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Information Sources:
An R (2016). Beverage Consumption in Relation to Discretionary Food intake and Diet Quality among US Adults, 2003 to 2012. *Journal of the Academy of Nutrition and Dietetics* 116, 28-37

CHOICE-CHAINS

Does drinking more mean eating more? Or do some drinks make you eat less? These questions of food and drink choice-chains need statistical uncoupling by measuring the gradients of population diet and drink intake patterns over time.

Thank goodness Professor Ruopeng An has both the brains and the stomach to unweave this messy tangle of dietary connections. His excellent analysis of drinks-links is presented in the January issue of *The Journal of the Academy of Nutrition and Dietetics* (An, 2016).

It seems that consumers of diet beverages and sugar-sweetened beverages (SSBs) are different not just in their drinks choices: they also make different food choices. And this is also the case for drinkers of coffee or alcohol. What you drink may couple with what you eat. Of course, coffee-and-cake or beer-and-crisps are matches: drinking coffee with crisps or beer with cake seem bizarre combinations. So would it be reasonable to predict that coffee drinkers consume more cake=sugars and beer-drinkers consume more crisps=salt?

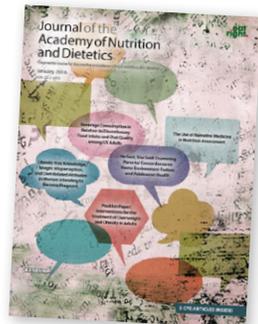
Professor An examined beverage choices of more than 22,500 American adults from data collected from the National Health and Nutrition Examination Survey (NHANES), in the years 2003 to 2012. Two non-consecutive day intakes were assessed to give two-day average scores. What do American adults drink? Most (53%) had coffee, which was twice as likely a choice as tea (26%). SSBs were consumed by 43% of the sample, which was twice as likely a choice as diet beverages (21%). Which was very close to the number who had enjoyed one or more alcoholic drinks (22%). Not included within the score system were drink choices of water or milk in any form, or pure fruit juices. The five beverage types

captured nearly all subjects - only 3%

reported to be consuming none of these drinks over the two days captured. In contrast, less than 1% of thirsty respondents reported to be consuming all of these drinks categories.

The next issue was, if you consumed these beverage types, what were the daily kilocalorie contributions from these choices? Alcoholic drinks (beers, wines, liquors, etc) topped the ratings with more than 380kcal. SSBs also added nearly 300kcal to daily energy intakes. Then much lower down the scale, tea drinks provided nearly 70kcal, and coffee and diet beverages contributed tiny amounts of less than 20kcal. Although tea drinks would be expected to match coffee drinks in the UK diet (so, small amounts of energy contributed by additions of sugar and/or milk), US tea drinking is often iced, sweetened and lemon flavoured, which makes it a more calorific choice than the classic cuppa.

Parallel to data on beverage intake, Professor An assessed intakes of discretionary foods. These are described as energy-dense, nutrient-poor food products that are not listed in the main food groups. They are not a necessary part of the diet, but can add diversity, and may be useful in small amounts by those who are physically active. Alphabetical examples include: cakes, chips, chocolates, cookies, fries, ice cream, muffins, pies, popcorn and





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waffles. There are more than 660 individual foods listed in this category in the NHANES survey form and, of course, most people reported consuming some of these foods over two days: on average, more than 480kcal worth daily.

Professor An also assessed overall diet quality scores using the Healthy Eating Index score (which matches diet intakes with the US national healthy eating guidelines). The average score was just under 50%, but interesting that weekday scores were 10 points better than weekend scores. This is another of many examples of food survey data showing differences in weekday versus weekend patterns, and the need to include weightings for this in the analysis of data.

There were some associations between beverage choices and total daily intakes of energy. Choosing to drink alcohol was again linked to the largest increase in energy intakes by more than 380kcal. SSBs boosted total energy intakes by more than 220kcal per day. Choices of coffee or of diet drinks or tea were linked to energy intakes of just over or 100kcal or less. The most interesting pattern was that choices of alcohol or tea resulted in energy intakes that matched beverage choice. So, for example, people who chose alcohol obtained about 380kcal from this source and total daily energy intakes increased by this amount. In contrast, diet drink or coffee consumers obtained less than 20kcal from their beverage choices and yet their energy intakes increased by 70 and 110kcal respectively. Coffee drinkers appear to consume on average 90kcal

more of other linked foods. Only SSBs showed some substitution effect, so that total energy intakes were slightly lower than those provided directly by SBB consumption.

Looking only at energy intakes specifically from discretionary foods (aka 'junk' foods), coffee-drinking resulted in the largest increase daily of 60kcal. SSBs were linked to 30kcal daily and alcohol drinking had the lowest boost effect at about 20kcal. Intakes of energy from associated discretionary foods seem to be in almost perfect beautiful symmetry to the energy intakes from beverages. So, most kcal but least discretionary food intakes come with alcohol drinking, whereas least kcal but most discretionary food intakes are linked to coffee drinking, followed by diet beverages. The association between greater intakes of diet-beverage and greater kcal intakes from discretionary foods was highest in obese adults.

So, coffee-and-cake seems a stronger match than beer-and-crisps (to put picture to the data). Food and beverage intakes are not a zero-sum game and there are compensation and substitution effects. Professor An concludes that healthy eating promotions need to consider the links between beverage choices and other food choices. But the psychology of choice, so that sacrifices demand the balance of reward and compensation, is often observed ("because my latte is skinny, my flapjack can be chocolate-covered"). These and many other aspects of food choice form the daily basis for the wise and supportive advice given by dietitians every day. And Professor An's research is an excellent contribution to better understanding and supporting those we help.