

Has the US Republican Party lost its connection to what we like and admire about business?

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The states that voted Republican in the 2008 US presidential election tend to be lower in per capita GDP, K-12 education, and public health. What, if any, are the implications?

The statement in italics above will come as a surprise to some and as an outrage to others.

Let me begin my defense of this statement by reviewing three sets of data: per capita GDP data from the "BEA" or US Bureau of Economic Analysis[1], K-12 education scores from the "CofC" or US Chamber of Commerce[2], and public health scores from the "UHF" or United Health Foundation[3].

An overview of Figure 1.

In each of the three graphs of Figure 1, I have ordered the states by their BEA per capita GDP. The states with the highest per capita GDP are on the left, and the states with the lowest per capita GDP are on the right.

The top graph has black circles that show the 2008 BEA per capita GDP data, and superimposed on this data is the best-fitting straight line or "trendline".

The middle graph shows the 2007 CofC K-12 education ranks, and the 2007 UHF public health ranks, along with their trendlines.

The bottom graph shows those states which cast their electoral votes for the Republican candidate in the 2008 presidential election.

The details.

In the top graph, the BEA data shows much higher per capita GDP for the highest-scoring states on the left, than for the lowest scoring states on the right.

For example, we see on average about a \$46,000 per capita GDP for the top quintile of states (DE, CT, NY, MA, NJ, AK, CA, VA, MN and CO), and about a \$28,000 per capita GDP for the bottom quintile of states (KY, ME, ID, AL, OK, SC, MT, AR, WV and MS).

In other words, if per capita GDP is proportional to economic productivity, the populations in the top per capita GDP states are able to be about 1.5 times as productive economically as those in the bottom per capita GDP states, for whatever reasons.

In the middle graph, the black circles show the rank of each state according to the 2007 CofC K-12 education data. Of course, by using ranks, I have hidden the actual data on K-12 education.

So Figure 2 has the actual CofC data, which shows the K-12 education scores varying by almost a factor of three, from 144% of the national average for number 1, Massachusetts, to 56% of the national average for number 50, Mississippi. For this paper, we will forget the sad case of Washington, D.C., which is a whole other matter.

Going back to the middle graph of Figure 1, the red squares show the rank of the states according to the 2007 UHF public health scores. Here again, the use of ranks hides the actual data on public health.

So Figure 3 has the actual NHF data, as graphed by Time magazine.[4] This data shows a huge variation in scores too.

Now, I have not investigated the meaning of a positive public health score, a score of zero or a negative score.

But I can see that some states, like Vermont, score way above the national average, while other states, like Mississippi, score an equivalent amount below the national average. So my point is simply that, whatever the numbers mean, there is large variation.

And I have attached both the raw data and my rank data as Appendix 1. So please feel free to check my results and let me know if you find any mistakes.

Having reviewed the raw data for the middle graph of Figure 1, it is time for me to say why I used ranks in this graph.

The data in the middle graph are the ranks of education and public health scores. My goal in using ranks was to be able to question the data visually as well as statistically.

Question 1: do the education and public health scores go up and down together?

Visually, the answer in general seems to be "yes", although there are exceptions like Hawaii (HI), where the health score is high although the education score is low.

Here is a more technical version of this question: is there a significant difference between the ranks for education and the ranks for public health?

The answer to this technical question is "no". If we establish as our hypothesis that there is no difference between the rank of education and the rank of public health for each state, then our data does not allow that hypothesis to be rejected.

Specifically, a Wilcoxon test on these rank data says the null hypothesis, that there is no difference between the rank of education and the rank of public health for each state, cannot be rejected ($p(z) = 0.68$, two-tailed).[5] See my Wilcoxon calculation in Appendix 2.

The fact that the black trendline for education and the red trendline for public health are so close to one another reinforces the suggestion that these two sets of data are not significantly different.

Of course, it is important to have the Wilcoxon result as well as the trendlines, because data that goes up then down, like " \wedge ", and data that goes down then up, like " \vee ", can have the same trendline but be the opposite of one another.

Question 2: do the education and public health scores go down as per capita GDP goes down?

Visually, the answer to this second question is "yes". The trendlines are high on the left and low on the right, for per capita GDP in the top graph, and for both education and public health in the middle graph.

It is true that the variance about the trendlines is higher in the middle graph, but the means in the middle graph do go down, from a rank of about 17 in the left-most quintile to a rank of about 33 in the right-most quintile.

Also, variance about a trendline does not indicate that a trend does not exist, it just suggests that other variables may be in play, in addition to the variable that shows the trend. Dave Keeling's global-warming data is a good example of this.[6]

Note that these graphs do not tell us about causality. They do not tell us why the states on the left have the higher per capita GDP, and they do not tell us why education or public health scores tend to be higher in these same states.

We can of course ask questions about causality:

Can natural resources make per capita GDP high even where education and public health scores are low? Oil-rich Alaska may be an example.

Can better health lead to better education? Better health before elementary school may be an example.

Can better education lead to better health? In adult life, better life-style choices by more educated people may be an example.

We can ask such questions, but these graphs do not tell us the answers.

Question 3: does the probability that a state voted Republican in the 2008 US presidential election increase, as per capita GDP, education and public health scores decrease?

Now we get to the electoral vote data[7] in the bottom graph of Figure 1. I must say that this data was a surprise to me.

In this bottom graph, the number of states voting Republican shows a clear trend from fewer states on the left to more states on the right.

Only one of the 10 states with the highest per capita GDP voted Republican in the 2008 US presidential election, while nine of the 10 states with the lowest per capita GDP voted Republican. The counts by quintile are 1, 3, 5, 4 and 9, almost a monotonic trend.

So, combining the data from the top, middle and bottom graphs of Figure 1, the answer to my third question is "yes":

As per capita GDP decreases, the probability of voting Republican increased. As education and public health scores decrease, the probability of voting Republican increased.

Is this your Doktorvater's Republican Party?

If the Republican party describes itself as a party of business, does that mean that business should now be associated with low per capita GDP, low education and low public health?

If business solutions, private-sector solutions, are presented as an alternative to solutions that rely on the public sector, does that mean that business solutions should now be associated with low per capita GDP, low education and low public health?

I believe these questions would come as a shock to my late thesis advisor, Dr. Franklin Cooper.[8] Frank was an MIT-trained physicist, and a Republican.

In the late 1960's, when some academic researchers at Sweden's Royal Institute of Technology left their Institute to create a company to make speech devices, some American academic researchers were dismayed:

There were still many research questions to answer about speech, so why were these Swedish colleagues selling out when basic research was not done? For the money?

But Frank was not dismayed. He was in charge of Haskins Laboratories in New Haven and he understood that you had to do more than take public research money forever and never produce a result that the public can use.

Frank did not join the hypocrisy of persons who were disparaging business while at the same time demanding for themselves, as consumers, effective and attractive products, that are safe, with competently written and detailed user's guides, training if desired, a warranty, updates, and, oh, by the way, a good price.

So even though Frank competed with these Swedes on research questions, and had built over the years many speech devices himself, he bought one of the Swedish company's synthesizers for the advantages it offered, and installed it in his not-for-profit, US-government supported, research lab.[9]

And when people of impeccable reputation and qualifications were needed to review another Republican, US President Richard Nixon, Frank accepted to become a member of a panel of acoustics experts, and to investigate what was said to be a single audio erasure, a whole 18 minute gap in a presidential recording. [10]

Engineer David Zeichner and I tested various tape recorders at Frank's lab, looking for any signature that their record, erase and other actuators might leave on an audio tape.

I remember when Frank returned from one of the last meetings of the panel, shaking his head. He did not tell us what he had learned about the president at that meeting, but it seemed shameful, because Frank's opinion had become "He'll have to leave office."

Frank was a Republican living in high per-capita GDP Connecticut, with a good education and good health. He lived to be 91.

If Frank was ashamed of 18 minutes of missing presidential audio, what would he have thought of the report of 473 days of emails missing from our most recent Republican White House?[11]

What, if any, are the implications of these findings?

So, maybe our take-away message from Figure 1 is not that business or business solutions should now be associated with low per capita GDP, low education and low public health.

Maybe our take-away message is that we can not associate today's Republican Party with the things that we like about, and want from, business.

In February, former Republican presidential candidate Mike Huckabee wrote, while blogging on behalf of Americans: "Congress must think we're stupid".[12]

Well, I think Figure 1 suggests that today's Republican voters may tend to be economically less productive, under-educated, and in relatively poor health. That is shocking enough.

But I do not think that today's Republican voters are stupid. I think an attitude like that could get me into a lot of trouble!

Which means, given the recent and on-going economic crisis, that I expect Republican voters, like the rest of the American public, to ask: how strong is the connection between today's Republican Party and what we like and admire about business?

Of course, whatever the answer is to that question, it is another question whether states that voted Republican in 2008 would help themselves more, by voting for some other party in the future...

References:

- [1] http://bea.gov/newsreleases/regional/gdp_state/2008/pdf/gsp0608.pdf
- [2] <http://www.uschamber.com/icw/reportcard/default>
- [3] <http://www.americashealthrankings.org/2008/reportdownload.html>
- [4] Time magazine, November 19, 2007.
- [5] Siegel, Sidney. 1956. Nonparametric Statistics for the behavioral sciences. New York. McGraw-Hill, pp 75-82.
- [6] <http://www.aip.org/history/climate/Kfunds.htm>
- [7] <http://www.npr.org/news/specials/election2008/2008-election-map.html>
- [8] http://en.wikipedia.org/wiki/Franklin_S._Cooper
- [9] <http://www.cs.indiana.edu/rhythmsp/ASA/partA.html>
- [10] <http://www.aes.org/aeshc/docs/forensic.audio/watergate.tapes.introduction.html>
- [11] http://rawstory.com/news/2007/White_House_no_email_archived_on_0118.html
5nov10 update:
http://web.archive.org/web/20080423022429/rawstory.com/news/2007/White_House_no_email_archived_on_0118.html
- [12] <http://blogs.myspace.com/index.cfm?fuseaction=blog.viewcustom&friendId=147698148&blogId=468272880&swapped=true>

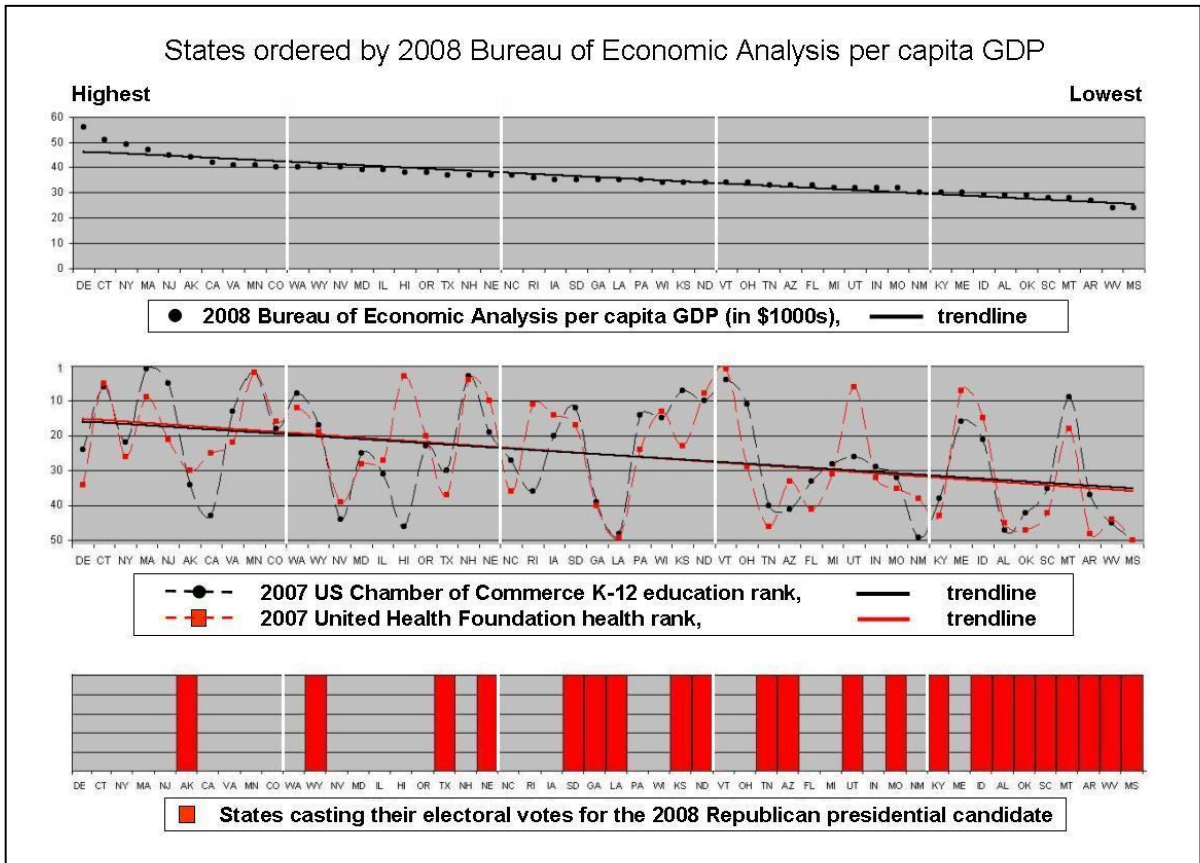


Figure 1: States ordered by 2008 Bureau of Economic Analysis per capita GDP. See larger, landscape view below.

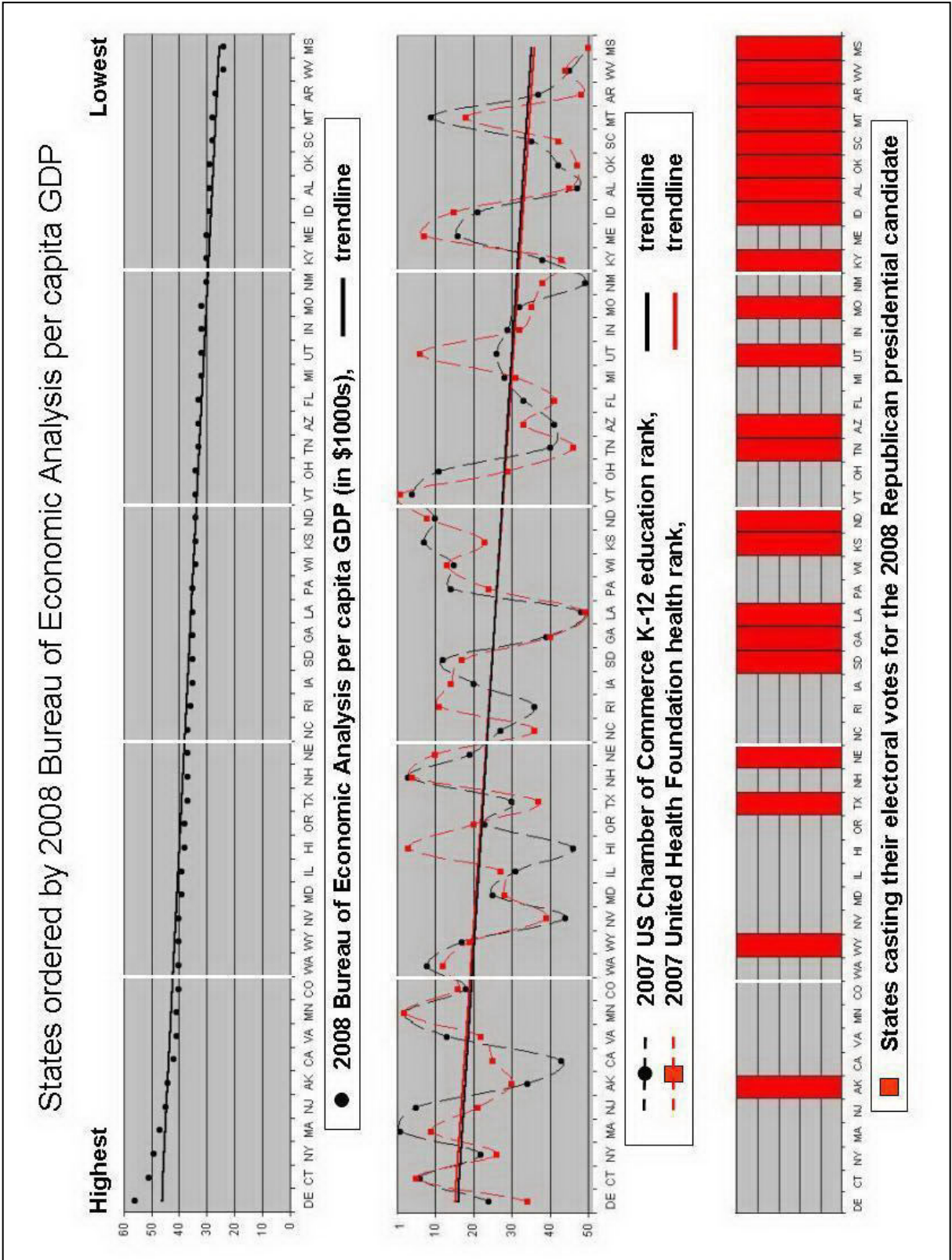


Figure 1 (landscape): States ordered by 2008 Bureau of Economic Analysis per capita GDP

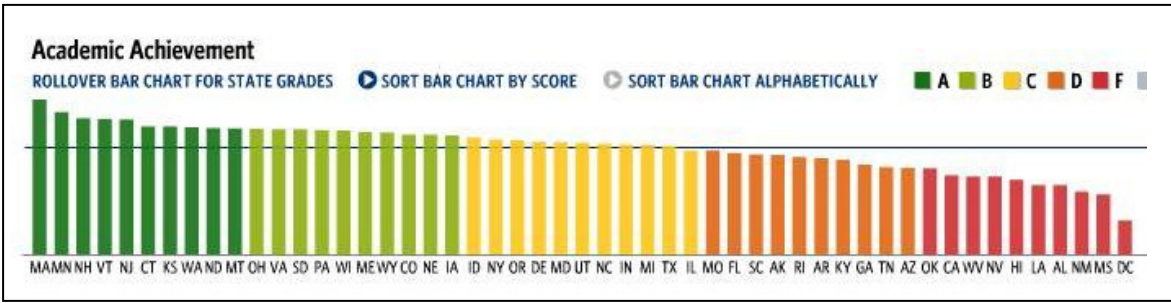


Figure 2: 2007 K-12 academic achievement by US states. The horizontal line is the US national average. Source: US Chamber of Commerce[2]

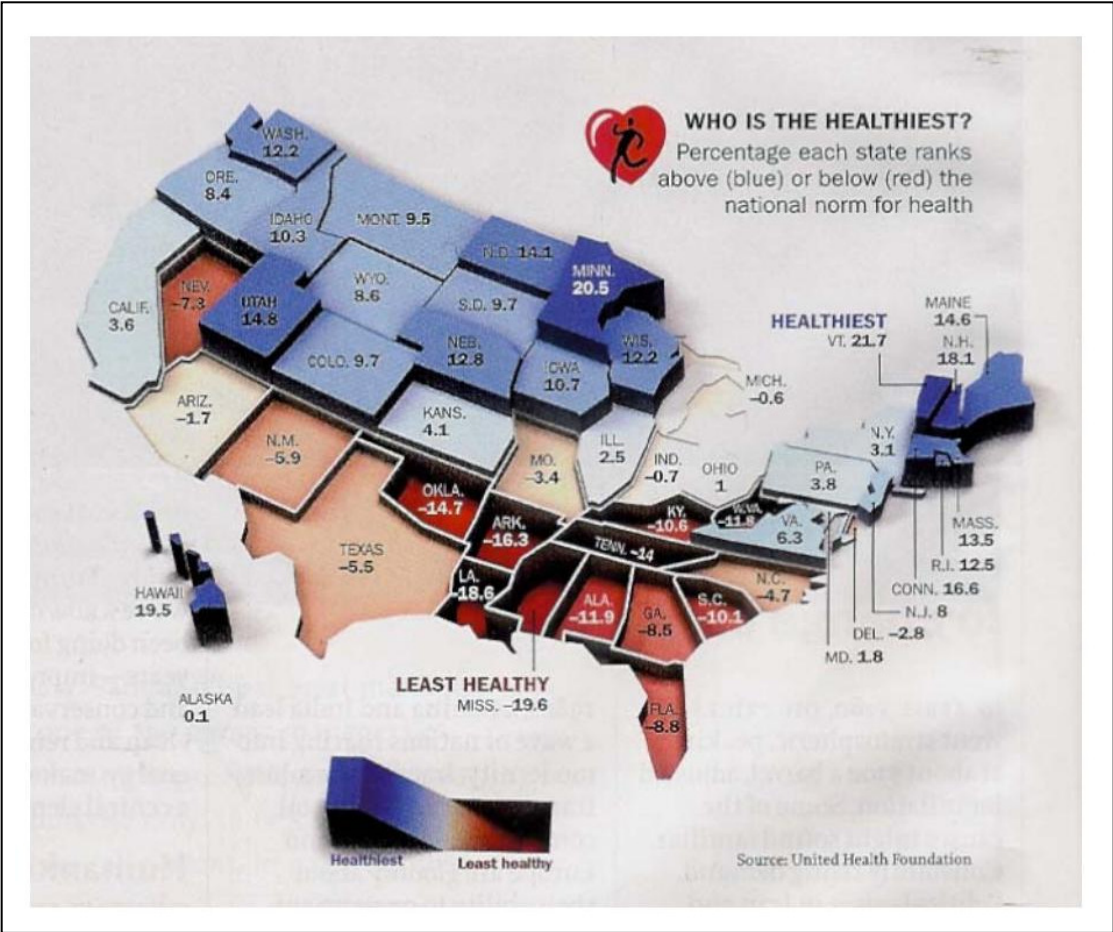


Figure 3: 2007 public health scores by US states, as graphed by Time magazine. Source: United Health Foundation.[3,4]

K-12 EDUCATION		PUBLIC HEALTH		per capita GDP		State	EVotes
Rank	Score	Rank	Score	Rank	2007\$		
24:	105	34:	-28	1:	56496	DE	
6:	119	5:	166	2:	51911	CT	
22:	107	26:	31	3:	49038	NY	
1:	144	9:	135	4:	47351	MA	
5:	125	21:	80	5:	45052	NJ	
34:	93	30:	1	6:	44807	AK	R
43:	74	25:	36	7:	42376	CA	
13:	116	22:	63	8:	41617	VA	
2:	132	2:	205	9:	41353	MN	
18:	112	16:	97	10:	40805	CO	
8:	118	12:	122	11:	40361	WA	
17:	113	19:	86	12:	40303	WY	R
44:	73	39:	-73	13:	40210	NV	
25:	104	28:	18	14:	39596	MD	
31:	97	27:	25	15:	39568	IL	
46:	70	3:	195	16:	38850	HI	
23:	106	20:	84	17:	38339	OR	
30:	100	37:	-55	18:	37793	TX	R
3:	127	4:	181	19:	37375	NH	
19:	111	10:	128	20:	37075	NE	R
27:	102	36:	-47	21:	37053	NC	
36:	91	11:	125	22:	36543	RI	
20:	110	14:	107	23:	35814	IA	
12:	116	17:	97	24:	35596	SD	R
39:	84	40:	-85	25:	35265	GA	R
48:	64	49:	-186	26:	35181	LA	R
14:	115	24:	38	27:	35153	PA	
15:	115	13:	122	28:	34890	WI	
7:	119	23:	41	29:	34770	KS	R
10:	117	8:	141	30:	34694	ND	R
4:	126	1:	217	31:	34197	VT	
11:	117	29:	10	32:	34040	OH	
40:	82	46:	-140	33:	33742	TN	R
41:	81	33:	-17	34:	33655	AZ	R
33:	94	41:	-88	35:	33417	FL	
28:	101	31:	-6	36:	32846	MI	
26:	103	6:	148	37:	32774	UT	R
29:	101	32:	-7	38:	32724	IN	
32:	97	35:	-34	39:	32590	MO	R
49:	58	38:	-59	40:	30943	NM	
38:	88	43:	-106	41:	30364	KY	R
16:	114	7:	146	42:	30282	ME	
21:	109	15:	103	43:	29843	ID	R
47:	64	45:	-119	44:	29603	AL	R
42:	80	47:	-147	45:	29470	OK	R
35:	93	42:	-101	46:	28894	SC	R
9:	117	18:	95	47:	28201	MT	R
37:	90	48:	-163	48:	27781	AR	R
45:	73	44:	-118	49:	24929	WV	R
50:	56	50:	-196	50:	24477	MS	R

Appendix 1. Raw data and ranks for K-12 education, public health, and per capita GDP, plus 2008 electoral college vote for 50 states. Details in the text.

State	RANKINGS		d	#	Rank w less	
	GRADES	HEALTH			Rank(d)	frequent sign
MN	2	2	0	1	1.5	1.5
MS	50	50	0	2	1.5	1.5
CT	6	5	1	3	5	5
NH	3	4	-1	4	5	
GA	39	40	-1	5	5	
LA	48	49	-1	6	5	
WV	45	44	1	7	5	5
CO	18	16	2	8	10	10
WY	17	19	-2	9	10	
WI	15	13	2	10	10	10
ND	10	8	2	11	10	10
AL	47	45	2	12	10	10
MD	25	28	-3	13	15.5	
OR	23	20	3	14	15.5	15.5
VT	4	1	3	15	15.5	15.5
MI	28	31	-3	16	15.5	
IN	29	32	-3	17	15.5	
MO	32	35	-3	18	15.5	
NY	22	26	-4	19	20.5	
AK	34	30	4	20	20.5	20.5
WA	8	12	-4	21	20.5	
IL	31	27	4	22	20.5	20.5
NV	44	39	5	23	24.5	24.5
SD	12	17	-5	24	24.5	
KY	38	43	-5	25	24.5	
OK	42	47	-5	26	24.5	
IA	20	14	6	27	28	28
TN	40	46	-6	28	28	
ID	21	15	6	29	28	28
TX	30	37	-7	30	30.5	
SC	35	42	-7	31	30.5	
MA	1	9	-8	32	33	
AZ	41	33	8	33	33	33
FL	33	41	-8	34	33	
VA	13	22	-9	35	37	
NE	19	10	9	36	37	37
NC	27	36	-9	37	37	
ME	16	7	9	38	37	37
MT	9	18	-9	39	37	
DE	24	34	-10	40	40.5	
PA	14	24	-10	41	40.5	
NM	49	38	11	42	42.5	42.5
AR	37	48	-11	43	42.5	
NJ	5	21	-16	44	44.5	
KS	7	23	-16	45	44.5	
CA	43	25	18	46	46.5	46.5
OH	11	29	-18	47	46.5	
UT	26	6	20	48	48	48
RI	36	11	25	49	49	49
HI	46	3	43	50	50	50

Smaller sum of like-signed ranks, $T = 548.5$

**Appendix 2, part 1 Wilcoxon test on K-12 education rank and public health rank.
More details in the text and below.**

Two d's were 0 so $N = 48$.

N > 25 so compute z from:

$$T = \frac{N(N+1)}{4}$$
$$z = \frac{T - \frac{N(N+1)(2N+1)}{24}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$
$$z = \frac{548.5 - \frac{48(48+1)}{4}}{\sqrt{\frac{48(48+1)(2 \cdot 48 + 1)}{24}}}$$
$$z = \frac{-39.5}{97.5}$$
$$z = -0.4051 \rightarrow -0.41$$

From Table A (Siegel[5], p247) the one tailed p of

-- z >= 0.41 or
-- z <= -0.41
is .3409.

For a two-tailed test, double the p shown.
So the two-tailed p(z) = 0.6818.

Conclusion: The observed value of z is highly probable, p = 0.68,
under the assumption that there is no difference between the two
treatments.

The null hypothesis, that there is no difference between the two
treatments, is not rejected at e.g. an alpha = 0.05 level.

Appendix 2, part 2. Wilcoxon test on K-12 education rank and public health rank.