Choosing Successful Residents:
Do We Have a Gambling Problem?

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Objectives

- Define what we know about predictors of success in residency training, including predictor strength, interdependence and independence.
- Articulate how personality inventories have been used to screen applicants for medical training programs.
- Discuss how the uncertainty in our selection criteria impacts our ability to predict future performance.
- Evaluate whether we have a gambling problem when it comes to trainee recruitment.

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Defining success* AFTER residency?
Conventional

- Academic output, peer-reviewed publications
- Awards
- Board Certification
- Fellowship positions
- Independent research funding
- Innovation and Intellectual Property
- Leadership positions
  - Departmental, Hospital or University level
  - SCCM, ABA, AMA, ASA, etc.
- Master clinician
- Master educator
- etc.

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Defining success* AFTER residency?
Additional

The ACGME, Program Requirements (Int. B, 2016)

Full spectrum of patient care related to anesthesiology
Conduct, interpret, and apply the results of medical research
Leadership of health services delivery,
Prudent fiscal resource stewardship,
Quality improvement,
Supervision, education, and evaluation of the performance of personnel, both medical and paramedical, involved in peri-operative and peri-procedural care

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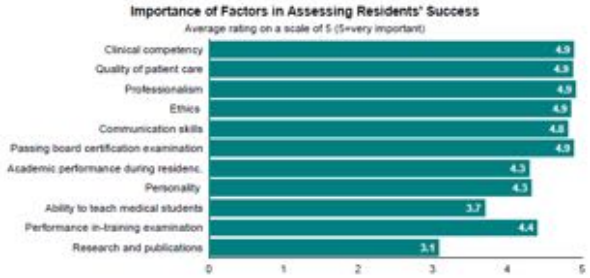
How do 'we' define success* DURING residency?

2016 NRMP Survey of Anesthesiology Program Directors
N = 51 or 40%



http://www.nrmp.org/wp-content/uploads/2016/09/NRMP-2016-Program-Director-Survey.pdf

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The definition of success varies widely and also depends on who is doing the defining:

Chair
Program Director
Trainee
Faculty Member
Patient
ACGME
ABA
Hospital
Partners in a group
etc.

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In all cases, we want Performance

Performance is what you actually do *in everyday practice (**typical** performance)*

Competence is what you can do *under optimal conditions (**maximum** performance)*

In most cases medical school measures ***competence***.
Presentation on rounds
Shelf exam, USMLE exam
Interview day

Performance and *competence* are different

Rethans JJ, et al., Fam. Pract. **7** 168 (1990)
Rethans JJ,et al., Med. Educ. **36** 901 (2002)

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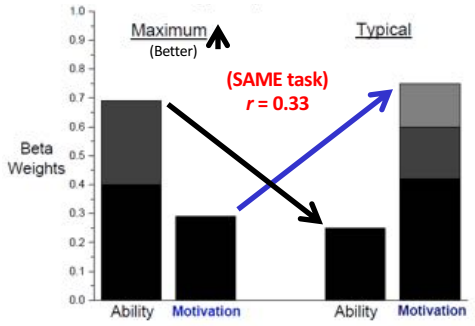
What predicts performance under different conditions?
Maximum vs. Typical Situations (Same Task!)



Klehe et al., J. Appl. Psych. **92** 978 (2007) – after Table 3 and Table 4
Beus et al. Human Perf. **25** 355 (2012)

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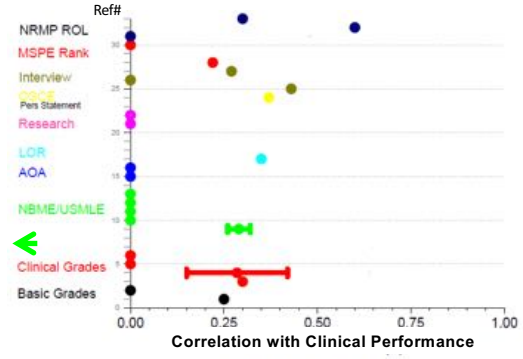
Representative **correlations** of medical school metrics and **resident clinical performance** (various specialties & times)



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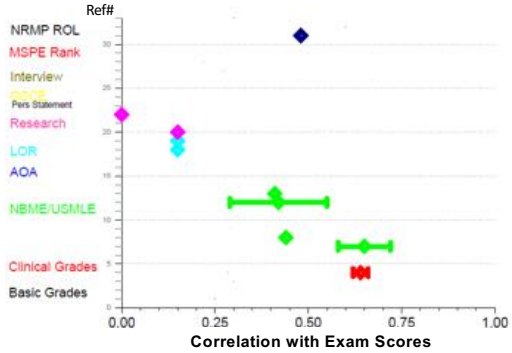
Representative **correlations** of medical school metrics and **resident exam scores** (various specialties & times)



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A word about correlation
What can you conclude with a correlation of 0.25?

If
X correlates with Y and $r = 0.25$
$R^2 = 0.25 \times 0.25 = 0.063$

Then
X explains 6.3% of the variance in Y

Example:
If **USMLEs** correlate with **clinical performance** at ***r* = 0.28** that means you can use USMLE scores to explain less than **8 %** of the variation in clinical performance scores.

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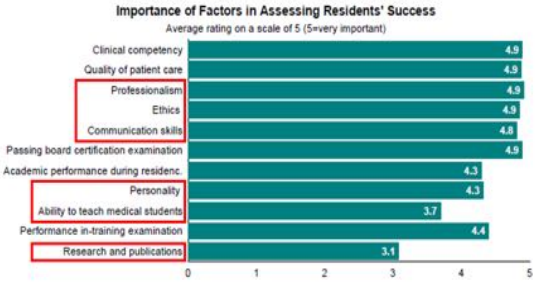
Should we gamble on inventories



http://www.nrmp.org/wp-content/uploads/2016/09/NRMP-2016-Program-Director-Survey.pdf

Should we gamble on inventories

Importance of factors cited for ranking applicants

http://www.nrmp.org/wp-content/uploads/2016/09/NRMP-2016-Program-Director-Survey.pdf

Inventories: betting "max lines"

Inventories: Anesthesia

- California Personality Inventory
- State-trait anxiety inventory
- The Vigil
- Strong Interest Inventory
- Cattell's Sixteen Personality Factor Questionnaire
- International Personality Item Pool Representation (NEO PI-R) Revised as"Big Five"
- Myers-Briggs Type Indicator

Merlo et al. Med. Teach. 31, e551 (2009)
Reich et al., Anesth. & Analg. 88(5), 1092 (1999)
Schnell et al. J. Clin. Anesth. 24(7), 566 (2012)

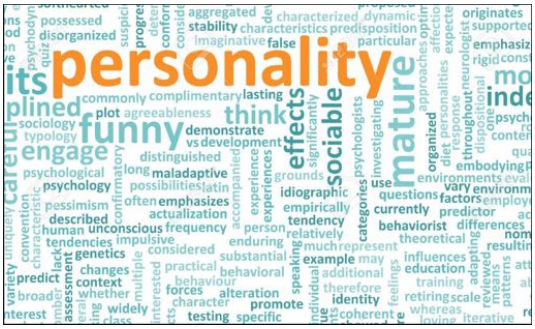
Correlations and significance

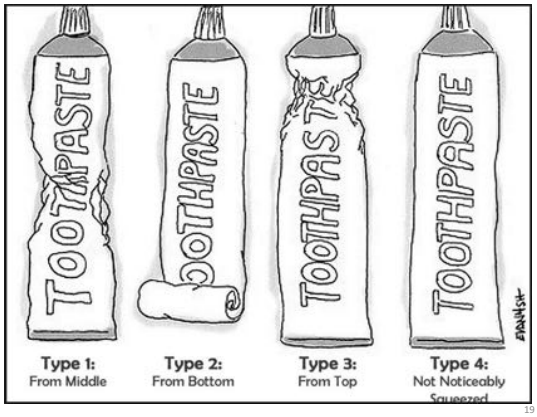
high performers - anesthesiology

- Very limited data = not generalizable
- CPI Correlation (.20 to .26):
  - Independence, empathy, socialization, well-being, achievement via conformance
- IPIP NEO Statistical significance (*p<.05 to **p<.0.01)
  - *Scored higher on cooperation, self-efficacy, adventurousness, neuroticism
  - **Scored lower on neuroticism, anxiety, anger, assessing vulnerability

Merlo et al. Med. Teach. 31, e551 (2009)
Reich et al., Anesth. & Analg. 88.5, 1092 (1999)

So many inventories!





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Challenges with inventories

The Most Effective Method to Pass a Personality...
www.youtube.com/watch?v=zX0HGlxfLp4
Jul 27, 2015 ... The screening will detect if the probable employee... ... The Most Effective Method **to Pass a Personality Test** during **Employment** Screening ... Up next. **How To Pass A Pre-Employment Personality Test Part 1** - Duration: 9:48. ... **How to** Use **a Pre Employment Test**.

Cornell HR Review. http://www.cornellhrreview.org/personality-tests-in-employment-selection-use-with-caution
Duckworth et. al., Edu. Res. 44(4), 237 (2015)

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Moving from slots to table games

can we increase our odds

- Deficits in professionalism
- Academic difficulties
- Communication
- Teamwork
- MSPE = read for the negative or lack of the positive
- Examine the outliers

Baker. Acad. Med. 88, 1206 (2013)

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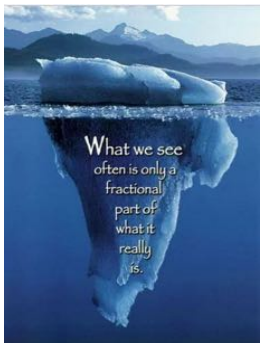
Tip of the Iceberg



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The consequence of **independent** traits

We want residents that have:

High IQ

High Grit (i.e. high conscientiousness) Duckworth

High Rationality quotient (RQ) (unbiased thinking) Stanovich

But, It turns out that these are independent traits!

Example:

Let's be choosey and try to pick an applicant who is in the top 30% for EACH trait (top 30% for IQ, Grit and RQ).

Unfortunately, less than 3 in 100 applicants will have all 3 traits in this top range (top 30%). *calc*: 0.3 x 0.3 x 0.3 = 0.027 = 2.7% of the applicant pool (which is 0.027 x 1771 = 48 people).

Duckworth et al. J. Pers. Soc. Psych. **92** 1087(2007)
Stanovich et al. Curr. Dir. Psych. S ci. **22** 259 (2014))

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We appear to have a gambling problem

1) The predictors are **weak** (USMLEs, Class Rank, LoRs, AOA, Clinical grades, Research, Interviews, etc.). This is made worse by using maximum performance metrics to predict typical or everyday performance.

2) Some important **traits** are **independent** of each other

The combination of **weak independent predictors** means that our decisions contain a high degree of **uncertainty** when it comes to determining which applicants will become highly successful residents. This is like rolling the dice and hoping for snake eyes! (which does happen but only 1/6 x 1/6 ≈ 3% of the time)

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When it comes to selecting anesthesia residents
It's a zero-sum game:

If you recruit the best, then someone else can't

Table 1 Number of Applicants and Positions in the 2016 Main Residency Match *by Preferred Specialty**

Preferred Specialty	Total Positions Offered	Total Number of All Applicants	Number of All Applicants Per Position	Number of U.S. Seniors			Number of U.S. Seniors Per Position
				Matched	Not Matched	Total	
Anesthesiology	1,696	1,771	1.04	1,048	28	1076	0.63

http://www.nrmp.org/wp-content/uploads/2016/09/Charting-Outcomes-US-Allopathic-Seniors-2016.pdf

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Hoping for X but getting Y

What to do? → Manage, Manage, Manage

Set expectations at the outset
Teach them, **show** them, **council** them, **coach/mentor** them

If issues arise, **PROMPTLY intervene**!
Consider these resources:

- Clinical Competency Committee (CCC)
- Occupational Health (Fitness for Duty)
- Mental Health consultation
- Physician Health Services (PHS)
- Office of General Council (OGC)
- Graduate Medical Education (GME) office
- Leave of Absence (LOA)

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Thanks for your attention

Questions?

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