mentees were African American, the opportunity to cultivate a relationship involving mutual trust and strong identity bonds was provided by this IOFM program. The third benefit of the ELC program was access to social capital provided by the program. This access is facilitated both through the matching of mentees to influential senior African American executives and the inclusion of peer mentoring as a component of the program. In much the same way that Burt (1992) described, the mentee could "borrow" the social capital of these influential African American leaders. Clearly, this IOFM approach provides an expansion to the participants' social networks that is consistent with work by Ibarra (1993, 1995) in that it extends the relational ties to individuals with little redundancy within the organization.

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Challenges of IOFM Program

While there are numerous benefits to the use of an IOFM program such as that executed by the ELC, this organization faced many challenges during this effort. One of the challenges related to IOFM programs is connected to the provision of mentoring functions. Kram's (1985a) career and psychoso-

cial functions were developed from the exploration of informal mentoring relationships, in which mentoring partners were generally located in the same organization. Because IOFM relationships span organizations, access to some of Kram's functions, particularly those that are career-related, may not be as readily achieved. A mentor within the same organization as his or her mentee serves many duties, acting as protector, providing opportunities for exposure and visibility to key management leaders, and coaching around political landmines.

Mentors in IOFM, who are not embedded in their mentees' organizations, will not be able to offer those career functions to the same extent as an internal mentor.

Another challenge associated with IOFM programs is related to how mentoring partners locate one another such that they are able to build strong psychosocial connections. This study highlights the importance of IOFM relationships for African American executives as sources of critical psychosocial support, such as counseling and confirmation and acceptance. But these psychosocial functions do not just happen spontaneously. Kram (1985a) indicates that in informal mentoring relationships, career functions emerge first, and, with time

and trust, psychosocial functions follow. In IOFM relationships, time is often the scarcest resource; it is challenging for mentoring partners to build in opportunities for spending time with one another. In fact, in this study of the ELC program, the most common challenge cited by participants was not enough face-to-face interaction with their mentoring partners.

Thus, while similar demographic characteristics are important for the initial matching within IOFM, cultivation of the relationship is essential and requires that mentors and mentees take time to orient themselves to one another, to locate their partners in

terms of who they are and what they stand for. It is critical for mentoring partners to take time to personally get to know one another; extant research on formal mentoring programs reinforces this notion (Raabe & Beehr, 2003). Programs can assist with this process by providing structure and tools to connect employees. For example, in the ELC program, the first conversation between the mentor and mentee is structured using an exercise that encourages each to consider his or her past mentoring experiences, the strengths and challenges of those relationships, and how past experiences may impact this relationship. Exploring their "history of mentoring" provides one example of a mechanism to support IOFM partners in building comfort and familiarity with one another to increase the likelihood of gaining access to psychosocial functions.

This research contributes to the literature in several important ways. First, this effort offers a glimpse into the relationships of African-American mentees partnered with African-American mentors. An opportunity to study this particular configuration is not common, as most mentoring studies do not have a sufficient number of African-Americans (or any other group of people of color) in the mentor role. As the workforce continues to become more diverse, it will be important to have some understanding of how mentoring relationships shift or change as mentors become more diverse.

This study also offers an opportunity to examine the effects of formalizing the mentoring process. There are a great number of anecdotal descriptions of formal mentoring initiatives (Friel, 2007; Tyler, 2007; Weinstein, 2006). As more organizations adopt formal mentoring, the need for substantive examination of these initiatives will be more critical than ever. Findings from this research can be used to ensure that program participants reap the benefits of well-planned initiatives and program planners avoid the challenges associated with developing and implementing formal mentoring.

Finally, this study provides a sense of how mentoring evolves as it is expanded beyond organizational boundaries. Higgins

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and Kram (2001) ground their research on mentoring constellations with two concepts that are relevant to this effort. They note the changing career landscape and suggest that mentoring relationships will also need to change. Future research should specifically address the need to look beyond traditional boundaries to build mentoring relationships. In addition, ongoing work is needed to explicitly identify opportunities for enhanced career development of minorities that may happen as a result of developing multiple relationships that extend beyond their places of work. The research presented here is an initial attempt to respond to Higgins and Kram's call for a reconceptualization of mentoring at work.

Implications for Research

This study raises a number of questions that merit additional research. What this study suggests is that access (overall availability and characteristics of mentor) to mentoring may be driven by the types of relationships and social networks that people of color can cultivate. For example, Ibarra's (1993) study of the informal networks found that minority managers had networks with significantly lower levels of homophily than those of their white counterparts. In addition, career advancement for minority managers was related to the configuration of their networks; Ibarra (1995) found that the networks of low-potential minorities tended to be dominated by whites (cross-race relationships), while the networks of high-potential minorities were composed of a balance of same-race and cross-race relationships. Her research speaks to the importance of the pattern and composition of relationships that are developed both within and across racial boundaries.

People of color often develop two complementary networks: one set of relationships with whites who may provide access to resources and opportunities, and another set of relationships with people of color who provide psychosocial and emotional support. Whites, on the other hand, do not have to think about who is in their network in the

same way or include people who are racially different from them within this network. An interesting implication of these different patterns is the suggestion that for people of color, same-race versus interracial mentoring serves very different purposes, or what Kram (1985a) would label as "mentoring functions." Thus, the pattern of access to developmental relationships is clearly tied to the nature, type, and strength of these relationships that also vary as a function of dimensions of diversity, such as race.

An interesting question to explore further is suggested by work within the area of social networks. Raider and Burt (1996) argue that it is "generally important, but more important for people at the social frontier—people at the interface of different social worlds" (p. 189). This proposition suggests that people of color may rely on the benefits of social capital to a greater extent than their white counterparts. However, little current research helps to examine the types of social networks that are the most productive as a function of the diversity dynamics taking place in organizations. Burt and his colleagues would argue that differences in social networks account for performance differences among individuals who are equivalent in terms of experience, education, and ability (Burt, 1992; Raider & Burt, 1996). Their research suggests that strong social capital helps some individuals to experience a better return on their human capital than others. Consistent with Burt, mentoring relationships may be viewed as a competitive advantage for individuals as well as a primary source of social capital for the individual and for the firm.

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Implications for Practice

We make several recommendations for organizations that are considering participating or initiating an interorganizational for-

mal mentoring program. Decision makers must attend to the following aspects of IOFM implementation: recruitment and selection of participants, matching and training of participants, evaluation, positioning of the program, and funding. Some of these dimensions of IOFM, as well as several of the common mistakes that organizations involved in formal mentoring programs make (and suggestions to counter them), will be discussed.

Organizations that implement IOFM programs should spend valuable time up front in carefully selecting and matching mentors and mentees (Hegstad, 1999). Participation in formal mentoring initiatives requires serious commitment and willingness to invest time and energy into building the relationship. Sponsoring organizations may have an application process in place for mentees who are interested in participating. Applications (or some process requiring potential mentees to consider and share why they stand to benefit from the IOFM program) offer program administrators critical information about the mentees' readiness to engage in mentoring. As a result of expending the effort to secure placement, mentees may be more committed to effectively working with their mentors. It may be

While formal mentoring programs hold a great deal of promise, inadequate attention often is paid to how mentoring partners are brought together—the match.

more challenging to recruit mentors for the program—many more people tend to sign up for access to mentoring than those signing up to act as mentors. So one common mistake program planners make is to accept every single “mentor” they are able to get to sign up for the program. In fact, just as mentees are evaluated for their readiness to be mentored, mentors should also be evaluated for their developmental strengths and willingness to mentor.

It is also important to thoughtfully match mentees and mentors and to provide training for both mentoring partners. While formal mentoring programs hold a great deal of promise, inadequate attention often is

paid to how mentoring partners are brought together—the match. In far too many cases, mentor-mentee pairs are formed in unreliable ways: at random, by geography, for convenience, or because there is a “hunch” that particular people will make a good pair. In fact, how mentoring partners are selected and placed together is critical (Blake-Beard, O'Neill, & McGowan, 2007).

Another common mistake that formal mentoring program implementers make is to plan a kickoff session without regular and rigorous follow-up in the form of check-in sessions and strategically placed reminders and prompts. Again, a huge issue in formal mentoring initiatives is finding time for the relationships. To the extent that IOFM programs include opportunities for participants to spend time together, the effectiveness of these initiatives may be positively affected. For example, Lyons and Oppler (2004) found that the more often mentors and mentees participating in a formal mentoring program met, the more satisfied the mentees were with the relationships. Program administrators need to build in time for participants to receive training as an orientation to prepare them for work as mentoring partners, continuous support throughout the program, and systematic evaluation at the conclusion of the program.

Conclusions

Organizations are undergoing significant changes related to the interaction across a variety of dimensions related to diversity. One idea explored here is that formal mentoring relationships that cut across traditional organizational boundaries may be a mechanism to facilitate positive interactions among the increasingly diverse members of today's organizations. This study of the Executive Leadership Council's program offers one model of how interorganizational formal mentoring can provide valuable access to mentoring relationships that include trust and psychosocial support, access to legitimate organizational power, and the sharing of social capital across traditional organizational boundaries.

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NOTE

1. Mentor perceptions were also collected but only in the first follow-up session and are not the focus of data analyses and review here.

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Gender and Diversity in Organizations: Past, Present, and Future Directions

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This introduction reviews some of the key issues that have been studied by researchers focused on gender and diversity in organizations. Issues such as discrimination, affirmative action, barriers to career advancement, and sexual harassment at work are discussed. Although the study of gender and diversity in organizations has expanded in the last decade, key areas of research are still underrepresented. Issues for future research in this area are discussed.

OVERVIEW

The issues of gender and diversity in organizations are inextricably linked. Researchers, practitioners, and even laypersons have known for decades that women and racial minorities constitute a growing percentage of the labor force. More importantly, this growth exists at all levels of the organizational hierarchy. That said, however, groups that represent a statistical or social minority, or both continue to face challenges in U.S. organizations. A variety of factors have been shown to influence work-related outcomes for women and people of color, including overall corporate climate, gender discrimination, sexual harassment, occupational segregation, and exclusion from mentoring opportunities. Although issues facing diversity in organizational careers are complex enough to fill several volumes, this

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special issue includes a diverse range of empirical and theoretical work that examines many of the issues facing women, people of color, and yes, even White men, in today's organizations. The goal of this issue is to highlight some of the ways in which the nature of organizations have changed over the past decade and review the unique implications of these changes for the future. In addition, some of the key strategies for enhancing career opportunities for diverse organizations of the future are part of our focus.

EXAMINING THE PAST

One of the most widely studied areas that examines the barriers to women's career advancement are the consequences of discrimination in the workplace. The most well-known illustrations of discrimination in the workplace are captured by the concept of the glass ceiling, which defines the invisible barrier that prevents many women and minorities from advancing into senior and executive management positions within organizations (Hede, 1994; Morrison, White, & Van Velsor, 1987). A number of studies have explored discrimination at work across factors such as job type, organization size and composition, and industry and target group involved. A study by the Federal Glass Ceiling Commission (1995) reported lower representation of women and minorities in occupations with high status, executive level positions, and board of directors. In addition, studies show that women experience barriers at all levels not only at the top (Marlow, Marlow, & Arnold, 1995), and these barriers significantly retard a woman's career advancement and detract from her performance in the profession. Work by a nonprofit organization known as Catalyst has devoted substantial attention to the issue of women's advancement in organizations. Examples of differential treatment within organizations are one of the most widely cited reasons why women fail to advance to levels of authority and visibility within organizations (Catalyst, 1998).

Misconceptions and negative attitudes that have been shown to derail the careers and success of women in the workplace also have a clear and negative impact on members of other racial and ethnic groups. Research shows that women are often segregated in organizations by specialty based on prevailing stereotypes (Blau, Ferber, & Winkler, 1998). For example, work by Dobbins, Cardy, and Truxillo (1988) identifies discrimination in job assignments that lead to future promotions as the number one barrier for women, particularly African American women in management jobs. The concept of occupational gender segregation (Jacobs, 1989) describes the disproportionate overrepresentation of women and minorities in low-paying, low-status occupations compared to men and nonminorities. Clearly these differences

decrease women and minorities' earnings potential, career mobility, and access to leadership and decision-making positions within organizations (Goldin & Polacheck, 1987). In addition, discrimination by occupational type is more likely to exclude women and minorities from access to informal networks of information and support that can help in career advancement (Reskin & Hartmann, 1986; Roos & Reskin, 1984). Lastly, the disproportionate representation of women and minorities in low-status jobs puts them at greater risk of workplace discrimination, including sexual (and racial) harassment (Bergmann, 1986).

Another area that has received a great deal of attention in work on the glass ceiling focuses on earnings disparities between men and women. Legislation of the 1960s drew considerable attention to discrimination at work as manifested in wage gaps and inequities in incentives and benefits. The notion of comparable worth and pay equity received a great deal of attention during the past two decades (see Corcoran & Duncan, 1979; 1983). Efforts such as "equal pay for equal work" and affirmative action helped reduce some of this well-documented wage gap based on gender (Murrell & Jones, 1996), but the pay for women of color continues to lag behind their White counterparts. Recent attention has focused on why sex discrimination in wages in some occupations and industries continues and the particular issue of wage differences for women in top positions within organizations (e.g., Catalyst, 1998).

One explanation for the persistence of earnings discrimination in earnings that is frequently cited is the existence of what has been labeled as "dual labor markets" (Morrison & Von Glinow, 1990; Morrison, White & Van Velson, 1987). A greater number of men are employed in the primary labor market compared to women. This primary market offers better jobs with higher pay rates. Conversely, the secondary labor market is dominated by women and minorities and contains jobs that are low-paying and low-status. The notion of different labor markets based on demographic factors such as sex and race is quite consistent with the notion of occupational segregation based on sex and race previously discussed. What is key to the notion of the dual labor market is that it represents a structural barrier to women's career advancement that explains why there is relatively little movement between the two markets, especially for women and minorities. This dual labor market for women provides an impermeable barrier for career advancement and is of critical importance in explaining the gender gap in earnings.

A significant area under research within the literature on the glass ceiling, is the intersection of race and gender on career outcomes and advancement (Murrell, 1999). Some writing in this area (e.g., Bell, 1990) focuses on the double disadvantage experienced by minority women in professional

settings. Bell argues that for women of color a push and pull exists between issues of race, ethnicity, and gender that uniquely effects career outcomes. This dual pressure puts this group in the unique position of being both visible and isolated within a traditional male (and White) work environment. In addition, these women are likely to experience job stress, dissatisfaction, and interpersonal conflict resulting from high visibility, performance pressure, and isolation (Essed, 1991).

In her classic work on the effect of tokenism or solo status and gender, Kanter (1977) argued that proportional representation affects the dynamics of social interactions at work. A workplace that is homogenous in terms of master statuses such as sex or race will differ qualitatively from environments that are “skewed” (those with a 15% or less minority) or “balanced” (those with a 40–50% minority). Specifically, she contended that in skewed work environments, token or solo status results in stereotypical assumptions about what those characteristics mean that disadvantage women and minorities in organizations. Kanter (1977) argued that women who enter male-dominated organizations are more visible to others due to their uniqueness, more likely to be viewed as different from the dominant gender group, and more likely to be stereotyped within the workplace. Although Kanter’s work was initially focused on female tokens, what we have learned over time is that the experiences and consequences of tokenism hold true whether it is a man or woman, and racial minority or White, in the token position.

Ely (1995) argues that as long as women are underrepresented in positions of power, barriers to advancement for women may persist. Ely (1994) examined women in law firms with either few women in senior positions (“male-dominated” firms) or a significant number of women in senior positions (“sex-integrated” firms). She found that the proportion of women in senior positions shaped both the peer and supervisory relationships women had in the firms. More specifically, she found that early career stage women in male-dominated firms were less likely than those in sex-integrated firms to view senior women as good role models. Ely explained this finding by arguing that in male-dominated firms, junior women perceived that being female was incompatible with power and status within the organization. Junior women in her study would either see senior women as lacking in power and, therefore, not “legitimately senior,” or they would see them as having obtained their positions by acting like men rather than women.

Clearly career strategies have changed substantially for women in organizations since the early studies on the glass ceiling. Although organizations attempt to restructure career patterns of their employees, there has also been a corresponding change in individual career attitudes. *Fortune* magazine (Linden, 1992) described college graduates of 1989 as having their eyes on “new realities” in reference to career mobility. Feldman (1981, 1985, 1986,

1988) has described the changing career values and goals that are defined as “the propensity to pursue career advancement through non-performance-based means” (Feldman & Weitz, 1991, p. 238). These non-performance-based means include career mobility tactics (e.g., lateral transfers, downward movements, changing companies) and the instrumental use of social relationships with coworkers, supervisors, or other organizational mentors. Ironically, the careerist attitude is seen as a double-edged sword. When individuals place a great deal of weight on career advancement, the desire for success is often at the expense of both relationships within organizations and with coworkers who resent the instrumental and deceptive relationships maintained by careerists (Feldman & Brett, 1983). The fact that career paths increasingly extend beyond organizational boundaries and span different organizations (Arthur & Rousseau, 1996; Hall & Mirvis, 1995) calls for a special consideration of the impact of these “boundaryless careers” and key outcomes and obstacles.

This “new career” reality has unique consequences for the experience of women compared to men in organizations. Research by Murrell, Frieze, and Olson (1996) shows that gender has an important effect on whether career mobility has positive versus negative outcomes on earnings, satisfaction, and breaking through the glass ceiling. Thus, although career mobility factors may enhance flexibility for males, they often involve mobility strategies (interruptions, job changes, part-time work) that may have a negative effect on career outcomes, particularly for women.

Another area of research that has been a traditional focus of scholars in this area is sexual and as a form of gender discrimination. Behaviors such as sexual remarks, sexual coercion, and intimidation are examples of discriminatory acts that comprise the legal definition of harassment. In addition, aspects of the environment that are seen as hostile constitute harassment. Although the issue of sexual harassment in the workplace is not a new issue, the attention focused on defining, prosecuting cases, and preventing harassment has increased substantially over the past decade. Still, a vast number of incidents of gender-based harassment go unreported because victims fear retribution by the perpetrator and by the organization (Gruber, 1992; Lach & Gwartner-Gibbs, 1993).

Attention to the issue of harassment had substantially increased since the influential work by MacKinnon (1979). By 1980, only 15% of workers had not heard of the term sexual harassment (Gutek, 1985). There is some evidence to support the speculation that marginality, or low-status characteristics, increase an individual’s vulnerability to harassment. Younger women are more often the targets of harassment (Gutek, 1985; LaFontaine & Tredeau, 1986). Unmarried women are also reported as somewhat more likely than married women to be victims of harassment (Gutek & Bjorn, 1987).

In addition, women who represent a minority within the organization, such as those in nontraditional occupations, are at increased risk of being harassed (Gutek, Cohen, & Konrad, 1990). Gruber and Bjorn (1982, 1986) found that Black women autoworkers not only received more harassment than Whites, but these women were also harassed more severely than their White counterparts. These incidents ranged from what these researchers labeled “moderate” harassment (sexual propositions, sexual innuendos) to “severe” harassment (demands for sexual activity, physical assault). Segura (1992) examined Chicanas in white-collar jobs and found evidence for incidents of both sexual harassment and race discrimination. Research that disentangles issues such as gender, race, and class or race and status within the workplace (e.g., low level workers, contingent workers) is clearly needed. In addition, comparing the frequency of sexual harassment for women of color across different occupational levels is necessary in order to confirm that these women, regardless of power or status within the workplace, are more prone to harassment.

Although there is little evidence examining the frequency and severity of harassment among women of color, there has been some research investigating the factors that predict whether women will report incidents of sexual harassment and the impact of sexual harassment on work outcomes for these women. For example, Gutek (1985) found that women who experience sexual harassment at work also experience isolation and lack of access to mentoring and informal networks. Some suggest that these women may limit the nature of their interpersonal contacts at work, in part, because of their fear over exposure to harassment. Women may also be likely to quit their jobs because of harassment and, thus, harassment can derail their career advancement. One theoretical explanation for the impact of sexual harassment on women’s careers can be extrapolated by the work of Gutek and her colleagues. Gutek and Morasch (1982) suggested that sex-role spillover occurs when gender roles spill over into the workplace and either replace or compete with work-related roles and expectations. As a consequence of this spillover, experiences with sexual harassment are more likely to occur within environments that are highly sexualized, or when gender roles are highly salient. According to this argument, women in nontraditional, male-dominated occupations and men in nontraditional, female-dominated occupations are more likely to experience sexual overtures at work compared to women and men working in traditional jobs. Gutek, Cohen, and Konrad (1990, p. 101) argue that often “male sexuality becomes incorporated into male-dominated work environments.” Such an orientation tends to cause people to respond in stereotypic ways. Young, attractive women may be seen as “sex objects” by their male coworkers rather than as employees, resulting in higher levels of sexual harassment. And, within this type of stereotypic

thinking, once a woman is labeled as “sexual” within a work environment, most of her behavior is perceived within this framework (Gutek, 1985). Thus, it appears that individuals in male-dominated or highly sexualized workplaces are more likely to have highly stereotyped beliefs about the more general roles of women and men. Thus, stereotyped views of males and females, often pervasive in work environments that have a skewed gender ratio (e.g., are male-dominated), serve as a key barrier for women’s career outcomes and well-being at work.

A substantial number of scholars who focus on gender and diversity in organizations have examined the issue and impact of affirmative action. Methods for measuring the negative or adverse impact of a variety of different employment practices on employees are a key feature of antidiscrimination policies and programs such as affirmative action (Crosby, 1994). These monitoring systems are usually put in place to either assess progress of some existing antidiscrimination effort or to determine the need for future intervention. Recently, there has been a substantial amount of debate over the need for antidiscrimination programs such as affirmative action (Murrell & Jones, 1996). As Murrell, Dietz-Uhler, et al. (1994) argue, macrolevel initiatives that monitor the progress of women and minorities in organizations are essential for the accurate detection of discrimination in the workplace. However, some critics of antidiscrimination policies such as affirmative action argue that these measures are no longer needed given the gains of women and coupled with claims of “reverse discrimination” (see Murrell & Jones, 1996, for a discussion). In fact, even some women report negative feelings toward affirmative action programs, in large part due to the stigma often associated with the perception of being an “affirmative action hire” (Heilman, Block & Lucas, 1992). Unfortunately, critics of antidiscrimination policies such as affirmative action often base their criticisms on employment practices that generally misinterpret the spirit of affirmative action (e.g., quotas). It may be the case, however, that although affirmative action and similar policies and programs generate some resistance, changes in the nature of the employment relationship and the reduction of stable or full-time work may increase their importance and necessity in the future (Turner & Pratkanis, 1994).

More recently, a great deal of attention has been focused on the area of mentoring and its impact on career outcomes for women and people of color in organizations. Kram’s influential work (e.g., Clawson & Kram, 1984; Kram, 1983, 1985) distinguished between the classic mentor relationship and other less involving, exclusive, and intricate types of relationships such as the sponsor relationship and peer support (p. 4). Kram argues that there are two basic types of mentoring functions. The first type tends to be exclusively career-focused and includes a sponsor providing exposure and visibility,

coaching, protection, and challenging assignments to a junior member in the organization. The second type of function, called psychosocial, involves a more senior member of the organization serving as a role model and providing acceptance and confirmation, counseling, and friendship. Although career functions are closely related to an individuals' advancement in the organization, psychosocial functions are equally as important in that they focus on the enhancement of competence, identity, and personal effectiveness.

Kram proposes that developmental relationships can serve different functions at different stages in the life of a person's career. Scholars have also noted that under some conditions career advantages for a protégé are achieved because a more senior person undertakes key mentoring functions (Ibarra, 1995; James, 2000; Ragins, 1989;). Recent evidence provides support for the positive impact of these developmental relationships. A recent study by Dreher and Cox (1996) showed that women and minority MBAs who had had a mentor earned significantly more money than those who had not had one. Protégés of White male mentors earned \$22,454 more than those without formal mentors.

Recently attention has turned to the developmental and relationship aspects of mentoring, particularly as they relate to the protégé's development of status and power within organizations. Research indicates that individuals who receive mentoring report more positional power (Fagenson, 1988; 1989) and receive more promotions and compensation (Dreher & Ash, 1990; James, 2000) than individuals without either formal or informal mentoring relationships. Ragins and her colleague argue that mentoring is also a source of power for mentors. Protégés affect a mentor's status and credibility in the organization and can provide a loyal base of future support and expertise (Ragins & Scandura, 1994). In addition, an individual's experience as a protégé has been found to be a significant predictor in the decision to become a mentor (Ragins & Cotton, 1993). Clearly individuals see the value in these types of developmental relationships; they are likely to enter the relationship again as a mentor.

Mentoring relationships may take a variety of forms (Kram & Hall, 1996). Key dimensions that have been the focus of previous research include the specific position of the mentor (Fagenson-Eland, Marks, & Amendola, 1997; Ragins & McFarlin, 1990) and his status within the organization (Fagenson, 1988). Work by Kram and Isabella (1985) showed that mentors who are at higher ranks than protégés differ from mentors who hold lateral or peer positions within the organization. These issues are particularly relevant with respect to gender and race and career outcomes. Because women face greater barriers to mentoring relationships they may be more likely to develop relationships with their immediate supervisor and senior peers (Ragins & Cotton, 1991). Minority employees often go outside their department and

their organization to find mentoring (Thomas, 1989, 1990, 1993; Thomas & Higgins, 1996). These types of “external mentors” are an increasing trend in developmental relationships, particularly as organizations and careers become more “boundaryless” (Ragins, 1997). Clearly these various types of mentoring relationships have implications for women and other minorities in organizations who are faced with the glass ceiling and barriers to advancement. Women and minorities in organizations face somewhat of a paradox, they may have a special need for mentoring relationships, but are likely to have limited access to both external and internal mentors (Ragins, 1989).

Recently, Ragins proposed the diversified mentoring construct (Ragins, 1995; 1997) to capture the challenges and advantages of same-gender and cross-gender relationships within organizations. Gender, race, age, career stage, organizational tenure, socioeconomic class, and education may influence mentor functions and protégé outcomes, and they may also vary by the culture and composition of the workplace (Paludi, Meyers, Kindermann, Speicher & Haring-Hidore, 1990; Ragins & McFarlin, 1990). For example, Paludi and her colleagues (Paludi et al., 1990) found that gender differences in career stages affect the mentoring relationship. Because of interrupted careers, female protégés are frequently older than their male counterparts and this may impact the ability of the mentor to serve as a role model. Clearly the gender composition of the mentoring relationship affects not only mentoring functions but also career outcomes that are promising, yet offer many challenges as well.

FOCUSING ON THE PRESENT

We are pleased to report that the papers in this special issue of *Sex Roles* not only address many of the topics just described, but do so from multiple levels of analysis. These levels range from macrocultural issues such as Davidson’s work on conflict resolution across racial cultures; to organizational considerations, including the work by Wooten on organizational cultures of female friendly professional service firms, and the Young and James’ paper on male tokenism; to more microconcerns, including Chrobot-Mason and DiClementi’s paper on managing one’s sexual identity in the workplace. Although all of the papers are unique, they each contribute important insights that will contribute to our understanding of race and gender in the workplace. By means of introduction, we offer brief comment on each of the papers in this issue.

Conflict in the workplace is virtually unavoidable, and although there is an extensive body of research on the topic, precious little has been devoted to understanding the differences, or similarities for that matter, regarding how

groups that represent different racial cultures reconcile conflict. Davidson's work begins to fill this gap in the literature. Using two laboratory studies, Davidson first establishes that there are different cultural responses to conflict between Blacks and Whites. Even more valuable, however, is his attempt to understand why those differences exist. Davidson cleverly uses attribution theory (Ross, 1977) to provide a theoretical underpinning regarding why Blacks tend to be more emotionally expressive in their response to conflict than their White counterparts.

Focusing more on organizational culture rather than racial/ethnic culture, Wooten's paper uses Oliver's five predictors of institutional behavior to provide a framework for understanding why public accounting firms tend to adopt women-friendly human resource management policies (Oliver, 1991). Among other things, her study shows that public accounting firms (1) experience workforce diversity initiatives as a catalyst for social obligations to women-friendly policies; (2) conform to pressure from stakeholders (clients and governing bodies) encouraging the adoption of women-friendly policies; and (3) experience competition for labor and therefore adopt policies that would make them an attractive employer to all possible candidates for employment.

Continuing with the focus on organizational context, Young and James studied how a firm's demographic profile might influence one's attitudes and behaviors toward the organization. More specifically, they studied the effects of token status in an organization. What makes this study different from how one might usually think of tokenism is that their minority group was White men, male flight attendants to be precise. Using survey data they found that the relationship between male token status and organizational commitment, intent to quit, and job satisfaction was a function of the male tokens' self-esteem, experience of role ambiguity, and job fit.

Chrobot-Mason and DiClementi bring us back to micro and psychological issues associated with gender and diversity in the workplace. In particular, they examine the antecedents and consequences associated with various strategies gay and lesbian employees use to reveal their minority status at work. We are particularly pleased to include this research into the special issue because although diversity issues around race and gender have made their way into "mainstream" scholarly literature, research on gay and lesbian issues are still relatively new.

SETTING AN AGENDA FOR THE FUTURE

This paper reviews some of the opportunities and barriers facing women and people of color within organizations of the past, present, and the future.

Scholars in the area of gender and diversity in organizations have focused considerable attention on key issues such as the “glass ceiling,” discrimination, sexual harassment, affirmative action, mentoring, job interruptions, career mobility, part-time work, and leaves of absence. Contributors to this special issue represent a range of the empirical and theoretical work in this area as well as some emerging topics. Although it is clear that there have been a number of advancements for women and people of color in organizations, considerable barriers remain. Thus, the need for future research on gender and diversity in organizations remains significant.

Clearly one focus of future research efforts should be toward defining systems and structures that are effective in advancing positive outcomes for women and people of color in organization. In addition, more attention should be paid on the impact of legislative efforts toward a more inclusive workplace, especially within the global business environment. Third, more longitudinal studies that track the impact of social, economic, and managerial factors on outcomes for women and people of color are needed. These types of studies are essential in separating sustainable diversity in organizations from one-shot program interventions.

In addition, a number of authors within this special issue caution scholars within the area of gender and diversity in organizations on their choice of conceptual models and methodological approaches. Smith, DiTomaso, Farris, and Cordero argue that scholars should not lump “women and minorities” together as a standard approach to research and also caution against aggregating all “Whites” together in future studies. In their work, issues such as favoritism and bias in performance ratings were significantly effected by the relative number, power, and status of these various groups within the organization. These authors argue that findings such as this are often masked because researchers often do not attend factors such as proportional representation within the workplace or within their own research samples. Goldberg’s research included in this issue makes a similar argument through findings within the context of sexual harassment. Her work reveals that women’s responses to negative events such as sexual harassment at work are, indeed, impacted by the gender proportions within their specific workgroup. The representation of women and people of color within the workplace also impacts ubiquitous phenomenon such as organizational commitment, as the research by David Porter demonstrates. His work shows that conceptions and attributions of behaviors that demonstrate commitment to the organization are “gendered” constructs that have important consequences for women’s progress within the organization. Thus, the proportional representation of women and people of color within organizations and research samples are topics that should receive more attention in future research.

In addition to microissues for future work in the area of gender and diversity in organizations, two papers within this special volume cite macro-level issue for future study. Work by Bajdo and Dickson reinforces this point through data showing that organizational cultures that are supportive of gender equity are more likely to achieve higher proportions of women in managerial positions than organizations lacking this emphasis. Alison Konrad and her colleagues provide data on the impact of identity and support of macrolevel policies and programs for affirmative action within the workplace. Her findings suggest that differences in worldview between women and men pose a threat to the success of antidiscrimination efforts such as affirmative action. Lastly, research by Ebrahimi, Young and Luk reminds us that gender and diversity within organizations is not strictly a U.S. phenomenon. Their paper reviews work on management and gender within an international context and reminds us that organizational effectiveness and diversity must be examined within the global context of the workplace. Thus, future research must not only focus on microlevel issues facing a diverse workforce, but macrolevel issues impacting organizational policies and programs within a global work environment.

Clearly each of the papers within this special issue raise important concerns that should be addressed by future work in this area. The hope of the authors who have contributed their work to this project and the editors who have organized these efforts is that the issues raised herein will not only stimulate additional working in the area of gender and diversity in organizations, but will also uncover new solutions to the barriers and challenges facing women and people of color within a rapidly changing, global workplace.

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DEVELOPMENT OF A MENTAL HEALTH AND WELLNESS INITIATIVE FOR POSTDOCTORAL SCHOLARS AT WESTERN UNIVERSITY



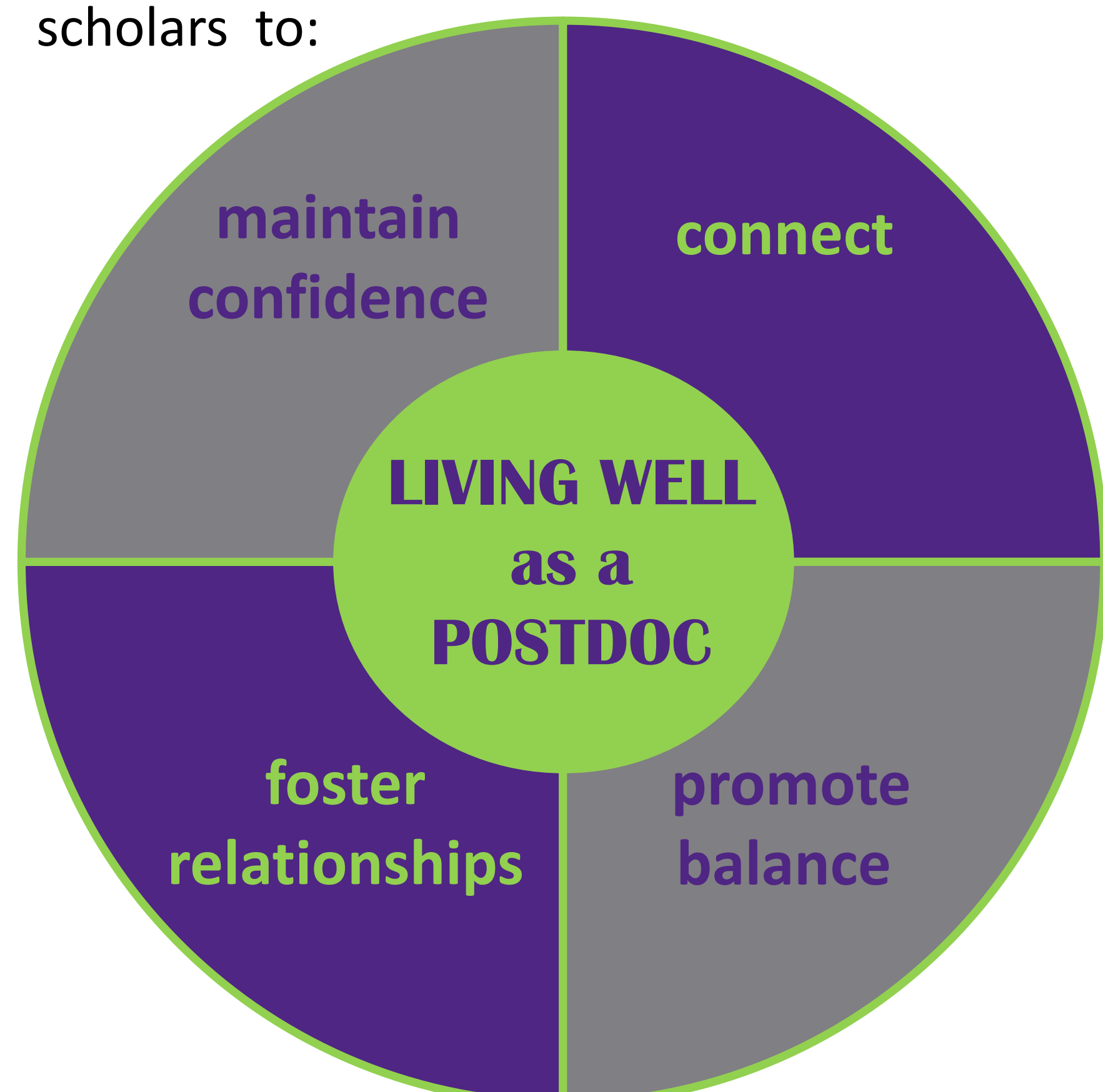
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1. OVERVIEW

- Increasing attention is being paid to mental wellness in Academia.¹⁻⁴
- There is little information on the effect of academic commitments to the wellbeing of postdoctoral scholars.^{5,6}
- Nevertheless, the stress associated with postdoctoral work is obvious:
 - Drive for academic perfection
 - Long hours, low pay
 - Limited health benefits
- The Postdoctoral Association at Western (PAW) has identified the need to promote health and mental wellbeing within our postdoctoral community.
- An initiative has been developed focused on equipping postdoctoral scholars with tools and resources for living well in their leadership roles.
- The initiative is based on four major action items, which are believed to foster health and well-being, by encouraging postdoctoral scholars to:



2. LIVING WELL AS A WESTERN POSTDOCTORAL SCHOLAR

Postdoctoral Mental Health and Wellness (MH&W) Initiative

- Appointed MH&W Representative to PAW Executive Committee.
- Ensured that postdoctoral scholars have a voice on Western's Mental Health Advisory Board and among The School of Graduate and Postdoctoral Studies (SGPS) Working Group on Health and Wellness.
- Focused on health and mental wellness as an integral part of the postdoctoral experience.
- Planned and executed programs, workshops and events based on the four MH&W action items.

POSTDOCTORAL PROGRAMS & EVENTS



3. FUTURE WORK

- Expanding this initiative will involve:
- Using surveys to assess health and wellness requirements among our postdoctoral community.
 - Working to provide free counselling services, specific to scholars' needs.
 - Educating advisors on the importance of a positive work environment for postdoctoral scholars.

4. SIGNIFICANCE

- It is expected that this initiative will benefit postdoctoral scholars by:
- Providing resources and tools to help them prepare for, and excel in their roles.
 - Fostering a supportive and welcoming environment for all.
 - Promoting a healthy work/life balance.
 - Advocating for unlimited access to Health and Wellness services.

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