

Traits of a Successful Statistician

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Editor's Note: These comments are abridged from Chapter 6 of the authors' recent book, [A Career in Statistics](#). They are targeted principally at statisticians aiming for a career in business, government, or other application area; however, the characteristics described are also highly desirable for those in academia.

It goes without saying that a successful statistician must have strong analytical and technical skills. Clearly, you need to know and understand statistics—this is, after all, the added value that you uniquely provide. Most statisticians have master's degrees, but some—especially those who plan to go into academia—earn PhDs. Still others might hold, at least initially, an undergraduate degree only. How far to take your training is highly dependent on the specific career path you expect to follow.

You also need to be able to quickly grasp and properly apply complex technical concepts and to carefully examine, absorb, and question what is presented to you. Mathematics provides the foundation of the theory of statistics. You need to like mathematics and be good at it. In school, you will be taught the fundamentals and nitty gritty of statistical methodology. On the job, you often have to bend or extend a particular method to address the problem at hand. This frequently calls for strong mathematical skills.

Agility on the computer is a further technical skill important for successful statisticians. In addition, you will need to rapidly gain an understanding of the application area in which you become involved. Thus, the ability to learn quickly the fundamentals of a field and be conversant in it will help you immeasurably. And being an A student, although far from guaranteeing your success, will surely come in handy when you are looking for a job.

Though strong analytical and technical skills are critical, they alone are far from sufficient to ensure success as a statistician. Various strong personal skills are also needed.

Communications and Related Skills

Your customers, and sometimes even your management, may have little understanding and a limited idea of the potential contributions of statistics and statisticians. This requires you to teach and 'sell' the value of statistics—as well as of yourself.

You must speak the language of your customers—and not expect them to be proficient in yours. Statistical jargon must be avoided. You need to assess others' statistical sophistication and calibrate what you say accordingly. You have to get across key ideas, conclusions, and recommendations succinctly and effectively in one-on-one or small-group settings, more formal presentations, and written communications.

The ability to be quick on your feet is an important part of communicating effectively. This is especially important in such situations as fielding questions from your CEO or agency or department head, or when, as an expert witness, you are under cross-examination or, as a government statistician, informing the media or the general public. And a significant part of being a good communicator is being a good listener.

A genuine interest in others, an outgoing personality, and diplomatic skills are also highly important. So is the ability to network with colleagues with backgrounds and training that may be different from your own.

Ability to Size Up Problems and See the 'Big Picture'

You need to be good at sizing up and diagnosing problems, appreciating their context and broader implications, and assessing their importance. Quoting George Box, "Statisticians must grit their teeth and also become practitioners. Only then will they discover where the truly novel problems are."

Most problems are not well defined or articulated. Occasionally, you may be asked questions that are of little interest to anybody other than the person posing the question. (If this person happens to be your CEO or agency or department head, that automatically makes it an important question.) Or you may be called upon to give your 'statistical blessing' to a fait accompli, and an objective evaluation is less than welcome. It is important for you to appreciate such situations and act accordingly—including turning down assignments that might present ethical conflicts.

The ability to size up a problem astutely requires you to be able to rapidly gain an understanding of the underlying politics and have a good nose for gauging management interest and support. This calls for an

inquisitive mind and the ability to frame—and the confidence to (politely) ask—fundamental questions that might challenge underlying and often unstated assumptions, as well as listening closely to the answers and any associated nuances. It may also require some independent digging and keen evaluation of your own.

Flexibility

Applied statisticians work in a dynamic environment. The strategic importance of a particular project may be downgraded (or upgraded) at any time due to, say, a change in management or business climate—and such changes are far from infrequent. (One of us worked for 17 managers in the course of a 46-year career in essentially the same organization).

You need to be prepared for things to change abruptly, to anticipate and recognize change, and to have the vigor to roll with the punches. While weighting heavily the demands of your current customers, managers, and projects, you need to frame your work to make it as robust to change as possible. This requires a good understanding of the business environment and information—and imagination—to recognize how this environment might change.

Some enjoy change and thrive on it. But it is not everybody's cup of tea.

A Proactive Mindset

Merriam-Webster defines proactive as acting in anticipation of future problems, needs, or changes. The so-called “democratization of statistics”—resulting in today's statisticians being relieved of many routine number-crunching activities—and the dynamic environment make it essential for statisticians to be proactive, and also make it easier. You need to search for opportunities for improvement and identify, assess, and communicate your potential role and contributions. This often calls for out-of-the-box thinking.

Once on a project, a proactive mindset will push you to look at things holistically—and to seek out important aspects of problems and useful and novel ways of addressing them to attain the best possible results.

Persistence

Statistical concepts—because they tend to be ‘different’ from the norm of deterministic thinking—often require reinforcement at strategically selected times before they take hold. Once on a project, action by others is often needed for you to be able to make meaningful contributions. For example, you typically have to rely on working partners to provide existing data or to collect new information.

You need to persist in driving toward what you believe to be in the best interest of the project and organization, not giving up easily when you are convinced you are on the right track. At the same time, you have to appreciate the fine line between

persistence (or tenaciousness) and obstinacy. You must listen carefully to understand why others might think what you are advocating will not work or be practical and consider modifying your ideas while still achieving your major goals.

A Realistic Attitude

You need to focus on both the immediate requirements of the project and the long-term goals of the organization and not let marginal issues divert you. Quoting our colleague Roger Hoerl, “The best business solution is more important than the best statistical solution, and you need to know the difference.”

It might seem cool to try out a new method you learned in school, heard about recently, or even developed yourself, but you should do so only to the degree it is relevant and useful for the problem at hand. You may, for example, determine the available data are inadequate to serve the immediate needs of the project and are tempted to apply advanced modeling with the hope that this might provide a rescue. But your time and efforts might be better spent in working instead to procure improved data.

We all derive satisfaction from a job well done. However, in a results-oriented environment, you can be a perfectionist only up to a point. Cost and practical considerations dictate how far to take a project. Those who are not satisfied until they have driven a problem to its ultimate optimal solution need to learn how to adjust their thinking to accommodate the practical needs of the problems they encounter.

Enthusiasm and Appropriate Self-Confidence

A prerequisite to making others enthusiastic about what you do is for you to be enthusiastic and have a positive can-do attitude, conveying passion for your work. This calls for a high level of self-confidence.

At the same time, you need to be able to distinguish self-assuredness from arrogance. Not taking yourself too seriously and maintaining a sense of humor are helpful. So is an appreciation of the egos of others.

Even the most successful statisticians—and especially the most resourceful ones—encounter occasional setbacks. You need to be able to cope with these, learn from them, and move forward. On the other hand, if you find yourself consistently not succeeding, you need to take a close and candid look—perhaps with a trusted friend or mentor—at how you go about doing things and what changes you need to make.

Ability to Prioritize, Manage Time, and Cope with Stress

Statisticians frequently work on multiple projects at a time and need to respond to unanticipated crises and requests. This can result in overload work

situations. It makes it especially important for you to be able to manage and allocate time efficiently. Unanticipated demands can be better met, and the resulting stress reduced, by scheduling yourself to meet those demands that are known, or can be readily anticipated, with time to spare. You need to be able to prioritize tasks skillfully—based upon their importance, their deadlines, and the time required to do the work—and be ready to reprioritize as the situation changes. And you must learn how to diplomatically say “no” to work you judge unimportant or are unlikely to address successfully, either due to lack of time or technical considerations.

Team Skills

Statisticians frequently work as members of a project team—a mode we strongly advocate. In this capacity, you need to provide important added value to the team and be easy to work with. It might also require you to suppress some of your own aspirations for the sake of team harmony and success.

Leadership Skills

The democratization of statistics has opened up—and, indeed invited exploration of—new opportunities for statisticians to exert leadership, either informally or in a specific role such as project team leader or manager of an organization. It requires you to have the strong personal, organizational, and visionary skills that characterize successful leaders.

Ability to Properly Apply and Adapt Knowledge

Knowledge of statistics is not enough. You need to integrate and synthesize what you know and apply it appropriately to the problem at hand. In a classroom setting, you expect the problems at the end of a chapter to deal with topics discussed within the chapter. But on the job, you do not know to which chapter of which book, if any, the problem you are facing pertains. You will have to select—from your arsenal of knowledge—the appropriate technical approach to use for a given application. Frequently, you need to tailor existing methods—or develop an appropriate new method and, perhaps, the associated software—to fit the problem.

Passion for Lifelong Learning

Our profession is constantly changing, as are the application areas in which you will be involved. You need to have the desire, and be able to take the time, to keep abreast of the latest developments in both.

Concluding Remarks

There have been numerous books and papers, as well as recent *STATtr@k* articles, about what makes a successful statistician. It is unrealistic to expect any single individual to possess all of the important traits we and others describe. But the more

of them you have, the better will be your chances of success.

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