

An Introduction to

Building Your Career In Statistics:

A Practical Guide

to

Longevity, Happiness, and Accomplishment

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Starting Point

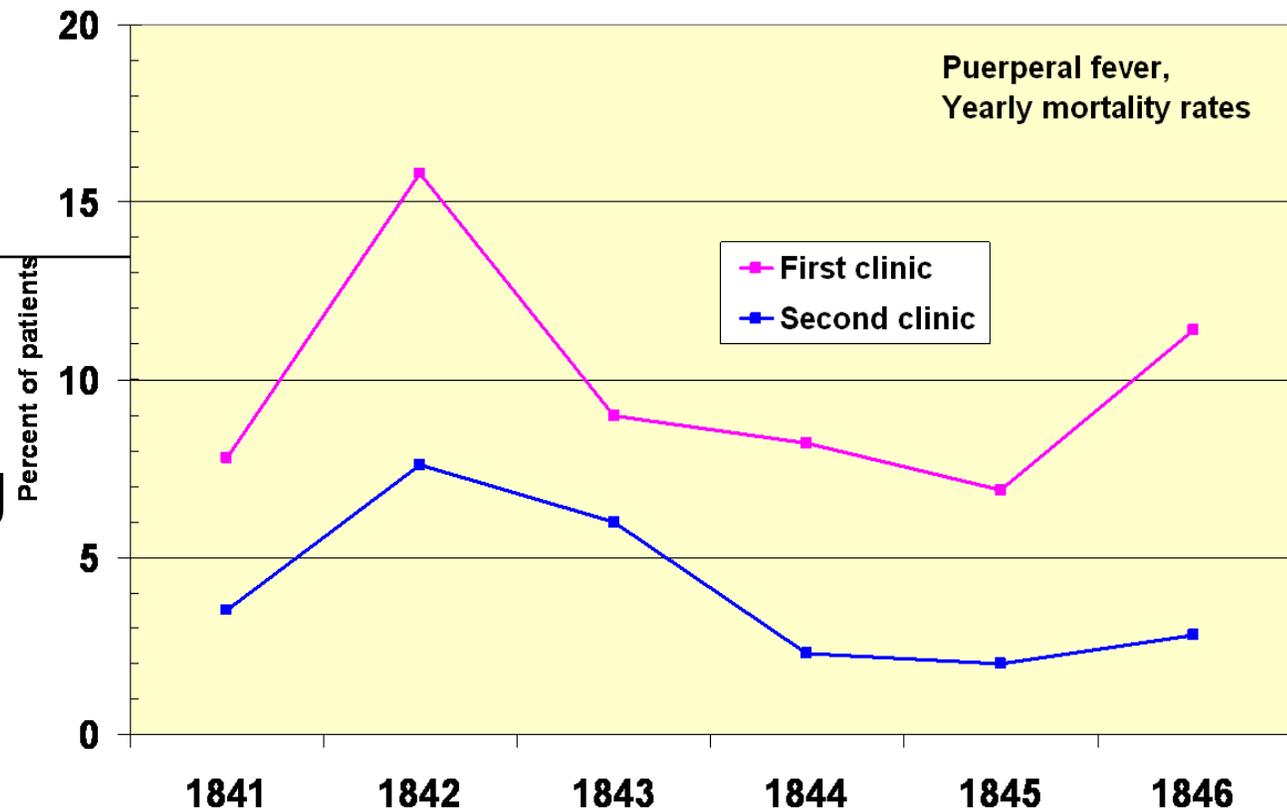
- **Many places to get advice on spot topics**
 - **Promotion, raises, difficult co-worker**
- **Dealing with obstacles / uncertainties as they come up is important but doesn't "build" a career**
- **Career building \neq following a recipe – too unpredictable – but we can nudge in good direction**
- **2 anecdotes to motivate long-term, big picture view**
- **Then, how to do it**

Motivating Example

- **“You have the perfect background for this role; the other 90% of what you need to know you can learn on the job.”**
 - **Exaggeration for emphasis - helps us realize the importance of continued learning. But...**
- **How do we maintain work/life balance?**
- **How do we continue to develop and learn?**
- **What is the long-term goal?**

Ignaz Semmelweis

- **Discovered incidence of childbed fever (post-partum infection) cut by hand washing**
- **Did not know why**
- **Findings not accepted**
- **Mental breakdown. Committed to an asylum where he died at age 47 after being beaten by the guards 14d after committed**
- **Being right wasn't enough**



Framework - Car Analogy

- **Consider your career as a car**
- **Technical acumen: engine, raw power (not covered further here)**
- **Other attributes are how to make use of the power – the features / components**

Car Analogy (continued)

- Technical acumen: engine, raw power (not covered further here)
- Other attributes are how to make use of the power – the features / components
 - **Productivity** & prioritization
 - **Communication**
 - **Creativity** & innovation
 - **Critical thinking (individual & group)**
 - **Influence and leadership**
 - **Work relationships**
 - **Continued learning & Career planning**

Most statisticians do not get formal training on these aspects

Car Analogy (continued)

- **Like cars, we can each emphasize different features**
- **Relative importance of features tends to change over time**
 - **Sports car**
 - **Kid hauler**
 - **SUV**
 - **Golf cart 😊**

My Path

- **1978:** **Assoc. Degree, U of MO**
- **1979-1985:** **Small business owner**
- **1986-1993:** **CSU, PhD Genetics**
- **1994-1998:** **CSU Dept of Stats** **Academia**
- **1998-2018:** **Lilly** **Large pharma**
- **2018-2021:** **Biogen** **Mid-size Pharma**
- **2021-2022** **Cortexyme** **Small Bio Tech**
- **2022-:** **Pentara** **CRO**

Outline

- Introduction
- **Productivity**
- Creativity
- Career planning
- Continued learning

Productivity

- **Foundational skill**
- **Intent is to be more efficient and effective**
 - **Work-life balance**
 - **Time for developing skills**
- **Two important things I learned about improving productivity**
 - **Relevant throughout your career, not just at the start**
 - **The best time to plant a tree was 30 years ago; the second best time is today**

Perspective on Productivity

- **Being overworked, tired, in constant contact 24/7 have become surrogates for being a valuable employee**
- **Companies constantly strive for “more”, push employees for more**
- **Pushes us to short-term “activity” rather than long-term productivity**

Definitions

- **Deep Work:** Done with intense, focused, concentration – no distractions
- **Shallow Work:** Activities with minimal lasting impact
Easy to replace

Cal Newport Deep Work

Definitions (continued)

- **Deep Work includes hyper focus and scatter focus tasks**
- **Hyper focus**
 - **Writing papers, studying, coding**
 - **Most relevant for productivity**
- **Scatter focus**
 - **Structured mind-wondering to connect dots**
 - **Most relevant for creativity and innovation**

Chris Bailey Hyper Focus

Shallow Work Increasing

- **As “knowledge” work gets more complex, harder to measure value of performance**
- **Impact of increasing shallow work hard to detect**
- **Tend toward what is easiest in the moment**
 - **Quick emails / IM that result in threads instead of well thought out responses that resolve the issue**
 - **IMs / texts can lead to lack of planning and thought**
 - **Multi-tasking where we do multiple things of questionable quality simultaneously**
 - **45 sec attention span**

Consequences of More Shallow Work

- **Activity and availability are surrogates for accomplishment**
- **More time spent**
 - **Shallow, multi-tasking**
 - **Responding quickly to “urgent” things**
 - **Gathering and passing along information via meetings, email, IM**
 - **Staying in contact 24/7**
- **Less time spent thinking, concentrating, focusing, creating new info / value**

Deep Work is Important & Difficult

- Needed to learn hard things, to be productive & creative
- **Increasingly rare and increasingly valuable**
- Trends in business / life decrease Deep Work
 - Instant messaging, open office, meetings
 - Social media & infotainment designed to hold our attention - keep us distracted
- Brains wired for distraction
- Spurt of dopamine with each notification

Neuroscience of Distraction & Concentration

- Distractions leave attention residue
- Doing complex tasks with distraction fires too many neuro circuits, reduces myelination and neuronal effectiveness
 - Over time, distractions make us more distractable
- Focused attention fires relevant neuro circuits, increases myelination and neuronal effectiveness
 - Over time, focusing makes us capable of greater focus
- *To be more productive we need to focus more and to focus we need to manage distractions*

Strategies to Increase Deep Work

- **Use routines to drive deep work / avoid distractions**
- **Tailor approach to your situation**
- **4 options for deep work scheduling:**
 - Monastic: radically minimize shallow work in your life
 - Bimodal: Schedule long stretches of time for isolation and deep work (days or weeks)
 - **Rhythmic: Schedule time everyday to do deep work – i.e., manage attention / distractions**
 - Journalistic: Whenever you can switch into deep work (very hard to switch like this)

Tactics for Rhythmic Deep Work

- **Limit social media and infotainment**
- **Limit availability on IM / text / phone**
- **Turn off email notification & batch process**
- **Limit multi-tasking**
- **Use quiet places away from your work station**

Multi-tasking

- **Estimated 28% loss of productivity due to multitasking**
- **You can do two things at once, but you can't focus effectively on two things at once – don't multi-task complex things**
- **Multitasking divides our focus and dumbs down all the outcomes in the process**

Attention Management Suited to Task

4 types of activities

	Attractive	Not Attractive
Productive	Purposeful	Necessary
Unproductive	Distractioning	Unnecessary

- **Unnecessary -** Takes care of itself
- **Necessary -** Block time to avoid procrastination
- **Purposeful –** The most important work, prioritize
- **Distractions –** Need to manage

Managing Distractions

	Fun	Not fun
Can control	1	2
Can't control	3	4

- 1. Set limits in advance**
- 2. Eliminate with planning**
- 3. Enjoy the moment, but be ready to refocus**
- 4. Coping mechanisms (head phones)**

Focus Requires Discipline and Willpower

- **Discipline and willpower**
 - **Not static traits**
 - **Vary over time / throughout the day**
- **The mind, like the body, fatigues with use and atrophies with inactivity**
- **Make doing what matters most a priority when your resources are at their highest**
 - **Morning people vs night people**

Thief of Productivity

- **Inability to Say “No”**
- **When you say yes to something today you may have to say no to something tomorrow**
- **Or, else lose work-life balance**

Idleness is Imperative

- **Downtime aids insights. Allows subconscious to sort through data and connect dots – sleep on it**
- **Helps recharge - Deep Work is hard**
- **Completely shutoff during breaks or end of day**
 - **Evening work usually not that important**
 - **Can reduce capacity for next day**
- **Take long breaks – vacations without work**

Putting The Principles Into Practice

- **Goal of increasing productivity is to be more efficient**
 - **Work-life balance**
 - **Continued learning**
 - **Not to get more done**
- **Activity and availability are not accomplishment**
- **Strive for more Deep Work**
 - **Manage your attention by managing distractions**
 - **Apply appropriate focus at appropriate time to maximize focus, discipline and will power**

Outline

- Introduction
- Productivity
- **Creativity**
- Career planning
- Continued learning

Broad Definition of Creativity and Innovation

- **Creative / innovative idea or approach**
- **Solution to a tough problem**
- **Complex decision**
- **Leading a large and/or complex task**
- **New analytic approach / data mining plan**
- **The best design / development plan**
- **The best programming approach**
- **The most influential result**
- **The best way to explain**
- **The key coaching / mentoring advice**

Good Ideas Seldom A “Eureka Moment”



Sources of Innovation

- **Ideas often evolve as slow hunches, maturing and connecting to other ideas over time**
- **When enough pieces of the “idea puzzle” fall into place, we suddenly see the picture**
 - **It feels like a eureka moment, but the key ingredients of the idea were likely building over time, often in subconscious**

S Johnson – Where good ideas come from

Enhancing Creativity

- **Importance of slow hunches suggests ways to enhance creativity:**
- **Interact with others doing similar things**
- **Allow time for slow hunches to evolve**
 - **Think**
 - **Interact**
 - **Refine**
- **Write down thoughts and ideas**

Exaptation

- **Originally used for 1 purpose, eventually used in a completely different way**
 - **Feathers were originally for warmth – evolved into flight**
- **Many inventions from borrowed / repurposed / connected ideas from multiple disciplines**
 - **WWW originally for scholars**
 - **Printing press morphed from 1000 yr old wine screw press (+ knowledge of metallurgy)**
 - **MMRM example**

Weak Ties Between Networks

- **Employees who work across areas solve more problems than in a silo**
 - **Inputs / info coming from different contexts**
 - **Collaboration among diverse thinkers**
- **Gutenberg: metallurgist with weak ties to wine making. Knowledge of both to make the printing press**

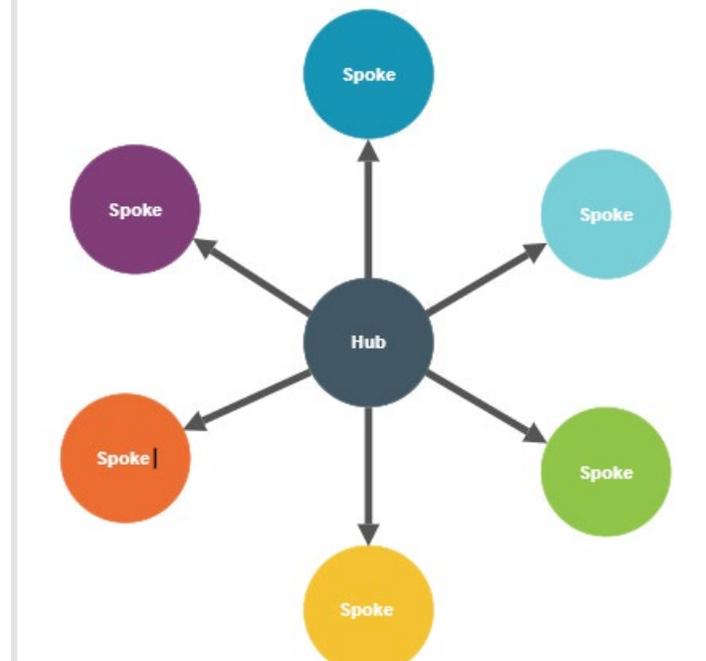
Quantity of Ideas is Key

- **Percentage of good ideas similar**
- **Innovative / creative people do not have better ideas, they have more ideas**
- **Therefore, to become more creative we need more ideas**
- **Get more ideas from**
 - **Diversity (thought, people, interactions)**
 - **Collaboration**
 - **Develop weak ties to non-core areas**

Adam Grant – The Originals

Focus **AND** Collaboration

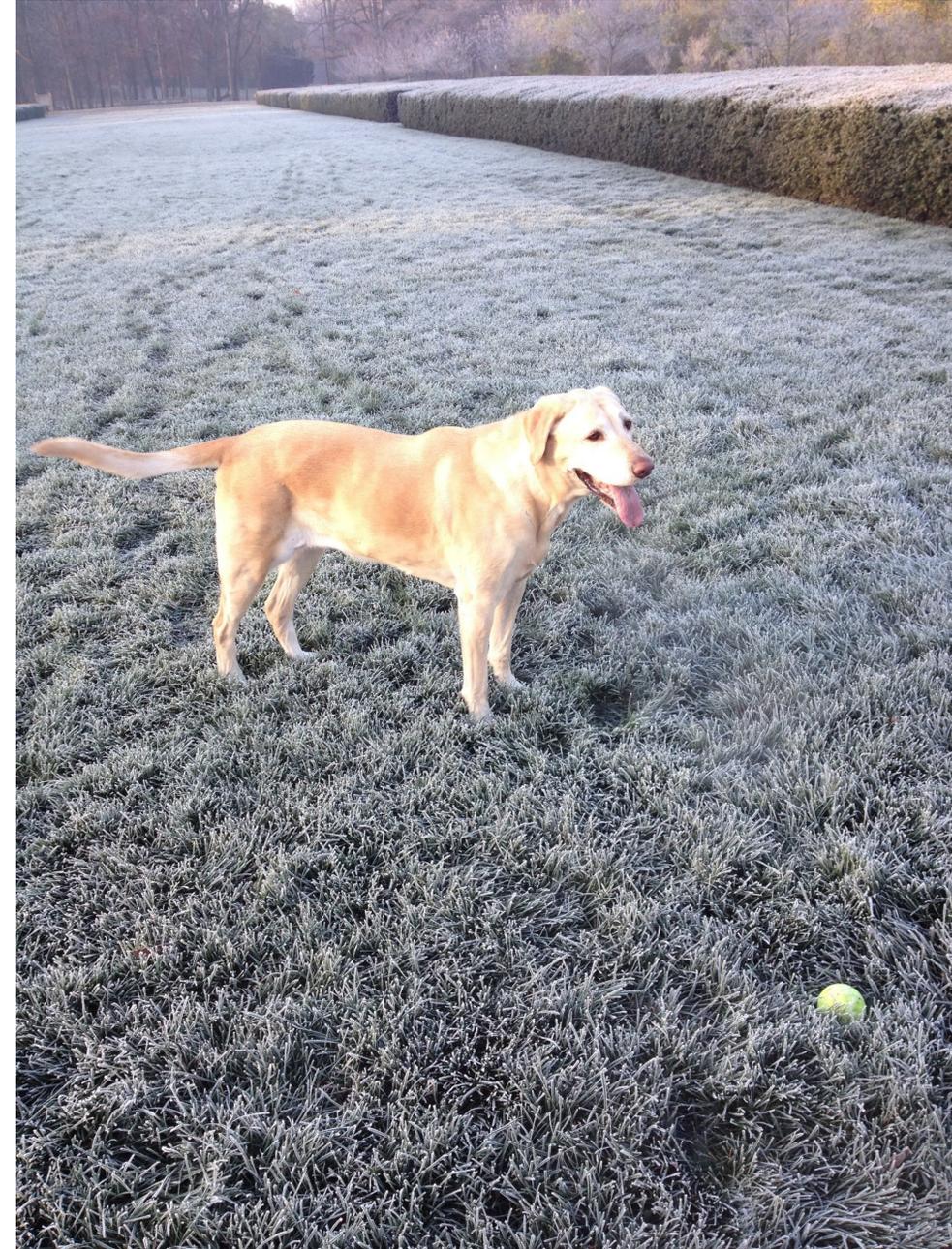
- **Hub and spoke layout (real / metaphor)**
- **Regular exposure to ideas in hubs**
- **Work Deeply in spoke on what you encounter in hubs**
- **Use flexible work locations to find your hub and spoke**



Putting Principles in Practice

Playing fetch with Maggie

- **Go outside**
- **Interact with people / groups**
- **Write things down**
- **Take on multiple hobbies**
- **Let others build on your ideas**
- **Borrow, recycle, re-invent**
- **We can't become Edison, but we can become better**



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- **Career planning**
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Career Planning

- **Two important things I learned about career planning**
 - **Relevant throughout your career, not just at the start**
 - **The best time to plant a tree was 30 years ago; the second best time is today**

Dimensions in Career Planning and Progression

- **Duration of planning cycle**
- **Depth and breadth of expertise**
- **Size of the organization**

- **Managerial and technical orientation**
- **Theoretical and applied expertise**
- **Academic and industry orientation**

Duration of Planning Cycle

- **Work planning tied to calendar, tasks for that year**
- **Necessary, but not career planning**
- **Need longer term plans**
 - **3-5 year duration**
 - **Look ahead to interests, possible next role(s), consider what skills and experiences are required**
 - **Plan how to acquire skills and experiences**

Examples of Preparing for Next Role

- **Work in a supportive role prior to a lead role**
- **Collaborate on research outside of current core expertise**
- **Supervise a small group prior to a broader managerial role**
- **Serve on a project or protocol review committee before taking on a broader methodological role**
- **Lead a youth sports team or volunteer organization to prepare for an initial leadership role at work**
- **Read & study**

Long Term Planning

- **5-10+ year plan can be useful**
- **Gather info**
 - **Exposure to diverse roles and experiences**
 - **Consult with senior employees**
 - **Seek things outside current role to know what else is out there**
- **A general plan**
 - *Be a good drug hunter who helps others to be better drug hunters*

Depth and Breadth of Expertise

- **Valuable contributions via either deep expertise in 1 area or broad expertise across areas**
- **Over a long career, probably necessary to have expertise in > 1 one area, even if 1 is most notable**
- **Broader expertise useful for innovation and creativity, and for critical thinking**

Depth and Breadth of Expertise

- **Can be useful to first develop depth in a narrow area**
 - **Recognized as an expert in that area**
 - **Along with being productive, provides initial traction in career progression**
- **Too narrow a focus for too long can foster a lack of understanding of the big picture and limit ability to recognize other areas where we can contribute**
 - **3-5 year plans should include diversity in experience & exposure to different areas and ideas**

Size of The Organization: coaching and mentoring

- **Small company - less opportunity, but could be more personal - less likely “to get lost in the shuffle”**
- **Regardless of size, Opportunities for coaching and mentoring may be good indicator of career progression potential**
- **Organizations that prioritize coaching and mentoring often have more satisfied employees who make greater progress in their careers**

Size of The Organization: level of bureaucracy

- **In a smaller company, fewer non-core tasks**
 - **Fewer emails and meetings, which can increase focus and productivity**
 - **Potentially less required training, fewer regulations and SOPs**
- **These factors can increase freedom and flexibility, thereby fostering greater focus and creativity**
- **However, less guidance and regulation also increase the likelihood of making crucial mistakes or wondering off into unproductive approaches**

Size of The Organization:

pressure for project success

- **Small companies may have only 1 or a few projects and the failure of any one project can be catastrophic**
- **Big companies have more projects, and the future of the company does not rest on any one project**
 - **Successful big companies often focus on failing fast so that time and resources can be devoted to other projects with greater prospects for success**

Size of The Organization: pressure for project success

- **However, motivation and other cognitive biases create pressure for success of individual projects - even in big companies**
- **Pressure for success can be great in academic careers where a researcher may have 1 or 2 lines of research that must be “successful” for continued funding and / or tenure**

Size of The Organization: Network

- **At a larger company, statisticians have automatic access to a wider network**
- **Over a decade or more, exposure to statisticians and scientists who inevitably switch organizations creates ready access to a large network**
- **At a smaller company, more conscious effort is needed to create a broad network**

Putting The Principles Into Practice

- **Yearly performance plans should include learning objectives from 3-5 yr plan and how to achieve them**
 - **Consider dimensions such as breadth vs depth, technical vs managerial, etc.**
- **Develop a 3-5 year plan**
 - **Define where you want to be in 3-5 years, as best you can**
 - **A good learning objective in year 1 is a list of possible things you might want to be in year 5**
- **Seek what you can't see from your routine work so you know more on the possibilities**

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Continued learning

- **Two most important things I learned about continued learning**
 - **Relevant throughout your career, not just at the start**
 - **The best time to plant a tree was 30 years ago; the second best time is today**

A Route to Excellence

Difference between average and elite performers:

- **Elite sought out teachers and coaches and engaged in supervised training**
- **Non-elites rarely engaged in similar types of practice**

Anders Ericsson

Coaches

- **Basic training for new employee**
- **Increase competence in fundamental skills**
- **Help experienced employees with a specific aspect of their work**

Mentors

- **Mentoring tends to be for general professional development**
- **Mentors tend to be more senior than coaches**
- **Important aspects of mentoring include being a role model and a longer-term relationship focused on overall development**
- **Mentoring can involve less frequent and less structured sessions than coaching**
- **Can be beneficial for mentor to come from outside the mentees function or organization**

Coaching and Mentoring

- **Being a coach and a mentor is also a great career springboard. Being a coach or mentor provides additional practice and diversity in applying skills**
- **“A student was given a mentoring opportunity because having someone leaning on her / him would help her / him to stand even steadier”** *Thomas Hughes*

Putting Principles Into Practice: Methods for Continued Learning

- **Conferences, internal training / seminars / lunch & learn, journal clubs are a good start – but unlikely to fully sustain development**
- **Read!**
 - **Average 30 min / day, 3 days / week, 5 years = 30 books**
- **Increasing productivity saves time for learning**
 - **Increasing efficiency by 10% frees up 25 work days per year, ~50 mins per day**
- **But these are not the only nor most efficient types of learning opportunities**

Putting Principles Into Practice: Methods for Continued Learning (continued)

- Incorporate learning into routine work
 - Ask questions. Seek input
 - Take time to learn the nuances, details, the underlying science, business rationale
 - Assess and understand competing methodologies for a particular application
- Present learnings in a seminar, congress, peer-reviewed journal in which you also hone communication skills
- *“It’s not that I gave talks on topics where I was an expert, rather I became an expert on topics I gave talks on”*



Being Right Isn't Enough

Technical acumen is the engine – but it isn't everything

- **Productivity & prioritization**
- **Creativity & innovation**
- **Communication**
- **Critical thinking (individual & group)**
- **Influence and leadership**
- **Work relationships**
- **Continued learning and Career planning**

We don't get formal training in these areas, but they are important everywhere we go

The Foundational Skill

- **Attention management is THE foundational skill –**
 - **Improves focus**
 - **Improves productivity to maintain work-life balance**
 - **Improves creativity and innovation**
 - **And these lead to many other good outcomes**

Key Connections Foster **Compounding Benefit**

- **Increasing productivity and better prioritization yields**
 - **Potential for work-life balance**
 - **Reputation as someone who gets things done**
 - **Time**
 - **Increase technical acumen and other skills**
 - **Creativity and innovation**
 - **Refine presentations / writing**
 - **Think critically**
 - **Influence and lead**
 - **Cultivate beneficial collaborations & relationships**

Key Connections

- **Increasing creativity and innovation**
 - **Increases your contributions - makes you more valuable to the organization**
 - **Provides better material to communicate & influence**

Key Connections

- **Increasing communication skills**
 - **Helps others understand your creative & innovative ideas**
 - **Clear writing / presentations is sign of clear thinking and effort**
 - **Increases ability to influence**
 - **Increases ability to lead**

Key Connections

- **Critical thinking & decision-making under uncertainty skills help ensure**
 - **Good ideas are optimized**
 - **Best alternatives evaluated**
 - **Proper prioritization - we are working on the right stuff**

Key Connections

- **Influence and leadership skills**
 - **Help put our ideas and others' ideas into action**
 - **Helps others to be more effective**

Perspective

- **Different people have different combination of skills**
- **Most important skills likely change over time**
- **Focus on what is important now and next**
- **Goal is consistent, long-term improvement**

- **You have an entire career - Be sure to use it**



Mileposts

- **To assess if you are headed in the right direction, answer these 3 questions**
- **Am I motivated in my work?**
 - **If you are motivated, you will work hard enough. Many work too hard**
- **Am I working smart?**
 - **Don't confuse activity / accomplishment**
- **Am I working well with others?**

Goals

It's a good question to be asking yourself

What is the good life, what is wealth?

What is the future I'm trying to see?

What does that future need from me?

— *- Jackson Browne*

Final Thoughts

- **Longevity**
 - **Take care of yourself – work life balance**
 - **Its good for you, your family, & your career**
- **Happiness**
 - **Not getting what you want**
 - **It is working toward some greater purpose (family, personal, professional)**
 - **It you don't know what you are working toward, you will never have “enough”**
- **Accomplishment: Working toward the future you are trying to see**

**BUILDING YOUR CAREER
AS A STATISTICIAN**
A Practical Guide to Longevity,
Happiness, and Accomplishment



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15. 40 Four Years *Craig Mallinckrodt*

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Building Your Career as a Statistician

A Practical Guide to Longevity, Happiness, and Accomplishment

Edited By Craig Mallinckrodt

This book is intended for anyone who is considering a career in statistics or a related field, or those at any point in their career with sufficient work time remaining such that investing in additional learning could be beneficial. The book focuses on the non-statistical aspects of being a statistician that are crucial for success. Each of these chapters includes sections on foundational principles and a section on putting those principles into practice. Connections between these individual skills are emphasized such that the reader can appreciate how the skills build upon each other leading to a whole that is greater than the sum of its parts.

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