Introducing the Academy for Future Science Faculty: Integrating Coaching and Social Science Theories into Biomedical training

Scientific Careers Research & Development Group
Simon Williams, Jennifer Richardson-Stovall, Michelle Naffziger, Rick McGee
Understanding Interventions Conference, May 2012
Acknowledgements and Contacts

Supported by:
NIH Grant: DP4 GM096807

With thanks to: Pat Campbell, Jill Keller, Robin Remich, Sandra LaBlance and Steve Lee and the rest of the Northwestern University Feinberg School of Medicine, Chicago, IL

Scientific Careers Research and Development Group
www.careersresearch.northwestern.edu

Email:
Simon Williams – simonwilliams@northwestern.edu
Rick McGee – r-mcggee@northwestern.edu
Academy for Future Science Faculty

Background premise, current state of the “field”, research aims.

Social and Career Development Theories (Bandura (1988; Carlone 2007; Chemers et al 2011; Schultz et al 2011); Cultural Capital (Bourdieu 1986; DiMaggio 1982; Warikoo and Carter 2009); Communities of Practice (Lave and Wenger 1991)

Coaching Concept; Summer Academy Meetings; Resources and Tools; Interviews; Surveys; Program evaluation; Ongoing Ethnographic Field Observations

Early indicators of impact and success; iterative process and feedback loop; Data repository that will answer our research questions
Mentoring as Central Dogma for PhD Training

**Shift approach to learning**

Within 1-2 years shift from structured to unstructured learning and skill development – emphasis on independence

**From teaching to mentoring**

“Teaching” disappears, replaced by mentoring and independent learning – including evaluation

**Presumptions of mentoring**

Mentoring highly variable and idiosyncratic process with purposeful maximum latitude for mentors’ judgments and stylistic preferences

**Challenges/risks for outsiders**

Informal learning architecture typically more difficult for anyone starting as an “outsider” to navigate
Intervention: Why and How?

Likely essential if we want change

Last 30 years have focused mostly on inputs to the PhD – more diversity and better preparation – we know where that has and likely will take us.

System issues as much as people

Look beyond practices and idiosyncrasies of individual mentors - impossible to control.

Systematizing more

Think about what we hope mentors will provide, assume they often won’t, and fill in the critical gaps.

Early phases critical

Early phases of PhD training high risk of system failure for those coming with ‘atypical’ backgrounds.
What is The Academy?

Integrating Multiple Social Science Theories to Study and Explain Career Decisions of Young Scientists and Design Interventions
What is the Academy?

- Randomized Control Trial (RCT)

- Two Groups: Group I = beginning PhD students and Group II = latter-stage PhD students

- Intervention involves:
  - Annual, in-person summer Academy Meetings (in Chicago);
  - Online social networking (Edmodo)
  - Virtual engagement via webinars and web-conferencing.

- Include a variety of topics on professional development, including:
  - choosing lab rotations and dissertation labs,
  - scientific presentation skills,
  - networking skills, etc.
Theoretical Framework

Communities of Practice
- Social learning
- Inclusion based on perceived competence

How do group processes such as shared norms, inclusion and exclusion affect the integration of young scientists into laboratories and other groups?

Identity
- Multiple senses of “self” based on interactions with the social world
- Contingencies including discrimination and stereotypes

How do students develop an identity as an academic scientist? How does a scientist identity interact with racial, ethnic, and gender identities? How do young scientists deal with stereotypes and discrimination?

Cultural Capital
- Social reproduction by dominant groups
- Focus on promotion and fit based on perceptions of knowledge and skills

What skills, knowledge, attitudes and values do young scientists need to “fit” with the culture of science? How are students differently evaluated based on gender, race, and ethnicity?

Social Cognitive Career Theory
- Individuals move toward particular careers based on experiences, interests, self-efficacy and goals

How do experiences translate into science self-efficacy and a goal as an academic scientist? How are students moved toward, or away from, academic science careers?
Starting point of PhD matters

Real and perceived differences in cultural capital and SCCT variables affect internal and external perceptions

Critical to be seen as scientist

Informal assessments by others take on central role for determination of *competence as scientist*

Communities of Practice - labs

Each lab group a C of P which students have to navigate to acquire *tacit knowledge* essential to performance and development as a scientist

High risk for system failures

Really challenging for even well-intended, skilled mentors to craft a learning environment able to support new members entering C of P continuously
What is Coaching in the Academy?

- Communalist, group-based approach to professional scientific training (vs. individualistic mentoring approach).
- Measure of standardization → greater external validity → greater generalized quality assurance (vs. idiosyncratic mentorship model → less comparability)
- Students exposed to early inter-institutional and inter-disciplinary interactions.
- More objective advice – i.e. mentor’s own research interests and success linked to the student’s research interests and success.
- Theoretically-grounded.
Research and Intervention Design: Overview

- Research Questions
- Student Population
- Coach Population
- Methodological Tools
- Data Collection
Research and Intervention Design: Research Questions

- Is it possible to prospectively “coach” individuals or groups of individuals toward successful academic careers?

- Can coaching positively impact URM PhD students’ ability to navigate PhD programs towards Academic careers?

- Compared to the control group, how will Academy students’ cultural capital be impacted? Can the coaching model operate to increase students’ cultural capital?

- As a result of participating in this program, will students be more comfortable as they start graduate school and enter lab rotations and more knowledgeable about the steps required to pursue an academic career?

- Compared to control group participants in the Academy, how will the experimental group participants’ sense of self-efficacy be impacted?
Research and Intervention Design: Student Population and Recruitment

- Group I (beginning PhD students) and Group II (latter stage PhD students)
  - Group I recruitment = March 2011; Group II recruitment = May 2012
  - Group I = 330 applicants → Experimental group, n=100; Control group, n=103.
  - Group II = 338 applicants → Experimental group, n=60; Control group, n=60.

- Inclusion criteria:
  1. to have an interest in an academic career in science and envision themselves as future faculty members;
  2. to be a U.S. citizen or permanent resident;

- Stratification → according to race-ethnicity and gender. Randomly allocated to experimental or control group, to achieve equal numbers in each:
  - E.g. Group I = 12 Caucasian men, 12 African American women, *etc.*
Research and Intervention Design: Data Collection

- Both Experimental and Control students participated in:
  - Baseline surveys:
    - Discussed demographic and academic histories.
  - Entry interviews:
    - Discussed graduate school preparedness, perceptions of graduate school and research lab environments, experiences with mentors and role models, and future career plans.
    - To assess: students’ existing cultural capital and self-efficacy; students’ perspectives on identity, race/ethnicity, gender, and SES.
  - Annual follow-up interviews and surveys → longitudinal findings:
    - Total aggregate interviews and surveys (both groups), n ≈ 1700
Research and Intervention Design: Data Collection

- Experimental students only receive certain tools – BOTH data collection AND part of the intervention, e.g.:
  - Self-assessment exercise
  - Individual Development Plan
  - Both tools to be revisited and discussed annually with coaches.

- Summer Academy Meetings
  - Additional data includes: Student and coach evaluations; ethnographic fieldnotes; full audio recordings of all sessions (full and coaching-group discussions),

- Electronic communication
  - Additional data includes: Social Networking “posts”; Coaching group web conferences recordings and fieldnotes and The Academy Scientific Skills Webinar Series evaluations.
Summer Academy Meeting 2011: The Agenda

Day 1: “Getting to know each other”
- Icebreakers
- “Our multiple identities”

Day 2: “Mentoring and coaching” and “Adapting to and Excelling in Graduate School”
- Exercise: “What do you hope to get from mentors?”
- Exercise: “What will be difficult to get or inconsistent?”
- Discussion: The limits of mentoring and the aims of coaching
- Discussion: Strategies for adapting to and excelling in Grad School.
- Discussion: “What are you looking to accomplish in your lab rotations?”
Summer Academy Meeting 2011: The Agenda

Day 3: Self-Assessment and IDPs

30 minute discussions of each of the following:

- Academic Preparation
- Research Skills
- Communication Skills
- Interpersonal Skills
- Scientific Thinking
- Networking
- Coping Skills and Stress Reduction

End product is a self assessment (relative to peers) and an individual development plan with coach as consultant.
Some Early Indicators of Value

- Improved commitment to an academic career

<table>
<thead>
<tr>
<th>Commitment to an academic career</th>
<th>Before Academy</th>
<th>After Academy</th>
<th>Change (+/-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25%</td>
<td>2.0%</td>
<td>0.0%</td>
<td>-2%</td>
</tr>
<tr>
<td>25-49%</td>
<td>14.3%</td>
<td>9.2%</td>
<td>-5.1%</td>
</tr>
<tr>
<td>50-74%</td>
<td>25.5%</td>
<td>18.4%</td>
<td>-7.1%</td>
</tr>
<tr>
<td>75-99%</td>
<td>38.8%</td>
<td>50.0%</td>
<td>+11.2%</td>
</tr>
<tr>
<td>100%</td>
<td>19.4%</td>
<td>22.4%</td>
<td>+3.0%</td>
</tr>
</tbody>
</table>
Some Early Indicators of Value

Following the Academy, to what degree do you feel you understand each of the following theories as they apply to development of scientists?

<table>
<thead>
<tr>
<th>Theory</th>
<th>NOT AT ALL</th>
<th>A LITTLE</th>
<th>QUITE A BIT</th>
<th>A LOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural Capital</td>
<td>12.1%</td>
<td>41.4%</td>
<td>29.3%</td>
<td>11.1%</td>
</tr>
<tr>
<td>Communities of Practice</td>
<td>10.1%</td>
<td>36.4%</td>
<td>20.3%</td>
<td>3.0%</td>
</tr>
<tr>
<td>The role that identity can play in scientific careers</td>
<td>1.0%</td>
<td>19.2%</td>
<td>56.6%</td>
<td>27.3%</td>
</tr>
</tbody>
</table>

To what degree do you think understanding each of the theories will be useful during the first year of graduate school or later?

<table>
<thead>
<tr>
<th>Theory</th>
<th>NOT AT ALL</th>
<th>A LITTLE</th>
<th>QUITE A BIT</th>
<th>A LOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultural Capital</td>
<td>4.1%</td>
<td>43.9%</td>
<td>36.7%</td>
<td>10.1%</td>
</tr>
<tr>
<td>Communities of Practice</td>
<td>1.0%</td>
<td>15.3%</td>
<td>15.2%</td>
<td>33.3%</td>
</tr>
<tr>
<td>The role that identity can play in scientific careers</td>
<td>10.1%</td>
<td>40.4%</td>
<td>50.5%</td>
<td>49.5%</td>
</tr>
</tbody>
</table>
Next Steps

- Academy Meetings:
  - Group I: meeting 2 (July 2012); meeting 3 (July 2013)
  - Group II: meeting 1 (July 2012); meeting 2 (July 2013)

- Data collection:
  - Group I second pre-meeting surveys and interviews.
  - Group II first pre-meeting surveys and interviews.
  - Ethnographic data during the meetings themselves.
Next Steps

- Some project hypotheses and predictions:
  
  - Academy participants will continue to strengthen their CoPs (Group I) and develop new CoPs (Group II).
  - Academy participants’ overall cultural capital will increase at a greater rate and/or to a greater extent, relative to control participants.
  - Academy participants’ sense of identity as a scientist will increase at a greater rate and/or to a greater extent, relative to control participants.
  - Academy participants’ self-efficacy will increase at a greater rate and/or to a greater extent, relative to control participants.