

A.P. STATISTICS SUMMER ASSIGNMENT

NAME _____

This assignment must be completed during the summer break. It will be **collected and graded** on the first day of school. No excuses!

Assignment #1: Data displays

Collect 4 displays of data (graphs) of different **types** from different **sources**. Attach each to a piece of paper and write a few lines with the following information:

- The source
- Explain any scales or keys used
- What do you think the graph is trying to say and do you find it convincing?

Assignment #2: Data Collection

Survey 20 people of at least high school age, 10 males and 10 females. Ask them their height and shoe size. Use the conversion chart supplied by Birkenstock and convert the shoe sizes into European shoe size. Make a scatterplot of this data using different marks for male and female. The x-axis is height and the y-axis is shoe size. draw one line of best fit.

Answer the following questions:

1. **Does your data convince you that height influence shoe size? Why or why not?**
2. **From your data, what would you guess as the shoe size for a person who is 5'10"?**
3. **If I tell you that I wear a size 39, how tall would you guess me to be?**

Assignment #3: "A book is, in fact, less a cause of intelligence than an indicator." Read the article "Do Parents Matter?" and complete the following:

Summarize the results of the data analysis about parenting. What results surprised you? What results matched your experience with your own parents?

Assignment #4: "The information has been set loose." Read "Cracking the Real Estate Code" and complete the following:

Summarize the article's finding. Be sure to describe how the realtor uses her "information advantage" to her benefit, and describe another example where you see this occurring. How has this advantage changed due to 21st-century technology?

Do parents matter?

By Stephen J. Dubner and Steven D. Levitt

By now, the letters have landed. The fast-track nursery schools and the "gifted and talented" public schools and the Ivy League colleges have mailed their acceptance letters, and parents everywhere are either a) congratulating themselves for having shepherded their children into the dream school or b) chiding themselves for having failed.

In the first case, the parents may tell themselves: It was those Mozart quartets we played in utero that primed her for success. In the second case, they might say: I knew we shouldn't have waited so long to get him his first computer. But how much credit, or blame, should parents really claim for their children's accomplishments? The answer, it turns out, is a lot — but not for the reasons that most parents think.

The U.S. Department of Education recently undertook a monumental project called the Early Childhood Longitudinal Study, which tracks the progress of more than 20,000 American schoolchildren from kindergarten through the fifth grade. Aside from gathering each child's test scores and the standard demographic information, the ECLS also asks the children's parents a wide range of questions about the families' habits and activities. The result is an extraordinarily rich set of data that, when given a rigorous economic analysis, tells some compelling stories about parenting technique.

A child with at least 50 kids' books in his home, for instance, scores roughly 5 percentile points higher than a child with no books, and a child with 100 books scores another 5 percentile points higher than a child with 50 books. Most people would look at this correlation and draw the obvious cause-and-effect conclusion: A little boy named, say, Brandon has a lot of books in his home; Brandon does beautifully on his reading test; this must be because Brandon's parents read to him regularly.

But the ECLS data show no correlation between a child's test scores and how often his parents read to him. How can this be? Here is a sampling of other parental factors that matter and don't:

- Matters: The child has highly educated parents.
- Doesn't: The child regularly watches TV at home.
- Matters: The child's parents have high income.
- Doesn't: The child's mother didn't work between birth and kindergarten.
- Matters: The child's parents speak English in the home.
- Doesn't: The child's parents regularly take him to museums.
- Matters: The child's mother was 30 or older at time of the child's birth.
- Doesn't: The child attended Head Start.
- Matters: The child's parents are involved in the PTA.
- Doesn't: The child is regularly spanked at home.

Culture cramming may be a foundational belief of modern parenting but, according to the data, it doesn't improve early childhood test scores. Frequent museum visits would seem to be no more productive than trips to the grocery store. Watching TV, meanwhile, doesn't turn a child's brain into mush after all; nor does the presence of a home computer turn a child into Einstein.

Now, back to the original riddle: How can it be that a child with a lot of books in her home does well at school even if she never reads them? Because parents who buy a lot of children's books tend to be smart and well-educated to begin with and they pass on their smarts and work ethic to their kids. (This theory is supported by the fact that the number of books in a home is just as strongly correlated with math scores as reading scores.) Or the books may suggest that these are parents who care a great deal about education and about their children in general, which results in an environment that rewards learning. Such parents may believe that a book is a talisman that leads to unfettered intelligence. But they are probably wrong. A book is, in fact, less a cause of intelligence than an indicator.

The most interesting conclusion here is one that many modern parents may find disturbing: Parenting technique is highly overrated. When it comes to early test scores, it's not so much what you do as a parent, it's who you are.

It is obvious that children of successful, well-educated parents have a built-in advantage over the children of struggling, poorly educated parents. Call it a privilege gap. The child of a young, single mother with limited education and income will typically test about 25 percentile points lower than the child of two married, high-earning parents.

So it isn't that parents don't matter. Clearly, they matter an awful lot. It's just that by the time most parents pick up a book on parenting technique, it's too late. Many of the things that matter most were decided long ago — what kind of education a parent got, how hard he worked to build a career, what kind of spouse he wound up with and how long they waited to have children.

The privilege gap is far more real than the fear that haunts so many modern parents — that their children will fail miserably without regular helpings of culture cramming and competitive parenting. So, yes, parents are entitled to congratulate themselves this month over their children's acceptance letters. But they should also stop kidding themselves:

The Mozart tapes had nothing to do with it.

*Stephen J. Dubner and Steven D. Levitt are the authors of *Freakonomics: A Rogue Economist Explores the Hidden Side of Everything*.*

Cracking the Real Estate Code

Is your agent really working for the enemy? A user's guide to home economics (and how to beat the expert industry).

By Steven D. Levitt and Stephen J. Dubner

Can You Crack the Code?

Listed below are 10 terms commonly used in real estate ads. Five have a strong positive correlation to the ultimate sales price and five have a strong negative correlation. Which are which? See Answers on the following page.

- fantastic
- granite
- spacious
- state-of-the-art
- !
- Corian
- charming
- maple
- great neighborhood
- gourmet

It's one of the biggest bets you can place on another person: You hire a real estate agent to sell your home.

She sizes up its charms, snaps some pictures, sets the price, writes a seductive ad, shows the house aggressively, negotiates the offers, and sees the deal through to the end. Sure, it's a lot of work, but she's getting a nice cut. On the sale of a \$300,000 house, you'll typically pay a 6 percent agent fee of \$18,000. That's a lot of money. But you tell yourself that you never could have sold the house for \$300,000 on your own. The agent knew how to - what's that phrase she used? - "maximize the house's value." She got you top dollar, right?

A real estate agent is every bit the expert. She is better informed than you about your home's worth, the state of the housing market, even the buyer's frame of mind. You depend on her for this information.

As the world has grown more specialized, countless such experts have made themselves similarly indispensable. Doctors, lawyers, contractors, auto mechanics: They all enjoy informational advantage. And they use that advantage to help you ... Right?

Information can be a beacon, or information can be a cudgel; it depends on who wields it and how. In any transaction, it's common for one party to have better information than the other. In the parlance of

economists, this is information asymmetry. There's value in asymmetry; it's the reason why someone, such as a consumer, will pay someone else, an expert, for his knowledge.

Of course, sometimes an expert might manipulate his advantage for his own benefit. If your doctor suggests that you have an angioplasty - even though current research suggests that angioplasty often does little to prevent heart attacks - your first thought won't likely be that the doctor is using his informational advantage to make a few thousand dollars for himself or his buddy. But as David Hillis, an interventional cardiologist at the University of Texas Southwestern Medical Center in Dallas, explained to The New York Times, a doctor may have the same economic incentives as a car salesman or a funeral director or a mutual fund manager: "If you're an invasive cardiologist and Joe Smith, the local internist, is sending you patients, and if you tell them they don't need the procedure, pretty soon Joe Smith doesn't send patients anymore."

Or consider these findings of a 1996 medical study: Obstetricians in areas with declining birthrates are much more likely to perform cesarean section deliveries than obstetricians in growing areas - suggesting that when business is tough, doctors may try to ring up more expensive procedures.

The Internet, of course, is all about smoothing over these asymmetries; in one industry after another, from life insurance to used cars, the Web has eliminated the expert's upper hand by giving once-exclusive information to the online masses. But some industries have been slow to change - real estate among them.

The best way to observe information asymmetry at work is to measure how an expert treats you versus how he performs the same service for himself. Real estate provides the perfect opportunity, since housing sales are a matter of public record, and real estate agents often do sell their own homes. Recent data covering the sale of nearly 100,000 houses in suburban Chicago show that more than 3,000 of those houses were owned by agents.

Before plunging into the data, a question: What is the agent's incentive when selling her own home? Simple: to make the best deal possible. Presumably, this is also her incentive when selling your home; after all, her commission is based on the sale price. And so your incentive and the agent's incentive would seem to be nicely aligned. But commissions aren't as simple as they seem. First of all, a 6 percent commission is typically split between the seller's agent and the buyer's. Each agent then kicks back half of her take to her agency. Which means that only 1.5 percent of the purchase price goes directly into your agent's pocket.

So on the sale of your \$300,000 house, her personal take of the \$18,000 commission is \$4,500. Still not bad, you say. But what if the house was worth more than \$300,000? What if, with a little more effort and patience, she could have sold it for \$310,000? After the commission, that puts an additional \$9,400 in your pocket. Yet the agent's additional share - her personal 1.5 percent - is a mere \$150. So maybe your incentives aren't aligned after all. Is the agent willing to put out all that extra time and energy for just \$150?

There's one way to find out: measure the difference between the sales data for houses that belong to real estate agents themselves and the houses they sold on behalf of clients. Using the information from those 100,000 Chicago homes, and controlling for any number of variables - location, age and quality of the house, aesthetics, and so on - it turns out an agent keeps her own home on the market an average

of 10 days longer and sells it for an extra 3-plus percent, or \$10,000 on a \$300,000 house. When she sells her

own house, an agent holds out for the best offer; when she sells yours, she pushes you to take the first decent offer that comes along. Like a stockbroker churning commissions, she wants to make deals and make them fast. Why not? Her share of a better offer - \$150 - is too puny an incentive to encourage her to do otherwise. So her job is to convince you that a \$300,000 offer is in fact very good, even generous, and one that only a fool would refuse.

This can be tricky. The agent doesn't want to come right out and call you a fool. So she merely implies it - perhaps by telling you about the bigger, nicer, newer house down the block that has sat unsold for six months.

This is the agent's main weapon: the conversion of information into fear. Consider this true story, related by John Donohue, a law professor who in 2001 was teaching at Stanford University: "I was just about to buy a house on the Stanford campus, and the seller's agent kept telling me what a good deal I was getting because the market was about to zoom. As soon as I signed the purchase contract, he asked me if I would need an agent to sell my previous Stanford house. I told him that I would probably try to sell without an agent, and he replied, 'John, that might work under normal conditions, but with the market tanking now, you really need the help of a broker.'"

In five minutes, a zooming market tanked. Such are the marvels that can be conjured by an agent in search of the next deal.

So a big part of a real estate agent's job is to persuade the homeowner to sell for less than he would like while at the same time letting potential buyers know that a house can be bought for less than its listing price. To be sure, there are more subtle means of conveying this information than blatantly telling the buyer to bid low. The Chicago study also reveals how agents exert influence through the listings they write. A phrase like "well maintained," for instance, is full of meaning to an agent - the house is old but not quite falling down. A savvy buyer will know this (or find out once he sees the place), but to the retiree who is selling the house, "well maintained" might sound like a compliment, which is just what the agent intends.

An analysis of the language used in real estate ads shows that certain words are powerfully correlated with the final sale price of a house. This doesn't necessarily mean that labeling a house "well maintained" causes it to sell for less than an equivalent house. It does, however, indicate that when an agent labels a house "well maintained," she is subtly encouraging a buyer to bid low.

So consider the terms in the box on the previous page: A "fantastic" house is surely fantastic enough to warrant a high price, right? What about a "charming" and "spacious" home in a "great neighborhood!"? No, no, no, no, and no.

In fact, the terms that correlate with a higher sales price are physical descriptions of the home itself: granite, Corian, and maple. As information goes, such terms are specific and straightforward - and therefore pretty useful. If you like granite, you might like the house; but even if you don't, "granite" certainly doesn't connote a fixer-upper. Nor does "gourmet" or "state-of-the-art," both of which seem to tell a buyer that a house is, on some level, fantastic.

"Fantastic," meanwhile, is a dangerously ambiguous adjective, as is "charming." These words, it turns out, are real estate agent code for a house that doesn't have many specific attributes worth describing. "Spacious" homes, meanwhile, are often decrepit or impractical. "Great neighborhood" signals to a buyer that, well, this house isn't very nice but others nearby may be. And an exclamation point in a real estate ad is bad news for sure, a bid to paper over real shortcomings with false enthusiasm.

If you study an ad for a real estate agent's own home, meanwhile, you see that she emphasizes descriptive terms (especially "new," "granite," "maple," and "move-in condition") and avoids empty adjectives (including "wonderful," "immaculate," and the telltale "!"). She patiently waits for the best buyer to come along. She might tell this buyer about a house nearby that just sold for \$25,000 above the asking price, or another house that is the subject of a bidding war. She is careful to exercise every advantage of the information asymmetry she enjoys.

But even the agent's advantage has been eroded by the Internet. After all, anyone can now get online and gather information about sales trends and housing inventory and mortgage-rate tremors. And recent sales data is starting to show the results. Agents still get a higher price for their own homes than for comparable homes owned by their clients - but since the proliferation of real estate Web sites, the gap between the two prices has shrunk by a third. The information has been set loose.

Adapted from Freakonomics: A Rogue Economist Explores the Hidden Side of Everything, copyright Steven D. Levitt and Stephen J. Dubner, published by William Morrow. Levitt is an economist at the University of Chicago. Dubner is an author and journalist

European / US Sizing Chart

Women		Men	
US	EU	US	EU
4.5 - 5	35	7.5 - 8	41
5.5 - 6	36	8.5 - 9	42
6.5 - 7	37	9.5 - 10	43
7.5 - 8	38	10.5 - 11	44
8.5 - 9	39	11.5 - 12	45
9.5 - 10	40	12.5 - 13	46
10.5 - 11	41	13.5 - 14	47
11.5 - 12	42	14.5 - 15	48
12.5 - 13	43		