Chapter Two

INFERENCE TO THE BEST EXPLANATION

The historian must collect, interpret, and then explain his evidence by methods which are not greatly different from those techniques employed by the detective, or at least the detective of fiction. . . . Evidence means different things to different people, of course. The historian tends to think mainly in terms of documents. A lawyer will mean something rather different by the word, as will a sociologist, or a physicist, or a geologist, or a police officer at the moment of making an arrest. For certain problems, evidence must be "hard," while for others it may be "soft." Even if no acceptable list of agreed-upon definitions of evidence may be given, most of us recognize intuitively what we mean when we use the word.

Robin Winks

INFERENCE TO THE BEST EXPLANATION

As we were getting into in Chapter One, we will be treating the expression "inference to the best explanation" as technical jargon. It will be a way of looking at evidence, or at least purported evidence, in an inductive argument. If we look at the component words in this expression, we will

discover quite a lot. First of all, we are dealing with an *inference*. For most purposes, we can consider that just another way of saying that we have an argument to be considered. This inference is to an *explanation*. Now it turns out that the nature of an explanation is a very controversial topic in academic philosophy. We will not be able to avoid all of this controversy in what follows, but for the present, let's adopt a very generic definition that explanations are hypotheses or accounts of "what is going on." In the context of an argument, the story of what is going on will be addressed in particular to the data presented as evidence. This all accords with our treatment of inductive arguments in the first chapter.

We are also dealing with some implied comparison. This isn't just an inference to an explanation, but to the *best* explanation. This implies two very important things. First, there must be other possible explanations of the data in the argument, *rival explanations*. And, the argument is also committed to this original explanation being better than all of these rivals. Therefore, there seems to be some *rank ordering* of the explanatory candidates, even if this is not explicitly stated.

I will use all of this as a way of articulating at test of the quality of evidence within an argument. This test will be most straightforward when you are what I have called a consumer of an argument. Your cousin used the *New York Times* article to put forward an argument for a very serious (morally, politically, personally) hypothesis. Inference to the best explanation (for short IBE) gives you a tool for assessing the quality of her evidence.

Inference to the Best Explanation Recipe

1. Schematize the argument
2. List some serious (hopefully challenging) rival explanations
3. Rank order all of the explanations – the original along with the rivals
4. Based on the rank order see if the original is the best explanation. If it is, the evidence has passed the test and looks pretty good. If it isn't, it's failed the test, and the evidence is weak, maybe nonexistent.

Let's apply the test or recipe to you cousin, and the Times', argument.

SCHEMATIZING THE ARGUMENT

Maybe as you tried your hand at schematizing the argument from the last chapter you had a glimmer of this, but let me state it explicitly. ***The single hardest part of argument analysis or the IBE recipe is simply identifying what the argument is in the first place***. There are a number of reasons for this. First and foremost, people aren't always as clear as the might be when they state their arguments. But there are other complicating factors as well. My guess is that if you contacted the reporter, Mr. Liptak, he would tell you that he wasn't presenting an argument at all, but simply "reporting" on a controversy that's brewing in Washington regarding Mr. O'Neill.   Still, the fact that there is this controversy, that law professors like Professor Rhode say that the evidence is "disqualifying" for his nomination, and that other legal experts see at least potential evidence of professional misconduct, indicates that your cousin hasn't simply gone off the deep end. Add to all of this judicial nominations are clearly political, and that few of us can read

articles like this and set our personal politics to the side. These unavoidable biases that we all carry with us will often tempt us to simply misread what the argument is. Finally, as we get a hint of in this rather long newspaper article, but becomes daunting when an argument is developed over the course of a whole book, the sheer number of words, thoughts, and sentences makes it extremely challenging to keep the structure of the argument clearly in mind.

Granted all of this, the first step in the IBE recipe is not only the most difficult, it is the most important. If we misrepresent what the argument is, then all of our work in analyzing it will be a waste of time. Who cares if you show "the argument" to be spectacularly successful, or a dismal failure, if it wasn't you cousin's argument in the first place?

Useful schematization requires three virtues, all of which defy simple characterization. First and foremost, as we have just emphasized, you should strive for **copy fidelity**. Your task is to represent "the other person's argument," a representation of his or her evidence. You may think of better ways to make the argument, or you may even think that the evidence points in a different direction. That's all fine, and will be useful in later steps. Right now, however, your job is to faithfully represent the argument as is was stated. You want to also strive for **brevity**. We just saw how an argument might take several columns of newspaper, but just imagine when we look in a later chapter at Darwin's "abstract" of his theory in **Origin of Species**,[1] and try to keep straight all of the evidence presented in over four hundred pages. In order for your schematization to useful to you, you will need to keep your representation of the evidence down to, say, no more than a page. Finally, and most difficult of all, you should strive for **charity** in your schematized arguments. You want to present the argument in the strongest form you can. This is not because you are being nice, or discounting the above virtue of copy fidelity.

It is because you want to avoid at all costs weakening the evidence in the way you choose to schematize it. This is particularly important when you are dealing with arguments with which you disagree. If you come to the judgment that the evidence is weak, you need to make darn sure that you've given the evidence its best shot.

START AT THE BOTTOM [FIND THE CONCLUSION]

Since Step One in the recipe is the most difficult, and most important, we will indulge ourselves with a couple more subsections on how to do it, or more modestly, some hints for doing it better.

We've already discussed the fact that **conclusions** may come anywhere in a statement of an argument. Still, in the **schematic form** I am urging on you, they always come at the bottom, they are always are identified as t_0 ("0" to start a sequence of explanations, and "o" as a reminder that this explanation is the original one), and they are always **explanations** of the data, not simply statements of the data. I strongly suggest that you begin your schematizing of the argument by trying to identify its conclusion.

Often times you will find hints in the statement that will guide you to the argument's conclusion. There are many words and phrases that are commonly used to alert readers or listeners that an inference is being drawn. Some of the classics you will find in any introductory logic book are: "therefore," "hence," "so," "it follows that," and many others. But at other times you are simply expected to pick out what the theory is that is supposed to be supported by the evidence. The best advice in these latter cases is simply to ask yourself something very general and vague like, "what's the point of all this?" Once you have a candidate, now see whether it explains some of the data in the

argument. If it doesn't seem to, you might want to look for another candidate as the argument's conclusion.

Two other general comments are appropriate here. First, don't get discouraged. This is hard stuff. It will get easier and more natural as you get more experience using the recipe. And secondly, there will be times when you fail to discover a conclusion to begin your schematization because the passage of prose in front of you is not an argument in the first place. We obviously use language do lots of things – make simple assertions, push people's buttons, or simply vent – stating an argument is only one use of language.

There is probably data in the *Times* article that might be used to support a number of conclusions -- that Mr. O'Neill will not be confirmed, or that he will, or that the administration will vigorously defend him. But your cousin focused on the charge of plagiarism. So, for our purposes the conclusion is:

> t_0. Mr. O'Neill plagiarized from the book review in his *Supreme Court Economic Review* article.

FIND THE RELEVANT EVIDENCE

In the New York Times article we learned a lot of stuff. Mr. O'Neill is a boyish looking 46 year old man, and was wearing blue jeans at the time of the interview. That's probably good newspaper style. It makes the subject of the story human and real. It is certainly not part of your cousin's evidence, though. Also, there is a great deal of data about the political implications of the scandal, but that data is only tangential to the charge of plagiarism. Your cousin is going to be concerned with four or five key facts.

e_1. The *Supreme Court Economic Review* issued a retraction of Mr. O'Neill's article.

e_2. "Substantial portions" of the article, the editors wrote, were "appropriated without attribution."

e_3. Details of the similar passages.

e_4. Other articles by O'Neill have similar problems.

e_5. Mr. O'Neill voluntarily stepped away from tenure.

We should feel free to exercise some good judgment about what can safely be omitted from our schematized representation of the argument, but we must always bend over backwards to include everything that is relevant, even those facts that might point in the away from the argument's conclusion. We need to consider all of the evidence, not just the stuff that suits our (or our cousin's) purposes. Simple fairness requires this. We learn other data that seems to help Mr. O'Neill's case. At the very least I think we would want to include the following.

e_6. Mr. O'Neill attributes the similar passages to "poor work method," and not "keep[ing] appropriate track of things."

e_7. One of the authors of a source article admires Mr. O'Neill and does not believe he would copy such banal points.

e_8. Republican congressional leaders and the President knew of the charges and have accepted Mr. O'Neill's explanation.

When all is said and done, I think we get something like the following as an accurate schematization of your cousin's evidence against Mr. O'Neill.

e_1. The *Supreme Court Economic Review* issued a retraction of Mr. O'Neill's article.

e_2. "Substantial portions" of the article, the editors wrote, were "appropriated without attribution."

e_3. Details of the similar passages.

e_4. Other articles by O'Neill have similar problems.

e_5. Mr. O'Neill voluntarily stepped away from tenure.

e_6. Mr. O'Neill attributes the similar passages to "poor work method," and not "keep[ing] appropriate track of things."

e_7. One of the authors of a source article admires Mr. O'Neill and does not believe he would copy such banal points.

e_8. Republican congressional leaders and the President knew of the charges and have accepted Mr. O'Neill's explanation.

t_0. Mr. O'Neill plagiarized from the book review in his *Supreme Court Economic Review* article.

RIVAL EXPLANATIONS

For our purposes, **rival explanations** will be accounts of the data that flat out **deny** the original explanation and substitute a completely different story of the data offered as evidence. It will be useful to imagine each truly rival account of Mr. O'Neill's article as starting out with a lengthy preliminary phrase -- "**no, no, no,** O'Neil did not plagiarize from the book review in his *Supreme Court Economic Review* article, rather ..." This is important because the original explanation might be phrased in very different language.

t_0'. The article in question was copied from another law journal.

Or an account might offer a more detailed (or less) account of what happened.

> t_0''. Mr. O'Neill discovered Ms. Daily's review on-line. He cut and pasted the passages into his manuscript, then changed a few words here and there.

Neither t_0' nor t_0'' will count as rival explanations. If you were to challenge your cousin with them, I think she would not say, "oh yeah, maybe I was wrong," but rather she'd exclaim, "exactly!"

So what else might have happened? Mr. O'Neill provides one very different account in the New York Times article.

> t_1. The similar wording was inadvertent. Notes from his sources, Ms. Daily, Mr. Katyal, and Mr. Caplan, got mixed up with Mr. O'Neill's thoughts and observations.

Other things might have been going on as well. Maybe Ms. Daily and Mr. O'Neil, independently, and without each other's knowledge, plagiarized from some third source that simply has not surfaced yet.

> t_2. Mr. O'Neill and Ms. Daily independently plagiarized from a third source.

Perhaps there is some really deep conspiracy going on.

> t_3. Mr. O'Neill's original manuscript to the *Supreme Court Economic Review*, which was good, honest scholarship, was altered by liberal law student editors seeking to

discredit him for his work on behalf of conservatives.

Once we allow our imaginations to start going, it is remarkable how many different accounts of data can be produced. I am constantly amazed, and quite delighted, at the number of creative, and often funny, rival explanations my students have been able to create for me on nearly thirty years of quizzes and examinations. A word of caution is relevant here, however. Don't let your desire to be creative and amusing trump the need for listing the most plausible and challenging rivals. Martians or political conspiracies may bring a smile to our faces, but simple bad record keeping is much more challenging to your cousin's account.

RANK ORDERING EXPLANATIONS

We now have on the table four competing accounts of the key data in the New York Times article.

t_0. Mr. O'Neill plagiarized from the book review in his *Supreme Court Economic Review* article.

t_1. The similar wording was inadvertent. Notes from his sources, Ms. Daily, Mr. Katyal, and Mr. Caplan, got mixed up with Mr. O'Neill's thoughts and observations.

t_2. Mr. O'Neill and Ms. Daily independently plagiarized from a third source.

t_3. Mr. O'Neill's original manuscript to the *Supreme Court Economic Review*, which was good, honest scholarship, was altered by liberal law student editors seeking to discredit him for his work on behalf of conservatives.

Inference to the best explanation asks us to judge one of these explanations as better than all the rest. How in the world do we start the process of judging one explanation as superior to another? What counts, and what doesn't count, in such a comparison?

   Consider the thoughts of one of the philosophers most responsible for championing the importance of inference to the best explanation, Professor Gilbert Harman.

> There is, of course, a problem about how one is to judge that one hypothesis is sufficiently better than another hypothesis. Presumably such a judgment will be based on considerations such as which hypothesis is simpler, which is more plausible, which explains more, which is less *ad hoc*, and so forth.[2]

Harman tells us we should value four characteristics in explanations.

- Simplicity
- Plausibility
- Completeness
- Not *ad hoc*

I think you would agree with me that these criteria are abstract, kind of technical, and ultimately very vague. None of this means that they are not useful in the task of rank ordering the differing accounts of the law journal article. I assume that both t_3 and t_4 would rank way down on your list, compared to t_0 and t_1. Isn't part of the reason for this, the fact that both of them introduce something "out of the blue" to explain the article? Where did this mysterious third source come from? Or those devious law student editors? Why in the world, if Professor Daily is a plagiarizer, would

she be so reckless to call attention to her article? And if the law students substituted the damning passages, why didn't Mr. O'Neill catch it when he approved the "proof copy" of his article? These two accounts suffer from a lack of simplicity -- the stuff that is introduced "out of the blue." They seem *ad hoc* -- all of this seems designed to come up with something counter to you cousin's hypothesis. And they fail to account for all of the data -- Ms. Daily bringing the charge in the first place, or Mr. O'Neill approving the proofs.

What about t_0 and t_1, however? They both are relatively simple, account for all of the data, and are not particularly *ad hoc*. Are they equally plausible? Here things start to get a little sticky. Let me simply assert some factors that do not count in rank ordering explanations. The **best explanation** is not necessarily the one we like the best, nor the one that best accords with our politics, religion, or moral perspectives. It is the one that is most plausible. But what the heck is this? The truth is, I fear, that this criterion is the most abstract and vague of all of the ones on Professor Harman's little list.   Here are the thoughts of another champion of inference to the best explanation, my teacher, Professor Larry Wright.

> [T]he only very general thing we can say about what we do when we evaluate evidence is rather coarse-grained. When we *do* prefer one member of the list of rivals to the others, we do so simply because it comports best with the data we have, against the background of our relevant knowledge. Some rivals score better in some ways, others in others. We weigh the tugs in all directions and judge one rival to 'fit' better than the others, all things considered. ... So at bottom it is always a complex judgment of fit: which one fits most easily with everything we know about the matter.[3]

Here comes a scary fact! **You** have to make the judgment about which explanation is best. There is no "objective," "reliable" test or formula you can utilize that automatically identifies the best explanation. The whole recipe, therefore, rests on a step that is candidly, unavoidably, **subjective**. When it comes to flavors of ice cream, or styles of beer, being subjective means that people's preferences are relative to who they are, and, consequently, all over the place. If evidence evaluation is the same, we're done for, and I can stop writing my book, and teaching my courses as I do. Fortunately, I believe, explanatory plausibility is very different from beer preferences. Even though each of us, individual subjects, must rank order alternative accounts for ourselves, it turns out that in a great number of contexts -- courts of law, the natural sciences, and even stories about very similar passages in law journals -- **subjective** judgments about plausibility can turn out to be **inter-subjective**. When all is said and done, when we think about it as free from prejudice and bias as we can be, we discover widespread agreement about what the best explanation is. We are the most intelligent species that has ever existed, and part of being intelligent is being darn good at spotting the best explanation of what's happening around us.

IDEAL AGNOSTICS

I want to share with you an idea that I am very taken with these days. It comes from a contemporary philosopher, as it turns out a very candid Christian philosopher, named Peter van Inwagen. He proposes an audience for arguments (at least those that occur in philosophical debates) that is psychologically impossible, but is useful to imagine, nonetheless.

> The audience is composed of what we might call ideal agnostics. That is, they are agnostic as regards the subject-matter of the debate. ... [E]ach member of the of the audience will have no initial opinion about [the subject of the debate]. ... My imaginary agnostics ... would very much like to come to some reasoned opinion [on the debate] ... indeed to achieve knowledge on that matter if it were possible. ... They don't care *which* position ... they end up accepting, but they very much want to end up accepting one or the other.[4]

Ideal agnostics are absolutely indifferent -- intellectually, personally, and in every way that might bias them -- about what the best explanation is. But that doesn't mean they don't care. They are also passionately committed to figuring out which explanation is the strongest.

I'm no ideal agnostic, and neither are you. But I think we are both well-served in our discussions and investigations, to pretend that we are. Indeed, I am suggesting that anytime we evaluate another's potential evidence, we try as hard as possible to adopt the position of the ideal agnostic, knowing all along that we will fail in certain respects. When we are presenting our own argument, I would also suggest that we pretend our audience is not composed of partisans, but rather ideal agnostics.

This whole little subsection might strike you as a tedious distraction. I am belaboring all of this because we all carry with us biases that will inevitably affect some of our rank ordering of explanations, especially when two competing accounts are very close to one another. That is the position I find myself in with the current argument. I care very deeply about constitutional law. I have very strong opinions

on some of the judges that Mr. O'Neill helped to get on the Federal Courts, including the Supreme Court. And, as you're going to find out anyway, I am a political liberal.

So now you know, but I'm still hopeful for inter-subjective agreement. I, trying just as hard as I possibly can to be the ideal agnostic, am forced to rank your cousin's hypothesis ahead of Mr. O'Neill's explanation. Four factors point me in that direction. One is, as the *Times* article told us, how rare it is for a law journal to take actions like the *Supreme Court Economic Review* did. Obviously, they thought this was very serious. The second is the pattern of unattributed "quotes" in his other articles. I concede that poor record keeping may be a more general problem with his research methods, but I see a tendency to rely way too much on what other scholars have said. My third consideration is firsthand knowledge of how scholars are trained to be scrupulous about being sure to acknowledge the work of others. But the clincher for me was how the thinking and wording taken from Ms. Daily's review was altered in very slight ways. If he were simply recording what she said for further thought and possible inclusion in his own work, why the subtle changes?

ASSESSMENT OF THE EVIDENCE

I rank order our four explanations in the following order.

t_0. Mr. O'Neill plagiarized from the book review in his *Supreme Court Economic Review* article.

t_1. The similar wording was inadvertent. Notes from his sources, Ms. Daily, Mr. Katyal, and Mr. Caplan, got mixed up with Mr. O'Neill's thoughts and observations.

t_2. Mr. O'Neill and Ms. Daily independently plagiarized from a third source.

t_3. Mr. O'Neill's original manuscript to the *Supreme Court Economic Review*, which was good, honest scholarship, was altered by liberal law student editors seeking to discredit him for his work on behalf of conservatives.

It is a **total accident** that this particular ranking was in strict sequential order of the subscripts, so please don't be misled by this coincidence.

The whole purpose of the inference to the best explanation "recipe" is to assess the quality of evidence in an argument. We need to find the **best** explanation. The whole test depends on what is in first place. In my best "ideal agnostic" judgment, your cousin's theory was the best explanation, and therefore, her evidence is pretty good. For all the talk about inter-subjectivity and ideal agnostics, I fully realize that some of you will have ranked t_1 ahead of t_0. Those of you who have come to that judgment would say that since there is a better explanation of the facts about the article, your cousin's evidence is weak, maybe so weak that you don't see real evidence at all.

I have been asking my students to use the inference to the best explanation recipe to assess the quality of evidence presented in an argument for more than three decades (if you include the time as Professor Wright's teaching assistant). The single most common mistake that my students make, including some of the best and most intelligent, is to forget about the purpose of the recipe, and neglect to offer an assessment of the evidence in the argument. They often beautifully schematize it, come up with some challenging rival explanations, offer subtle and insightful comments about how and why they have rank ordered as they have, but then remain silent on the quality

of the evidence. I am almost tempted to include a fifth step in the recipe saying something like the following:

> 5. Conclude your analysis with one of the following two sentences: "*Since the original theory proved to be the **best explanation** of the data in the evidence, the argument's evidence is pretty good (strong, etc.)*" or "*Since there is a **better explanation** of the data in the evidence, the argument's evidence is weak (poor, non-existent, etc.)*".

Step Four *requires* an explicit evaluation of the evidence, as it was presented, and schematized, in the original argument!

WHAT ABOUT TIES?

Suppose, in your best ideal agnostic frame of mind, you came to the conclusion that the plagiarism hypothesis and the poor record keeping rival were equally plausible explanations of all the data you had? What happens in the recipe when the original and one of the rivals are tied for first place?

This is a classic half-full, half-empty kind of dilemma. You might say that since the original is tied as the ***best explanation***, there's some evidence for that conclusion. You might also say, however, that since there's rival explanation that's tied as the best explanation, the evidence is not so hot. I think whichever way we go the message is really the same.   The original's being tied for first place allows us to see why someone would offer the argument in its defense in the first place, and why there is some evidence that seems to support it. A rival being tied for first place tells us that the evidence is far from conclusive. Ideally, in such a case, we go out and do a little more

investigating, and see if we could discover some new data that would help break the tie. And, indeed, the whole subject of new data is the topic for our next chapter. But, before heading there, let's do a review exercise.

A MAGICAL ENCORE?

Quite by accident I discovered a glitch in the ipod software. On a Saturday night last year my wife and I went to a banquet for the League of Oregon Cities. The entertainment was Pink Martini, a Portland band I like a lot. I had already planned that I was going to ask for two songs when they came back for an encore – "Lilly" and "Que Sera Sera." As it turned out they did "Que Sera Sera" as part of their concert, and there was no chance to ask when they did their encore. On Sunday as we drove back from Portland I plugged in my ipod to listen to them again. I set the settings to "All" and to "Shuffle Songs." This meant that my ipod searched through both of their albums, found all 36 songs and played them in "random" order. That's the glitch! The last two songs were "Lilly" and "Que Sera Sera." The exact encore I had imagined the night before! What are the odds of this? My theory is that these two songs came up last, not randomly, but because of all the Pink Martini songs, I listen to these two the most often. I am thinking of writing to Apple to tell them about the problem.

This crazy philosopher has a theory that there is a glitch in the ipod software. For practice, and to make sure you've got the IBE recipe down pat, take a few minutes, and using all four steps in the inference to the best explanation recipe. assess the quality of evidence he has for this theory.

FINAL THOUGHTS ON CHAPTER TWO

At the end of Chapter One I prioritized the learning outcomes in terms of importance. I can't do that for the current chapter, because they are all equally important.

- Inference to the best explanation is a tool for assessing the quality of evidence presented in an argument.
- Inference to the best explanation can be seen as a "recipe" for assessing evidence. It consists of the following four steps:
    - Schematize the argument.
    - Articulate some (challenging) rival explanations of the data contained in the evidence.
    - Rank order the alternative explanations – the original from the argument, and the rivals you have generated – in terms of plausibility.
    - Based on this rank ordering offer an assessment of the quality of the evidence presented in the argument.
        - If the original conclusion is the best explanation, i.e. it is in first place, than the argument has passed the IBE test, and the evidence is pretty good.
        - If one of the rival explanations provides a better explanation than the original, i.e. one of the rivals is in first place, than the argument has failed the IBE test, and the evidence is weak.
    - Each step presents challenges
        - Schematize the argument – this is often the most difficult step.

- Articulate some rival explanations – Sometimes rivals are suggested in the original source, but other times you must think of them yourself. You want the most challenging rivals possible.
- Rank order the alternative explanations – there is no magic formula for doing this. You must trust your perception of plausibility, trying as hard as possible to not let your biases influence the ranking.
- Offer a final assessment of the quality of the evidence – this is the whole point of IBE. Students often forget this step. The assessment, for the purposes of the recipe, is solely determined by the rank ordering.

Practice Exercises

Exercise Three

Use all four steps in the IBE recipe to assess the quality of the evidence for the theory about the death of William Henry Harrison contained in Exercise One at the end of Chapter One.

Exercise Four

Use all four steps in the IBE recipe to assess the quality of the evidence for the theory Connie's boyfriend was smooching Mary Jane contained in Exercise Two at the end of Chapter One.

EXERCISE FIVE

Here is an article from the *New York Times*. It contains evidence for a theory that the mere presence of female family members can be enough to nudge men in the direction of being more generous. Use all four steps in the IBE recipe to assess the quality of the evidence for this theory.

The New York Times

July 20, 2013

Why Men Need Women

By ADAM GRANT

WHAT makes some men miserly and others generous? What motivated Bill Gates, for example, to make more than $28 billion in philanthropic gifts while many of his billionaire peers kept relatively tightfisted control over their personal fortunes?

New evidence reveals a surprising answer. The mere presence of female family members —

even infants — can be enough to nudge men in the generous direction.

In a provocativee new study, the researchers Michael Dahl, Cristian Dezso and David Gaddis Ross examined generosity and what inspires it in wealthy men. Rather than looking at large-scale charitable giving, they looked at why some male chief executives paid their employees more generously than others. The researchers tracked the wages that male chief executives at more than 10,000 Danish companies paid their employees over the course of a decade.

Interestingly, the chief executives paid their employees less after becoming fathers. On average, after chief executives had a child, they paid about $100 less in annual compensation per employee. To be a good

provider, the researchers write, it's all too common for a male chief executive to claim "his firm's resources for himself and his growing family, at the expense of his employees."

But there was a twist. When Professor Dahl's team examined the data more closely, the changes in pay depended on the gender of the child that the chief executives fathered. They reduced wages after having a son, but not after having a daughter.

Daughters apparently soften fathers and ev oke more caretaking tendencies. The speculation is that as we brush our daughters' hair and take them to dance classes, we become gentler, more empathetic and more other-oriented.

There are even studies showing that American legislators with daughters vote more liberally; this is also true of British male v oters who hav e daughters, especially in terms of referendum and policy choices about reproductive rights. "A father takes on some of the preferences of his female offspring," argue the researchers Andrew Oswald at the Univ ersity of Warwick and Nattav udh Powdthaee, then at the Univ ersity of Y ork. For male chief executi daughter- driv en empathy spike may account for more generous impulses tow that temper the temptation toward wage cuts.

Is it possible that proximity to infant girls prompts greater generosity? Additional studies, in a variety of fields, suggest this is the case — and that it might extend beyond daughters. Consider, for example, the series of studies led by the psychologist Paul Van Lange at the Free University in Amsterdam. To figure out what motivates people to act generously, Professor Van Lange and three colleagues set up a game in which more than 600 people made choices about sharing resources with someone they didn't know and would never meet again. The participants chose between these basic options: (a) You get $25 and y our partner gets $10.
(b) You get $20 and your partner gets $30.

The first option is the selfish one; you're claiming most of the resources for yourself. The latter option is more generous as it involves sacrificing a small amount ($5) to increase your partner's gains by a much larger amount ($20).

The players expressed consistent preferences in each of the nine rounds they played on Professor Van Lange's watch. The data showed that play ers who made the more generous choices had more siblings. The givers averaged two siblings; the others averaged one and a half siblings. More

siblings means more sharing, which seems to predispose people toward giving.

And once again, gender mattered. The givers were 40 percent more likely to have sisters than the people who made more self-serving, competitive choices. (There was no difference in the number of brothers; it was the number of sisters, not siblings, that predicted greater giving.) And Professor Van Lange's team pointed to another study showing that the more sisters a
father has, the more time he spends raising his own children. After growing up with sisters, men who have opportunities to give are more likely to do so.

SOCIAL scientists believe that the empathetic, nurturing behaviors of sisters rub off on their brothers. For example, studies led by the psy chologist Alice Eagly at Northwestern University demonstrate that women tend to do more giving and helping in close relationships than men. It might also be that boys feel the impulse — by nature and nurture — to protect their sisters. Indeed, Professor Eagly finds that men are significantly more likely to help women than to help men.

Some of the world's most charitable men acknowledge the inspiration provided by the women in their lives. Twenty years ago, when Bill Gates was on his way to becoming the world's richest man, he rejected advice to set up a charitable foundation. He planned to wait a quarter-century before he started giving his money away, but changed his mind the following year. Just three years later, Mr. Gates ranked third on Fortune's list of the most generous philanthropists in America. In between, he welcomed his first child: a daughter.

Mr. Gates has reflected that two female family members — his mother, Mary, and his wife, Melinda — were major catalysts for his philanthropic surge. Mary "never stopped pressing me to do more for others," Mr. Gates said in a Harvard commencement speech. The turning point came in 1993, shortly before he and Melinda married. At a wedding event, Mary read a letter aloud that she had written to Melinda about marriage. Her concluding message was reminiscent of the Voltaire (or Spiderman) mantra that great power implies great responsibility: "From those to whom much is given, much is expected."

Along with guiding much of the Bill and Melinda Gates Foundation's philanthropy, Melinda played a pivotal role in shaping the Giving Pledge. She read a book about a family that sold their home and gave half the proceeds to charity, and began spreading the word about the idea.

When Bill Gates and Warren Buffett convened dinners for billionaires to discuss philanthropy, Ms. Gates made sure that wives were invited, too. "Even if he's the one that made the money, she's going to be a real gatekeeper," she said. "And she's got to go along with any philanthropic plan because it affects her and it affects their kids."

In a provocative 2007 presentation in San Francisco, the psychologist Roy Baumeister asked, "Is there anything good about men?" (The short answer, if you haven't read "Demonic Males," by Dale Peterson and Richard Wrangham, is not much.) But our saving grace, Professor Baumeister argues, is that across a wide range of attributes, "men go to extremes more than women." Men are responsible for the lion's share of the worst acts of aggression and selfishness, but they also engage in some of the most extreme acts of helping and generosity.

On this point, the economists James Andreoni at the University of California, San Diego, and Lise Vesterlund at the University of Pittsburgh report evidence that whereas many women prefer to share evenly, "men are more likely to be either perfectly selfish or perfectly selfless." It may be that meaningful contact with women is one of the forces that tilt men toward greater selflessness.

THE warming effect of women on men has important implications for education and work. In schools, we need to think carefully about how we organize children into groups. In 1971, in the wake of Texas school desegregation, Elliot Aronson, a psychologist at the University of California, Santa Cruz, validated a simple but powerful approach to reducing stereotypes and prejudice.

His core idea was that students would learn to respect and care about one another if they had to rely upon one another when collaborating in small groups toward shared goals. Professor Aronson made each student responsible for teaching the group about a different topic that would be covered on a coming test. It was like working on a jigsaw puzzle: the group needed pieces of information from every member in order to put together the general understanding that would be measured on the test. After the experiment, stereotypes and prejudice fell — the students became significantly less hostile toward one another — and the minority students got better grades.

What would happen if every classroom followed the jigsaw structure, with mixed-gender study groups providing boys with the opportunity to learn from girls? In addition to gaining knowledge, perhaps they would learn something about teaching, helping and caring for others. When some of those boys grow up to become rich men, they might be less like Scrooge and more like Mr. Gates — or at least less likely to become your

wealthy neighbor who refuses to pay his share of the hedge trimming. Or your (not so) great-uncle who always flies first class but sends your kids cheap birthday presents.

At work, we sorely need more women in leadership positions. We already know from considerable research that companies are better off when they have more women in top management roles, especially when it comes to innovation. Professors Dezso and Ross have recently shown that between 1992 and 2006, when companies introduced women onto their top management teams, they generated an average of 1 percent more economic value, which typically meant more than $40 million.

We recognize the direct advantages that women as leaders bring to the table, which often include diverse perspectives, collaborative styles, dedication to mentoring and keen understanding of female employees and customers. But we've largely overlooked the beneficial effects that women have on the men around them. Is it possible that when women join top management teams, they encourage male colleagues to treat employees more generously and to share knowledge more freely? Increases in motivation, cooperation, and innovation in companies may be fueled not only by the direct actions of female leaders, but also by their influence on male leaders.

It's often said that behind every great man stands a great woman. In light of the profound influence that women can have on men's generosity , it might be more accurate to say that in front of every great man walks a great woman. If we're wise, we'll follow her lead.

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