

Relationships

Motivation

Vance (2020) states that within the ASCCR Framework for Collaboration (E. A. Vance & Smith, 2019) there are two terminal (or end) goals for a statistician/data scientist in an interdisciplinary collaboration: to make a deep contribution (i.e., to accomplish the task of the project) and to create a strong relationship with the domain expert. Everything else (adopting an attitude of collaboration (E. Vance, 2019), structuring effective meetings (Alzen et al., 2024; Zahn, 2019), following the Q₁Q₂Q₃ workflow (E. A. Vance et al., in press), and effectively communicating to create shared understanding) are instrumental goals. That is, they are useful intermediate goals that help one accomplish the task and/or create a strong relationship.

How do we create strong relationships in statistics and data science collaborations? Are there ways to think about strengthening relationships that can help statisticians and data scientists create stronger ones with domain experts? This document explores some of these potentially useful frameworks for creating strong relationships.

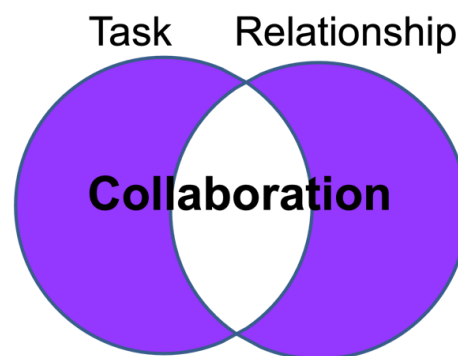
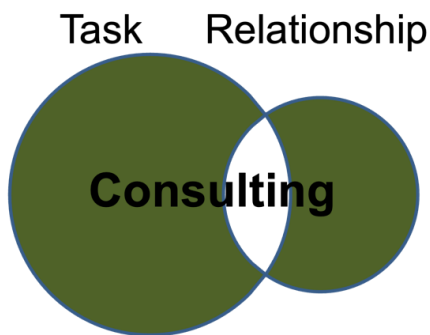
Brief examination of differences between consulting and collaboration

The type of and strength of relationship between the statistician/data scientist and the domain expert is also a major factor differentiating consulting from collaboration. The amount of time one spends on strengthening the relationship is a function of the type of relationship you are in.

In collaboration, the statistician/data scientist is more of a team member than a consultant and is expected to spend more time on the project and more time creating a strong relationship with the other team members.

Consulting v. Collaboration

- Outsider
- Shorter time commitment
- Team member
- Longer time commitment



Also, in collaborations, the members share somewhat equally in the outcomes of the project, such as being coauthors on papers or co-investigators on grants. The outcomes for consultants might only be money, i.e., a fee they collect for their work. Consultants are not listed as co-investigators on grant proposals and they might not be coauthors on any papers resulting from the project.

Emotional Intelligence Framework

Goleman (2006) wrote about four aspects of Emotional Intelligence:

- self-awareness
- self-management
- social awareness
- social management.

We think this is a useful way to think about attitudes and relationships in statistics and data science collaborations. Being aware of and managing the attitudes we have about ourself as a statistician/data scientist (me), about the domain expert (you), and about collaboration in general (we) can help us become more effective interdisciplinary collaborators. The second two points are about Relationships in interdisciplinary collaborations: being aware of relationships (social awareness) and managing or strengthening them (social management).

Once the statistician/data scientist is aware of the importance of relationships in interdisciplinary collaboration, she can begin to manage them, i.e., create collaborative relationships and strengthen them using the following models.

Business Input-Process-Output Model

A business executive might think about a product her company is manufacturing in three stages:

- Inputs: raw materials, plans, designs, allocation of labor (who are the right people?)
- Process: building the product, ensuring it is of high quality (i.e., quality control)
- Outputs: marketing the product, selling the product, making profits

We can think of an interdisciplinary collaboration using a similar three-stage model. There are things we put into a collaborative project, ways we work on the project, and project outcomes.

When focused on the relationship aspects of the project, these three stages are:

- Inputs: attitudes the statistician/data scientist has, attitudes the domain expert has, defining the roles of the statistician/data scientist and the domain expert (i.e., who is responsible for what?), goals (how closely aligned are the goals of the statistician/data scientist and the domain expert?), relative contributions (how much effort are the statistician/data scientist and the domain expert putting into the project?)
- Process: Are the statistician/data scientist and the domain expert actively building the relationship? Are they doing things to build trust? Are they respectful to each other? Are they making working together fun? Do they share decision

making? Are they creating shared understanding and otherwise communicating effectively?

- Outputs: What will the outcomes of the project be? Will both parties benefit equitably from the project outcomes? Do they feel that they have a strong relationship?

Statisticians can reflect on their relationships using this model to determine if there are aspects of the Inputs that need clarification, if the Process is actively strengthening the relationship, and if the outcomes are equitable. Which aspects of this model can the statistician improve to strengthen the relationship?

Medical Model

In the United States and elsewhere, there is a movement to transition the medical profession from “**Doctor**-centered medicine” to “**Patient**-centered medicine.” Briefly that means that rather than optimizing medical care to benefit doctors, medical care should be optimized to benefit patients and improve their health outcomes. One of the goals of the movement toward patient-centered medicine is to make the doctor/patient relationship less consultative and more collaborative. In patient-centered medicine, the doctor is a member of the team whose goal is to keep the patient healthy and thriving. A doctor who tries to find and fix the underlying cause of a patient’s symptom is more collaborative than a doctor who merely prescribes a medication to address the patient’s symptom.

According to Ridd et al. (2009), the patient-doctor relationship has 3 key dimensions:

- Longitudinal care (repeated interactions between doctor and patient over time)
- Consultation experience (the experience of what happens in the doctor’s office or, more generally, everything that happens to the patient between entering and exiting the medical facility)
- Depth of relationship (including how the patient rates the doctor’s knowledge, how trustworthy the doctor seems, whether the patient believes the doctor is loyal [i.e., has her best interests at heart], and how much the patient likes or respects the doctor)

Like in the input-process-output model, what happens in the doctor’s office (the process) is very important for building/strengthening the relationship. If the doctor does something to make the patient feel misunderstood or ignored, the relationship will be poor. If the patient sees the doctor only one time or only very briefly a couple of times, the relationship will not have enough time to grow strong.

Also, how the patient feels about the doctor and the attitudes the patient has about doctors is very important. If the patient does not trust the doctor, the relationship will be poor. The doctor’s attitudes towards the patient are also very important. If the doctor thinks the patient is weak or complains too much or asks too many questions, the relationship will not be strong. In many ways, the statistician/domain expert relationship is like the doctor/patient relationship.

Medical Model Applied to Statistics and Data Science Collaborations

A collaborative project can be statistics focused, domain problem focused, or somewhere in between. Similarly, the project can be focused on the statistician's needs, the domain expert's needs, or somewhere in between. Consultations tend to be focused on solving statistics problems, and the initial goal of the consultative statistician is to translate the domain problem into a statistical problem. In contrast, a collaborative statistician will strive to develop a statistical strategy to help solve the domain problem.

Applying the medical model to statistics and data science collaborations is straightforward. Repeated interactions between the statistician and domain expert can build the relationship over time. What happens during the collaboration experience will strengthen or weaken the relationship (e.g., the statistician can ask a question in a way that strengthens or harms the relationship). And the quality or depth of relationship is dependent upon established levels of trust, perceived competence, loyalty, and regard.

To complete this model for statistics and data science collaborations, one more dimension should be added: the *environment* of collaboration. What are the agreed-upon roles of the statistician/data scientist and the domain expert? What are the goals of the collaboration and to what degree are these goals shared by both parties? How equitable are the benefits or outcomes of the collaboration?

Measuring the Quality or Depth of Relationships

We could (potentially) measure the quality or nature of the relationship between statistician and domain expert. We could try to measure (possibly at the beginning and end of a collaborative project):

- perceived competence (knowledge, or to what degree the statistician/domain expert thinks the domain expert/statistician is an expert in their field)
- level of trust
- commitment the other party has to achieving the team's shared goals
- the feeling that the statistician/domain expert acts in the best interests of the other party (loyalty)
- how highly the other party is valued and liked (regard)
- the perceived degree of teamwork on the project.

Reflecting on Your Relationships

A collaborative statistician can choose one (or all) of the above models as a guide for reflecting on their relationship with a domain expert. Think about each component of your relationship. What are the strengths? Which aspects of the relationship could be improved? Overall, how strong is your relationship? What can you do now (or during your next meeting) to strengthen the relationship?

Tips for Strengthening Relationships

Tips for being *aware* of the importance of and the quality of relationships:

- Appreciate the two terminal goals of collaboration: the make a deep contribution and to create a strong relationship.

- Express authentic interest in developing and building a strong relationship with the domain expert. Do this initially and as your relationship grows.
- Ask the domain expert for feedback

Tips for *strengthening* relationships:

- Respect the skills/value the domain expert brings to the collaboration
- Learn and use the language of the domain expert's discipline
- Effective communication is key
 - Create shared understanding (E. A. Vance, Alzen, et al., 2022)
 - Ask great questions (E. A. Vance, Trumble, et al., 2022)
 - Listen, paraphrase, and summarize
 - Explain statistics and data science using ADEPT(R) (Azad, 2015; Azad, Kalid, n.d.)
- Building strong relationships requires time, patience, and trust
- Act trustworthy to gain trust

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