Passages from *Cribsheet* by Emily Oster

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In thinking about these decisions, I again, as I had during pregnancy, found there was comfort in starting with the data. For most of the larger decisions we had to make – breastfeeding, sleep training, allergies – there were studies. Of course, the trouble was that not all of these studies were very good.

Take breastfeeding. Breastfeeding is often hard, but you'll hear endlessly about the benefits. Breastfeeding is made out to be an absolute must by the medical establishment and a host of online voices, to say nothing of your friends and family. But are these benefits all real?

It's actually not so easy to answer that question.

The goal of studying breastfeeding is to see if children who are breastfed are different later in life -- healthier, smarter – than those who are not. The basic problem is that most people do not choose to breastfeed at random. In fact, people think carefully about this choice, and the kind of people who choose to do it are different from those who do not. When we look at recent data from the US, breastfeeding is more common among women with more education and higher income.

This is partly because these women are more likely to have the support (including maternity leave) that affords them the ability to breastfeed. It also may be partly because they're more aware of the recommendations that say that the choice to breastfeed is a crucial part of raising a healthy and successful child. But regardless of the reason, the fact remains.

This is a problem for learning from the data. Studies of breastfeeding show time and again that breastfeeding is associated with better outcomes for kids – better school performance, lower obesity rates, and so on. But these outcomes are also linked with a mother's education, income, and marital status. How can we know if it is the breastfeeding or the other differences among women that causes the better school performance and lower obesity?

One answer is that some of the data is better than other data.

In thinking about these decisions, I used my own economic training – especially the part where I try to tease causality out of the data – to try to separate the good studies from the

less-good ones. Causality isn't simply. It can look like there is a strong relationship between two things, but when you dig a bit deeper, you find they aren't related at all. For instance, people who eat Clif Bars are likely healthier than those who don't. This probably isn't because of the Clif Bars, but rather that the people who choose to eat them are engaging in other healthy behaviors.

A large part of my approach here was to try to identify which of the hundreds of breastfeeding studies provided the best data.

Sometimes when I did this, the best studies did support a relationship— breastfeeding does, for example, seem to consistently reduce infant diarrhea. But at other times, the best studies didn't show these effects; the idea that breastfeeding has dramatic effects on IQ, for example, isn't convincing.

In the case of breastfeeding, there are studies to rely on, even if they aren't all great. But even this isn't always true. When my kids were a bit older and I wondered about the effects of screen time, I found precious little data that really addressed the questions I had. iPad apps to teach a three-year-old letters simply haven't been around long enough to have prompted lots of research papers.

This was occasionally frustrating, but it is comforting, in its own way, to know there are some questions data just cannot answer for you. At least you can go into this with an understanding of the uncertainties…

Data is only one piece of the puzzle, and we can't stop there. When I saw the data, I made one set of choices. But the same data does not always lead everyone to the same decision. Data is an input, but so are preferences…

We all want to be good parents. We want our choices to be the right ones. So, after we make the choices, there is a temptation to decide they *are* the perfect ones. Psychology has a name for this: avoiding cognitive dissonance. If I choose not to breastfeed, I don't want to acknowledge that there are even small possible benefits to breastfeeding. So I encamp myself in the position that breastfeeding is a waste of time. On the other side, I if I spend two years taking my boobs out every three hours, I need to believe that this is what it takes to deliver a life of continued successes to my child.

This is a deeply human temptation, but it is also really counterproductive. Your choices can be right for you but also not necessarily the best choices for other people. Why? *You are not other people.* Your circumstances differ. Your preferences differ.

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The fact that preferences matter, however, doesn't mean there's no room for facts. We cannot hope to make the right choices for ourselves without seeing the data. You and I may see the same data and make different decisions, but we should both come to the data as the first step. As an economist, I try to start my decisions with the data – What does it say? How confident are we in its findings? – and then try to think about what works for my family in light of that data…

This part of the book goes through the data on these major early parenting decisions. In many cases, the work of the book is really to separate the good studies on these topics from the less-good ones. In making decisions, we want to know the *causal* effect of one variable on another, not just that they are associated. It is no good to tell you that a kid who was breastfed differs from one who wasn't; you want to know whether the breastfeeding itself matters.

How can you identify a good study? This is a hard question. Some things you can see directly. Certain approaches are better than others – randomized trials, for example, are usually more compelling than other designs. Large studies tend, on average, to be better. More studies confirming the same thing tends to increase confidence, although not always – sometimes they all have the same biases in their results

I read a lot of studies – for this book, but also for my job – so some of my conclusions come from experience. Sometimes you poke into a study and it doesn't smell quite right – the groups they are comparing are really different, or the way they measure variables is skewed. Sometimes they will be a really big study, but it will be deeply flawed and I'll end up relying more on a smaller study that has a better design.

And sadly, for those of us who love data, the data will never be perfect.

In confronting the questions here, we also have to confront the limits of the data and the limits of *all* data. There are no perfect studies, so there will always be some uncertainty about conclusions. Beyond that, in many cases, the only data we have is problematic – there will be a single, not-very-good study, and all we can say is that one study really doesn't support a relationship.

This means we can't ever say for sure that we're *certain* something is good or not for a baby. Of course, sometimes we are more sure than others, and I'll try to let you know when the data really helps us see a relationship as true, and when there just isn't much for us to go on.

I hope you'll leave this section armed with some facts. Facts about what we know, but also facts about what we still don't know – places where the data is just uncertain, or hasn't provided a compelling answer. Armed with these facts, you can go forward to make your choices. Not the same choices, mind you. But the right ones for you.

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The relationship between breastfeeding and education, income, and other variables is a problem for research. Having more education and more resources is linked ot better outcomes for infants and children, even independent of breastfeeding. This makes it very difficult to infer the *causal* effect of breastfeeding. Sure, there is a correlation between nursing and various good outcomes – but that doesn't mean that for an individual woman, nursing her baby will make the child better off.

To give a concrete example, take one study, conducted in the late 1980s of 345 Scandinavian children that compared IQ scores at age five for children who were breastfed for less than three months versus more than six months. The authors found that the children who nursed longer had higher IQ scores – about a seven-point difference. But the mothers who breastfed longer were also richer, had more education, and had higher IQ scores themselves. Once the authors adjusted for even a few of these variables, the effects of nursing were much, much smaller…

As you know by now, this book is focused on evidence in the form of data and what we can learn from that data. But there is another type of evidence, one that you see a lot on the Internet. I'd refer to this as "things people said" or " it happened once to my friend" evidence. You know: "my friend didn't breast feed, and her kid went to Harvard." "my friend didn't vaccinate, and her kid is super healthy!"

Here is what we learn from this: nothing.

Heed the statistics mantra: anecdote is not data. (I might put that on a T shirt.)

Now, as breast feeding will take us more deeply into questions of data, a word on the types of studies I'll use throughout the book.

An Aside on Research Methods

When researchers study breast feeding- or any of the other things I talk about in this book- they are looking to learn about the effect of whatever they are studying while *holding*

everything else constant. Our "ideal" experimental setup would be to see a child first after being breast fed, then the same child after not being breast fed, but with everything else exactly the same- same timeline, same parents, same parenting style, same home environment. If we could see that, we would just need to compare the child's later outcomes to know the effects of breastfeeding.

Of course, this is not possible. But when researchers conduct an analysis, this is what they are aiming for. How close they come depends a lot on how good their research methods are.

Randomized Control Trial

The "gold standard" for research methods is the randomized controlled trial. To run this kind of study, you recruit some people (ideally a lot of them) and then choose randomly which people will be "treated" as part of your study and which will be the "controls." For a randomized trial of breast feeding, you'd want to have the "treatment group" breast fed, and the "control group" not. Since you have chosen randomly who will be in which group, the groups are, on average, the same, other than the breastfeeding. You can then compare what happens for the breastfeeding group with what happens for the control.

A practical challenge with this type of study is that you typically cannot *force* people to do things, especially with their children. Instead, most studies I'll report on use an "encouragement design": one group is encouraged to do the behavior - breastfeed, or sleep train their child, or engage in some discipline program- and the other group is not. This encouragement could, for example, take the form of telling the group about the benefits of that behavior, or giving them some training or guidance about how to accomplish the behavior successfully. Assuming that the encouragement changes how many people do the thing you are studying, you can draw causal conclusions.

Randomized trials are expensive to run, especially if they are big, and they can, of course, have problems with implementation. But they are the closest were able to come to our ideal treat-the-same-kid-in-two-ways set up, so when I find them, I give them a lot of weight.

Observational Studies

A second, very large group of studies will fall under the "observational study" category. These studies compare, for example, children who are breast fed with those who are not, or those who are sleep trained with those who are not, *without* having randomly assigned people to groups.

The basic structure of these studies is similar. Researchers access (or collect) some data on children, either short- or long- term outcomes, along with some information on parental behaviors. They then analyze the differences between kids in different groups- comparing, say, the kids who are breastfed with the kids were not.

This type of study will make up the vast majority of the data we have to work with, and they vary widely in quality. One source of variation is study size- some of these are bigger than others, and bigger is typically better period but more important, there will be a lot of variation in how close they can get to the ideal of comparing the same child across one variable in two otherwise identical scenarios.

When they do their comparisons, researchers have to adjust for inherent differences across families that make different parenting choices. Most studies do this by adjusting for some aspects of the parents, or of the child, but their ability to do this well depends on the quality of the data.

On one end, you have sibling studies, which compared two children within the same family who were treated differently on some variables you care about. For example, one of the kids was breast fed, and one was not. Since these children have the same parents and grew up together, there is a strong argument that, other than breastfeeding, they are similar. These sibling studies are not perfect- you have to ask, why nurse one kid and not the other?- but they have a lot of value in illuminating some of the most important problems in observational studies. There is likely some randomness in the choice to nurse, perhaps related to how much each baby takes to it.

Many other studies do not compare siblings, but they do see *a lot* of information about parents: education, maybe IQ tests, income, race, other aspects of the home environment, characteristics of the child at birth, etc. Once the authors adjust for these variables, they can get closer to comparing two identical children. I'll often call these variables *controls*. The more things we control for- meaning, the more variables we can hold constant across children and families- the more confident we can be that we are really learning the effects of breastfeeding.

On the other end there are studies that have just one or two controls- that, say, adjust for differences in birth weight across children, but nothing else. These are more suspect.

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It is certainly true that obesity and breastfeeding are correlated, as kids who are breastfed are less likely to be obese later in life. But this correlation doesn't show causation – it doesn't prove that those kids who go on to become obese do so *because* they weren't breastfed. The randomized data from PROBIT (a large study on the effects of breastfeeding from Belarus in the 1990s) shows no impact of breastfeeding on whether the child is obese at the age of seven or, in the latest follow-up, at close to eleven. Bolstering this, studies that compare siblings who are breastfed to those who are not show no differences in obesity. These studies often demonstrate that breastfeeding seems to matter when you compare across families, but not *within* a family. This suggests that something about the family, not the breastfeeding, is impacting the likelihood of a child becoming obese. In fact, when researchers look at many studies of obesity and breastfeeding together to get a fuller picture, they find that studies that carefully adjust for maternal socioeconomic status, maternal smoking, and maternal weight – even if they cannot compare siblings – also show no association.

All these results come with some statistical error. Can we say *for sure* that breastfeeding does not impact obesity? No. but we can say that nothing compelling in the data supports a significant link.