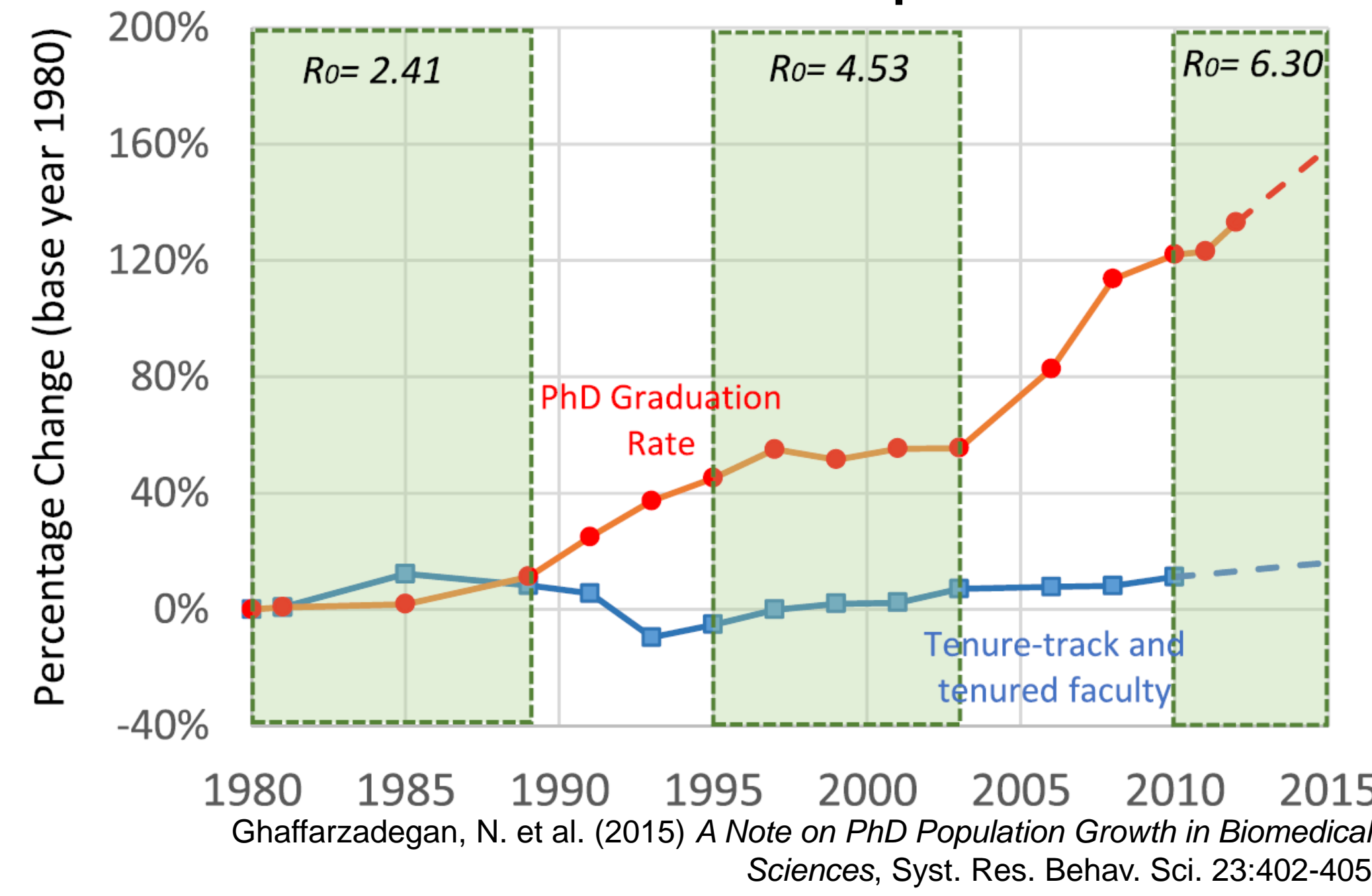


An Interactive Competency Approach to Career Exploration and IDP Implementation

Background

The paucity of academic positions has resulted in increasing numbers of PhD graduates from a wide spectrum of disciplines pursuing careers outside of traditional academia¹⁻³. Scientific and professional societies, academic institutions, advocacy groups and for-profit organizations have designed and implemented robust initiatives to alert and expose PhD trainees to a variety of non-academic career paths available to them⁴. Many of these efforts have converged on the use of an Individual Development Plan (IDP) as a tool that drives and supports career exploration^{4,5}. In general, IDPs *should be* reflective instruments that allow students to: assess their abilities, values, interests and personality traits; explore compatible career paths; and set goals to advance their skills and abilities. Implementation of the IDP, with the assistance of mentors, is a part of an iterative 'Career Decision-Making Cycle' through which students improve their skills and refine their selections. Our over-arching goal was to begin to identify and develop the competencies that facilitate finding employment in a fulfilling career.

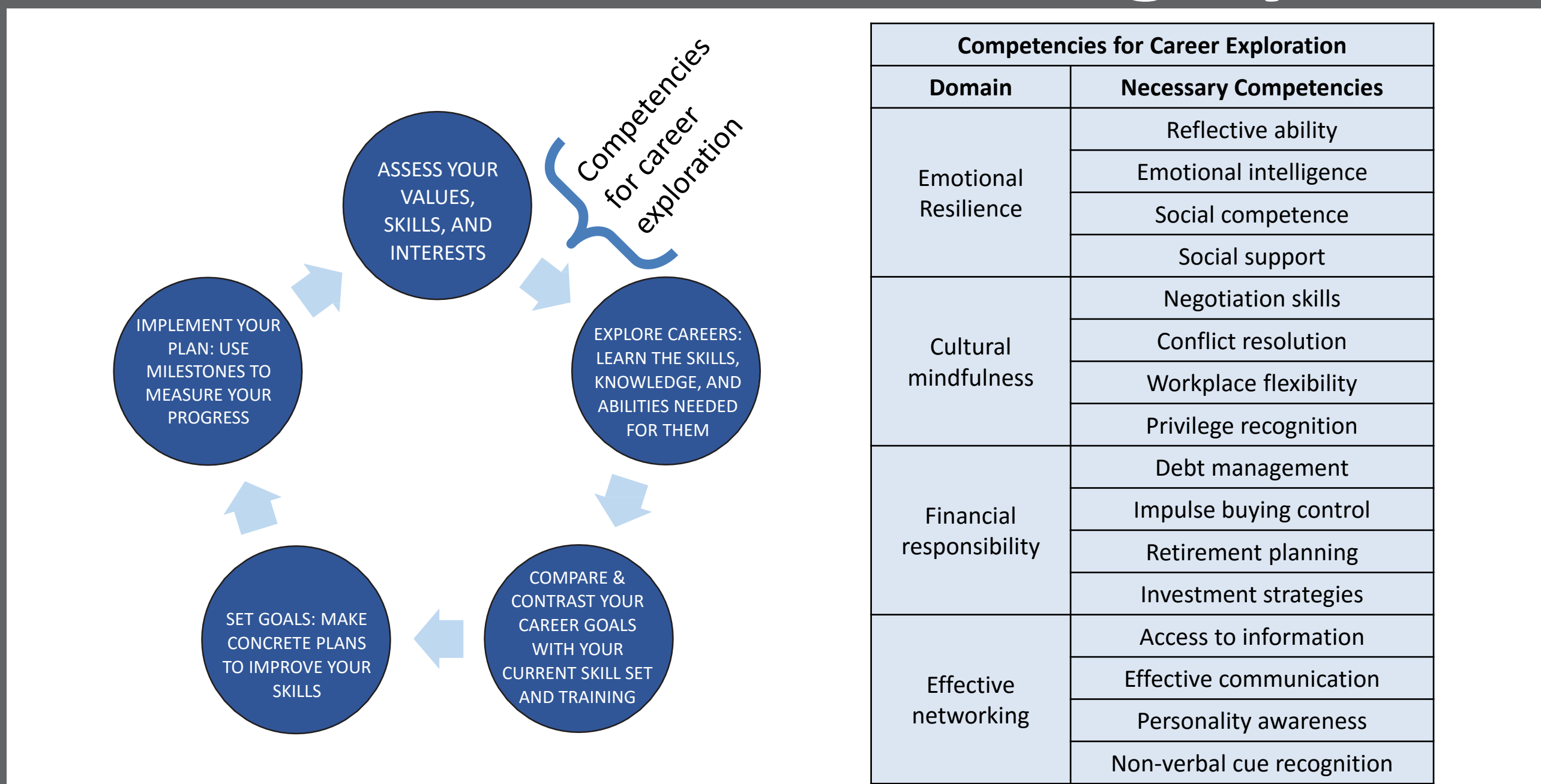
It is estimated that only ~1 in 6.3 Biomedical PhD graduates (~16%) will attain tenure-track academic positions in the US.



Needs Assessment

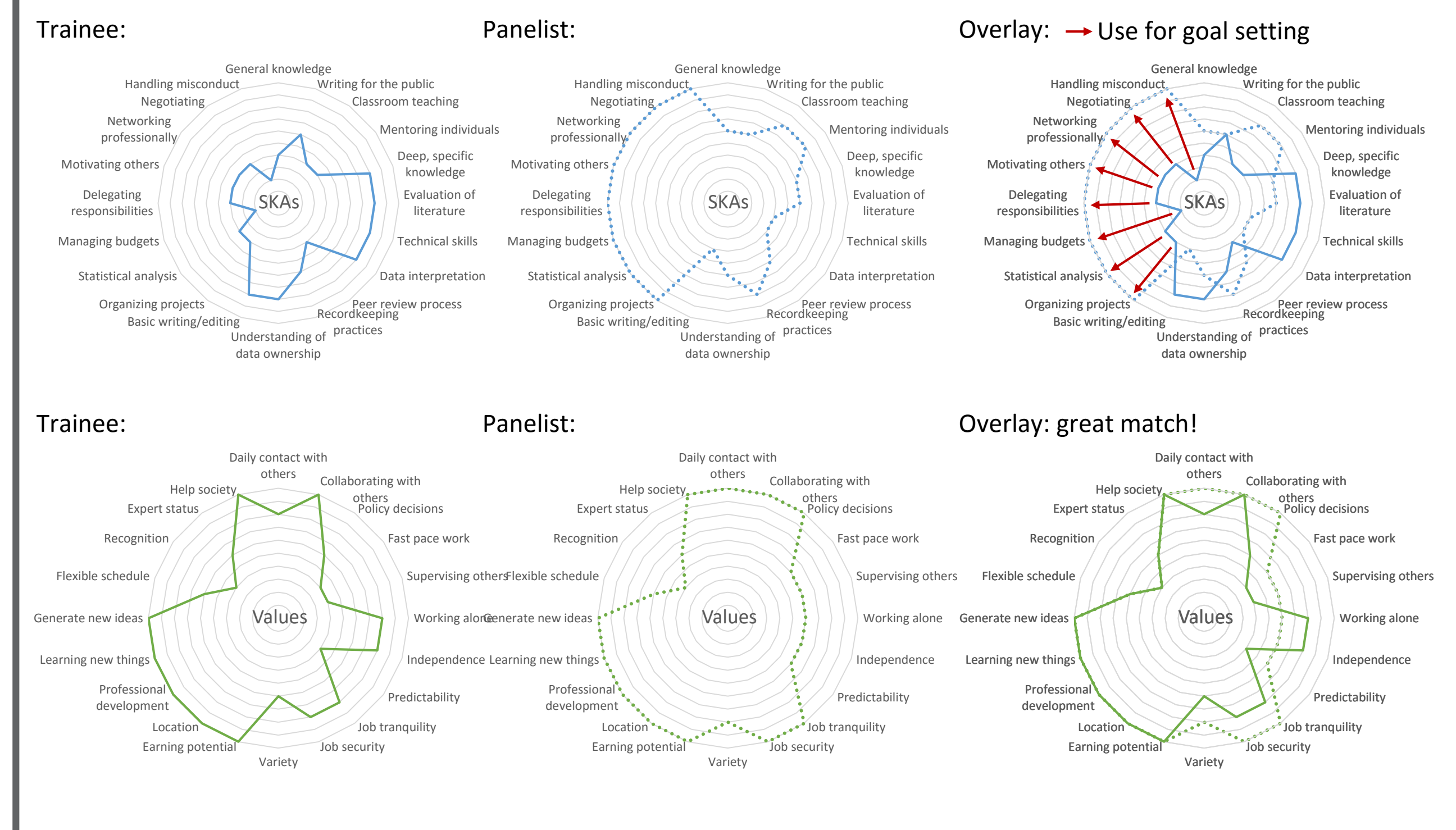
IDPs help trainees focus on skills, knowledge, and abilities (SKAs) needed for career success. They generally consist of iterative cycles of: self-assessment → career exploration → goal setting → plan implementation → self-assessment. However, successful career progression requires the development of competencies— the effective use of knowledge, and minimal level of skill performance that results in securing a job, improving abilities, and advancing in a chosen career. In addition, competencies vary among careers: for example a career in science policy requires knowledge integration across multiple fields, while a career in R&D at a biotechnology company requires focused knowledge and highly defined skills. *It would be optimal for graduate students and postdoctoral scholars to identify early in their training not just SKAs, but to efficiently utilize IDPs to help them understand the required competencies and to take steps to achieve them.*

Career Decision-Making Cycle



Our Approach

We developed a process aimed to promote (a) active reflection of trainees' own current SKAs, interests and values; (b) thorough exploration of potentially compatible current and future career choices; and (c) realistic goal setting. The process culminated in a two-day career forum that incorporated an "element of surprise" to increase trainee engagement



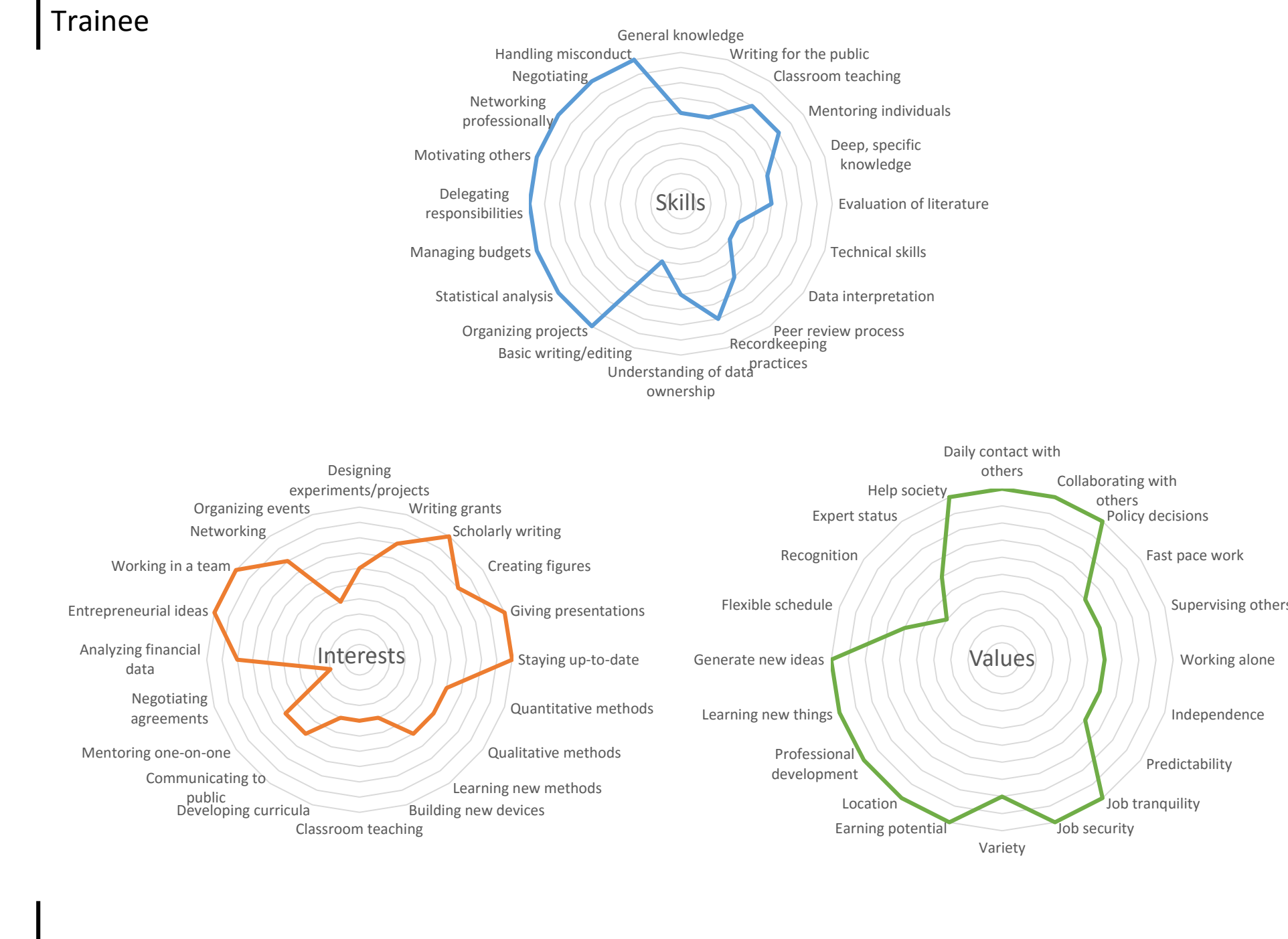
1. Trainees complete online IDP*

Prior to the career forum, trainees completed an abbreviated online survey to assess their SKAs, interests and values (modified, with permission⁶, from myIDP.sciencecareers.org).



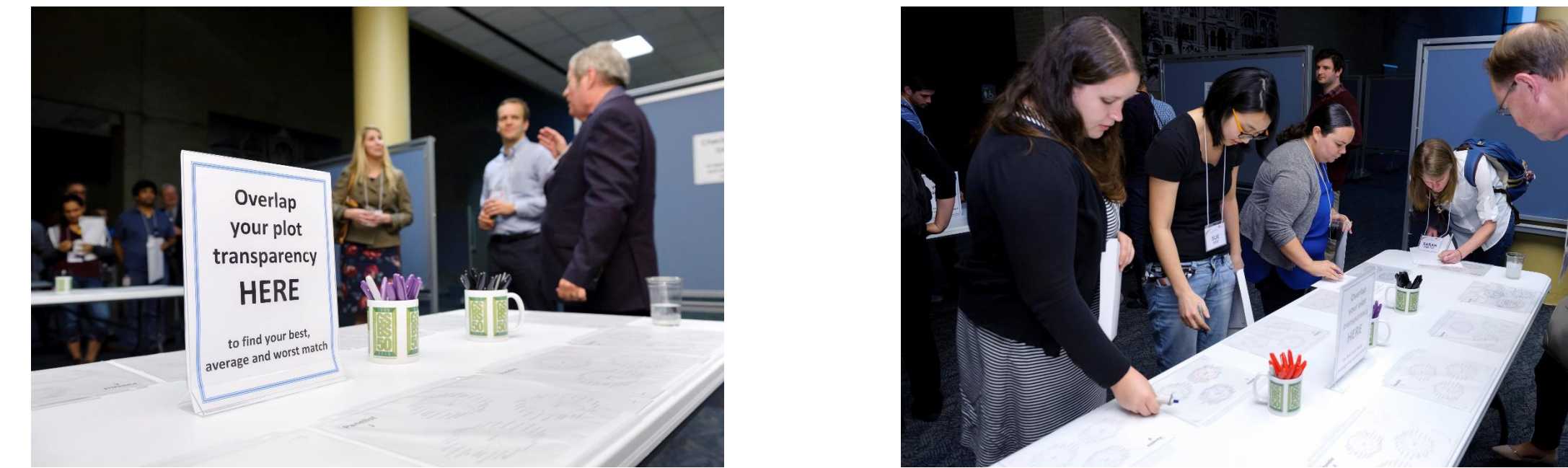
2. Generate SKA Fingerprint

At the beginning of the forum, each trainee received a graphical representation ('radar plots') of their survey answers related to their SKAs, printed on one transparency sheet and a one-page worksheet.



3. Compare with Panelists' Fingerprints

Trainees compared their SKA fingerprints with those of twelve career forum panelists (established academicians and professionals from diverse fields who completed identical surveys in advance) by physically overlaying their transparencies with those of the panelists. However, the identities of the panelists were blinded during the first forum day.



4. Complete Worksheets

Trainees utilized their worksheets to identify which panelists (identified only by letters A – F) best match their SKAs, interests and values and set realistic goals.

2017 UTMB Career Forum Worksheet
 March 10 - 11, 2017

March 10: Please identify which panelist profiles match well, average or poorly with your radar plots.

Skills	Interests	Values
Job description: (panelist A)(1/2/3)	Job description: (panelist A)(1/2/3)	Job description: (panelist A)(1/2/3)
Enter panelist letter:	Enter panelist letter:	Enter panelist letter:
Job description: (panelist B)(1/2/3)	Job description: (panelist B)(1/2/3)	Job description: (panelist B)(1/2/3)
Enter panelist letter:	Enter panelist letter:	Enter panelist letter:
Job description: (panelist C)(1/2/3)	Job description: (panelist C)(1/2/3)	Job description: (panelist C)(1/2/3)
Enter panelist letter:	Enter panelist letter:	Enter panelist letter:
Job description: (panelist D)(1/2/3)	Job description: (panelist D)(1/2/3)	Job description: (panelist D)(1/2/3)
Enter panelist letter:	Enter panelist letter:	Enter panelist letter:
Job description: (panelist E)(1/2/3)	Job description: (panelist E)(1/2/3)	Job description: (panelist E)(1/2/3)
Enter panelist letter:	Enter panelist letter:	Enter panelist letter:
Job description: (panelist F)(1/2/3)	Job description: (panelist F)(1/2/3)	Job description: (panelist F)(1/2/3)
Enter panelist letter:	Enter panelist letter:	Enter panelist letter:

March 11: Please reflect the following questions after panelist identities have been revealed:
 a) What do you think are your best overall career matches currently?
 b) Which career choices do not currently match your skills, interests or values?

By interacting with panelists, speakers and alumni, plan future goals and specific tasks. Base these on skills you are currently lacking that are needed in career paths you are now interested in, as well as how to measure your progress on each.

Goal 1:
 Task:
 Progress measure:
 Task:
 Progress measure:
 Task:
 Progress measure:

Goal 2:
 Task:
 Progress measure:
 Task:
 Progress measure:

(Please write for goals on the back)

5. Reveal Panelists' Identities

The following day, identities of the panelists were revealed, and trainees attended interactive sessions with them. Trainees utilized their worksheets to set realistic goals and progress measures, based on their interactions with the panelists.

Panelists:

For Profit Arena:

- Senior Project Manager, AlliantGroup.
- Principal Research Scientist, Eli Lilly & Co.
- Account Manager, Bio-Rad Laboratories
- Director of Intellectual Property, Kraton Polymers

Non-Profit Arena:

- Senior Epidemiologist, Centers for Disease Control
- Program Director and Team Leader, NCI, NIH
- Education & Professional Dev. Manager, ASBMB
- Editor-in-Chief, American Scientist Magazine

Academic Arena:

- Study Director, Regulated Studies, UTMB
- Health Innovations Director, Digital Health, UTMB
- Assistant VP for Strategic Initiatives, UT Arlington
- Assistant Professor, McNeese State University

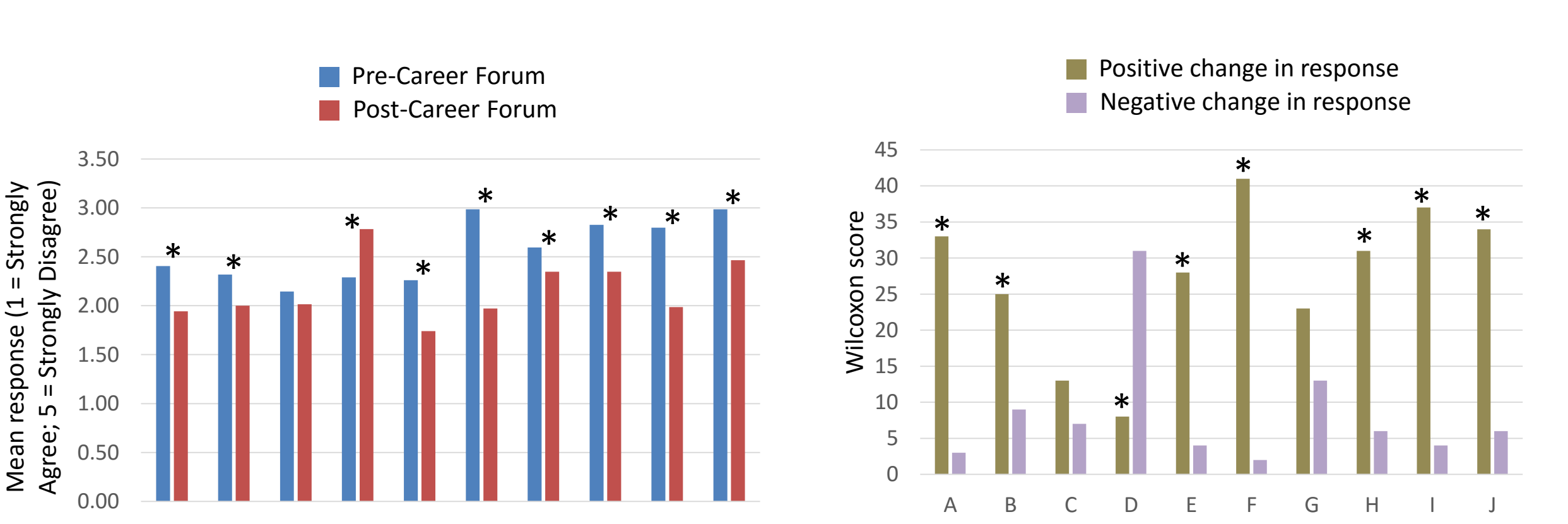
Pre- and Post- Surveys

1 = Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree

	Pre-Career Forum		Post-Career Forum		t score	p value
	Mean	SD	Mean	SD		
A My institution offers sufficient resources to prepare for my chosen career path.	2.41	0.88	1.94	0.76	6.10	0.000
B My institution provides opportunities to explore career paths of interest to me.	2.32	0.88	2.00	0.87	3.06	0.003
C My mentor/advisor supports my exploration of career paths of interest to me.	2.14	1.02	2.01	0.99	1.70	0.095
D I am worried about my career prospects after I finish my training.	2.29	1.10	2.78	1.11	-4.24	0.000
E I am familiar with careers available to scientists in academia.	2.26	0.92	1.74	0.59	4.81	0.000
F I am familiar with careers available to scientists outside academia.	2.99	1.09	1.97	0.75	7.64	0.000
G I know what career path I would like to pursue after I finish my training.	2.59	1.18	2.35	0.97	2.10	0.040
H I feel confident in my ability to network in social settings.	2.83	1.16	2.35	0.97	4.77	0.000
I I have tools to assist me with the emotional aspects of career exploration.	2.80	1.09	1.99	0.78	6.35	0.000
J I have a career plan that I feel confident about.	2.99	1.13	2.46	0.90	5.20	0.000

Pre- and Post- Surveys

1 = Strongly Agree; 2 = Agree; 3 = Neutral; 4 = Disagree; 5 = Strongly Disagree



Using STATA 14, we performed a Wilcoxon rank test for the differences between pre- and post-career forum scores for 69 students who completed both surveys. The right panel shows the positive and negative change in score between pre- and post-career forum. The green bars represent the positive change and are significant for all questions except for two ($p < 0.01$).

Conclusions and Future Steps

Conclusions:

- Trainees were highly engaged in using our IDP approach to compare their SKAs with those of panelists, which assisted in building competencies for career exploration.
- Overall, our results strongly suggest that this approach had a positive impact on students' attitudes towards their career preparation and decreased their anxiety.
- Particular advantages of our approach to IDP implementation include:
 - Iterative cycles of self-assessment
 - Visualization of SKAs that permits observation of their evolution over a continuum
 - Efficient comparison of SKAs with peers or with professionals in a diverse range of fields
 - Design of a "road map" for future career exploration and eventual career satisfaction

Future Steps:

- Identification of "fingerprint SKAs" for different professions or careers, by administering our IDP to a large set of alumni.
- Identification of areas of variation within each career, due to individual approaches and roles.

References

- National Institutes of Health Advisory Committee to the Director. Biomedical Research Workforce Working Group Report. National Institutes of Health. Bethesda, MD. 2012 http://acd.od.nih.gov/bmw_report.pdf
- Meyers, F.J. et al. "The origin and implementation of the Broadening Experiences in Scientific Training programs: an NIH common fund initiative" *FASEB J.* 30:507-514. 2016.
- Larson, R.C., Ghaffarzadegan, N. and Xue, Y. "Too Many PhD Graduates or Too Few Academic Job Openings: The Basic Reproductive Number R_b in Academia" *Syst. Res. Behav. Sci.* 31:745-750. 2014.
- Hobin, J.A. et al. "Putting PhDs to work: career planning for today's scientist" *CBE Life Sci. Educ.* 13:49-53. 2014.
- <https://myidp.sciencecareers.org/Overview/Summary>
- Philip S. Clifford, Ph.D., personal communication.

UTMB's Human Subject Protection Program determined that this project does not meet the definition of human subject research as outlined at 45 CFR 46.102 and as such is exempt from IRB approval or oversight.