

Correspondence

Chocolate habits of Nobel prizewinners

There is a reported correlation between chocolate consumption by different nations and the number of Nobel laureates in their populations (F. H. Messerli *New Engl. J. Med.* 1562–1564; 2012). So what are the chocolate habits of Nobel prizewinners?

We surveyed 23 male winners of the Nobel prize in physics, chemistry, physiology or medicine, and economics. Ten (43%) reported eating chocolate more than twice a week, compared with only 25% of 237 well-educated age- and sex-matched controls ($P=0.05$; see B. A. Golomb *et al. Arch. Intern. Med.* 172, 519–521; 2012). Three proffered that their chocolate consumption had indeed contributed to their Nobel prize, but most disavowed any link. Two attested that they had won the prize in spite of their chocolate habits (see also ‘Nobel laureates on chocolate’ and go.nature.com/copuha).

Some laureates might understate their chocolate consumption to amplify the impression that native prowess led to their prize, producing bias to the null. However,



given favourable chocolate–mortality associations, chocolate aficionados might have survived to get their just desserts.

Another caveat is that the laureates’ responses, like chocolate consumption itself, could be tongue in cheek. **Beatrice A. Golomb*** *University of California, San Diego, California, USA.* bgolomb@ucsd.edu
*On behalf of 14 co-authors (see go.nature.com/b5rz8h for a full list).

Future food: politics plague seed banks

As a former head of the gene bank at the International Center for Tropical Agriculture (CIAT), I feel that Susan McCouch and others underestimate the political problems facing seed banks — particularly with respect to access to new samples (*Nature* 499, 23–24; 2013).

I disagree that the Convention on Biological Diversity “has created significant barriers to the sharing of genetic material”. Most of the banked seed samples that are shared internationally or used by plant breeders are beyond the control of the convention — including those from the institutes of the Consultative Group on International Agricultural Research (CGIAR) and the US Department of Agriculture.

Neither does the International Treaty on Plant Genetic Resources for Food and Agriculture “now govern access to crop diversity”. The United States, Russia, China, South Africa and 61 other countries have not ratified the treaty.

CGIAR holdings were included in the treaty on the understanding that they would remain freely available subject to a small tax (payable to the Food and Agriculture Organization of the

United Nations for the treaty’s benefit-sharing fund) on patented varieties derived from supplied samples.

The treaty also excludes some important crops, such as soya beans, groundnut, tomatoes, wild cassava, some wild wheat and maize (corn) varieties, sugar cane, oil palm and most fruits and nuts.

In my view, the treaty needs to include many more countries and be much more effective at ensuring access to seed samples, if it is to be a success.

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Future food: use local knowledge

Efforts to mine seed banks and secure future food supplies would benefit from participation by farmers, who could help to develop crop varieties suitable for their own land-management systems (Susan McCouch *et al. Nature* 499, 23–24; 2013).

Farmers usually optimize land usage to supply year-round nutrition, to cater for cultural preferences and ecosystem services, to provide income, reduce labour and avoid economic risk.

Integrating these practices could enhance the success of crop-breeding efforts. In this age of information sharing, even remote farmers could now become directly involved in and take advantage of a globally accessible infrastructure of biodiversity informatics that incorporates local knowledge.

Such a biocultural informatics programme might add expense, but it would ultimately improve the cost-effectiveness of global food security and health.

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COCOA CONNECTION

Nobel laureates on chocolate

“Laureates are handed chocolate replicas of the medal in gold foil at the Nobel ceremony. This must mean that the Nobel Foundation thinks chocolate is important.”

“My wife is a chocoholic but so far has not received the phone call.”

“Chocolate made me who I am today.”

“The correlation could stimulate even greater efforts

to compete with the Swiss, French and Belgians.”

“Your research is poised precisely in the vast space between balanced objectivity and total confusion.”

“I eat a lot of wine gums and biltong in case you are considering snacking in general.”

“I am upping my chocolate consumption to recapture my youthful IQ.”

Supplementary information to: Chocolate habits of Nobel prizewinners

Full list of co-authors to a Correspondence published in Nature **499**, 409 (2013);
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Chocolate Consumption by Nobel Laureates

Favorable brain effects of chocolate extend to antioxidation/antiapoptosis¹, cerebral bloodflow², stroke risk³, cognition (elderly)⁴, and memory (age <50, when much original science takes place)⁵; and ecological data link national per capita Nobel recipients and per capita chocolate consumption.⁶ Do Nobelists themselves have lower, higher, or no different chocolate consumption?

We surveyed Nobel laureates regarding their chocolate consumption in the years of their Nobel-winning work (both absolute consumption and relative to age-sex matched comparators, preferably a chief competitor); how the Nobel altered their chocolate-consuming habits; and whether they attributed their Prize to their chocolate consumption.

23 male Nobelists (Physics, Chemistry, Physiology/Medicine and Economics) completed the survey (91% age>60). More reported eating chocolate somewhat- or much-*more* than their *overall* age-sex matched cohort during years of their Nobel-winning work, vs. somewhat- or much-less (41% vs. 23%). More reported eating chocolate somewhat- or much-*more* than a *specific* matched control (e.g. chief competitor) in years of their Nobel-winning work, than somewhat- or much-less (32% vs. 14%). Winning the Nobel only seldom altered chocolate habits. 42% reported eating chocolate >2x/week in the years of their Nobel-winning work. 42% reported chocolate >2x/week currently. In contrast, just under 25% reported >2x/week chocolate, from the best-matching available comparator sample (237 men age >60, among 1018 generally well-educated San Diego adults⁷), Chi-Squared p=0.05. Most Nobelists acknowledged no relationship between their chocolate consumption and their Nobel Prize. However, 14% credited their chocolate consumption as responsible, partly or completely, for their Nobel. 9% attested their Prize was awarded in spite of their chocolate consumption habits.

Comments by Nobelists, bringing the brightest minds to bear on this important subject, are provided in **Table 1**.

Peace and Literature awardees were excluded, because chocolate is linked to aggression⁸ (relevant to Peace Prize) and depression⁹ (germane to literary achievement¹⁰). Further research is needed, seeking additional suitable controls (such as, IgNobel Prize recipients).

Regarding limitations, Nobelists could understate chocolate consumption to amplify the appearance that native prowess led to their Prize – producing bias to the null. Given favorable chocolate-mortality associations, Prize recipients who ate chocolate may be disproportionately alive to complete the survey¹¹. However, longevity benefits of chocolate may be mediating rather than (merely) confounding -- advantaging Nobel Prize receipt by increasing prospects people will survive to (ahem) get their just desserts.

Sincerely,

Beatrice A. Golomb (nonNobelist, despite diligent chocolate consumption)

Sydney Brenner (Nobel Prize in Physiology or Medicine, 2002)

Martin Chalfie (Nobel Prize in Chemistry, 2008)

Sheldon Lee Glashow (Nobel Prize in Physics, 1979)

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Salk Institute

Columbia University

Harvard University

Roy J. Glauber (Nobel Prize in Physics, 2005)	Harvard University
Paul Greengard (Nobel Prize in Physiology or Medicine, 2000)	Rockefeller University
David J. Gross (Nobel Prize in Physics, 2004)	UC Santa Barbara
David Hunter Hubel (Nobel Prize in Physiology or Medicine, 1981)	Harvard University
Eric S. Maskin (Nobel Prize in Economics, 2007)	Harvard University
Sir Richard Roberts (Nobel Prize in Physiology or Medicine, 1993)	New England Biolabs
Susumu Tonegawa (Nobel Prize in Physiology or Medicine, 1987)	MIT
Frank A. Wilczek (Nobel Prize in Physics, 2004)	MIT
Eric Michael Brown (High school student, nonNobelist, but there is time)	La Jolla High School
Terrence J. Sejnowski (nonNobelist; attributes to shortfalls in chocolate consumption)	Salk Institute; UC San Diego

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Table 1. Nobel Laureate Comments*

Nobel Prize Field of Luminary Commenting	Theme of Luminary Comment	Nobel Laureate Comment
Physics	Pivotal Information	The Nobel Foundation hands out to the Laureates, (in addition to diploma, medal and check), small gold colored tinfoil copies of the medal filled with chocolate. This must mean that they think chocolate is important.
Physiology/Medicine	Nobelists' Spouses' Consumption may Mediate the Ecological Association	My late wife was a chocolate addict – and she did not win a Nobel Prize. I only ate liqueur chocolates occasionally and was more interested in the liquid contents than the outer casing. I do eat a lot of wine gums, liquorice and biltong in case you are also considering confectionery and snacking in general.
Physiology/ Medicine		I can offer you a sure example of a "double dissociation" between Nobel Prize winning and chocolate consumption...I am not particularly fond of chocolate but received a Nobel Prize. My wife is crazy about chocolate and eats it almost every day but so far she has not received the phone call. I hope the theory is correct so that I can enjoy the joy of her receiving this honor in my lifetime.
Physiology/Medicine	Temporality	The reason that my chocolate consumption increased after winning the Nobel Prize was that I no longer was willing to listen to my wife's anti-chocolate tirades
Physiology/ Medicine	Chocolate Preferences of Nobelists	The production of premium chocolate in the USA has improved very much in recent years (perhaps only on the coasts?)...[This] might stimulate still more efforts to compete with the French and the Belgians. In my book the French take the Prize.
Physiology/Medicine		I much prefer milk-chocolate (Toblerone...) to dark chocolate...
Chemistry		Eat and like dark chocolate occasionally preferably with nuts and fruit embedded when it appears on the table
Physics		White chocolate is an obscenity!
Physics	Methodological Plaudits	Who can say a bad word about any research that is poised so precisely in the vast space between balanced objectivity and total confusion?
Physiology/Medicine	Open Minded	This has made me wonder if I might have been more successful had I

		consumed more chocolate.
Chemistry	Credit Sharing	Chocolate made me who I am today.
Physiology/Medicine	Avid Chocolate Experimentation Underway	Having grown up in England after the 2 nd World War when chocolate was rationed I have been trying to make up for many years of abstinence ever since
Physiology/Medicine		I am trying to consume more chocolate every day to recapture my youthful IQ
Economics		Speaking as a (non-recovering) chocoholic myself...
Physics		You discovered my secret vice. I ... will reveal all to the web site.
Chemistry	Expanding the Hypothesis	Not only chocolate should be "blamed" for the Prize, sweets in general (cakes, ice cream, etc) are culprits as well
Physics	Nobel Life Insights	My CV is in desperate need of refreshment. Please sign me up as a coauthor!

* See Expanded Table in online supplement for additional Nobelists' comments, alternative dietary hypotheses, etc.

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