

DON'T PANIC

– or –

how to survive a PhD

Don't Panic

– or –

how to survive a PhD

Jilles Vreeken



UNIVERSITÄT
DES
SAARLANDES



CISPA
HELMHOLTZ CENTER FOR
INFORMATION SECURITY

mpi | max planck institut
informatik

Disclaimer

- 1) I'm not the "useful" type of doctor

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- 2) Any advice you'll get is useless.

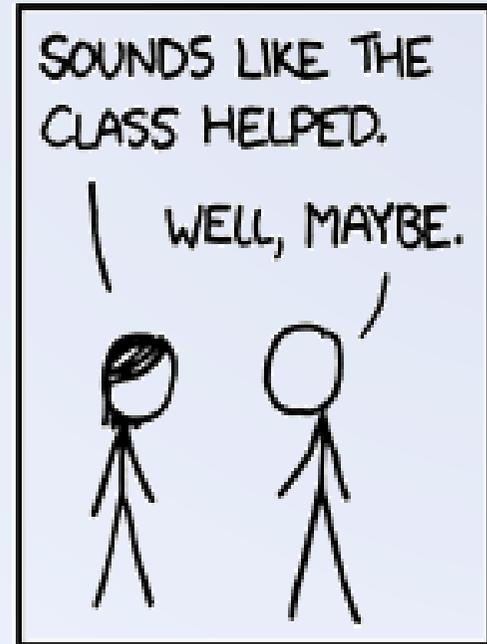
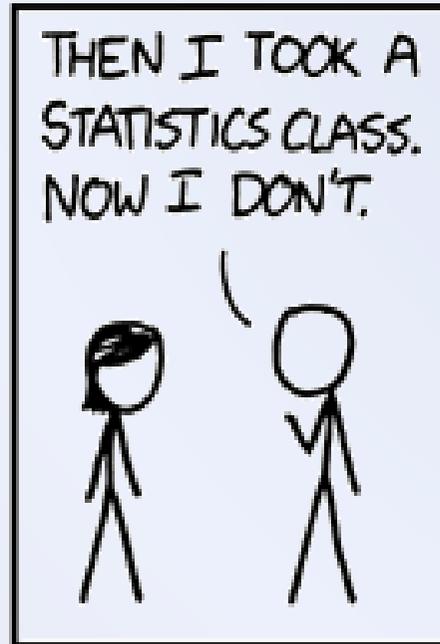
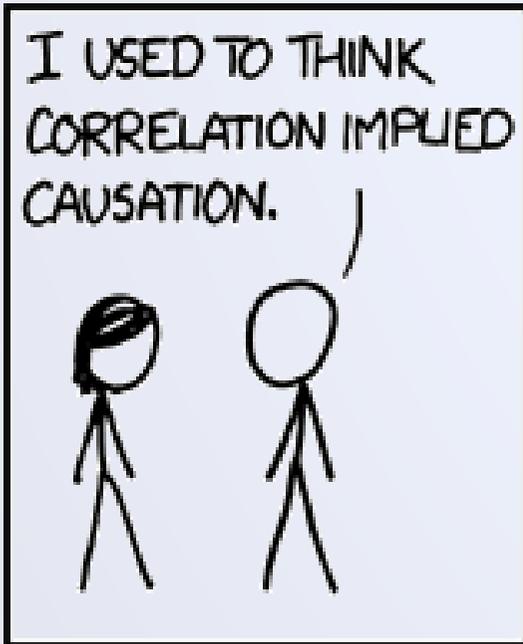
Don't ask **survivors** for advice.

“Russian roulette is a great way to make money!”

Disclaimer

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- 3) This is not a scientific presentation.

Disclaimer



Disclaimer

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- 3) This is not a scientific presentation.
- 4) I stand on the shoulders of giants.



and many, many others

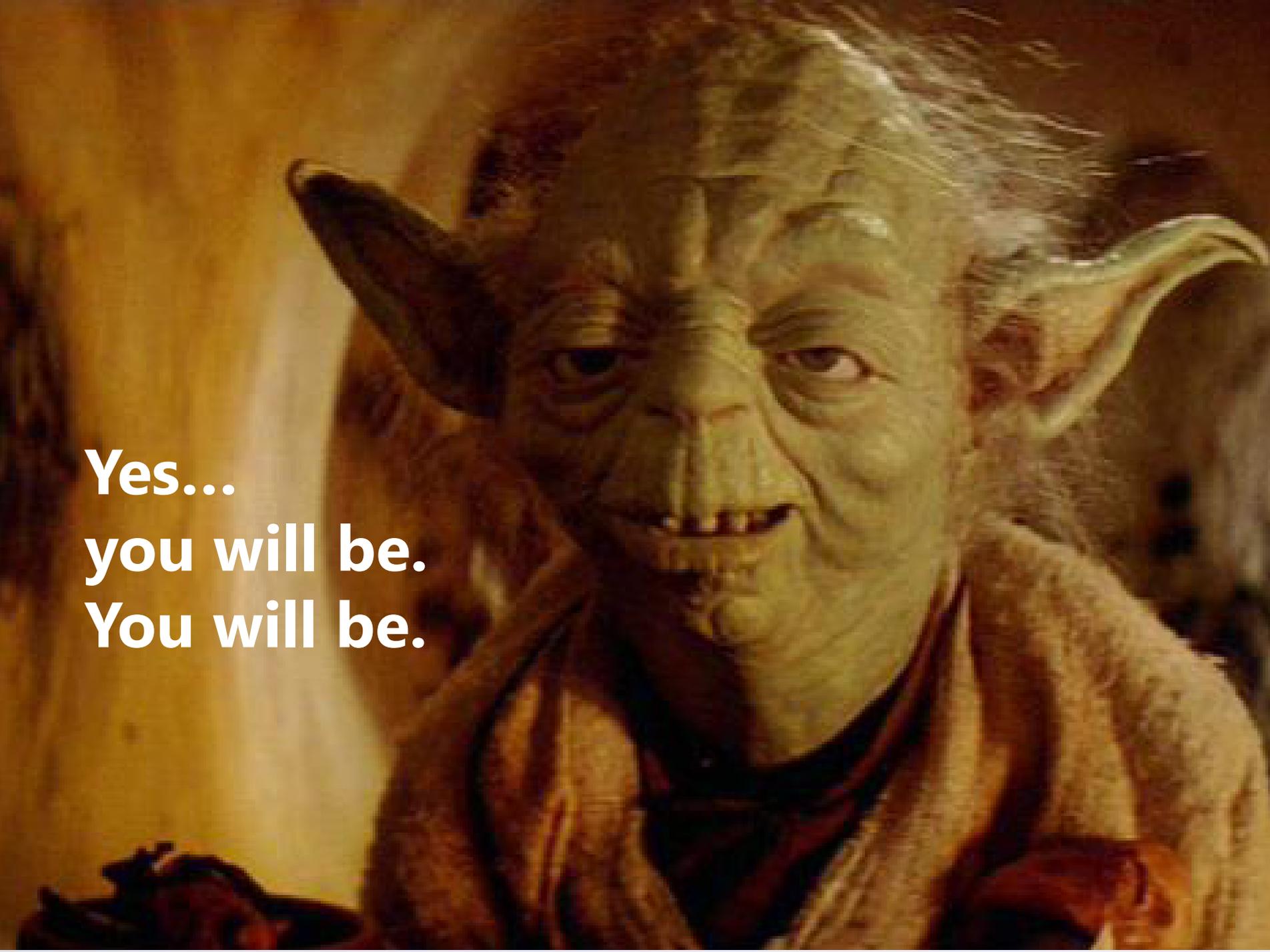
Let's start with

the **best** advice
you'll *ever* get...

**DON'T
PANIC**



I'm not afraid.



Yes...
you will be.
You will be.

Time of Disillusionment

I have some **bad** news for you

Doing a PhD will help you find out

- there are people who are better than you
- you are not good at everything
- being good at courses is not enough
- doing what you are told may not be enough

And, most prominently: **life is unfair**

- people less smart or hard-working will be luckier, get better results
- people who have done worse work will end up with better jobs

First things first

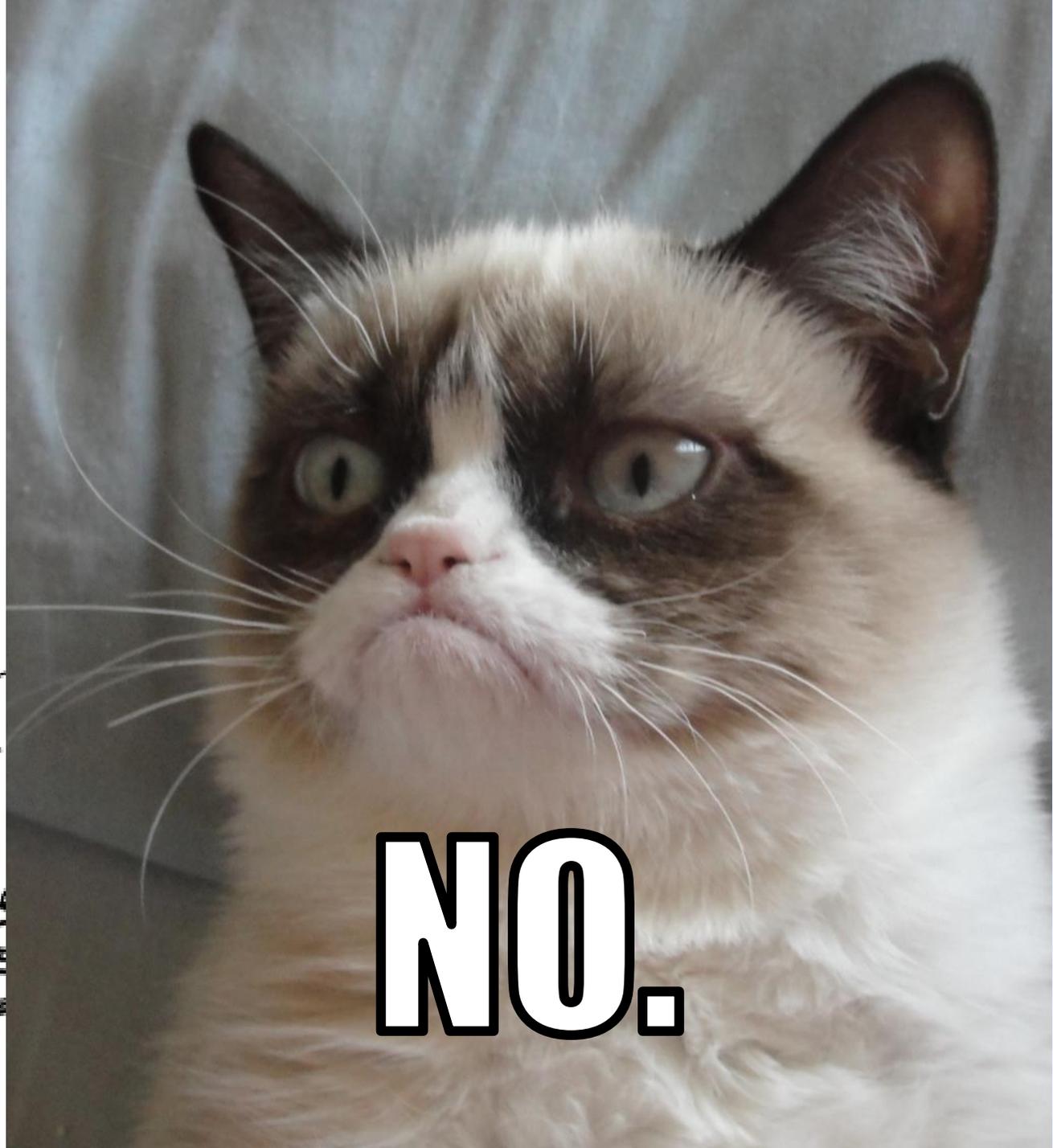
Why do a PhD?



Its gonna
make me
rich!

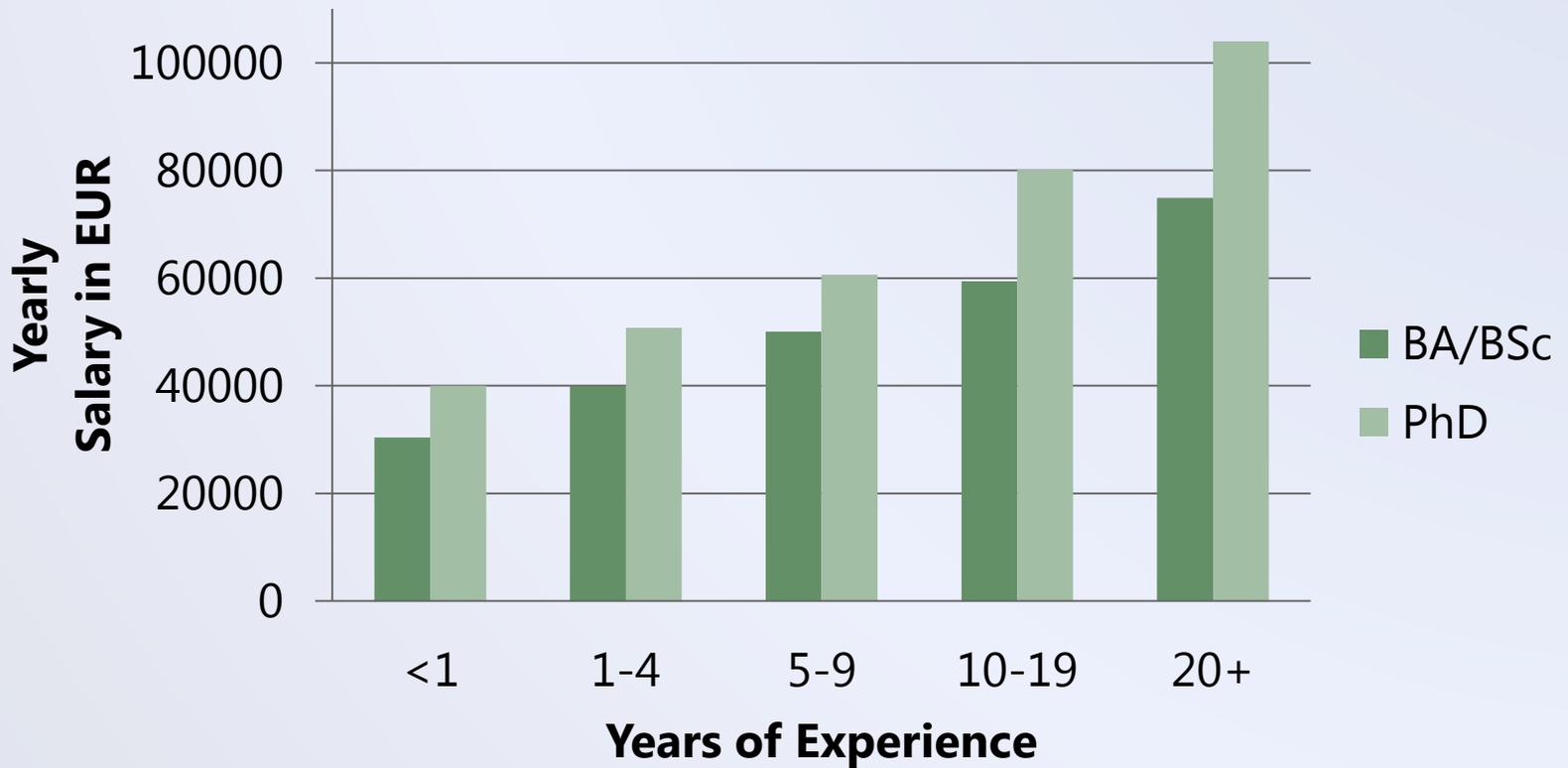


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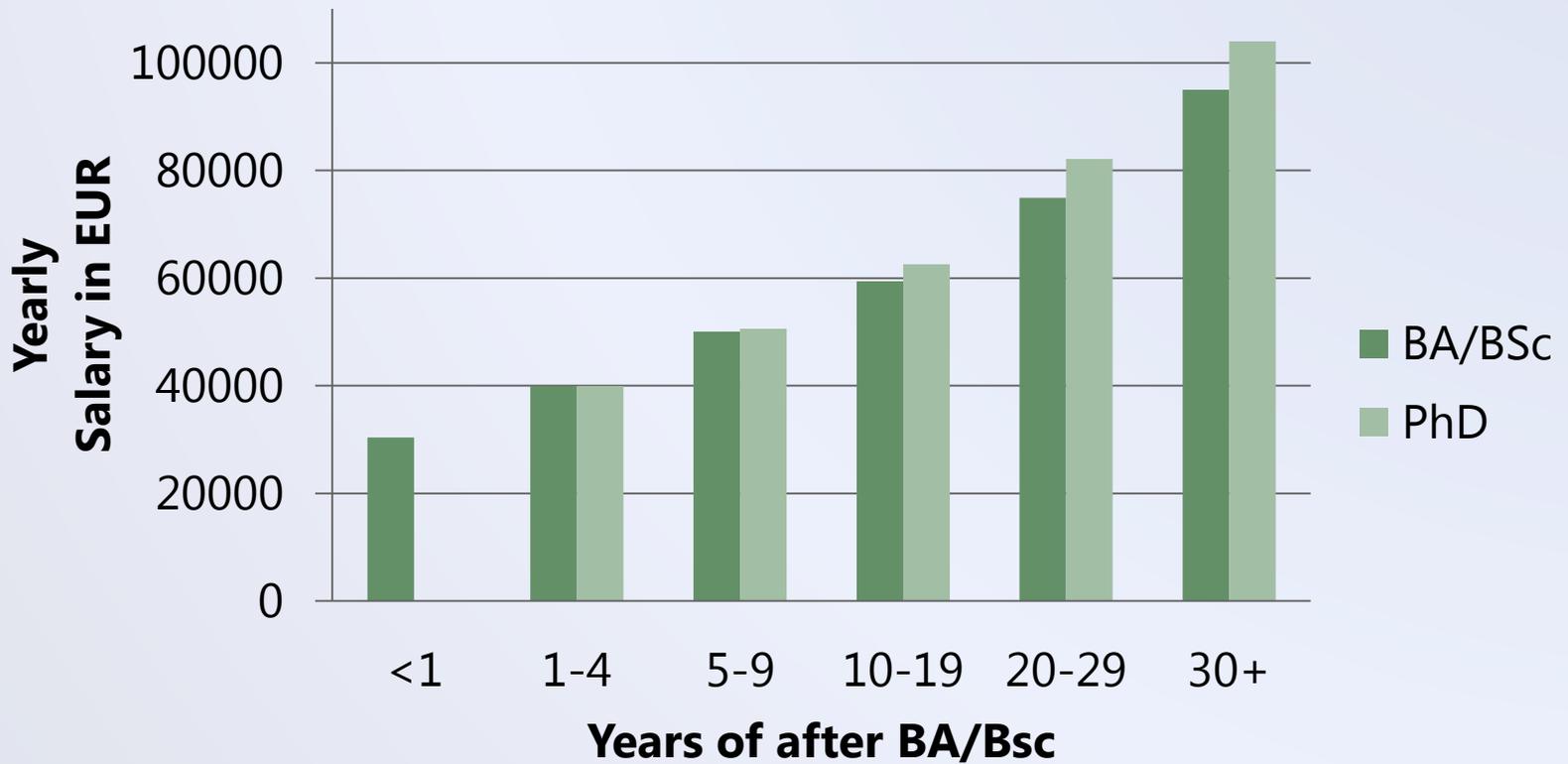


NO.

Salary by Degree



Salary by Degree



Variation in Salary

Years of experience explains 28% of the variation in salaries. Knowing whether you are a manager or have a PhD add another 4 percentage points.

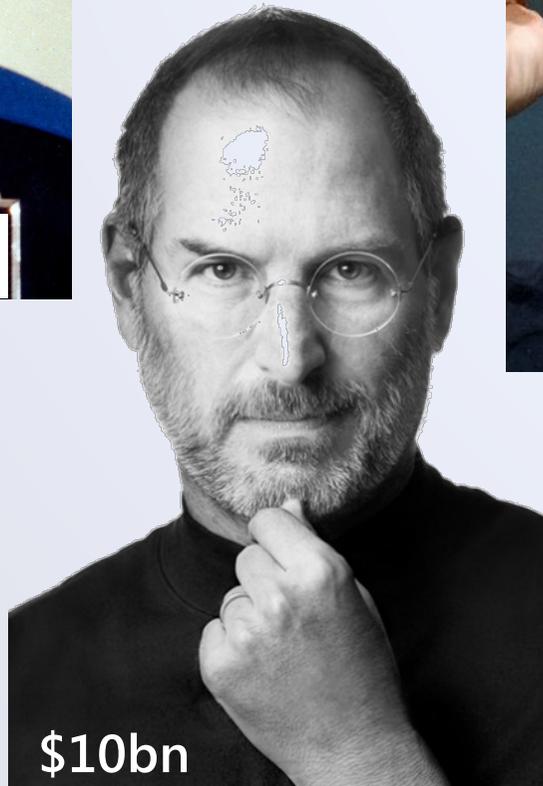
Variation in Salary

Years of experience explains 28% of

5 extra years of experience
worth **more** than a PhD!

PhD add another 4 percentage points.

Some degree-less people



Some degree-less people



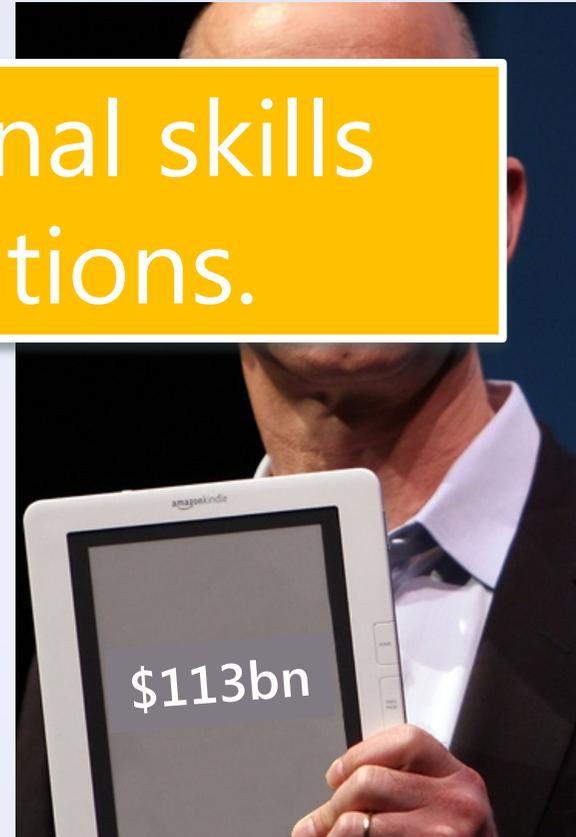
Skill sets and interpersonal skills
vs. academic qualifications.



\$10bn



\$60bn



\$113bn

First things first, again

Why do a PhD?



Because
my PhD
is gonna
change
the world!



I'm going
to change
the world
and this is
my plan...

Because
my PhD
is gonna
change
the world!



Because
my PhD
is going to
change
the world!

Big Problems are **Big**
because they are **Hard**

NO.



Because
my PhD
is gonna
change
the world!

Big Breakthroughs
are *rare, very rare.*
Once-a-career rare,
if you're lucky.

NO.



Because
my PhD
is going to
change
the world!

If you want to change the world,
become a politician.

NO.



**DON'T
PANIC**

If you're here for the right reasons...

Doing a PhD can be **awesome**

But, what is the right reason?

If you're here for the right reasons...

**The One and Only Right Reason
to pursue a PhD:**

you are **fascinated** by a topic,
you **need** to know all there is,
and **want to discover** even more.



You'll have to like both the big results and the little ones

Any Reasons Left...?

Any Reasons Left...?

BBC

News

Sport

Weather

Travel

Future

NEWS EDUCATION & FAMILY

Home **UK** Africa Asia Europe Latin America Mid-East US & Canada Business Health Sci/Environment

England Northern Ireland Scotland Wales UK Politics **Education**

5 July 2012 Last updated at 14:36 GMT

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Well-being and education "go together"

By **Angela Harrison**

Education correspondent, BBC News

People who are better educated are more likely to say they are satisfied with their lives, a study suggests.

And they are more likely to say that the things they do are worthwhile, according to **research** by the Office for National Statistics.

The study is part of a £2m project launched by the prime minister to try to measure people's happiness and well-being.



People who learn as adults are also more likely to rate their well-being as high

Any Reasons Left...?

BBC

News

Sport

Weather

Travel

Future

05 July 2012

 Office for
National Statistics

Measuring National Well-being - Education and skills

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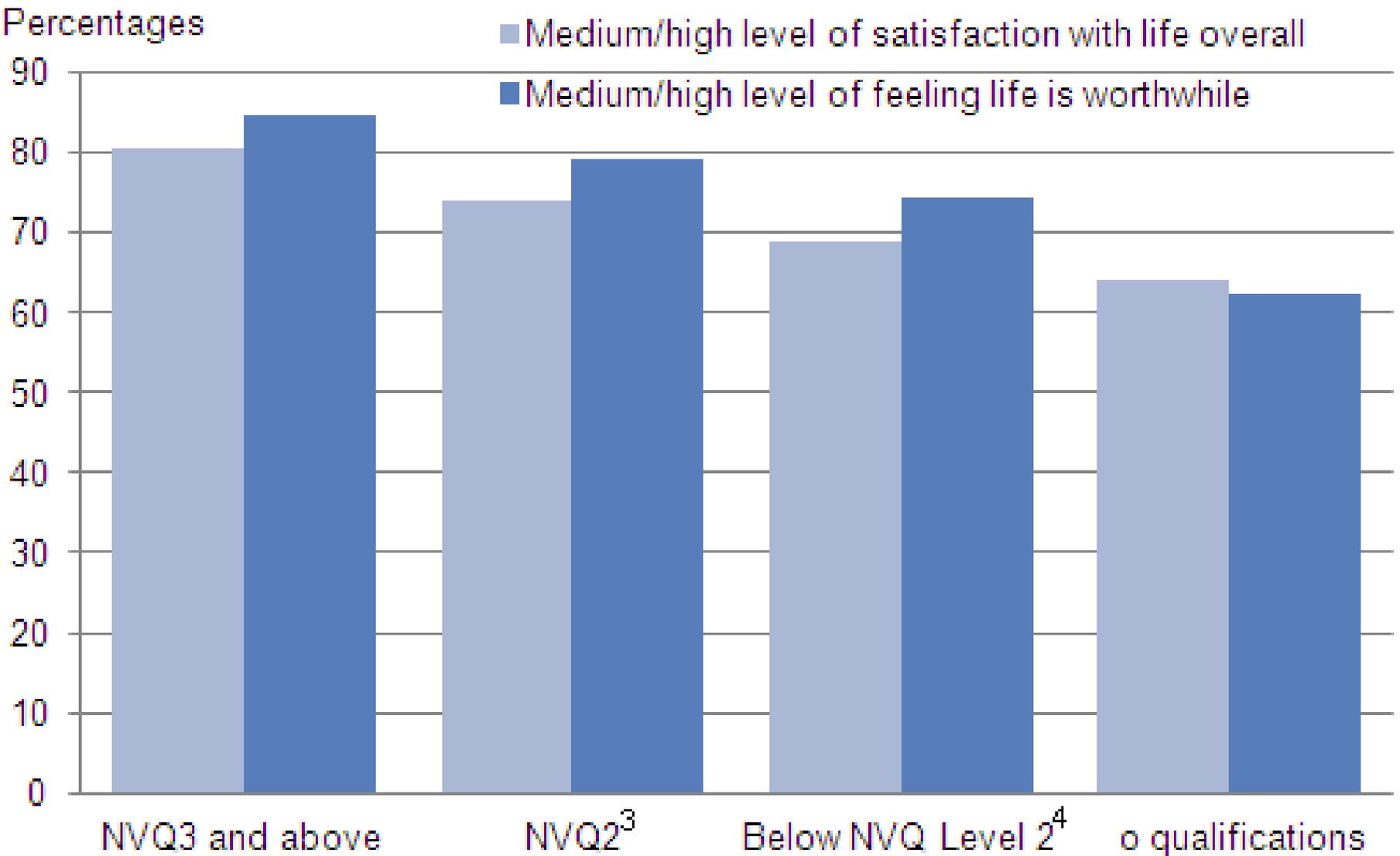
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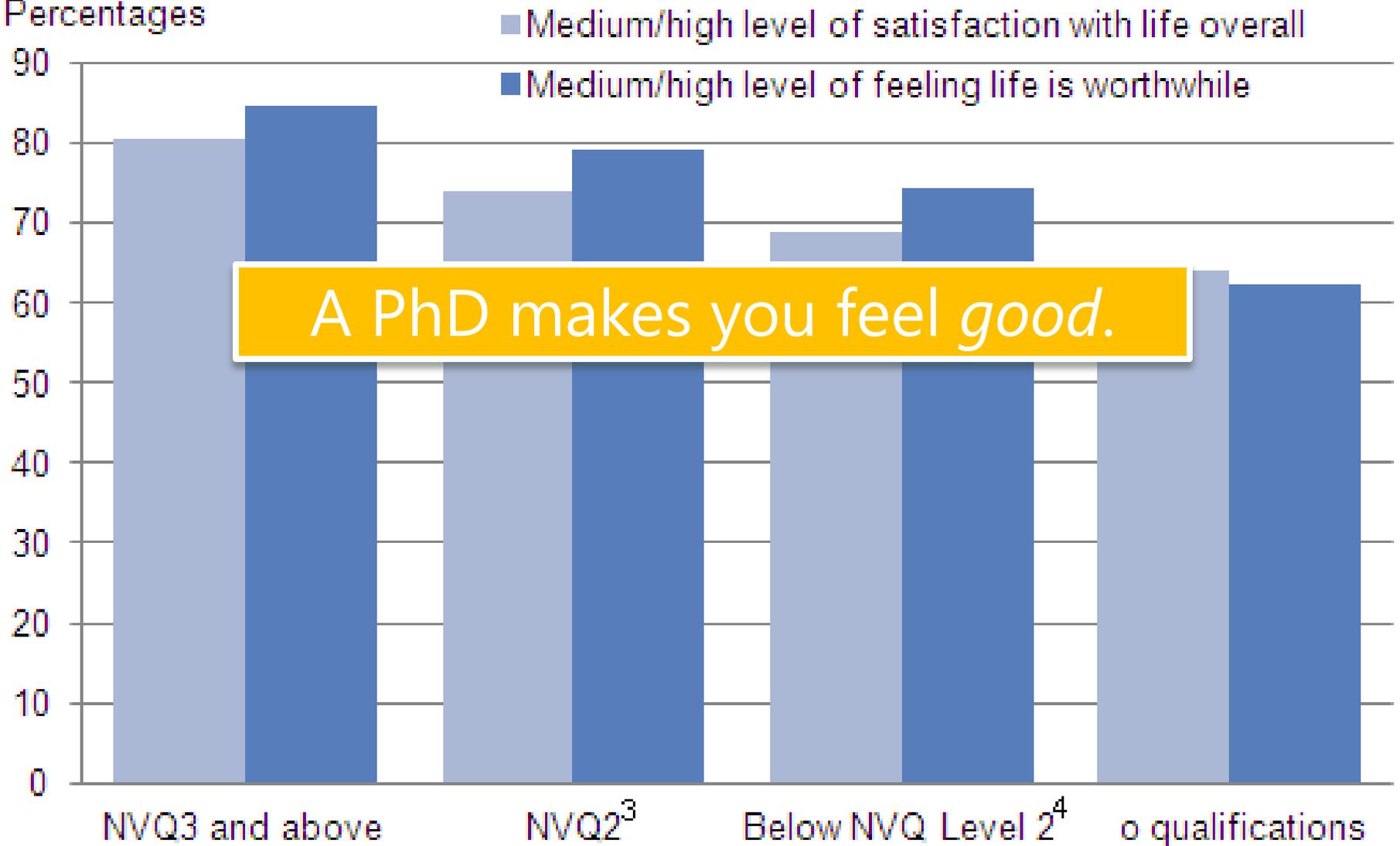
Any Reasons Left...?

Percentages



Any Reasons Left...?

Percentages



A PhD makes you feel *good*.

What's Great about Working in Science

Freedom!

- set your own agenda, schedule, ...

You get to travel regularly

- to New York, Tokyo, Beijing, Vancouver, London...

What dress code?

- I've seen keynote speakers in pajamas

Invisible band uniting all geeks

- helpful, enjoy learning, similar language

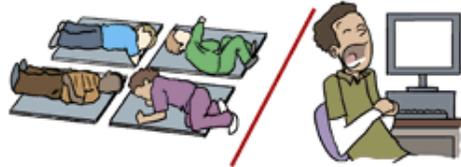
Surrounded by people who never grew up

- smart kids who love to play

What's Great about Working in Science

HOW GRAD SCHOOL IS JUST LIKE KINDERGARTEN

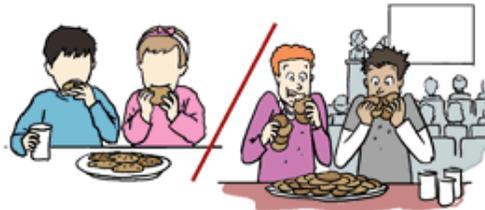
ALL DAY NAPPING IS ACCEPTABLE



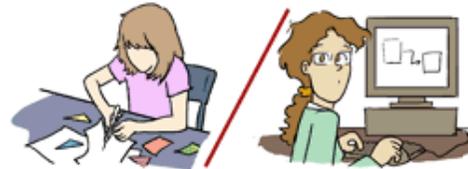
THERE IS CONSTANT ADULT SUPERVISION



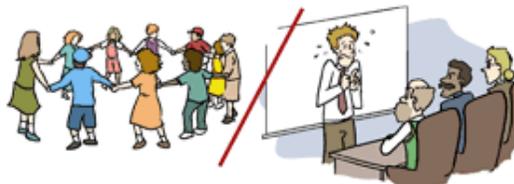
YOU GET COOKIES FOR LUNCH



MOST COMMON ACTIVITY:
CUTTING AND PASTING



THERE ARE NO GRADES
(YOU JUST HAVE TO PLAY WELL WITH OTHERS)



CRYING FOR YOUR MOMMY IS NORMAL



JORGE CHAM © 2010

What's Great about Working in Science

HOW GRAD SCHOOL IS JUST LIKE KINDERGARTEN

ALL DAY NAPPING IS ACCEPTABLE THERE IS CONSTANT ADULT SUPERVISION

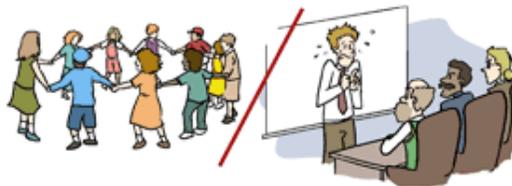


Working in science is **amazing** ...
... if you appreciate its benefits.



THERE ARE NO GRADES
(YOU JUST HAVE TO PLAY WELL WITH OTHERS)

CRYING FOR YOUR MOMMY IS NORMAL



JORGE CHAM © 2010

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Perspective



Industry,
according
to academia

Perspective



Academia,
according
to industry

Perspective



Industry,
according
to academia

Perspective



There's stress everywhere.
Just different kinds.



Industry,
according
to academia

What is a PhD?

What is a ~~PhD?~~ *science*?

What is a ~~PhD?~~ *science*?

*'knowledge or a system of knowledge
covering general truths or
the operation of general laws
especially as obtained and tested
through scientific method'*

What is a ~~PhD?~~ *science*?



What is a ~~PhD?~~ *science*?

Because!

Science is about discovering
things we didn't know

What is a ~~PhD?~~ *science*?

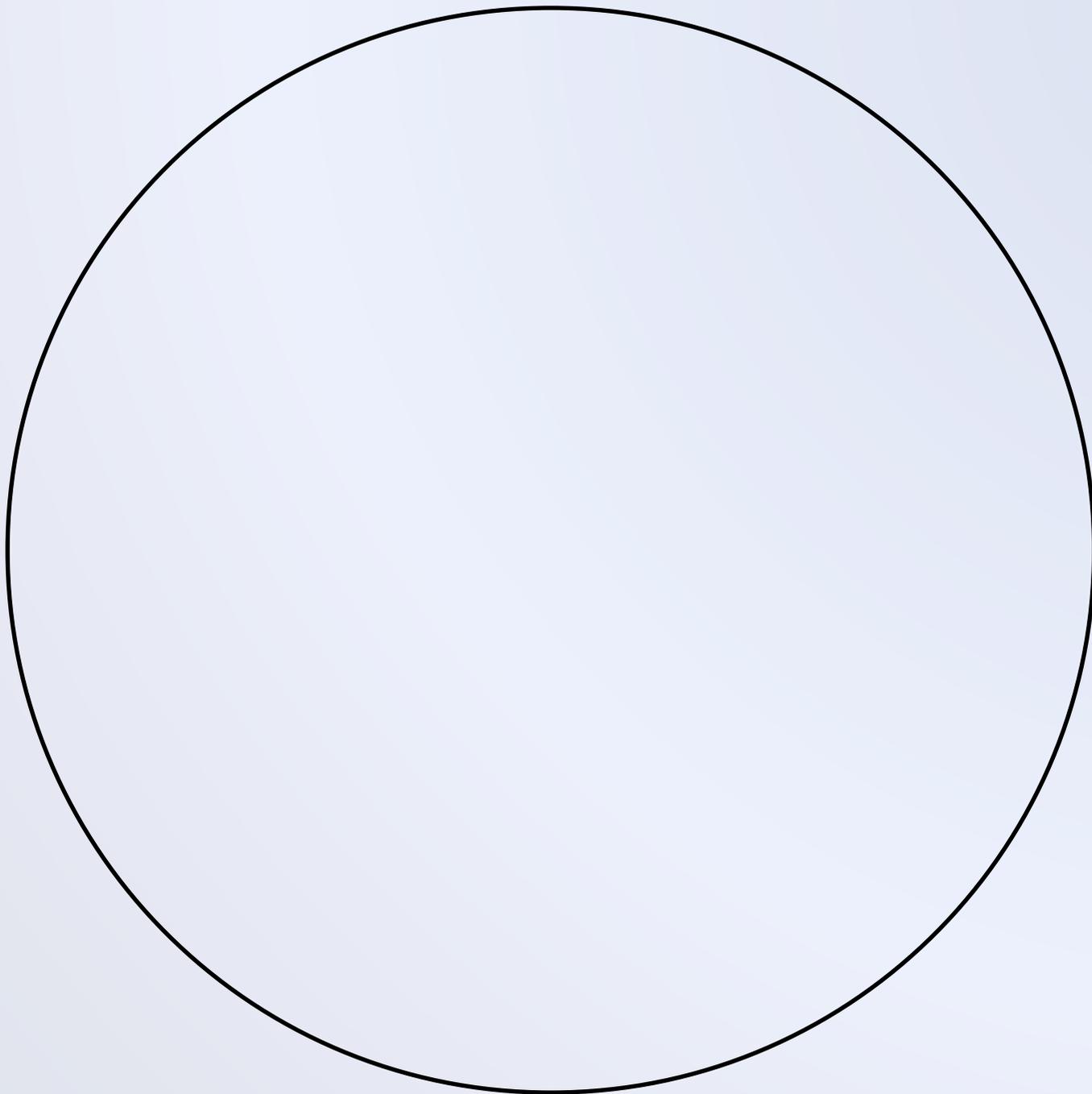
Because!

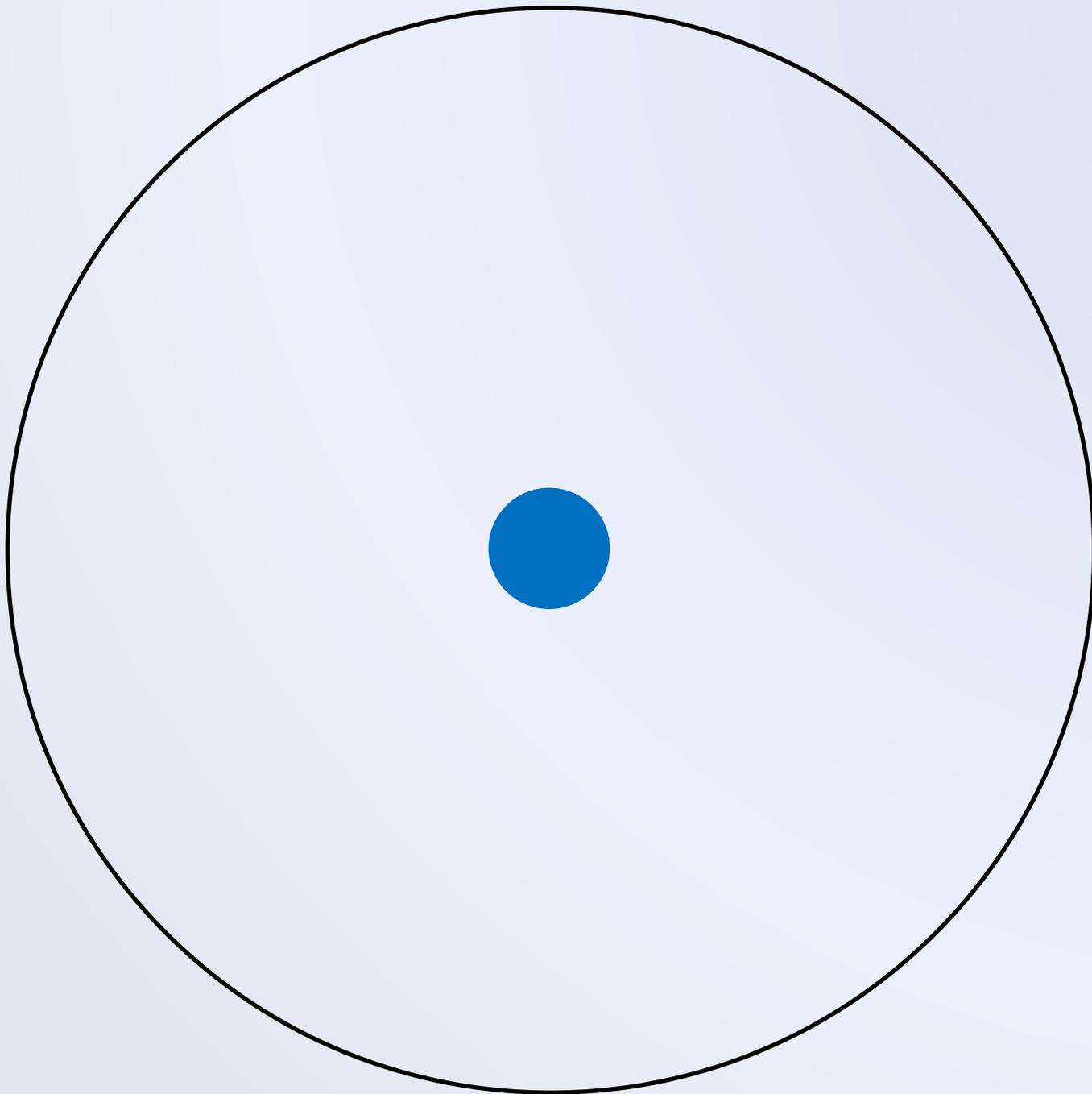
Science is about discovering
new knowledge!

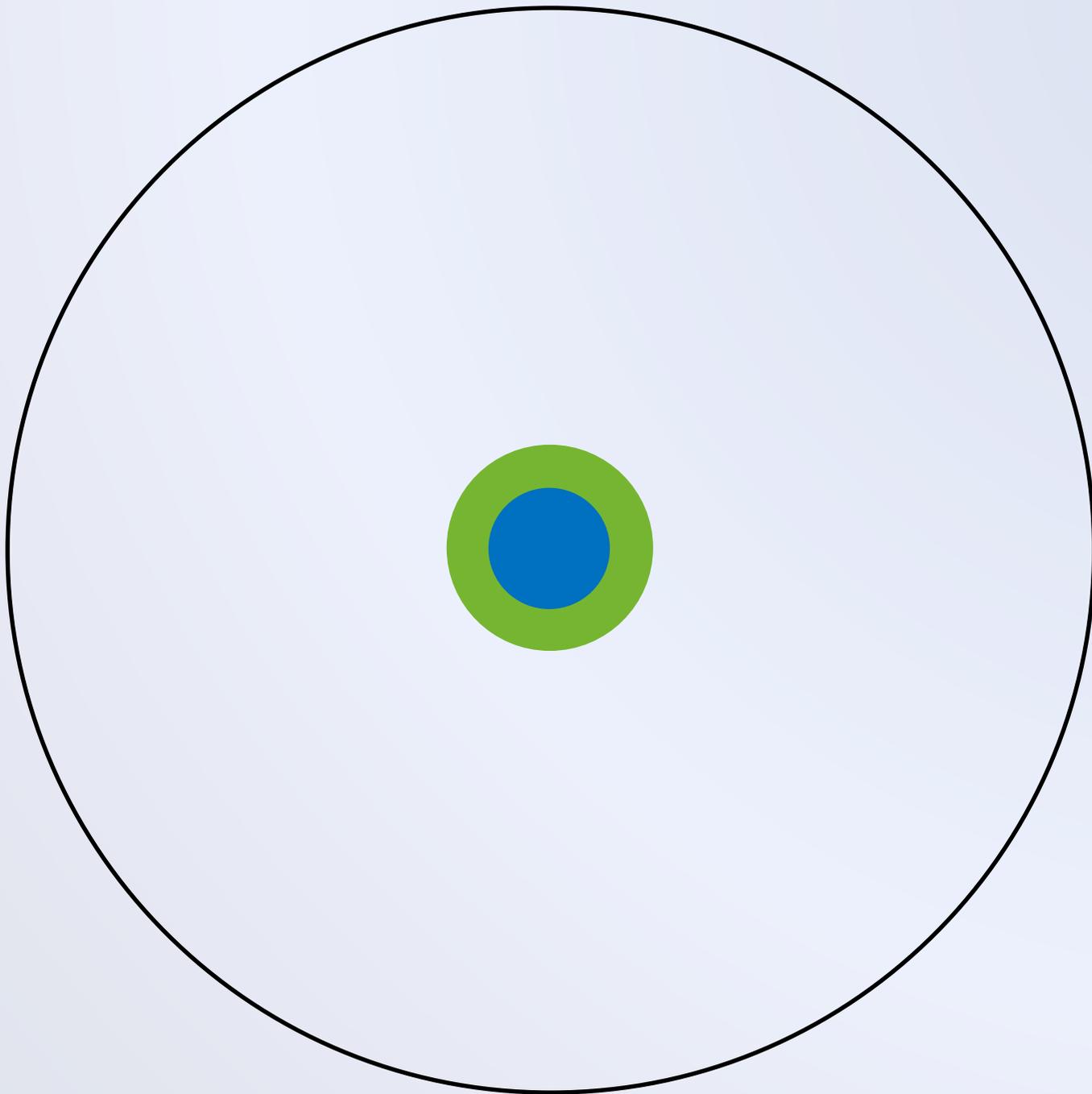
What is a PhD?

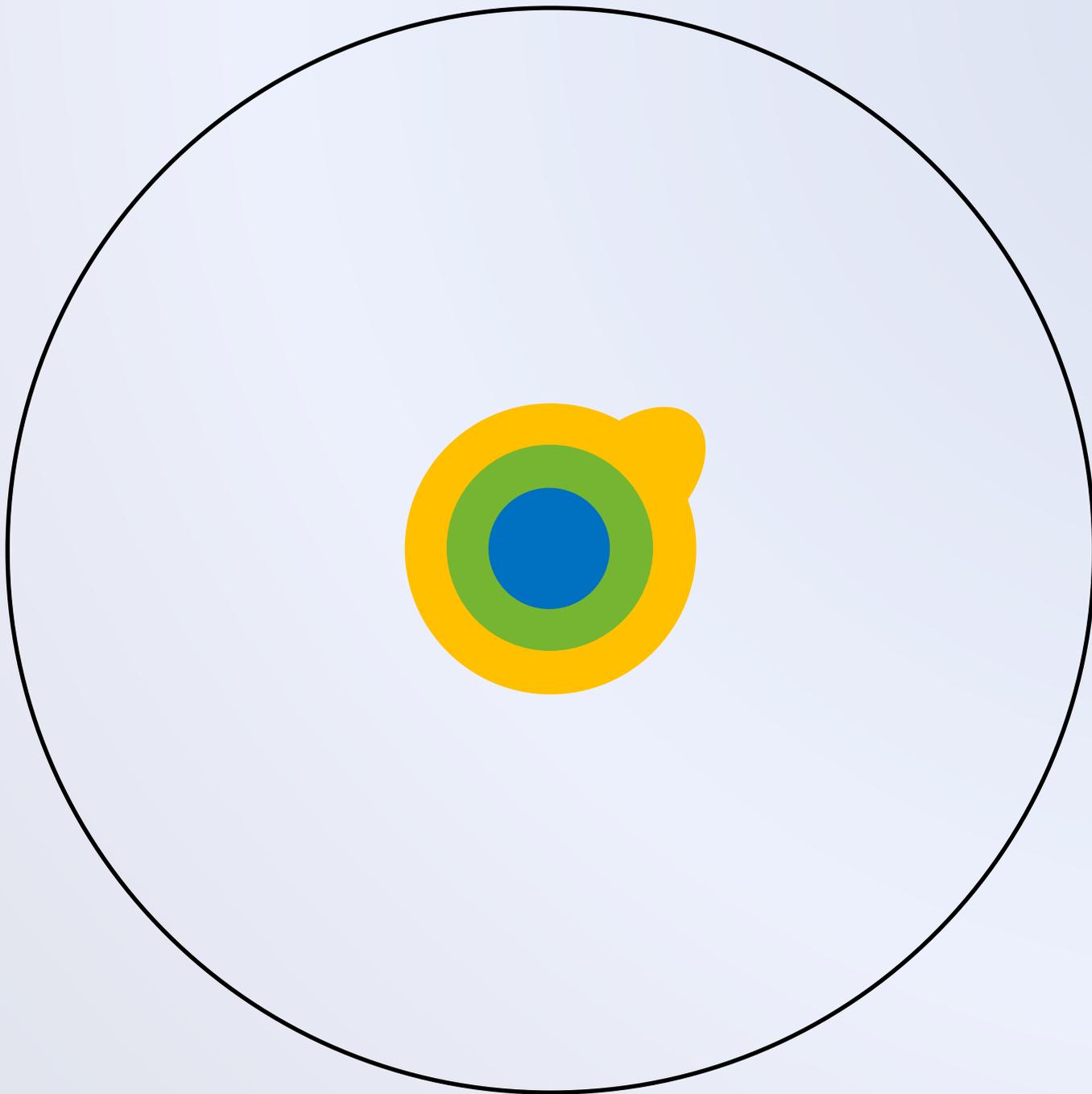
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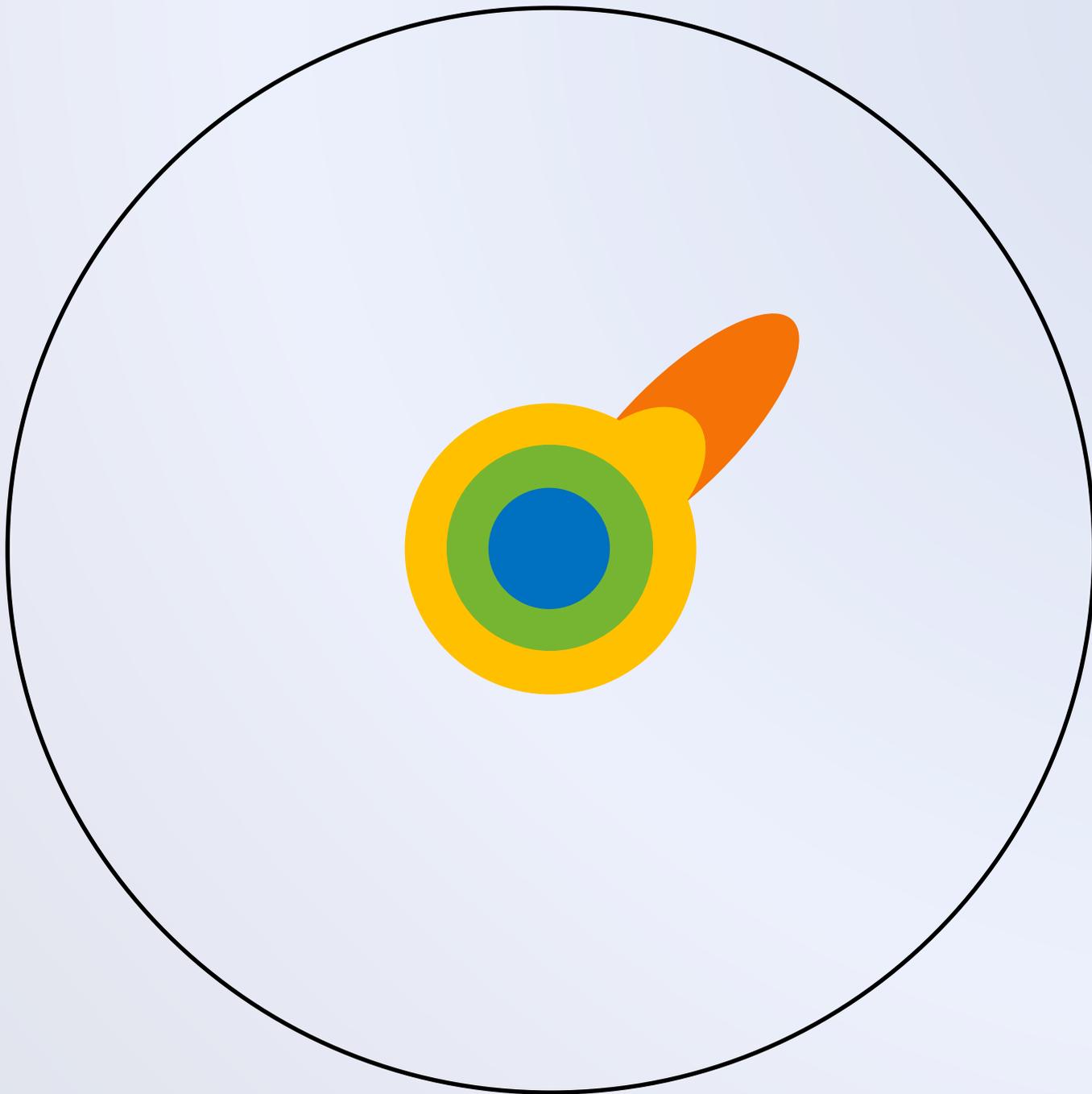
No, really, what is a PhD?

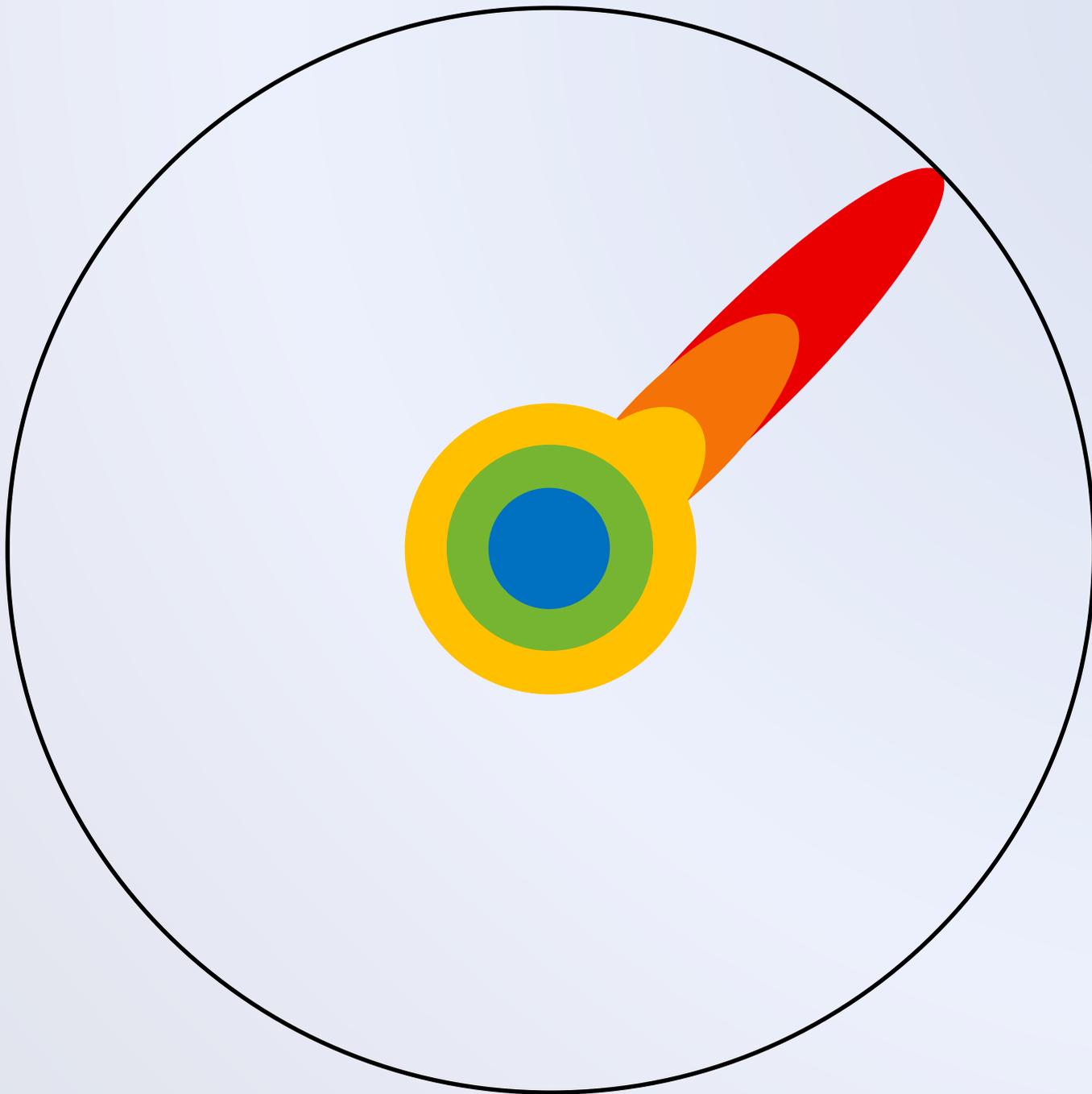


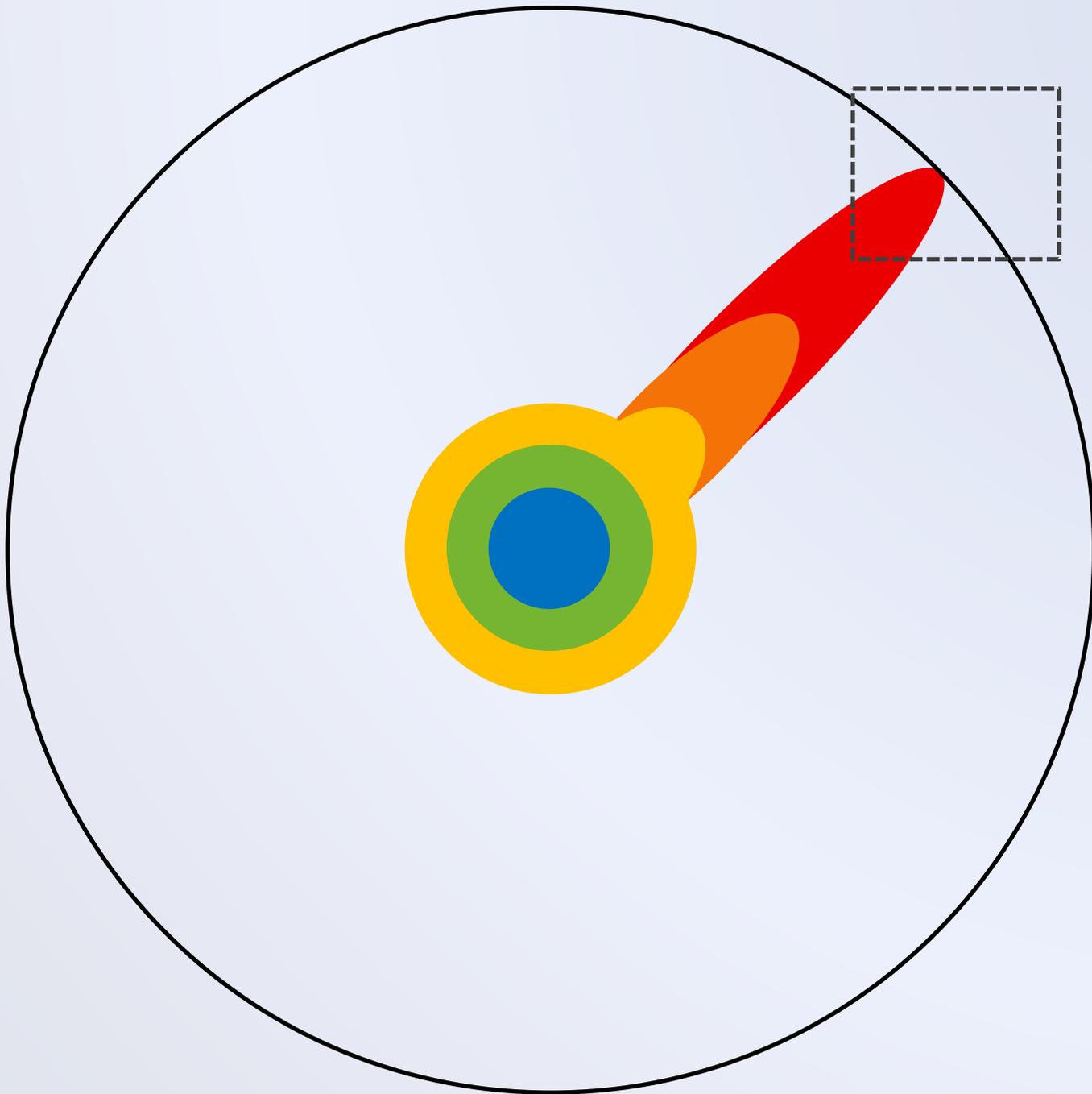


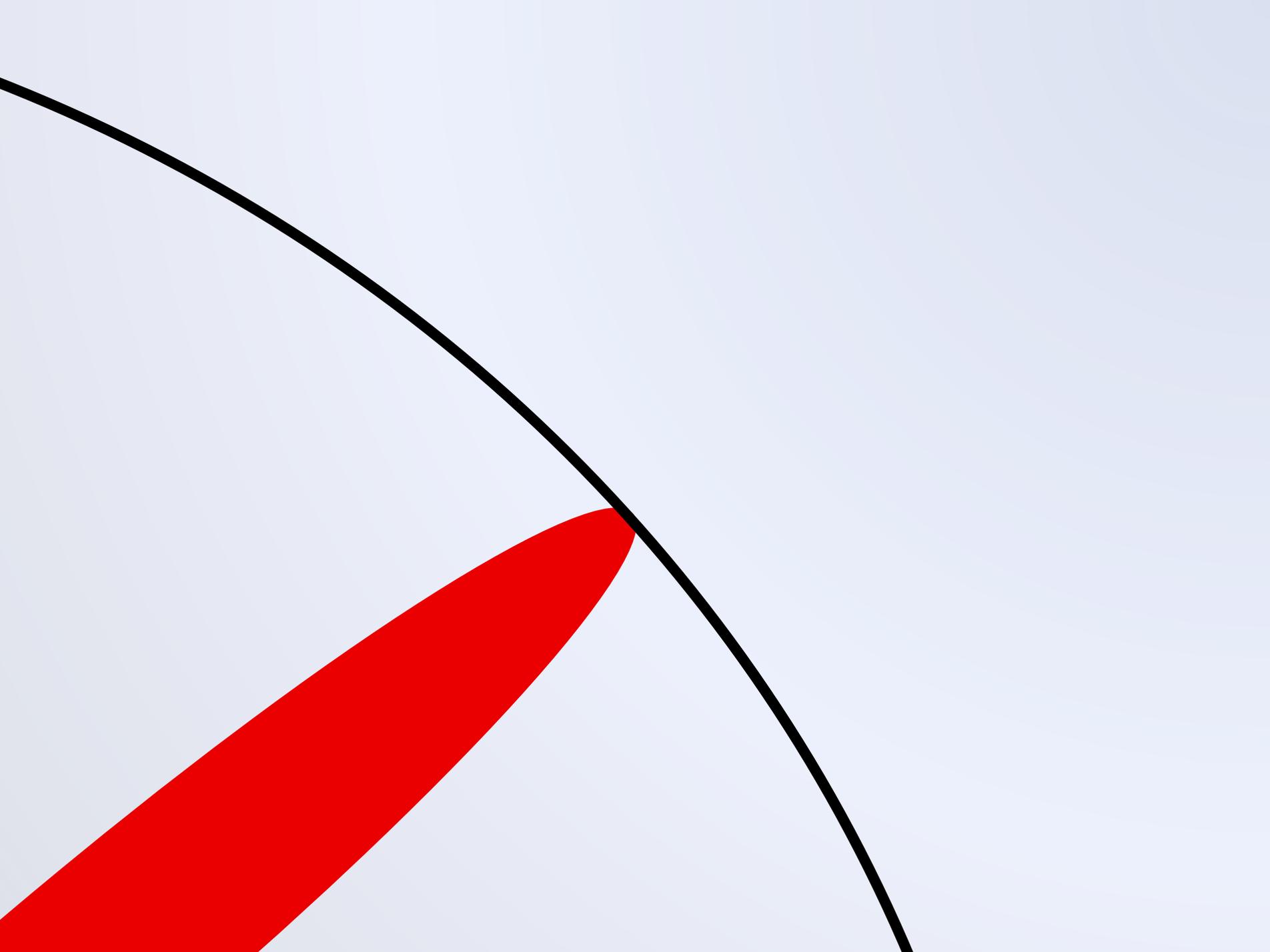


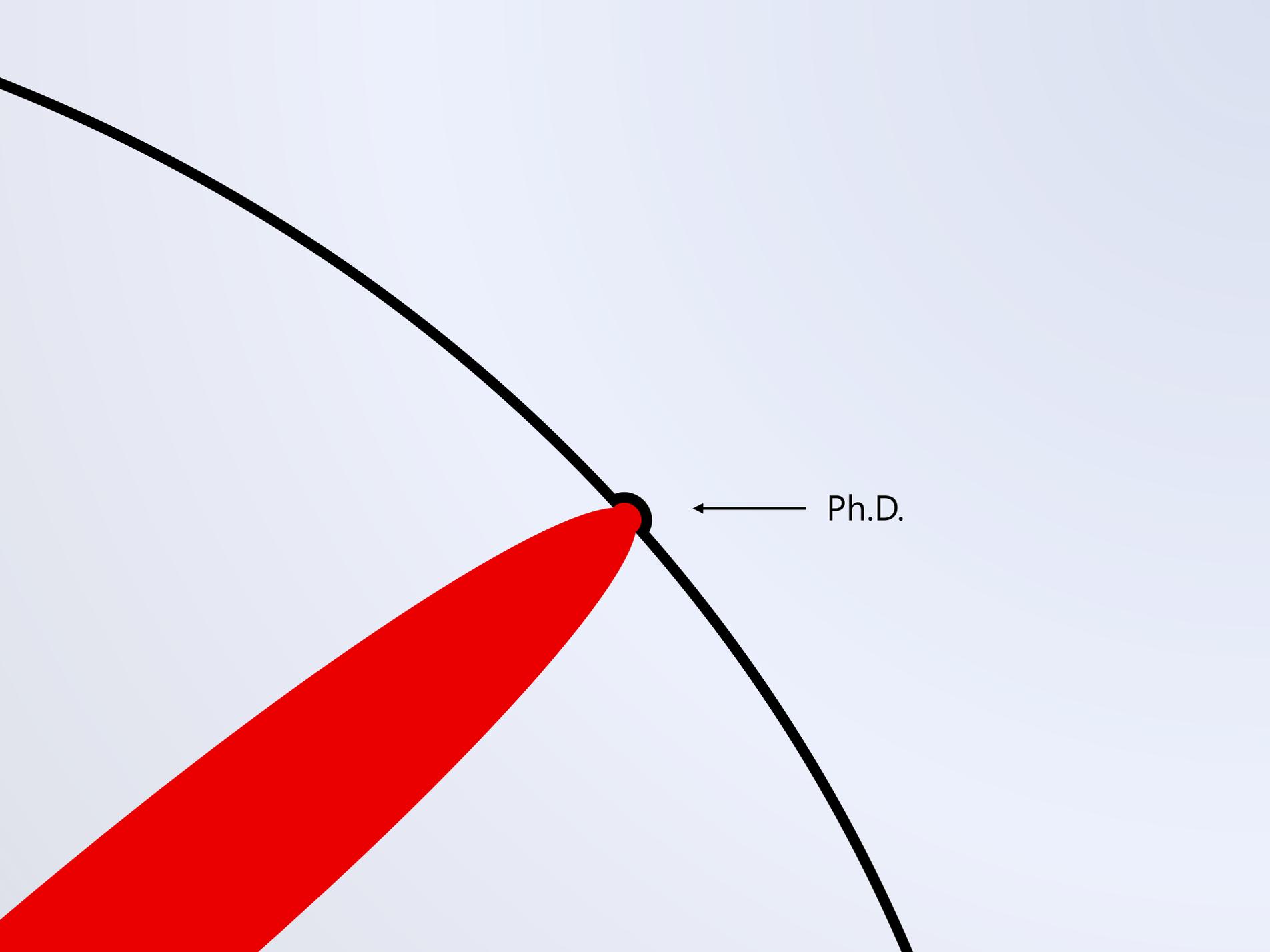




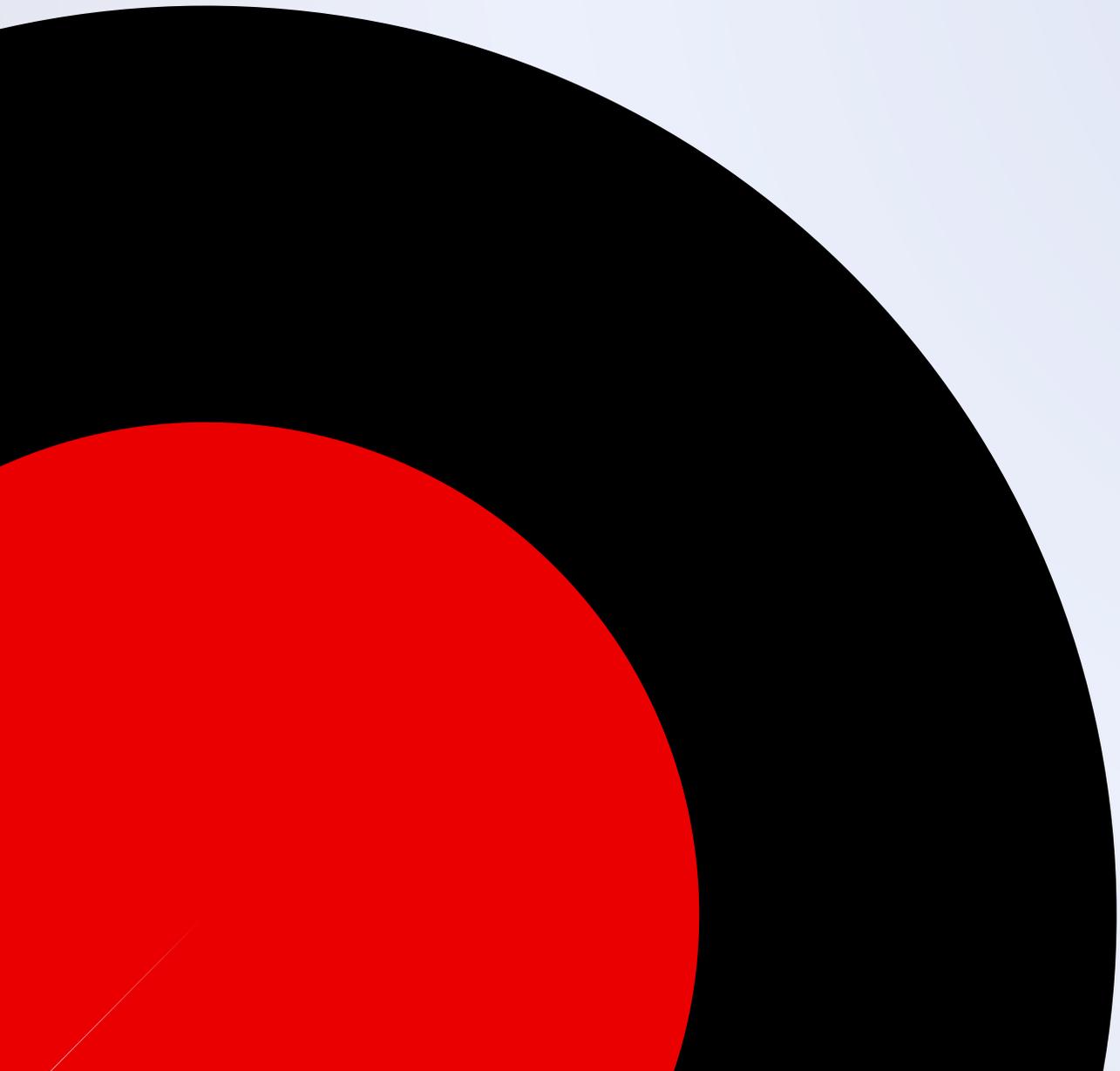


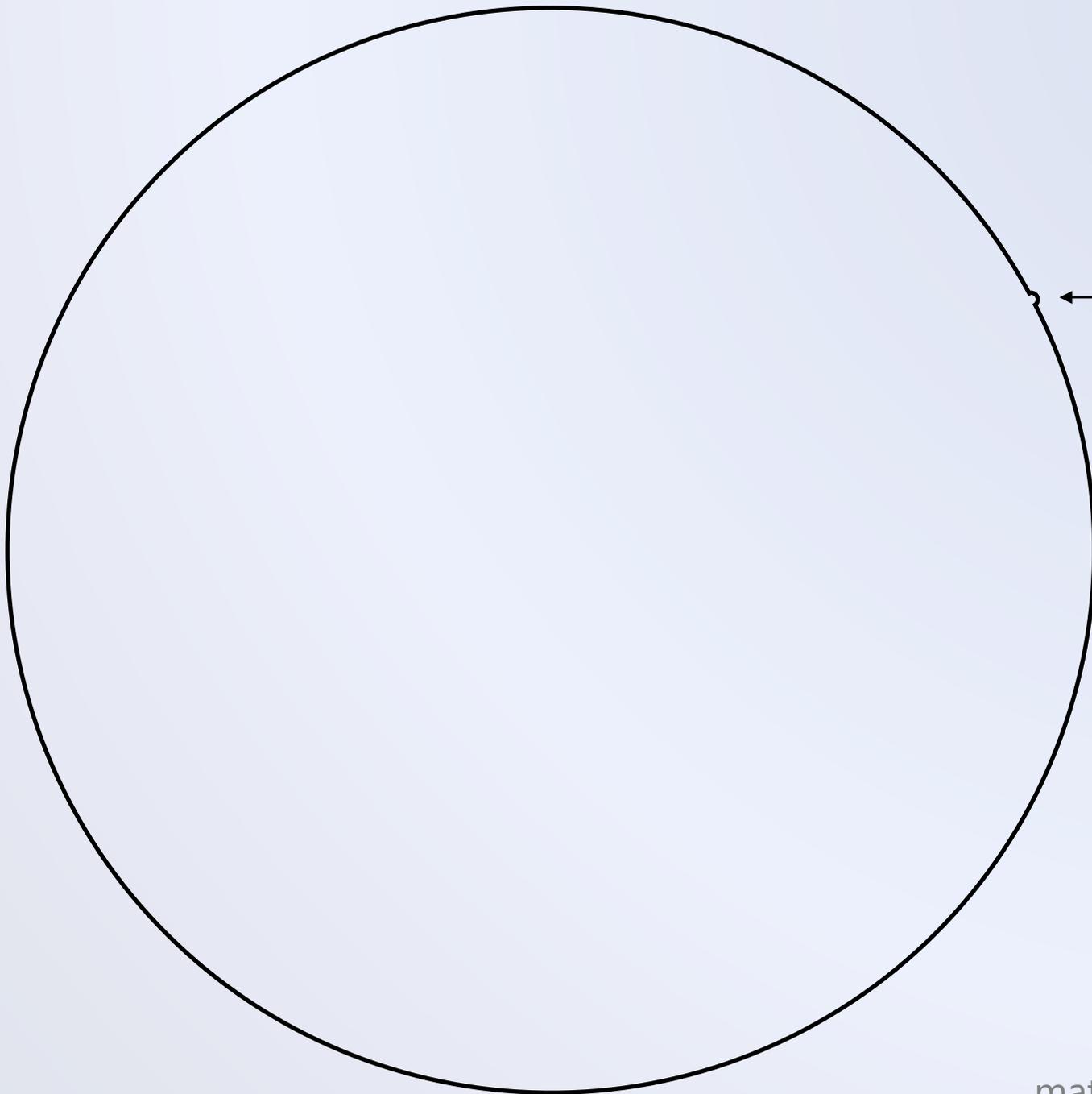




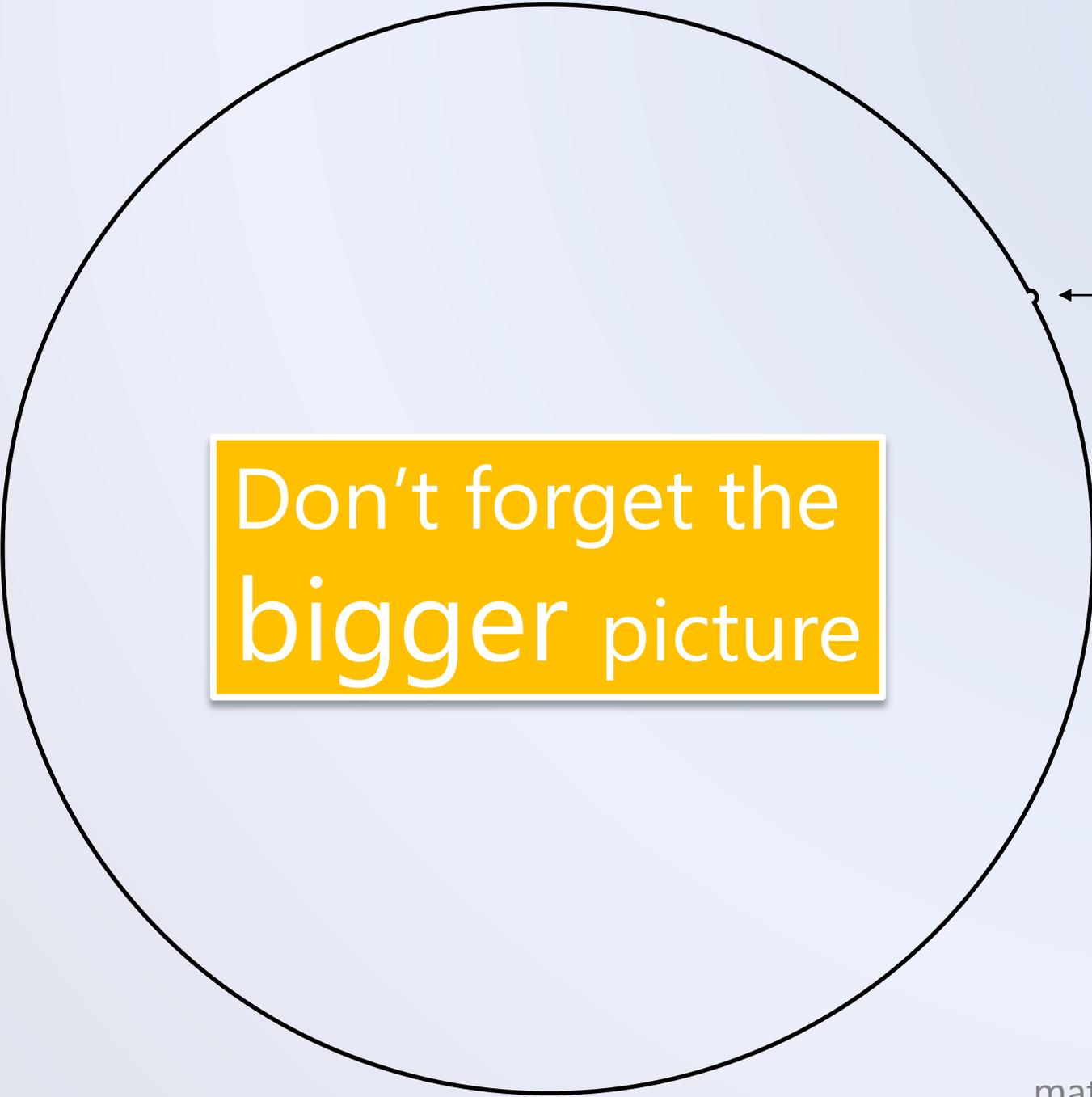


← Ph.D.



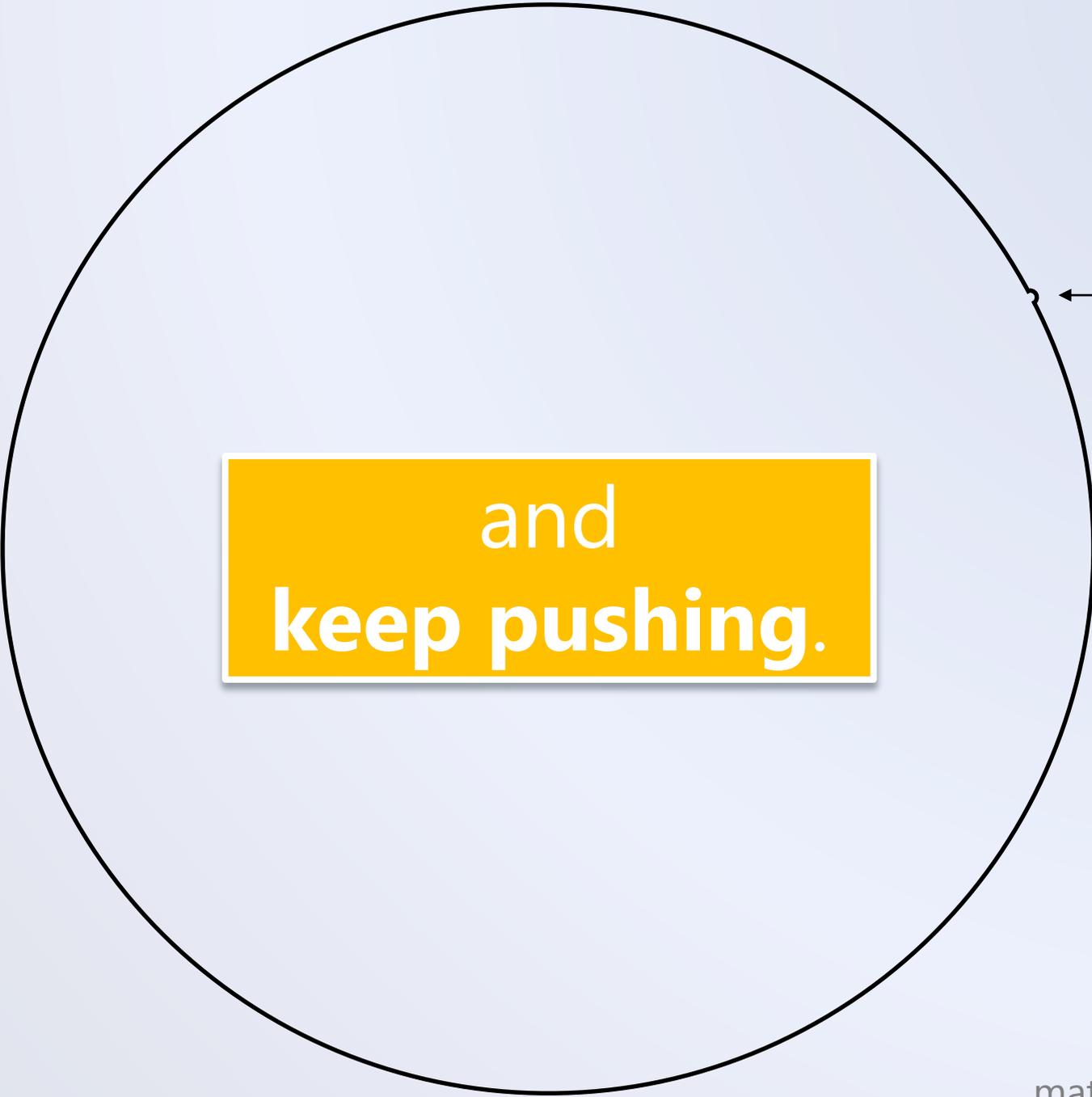


← Ph.D.



Don't forget the
bigger picture

← Ph.D.



← Ph.D.

and
keep pushing.

Sometimes...



WELL CRAP



You're stuck.

**DON'T
PANIC**



I NEED AN ADULT



Don't be afraid
to ask for **help**.



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Choosing an Advisor



"Hey, that's just one omniscient guy's opinion."

Choosing an advisor

Research area matters ...

- ... but less than you might think

Big Name or Shooting Star

- depends on overall support network

Stability

- people move, change positions

Culture

- personality needs to click

Talk to current and former ~~victims~~ students

- how long did they take? did they enjoy it?

Choosing an advisor

Research area matters ...

- ... but less than you might think

Big Name or Shooting Star

- Whole environment matters.
- Find out by talking to students.

Culture

- personality needs to click

Talk to current and former ~~victims~~ students

- how long did they take? did they enjoy it?

What should I ask?

How is the working environment

- what is the general attitude, hours, work week?

How is the group culture?

- regular meetings, joint projects, outings, fun?

Are own ideas stimulated?

- or are you pursuing their larger research agenda?

How much teaching will you have to do?

- how much other community service will you have to do?

Are people acknowledged for their work?

- are there free-rider co-authors or advisors?

Getting a position

PhD **positions** are much more **abundant** than you think

- often not advertised

PhD **candidates** are (much more) **rare** (than you think)

- especially good ones

If you have **good grades**, did **relevant projects**, and **good recommendations**, your chances are **very good**.

- publications don't matter much (or at all)
- and even if your supervisor of choice has no money or time to supervise you, they'll be happy to help you in your search!

You & Your Advisor



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Are you afraid of the Dark?



We're explorers

- we may strike gold, or
- find dirt, dirt, and more dirt

We don't know the way

- we follow intuition, and see where it leads us...
- soon, you'll know 'the way' better than your supervisor

Are you afraid of the Dark?



We're explorers

If you're afraid of the dark, or
research is not for you. more dirt

We don't know the way

- we follow intuition, and see where it leads us...
- soon, you'll know 'the way' better than your supervisor

You & Your Advisor

- You are 1 of N students
- Your paper is 1 of M papers
- They review P papers a year and teach Q courses a year
- They attend X committee meetings a week
- They travel Y times a year

Let's do the math

$$\frac{(365 - 2 * 52 - 25 - 5Y) * \left(8 - \frac{X}{5} - 1\right) - 2P - 160Q}{52 * (N + M)}$$

hours /week for you

$$N = 15, M = 8, P = 30, Q = 2, X = 3, Y = 8$$

answer = 0.97

You & Your Advisor

- You are 1 of N students

■ **Be realistic** about
■ your advisor's time
■ (and hence, *choice* of advisor)

Let's do the math

$$\frac{(365 - 2 * 52 - 25 - 5Y) * \left(8 - \frac{X}{5} - 1\right) - 2P - 160Q}{52 * (N + M)}$$

$$N = 15, M = 8, P = 30, Q = 2, X = 3, Y = 8$$

hours /week for you
answer = 0.97

You & Your Advisor

Keep your advisor up-to-date, but don't spam

- be interesting, not pestering

Agree on and check against SMART goals

- Specific, Measurable, Attainable, Realistic, Timely

Try to phrase suggestions, not questions

- *“I think we should do X”* vs. *“Should we do X?”*

There are other helpful people out there...

- officemates, postdocs, fellow students

You & Your Advisor

Keep your advisor up-to-date, but don't spam

- be interesting, not pestering

Agree

- Spe

Try to

- *"I t*

Be proactive.
Agree on concrete goals.
Learn from fellow students.

There are other helpful people out there...

- officemates, postdocs, fellow students

EVERYBODY'S PUBLISHING



AND I'M JUST SITTING HERE...

**DON'T
PANIC**

What is a PhD about?

Learning how to do science,

such that you *become*

an independent researcher

What is a PhD about?

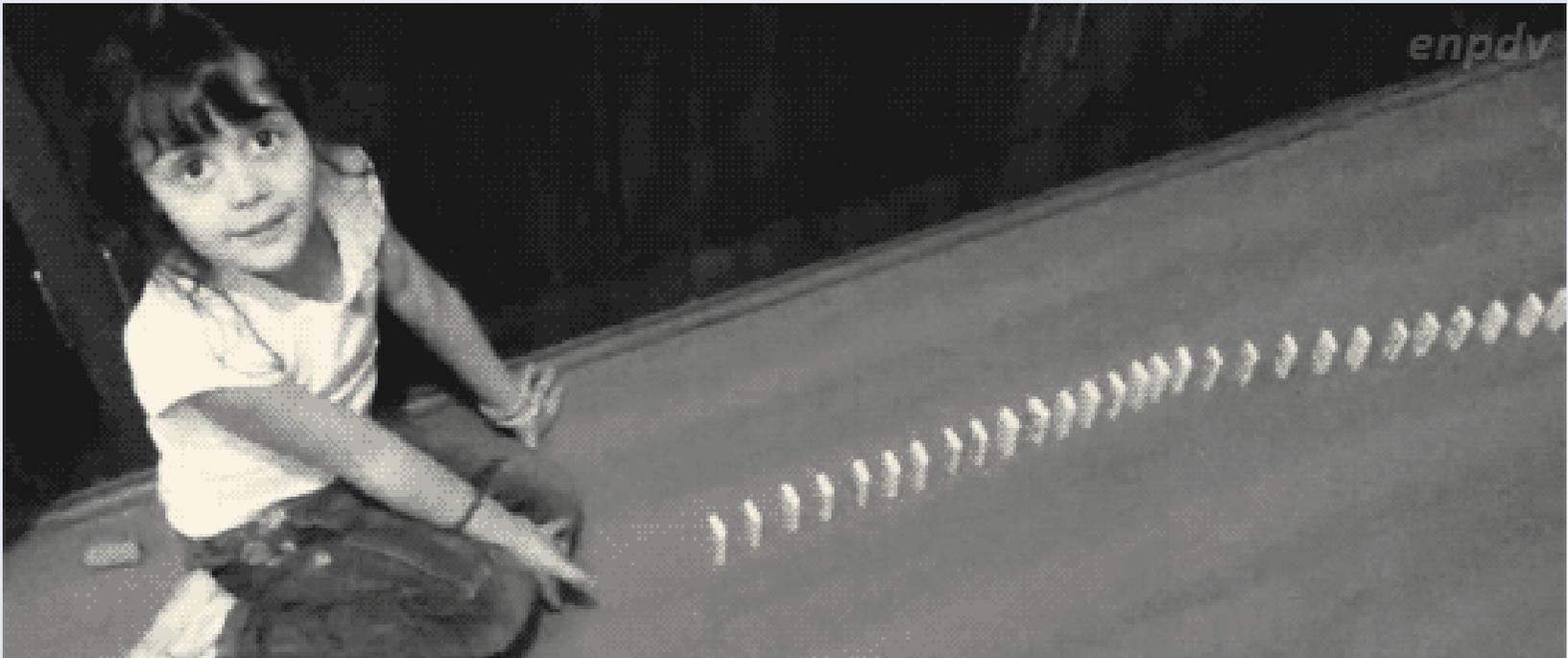
Do **not** compare yourself
to more senior people.

an independent researcher

All these papers are so nice...



All these papers are so nice...



and my research is not going anywhere...

All these papers are so nice...

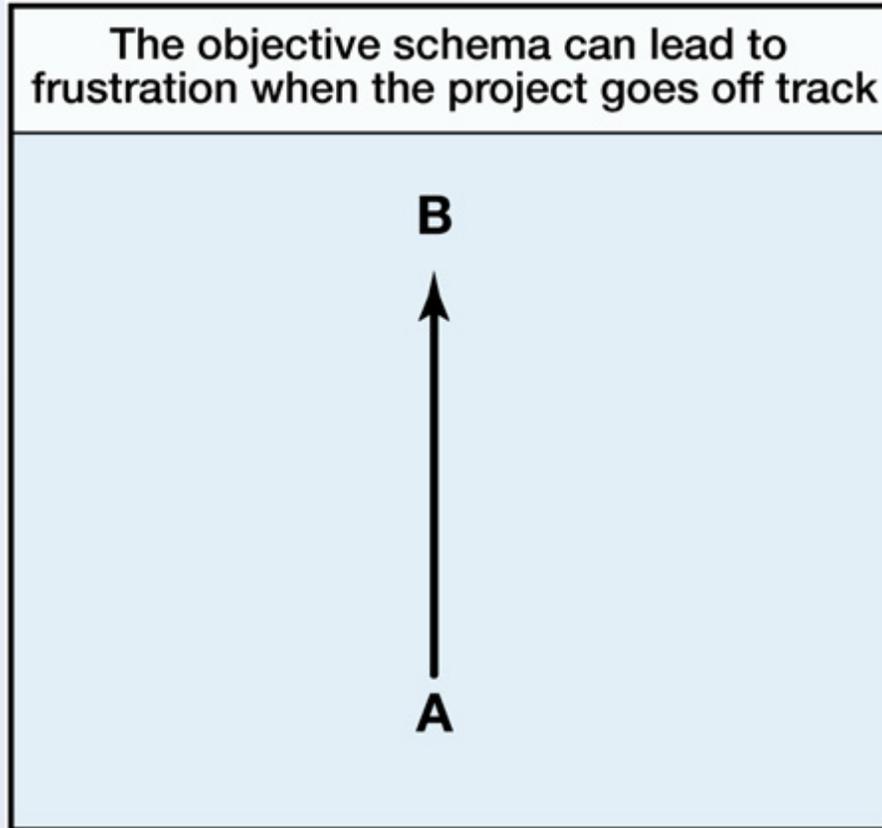


Published papers
are smooth representations
of long and messy processes

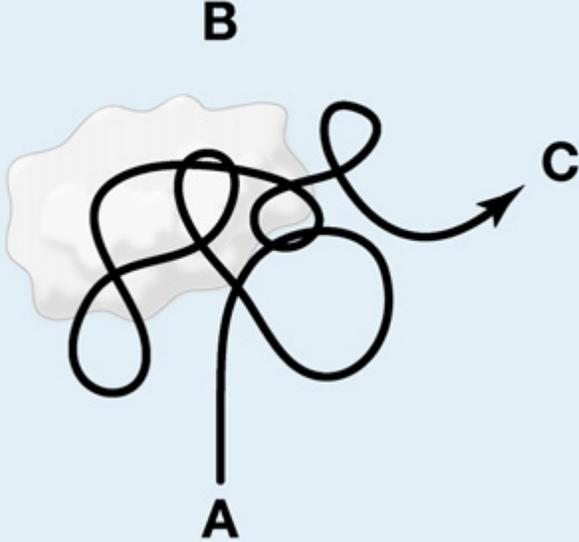
and my research is not going anywhere...

Reaching the Goal

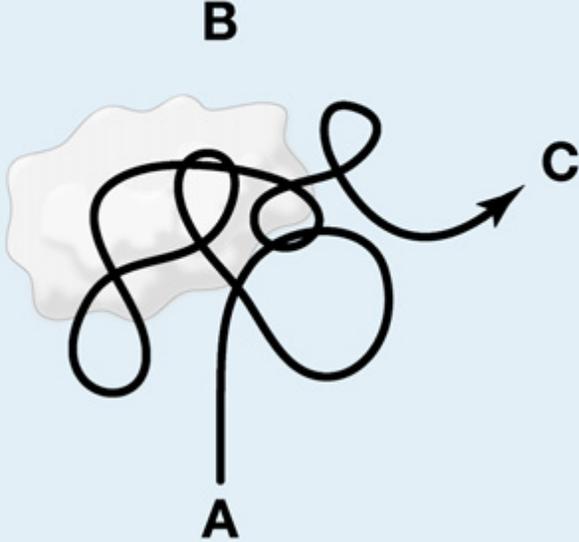
Reaching the Goal



Reaching the Goal

The objective schema can lead to frustration when the project goes off track	The nurturing schema gives support and opens new directions
 <p>A straight vertical arrow starts at point A at the bottom and points directly up to point B at the top, representing a direct path to a goal.</p>	 <p>A path starts at point A at the bottom. It enters a light-colored, irregularly shaped shaded area labeled B. Inside this area, the path loops and curves in a complex, non-linear fashion. After exiting the shaded area, the path continues as a straight line to point C on the right, representing a path that explores multiple directions before reaching a new goal.</p>

Reaching ~~the~~ Goal

The objective schema can lead to frustration when the project goes off track	The nurturing schema gives support and opens new directions
	

Reaching ~~the~~ Goal

A good **problem** is often worth more than a good **solution!**



Time to learn

As a grad student you have to learn a *lot*

- new students often think they know everything.

Time to learn



**Logic: another thing that
penguins aren't very good at.**

Time to learn

As a grad student you have to learn a *lot*

- new students often think they know everything.
- no bachelor student can immediately make a contribution

Time to learn

As a grad student you have to learn a *lot*

- new student
- no bachelor contribution



Time to learn

As a grad student you have to learn a *lot*

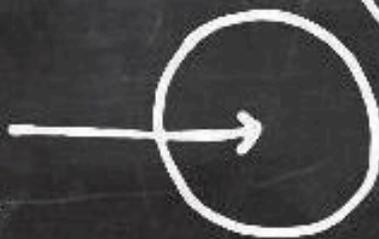
- new students often think they know everything.
- no bachelor student can immediately make a contribution

However, you're being **paid** to learn

Find out what you need to know.

T
A
F

Your
Comfort
Zone



Where the
magic happens

Time to learn

As a grad student you have to learn a *lot*

- new students often think they know everything.
- no bachelor student can immediately make a contribution

However, you're being **paid** to learn

Find out what you need to know.

Learn what it is. Read about it. Take classes. Practice.

Time to learn

As a grad student you have to learn a *lot*

- new students often think they know everything
- no

You're being *paid to learn*
How **cool** is that?

Find out what you need to know.

Learn what it is. Read about it. Take classes. Practice.

Scientific Writing – in English

Science means a *lot* of writing

A paper is a story, not a shopping list

- there needs to be a plot

Any draft can be shortened without loss

- don't believe information theoretic lower bounds

Get help with concise but complete writing

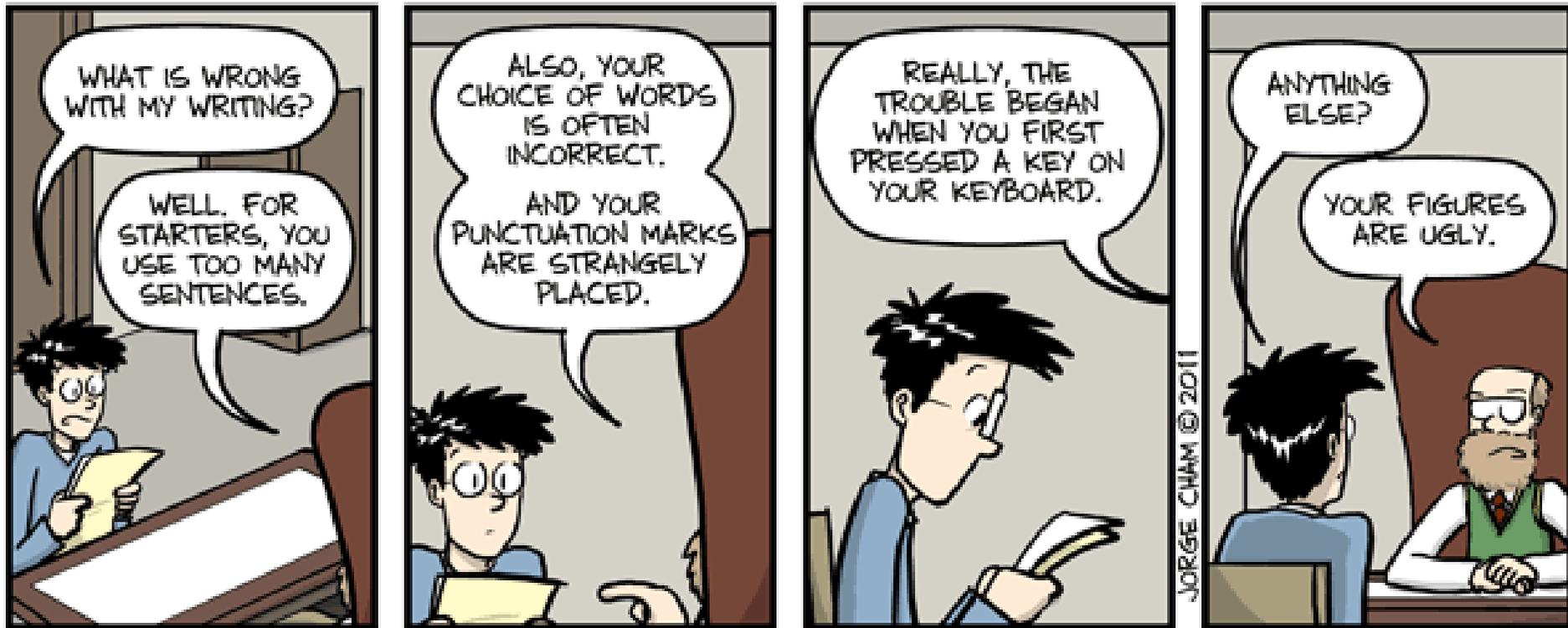
- don't forget reproducibility

Don't have sentences being written in passive voice

- they will not be easily read

Hard to improve without detailed feedback

Scientific Writing – in English



- they will not be easily read

Hard to improve without detailed feedback

Scientific Writing – in English

Science means a *lot* of writing

A paper is a story, not a shopping list

For every word ask: is it *necessary*?
Train your language and writing skillz

Get help with concise but complete writing

- don't forget reproducibility

Don't have sentences being written in passive voice

- they will not be easily read

Hard to improve without detailed feedback

Notification

So you finished your masterpiece, submit it, wait...

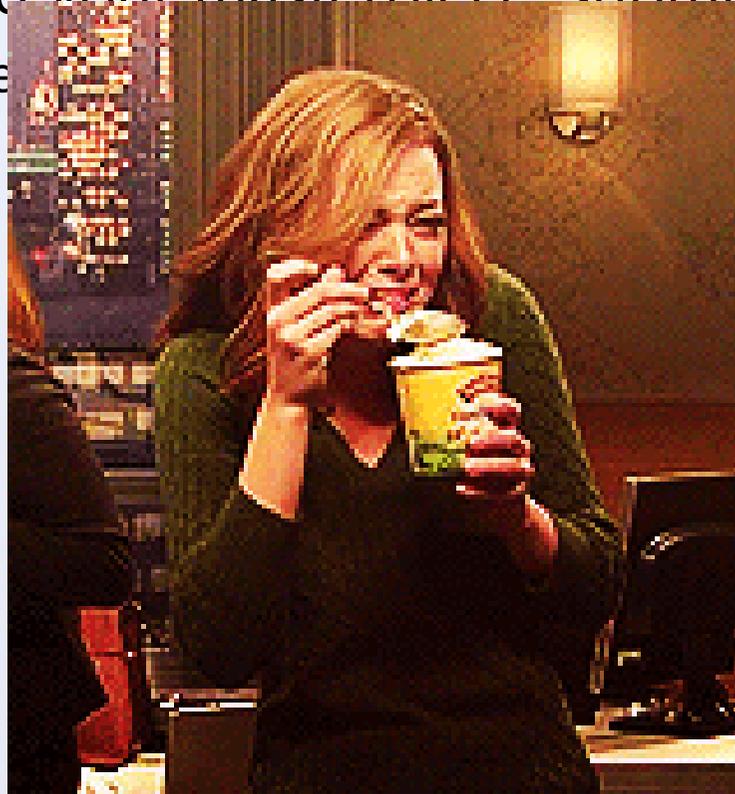
- and then the reviews come in

Reject

Notification

So you finished your masterpiece, submit it, wait...

- and then the re



**DON'T
PANIC**

Reject

So you finished your masterpiece, submit it, wait...

- and then the reviews come in

Happens to the best

Getting something published can be **hard**

- 10 to 20% **acceptance rate** means
- 80 to 90% of the papers get **rejected**

Reject

So you finish

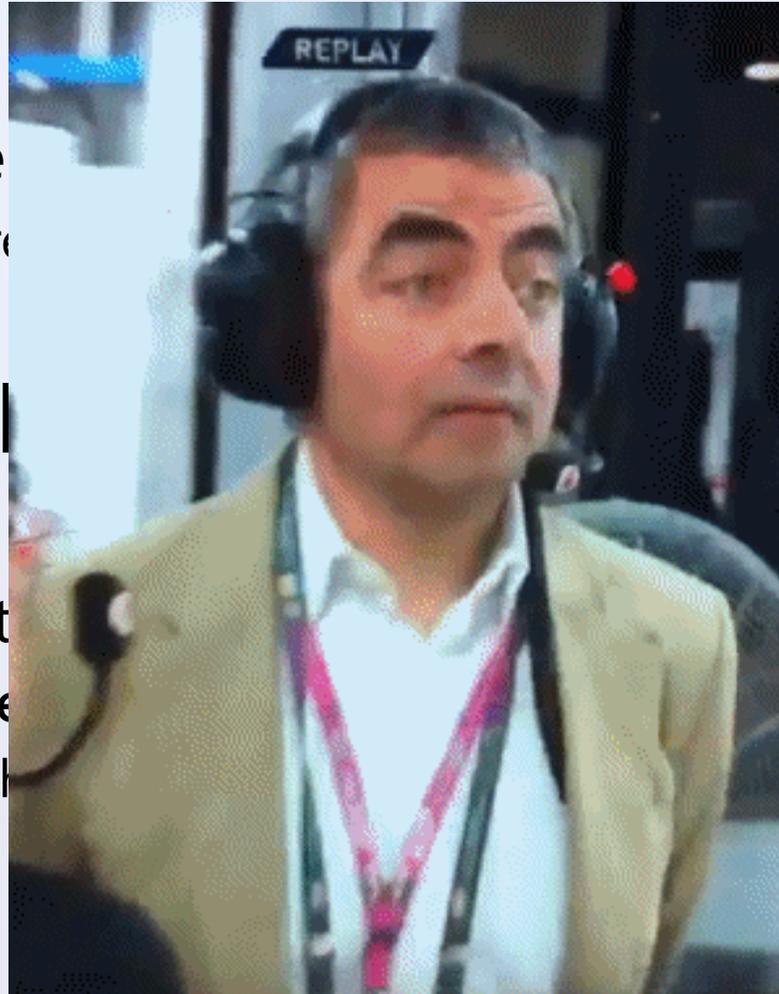
- and then the r

it, wait...

st

Getting somet

- 10 to 20% acc
- 80 to 90% of th



Reject

So you finally have your submission, but it takes a while to wait...

- and then



Getting so

- 10 to 20%
- 80 to 90% of the papers get rejected

Reject

So you finished your masterpiece, submit it, wait...

- and then the reviews come in

Happens to the best

Getting something published can be **hard**

- 10 to 20% **acceptance rate** means
- 80 to 90% of the papers get **rejected**

Lots and lots and lots and lots of noise in the review process

- take reviews seriously, re-evaluate, improve your paper, resubmit

Reject

So you finished your masterpiece, submit it, wait...

- and then the reviewer says



Getting so

- 10 to 20%
- 80 to 90%

Lots and lots and lots and lots of noise in the review process

- take reviews seriously, re-evaluate, improve your paper, resubmit

Reject

So you finished your masterpiece, submit it, wait...

- and then the review process

Can take time to get publish.
Use reviews to improve your
paper, don't **overfit**.

Get:

- 10 to 20%
- 80 to 90%



Lots and lots and lots and lots of noise in the review process

- take reviews seriously, re-evaluate, improve your paper, resubmit



YOUR HIGH HORSE

Get off it.



When you are the reviewer:
do your job **well**, don't be *that* guy.



YOUR HIGH HORSE

Get off it.

How to work

Everybody works differently

- find out what works for *you*



**I'M NOT A
MORNING
PERSON**

How to work

Everybody works differently

- find out what works for *you*

It's **not** about how many hours — *stupid*!!1!!!one!eleven

- say no to peer pressure

Life is much more than just work

- have fun and do sports: a healthy mind lives in a healthy body



How to work

Everybody works differently

- find out what works for *you*

It's **not** about how many hours — *stupid!!1!!!one!eleven*

- say no to peer pressure

Life is much more than just work

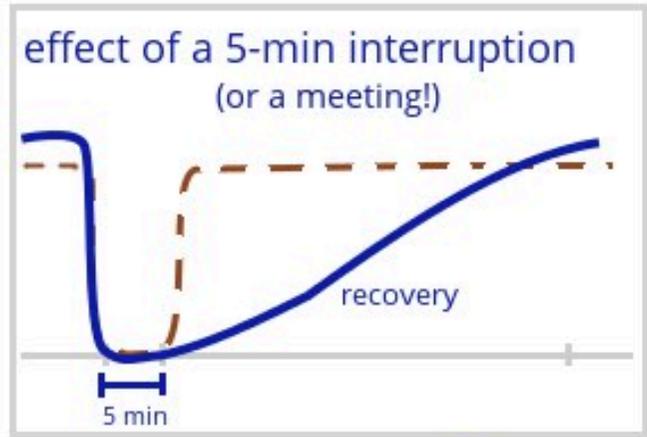
- have fun and do sports: a healthy mind lives in a healthy body

Create a stimulating environment

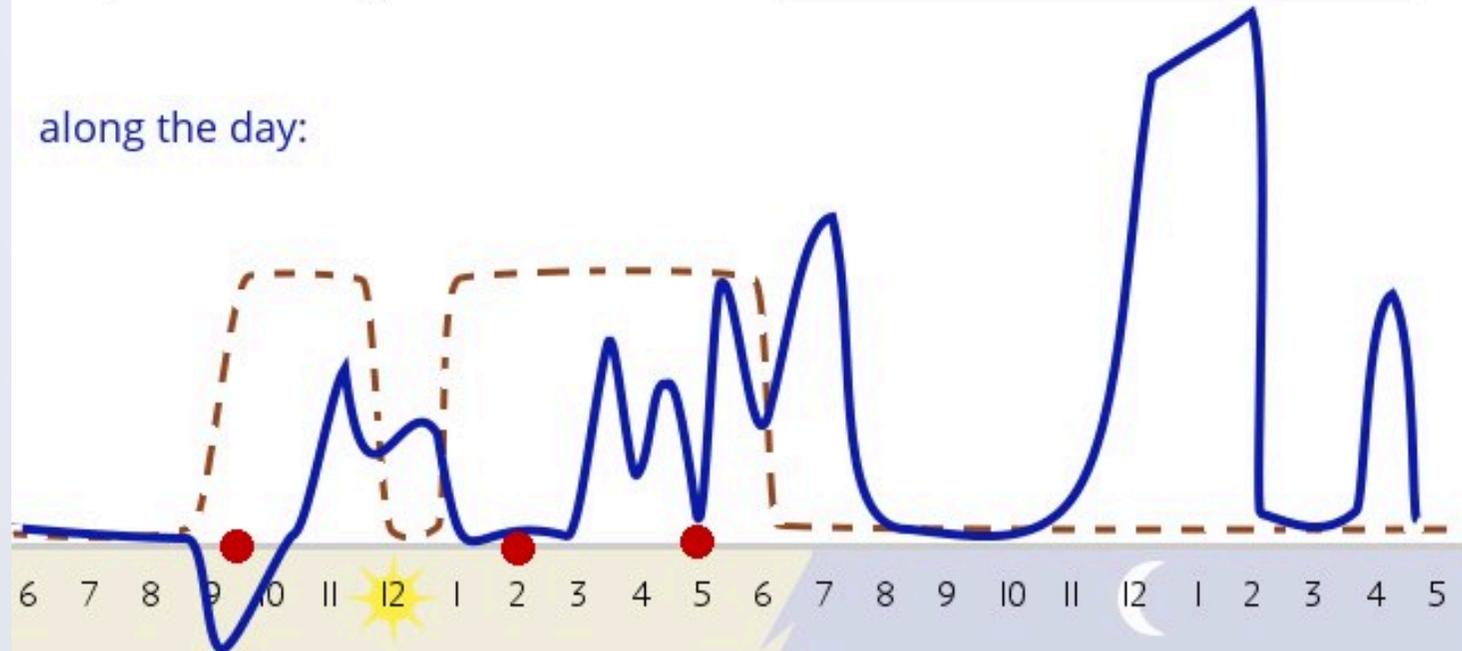
- optimize your workplace

geek productivity at work

- how non-geeks think it works
- how it actually works
- sampling points likely to be used by non-geeks to get a general picture of how geeks work



along the day:



How to work

Everybody works differently

- find out what works for *you*

It's **not** about how many hours — *stupid!!1!!!one!eleven*

- say no to peer pressure

Life is much more than just work

- have fun and do sports: a healthy mind lives in a healthy body

Create a stimulating environment

- optimize your workplace

Focus

How to work

Everybody works differently

- find out what works for *you*

It's **not** about

- say no to pe

Life is much i

- have fun an

Create a stim

- optimize your workplace

Focus

- and **procrastinate** when you can't

PhD Goal:
figuring out how
you get your
best ideas

even

ny body

I don't know man..

VIA 9GAG.COM

**Sometimes, I don't want to
move it move it.**

I don't know man..

Sometimes, it's just not happening. No need to keep your chair warm, call it a day – go out, have **fun**. Who knows, maybe you'll even get a good idea.



Sometimes, I don't want to move it move it.

When You're Feeling Low

It's not so bad, really

- don't get yourself down

Acknowledge the good times

- keep a **folder** with past **accomplishments**, with e.g., graduation photos, acceptance notifications, awards, conference visits, etc.

When You're Feeling Low

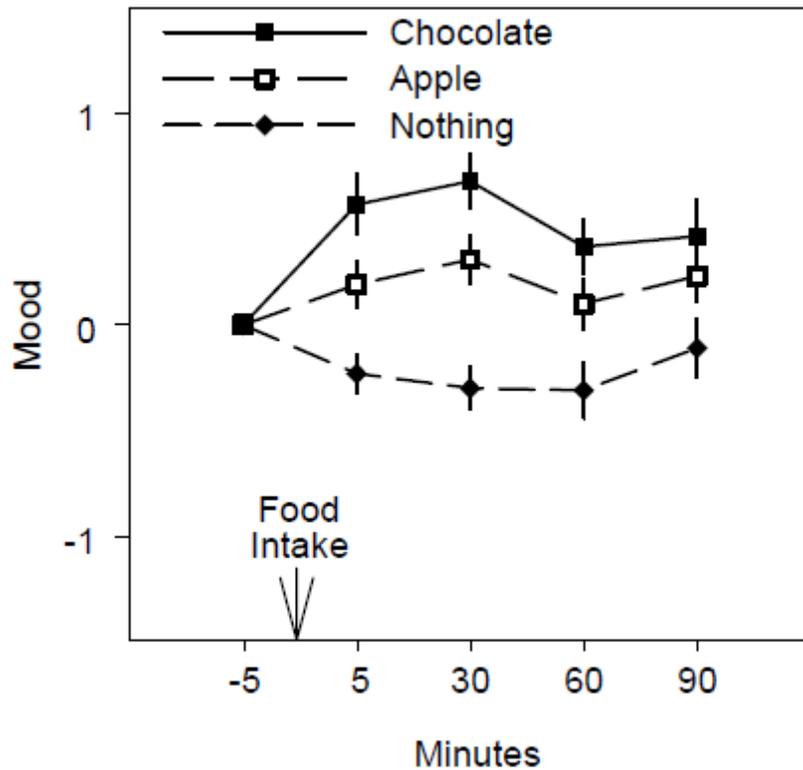
Everyday mood and emotions after eating a chocolate bar or an apple

Michael Macht *, Dorothee Dettmer

When You're Feeling Low

Everyday mood and emotions after eating a chocolate bar or an apple

Michael Macht *, Dorothee Dettmer

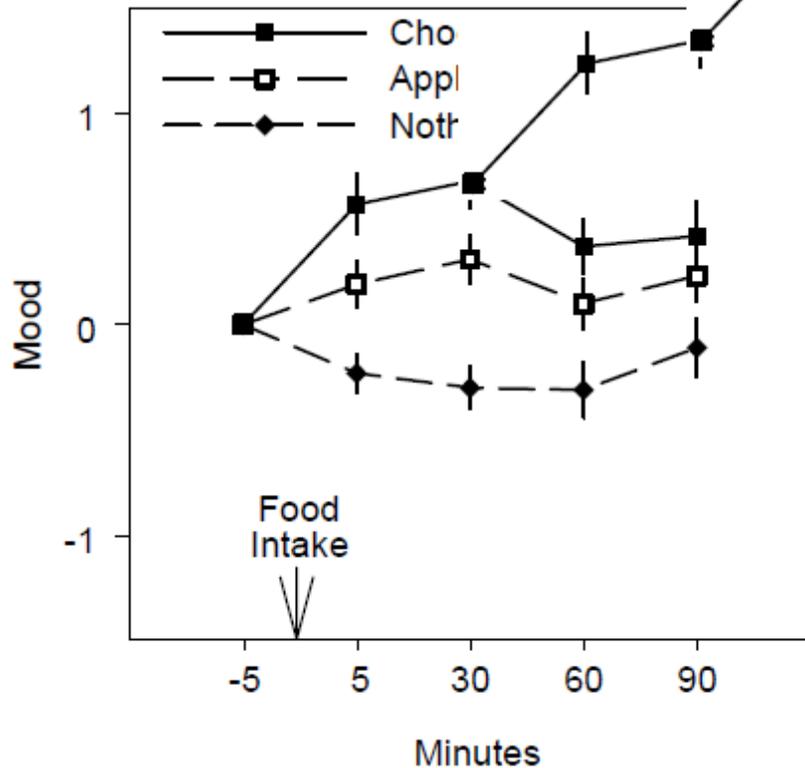


When You're Feeling Low

Ever

chocolate bar or an apple

er



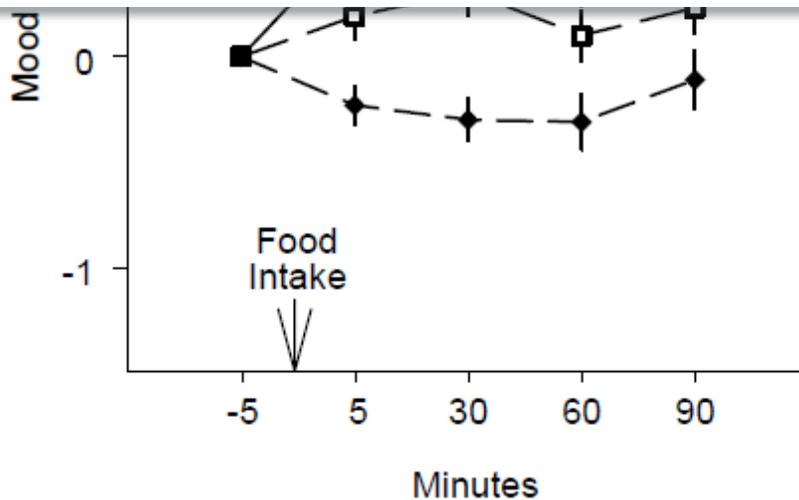
When You're Feeling Low

Ever

chocolate bar or an apple

er

Who cares about "an apple a day ...",
it's: "a chocolate bar every 30 minutes"!



Celebrate Your Victories

Celebrate Your Victories

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"REMEMBER, WINNING ISN'T THE ONLY THING. YOU ALSO
NEED TO DEVELOP A GREAT VICTORY DANCE."

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Celebrate Your Victories

“Success is not the key to happiness.
Happiness is the key to success.
If you love what you are doing,
you will be successful.”

Albert Schweitzer

Some groups have “publication cakes”

- Make it chocolate, please!

Acknowledge everyone somehow involved

- Create a positive group atmosphere

Celebrate Your Victories

“Success is not the key to happiness.
Happiness is the key to success.
If you love what you are doing

If you're **happy** and you know it,
then you really ought to **show it!**

Some groups have “publication cakes”

- Make it chocolate, please!

Acknowledge everyone somehow involved

- Create a positive group atmosphere

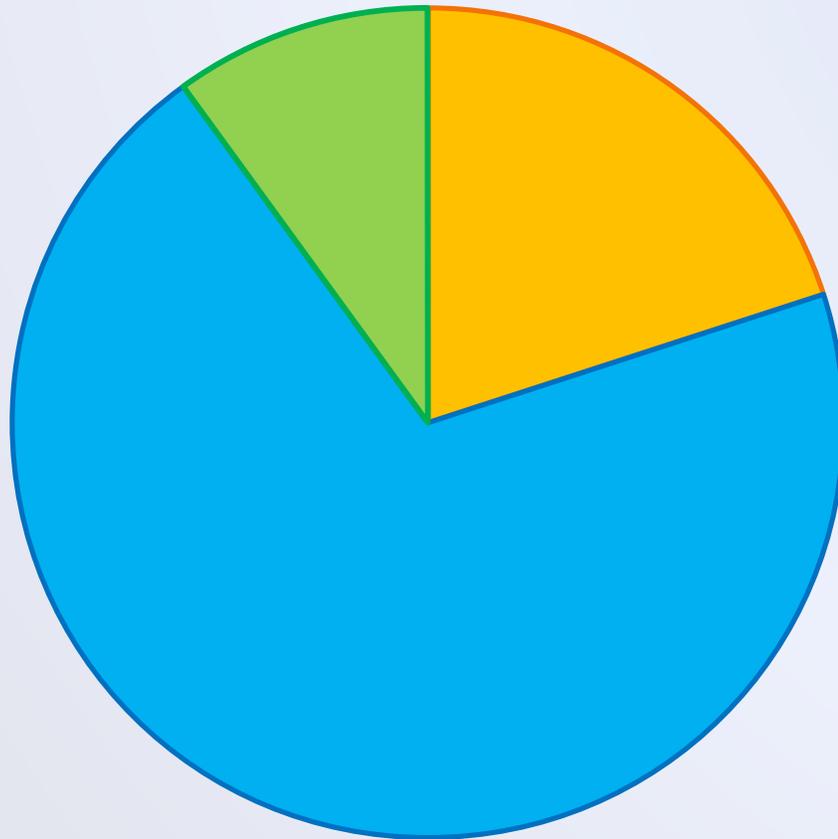
Imposter Syndrome

Imposter Syndrome is by far the **most dangerous disease** for any researcher to catch

- symptoms include thoughts such as “everyone could have done this”, “why is all other work better”, “my work is trivial”, etc.
- deadly for the creative process
- deadly for overall happiness
- deadly for science



Who Feels Like an Imposter?



■ People with Imposter Syndrome

■ Other people with Imposter Syndrome

■ Successful people you think have their shit together, but have Imposter Syndrome

Who Feels Like an Imposter?



■ People with Imposter Syndrome

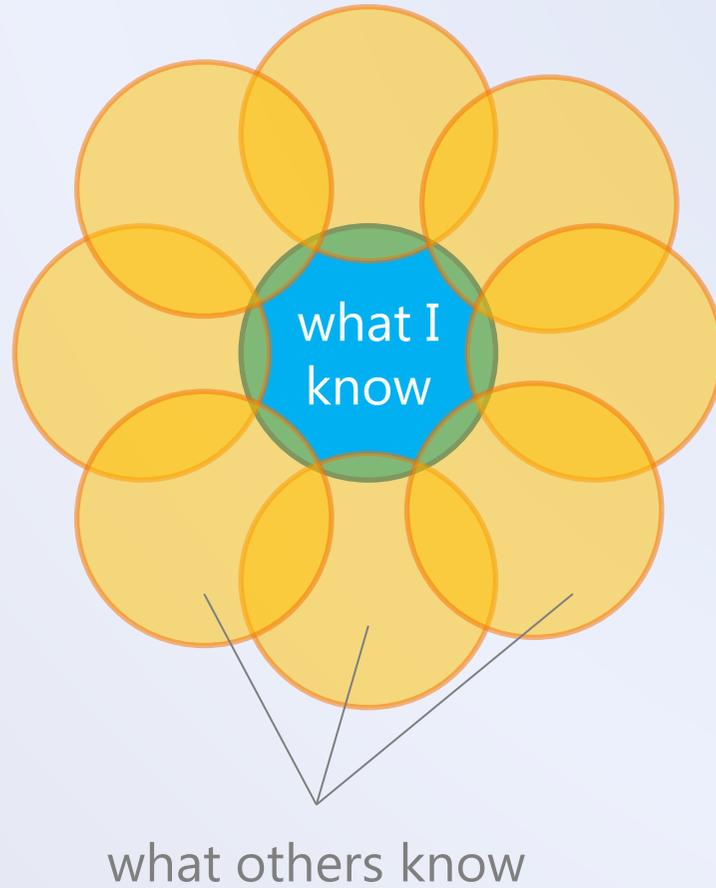
Everyone feels like an imposter sometimes, and that's **okay**, but just **remember** that you aren't

think have their shit together, but have Imposter Syndrome

What do I Know?



What do I Know?



What do I Know?



**Everything is obvious
once you know it!**

what others know

Survival Checklist

Put yourself in the shoes of **your audience**

- your advisor, your readers, conference attendees, ...

Get your priorities **straight**

- define achievable short-term goals and stick to them

Learn when to say **no**

- don't get involved in too many things

Be thoughtful about networking opportunities

- personal story

Some references

Good Books

- "A PhD is not Enough", Feibelman
- "Mastering your PhD", Gosling & Noordman
- "How to Get a PhD", Philips & Pu
- "The PhD Grind", Philip Guo

Informative Sites

- <http://matt.might.net/articles/>
- <http://public.randomnotes.org/richard/>

Great Slides

- Sue Moon "A few tips I wish I had before I met my advisor"
- Yannis Smaragdakis "PhD Rants and Raves – be afraid, be very afraid"
- Eamonn Keogh "How to do good data mining research, get it published, and get it cited"

Special thanks to **Ingmar Weber** for his **excellent** talk

- "Advice for young Jedi knights and PhD students" at PIKM 2012

Google [title] filetype:pdf

- "From Research to Manuscript", Katz
- "Scientific Writing", Peat
- "Writing for Science", Goldbort

Funny Sites

- *Research in Progress* – researchinprogress.tumblr.com
- Piled Higher & Deeper – phdcomics.com

DON'T PANIC

For comments, praise, pointers to books, slides, sites, ...

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