What does it mean to be smart?

Intelligence and Ability in Professional Astronomy

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Self-Reflection

Think of something that challenged or frustrated you recently.

Did you try to address the challenge?
   If yes: How did you feel while you were trying?
   If no: What was undesirable about trying?

How do you feel about your own abilities, as a result of this experience?
My Goals

• Share a perspective that has helped me address challenges in (and outside of) grad school

• Provoke discussion about intelligence and ability

• Consider whether certain attitudes can promote equity in astronomy

• Share a few articles for further reading

• Acknowledge colleagues who have also considered these issues
What Makes a “Good” Astronomer?

• Understand scary equations
• Asks good question
• Ability to communicate efficiently
• Answer the right questions timely
• Get funding
• Connect apparently disparate ideas
• Publish
• Time management, multi-tasking
• Having resourceful friends
• Find things that other people missed
• Finish what you start
• Attend colloquium
• Collaborate

• Knowledge of astro current events
• Intuitive understanding of non-specialization
• Specialization
• Prizes (e.g., Nobel)
• Stress management
• Interpersonal skills
• Group management
• Mentoring
• Teaching
• Produces good students

(group list, 3/16/12)
What Makes a “Good” Astronomer?

- Publishes frequently
- Publishes meaningful results
- Has original ideas
- Makes connections between theory and observations
- Aware of and engaged with the latest research
- Has technical expertise
- Gets telescope time
- Gets grant money
- Leads successful projects
- Collaborates broadly
- Attracts mainstream media to their research

- Presents ideas clearly (gives good talks)
- Receives teaching awards or is regarded as a good teacher
- Mentors students who also become “good” astronomers
- Earns awards (e.g., AAS prize lectures) or society membership (e.g., AAAS)

(NJM’s list)
Professional “Intelligence”

- Absorbing new information
- Analytical thinking
- Creativity
- Writing ability
- Speaking ability
- People skills

**Fixed mindset:**
These are innate abilities that some people possess.

**Growth mindset:**
Anyone can develop these abilities through practice and/or instruction.
How does a choice of mindset (fixed, growth, other) affect your response to the following scenarios?

• It takes you weeks or months (or longer) to complete a task you thought would be easy.

• You have a question during a talk but wonder if asking it will reflect your ignorance of the background material.

• You discover a crucial mistake in results you have published.

• Your work is criticized.

• You feel like an imposter.

• You consider pursuing a career outside astronomy.

• You finish a major project and get lots of positive feedback.
Some Follow-Up Questions

(generated during group discussion on 3/16/12)

• Are you 100% responsible for improving your own abilities, or can growth be handed down by others with experience and expertise?

• When is it better to consult an expert, versus work on a problem yourself?

• Even if you think it’s possible to get better at absorbing information, or at being creative, how do you do it?
A Few References

  full book on fixed vs. growth mindset (self-help format)

• Carol Dweck, “The Secret to Raising Smart Kids.” 2007, Scientific American
  short article describing fixed vs. growth mindset

  research article on brain wave patterns in people with different mindsets

• Lucas Laursen, “No, You’re Not an Imposter” 2008, Science Careers
  short article describing imposter syndrome and solutions -- including
  self-assessment. Includes links to other resources.