

Tyranny of convenient numbers

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Being intimidated by numbers is troubling enough in a society that views so many issues through a quantitative lens. Even worse, however, is the harm to critical thinking from the numeracy shortcomings that afflict so many Canadians.

Especially journalists.

It's best to admit this failing right up front — journalists are often poor at handling numbers. The reasons are many but the outcome is depressingly predictable. All sorts of nonsense gets into print or on the air, because many reporters and editors check their critical thinking facilities at the door when numbers arrive on the scene.

The failings of journalists are on display every day but lots of Canadians share the problem, as shown by recent international surveys of literacy and numeracy skills. The Adult Literacy and Life Skills Survey, released last year, concluded that half of Canadian adults age 16 to 65 lack the minimum numeracy skills necessary to cope with the everyday demands of an advanced society.

This leaves us vulnerable to "commercial chicanery, financial foolery, medical quackery and numerical terrorism from pressure groups," in the words of A.K. Dewdney, a math professor at the University of Western Ontario and author of a 1993 book on public innumeracy (*200% of Nothing: An Eye-Opening Tour through the Twists and Turns of Math Abuse and Innumeracy*).

Consider how the Harris government in Ontario in the mid-1990s was able temporarily to bamboozle most of the media and the public with claims of a crime wave among the province's youth by using carefully massaged statistics as justification for setting up special boot camps.

The absolute number of crimes committed by those age 12 to 17 had, indeed, been rising. But the number of young people in the province was rising even faster, which meant that the youth crime rate — the number of crimes committed per 1,000 young people — had actually been dropping since 1991.

Solicitor General Bob Runciman sidestepped this inconvenient fact by using Canada-wide statistics and restricting his example to an earlier period from 1986 to 1991, when the rate of youth violent crime had actually soared.

Spotting this deception didn't demand the ability to solve quadratic equations, calculate square roots, or even figure out percentages. It simply required people to use their noggins in a critical fashion. After all, looking at the rate or incidence of some phenomenon is familiar territory. Health officials do it all the time to find out if particular diseases are increasing or decreasing in the general population, or in sub-groups such as the elderly.

Not asking the critical question — such as, is the rate of youth crime increasing, not just the absolute numbers? — is what distinguishes the big concerns from the little ones in the media's uneasy relationship with numbers.

The little concerns constitute the "numeracy mischief" we journalists do to ourselves.

They're the slips people usually notice: repeated confusion between per cent and percentage point, meaningless decimal places, laughable conversions between Imperial and metric measurements, the shoddy and self-serving presentation of public opinion surveys, mixing up millions and billions, and so on.

The big concerns constitute the numeracy mischief inflicted upon the numbers-challenged media. They involve uncritical acceptance of numbers supplied by others, often people pushing an agenda, as Runciman did with that phantom explosion of youth crime.

Among the most blatant instances have been the media's treatment of supposed health dangers from the threat *du jour* (toxins in salmon, silicone breast implants, etc.), the fictional poverty line, gender pay inequities, race and crime, violence against women, drug use in schools, the education gap with other countries, and more.

The media numeracy problem isn't limited to Canada. In the U.S., the Statistical Assessment Service, based in Washington, D.C., operates as a numbers "truth squad," keeping tabs on journalists and politicians. In the U.K., Ben Goldacre's "Bad Science" column in *The Guardian* newspaper regularly exposes numbers malfeasance in the media and names individual reporters.

And it's a big problem. After studying a 150,000-circulation newspaper for three months, journalism professors at the University of North Carolina concluded that "an example of blatant misuse of numbers could be found, on average, in the newspaper every other day."

Or consider the numbers boner perpetrated this summer by *New Scientist*, a weekly magazine in Britain that prides itself on covering science and technology with style and authority. A July 1 article about the global boom in desalination plants reported that the Earth harboured 1,400 million cubic metres of water.

Two weeks later the magazine acknowledged that "we managed to get the quantity of water wrong by a factor of 1 billion. The correct figure is 1,400 cubic kilometres, not cubic metres."

That wasn't the end. After two more weeks, *New Scientist* reported that the correction itself was "missing some zeros" and should have been 1,400 million cubic kilometres. Surveys have found that reporters are well aware of their inadequacies on the numbers front. Many chose their craft because of a fascination with words and often a corresponding aversion to even simple math, such as calculating percentage increases. Overwhelmingly, newsrooms are populated by arts and humanities graduates who spent the four years after high-school math coddled in a numbers-free environment at university. John Brynner, a leading British social-science researcher, has shown that numeracy skills have a half-life of roughly 3.5 years when they're not used.

So many "experienced" journalists 10 years into their craft have lost whatever facility they might have had with numbers. And there's no numerical counterpart to Spell Check on computers.

What there is, however, is a constant demand for numbers in reporting. Numbers make news. How does the city's murder rate now compare to a year ago? What percentage of hospital emergency wards are redirecting ambulances? What is the added health risk from hormone-replacement therapy?

Journalists have a love-hate relationship with numbers. They believe they need them "to add verisimilitude to an otherwise bald and unconvincing narrative," as Gilbert and Sullivan said in *The Mikado*.

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Yet since they aren't really comfortable around numbers, reporters tend to grab the first one handy and quickly hang it on the prose, like an ornament on a Christmas tree. This behaviour leads to the Tyranny of the Convenient Number.

Consider the *Star* story in August last year about a 48-year-old man killed by lightning at a remote campsite in a Killarney wilderness park. The first question any editor would ask is how many people are killed by lightning every year in Canada. So the story quoted a figure of "about 16 people a year" from a website operated by an amateur "storm chaser."

But that number is patently nonsense. It's obvious to anyone who thinks for a few seconds that the number of lightning strikes must vary greatly from year to year depending on thunderstorm frequency and intensity. Equally obvious is that human exposure to dangerous lightning would also be highly variable.

Sure enough, the official number of deaths annually from lightning in Canada, as verified by Statistics Canada, fluctuated widely over the past dozen years from just one in 2002 to a maximum of 11 in 1994. The median was five, a mere third of the website's figure. Such Convenient Numbers abound in our society, often supplied by groups with a vested interest in making some social problem seem large and pressing. Claims about the numbers of Canadians who supposedly suffer from a severe allergy to peanuts rested for years on a meagre research base. And the alarming 940,000 figure often quoted for the number of birds that collide with lit office towers and other artificial structures annually in Toronto is speciously precise for what is basically an extrapolation from whatever proportion can't fly away after colliding and manage to be picked up. All too often the numbers that find their way into print or onto air simply don't make sense. Stephen Lewis was once quoted as saying in a speech that AIDS was killing 300 million people a year. You would think someone would have noticed, since at that rate Africa would long ago have been depopulated. Yet a reporter typed that nonsensical number and an editor read it and it got into all editions of a newspaper. (The correct figure is 3 million.) Or take the chart that appeared in a Toronto-based newspaper (not the *Star*) that compared health resources between Canada and other countries. According to the numbers, Canada has a mere 10.3 CT scanners per 1,000 population, while Japan boasted 92.6. Which would mean one CT scanner for every 10 Japanese. (The correct figure was 92.6 per *million* people.) Yes, mental alarms should have sounded in both cases. Yet as embarrassing as they are, such slips aren't the media's real numbers problem. The true concern is that matters of great public interest are reported poorly, or not reported at all, because of pervasive numbers anxiety in the media. Journalists who aggressively question politicians on policy matters suddenly become silent stenographers when those same public figures start throwing numbers around. Look at the confusing reportage on climate change, a subject founded on numerical modelling and the detection and attribution of statistical trends. Because most reporters don't have the background or the inclination to tackle the numerical underpinnings of climate change, the story becomes transformed into something they do understand: a political controversy.

When the media do handle numbers well, the force of the resulting coverage has the power to change public policy. Remember the recent investigative series by the *Star* and its sister papers about airline safety? The reporters ferreted out elusive numbers, explained them well, and marshalled them as big weapons in the stories. Action followed. Such triumphs are the exception to the generally unsatisfactory handling of numbers in the media. Hand wringing and finger pointing, however, aren't much of a solution. Some media outlets, like the *Star*, already offer numbers workshops for reporters and editors. Many more are needed. Journalism schools are starting to at least try to tackle numbers proficiency but there's plenty of room there for improvement. Perhaps editors could even take the daring step of hiring even half as many new reporters with science or engineering backgrounds as with arts or humanities degrees. After all, in today's quantitative-obsessed society, shouldn't a facility with numbers be considered just as important by the media as the ability to craft a telling metaphor or the familiarity with history required to put current developments into context? The issue goes far beyond how we journalists handle numbers. The poor numeracy of the Canadian public ought to be the real cause for concern, especially the fact that almost no one in authority seems to care, and that otherwise intelligent people offer up the idiotic excuse that they were "never any good at math." All this matters greatly, because we construct the world around us as much with numbers today as with words. Yet people will willingly do battle over the perversion of language by a phrase like "The Coalition of the Willing," because they understand how words can be used to shape reality, but similar flim-flammery with numbers mostly escapes critical scrutiny and thought.

That actually makes numbers more powerful than words, because often they shape reality without many people being any the wiser. As Temple University math professor John Allen Paulos wrote in his book, *A Mathematician Reads the Newspaper*: "Mathematics is not primarily a matter of plugging numbers into formulas and performing rote computations. It is a way of thinking and questioning that may be unfamiliar to many of us, but is available to almost all of us."

Peter Calamai, the Star's national science reporter, conducts regular numbers workshops at the paper. A 1965 science graduate from McMaster University, he is on the board of directors of ABC Canada, a national literacy and numeracy body. He too messes up numbers in reporting.