DATA 552

Communication and Argumentation

Lecture 3: Writing (Tone, Language, and Style)

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Email One: The Version That May Get Results

Sarah –

Last week you asked me to approach Magnabilify Corporation, the software developers, to see whether they might have any interest in our customizing some security applications for their computer systems. I finally got through to Jim Martinez, corporate vice president in charge of software, and we have planned a face-to-face meeting at his office next Tuesday.

The next steps, as I understand them under Magnabilify's protocol, will be to enter into a nondisclosure agreement, to develop a sample application (in less than two weeks), and to schedule a demonstration shortly after.

Can you and I chat before Tuesday's meeting?

Frank

Example from Bryan A. Garner, *HBR Guide to Better Business Writing*

Email Two: The Version That May Get Results

Subject: Request for an Interview

Hal –

May I ask a favor of you? Glenda Jones, a really sharp mentee in the township's Young Leaders program, wants to pursue a career in journalism, and she's eager to learn how commercial news organizations work. Would you spend 15 minutes chatting with her at your office sometime this month, before school lets out? I know it would be a meaningful introduction for her. You'll find that she is a poised, mature, smart, and incredibly self-possessed young woman.

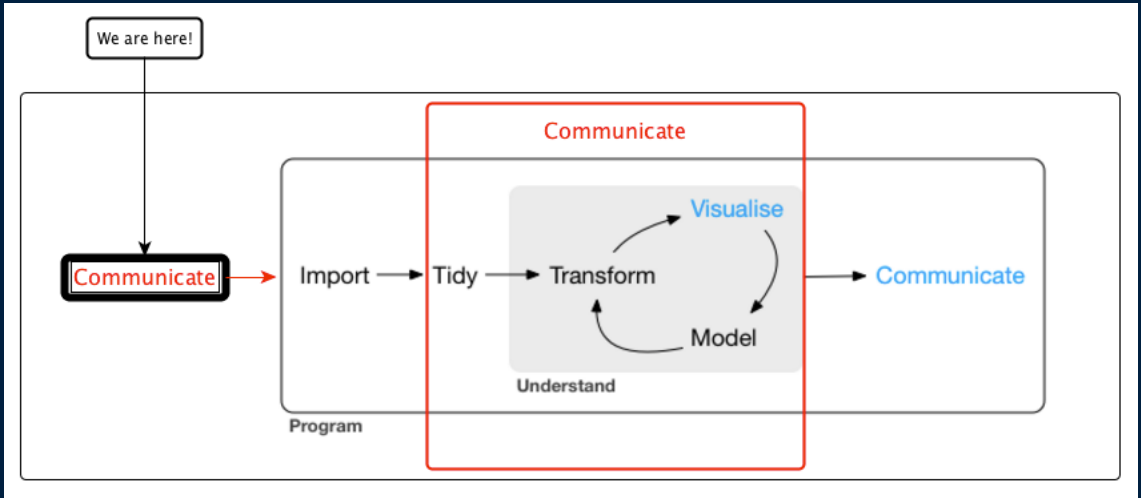
She tells me that she's looking for an unpaid internship. After a brief interview, perhaps you'd consider giving her a one-week tryout as your assistant. I know you've been a mentor to many aspiring journalists over the years, but here you have a real standout: editor of her college newspaper, Phi Beta Kappa member, state debate champion.

No pressure here. If it's a bad summer for you to take on an intern, I'll completely understand. But please meet with her if you can. I've asked her to write to you independently, enclosing her resume, to give you a sense of her writing skills. Thanks very much. Hope you and your family are doing well.

Myra

Example from Bryan A. Garner, *HBR Guide to Better Business Writing*

Beginning of a data science project



Today's goal: devise a framework for analyzing the relationship between a research question and the goals of a decision-maker.

What is a data science project

There are two types

- Let us see examples of each type
- See if can spot the key elements that make them all data science projects
- See if you can spot the differences that split them into two types of projects

Examples of first type:

- Twitter bot that scans for breaking news stories and retweets them to notify users

- Automated messaging system that gives advice to students to help them meet their goals in a course

- Predictive model of employee performance, used to select candidates for a position

Examples of second type:

- Analysis of baseball statistics to help team managers identify high-value players

- Predict university course enrollments to help department heads know how many instructors to appoint for each semester

- Analysis of test-taker behaviour in a game-based assessment, to determine whether the assessment needs to be redesigned

Questions

- What makes them all data science projects?
- What's the difference between the first type and the second type?

First	Second
- Twitter bot that scans for breaking news stories and retweets them to notify users - Automated messaging system that gives advice to students to help them meet their goals in a course - Predictive model of employee performance, used to select candidates for a position	- Analysis of baseball statistics to help team managers identify high-value players - Predict university course enrollments to help department heads know how many instructors to appoint for each semester - Analysis of test-taker behaviour in a game-based assessment, to determine whether the assessment needs to be redesigned

Understanding data science's relationship with decision making

- There is often a wide gap between what people care about and what data science can do

- "interesting to the data scientist" is not the same thing as "interesting to the decision-maker"

All decisions are just intentional manipulation of variables

They take two atomic forms:

- How much? (numeric)
- Which one? (categorical variable)

How much? (numeric)	Which one? (categorical)
	

The decision variable, and its values (alternatives)

- How much pasta should I cook for dinner?
  - decision variable: amount of pasta
  - alternatives: 100g, 200g, 235g, etc
- Should I bring my raincoat today?
  - decision variable: whether the raincoat is brought
  - alternatives: yes, no

The decision maker's objectives

What does the decision aim to achieve?

- How much pasta should I cook for dinner? Objectives:
  - Reduction in hunger (numeric)
  - minimization of wasted food (numeric)
- Should I bring my raincoat? Objectives:
  - Minimization of probability of getting wet (numeric)
  - minimization of probability of carrying around needless weight (numeric)

The context: what does the decision depend on?

- How much pasta should I cook for dinner? Context:
  - How much pasta do you have? (numeric)
  - How much pasta can you afford? (numeric)
  - How hungry are you? (numeric)
- Should I bring my raincoat? Context:
  - What is the probability of rain? (numeric)
  - How much time will you spend outdoors? (numeric)
  - Do you have an umbrella? (categorical)

Every decision entails a complex evaluation of numerous interconnected variables

- The decision variable is the variable manipulated through the decision.

- The objectives of the decision maker represent the variables of primary concern, which the decision-maker aims to influence (often indirectly) through manipulation of the decision variable.

- Context variables serve to mediate the relationship between the decision variables and the objectives. Frequently, these variables are not directly controllable, or at least not within the same timeframe as the decision variable.

A few words on this framework

- This analysis framework is closer to decision theory than it is to hypothesis testing or statistical inference

Every decision deals with variables on three separate levels

1. The **decision variable**'s values are your **alternatives**. 100g, 200g, 235g, yes, no. These are the *values* that you choose between when you manipulate the variable at the centre of your decision.

2. **Objectives.** Hunger, wasted food, probability of getting wet. These are the variables that will change *as a result of your selection of an alternative*. They're the variables that you actually care about.

3. **Context.** How much pasta you have, how much you can afford, probability of rain today. These are all the other variables that determine how your selection of an alternative affects the resulting changes in your objectives. They are usually variables whose values you cannot control.
    - I chose 100g. If nobody is hungry, then my entire selected amount of pasta is wasted — I've done poorly on my second objective. If everyone is very hungry, then I might not have made enough to satisfy everyone — suboptimal on first objective.
    - I brought my coat. If it doesn't rain, then I would have avoided getting wet regardless of my decision, but now I've wasted energy carrying a coat around — I've done poorly on one of my objectives. If it does rain, then I successfully stayed dry at the small cost of additional weight — optimal decision!

The process that every data science project either augments or automates:

1. Define objectives
2. Understand context
3. Evaluate alternatives based on objectives and context
4. Select an alternative

How does this inform communication & argumentation at the beginning of a data science project?

- Questions you must answer:
  - Who is the decision maker?
  - What are their objectives
  - What are their alternatives?
  - What is their context?

Portfolio

Find a partner. One of you will act as the decision-maker and the other will act as the data scientist. The decision-maker has a decision to make:

- When should they start applying for data science jobs?

Identify your partner's alternatives, their objectives, and their context for this decision. (Take point-form notes in your portfolio.)

After 5-10 minutes, switch roles and consider a new decision:

- Which MDS course, if any, should they prepare for in advance?

Project

- In lab next week, you will be writing a proposal for your project. You should start brainstorming!
- Most of your working life will be spent worrying about others as the decision maker. I would like your project to be selfish...
- I will therefore require that the decision maker *has* to be you!

Project

- Note that the project need not actually lead you to an ultimate decision of any kind.
- It could automate gathering information on the context/alternatives, how the alternatives affect the context, etc.
- We obviously don't have months to spend on this, so set a reasonable goal for your proposal.

Project

- House search — setup an automated system to inform when a new house hits the market within certain bounds.
- Car search — set up a model for used cars versus new cars with several variables to investigate the optimal purchasing strategy
- Fantasy sports — scrape a public database to setup models for potential game outcomes, probabilities, flag undervalued players, build teams, actually keep score for a private league, etc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