Pritzker Summer Research Program
Research Seminar #3
The Art and Science of
Successful Scientific Presentations

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Assistant Dean of Medical Student Research

July 18, 2022
2 Minute Check In

• Still struggling with results?

• Other problems?
  – Methods?
  – Statistical help?
  – Mentor?
  – Mixed feelings about project?

• Seek guidance of your mentor, cluster leader, or SRP Directors
  – Reg office meeting times can be sparse SO…
  – Explain what you can in an email, offer best way to reach you by phone
Common Issues in SRP

- Mentor unavailable?
  - Need time for paper and presentation
    - Set up a plan
  - Who the other resources in the ‘lab’
  - Be flexible
    - Make it easy for them (phone, email, after hours, etc)
Project not working?

- **It is OK if…**
  - Hypothesis disproven
  - p value is >0.05
  - enrollment low
  - results slow

- **If a project is NOT VIABLE…**
  - Meet with mentor to troubleshoot or change direction
  - Contact SRP directors
Fear of statistics?

• FIRST use your mentor’s resources
  – Statistician or other collaborator?

• If your mentor needs help…
  – Biostatistics laboratory
    http://biotime.uchicago.edu/
    • Assistance limited
  – Have focused questions your mentor agrees on
Managing Expectations

**TIME**
- your timeline consistent with mentor/lab?

**OUTCOME**
- VERY UNUSUAL to have paper ready to submit to journal at end of summer
- Publication success
  - depends on factors out of your control
    - Project, mentor, scientific climate
Results

• Remember to start with the basics
  – “Descriptive statistics” - basic # to demonstrate
  – Describe study sample characteristics
    • Often referring to “Table 1”

– Examples
  • # of experiments you’ve done
  • # of people you have enrolled (response rate)
Results

- Consider the “flow” – give most important results first or “set up” the important ones
  - Important results relate to your hypothesis
  - Followed by “secondary” results that are less important but interesting or characterize a finding further

- Consider flow with your mentor

- Likely will continue to work on results rest of summer
  (Upload a placeholder)
Figures/Graphs/Tables

• Show the data the best you can

• Tables and Graphs should be “stand alone”
  – That is they should convey the meaning of the data without HAVING to read the paper

• Often this will require a legend
  – Be very careful with abbr. - explain in legend
How Most People Read Journals

- Read Title
- Read Intro (first few lines) to decide to read further
- Look at figures/tables to see if they can get the gist of your work
- Read conclusion

But, reviewers do not read this way!
Neither do those “looking for your article”
Discussion

1\textsuperscript{st} paragraph – Summarize the results in word form
   – Can add if this was the ‘first study’ of its kind
   – Make sure it is clear whether you accept or reject hypothesis

2\textsuperscript{nd} paragraph – Mechanisms for these findings
   – No new data from the study here
   – Were there any findings that were surprising? Or was this to be expected?
   – Can frame in context of other results / studies but use references sparingly
Discussion

• 3rd paragraph – Implications for these findings
  – What do these findings mean for patients or clinicians?
  – What type of future work is needed?
• 4th paragraph – Limitations
  – Be comprehensive
• 5th paragraph – Conclusions
  – No more than 2-3 sentences
Pitfalls of Discussion

• Not summarizing first paragraph
• Introducing new data from study
• Too many references
• Too few limitations
• Overinterpreting the findings
  – Stick to what the data shows
  – i.e. causal inference problem
Finishing Paper

• String it together
• Likely need to modify portions and edit
• Double spaced
• Under 3000 words (or specify your journal format)
• Fewer than 5 tables or figures
• Upload to SRP website by paper deadline
On Racism: A New Standard For Publishing On Racial Health Inequities

Rhea W. Boyd, Edwin G. Lindo, Lachelle D. Weeks, Monica R. McLemore

JULY 2, 2020 10.1377/hblog20200630.939347
Recommendations

• Define race during the experimental design, and specify the reason for its use in the study.
  – Such definitions should be couched within a sociopolitical framework, not a biological one, that explicitly reviews all relevant social, environmental, and structural factors for which race may serve as a proxy measure.

* it engenders critical thinking about racial constructs that prevent the reification of race as a biological (or genetic) entity.
Recommendations

• Name racism*
  – identify the form (interpersonal, institutional, or internalized) the mechanism by which it may be operating
  – other intersecting forms of oppression (such as based on sex, sexual orientation, age, regionality, nationality, religion, or income) that may compound its effects

*naming racism explicitly helps authors avoid incorrectly assigning race as a risk factor, when racism is the risk factor for racially disparate outcomes.
Bad Medicine: The Harm That Comes From Racism

Racial bias still affects many aspects of health care.

Why This Matters
“I need someone well versed in the art of torture—do you know PowerPoint?”
SRP Forum: Logistics

- **In-person vs hybrid format**
- 7 min presentation + 2 min for questions
- Esteemed faculty judges
- 10-12 slides MAX (see worksheet)
  - Could have 1-2 extra slides for questions
- Practice…Practice…Practice…
- Slideshow / rehearse timings feature in ppt
Starting off

• Title slide
  – Do not read title at talk (waste time)

• Background
  – Avoid too much, could be 1-2 slides
  – Why is this topic of interest to you or others?
    • Tie it to clinical problem
  – Define /introduce terms people need to know to understand your work
So what and who cares?

- Good presentations are key for:
  - Dissemination & Scholarship
    - National meetings, grand rounds
  - Research
    - Recruiting collaborators or subjects
  - Funding
    - Grants (Federal / Pvt / Internal)
    - Getting a job!
  - Education
    - Teaching trainees, patients, etc.
  - Advocacy
    - Testifying & legislative action
For Basic/Translational Scientists

• Not everyone knows what the xxxxx gene or protein is!

• Need to provide some clinical context

• Consider opening with a clinical context and revisiting this later in the discussion
Aim and Hypothesis

• Get here early
  – Essence of your work
  – Serves as a guide

• To review the basics of scientific presentation
• To provide examples of effective (and ineffective) presentation techniques
Shortage of Physician Scientists

PSW TRAINING PIPELINE

MEDICAL/DENTAL/ NURSING/VETERINARIAN SCHOOL

CLINICAL TRAINING, FELLOWSHIP, RESIDENCY, APPOINTMENTS

INDEPENDENT INVESTIGATOR

JUNIOR FACULTY

SENIOR FACULTY

T32 · T35 · F30 · F31

T32 · F32

LRP · K08 · K23 · K12/KL2 · K99/R00

RPG R01

INDUSTRY RESEARCH

CLINICAL PRACTICE

2014 NIH Physician-Scientist Workforce (PSW) Report

November 2016 RIME
Question:

What is the impact of Scholarship & Discovery on students’ intent to include scholarly work in their future careers?
Aim

- Describe factors associated with increased intention to participate in career-long research from matriculation to graduation
Methods

• Explain major steps
  – Study design
  – Data collection
    • Could show sample survey or interview questions
  – Data analysis

• How and why did you choose these techniques?

• An opportunity to educate others who may be unfamiliar with these methods
Methods

• Included 2014 and 2015 Pritzker graduates who completed S&D (n=125)
• Demographic data
  - Gender (63 men, 62 women)
  - S&D Track
• Students completed an Intake Assessment (matriculation) and Evaluations (MS2 completion and graduation)
  – Completion of all three survey tools indicated full participation in S&D
Methods

• Interest in career-long research queried in MS1 and MS4, using question adapted from AAMC GQ

“How extensively do you expect to be involved in research during your medical career?”
– Exclusively
– Significantly involved
– Somewhat involved
– Involved in a limited way
– Not involved
Methods

- Graduating students asked
  - Overall satisfaction with S&D (5-point Likert scale)
  - Overall mentor satisfaction (5-point Likert scale)
  - Self-reported dissemination of scholarly work
Methods

- All data de-identified
- IRB exempt
- Analysis
  - Created a research interest change score
  - Ordinal logistic regression (Stata 14) to examine proportional odds of increased interest
    - Related to satisfaction and dissemination of work
    - Models controlled for baseline career interest in research, track selection, and gender
    - Low interest (somewhat, limited, none) and high interest (significant, exclusive) analyses
  - p<0.05 deemed statistically significant
Data Collection: Fatigue

ESM: Experience Sampling Method

- ESM - Assesses feelings in real-time
  - Retrospective report tends to underestimate fatigue

- Pocket PC’s provided random prompts q2h during 30h call day
  - Lockout from 12-7 AM

- Instrument: Stanford Sleep Scale (SSS)
  - Validated 7 point scale:
    - 1 is most alert & 7 is most tired

Stanford Sleep Scale

1 – most alert
7 – most tired
Data Analysis

- Multivariate logistic regression, controlling for site and pre-clerkship interest, to determine the effect of overall satisfaction with the rotation on student pursuit of a generalist career
  - Used similar models to determine the effect of satisfaction with individual rotation items

- Because survey items were highly correlated, performed factor analysis
Factor Analysis

• Allow analysis of highly correlated items by extracting independent factors that may be responsible for variability across them

• Resulting factors will be uncorrelated and can be used in regression analyses without concern of collinearity
Results

• Remember to highlight the # of people/subjects/experiments that were performed first

• Use tables or graphs when possible
  – Likely a simpler version of the table in your paper
Font and Wording

• 5 x 5 rule
  – 5 lines of 5 words each
  – Avoid complete sentences

• Use “Telescoping” text
  – Related ideas grouped together
    • Underneath the main idea

• Large font
  – Kind to the back row and visually challenged

• Beware of qualitative research
  – Showcase a quote not the book

Use Figures and Graphics when possible!!!

No Comic sans!
Or any other “clever” font!
Color & Background

• Beware of red-green
  – 10% of males colorblind

• Keep it simple
  – Avoid busy templates

• Background color – white or other light color
  – If you ever print handouts, use grayscale option

• Use color to highlight and focus attention
  – Beware pastel colors
TEAM Surveys

- 3 Teams—all rated highly
- “In what ways did your team do well? What things could the team have improved?”
  - Our doctor was very considerate of each of us and had very sincere interactions with us.
  - The team worked well together, I learned a lot, a lot. We did well in many, many, many ways.
  - My team did well in everything. The leaders helped me whenever I needed help. Overall this was a great experience.
  - We worked good together. I learned a lot, a lot. We spoke to each other well and understood each other. Maybe having more time to work and get information.
  - I think that the group worked very well together because no one tried to force their own ideas upon the group.
  - I think my team worked well together. We did all the work as a group and I enjoyed my team! The doctors were great and my CSP peers were excellent. I hope we receive another chance to work together.
  - That our team work hard and we all cooperated in our poster and we all made suggestions and about our poster and put down our ideas.
## Adverse Events/Near Misses due to Poor Sign-out in Preceding Shift

<table>
<thead>
<tr>
<th>Category (n)</th>
<th>Sub-category (n)</th>
<th>Representative Incident (n=25)*</th>
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<tbody>
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<td>There was a patient who had their heparin drip turned off and it was not mentioned to me that it was turned off.</td>
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<td>Active Medical Problems (9)</td>
<td></td>
<td><em>There was a patient that had hematuria and it was not indicated on the sign-out. They had ordered CBI [continuous bladder irrigation] and I had no idea.</em></td>
</tr>
<tr>
<td>Factor</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>--------------------------------------------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>Quality of attending rounds</td>
<td>0.15</td>
<td>-0.08</td>
</tr>
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<td>0.22</td>
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<td>0.27</td>
<td>-0.03</td>
</tr>
<tr>
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<td>0.30</td>
<td>-0.01</td>
</tr>
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<td>0.32</td>
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</tr>
<tr>
<td>Presence of structured curriculum</td>
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<td>-0.06</td>
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<td>Teaching of clinical topics</td>
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<td>-0.01</td>
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## Identification of Factors

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<th>3</th>
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Highlighting a Point

• Laser pointers
  – Avoid the “laser moth”
    • Shine on the bullet and then off
• Alternatives to laser pointers
  – Circles
  – Boxes
  – Arrows

DO NOT ANIMATE EACH BULLET....
If you do animate use “appear”
Make sure no “sound”
# Ordinal Logistic Regression

## Increased Interest in Research Career

<table>
<thead>
<tr>
<th>All Students (n=125)</th>
<th>Low-interest Matriculates (n=73)</th>
<th>High-Interest Matriculates (n=52)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proportional OR of 1-pt increased intent for research career</td>
<td>95% CI</td>
</tr>
<tr>
<td>Overall satisfaction</td>
<td>2.05</td>
<td>1.28-3.27</td>
</tr>
<tr>
<td>Publication</td>
<td>2.29</td>
<td>1.03-5.08</td>
</tr>
<tr>
<td>Female gender</td>
<td>1.66</td>
<td>0.76-3.64</td>
</tr>
<tr>
<td>Baseline research interest</td>
<td>0.08</td>
<td>0.04-0.16</td>
</tr>
<tr>
<td>Basic Science Track</td>
<td>0.99</td>
<td>0.30-3.24</td>
</tr>
<tr>
<td>Clinical Research Track</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Social Science Track</td>
<td>0.58</td>
<td>0.16-2.13</td>
</tr>
<tr>
<td>Medical Education Track</td>
<td>0.61</td>
<td>0.17-2.17</td>
</tr>
<tr>
<td>Quality &amp; Safety Track</td>
<td>0.87</td>
<td>0.21-3.62</td>
</tr>
<tr>
<td>Community Health Track</td>
<td>0.94</td>
<td>0.20-4.34</td>
</tr>
<tr>
<td>Global Health Track</td>
<td>0.91</td>
<td>0.20-4.13</td>
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</table>

Publication and overall satisfaction not correlated

November 2016 RIME
Results

Clinical Scenario by Route of Exposure

Clinical Scenario
GI bleeding  Pulmonary edema  Fever  Acute Renal Failure

Legend:
- Reading
- Conf.
- Rounds
- Direct
Results: Route of Exposure

Clinical Scenario

- GI bleeding
- Pulmonary edema
- Fever
- Acute Renal Failure

# of encounters

- Direct

[Bar chart showing the number of encounters for each clinical scenario]
Results: Route of Exposure

Clinical Scenario

- GI bleeding
- Pulmonary edema
- Fever
- Acute Renal Failure

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<th>Rounds</th>
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</table>
Observation of Student H & P

38.2
26.7
40.6
42.7
24
30.4

Percent reporting at least one observation

C1 C2 C3

Observed performing interview
Observed performing physical exam

Cohort
Observation of MS3 H & Ps

Percent of MS3s observed performing H & P at least once

- Observed performing interview
  - C1: 30.4%
  - C2: 38.2%
  - C3: 26.7%

- Observed performing physical exam
  - C1: 40.6%
  - C2: 42.7%
  - C3: 24%
A “Busy” Slide

• Do not subscribe to this trap:
  – “Now I know this is a busy slide but I will walk you through it”....

• Opt for effective graphics
What are Effective Graphics?

• Show the data
• Serve a clear purpose
• Support the message
• Avoid distortion
• Space-saving
• Encourage comparison
• Closely integrated with statistical & verbal descriptions of data

This map drawn by Charles Joseph Minard portrays the losses suffered by Napoleon's army in the Russian campaign of 1812. Beginning at the left on the Polish-Russian border near the Niemen, the thick band shows the size of the army (442,000 men) as it invaded Russia. The width of the band indicates the size of the army at each position. In September, the army reached Moscow with 100,000 men. The path of Napoleon's retreat from Moscow in the bitterly cold winter is depicted by the dark lower band, which is tied to temperature and time scales. The remains of the Grande Armée struggled out of Russia with 10,000 men. Minard's graphic tells a rich, coherent story with its multivariate data, far more enlightening than just a single number bouncing along over time. Six variables are plotted: the size of the army, its location on a two-dimensional surface, direction of the army's movement, and temperature on various dates during the retreat from Moscow. It may well be the best statistical graphic ever drawn.
Limitations

Think about the main ones that threaten your study
Limitations

- **Generalizability**
  - One institution

- **Sampling bias**
  - Intern participation lowest in winter months

- **Technical difficulties**
  - PPC failures
Conclusion

• Wrap up
• Be sure to answer your hypothesis question
• Implications
  – Are there important implications of this work for patient care?
  – Is further work needed?
Acknowledgements

• Your Mentor
• Anyone who has helped you with your project (lab techs, statisticians, collaborators, students, etc)
• Your Cluster Group Leaders & Members
• You do NOT have to read everyone’s name

• FUNDING that your project has received (including from SRP®)
Things to Check/Lifesavers

• Go on a stake-out
  – Time to practice in the room
  – Double (or triple check)
    the version of your presentation you upload

• PRACTICE!!

• Notes or scripts
  – Do not read your script verbatim
    • Dreaded monotone
  – Make it conversational
Lifesavers

• “Powerful pauses”
  – Get attention
  – Reformulate your thoughts
  – Avoid the “uhm”

• Question for Q&A
  – “A question that I am often asked is” for time to kill

• Timing it
  – Even if you think you have done it enough (Slideshow/rehearse timings)

• Practice at home!
SRP Questions

• SRP ?s
  • When your mentor or cluster group leader can’t answer…
  • Email us:
    • Logistical (Candi Gard)
    • Mentor/project issues (Dr. Wolfson, Dr. Press)