

CHANCE News 12.05
Oct.16, 2003 to Nov. 30, 2003

Prepared by J. Laurie Snell, Bill Peterson, Jeanne Albert, and Charles Grinstead, with help from Fuxing Hou and Joan Snell. We are now using a listserv to send out notices that a new Chance News has been posted on the Chance Website. You can sign on or off or change your address at this [Chance listserv](#). This listserv is used only for this posting and not for comments on Chance News. We do appreciate comments and suggestions for new articles. Please send these to jlsnell@dartmouth.edu. Chance News is based on current news articles referenced in [Chance News Lite](#).

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Here are two forsooth items from the October 2003 issue of the RSS News.

Earning Airpoints:

Unlike most other frequent flyer programmes where points are based on miles, Airpoints is based on kilometers. In fact, you're earning up to 60% more points than other frequent flyer programmes...

letter from Air New Zealand
October 2002

Better yet, let's use the number of feet traveled!

After the menopause, women's risk of heart disease is similar to men's. One woman in six dies of it every year.
Medical editor,

The Daily Telegraph
15 July 2003

Chance are...On generic Democrats and seven-game series.
ABCNews.com, Whose Counting? ([archived](#) or [current](#))
John Paulos

John writes:

There have been several polls in recent months indicating that, were the presidential election to be held early, President Bush would lose to a generic Democrat in a close race. This is an interesting fact on the surface, but becomes somewhat paradoxical when these same polls also show Bush beating each of the primary Democratic contenders by a slight margin.

John then goes on to explain how this might happen. He also discusses the chance of a seven-game world series which was in the news after this years world series. John provides two different ways to compute this probability assuming the teams are equally matched. See also item 8 in this newsletter.

DISCUSSION QUESTION:

- (1) Is the apparent voting paradox an example of Simpson's Paradox?
 - (2) What does world series being longer than expected suggest about "the hot hand" theory?
-

Perry Lessing suggested the following story.

[Air aces show fame is not fair.](#)
New Scientist, 18 October 2003
Jenny Hogan

How to be famous.

New Scientist, 10 November 2003

Robin Oakley-Hill (letter to the editor)

Mikhail Simkin and Vwani Roychowdhury, two electrical engineering professors at UCLA, examined the records of Germany's WWI flying aces. The goal was to see whether an ace's fame, as measured by the number of Google hits on his name, is proportional to the number of planes he actually shot down. Simkin and Roychowdhury feel that such proportionality would reflect an equitable distribution of fame. Instead, they found that the actual relationship looks exponential rather than linear.

Arguably the most famous flying ace is Manfred von Richtofen, the Red Baron. The 80 planes he shot down represent only 1.6% of the total number downed by German aviators. However, his name drew 4720 Google hits, which is 27% of 17,674 total hits obtained for all 393 German aces identified by Simkin and Roychowdhury. For more details, you can download a pdf version of their paper, "[Theory of Aces: Fame by Chance or Merit?](#)"

The letter to the editor, however, argues that this whole analysis is misguided, and shows "the science of statistics going where it cannot really reach." According to Oakley-Hill, fame reflects glamour as well as achievement. In the case of Richtofen, being a actual baron and assembling a colorful "flying circus" were key factors in establishing his reputation.

Our next article was suggested by Peter Kostelec and Paul Alper.

Rich colleges receiving richest share of U.S. aid.

New York Times, 9 Nov. 2003

Greg Winter

The article states:

The federal government typically gives the wealthiest private universities, which often serve the smallest percentage of low-income students, significantly more financial aid money than their struggling counterparts with much greater shares of poor students.

As evidence of this they provide the following graphic:

Richer School, More Aid

Federal financial aid was higher during the 2000-1 school year for wealthier colleges, which are less likely to have students from low-income homes.

	Applicants	Amount of per-applicant aid received by colleges for:		For each dollar its students got in federal grants, the college got an extra ...
		PERKINS LOANS	WORK-STUDY	
National median		\$ 14.38	\$ 87.67	\$0.07
Princeton	2,228	128.13	529.70	1.42
Dartmouth	2,693	174.88	429.99	0.92
Brown	2,823	169.23	466.22	0.76

College	Enrollment	Per-student	Total	Per-student	Ratio
Yale	4,811	112.22	592.75	0.72	
Stanford	4,995	211.80	475.09	0.56	
Harvard	8,399	137.61	463.17	0.98	
Pennsylvania	9,090	77.98	582.00	0.98	
SUNY Albany	10,510	3.39	94.55	0.06	
Florida State	18,172	7.33	66.51	0.04	
Arizona State	24,431	3.25	86.83	0.10	
San Diego State	26,080	2.83	73.53	0.06	
Ohio State	32,696	3.12	119.20	0.07	
Penn State	48,187	9.95	95.77	0.12	
CUNY	108,961	15.98	88.80	0.04	

Source: Analysis of Department of Education data

The article describes the origins of the disparities as:

As for the origins of the disparities, most veterans of university finance agree that they date back at least to the 1970's, when regional panels of educational experts, not formulas, decided how much colleges would receive. Because each university had to make its own case for the money, those with long histories and a certain financial savoir-faire tended to do particularly well. In fact, the panels were sometimes composed of their peers.

The article goes on to say:

Congress tried to correct the imbalance in 1980, voting to divide the aid according to a "fair share" formula. But that applied only to whatever new money flowed into these programs, guaranteeing that no college would receive less than it was already getting. It is a guarantee that still exists.

We wondered if the elite schools really did tend to have the fewest needy students. An article "Pell Grant Count Puts Most Ivy League Schools Near the Bottom in Percentage of Low-Income Students": in the [The Journal of Blacks in Higher Education](#) (Issue No. 41, Autumn 2003) answers this question. The article states:

Pell Grants, which provide up to \$4,050 for students from low-income families, are awarded to undergraduate college students by the federal government upon calculations of family size, income, and assets that could be used to finance education as well as upon projected tuition costs.

In almost all cases, students from families with incomes above \$35,000 are ineligible for Pell Grants. More than one half of all Pell Grant recipients come from families that have incomes under \$15,000.

In most cases, educational institutions make certain that entering students who are eligible for a Pell Grants take advantage of the program and exhaust all other available federal aid before the institution will offer any financial help from university funds.

The article provides the following table based on data obtained from the Department of Education for the 2000-01 academic year. It shows 26 major universities ranked according to the percent of undergraduate students who received Pell grants:

University	Total Pell grant recipients	Percent of all undergraduate students who received Pell grants.
University of California-Berkeley	6,569	28%
Cornell University	2,327	27.1
California Institute of Technology	137	14.5
Columbia University	978	14.2
University of North Carolina-Chapel Hill	1,936	12.2
Massachusetts Institute of Technology	503	11.9
University of Michigan	2,865	11.7
Rice University	313	11.5
Stanford University	816	11.2
Emory University	687	10.8
Georgetown University	687	10.4
Yale University	544	10.3
Carnegie Mellon University	539	10.2
Dartmouth College	422	10.2
Johns Hopkins University	516	9.6
University of Pennsylvania	1,127	9.5
Northwestern University	858	9.4
Duke University	575	9.3
Vanderbilt University	564	9.3
University of Virginia	1,194	8.7
Brown University	506	8.4
Notre Dame University	611	7.4
Washington University	496	7.3
Princeton University	321	6.8
Harvard University	636	6.6

Recall that the *New York Times* article had Princeton, Dartmouth, Brown, Yale, Stanford, Harvard, and Pennsylvania as receiving the highest per-student government aid. None of these is near the top in the percentage of needy students and two of them, Princeton and Harvard, are at the bottom.

Note also that two Ivy League schools, Cornell and Columbia, who were not in the top group receiving government aid, were near the top in serving needy students.

In the *Times* article the author compares Stanford University with the nearby California State University in Fresno. He remarks that Stanford has far fewer poor students than Fresno State, yet it receives about 7 times as much federal money in one program, 28 times as much in another program and 100 times as much in a third program. Robin Mamlet, Dean of Admission and Financial Aid at Stanford, replied as follows:

Letter to the Editor.
New York Times, 17 November, 2003
Dean Robin G. Mamlet

The aid referred to in "Rich Colleges Receiving Richest Share of U.S. Aid" (front page, Nov. 9) goes to students with demonstrated financial need — not to the university. Moreover, the lion's share of that aid is in loans, paid back to the government by the students who receive the money. On average, a Stanford student receives less in Pell grant money than a student at the state school to which Stanford was compared in the article.

Stanford is one of a handful of private schools that admit students regardless of their ability to pay. In the 2002-03 year, the federal government contributed about \$5.3 million in grant money to our student aid packages; Stanford contributed \$67 million of its own money. This federal-institutional partnership allowed Stanford to provide access to students from lower-income backgrounds.

We strongly believe that it is in society's interest for the federal government to support needy students wherever they attend college.

DISCUSSION QUESTIONS:

- (1) What do you think about Dean Mamlet's letter?
- (2) Some would argue that the Ivy League schools have such a high tuition that it is natural that they should get much more government money. What do you think of that argument?

On-line exchange upsets betting world.
Globe and Mail, 3 Nov., 2003

This article describes the [Betfair website](#) for internet betting providing a new form of betting, developed by computer programmer Andrew Black. Traditional bookies allow you to bet, for example, that a particular horse will win. But this website allows you to bet that the horse will win or that it will not win. You propose a bet on a sporting event with the odds you want and the amount of money you are willing to bet. Then, if anyone is willing to accept your bet, you have a bet. If you lose, Betfair does not take any service charge, but if you win they take from 2 to 5 percent of your profit. A traditional bookie would take about 16 percent of the amount bet, win or lose. The percent service charge depends, in a rather interesting way, on how much you have bet previously as explained [here](#).

We will give an example to illustrate betting on a particular event, but first we have to explain some Betfair terminology. To say that you "back" an event is to say that you bet that the event will happen, and to say that you "lay" an event is to say that you bet that it will not happen. Betfair uses a single number to express odds called "digital odds". If you bet £10 that an event will happen, and the odds are given as 3, then you receive £30 if you win (this includes the £10 you bet), and lose the £10 you bet if the event does not happen. The reciprocal of the digital odds is the probability of winning that would make the bet a fair bet. In our example this probability is 1/3. The traditional odds for this example would be expressed as 2 to 1 in favor of the event happening.

Here is an example showing the bets available on the outcome of a basketball game between the Memphis Grizzlies and the Los Angeles Lakers to be played on the day this was written.

LA Clipp. @ Minnesota - Match Odds		REFRESH				
<input type="checkbox"/> View P&L		Total selections: 2				
		103.9% BACK			89.1% LAY	
i Los Angeles Clippers	4 £2	4.5 £42	4.7 £96	6.2 £8		
i Minnesota T-Wolves	1.18 £15	1.2 £405	1.21 £69	1.37 £4	1.39 £14	1.4 £15

Each square of the graphic corresponds to a customer's offer to bet. In the Los Angeles line, the first three squares correspond to those who propose to bet that Los Angeles will win and the second three squares correspond to those who bet that Los Angeles will lose. The number at the top of the square gives the odds the customer proposes and the number below this is the amount that is available to bet at these odds. You can bet less than this amount if you wish.

Though not included in our graphic, the amount of the bets matched so far is reported to be £100. You might wonder how Betfair can make money on such small amounts bet. But if you go to "where the money is" you will find:

English Soccer / Barclaycard Prem / Winner 2003/04, unmatched £63,315, matched £3,201,358.

Traditional bookies have to worry about too many people betting on the horse that wins, but Betfair doesn't care who wins since Betfair does not pay the winner. This new form of betting is called an "exchanges." Andrew Black's success has led to a number of other such exchanges, but Black's Betfair is called the "e-bay of gambling."

The *Globe* article is mostly about the success of Betfair as a new business as well as some concerns traditional betting shops have about their future trying to compete with these new exchanges. A better discussion of the betting process can be found in a Jan. 3rd, 2003 article in the *Washington Post* posted [here](#) by Betfair. You can also get more information on how it works by going to the help link on Betfair's homepage where you will find an FAQ and a sample bet.

DISCUSSION QUESTIONS:

(1) Do you think that the bets suggested by Betfair customers would tend to be fair bets? Do you see any evidence of this in the basketball example?

(2) The *Globe* article states that some people are concerned about allowing people to bet that a particular team will lose will lead to rigged games. Do you think this is a real problem?

Eunice Goldberg (Math Education, National Louis University) sent us the next two suggestions. They are a good examples of the kind of contributions that will help us keep Chance News going.

How many in the dark? Evidently not 50 million.

New York Times, 17 August 2003

Mike McIntire

In reporting the great August 14th East Coast blackout, the media stated that 50 million people (1/6 of

the US population) lost power. This article states:

The number 50 million appeared as part of a news release issued late Thursday and again on Friday by the reliability council, which sets rules for managing the electrical grid. The council's news release said:

Approximately 61,800 megawatts of customer load was lost in an area that covers 50 million people; we cannot say with precision how many customers were affected at this time.

Of course, not all people in the area covered were without power. For example, in the New York area about 20% of the available power remained on. The article goes on to say that a review of the largest utility companies in the area effected by the blackout indicates that at least 10.5 million customers lost power, but translating this into the number of people affected would be very difficult and would take a long time to even get a reasonable estimate.

Eunice said that she found this article fascinating and so did we.

DISCUSSION QUESTION:

How might they estimate the number of people without power?

Class action no bargain for Wal-Mart: 1.5 million could be added to bias suit by women.
Chicago Tribune, 24 September, 2003
Gren Burns

This article describes a hearing in the U.S. District Court Northern district of California to decide if a discrimination case against Wal-Mart brought by six former employees should become a class action suit. If so, the resulting suit would involving 1.5 million current and former employees which would make it the largest such civil rights class action case to date. The claim of the plaintiffs is that Wal-Mart systematically discriminated against women in pay and in promotion. Here are some comments that give a flavor of the arguments for and against such a suit:

Remarks from Wal-Mart:

It's simply not possible for the experiences of so few to represent so many.

Since Wal-Mart has so many different departments under one roof, taking action against the entire company is akin to suing "all the shops" on main streets from Alaska to Florida.

Lester Brickman, a law professor at Yeshiva University and a critic of class-action practices, is quoted as saying:

In practice, certification almost surely would compel Wal-Mart to settle, no matter the merits of its arguments.

Even if the company believed it had a strong case, the consequences of losing such a massive litigation would be too great a risk to run. The decision on whether to certify the class is the "whole ball game." There is either a home run or an out.

The article states that the case turns on the statistical analysis of Wal-Mart's work force as defined by dueling expert witnesses. From the plaintiffs we read:

The numbers show that Wal-Mart pays women less than men in every part of the country where it operates and in nearly every job, from sales associate to district manager. And although women account for two-thirds of lower-paid hourly workers, they receive only one-third of all promotions into management.

From Wal-Mart we read:

Women at Wal-Mart are more successful than men at securing the positions they seek. Similarly, promotions of women to higher-salaried positions such as store managers exceeded the rate at which women applied. And differences in pay become statistically insignificant when adjusted for factors such as the size and type of store.

Eunice writes:

I think if you read the article carefully it may be a model for Simpson's Paradox because the plaintiffs don't cut the data according to how many people actually applied for each position. They are only comparing men and women overall in different job categories. The same is true with the compensation issues-- they are not looking at the individual locations to see if that makes a difference.

If you want to look further into all this you should go to [Wal-Mart Class Website](#). Here you will find a statistical analysis, prepared for the plaintiffs by statistician Richard Drogen, under "for the press." You can also read a more legalistic discussion of the statistical issues [here](#). Unfortunately, both are from the point of view of the plaintiffs. If you want to hear both sides of the case you will have to wade through the 224-page [transcript](#) of the hearing. To see the response that Wal-Mart makes against Drogen's statistical analysis we suggest that you read the testimony of Nancy Abell in the transcript.

The plaintiffs argue that Wal-Mart has uniform hiring and promoting policies that apply to all the stores and all departments, but the implementation of these policies involves subjective decisions and this is where the discrimination occurs. Abell argues that there are significant differences between the kinds of stores Wal-Mart has (Wal-Mart stores, Supercenters, Neighborhood Markets and Sam's Clubs) and departments within these stores, clothing, electronics, etc. and this makes Drogen's statistical analysis invalid. This seems to translate into the statistical question: Are the coefficients in Drogen's regression model the same in separate sub-samples? There are numerous references to a "Chou test" which is designed to test if they are.

DISCUSSION QUESTION:

- (1) Read the transcript. How do you think the Judge should rule? How do you think the Judge will rule?
- (2) See if you can find more about the Chou test and decide if it is relevant to this case.

Baseball: A 7-game world series is unusually common.
New York Times, 22 October, 2002, p.6
Kenneth Chang

Are 7-game world series more common than expected?

[Inside Science News Service](#) (ISNS), 17 October, 2003, update 20 October, 2003

Ben Stein

The ISNS is a bit like Chance News. It is described as:

The American Institute of Physics and its member societies, including The American Physical Society, created *Inside Science News Service* (ISNS) to identify science stories that are of interest to the general population. ISNS provides science stories and expert contacts to the popular news media. Stories are drawn from today's headlines, as well as from research published in scientific journals, presented at scientific meetings, and performed in the labs of scientists around the world.

In his article Stein writes:

Assuming that the two teams are evenly matched, simple probability yields the following chances for the number of games in the World Series:

# games	% chance
4	12.5
5	25
6	31.25
7	31.25

However, in the last 50 years' worth of World Series (1953-2002), the actual percentages of World Series game lengths were:

# games	% chance
4	16
5	16
6	20
7	48

Strikingly, 24 of the last 50 Fall Classics have gone to Game 7--a rate of 48%--much greater than the 31.25% chance that statistics suggests. The difference is worth noting, or "statistically significant," as mathematicians would say. According to Carl Morris, a professor of statistics at Harvard University: "There is only a 1% chance that at least 24 of the last 50 World Series would reach seven games if these simple probabilities were correct".

The 20 October update states:

Since our original article was published, we looked at all World Series back to 1905 with a best-of-seven format. According to our unofficial count, 35 out of 94 World Series have gone to Game 7 - a rate of 37.2 percent. That's still higher than the rate one would obtain from simple probability calculations. But it may no longer represent a significant difference. "The imbalance was really created between 1952 and 1977", said Carl Morris of Harvard, "when 15 out of 25 series went to their maximum length." "I wonder what would be revealed if a scientific study were done on the numbers," said Ben Stein, this article's author.

The author gives the following useful links.

[World Series Outcomes from 1903-present](#)

[History of the World Series format](#)

[University of Illinois site shows probability calculations in more detail](#)

[Historical victory probabilities and team performance records for best-of-7 format MLB, NBA, and NHL playoff series.](#)

The *New York Times* article was based on Stein's article and, after explaining that the original result was not significant after all, the author quotes Stein as saying: "Now I feel comforted by the power of mathematics".

DISCUSSION QUESTIONS:

- (1) What do you think Stein had in mind with his comments: "I wonder what would be revealed if a scientific study were done on the numbers" and "Now I feel comforted by the power of mathematics".
- (2) See how the MLB, NBA, and NHL playoff series fit the coin tossing model.

This article was suggested by Milton Eisner and Joan Garfield.

[Oh, No: It's a Girl!](#)

Do daughters cause divorce?

[Slate](#), 2 October 2003

By Steven E. Landsburg

Posted Thursday, October 2, 2003, at 6:29 AM PT

[Slate's Everyday Economics: Kid Genders and Divorce.](#)

NPR, 9 October, 2003

Alex Chadwicks talks to Steven Landsburg

We read:

In the United States, the parents of a girl are nearly 5 percent more likely to divorce than the parents of a boy. The more daughters, the bigger the effect: The parents of three girls are almost 10 percent more likely to divorce than the parents of three boys. In Mexico and Colombia the gap is wider, in Kenya it's wider still. In Vietnam, it's huge: parents of a girl are 25 percent more likely to divorce than parents of a boy.

There are lots of theories to explain this and lots of interesting comments from readers including several reminders that correlation does not mean causation.

The authors of the study are Gordon Dahl of the University of Rochester and the National Bureau of Economic Research (NBER) and Enrico Moretti of UCLA and NBER). You can read a draft copy of their paper [here](#).

Even a "sure thing" can be wrong.

[This Week's American Cynic](#), August 26, 2003 Volume 08 Issue 05

Gregory Kohs

Kohs provides four case studies where casino gamblers have profited by noticing that the casino had made mistakes resulting in games favorable for the players: changing the rules, biased roulette wheels, etc. These stories were told in a wonderful lecture by Olaf Vancura in our [1997 Chance Lecture Series](#).

Our readers would enjoy Kohs' "This Week's American Cynic".

It occurred to us that a good internet editor should occasionally provide an "internet story" that you can just read by just click, click, click... . Here is our first attempt at such a story.

The controversy of fingerprints in the courts.

The Internet, 29 Nov. 2003

You can begin our story by reading Eamonn Keogh's [An Overview of the Science of Fingerprints](#). Next read pages 34 to 38 of David Ashbaugh's [Ridgeology](#). In particular you will want to know about the three levels of detail used in comparing fingerprints. This is a great on-line fingerprinting book by one of the leading authorities on this subject. You may want to read more of it.

Now to see what the controversy is, read Michael Spector's *New Yorker* article [Do fingerprints lie?](#) Then we go to [Latent Print Examinations](#) and choose [Problem Idents](#) to see a comparison of the latent fingerprints (those found at the scene of the crime) and the actual fingerprints of the accused in the David Asbury case discussed in the *New Yorker* article. Then click [here](#) to listen to a 60 minutes story about a similar mistake made recently in the U.S.

Next click [here](#) to see a portrait of Judge Louis Pollak, the leading character in our story. Read Judge Pollak's first [opinion](#) on the use of fingerprints in the courts. This is a fine discussion of the issues involved in the use of fingerprints as evidence in the courts. If you want to read more you can read the governments argument [here](#) and the defense's arguments [here](#). Click [here](#) for an account of the trial from the point of view of a witness, Simon Cole, who "Suspect Identities: A History of Fingerprinting and Criminal Identification" brought to the public the story of fingerprinting and the lack of testing of its reliability.

Judge Pollak's ruling would have made an exciting ending to our story. But alas, as you know from the *New Yorker* article, he reversed his decision in his [second opinion](#). If you are not up to another long discussion you could read instead an account of this decision as reported in the [Los Angeles Times](#).

In both of his opinions, Judge Pollak mentioned that, in early 2000, the [National Institute of Justice](#) (NIJ) solicited grant proposals for research projects to study the reliability of fingerprinting. He felt that the results of these studies might resolve the problems related to the use of fingerprints as evidence. Ironically, this is what killed the NIJ project.

The defense argued that the fact that the government was soliciting these grants was itself evidence that the government did not know the reliability of fingerprinting. Acting NIJ Director Julie Samuels felt

obliged to write a [letter](#) explaining that, while the NIJ was part of the Department of Justice, it was not involved in government policy making. Then the NIJ cancelled its original solicitation and replaced it by a [General Forensic Research and Development](#) solicitation. In the guidelines for this proposal under "what will not be funded", we find " proposals to evaluate, validate, or implement existing forensic technologies".

While the government seems reluctant to carry out evaluation tests, there is a fingerprint validation program carried out in the private sector by the Collaborative Testing Service([CTS](#)). In cooperation with the International Association of Fingerprint Identification ([IAI](#)), CTS carries out tests to evaluate the ability of fingerprint experts to correctly identify fingerprints from latent fingerprints. Read next the article [Possession of Truth](#), by David Grieve (Journal of Forensic Identification Vol. 46, p. 524, 1996). Here you will learn more about the CTS tests. You should then look at the results of current CTS tests [here](#). You will see that the results of the test have improved significantly since the disastrous results of 1995 described by Grieve, but the tests still have a margin of error of about 10%. And this ends our first "internet story".

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