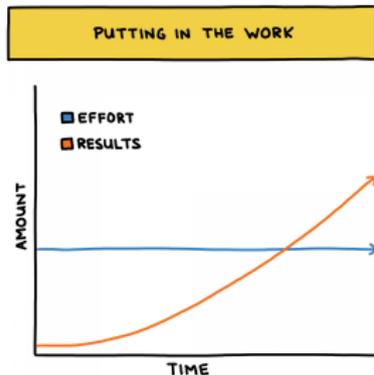


I H ♥ TE Grad School, and You Can Too!

Tales and Advice from an Interdisciplinary Graduate Student

Shelby Scott

Department of Ecology and Evolutionary Biology
University of Tennessee, Knoxville



1 April 2021

shelbymscott.github.io



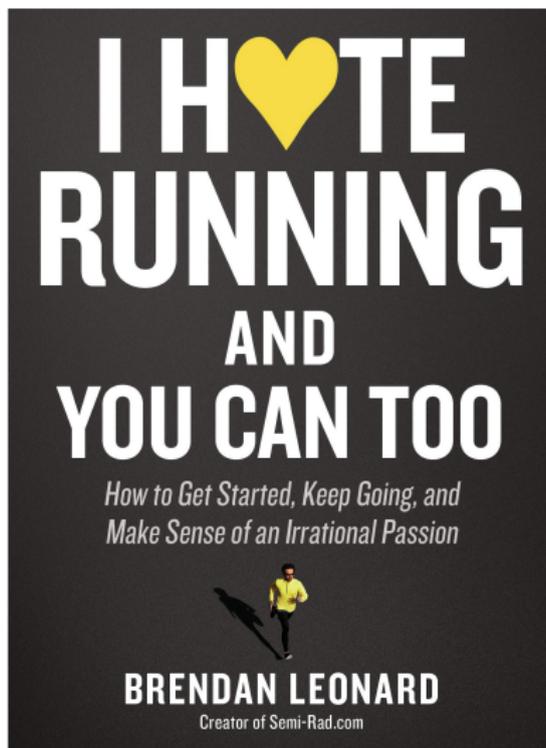
Acknowledgments

- SMB Education Subgroup
- UTK Department of Ecology and Evolutionary Biology
- Dr. Louis J. Gross*, Dr. Nina Fefferman, Dr. Sergey Gavrilets, Dr. Suzanne Lenhart
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THE UNIVERSITY OF
TENNESSEE
KNOXVILLE

DEPARTMENT OF ECOLOGY &
EVOLUTIONARY BIOLOGY



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- 7 Do the Verb Until You Become the Noun
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- 12 There Are No "Hacks"
- 13 Screw Busy
- 14 Loving Something is Different from Liking It
- 15 Epilogue: There is No Right Way to Do It

Introduction

- May 2015: B.S. Rhodes College - Biomathematics
- Senior thesis: *An Agent-Based Model of Golden Eagle Predation on the Santa Cruz Island Fox*
- August 2015: Started in the Ecology and Evolutionary Biology Department at UTK
- Concurrently pursuing a Masters in Statistics via the IGSP
- Masters project: *Analyzing Covariates of Diabetes Using Bayesian Linear Regression and Model Selection*
- Dissertation: *Spatio-Temporal Modeling of Gun Crime in Chicago, Illinois*

Introduction: A Complicated Relationship with Science

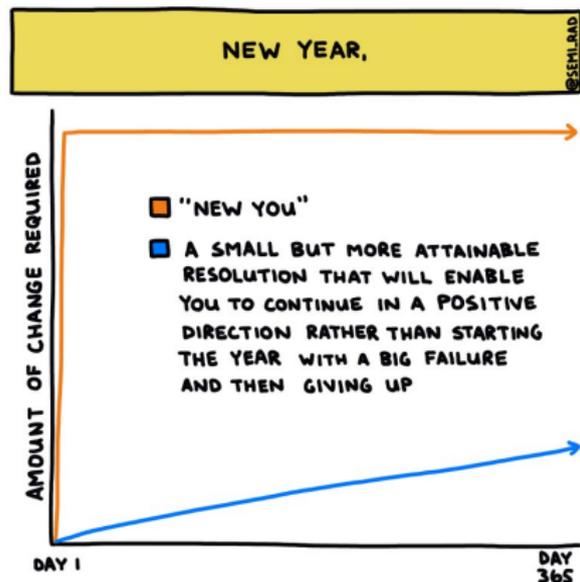
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- Dissertation: *Spatio-Temporal Modeling of **Gun Crime** in Chicago, Illinois*
- Service and Extracurriculars: SMB Education Subgroup, SMB Writing Group, Criminology Writing Group, EKEE Co-Founder and Past President

Start Small, Start Now - Lessons from Undergrad

- Get involved with research:
 - Summer REU Programs
 - Internships and externships
 - Informal experiences
- Attend conferences
- Develop valuable skills:
 - LaTeX
 - Effective Oral and Poster Presentation
 - Coding
 - Teamwork
- Publish (if possible)
- Enroll in classes outside of your major



Start Small, Start Now - Wishes from Undergrad



- Course wishes:

- Linear Algebra
- Proofs course
- More computer science
- More interesting classes

- Experiences

- Networking with more diverse groups
- Grad school application process
- More reading
- Gap year

Reading IS Research

- Read, and then read some more
- Google Alerts
- Literature organization

← mathematical modeling November 27, 2017 >

2 days ago

NEWS

Researchers Using Math to Boost Wheat Straw Use for Ethanol
U.S. News & World Report

Researchers Using Math to Boost Wheat Straw Use for Ethanol: Researchers in Kansas and China are using mathematical modeling to improve the process of converting wheat straw into pellets for the production of ethanol. Nov. 26, 2017, at 11:26 a.m. · Researchers Using Math to Boost Wheat Straw ...

WEB

Computational psychiatry: mathematical modeling of mental illness
Stanford SearchWorks - Stanford University

Computational psychiatry: mathematical modeling of mental illness. Responsibility: edited by Alan Antonicic, John D. Murray. Imprint: London : Academic Press, c2018. Physical description: online resource (xvi, 300 pages) : color illustrations, charts ...

Gun violence, phenomenal reality and parallel worlds: Christina Kallas's multi-protagonist narratives in The Rainbow Experiment

MC Roggio - Journal of Screenwriting, 2021
The second film in writer-director Christina Kallas's New York trilogy, which includes 42 Seconds of Happiness (2016) and Parts 1 in Harlem (forthcoming), The Rainbow Experiment (2018) portrays the powerful but flawed American experiment. Its script ...

Evaluating the impact of Project Safe Neighborhoods (PSN) initiative on violence and gun crime in Tampa: does it work and does it last?

E Fox, SF Allen, A Totti - Journal of Experimental Criminology, 2021
Project Safe Neighborhoods (PSN) is an increasingly popular violence and gun crime prevention program which aims to identify prolific violent offenders, and deter or incapacitate them from offending. While PSN programs generally show moderate ...

Integrating the Literature on Lethal Violence: A Comparison of Mass Murder, Homicide, and Homicide-Suicide

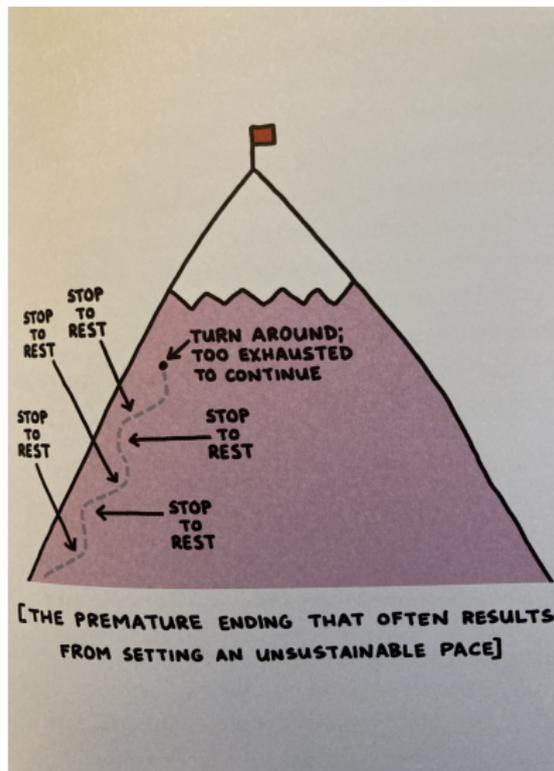
EE Fridel - Homicide Studies, 2021
... Tips on citation download. Download Citation. Download article citation data for Integrating the Literature on Lethal Violence: A Comparison of Mass Murder, Homicide, and Homicide-Suicide. Emma E. Fridel. Homicide Studies 0 ...

Existing Crime Models Paper Breakdown

1	2	3	4	5	6	7	8	9	10
Paper Title	Authors	Journal	Year	Question Asked	Method Used	Major Contribution			
1	Novel evaluation metrics for sparse spatio-temporal point process hazard predictions - a crime case study	Mariusz Adamski, Gabriel Raouf, Tao Cheng	2018	Develop a practical toolkit of evaluation metrics for sparse spatio-temporal point process predictions	Spatio-temporal point process	The developed toolkit of evaluation metrics can be used to determine the accuracy, variability, and complementarity of sparse spatio-temporal point process observations.			
2	An Exploratory Analysis of Guns and Violent Crime in a Cross-National Sample of Cities	Ishtak Athman	2010	Examines the relationship between gun availability and crime in cross-national sample of cities	Limited information maximum likelihood estimation	Gun availability influences rates of assault, gun assault, robbery, and gun violence. Increasing the levels of gun availability increases the likelihood that violent crimes are committed and that guns are involved in these crimes.			
3	A Secondary Spatial Analysis of Gun Violence near Boston Schools: a Public Health Approach	Gis Barbosa	2018	Quantify the concentration of shootings near schools to elucidate the place-based dynamics that may be focal points for violence prevention; determine the degree of spatial dependence of shootings around schools	Spatial statistics for point pattern data, distance metrics and K function methodology	In an 8-year period between 2012 and 2015, there was a clustering pattern of gun shooting incidents indicative of a spatially non-random process. A significantly greater number of shootings were clustered within short distances from schools.			
4	Neighborhood Co-Offending Networks, Structural Embeddedness, and Violent Crime in Chicago	Sara Eastman, Neil Small, Andrew Papacharisis	2017	Examines the role of neighborhood-level criminal networks in shaping the distribution of crime throughout cities; investigates how a local neighborhood's homicide rate is influenced by its structural embeddedness within the larger non-neighborhood co-offending network	Network models	A neighborhood's embeddedness increases the local homicide rate, even after controlling for the neighborhood's internal properties, lower crime and according to unexplained spatial processes			
5	Robberies in Chicago: A Block-Level Analysis of the Influence of Crime Generation, Crime Attraction, and Offender Anchor Points	Wen Bensussan, Richard Book	2010	Examine the effects of crime generation, crime attraction, and offender anchor points on the distribution of street crimes across the 25,000 census blocks of Chicago	Negative binomial model	Blocks that host crime attractors and offenders not only have elevated numbers of robbery incidents, but also indicate their elevated crime risk to adjacent blocks. Modeling effects of the spatial environment in situations where the spatial units of analysis are			

Slow is (Eventually) Fast

- 1. Undergrad vs. Grad: Tasks take less time now and are less intimidating
- 2. If you, “go out too fast,” you’ll burn out.



Compete (Against Yourself)

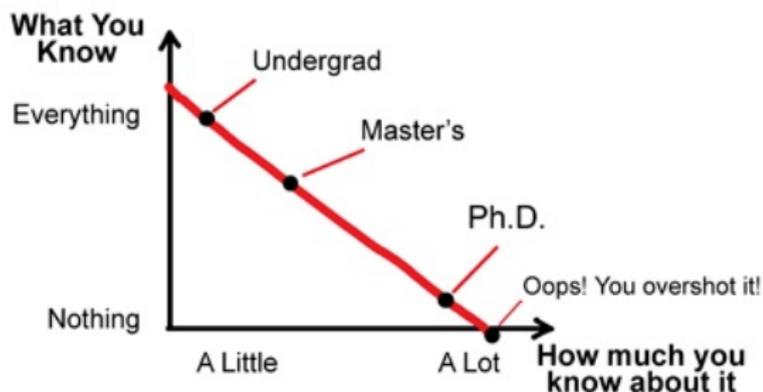
- Your PhD is an individual event
- Grad school is a team sport
- Imposter Syndrome is the worst



Get Comfortable Being Uncomfortable

- Interdisciplinary work means interacting with and establishing new contacts
- This means new conferences and new collaborations
- You'll quickly learn: you know nothing

What You Know vs How much you know about it



JORGE CHAM © 2008

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Do the Verb Until You Become the Noun

How to become an Applied Mathematician

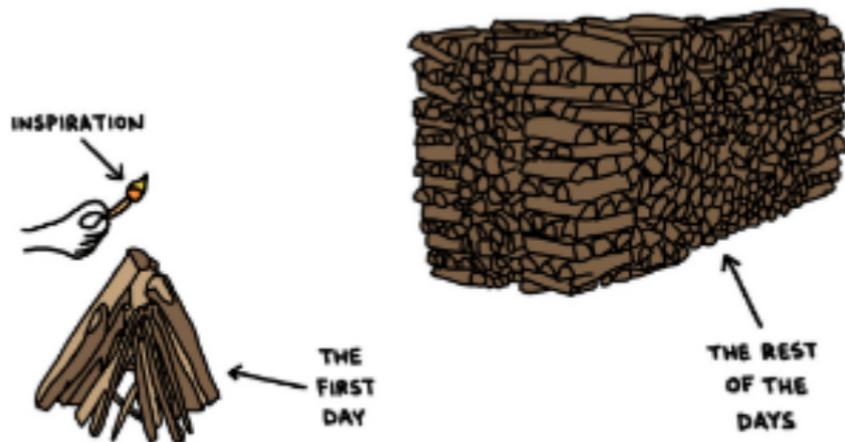
$$\text{Applied Mathematician} = \int_0^n n(\text{Apply Math}), \quad (1)$$

where n is the number of times you apply math.

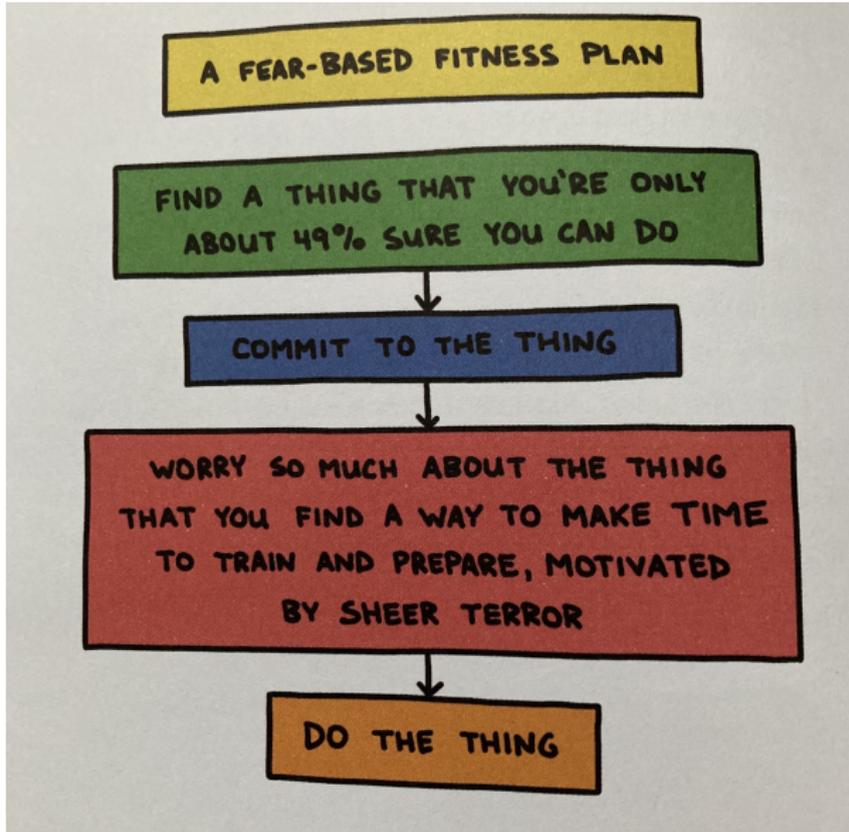
- If you do something often enough, it starts to become your academic identity
- This can be hard and soft skills – choose wisely
- Practice doesn't necessarily make perfect, but practice does make permanent

Inspiration is (Unfortunately) Not a Strategy

- Inspiration isn't enough
- Find your fuel
- Planning is important



A Fear-Based PhD Plan



Write Your Own Definition of Success

What makes a successful PhD Candidate?

- Papers published
- Conferences attended
- Courses taken
- Dissertation quality/length
- Service

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What makes a successful person?

- Focus and self-control
- Perspective
- Communication
- Making Connections
- Critical Thinking
- Taking on Challenges
- Self-Directed, Engaged Learning

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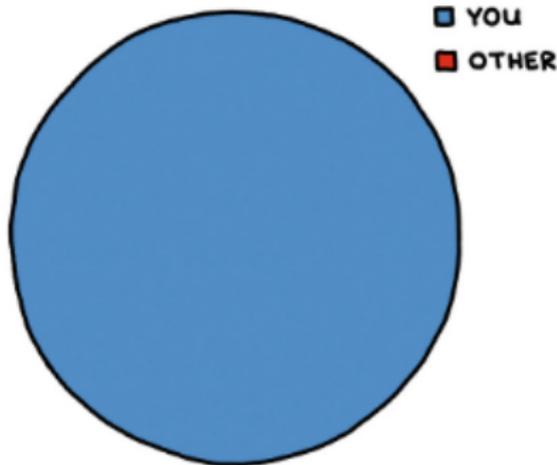
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Write Your Own Definition of Success

- What do you want to do after a PhD?
- Who do you want to be after a PhD?

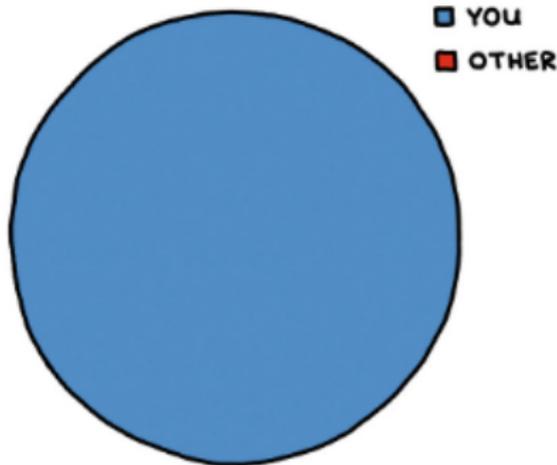
PEOPLE WHO GET TO DECIDE WHAT
THE POINT OF ALL YOUR RUNNING IS:



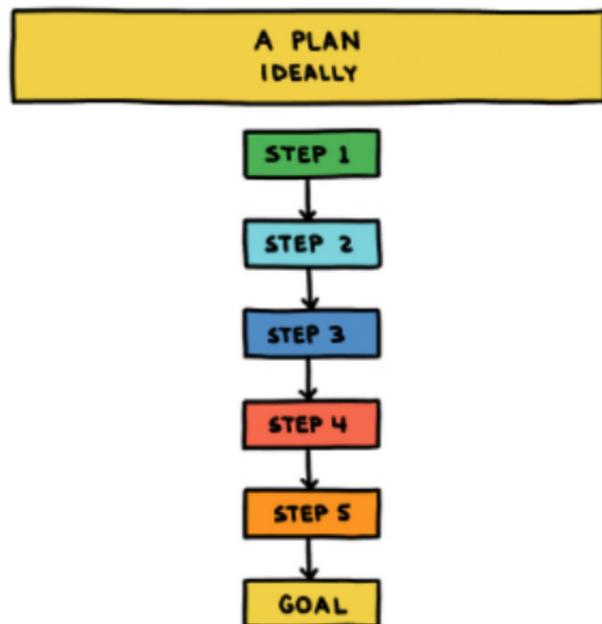
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Progress is Not a Straight Line



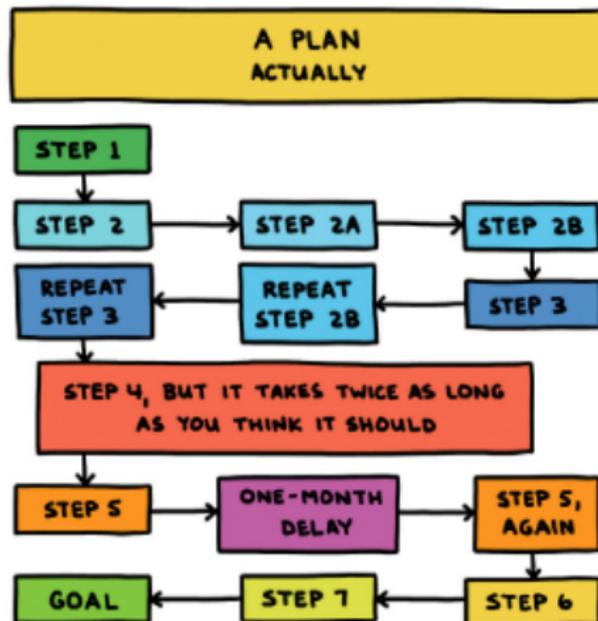
- Step 1: Get into PhD program
- Step 2: Pass qualifying exam
- Step 3: Pass comprehensive exam
- Step 4: Defend dissertation
- Step 5: Graduate, get dream job.

Progress is Not a Straight Line



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Progress is Not a Straight Line



An Agent-Based Model of Santa Cruz Island Foxes (*Urocyon littoralis santacruzae*) which Exhibits an Allee Effect

Shelby M. Scott, Erin N. Bodine & Anne Yust

Technology as a tool in teaching quantitative biology at the secondary and undergraduate levels: a review

Miranda M. Chen, S. M. Scott & Jessica D. Stevens

An Agent-Based Model of the Spatial Distribution and Density of the Santa Cruz Island Fox

Shelby M. Scott*, Casey E. Middleton† and Erin N. Bodine^{1,†}

A Report from the NIMBioS/DySoC Investigative Workshop on the Mathematics of Gun Violence

Shelby Scott

COVID-19 and crime: Analysis of crime dynamics amidst social distancing protocols

Shelby M. Scott*^{1†#a}, Louis J. Gross^{1,2&}

It's Only Half About Science - The Not-Science



It's Only Half About Science - The Not-Science



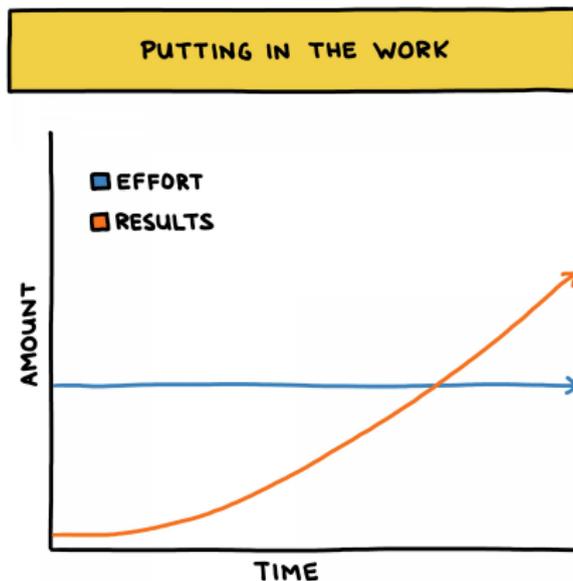
It's Only Half About Science - The Not-Science



There Are No “Hacks”

At some point, you just have to:

- Read the textbook
- Learn the coding language
- Write the manuscript
- Ask for help

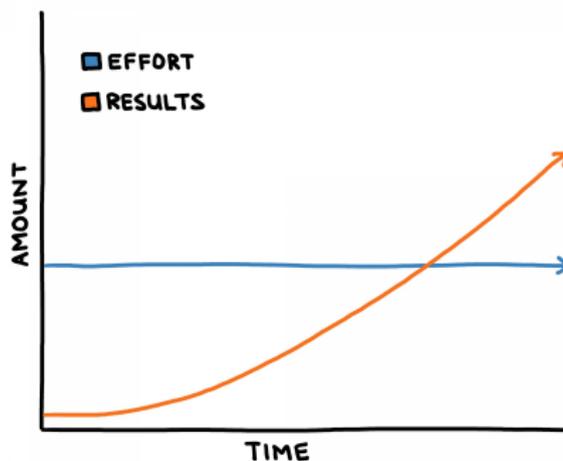


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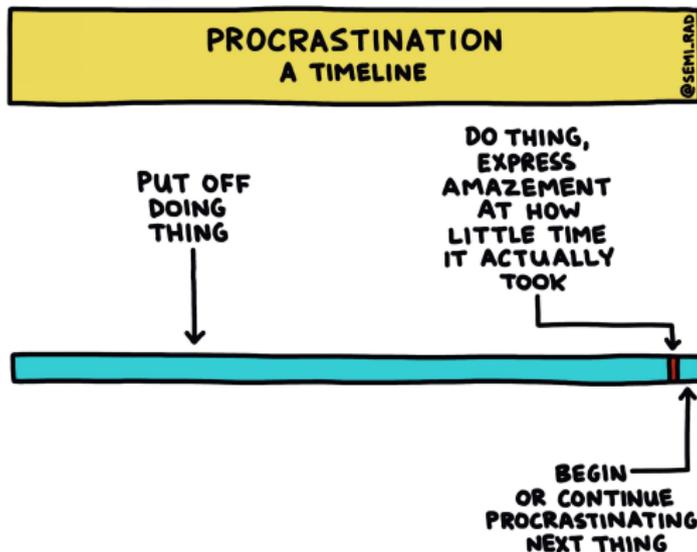
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PUTTING IN THE WORK



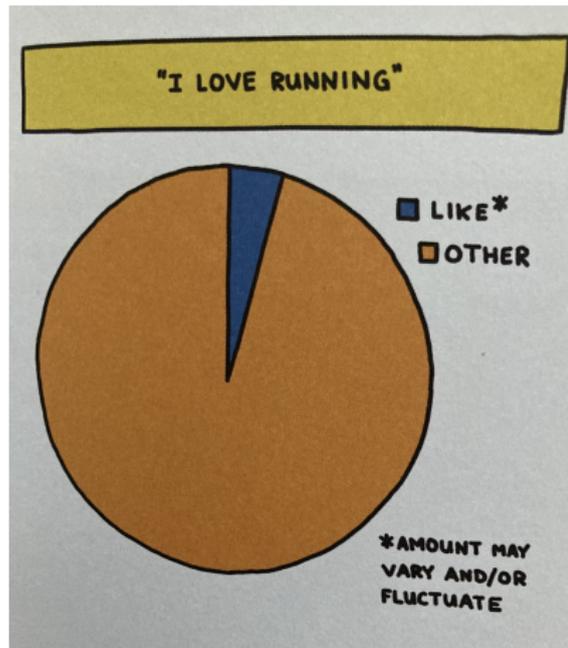
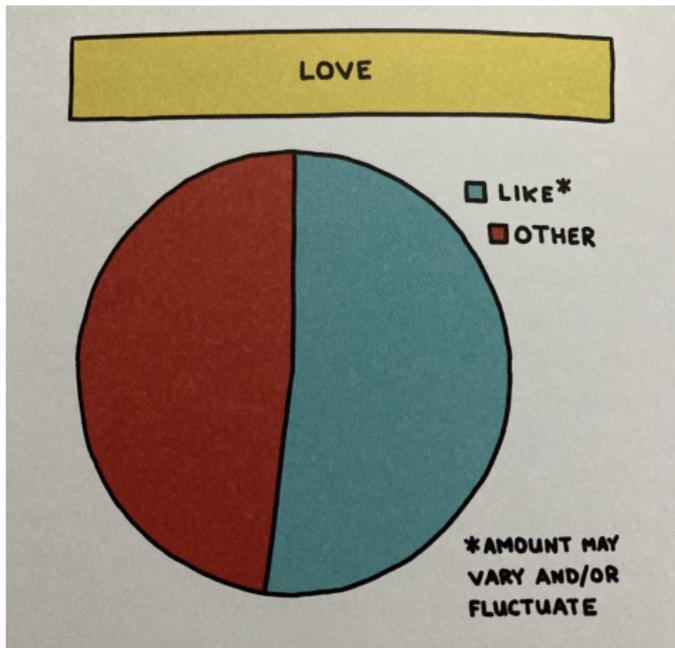
Screw Busy

- Graduate school is a master class in time management
- You can be as busy as you want to be*



* This will differ based on your non-grad school responsibilities. Parents – how are you doing?

Loving Something is Different from Liking It



Epilogue: There is No Right Way to Do It

Questions?

