

Math is Everywhere!

Neil Holdway • News Editor, Daily Herald (suburban Chicago), ACES Treasurer
ACES National Conference, New Orleans, April 14, 2012

Figuring percentage

1. The district says 1,000 of its 4,000 students are minorities, or ____ percent.
2. The average homeowner's tax bill will rise to \$1,500 from \$1,400, or ____ percent.
3. The average homeowner's tax bill will drop to \$1,400 from \$1,500, or ____ percent.
4. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

Absences increased ____ percent from Wednesday to Thursday.

Thursday's absences were ____ percent of Wednesday's.

Absences ____ed from Wednesday to Thursday.

Percentage vs. percentage point

5. An increase from \$2.00 to \$2.50 is an increase of _____.
6. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.
7. Take a look at this sentence: "Firefighters will receive a 3.5 percent raise the first year, and will get 0.5 percent more in each of three years after that."

7a. Kane County might halt an increase in impact fees in hopes of spurring commercial growth as plummeting sales tax income becomes an increasingly menacing problem for the county's finances this year.

Impact fees are charged to land developers as a way to compensate for the increased burden their projects place on roads, schools, parks and other public services.

The county charges impact fees that are only a portion of the calculated impact. The impact fee rate is set to increase 8 percent every year on July 1 until it hits a maximum rate of 64 percent in 2011.

A new proposal will halt the 8 percent increase scheduled for 2009, keeping the current multiplier of 40 percent.

Percentages and ethics

8. What's wrong with this sentence: The Norridge Park District is raising its pool fee by 100 percent.

Rates and ratios

A **ratio** is simply the number of times one number is larger than another

- 25-to-1 student-to-teacher ratio
- "Whites at the school outnumber blacks 2 to 1."

To calculate the ratio of X to Y, divide X by Y.

- If Citrus High School has 1,200 students and 60 teachers:
- $1,200 / 60 = 20$
- 20-to-1 ratio

As if it ever worked out that evenly:

- If Citrus High School has 1,347 students and 61 teachers:
- $1,347 / 61 = 22.08$
- Close enough: 22-to-1 ratio

What about ...

- If Citrus High School has 1,347 students and 59 teachers:
- $1,347 / 59 = 22.83$
- At some point you'll want to say something like "a nearly 23-to-1 ratio."

A **rate** describes a number in terms of how it fits into a larger one.

- Three homicides per 10,000 people
- One cell phone sold for every 100 people

To calculate, divide the smaller number by larger one, then multiply by a round number of your choice:

- If police report 120 crimes in a city of 93,000:
- $120 / 93,000 = 0.00129$ (yes, for crime you'll often get a really tiny number like this)

Pick your round number. 1,000?

- $0.00129 \times 1,000 = 1.29$ for every 1,000 people (round off where you want)
- Choose 10,000 if you like: $0.00129 \times 10,000 =$ a crime rate of 12.9 for every 10,000 people

9.

When the population rises, so does crime.

In Kane County, the population grew by 15,360 residents between 2004 and 2005.

The latest crime statistics released by the Illinois State Police show increases in burglary and theft in many towns continued a multi-year trend tied to an overall population increase and its fallout, Kane County Sheriff Capt. Rick McKiness said.

More cars cause more gas station driveoffs, which count as thefts.

And new subdivisions spawn construction theft, while new retail encourages shoplifting. More cars, and more teens, encourage burglaries to unlocked vehicles.

In Elgin, robberies rose to 208 from 106, or 96 percent. Elgin police attribute most of the robberies to a spree in late summer and early fall of 2005 in which intoxicated men were mugged in a concentrated area.

Police then did some undercover work, made numerous arrests and the number of robberies dropped, Sgt. Glenn Theriault said.

But the most glaring increase in Elgin was a 200 percent jump in the number of murders. There were two in 2004 and six in 2005.

"It's very difficult to prevent homicides because they frequently occur between families and relationships and are centered on great emotion," Theriault said. "These were not random acts of violence. But obviously 200 percent is a huge increase."

And as the population outpaces the number of police officers added to departments, officials say that a spike in some types of crime is to be expected.

"We just can't have officers where we need them," said McKiness, of the sheriff's department, which has not added patrol deputies since 1996. "If you focus on one area, another suffers."

South Elgin Police Chief Chris Merritt said his village's 16.2 percent crime increase correlates with the 2.6 percent population increase.

"We are a fairly quiet town when it comes to our (police) activity," Merritt said. "When more and more people move into an area, we're going to see a few more instances (of crime)."

But there were some drops in crime locally. Elgin's arson rate was cut in half and aggravated assault and battery dropped by 10 percent.

Aggravated battery and assaults dropped by 50 percent in the unincorporated areas of the county. Officials believe a large-scale gang suppression effort in the southern end of the county may have contributed to the drop.

Elgin Police Chief Lisa Womack plans to release mid-year crime statistics at 7 p.m. Monday at the Elgin Police Department, which she said contain some "good news."

Using big numbers

10.

County leader tries to fight \$500 million deficit

As county financial experts forecast a \$500 million deficit for the county budget next year, Cook County Board President Bobbie Steele unveiled some early ideas to rein in county government.

Some commissioners criticized a lack of specifics in Steele's report, while others openly called the \$500 million deficit projection a scare tactic to try to push through tax increases.

Steele was selected July 19 by fellow commissioners to fill the president's chair after John H. Stroger resigned because of a stroke. She officially started Aug. 1 and created four panels to help her assess what needed to be done to get Cook County stabilized.

Thursday, Steele revealed snippets of those panels' suggestions to cut costs - the same day Chief Financial Officer Tom Glaser confirmed the county is \$500 million in the red for 2007. In her address later in the day after Glaser's remarks, however, Steele said simply the amount was more than \$400 million.

"The fact of the matter is, this financial quagmire did not happen overnight, and it can not be turned around in a matter of months," said Steele, whose term expires the first week of December.

But to try, she's asking all departments to spend only 96 percent of their budgets for 2006, and she's asking them to cut their 2007 budgets to 90 percent of their 2006 spending.

That simply cannot be done, said Cook County Sheriff Michael Sheahan and Cook County State's Attorney Richard Devine. To cut 10 percent would mean fewer prosecutors and jail guards, they said.

Many officials point to the Bureau of Health as the source of the deficit problems. That department is dozens of millions of dollars behind budget in collecting patient fees for 2006.

Almost everyone acknowledges the department needs reform. But many, like Democratic Commissioner Mike Quigley of Chicago, have said the sheriff's department needs to take its share of cuts, too, since its unincorporated patrol area has gradually shrunk over the years. Steele appeared to take up that call as well.

Regarding the Health Bureau, though, Steele called for collecting monies from surrounding counties, which often send their patients to Stroger Hospital, the only public hospital in the region. Another cost-cutter will be to organize the department to ensure collection of payment when possible. Finally, standardizing covered prescription lists would help limit distributing medicines for which it cannot be reimbursed, said Democratic Commissioner Larry Suffredin.

Cook County Commissioner Tony Peraica, a candidate for county president in November, said the \$500 million figure was a scare tactic to try to convince voters a tax hike is needed.

11. The board has scheduled a 2,500-foot walk at 2 p.m. Oct. 22 in downtown Elgin in the hopes of raising \$71,000.

12. The Walter Payton 16,726-Yard Run – covering the distance of his long-standing rushing record – honors Payton's incredible accomplishments on and off the field and raise money for life-saving cancer research.

Statistics and sampling

13. Check out the following story that moved in the summer of 1996 on a major news wire:

WASHINGTON (Reuters) - President Clinton, hit by bad publicity recently over FBI files and a derogatory book, has slipped against Bob Dole in a new poll released Monday but still maintains a 15 percentage point lead.

The CNN/USA Today/Gallup poll taken June 27-30 of 818 registered voters showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided.

The poll had a margin of error of plus or minus four percentage points.

A similar poll June 18-19 had Clinton 57 to 38 percent over Dole.

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Math is everywhere!

— [Budget stories

— [Salary disputes (raises)

— [Tax stories

— Sales taxes

— Property/local taxes

— Income taxes

— [Crime stories

— [Elections and polls

— [Sports! (Even in
the A section)

— [Box office reports,
TV ratings

Everywhere, I tell you

Consumer stories

Gas prices (car)

Heating costs

Utilities

Cost of needs
(milk, food, clothes)

Cost of transportation
(cars, public transit)

Cost of wants
(electronics, more
clothes, shoes,
home decorating)

It won't stop ...

Business stories

— Stock market

— Businesses sold
(Google buys
YouTube)

— Revenues, earnings,
profits, losses

— Farm reports

— Mutual funds, 401(k)

— Mergers

Your math could make you:

— [**Unclear**

— [**Confusing**

— [**Inaccurate**

— [**Unethical**

The math we'll cover

Percentages

Percent change

The dreaded percent
vs. percentage point

Rates and ratios

Using big numbers

Presenting financial news

Statistics and sampling

CEOs getting spanked

Percentages

- [Figuring percentages

- In most cases, it's small number divided by big number, then multiply by 100.

- $(x / y) * 100$

Percentages

1. The district says 1,000 of its 4,000 students are minorities.

Percentages

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$$1,000 / 4,000$$

Percentages

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$$1,000 / 4,000 = 0.25$$

Percentages

1. The district says 1,000 of its 4,000 students are minorities.

$$1,000 / 4,000 = 0.25$$

$$* 100 = 25 \text{ percent}$$

Percentage change

— [Figuring percentage change

— Difference divided by the original number, then multiply by 100

— That's whichever way the change goes, up or down

Percentage change

3. The average homeowner's tax bill will rise to \$1,500 from \$1,400, or _____ percent.

Percentage change

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$$\$1,500 - \$1,400 =$$

Percentage change

3. The average homeowner's tax bill will rise to \$1,500 from \$1,400, or _____ percent.

$$\$1,500 - \$1,400 = \$100$$

Percentage change

3. The average homeowner's tax bill will rise to \$1,500 from \$1,400, or _____ percent.

$$\$1,500 - \$1,400 = \$100$$

$$\$100 / \$1,400 = 0.0714285$$

Percentage change

3. The average homeowner's tax bill will rise to \$1,500 from \$1,400, or _____ percent.

$$\$1,500 - \$1,400 = \$100$$

$$\$100 / \$1,400 = 0.0714285$$

$$\times 100 = 7.14\% \text{ (choose your rounding point)}$$

Percentage change

4. The average homeowner's tax bill will drop to \$1,400 from \$1,500, or _____ percent.

Percentage change

4. The average homeowner's tax bill will drop to \$1,400 from \$1,500, or _____ percent.

You still go $\$1,500 - \$1,400 = \$100$

(difference is what matters, regardless of whether it's up or down – the key is dividing by the *old* number)

Percentage change

4. The average homeowner's tax bill will drop to \$1,400 from \$1,500, or _____ percent.

You still go $\$1,500 - \$1,400 = \$100$

(difference is what matters, regardless of whether it's up or down – the key is dividing by the *old* number)

$\$100 / \$1,500 = 0.0666666\dots$

Percentage change

4. The average homeowner's tax bill will drop to \$1,400 from \$1,500, or _____ percent.

You still go $\$1,500 - \$1,400 = \$100$

(difference is what matters, regardless of whether it's up or down – the key is dividing by the *old* number)

$\$100 / \$1,500 = 0.0666666...$

$\times 100 = 6.67\%$ (choose your rounding point)

Percentage change

— [Large percentage change: Be careful to say it right!

5. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

Percentage change

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— Absences increased _____ percent from Wednesday to Thursday.

Percentage change

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— Absences increased _____ percent from Wednesday to Thursday.

— $45 - 15 = 30$ (difference)

Percentage change

5. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

— Absences increased _____ percent from Wednesday to Thursday.

— $45 - 15 = 30$ (difference)

— $30 / 15 = 2$ (difference divided by original)

Percentage change

5. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

— Absences increased _____ percent from Wednesday to Thursday.

— $45 - 15 = 30$ (difference)

— $30 / 15 = 2$ (difference divided by original)

— $2 * 100 = 200\%$ (multiply by 100)

Percentage change

5. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

— Thursday's absences were _____ percent of Wednesday's.

— $45 / 15 = 3$ (with "% of," new divided by old)

Percentage change

5. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

- Thursday's absences were _____ percent of Wednesday's.
- $45 / 15 = 3$ (with "% of," new divided by old)
- $3 * 100 = 300$ percent (not 300 percent *more*)

Percentage change

5. Citrus Middle School reported 15 students absent Wednesday and 45 absent Thursday.

— Absences _____ed from Wednesday to Thursday.

Percentage change

— Absences **tripled** from Wednesday to Thursday.

(Again, $45/15 = 3$ – three times Wednesday's 15.)

(That's 300 percent ^{*}of^{*} Wednesday's absences.)

(But it's a 200 percent ^{*}increase^{*}.)

Percentages

- Percentage vs. percentage points

- Use "percent" when comparing numbers

- Use "percentage point" when comparing percentages

- Huh?

Percent, percentage point

6. An increase from \$2.00 to \$2.50 is an increase of _____.

Percent, percentage point

6. An increase from \$2.00 to \$2.50 is an increase of _____.

Just like before: $\$2.50 - \$2.00 = \$0.50$ (difference)

Percent, percentage point

6. An increase from \$2.00 to \$2.50 is an increase of _____.

Just like before: $\$2.50 - \$2.00 = \$0.50$ (difference)

$\$0.50 / \$2.00 = 0.25$ (difference divided by old)

Percent, percentage point

6. An increase from \$2.00 to \$2.50 is an increase of _____.

Just like before: $\$2.50 - \$2.00 = \$0.50$ (difference)

$\$0.50 / \$2.00 = 0.25$ (difference divided by old)

$0.25 * 100 = 25$ percent

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

First of all, it's a **0.5 percentage point** increase.
Or a **half-point** increase, if you prefer.

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

It is **not** a "0.50 percent" increase!

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

If you want to put it in those terms – the percent change of the percentage – do it right (just like we did with the dollar amounts):

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

$$2.5 - 2 = 0.5 \quad (\text{difference})$$

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

$$2.5 - 2 = 0.5 \quad (\text{difference})$$

$$0.5 / 2 = 0.25 \quad (\text{difference divided by original})$$

Percent, percentage point

7. A sales tax increase from 2 percent to 2.5 percent is a _____ increase.

$$2.5 - 2 = 0.5 \quad (\text{difference})$$

$$0.5 / 2 = 0.25 \quad (\text{difference divided by original})$$

$$0.25 * 100 = 25 \text{ percent}$$

Percent, percentage point

So you could say:

“The Taxville City Council is proposing raising its sales tax by 25 percent.

Aldermen propose raising the city’s 2 percent sales tax by half a percentage point.”

Percent, percentage point

But it might be less confusing to avoid throwing so many percentages at your readers and say:

“The Taxville City Council is proposing raising its sales tax by half a percentage point, to 2.5 percent.”

Percent, percentage point

And then to give it even more meaning:

“The Taxville City Council is proposing raising its sales tax by half a percentage point, to 2.5 percent.

That means if you buy a \$100 gift, you’d pay \$2.50 in sales tax to the city rather than \$2.00.”

Percent, percentage point

Furthermore, there's an **ethical** advantage to saying it this way. To say ...

"The Taxville City Council is proposing raising its sales tax by 25 percent."

25 percent!?! That sounds like a lot. But when you break it down by dollars, it's not so much. Don't make it sound worse than it is.

Percent, percentage point

Also, be careful as the story reads on:

“Alderman Pat Fitzgerald had sought a 0.75 percent increase, but other aldermen thought too much of a hike would drive shoppers to neighboring cities.”

Percent, percentage point

WRONG!

“Alderman Pat Fitzgerald had sought a 0.75 percentage point increase, but other aldermen thought too much of a hike would drive shoppers to neighboring cities.”

Percent, percentage point

Take a look at this sentence.

7. Firefighters will receive a 3.5 percent raise the first year, and will get 0.5 percent more in each of the three years after that.

Percent, percentage point

“Firefighters will receive a 3.5 percent raise the first year, and will get 0.5 percent more in each of the three years after that.”

If you read this literally, the firefighters will get a raise of 0.5 percent in the second, third and fourth years. They agreed to this???

Percent, percentage point

“Firefighters will receive a 3.5 percent raise the first year, and will get 0.5 percent more in each of the three years after that.”

The writer meant, the *raise* will increase by 0.5 percent each year.

Percent, percentage point

“Firefighters will receive a 3.5 percent raise the first year, and will get 0.5 percent more in each of the three years after that.”

Wait! That’s wrong, too. The writer meant, the *raise* will increase by *a half-point* each year.

Percent, percentage point

So ...

“Firefighters will receive a 3.5 percent raise the first year, and their raise will increase by half a percentage point in each of three years after that.”

Percent, percentage point

Or, help the readers a little so they don't have to do the math ...

“Firefighters will receive a 3.5 percent raise the first year, and their raise will increase by half a percentage point in each of three years after that, peaking at 5 percent in 2009.”

Percent, percentage point

Another example

7a. Kane County might halt an increase in impact fees in hopes of spurring commercial growth as plummeting sales tax income becomes an increasingly menacing problem for the county's finances this year.

Impact fees are charged to land developers as a way to compensate for the increased burden their projects place on roads, schools, parks and other public services.

The county charges impact fees that are only a portion of the calculated impact. The impact fee rate is set to increase 8 percent every year on July 1 until it hits a maximum rate of 64 percent in 2011.

A new proposal will halt the 8 percent increase scheduled for 2009, keeping the current multiplier of 40 percent.

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Another example

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A new proposal will halt the **8 percent increase scheduled for 2009**, keeping the current **multiplier of 40 percent**.

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The county charges impact fees that are only a portion of the calculated impact. The impact fee **rate is set to increase 8 percentage points** every year on July 1 until it hits a **maximum rate of 64 percent** in 2011.

A new proposal will halt the **8-point increase scheduled for 2009**, keeping the current **multiplier of 40 percent**.

Percent, percentage point

— [A couple of common examples of “point”:

— “Approval of Obama’s handling of the situation in Afghanistan is down 10 points.”

— That’s a comparison of percentages – 46 percent to 36 percent.

Percent, percentage point

- “Analysts are expecting a quarter-point hike from the Federal Reserve in January.”
- We’re talking about an increase in a key interest rate, which is a percentage.

Percentages and ethics

What's wrong with this sentence?

8. The Norridge Park District is raising its pool fee by 100 percent.

Percentages and ethics

“The Norridge Park District is raising its pool fee by 100 percent.”

The only problem may be an ethical one. What if the fee went up to \$2 from \$1? That doesn't sound as drastic as “100 percent.”

Rates and ratios

— [A **ratio** is simply the number of times one number is larger than another

— 25-to-1 student-to-teacher ratio

— “Whites at the school outnumber blacks 2 to 1.”

Rates and ratios

- [To calculate the ratio of X to Y , divide X by Y .
- If Citrus High School has 1,200 students and 60 teachers:

Rates and ratios

— [To calculate the ratio of X to Y, divide X by Y.

— If Citrus High School has 1,200 students and 60 teachers:

— $1,200 / 60 = 20$ (big number divided by small)

Rates and ratios

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— If Citrus High School has 1,200 students and 60 teachers:

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— 20-to-1 ratio

Rates and ratios

— [As if it ever worked out that evenly:

— If Citrus High School has 1,347 students and 61 teachers:

Rates and ratios

— [As if it ever worked out that evenly:

— If Citrus High School has 1,347 students and 61 teachers:

— $1,347 / 61 = 22.08$ (big divided by small)

Rates and ratios

— [As if it ever worked out that evenly:

— If Citrus High School has 1,347 students and 61 teachers:

— $1,347 / 61 = 22.08$ (big divided by small)

— Close enough: 22-to-1 ratio

Rates and ratios

— [What about ...

— If Citrus High School has 1,347 students and 59 teachers:

Rates and ratios

— [What about ...

— If Citrus High School has 1,347 students and 59 teachers:

— $1,347 / 59 = 22.83$

Rates and ratios

— [What about ...

— If Citrus High School has 1,347 students and 59 teachers:

— $1,347 / 59 = 22.83$

— At some point you'll want to say something like "a nearly 23-to-1 ratio."

Rates and ratios

— [A **rate** describes a number in terms of how it fits into a larger one.

— Three homicides per 10,000 people

— One cell phone sold for every 100 people

Rates and ratios

- [To calculate, divide the smaller number by the larger one, then multiply by a round number of your choice:
 - If police report 120 crimes in a city of 93,000:

Rates and ratios

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 - If police report 120 crimes in a city of 93,000:
 - $120 / 93,000 = 0.00129$ (small divided by large)

Rates and ratios

— [To calculate, divide the smaller number by the larger one, then multiply by a round number of your choice:

— If police report 120 crimes in a city of 93,000:

— $120 / 93,000 = 0.00129$ (yes, for crime you'll often get a really tiny number like this)

Rates and ratios

— [Pick your round number. 1,000?

— $0.00129 \times 1,000 = 1.29$ for every 1,000 people
(round off where you want)

Rates and ratios

— [Pick your round number. 10,000?

— $0.00129 \times 10,000 =$

A crime rate of 12.9 for every 10,000 people

Rates and ratios

— [What does the rate matter?

Rates and ratios

— [It's a matter of **truth** and **ethics**

— Especially when you're talking about how, say, crime has changed, or you're comparing two towns' crimes.

— "Per capita" crime is really more important than the number of crimes itself.

Rates and ratios

— [Take two towns

— Biggville had 500 crimes in 2005. Smallville had 100 crimes. Which is more dangerous?

Rates and ratios

— [Take two towns

— Biggville had 500 crimes in 2005. Smallville had 100 crimes. Which is more dangerous?

— You need the towns' populations.

Rates and ratios

— [Take two towns

— Biggville had 500 crimes in 2005. Smallville had 100 crimes. Which is more dangerous?

— Biggville's population: 100,000

— Smallville: 10,000

Rates and ratios

— [Take two towns

— Biggville had 500 crimes in 2005. Smallville had 100 crimes. Which is more dangerous?

— Biggville: $500 / 100,000 = 50$ for every 10,000

— Smallville: $100 / 10,000 = 100$ for every 10,000

Rates and ratios

— [Take two towns

— Biggville had 500 crimes in 2005. Smallville had 100 crimes. Which is more dangerous?

— **Smallville** is more dangerous! Congratulations!

Rates and ratios

— [Let's read the crime story in the packet (No. 9).

Rates and ratios

— [Meanwhile, in this story:

The crime rate here continued a slight downward spiral of 2.3 percent, equaling 23 incidents per 1,000 residents. There were 21,726 total crimes reported in 2005, compared to 22,237 a year earlier.

Rates and ratios

— [What's the question?

The crime rate here continued a slight downward spiral of 2.3 percent, equaling 23 incidents per 1,000 residents. There were 21,726 total crimes reported in 2005, compared to 22,237 a year earlier.

Rates and ratios

— [What's the question?

The crime rate here continued a slight downward spiral of 2.3 percent, equaling 23 incidents per 1,000 residents. There were 21,726 total crimes reported in 2005, compared to 22,237 a year earlier.

— [23 per 1,000 – good to show rate, but too many numbers?

Rates and ratios

What's the question?

The crime rate here continued a slight downward spiral of 2.3 percent, equaling 23 incidents per 1,000 residents. There were 21,726 total crimes reported in 2005, compared to 22,237 a year earlier.

Good real crime numbers.

How about population change, too?

Rates and ratios

In the same story:

In analyzing the crime statistics, experts warn that percentage changes can be misleading because, in a county such as DuPage where crime is low, a difference of a few incidents will show up as a giant leap.

For example, Itasca saw a 300 percent jump in assaults and batteries. In actuality, there were 3 such reports, compared to one in 2004.

Rates and ratios

— [Uh-oh:

For example, Itasca saw a **300 percent** jump in assaults and batteries. In actuality, there were 3 such reports, compared to one in 2004.

Rates and ratios

— [Uh-oh:

For example, Itasca saw a **300 percent** jump in assaults and batteries. In actuality, there were 3 such reports, compared to one in 2004.

— [$3 - 1 = 2$ (difference)

— [$2 / 1 = 2$ (difference divided by original)

— [$2 \times 100 = \mathbf{200\% \text{ increase!}}$

Using big numbers

- [We like big numbers, because they're, you know, **big**.
- Especially when it comes to money.
- Or they're just dramatic in some way.

Using big numbers

\$150 billion in tax cuts
part of stimulus plan

Using big numbers

- [Explain what it means to the readers.
 - How much will **my** taxes go down?
 - And maybe make that part of the headline.
 - “\$500 tax break for most individuals”

Using big numbers

— [Check out No. 10.

County leader tries to fight \$500 million deficit

Using big numbers

— [What's the problem?

County leader tries to fight \$500 million deficit

Using big numbers

— [What's the problem?

County leader tries to fight \$500 million deficit

— [We need perspective: What's the total budget?

Using big numbers

No. 11 and 12:

11. The board has scheduled a 2,500-foot walk at 2 p.m. Oct. 22 in downtown Elgin in the hopes of raising \$71,000.

12. The Walter Payton 16,726-Yard Run – covering the distance of his long-standing rushing record – honors Payton's incredible accomplishments on and off the field and raises money for life-saving cancer research.

Using big numbers

— [Uh, 2,500 feet?

11. The board has scheduled a 2,500-foot walk at 2 p.m. Oct. 22 in downtown Elgin in the hopes of raising \$71,000.

— [Well, how much is that?

— 1 mile = 5,280 feet

Using big numbers

— [Uh, 2,500 feet?

11. The board has scheduled a 2,500-foot walk at 2 p.m. Oct. 22 in downtown Elgin in the hopes of raising \$71,000.

— [Well, how much is that?

— 1 mile = 5,280 feet

— $2,500 / 5,280 = 0.47$ mile

Using big numbers

— [Uh, 2,500 feet?

11. The board has scheduled a 2,500-foot walk at 2 p.m. Oct. 22 in downtown Elgin in the hopes of raising \$71,000.

— [Well, how much is that?

— 1 mile = 5,280 feet

— Or about a half-mile

Using big numbers

— [Cool idea, but, how much is that again?

12. The Walter Payton 16,726-Yard Run – covering the distance of his long-standing rushing record – honors Payton’s incredible accomplishments on and off the field and raises money for life-saving cancer research.

— [1 mile = 1,760 yards

Using big numbers

— [Cool idea, but, how much is that again?

12. The Walter Payton 16,726-Yard Run – covering the distance of his long-standing rushing record – honors Payton’s incredible accomplishments on and off the field and raises money for life-saving cancer research.

— [1 mile = 1,760 yards

— [$16,726 / 1,760 = 9.5$ miles

Presenting financial news

— [Like all other newsy math, present the stuff that really matters to people.

— [And present it in a way that people will understand.

— [Take, for instance ...

Presenting financial news

— [The mighty **Dow**

Presenting financial news

— [“Dow breaks 12,000 for the first time”

— [“Dow sets new record”

— [“Dow climbs 200 points”

— [“Dow plunges 508”

Presenting financial news

— [“Dow breaks 12,000 for the first time”

— [“Dow sets new record”

— [“Dow climbs 200 points”

— [“Dow plunges 508”

— [**So what?**

Presenting financial news

— [Example:

— Largest one-day point drop in Dow history?

Presenting financial news

Example:

- Largest one-day point drop in Dow history?
- 777.68 points, or 7%
- Sept. 29, 2008 – House rejects bank bailout plan

Presenting financial news

— [Now the math question:

— 777.68 points, or 7%

— Is that the worst day in Dow history?

Presenting financial news

— [Now the math question:

— 777.68 points, or 7%

— Is that the worst day in Dow history?

— Consider: One other day in history the Dow dropped 508.

Presenting financial news

— [Now the math question:

— Sept. 29, 2008: 777.68 points, or 7%

Presenting financial news

— [Now the math question:

— Sept. 29, 2008: 777.68 points, or 7%

— Oct. 19, 1987: 508-point drop

Presenting financial news

— [Now the math question:

— Sept. 29, 2008: 777.68 points, or 7%

— Oct. 19, 1987: 508-point drop

— To 1,738 from 2,246

Presenting financial news

— [Now the math question:

— Sept. 29, 2008: 777.68 points, or 7%

— Oct. 19, 1987: 508-point drop

— To 1,738 from 2,246

— What's the percentage?

Presenting financial news

— [Now the math question:

— Oct. 19, 1987: 508-point drop, to 1,738 from 2,246

— 508 / _____

Presenting financial news

— [Now the math question:

— Oct. 19, 1987: 508-point drop, to 1,738 from 2,246

— $508 / 2,246$

— $= 0.226$

— **$= 22.6$ percent**

Presenting financial news

— [Now the math question:

— Oct. 19, 1987: 508-point drop, to 1,738 from 2,246

— $508 / 2,246$

— $= 0.226$

— $= 22.6$ percent

— **“Black Monday”**

Presenting financial news

— [So keep in mind when presenting the Dow:

— Not just the number

— But also the percentage

— (200 points up or down just ain't what it used to be)

Presenting financial news

— [Otherwise in business, remember previous lessons.

— Google buys out YouTube for \$1.65 billion

— That's a big number! Or is it? Bring perspective.

— And ask, what does it mean to your readers? Are their 401(k)s going up? Are they rich? Anything?

— If it's hard to say, then newsworthiness is a question.

Statistics and sampling

— [Is your sampling good enough to declare something so?

— [Are you summarizing the results accurately?

— [(And therefore, are you being ethical?)

Statistics and sampling

— [RobertNiles.com

Margin of Error deserves better than the throw-away line it gets in the bottom of stories about polling data. Writers who don't understand margin of error, and its importance in interpreting scientific research, can easily embarrass themselves and their news organizations.

Statistics and sampling

— [RobertNiles.com

13. Check out the following story that moved in the summer of 1996 on a major news wire:

WASHINGTON (Reuters) - President Clinton, hit by bad publicity recently over FBI files and a derogatory book, has slipped against Bob Dole in a new poll released Monday but still maintains a 15 percentage point lead.

The CNN/USA Today/Gallup poll taken June 27-30 of 818 registered voters showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided. The poll had a margin of error of plus or minus four percentage points.

A similar poll June 18-19 had Clinton 57 to 38 percent over Dole.

Statistics and sampling

The CNN/USA Today/Gallup poll taken June 27-30 of 818 registered voters showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided. The poll had a margin of error of plus or minus four percentage points.

— [**54 percent for Clinton, 39 for Dole, 7 undecided**

Statistics and sampling

The CNN/USA Today/Gallup poll taken June 27-30 of 818 registered voters showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided. The poll had a margin of error of plus or minus four percentage points.

— [But factor in margin of error of +/- 4:

— [58 percent for Clinton, 39 for Dole, 7 undecided

— Previous poll:

57 percent Clinton, 38 Dole, 5 undecided

Statistics and sampling

The CNN/USA Today/Gallup poll taken June 27-30 of 818 registered voters showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided. The poll had a margin of error of plus or minus four percentage points.

— [Or it could be different:

— [56 percent for Clinton, 35 for Dole, 9 undecided

— Previous poll:

57 percent Clinton, 38 Dole, 5 undecided

Statistics and sampling

— [In any case, you can't definitively say:

WASHINGTON (Reuters) - President Clinton, hit by bad publicity recently over FBI files and a derogatory book, **has slipped against Bob Dole** in a new poll released Monday but still maintains a 15 percentage point lead.

— [It's inaccurate, and risks at least appearing unethical ("You Clinton haters want to make him look like he's losing ground.")

Statistics and sampling

— [Make sure you've got a good sample size.
(RobertNile.com again:)

Common sense will tell you (if you listen...) that the chance that your sample is off the mark will **decrease** as you add more people to your sample. In other words, the more people you ask, the more likely you are to get a representative sample. This is easy so far, right?

Statistics and sampling

— [If you don't have a sample size in the story, ask for it.

The CNN/USA Today/Gallup poll taken June 27-30 of **818 registered voters** showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided. The poll had a margin of error of plus or minus four percentage points.

Statistics and sampling

— [In a poll story, if you don't have a margin of error, calculate it, or ask for it.

— How to calculate margin of error:

**The margin of error in a sample =
1 divided by the square root
of the number of people in the sample**

Statistics and sampling

— [So in this story's case:

The CNN/USA Today/Gallup poll taken June 27-30 of **818 registered voters** showed Clinton would beat his Republican challenger if the election were held now, 54 to 39 percent, with seven percent undecided. The poll had a margin of error of plus or minus four percentage points.

— [Square root of 818 = 28.6

— [$1 / 28.6 = 0.035$ (*100 = 3.5%)

Statistics and sampling

— [Let's discuss the USA Today story.]

Statistics and sampling

Hit with the question: Were you spanked? CEOs say yes

Execs say paddlings don't create leaders, or do they?

By Del Jones
USA TODAY

The debate over whether CEOs are born or made remains unresolved, but there is one thing they overwhelmingly have in common.

As children, they were paddled, belted, switched or swatted.



Ameritrade

“If I came home late, chances are I'd get hit.”

— Joe Moglia,
CEO at TD Ameritrade

Statistics and sampling

traits common to CEOs.

But USA TODAY interviewed about 20 CEOs over three months and, while none said they were abused, neither were any spared. Typical is General Motors CEO Rick Wagoner, 53. He got an occasional “whack in the fanny,” while growing up in Richmond, Va., but said he had it coming and that it probably had no influence on his life as a high achiever.

— [Conclusion's based on 20!?!]

Summing up (get it?)

— [**Don't be afraid** to ... do the math!

— It won't bite you, it's simple, and you can use a calculator

Summing up (get it?)

— [**Don't be afraid** to challenge
the numbers.

— Even if they look right.

Summing up (get it?)

- [**Don't be afraid** to rewrite the numbers.
- If you don't want to do the math, chances are readers don't either, so put it in the plainest and most meaningful terms possible.



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Hit with the question: Were you spanked? CEOs say yes

Updated 10/9/2006 3:50 AM ET

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Moglia


By Del Jones, USA TODAY

The debate over whether CEOs are born or made remains unresolved, but there is one thing they overwhelmingly have in common.

As children, they were paddled, belted, switched or swatted.

Child psychologists wince at such a finding. They warn that spanking slows mental development and hinders achievement. They say the last thing parents need in the back of their minds is a suggestion or justification that the rod is the road to vision, ruthless drive and other leadership traits common to CEOs.

But USA TODAY interviewed about 20 CEOs over three months and, while none said they were abused, neither were any spared. Typical is General Motors (GM) CEO Rick Wagoner, 53. He got an occasional "whack in the fanny," while growing up in Richmond, Va., but said he had it coming and that it probably had no influence on his life as a high achiever.

"I probably deserved it more," Wagoner says, and though he spanked his two sons less often, it was "probably not enough," he jokes. "I'm not sure they deserved it less than I did."

The Securities and Exchange Commission doesn't require CEOs to disclose childhood paddlings, so USA TODAY ambushed them with the question during interviews on other topics.

A handful declined to respond. "I don't remember," said Sheldon Adelson, 73, CEO of the Las Vegas Sands (LVS)

casino and hotel operation. The son of poor immigrants grew richer by \$1 million an hour over the past two years to become worth \$20.5 billion and the third-richest man in America.

But most CEOs answered the question, albeit through forced smiles. "Very, very rarely," said Cisco Systems (CSCO) CEO John Chambers, 56, the son of two doctors, who visited USA TODAY in July for what he knew

would be a wide-ranging interview. He had no idea how wide ranging. "I'm from Charleston, West Virginia. My dad was firmer than my mom," he said.

Some CEOs had more heavy-handed parents. Dave Haffner, CEO of *Fortune* 500 manufacturer Leggett & Platt (LEG), says he was familiarized with his father's belt about six times a year. That includes the time Haffner, then 8 or 9, kicked down the screen door after his brother locked him in the basement.

"I received the belt when I deserved it," said Haffner, 54, who spoke with obvious love in his voice for his father, Carl, a mechanic and truck driver who expected every tool to be in its place. After the interview, Haffner volunteered to pose for a photo beside the grave of his father, who died in 1989 at 72.

Is there some connection between corporal punishment and corporate leadership? Most CEOs believe spankings played little or no role in their success but usually could cite important lessons learned. "I'm disciplined, detailed and organized," Haffner says.

Mark Cuban, 48, says he was spanked one or two times but does not remember why. He went on to become worth \$2.3 billion, rich enough to buy "toys" such as the Dallas Mavericks. "I got the 'this is going to hurt me more than it hurts you' speech from my dad. I don't think spankings influenced my life one way or the other," Cuban says.

A generational thing

University of New Hampshire sociology professor Murray Straus, author of *Beating the Devil Out of Them*, has www.usatoday.com/money/companies/management/2006-10-08-spanking-ceos-usat_x.htm

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been studying corporal punishment since 1969 and says it comes as no surprise that almost every CEO was spanked. They mostly grew up in the 1950s and 1960s.

Although the systematic use of corporal punishment has declined steadily, 90% of toddlers are still spanked at least once, he says, and a 1998 Gallup Poll found that 55% of parents agreed with the statement "A good hard spanking is sometimes necessary."

But Straus says evidence points to corporal punishment as detrimental. If some spanked children grow up to be successful, even billionaires, it's like saying, go ahead and smoke because two-thirds of smokers don't get lung cancer, he said.

"We don't allow any other humans to be legally hit," says Nadine Block, executive director of the Center for Effective Discipline.

TD Ameritrade (AMTD) CEO Joe Moglia, 55 and the oldest of five children, says he was "hit" about once a month when things were going well, about once a week when they weren't. "If I came home late, chances are I'd get hit. If my parents found out I was someplace I wasn't supposed to be, I'd get hit."

Ditto if Moglia got into a fistfight — unless someone else started it. He remembers his parents as hardworking immigrants with no time for diversions such as swimming lessons. That required strict rules about playing near the Hudson River.

Forty-five years ago, the 10-year-old Moglia and his 9-year-old brother, John, rescued an injured pigeon near the river bank. A year went by. One day, his father gave him a spanking without warning or explanation. When Joe returned to his room, a laughing John revealed that he had blabbed about the pigeon incident.

Joe Moglia said he learned from his parents, and later from his athletic coaches, that "tough love is better than soft love," and he has written books on leadership that recommend positive reinforcement backed up by consequences. "You appreciate good-weather days when you get rain," Moglia says.

Incidences of CEO spankings go well beyond USA TODAY's anecdotal research. Retired General Electric (GE) CEO Jack Welch wrote in his 2001 memoir, *Jack: Straight from the Gut*, that his mother, Grace, was the disciplinarian in the family. When Welch skipped altar-boy practice, she whacked him with a shoe.

Eve Tahmincioglu interviewed 55 CEOs about their backgrounds for her book *From the Sandbox to the Corner Office: Lessons Learned on the Journey to the Top*, which went on sale Friday. The book includes chapters on such things as how CEOs attacked their first jobs and how they overcame bad bosses, but Chapter One is called "Parents: Less Carrot, More Stick."

She found that most CEOs had tough disciplinarians as parents. Among those who told Tahmincioglu that they had been spanked were Time Warner (TWX) CEO Richard Parsons, Shell Chemicals (RDSA,RDSB) Executive

Vice President Fran Keeth, Alliant Energy Resources (LNT) former CEO Erroll Davis, SCO Group (SCOX) CEO Darl McBride and United Way CEO Brian Gallagher.

A mean drunk

Gallagher told Tahmincioglu that he was, at a minimum, verbally abused. "My dad was drunk all the time, and he was a very mean guy when he was drunk. It was every day, from the time he woke up in the morning with a shot and a beer. You were just afraid of him." He learned not to feel sorry for himself and that anyone could rise from a bad environment.

Parsons told Tahmincioglu that he was often spanked with a switch from a tree, primarily for misbehaving at school. Switches were also used on Shell's Keeth (from the family's peach tree) and Alliant's Davis (from a tree/bush in the backyard that could be easily stripped of leaves). Keeth says in the book that her father spanked her and her siblings "in a loving way."

Tahmincioglu says she spansks her children, 4 and 6, on rare occasions and has felt less guilty about it since researching her book. "One night, my son was being a bear, and I told my husband, 'Hit him. The CEOs got spanked.'"

She said she did not ask every CEO about their spankings, but among those who answered the question, it was unanimous. None said there was a direct correlation between spanking and success. "But they respected authority. It wasn't a joke to them. They feared their parents but loved them as well. Their parents would follow through with a spanking. Today, there is no follow-through," Tahmincioglu said.

Spanked female executives include Keeth; Nancy McKinstry, the American CEO of giant Dutch publisher Wolters Kluwer; and Wal-Mart (WMT) Chief Information Officer Linda Dillman.

Nick Turner, the 33-year-old chief financial officer of executive recruiter Kaye/Bassman International, says his sister rarely got spanked, while he and his four brothers got the belt so regularly that, "by today's standards, it would be over the top."

Turner says he never went an entire month without a spanking, and he often got them on consecutive days. "Dad raised the boys, and Mom raised the girls," he says. "You were expected to say, 'Yes, ma'am' and 'Yes, sir.' You eat at 5:30, and you don't eat with your fingers. You knew if you didn't mow the yard right away or chop wood or feed horses, you were going to get a spanking, period."

Turner gives credit to corporal punishment for his success. He says he wasn't a bad or malicious child, but he was difficult and needed to learn self-discipline and to focus on a goal. "I certainly wouldn't have done that if I had grown up with Mary Poppins."

He meets many top executives in his job as an executive recruiter and estimates that 90% or more got spankings. Colleagues at Kaye/Bassman had "crazy discipline" much like his own, and they turned out to be "stable, focused, competitive guys," Turner says.

If that's the case, it happened despite the punishment, not because of it, says Straus, who gave a presentation on corporal punishment last month in Brazil, a country where 19% agree that a good, hard spanking is sometimes

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necessary vs. 55% in the USA. In Greece, 87% of parents agree, according to Straus. The worldwide median (half are more, half are less) is 52%.

Raju Reddy, the 46-year-old CEO of software company Sierra Atlantic and a native of India who now lives in Fremont, Calif., says spanking is common in Indian homes. But so are grandparents who are on hand to "soften the blow" after a spanking from Mom or Dad.

Reddy declines to discuss the discipline of his own teen children. But typical of CEOs interviewed is Jim Crane, 52, CEO of transportation logistics company EGL ([EAGL](#)), who says he used an infrequent swat to get the attention of his son and daughter, now both in college.

Times are changing. McKinstry says she has never spanked her children.

Moglia has found grounding or taking away some other liberty to be more effective. "They have more time to think about it," Moglia says. "If you get slapped a couple of times, it's over in 30 seconds."

Although children grow too old for spankings, their influence remains for a lifetime. When Haffner graduated from high school, his father insisted that he attend a small college, play football and maintain strict discipline. Instead, Haffner chose to go to the University of Missouri-Columbia, which his father believed to be infested with unsavory influences.

"He threw down the gauntlet," Haffner says. The two didn't speak for a couple of years. "He couldn't whip me anymore. It was because I had to prove my father wrong that I graduated at the top of the engineering class. It was a major contributor to my success. I miss the ol' coot."

Spanking doesn't make them bad parents

Straus says it comes as no surprise that CEOs who were spanked express great affection for their parents. It's not just bad parents who spank.

"So do very good parents," he says. "They would be even better parents if they didn't spank, and their kids would be doing even better."

Sara Blakely may be an exception. She says she was "spanked and spanked often," so much that she would wear all of her days-of-the-week underwear at the same time to soften the blow.

Today, she is the founder and owner of a women's undergarment manufacturer that has passed \$100 million in retail sales this year.

Blakely says she thought of a name for her company while sitting in Atlanta traffic. It's a name that nobody seems to forget.

Spanx.

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