The Transformative Power of Flavor

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American Spice Trade Association

April 28, 2014

What's on Today's Menu

- **Flavor** as a catalyst for positive dietary change
- **Current science** on culinary **spices and herbs** and their potential to improve health
- Translation of **science to the table** through positive and practical strategies
- Capturing opportunity for **spices and herbs as key** to helping achieve dietary goals and improve overall health

Consumers think of food as a

MEANS OF HEALTH

and part of their

PERSONAL IDENTITY

66% believe that the foods they eat make a statement about their **personal values**

Source: StrategyOne, We Are What We Eat: Personal Values and Social Responsibility, 2010

Positive Nutrition vs. Avoidance

Nearly two-thirds (63%) of adults want to **know what to eat**, instead of what not to eat

Accentuate the Positive?

Source : FMI, Shopping for Health 2011

The Bonus of Plus Instead of Minus

*It appears **more important to increase** the number of healthy foods regularly consumed **than to reduce** the number of less healthy foods regularly consumed.*

Michels & Wolk, International Journal of Epidemiology, 2002.

Health & Wellness

Nutrition and Dietary Therapies

Nutrition and diet play a role. . .

- in 6 of the 10 top leading causes of death
- in 2 of the 3 preventable causes of death
- in a host of chronic and debilitating health conditions and diseases
- to under-nutrition. . . even when overfed
- in promoting healthy weight, wellness, high quality of life, and longevity

Overall, 2.7 million deaths are attributable to low fruit and vegetable intake.

From

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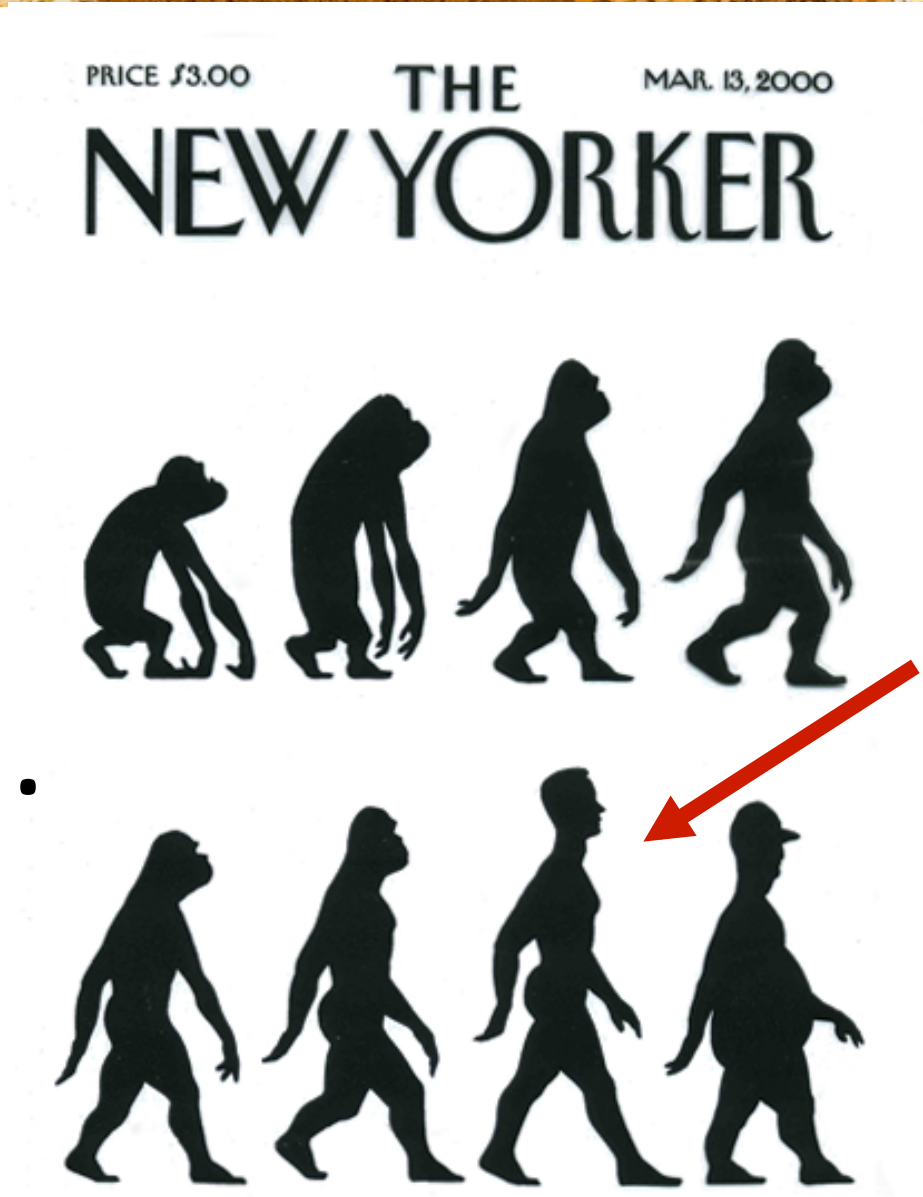
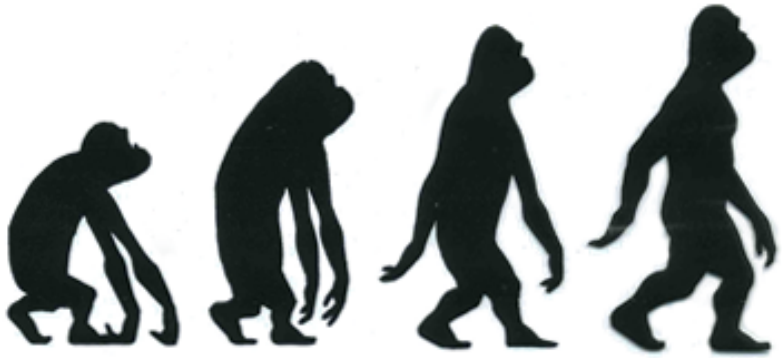


PRICE $3.00 THE NEW YORKER MAR. 13, 2000



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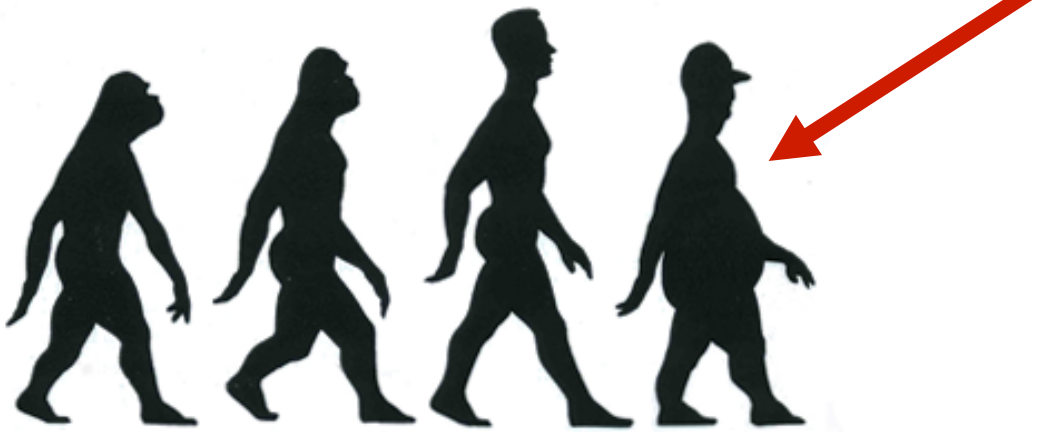

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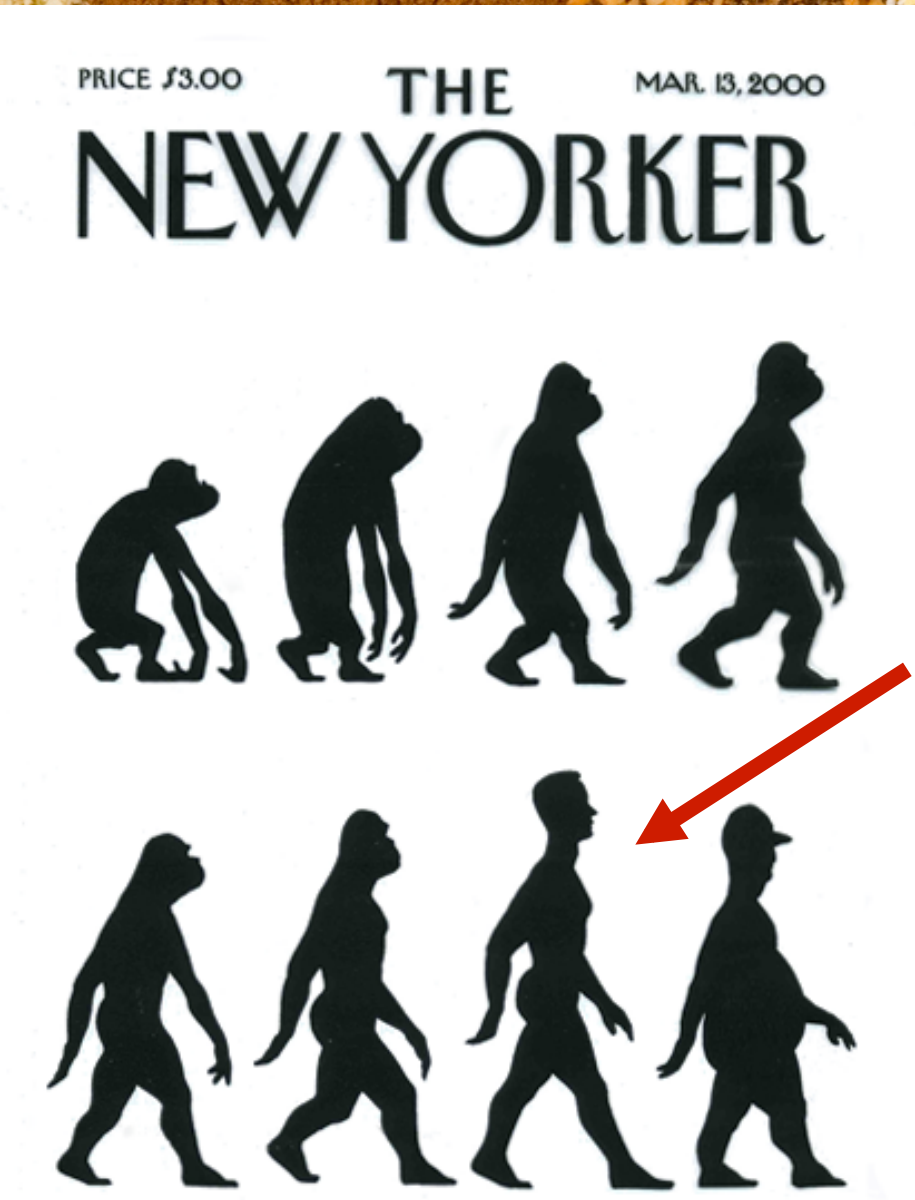
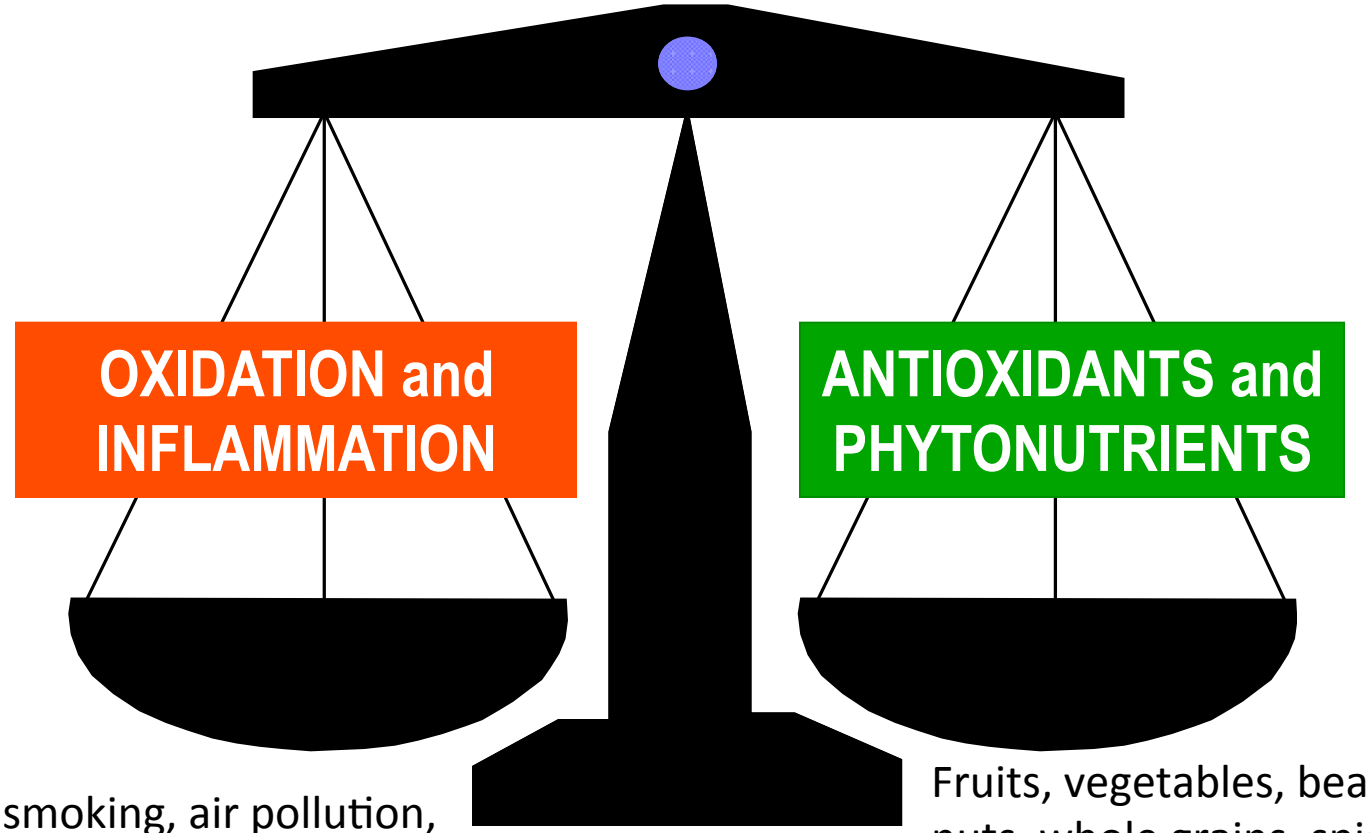


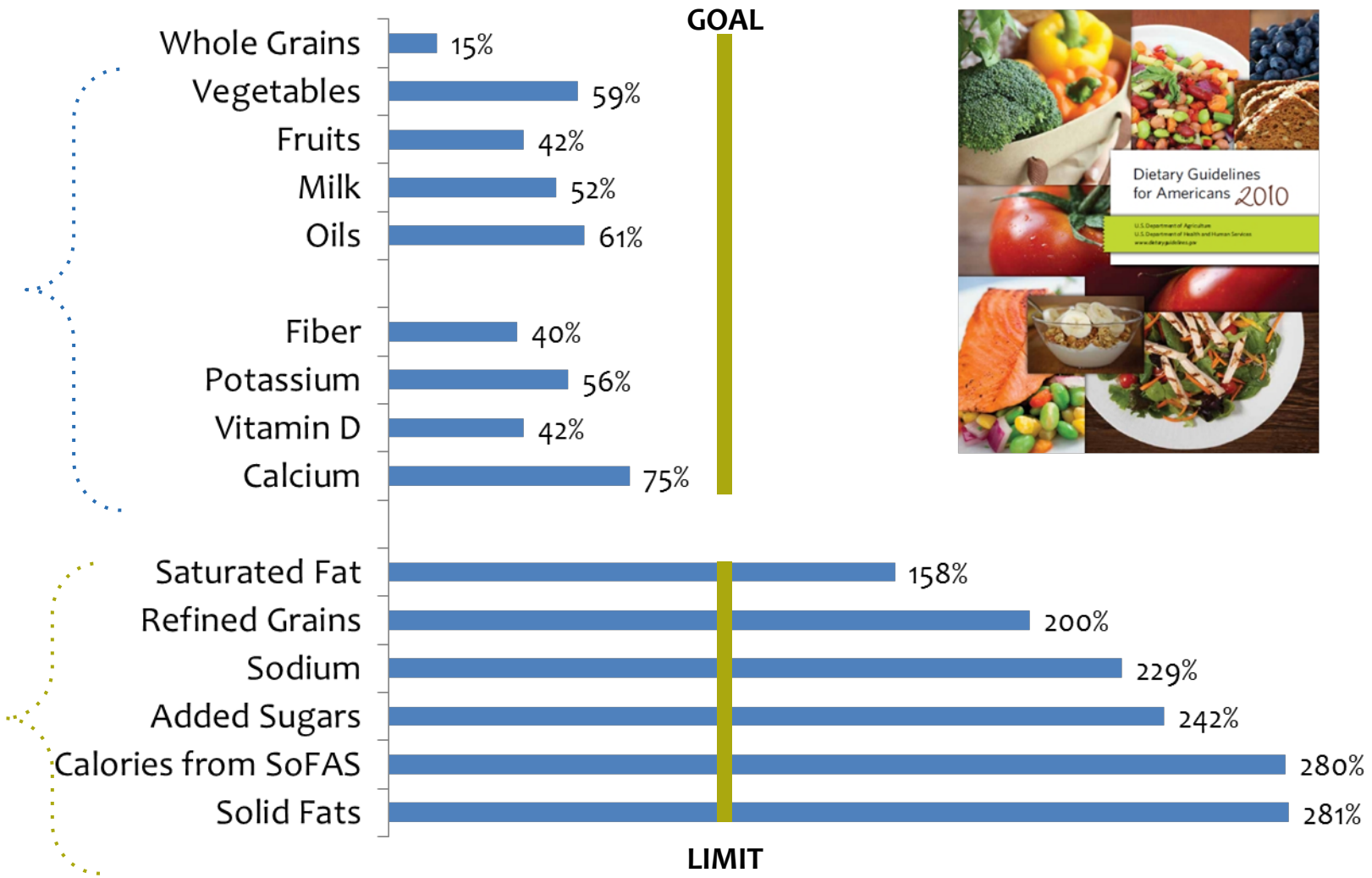
Finding Balance



Sun, smoking, air pollution,
cell turnover, diet and lifestyle, stress

Fruits, vegetables, beans,
nuts, whole grains, spices,
herbs, tea, wine, chocolate

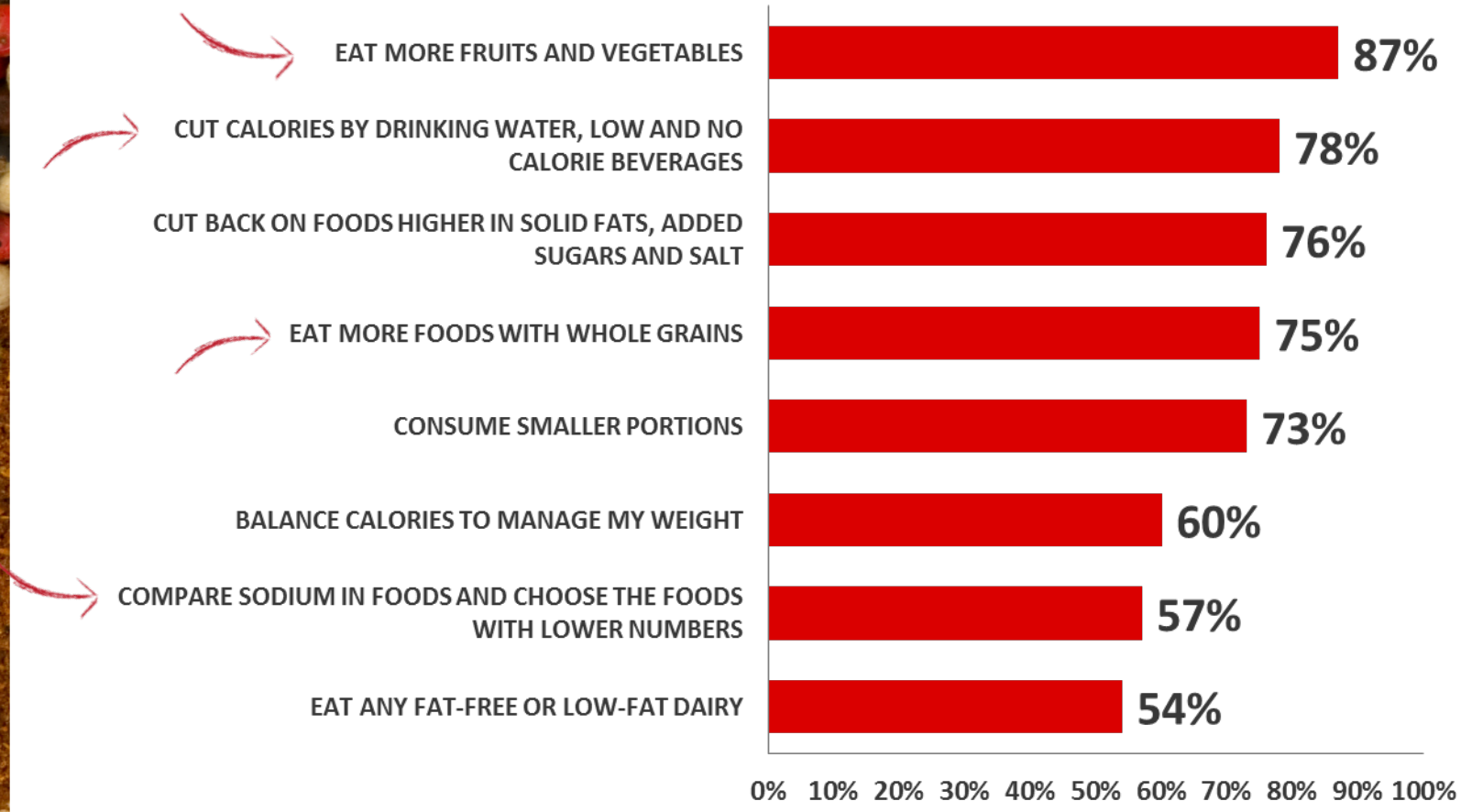
Conflict Exists in the American Diet



SOURCE: 2010 Dietary Guidelines for Americans

People Are Trying to IMPROVE Their EATING HABITS

Over the past year, which of the following, if any, have you made an effort to do?

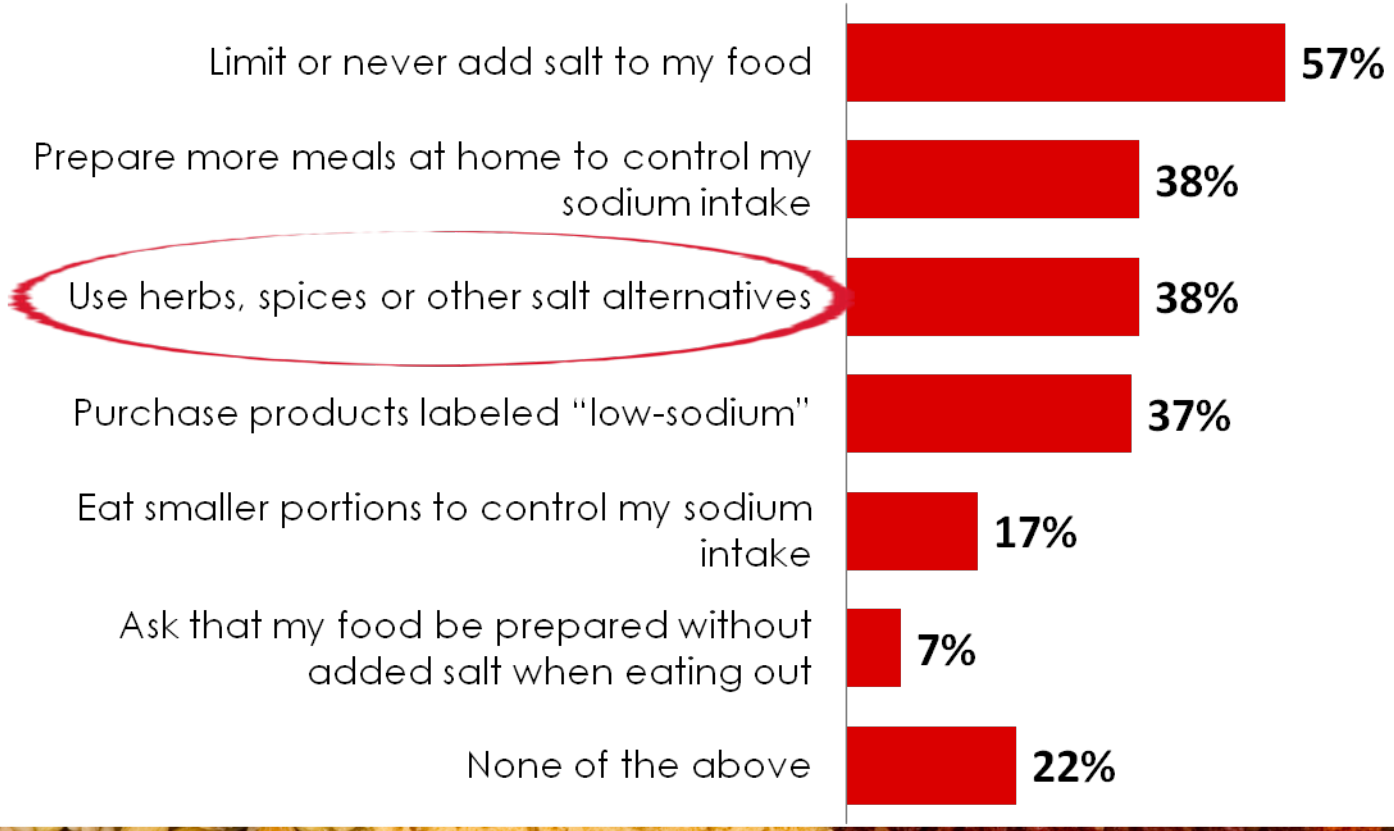


Source: FMI Shopping for Health, 2011; IFIC Food and Health Survey 2013

Sodium Reduction is Top Consumer Concern

8 of 10 Americans have taken some action to limit sodium consumption, including using herbs and spices

Which of the following, if any, do you regularly do regarding your sodium consumption?

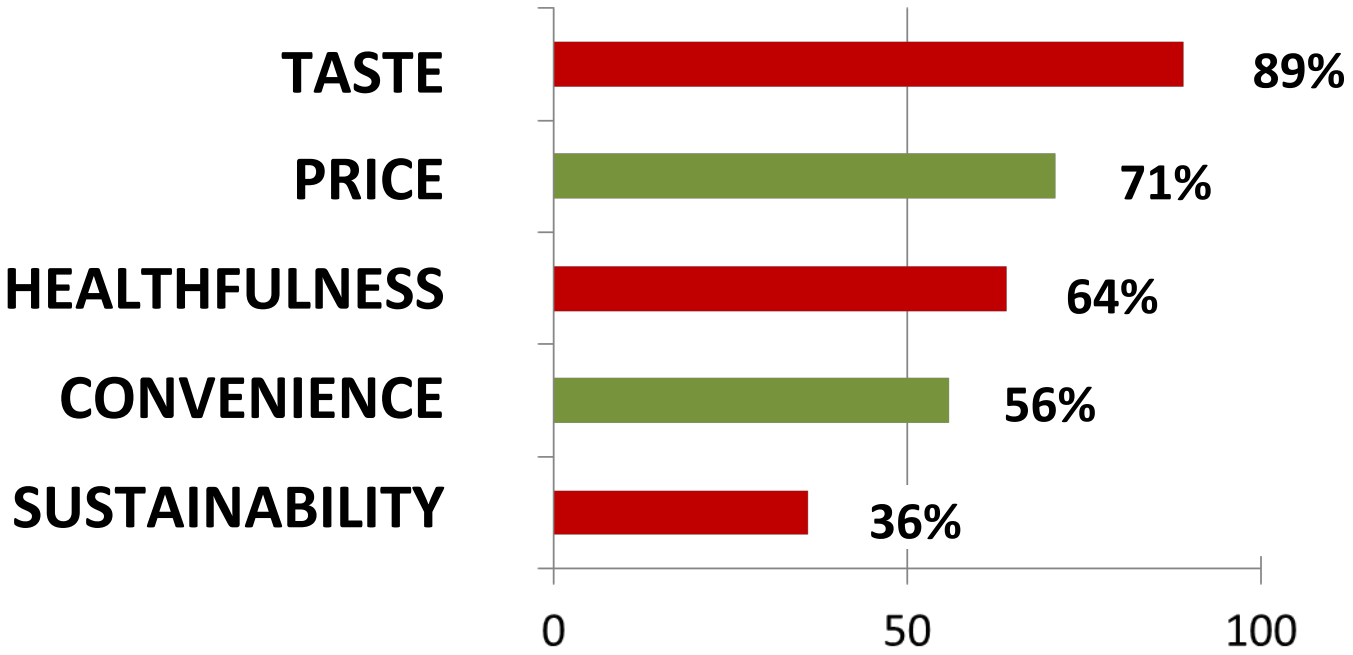


All (n=1,057)

Source: IFIC Food and Health Survey, 2012

Flavor is NOT an Area of Compromise

Taste remains the #1 driver of food decisions…



Source: IFIC Food & Health Survey, 2013

People are Cooking More at Home

90% shoppers believe home-cooking is either "somewhat" or "much" healthier

1 in 3 adults are cooking more at home than they did in 2011

More control, easier to reduce salt, sugar and fat

Sources: U.S. Grocery Shoppers Trends 2011 Report. What, Where, When America Eats Report. IFT 2012; The Gallup study of dinner. Multisponsor Surveys Inc., Princeton, NJ.

Increased Globalization is Raising Awareness and Demand for Authentic, Flavorful and Healthful Food

Globalization

- U.S. flavor preferences are increasingly complex – measured in spices consumed in more than a billion pounds annually
- Ethnic foods are highly seasoned, with spices and herbs key differentiators… and, rising in popularity
- The worldwide "natural" and "clean" movement is driving greater interest in spices and herbs on labels and the origin of foods

Herbs and Spices Have a Long History Linked to Health

"An herb is the friend of physicians and the praise of cooks."

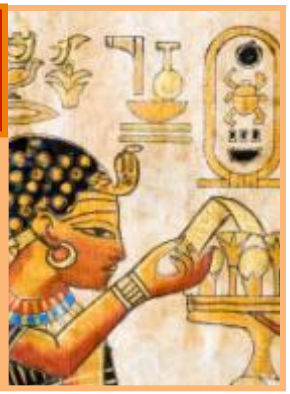
~ Charlemagne
9th Century

Spices And Herbs

Then to Now

Past

In ancient civilizations, spices and herbs were valued for their both culinary and mythical medicinal power



Present

We are experiencing a type of renaissance with modern-day science unveiling new protective properties of spices and herbs

Renewed Interest in the Potential Health Benefits of Spices and Herbs

Metabolism
Clinical and Experimental

Ginger consumption enhances the thermic effect of food and promotes feelings of satiety

Muhammad S. Mansour[a], Yu-Ming Ni[a], Amy L. Roberts[b], Michael Kelleman[b], Arindam RoyChoudhury[c], Marie-Pierre St-Onge[a,b,]*

Journal of the Academy of Nutrition and Dietetics
The premier source for the practice and science of food, nutrition, and dietetics

Cinnamon shown to reduce blood sugar levels after eating

Ashley Magistrelli, MS, RD, LDN; Jo Carol Chezem, PhD, RD

Physiology & Behavior

Spices may impact energy balance

Richard D. Mattes

JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY

Components of black pepper could inhibit adipogenesis

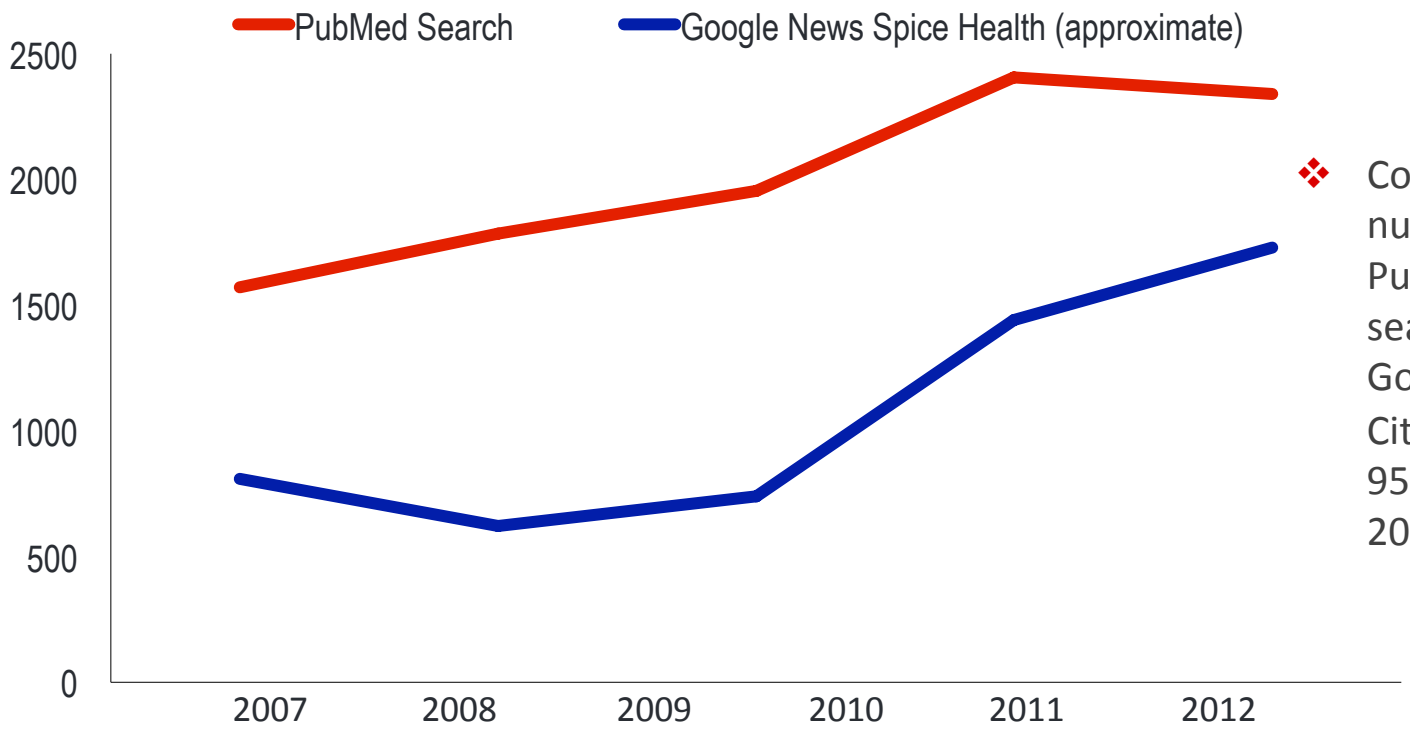
Ui-Hyun Park,[†] Hong-Suk Jeong,[§] Eun-Young Jo,[§] Taesun Park,[#] Seung Kew Yoon,[⊗] Eun-Joo Kim,[⊥] Ji-Cheon Jeong,[*,§] and Soo-Jong Um[*,†]

Influence of Red Pepper Spice and Turmeric on Inflammation and Oxidative Stress Biomarkers

David C. Nieman, Lynn Cialdella-Kam, Amy M. Knab, R. Andrew Shanely

Consumer and Health-Research Interest in Spices & Herbs and Health has Grown Significantly

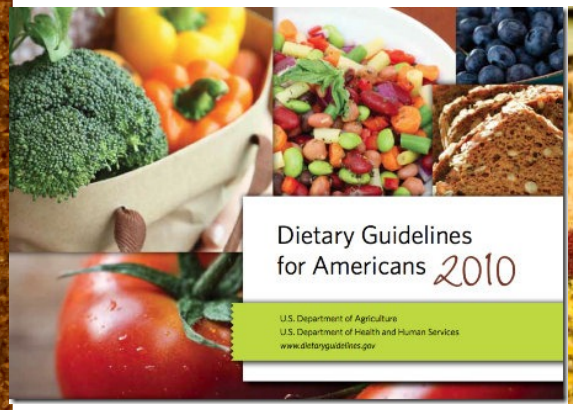
Spice, Herb & Health PubMed Searches and Google Citations by Year: 2007 to 2012



- Combined, the number of PubMed searches and Google Citations is up 95% since 2007

Flavor: the Catalyst for Dietary Change

Demonstrate **flavor's transformative powers** to help make today's dietary guidelines an **enjoyable** and **sustainable habit.**



Could Flavor be the Missing Link?

Can **adding more flavor** to USDA's MyPlate can help make it easier – and more enjoyable – to meet the recommendations outlined in the Dietary Guidelines for Americans?

Spices and Herbs…

Make healthy food taste good

Have no nutritional liabilities

Contain concentrated plant compounds

Nutrition Facts Per 1/2 tsp (1 g)	
Amount	% Daily Value
Calories 0	
Fat 0 g	0 %
Saturated Fat 0 g + Trans Fat 0 g	0 %
Cholesterol 0 mg	0 %
Sodium 0 mg	0 %
Potassium 0 mg	0 %
Carbohydrates 1 g	1 %
Fibre 0 g	0 %
Sugars 0 g	0 %
Protein 0.1 g	0 %
Vitamin A	0 %
Vitamin C	2 %
Calcium	0 %
Iron	0 %

Phytonutrients in Herbs and Spices

Capsaicin

Gingerol

Thymol

Curcumin

Piperine

More than 2000 phytonutrients have been identified in spices and herbs

Anethole

Eugenol

Diallyl disulfide

Rosmarinic acid

4-hydroxyisoleucine

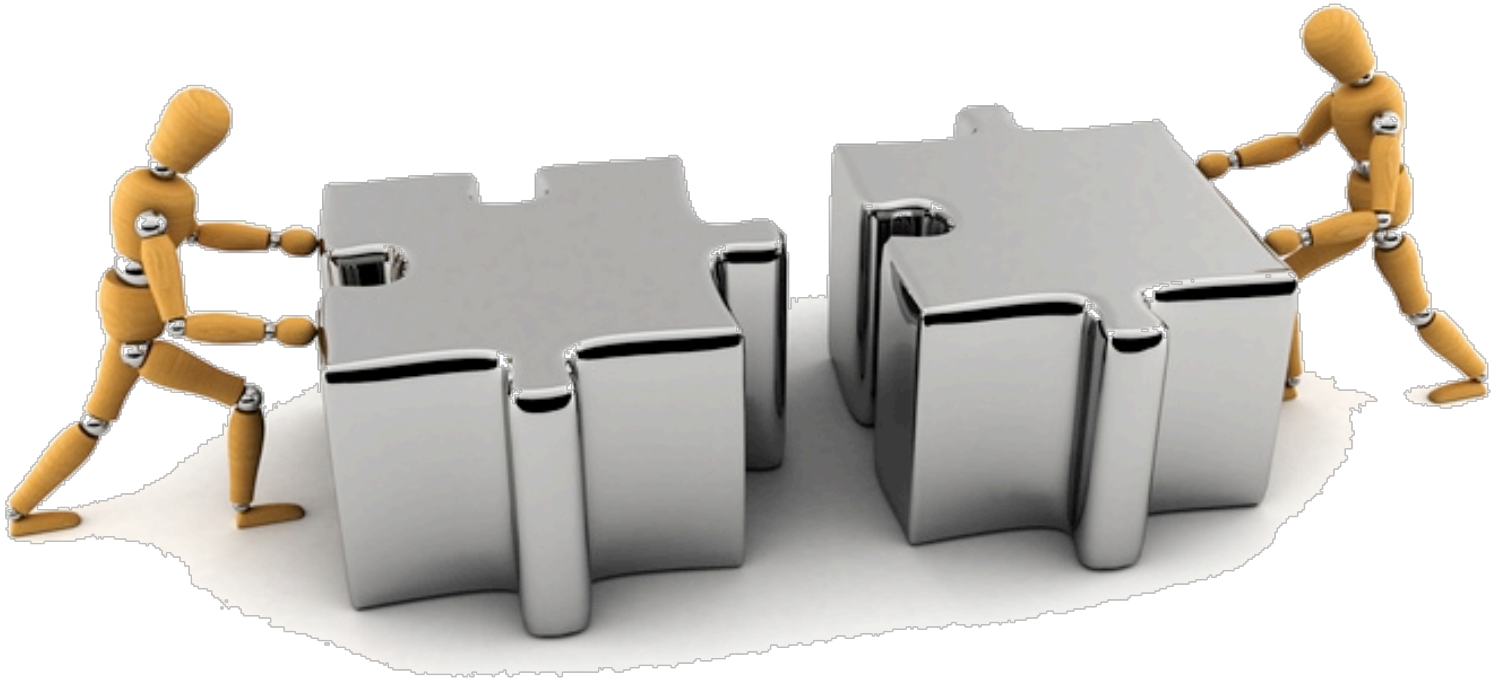
Crocetin

Carnosol

Alpha-terpineol

Benefits of Spices and Herbs

FLAVOR + NUTRITION

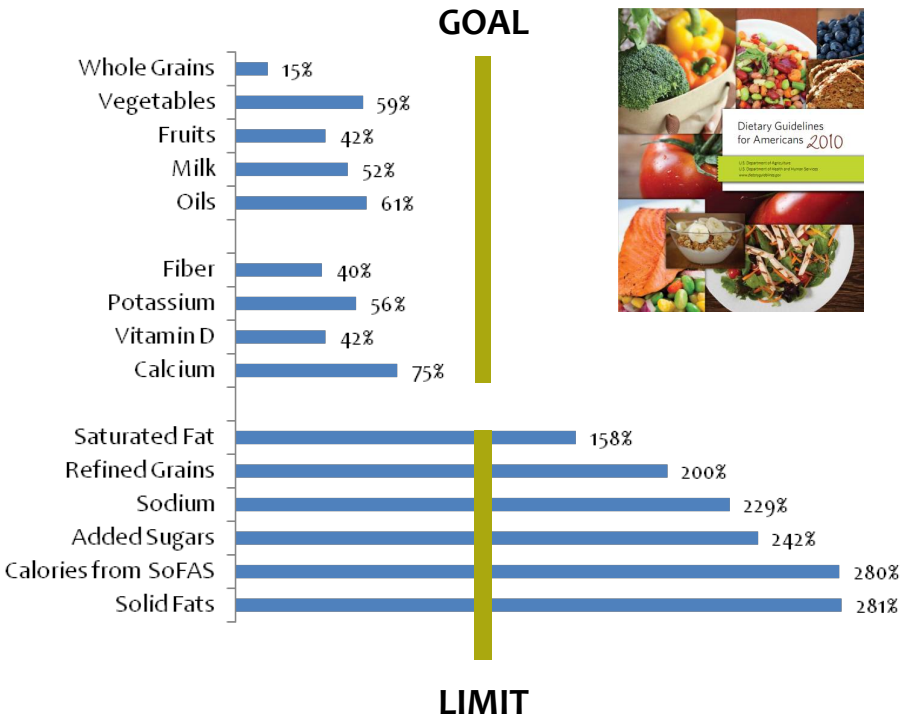


Flavor Can Help Close the Gap

Spices and herbs are a powerful solution to help **close the gap** – eat more of what you need, eat less of what you don't need.

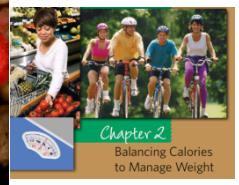
Veggies
Fruits
Whole Grains
Seafood

Salt
Fat
Sugar



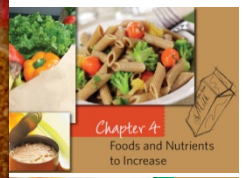
Flavor assists the Dietary Guidelines

Supports all 5 major recommendations

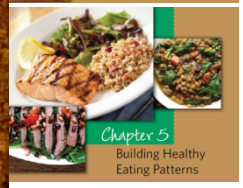


Balancing calories to manage weight → Satiety, energy metabolism and greater appeal of lower-calorie foods

Foods and food components to reduce → Help reduce salt, added sugars, saturated fat



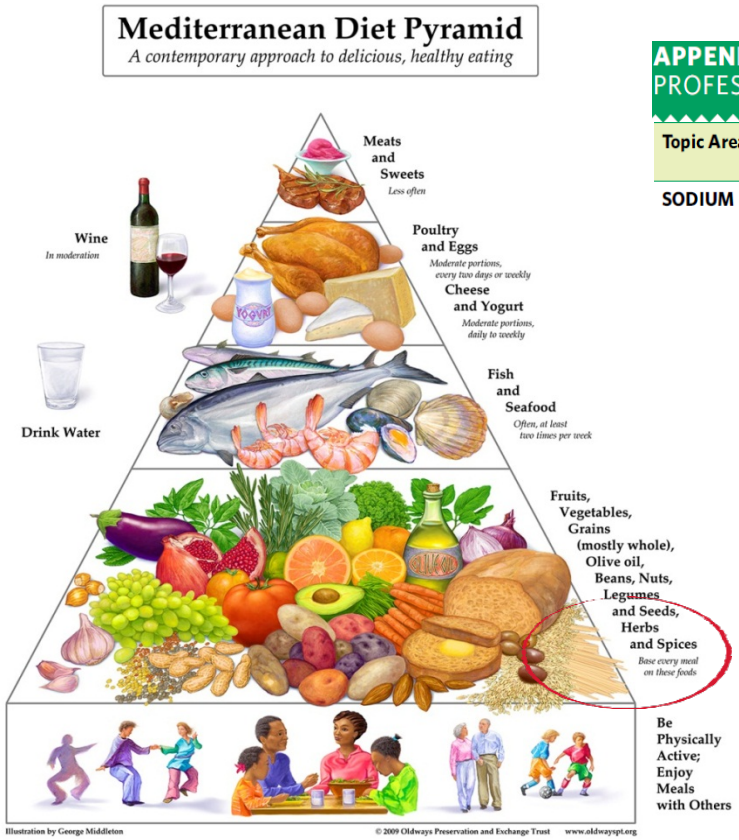
Foods and nutrients to increase → Increases palatability of vegetables, whole grains, seafood



Building healthy eating patterns → Makes it easier to adhere to DASH diet, Mediterranean eating plan and MyPlate

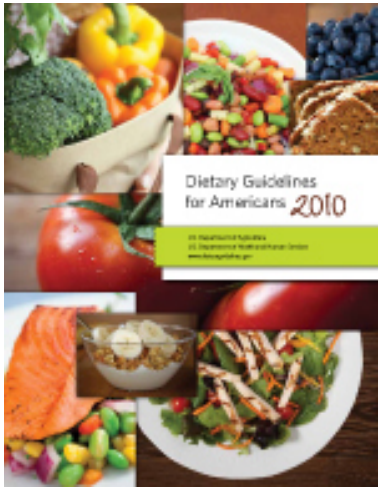
Helping Americans make healthy choices → Improved flavor and cooking more at home to eat healthier

Role of Flavor Beginning to be Recognized



APPENDIX 2. KEY CONSUMER BEHAVIORS AND POTENTIAL STRATEGIES FOR PROFESSIONALS TO USE IN IMPLEMENTING THE 2010 DIETARY GUIDELINES

Topic Area	Key Consumer Behaviors	Potential Strategies
SODIUM	Reduce sodium intake.	Use the Nutrition Facts label to choose foods lower in sodium.
	Choose foods low in sodium and prepare foods with little salt.	When purchasing canned foods, select those labeled as "reduced sodium," "low sodium," or "no salt added." Rinse regular canned foods to remove some sodium. Many packaged foods contain more sodium than their made-from-fresh counterparts.
	Increase potassium intake.	Use little or no salt when cooking or eating. Trade in your salt shaker for the pepper shaker. Spices, herbs, and lemon juice can be used as alternatives to salt to season foods with a variety of flavors.



Herb & Spice Research and Health

From Single Spice Benefits to Enhancing the Total Diet

and Translating the Science to the Table

Research on Herbs and Spices

- **Empirical research dating back centuries**
- **Single herb or spice** research
- **Compounds** – phytonutrients, vitamin/minerals, anti-inflammatory chemicals
- **Mechanisms** – antioxidant, insulin-like, analgesic pathways. . .
- **Physiological response/outcomes** – inflammatory markers, thermoregulation, blood sugar response. . .
- **Herb/spice blends and functions** – production of HCAs, oxidative byproducts; digestive function. . .
- **Herbs and spices in dietary patterns, adherence to specific diets, role in helping meet DGAs** (sodium reduction, increase fruit/vegetable consumption, dietary quality, weight management. . .)

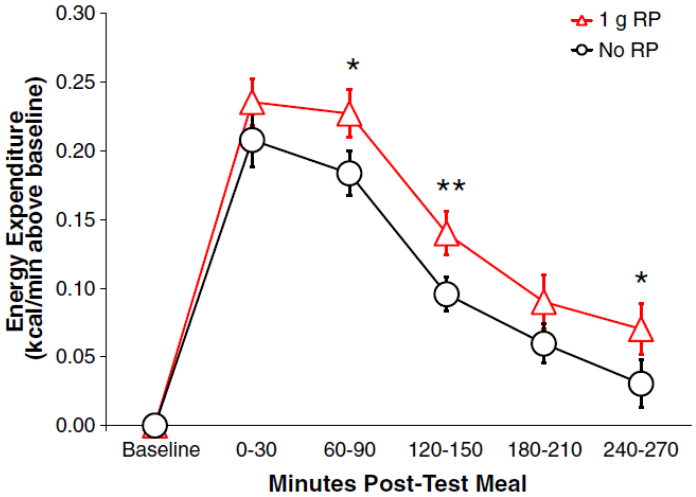
- Red pepper
- Ginger
- Cinnamon
- Herb/Spice Dips to Increase Veggies in Preschoolers
- Herb/Spice blends to reduce fat and calories in meals and sides
- Herb/Spice education and use to reduce sodium and increase diet compliance
- Emerging research

Transformative Power of Flavor – The Science of Herbs and Spices

Capsaicin

Red Pepper and Weight Management

- Powerful compounds in red pepper may play a beneficial role in weight management.
- Red pepper enhanced thermogenesis, fat oxidation, and satiety; decreased desire to eat fatty, salty and sweet foods.



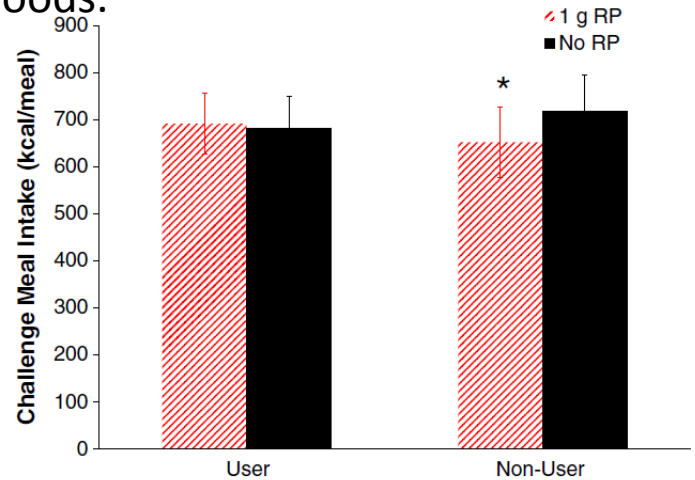


Fig. 6. Mean (±SEM) energy intake at a challenge meal served 270 min after test loads ($n=25$) was lower in non-users after test loads with 1 g RP compared to no RP, but did not vary significantly in users ($p<0.05$). *$p<0.05$.

1 gram red pepper (~ ½ tsp; preferred dose)

PURDUE UNIVERSITY

Source: Ludy and Mattes. Physiology & Behavior. 2011;102:251-258.

Red Pepper and Weight Management

Testing effects on:

- Thermogenesis (metabolism)
- Fat burning
- Satiety / Hunger

Findings:

- Counteracted usual drop in energy expenditure (metabolism) from caloric restriction common to weight reducing diets.
- Increased fat burning.
- Positive impact on satiety.

~1 gram red pepper (½ teaspoon) per meal

2.56 mg capsaicin

Janssens, et al. Appetite. 2014; 77C:46-51, e-pub.

Janssens, et al. PLoS ONE. 2013;8:e7786.

Smeets , et al. The Journal of Nutrition. 2013;143:442-447.

Maastricht University

Red Pepper

Easy Additions:

1) Sprinkle ¼ tsp of ground red pepper (cayenne or paprika) or ¼ teaspoon crushed red pepper to hummus.
2) Sprinkle paprika over deviled eggs, tuna or chicken salad.
3) Shake crushed red pepper onto pizza, soups, eggs and poultry/fish.
4) Add cayenne Pepper to basic Italian dressing or raspberry vinaigrette.
5) Include a pinch of cayenne into chocolate puddings, mousses and baked items.

Ginger and Appetite

Testing the effects of ginger on:

- Metabolism in OW men
- Blood markers

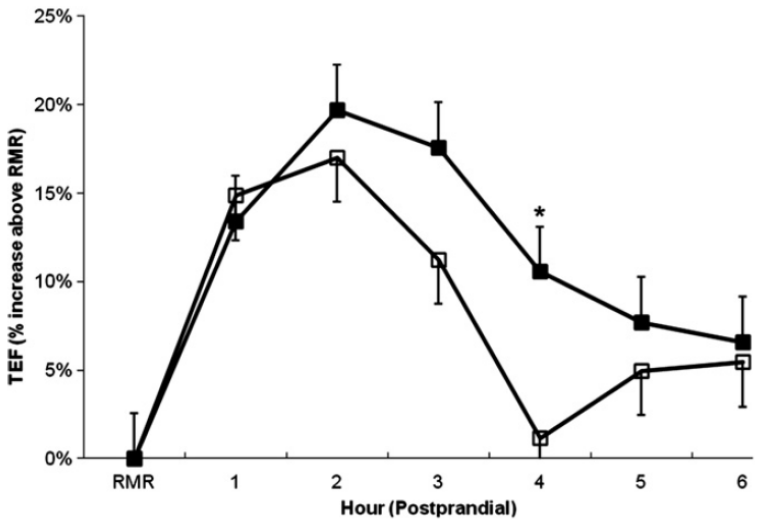
Findings:

Significant differences ginger vs. control in:

- Thermogenesis ↑
- Hunger, prospective intake ↓

N.S.:

- Blood markers: BG, insulin, lipids, inflammatory markers



Thermic Effect of Food (post-prandial)

2 g ground ginger (~1 teaspoon)

Mansoura, Metabolism, 2012.

COLUMBIA UNIVERSITY
IN THE CITY OF NEW YORK

Science to the Table

Ginger

Easy Additions:

1) Make a quick Asian-inspired salmon, by stirring ½ tsp ground ginger or 1 Tbsp. ginger 'juice' and 2 tsp sesame seeds into ½ cup hoisin sauce and brush over salmon fillets during last few minutes of grilling or broiling.
2) Sprinkle ground ginger onto cooked carrots or squash.
3) Sprinkle ¼ tsp ground ginger on store bought fruit cups or homemade fruit salad.
4) Ginger complements green tea and lemonade.
5) Add liquid ginger into salad dressings, marinades, fruit compotes and frozen vanilla yogurt or ice cream.

Cinnamon and Blood Sugar / Lipids

2013 Meta-analysis

University of Connecticut

Western University of Health Sciences College of Pharmacy

Beneficial effect in patients with Type 2 Diabetes:

- Fasting plasma glucose
- Total cholesterol
- LDL-C, HDL-C
- Triglycerides

N.S.

- HbA1c

10 randomized controlled trials, intake range 120 mg to 6 g per day (4-18 weeks)

.

Allen, et al. Ann Fam Med, 2013;452-459.

U.K. Study: Type 2 DM patients

UNIVERSITY OF WEST LONDON

Cinnamon and BG / BP

- Cinnamon supplementation in people with Type 2 DM showed significant decreases in:
  - fasting BG
  - HbA1c
  - BMI
  - blood pressure (both SBP and DBP)
- **2g cinnamon (~3/4 tsp)**

Akilen, Diabetic Medicine, 2010.

Science to the Table

Cinnamon

Easy Additions:

1) Make cinnamon yogurt by mixing 1 container (6 oz) plain or vanilla Greek yogurt, 1 tsp. maple syrup or honey, ½ tsp ground cinnamon and ¼ tsp ground ginger.
2) Sprinkle ½ tsp ground cinnamon over ground coffee before brewing.
3) Add ¼ tsp ground cinnamon to oatmeal.
4) Toss sliced apples with ½ tsp ground cinnamon.
5) Sprinkle to peanut butter + preserves or peanut butter and fruit sandwiches *(. . .or almond butter).*

Herb & Spice Research and Health

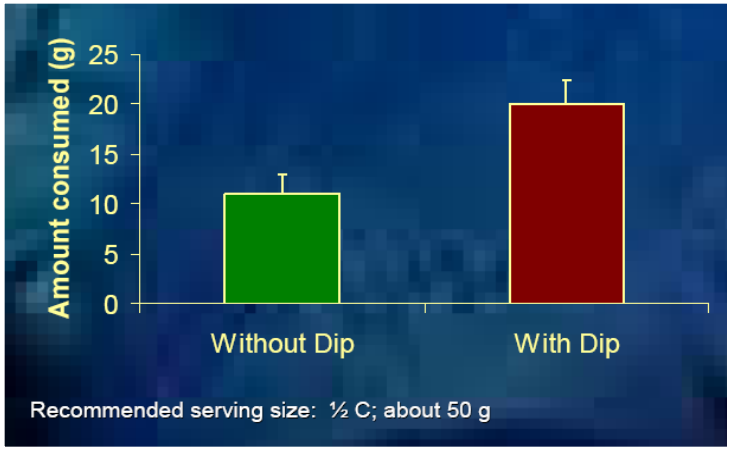
Helping Meet Dietary Recommendations and Enhancing the Total Diet

and Translating the Science to the Table

Enhancing the Flavor of Vegetables to Promote Children's Consumption

Testing:

- Acceptance and likeability of vegetables in preschool children in spice & herb enhanced dips



Findings:

- Adding flavor to vegetables by offering dips with familiar spices and herbs helped children eat more vegetables, including vegetables previously rejected.
- A low-fat dip with spices and herbs encouraged greater vegetable consumption compared to plain dip.

PENNSTATE 1855

Source: Birch, JAND, 2013.

Flavored Dips

Tips / Strategies:

1) Use low fat Greek or regular yogurt as a base for creamy savory and sweet dips using honey and ginger or dill and garlic.
2) Add paprika or cayenne to hummus and cumin to black bean dips.
3) Make kid-friendly vinaigrettes and healthier ranch dips flavoring them up with herbs and spices.
4) Oregano, garlic powder and crushed red pepper can kick-off a pizza-inspired dip.

Spices/Herbs and Reduced-Fat Meals

Testing:

- Whether enhancing the flavor of reduced fat/saturated fat food through the use of spices and herbs can improve overall liking.

Presented at IFT, 2013; Manuscript submitted (in review).

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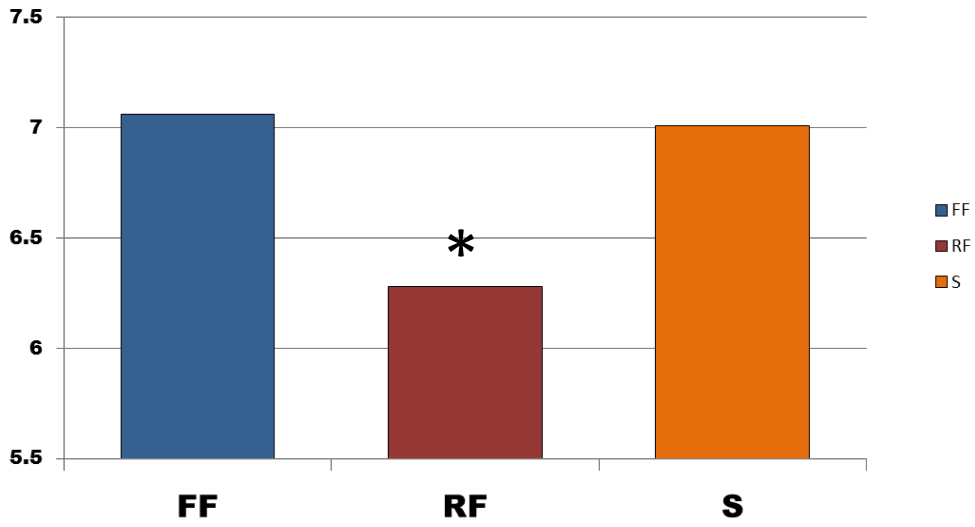
Spices and Herbs Helped Restore Liking to Full-fat Meal

Methods & Procedures:

148 subjects tasted
3 versions of a meal of meatloaf, vegetables and creamy pasta

- Full-fat meal (610 calories)
- Reduced-fat meal (395 calories)
- Reduced-fat meal with spices – Onion, Oregano, Paprika, Garlic (395 calories)

Overall Meal Liking



* Significant difference to FF, p<.0001

Reduced-fat meals had 35% less calories and 68% less fat

Presented at IFT, 2013; Manuscript submitted (in review).

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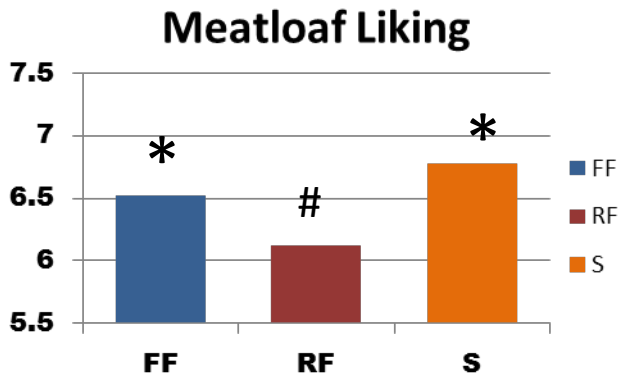
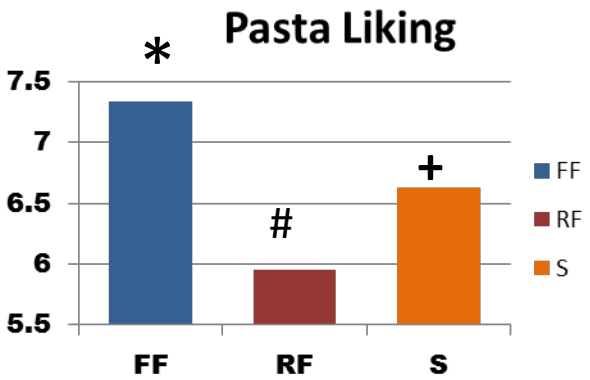
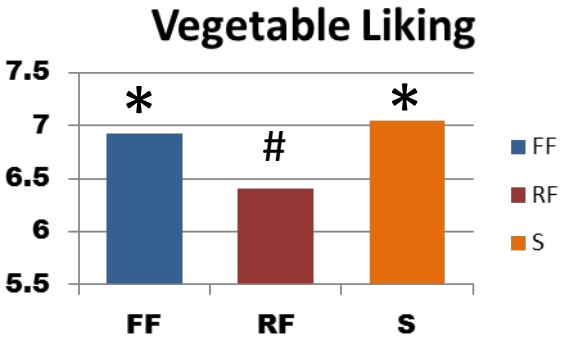
Individual Entrée and Side Dish Results







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* #+ Significance, p<.0001

Science to the Table

Reducing Fat and Calories with Herbs & Spices

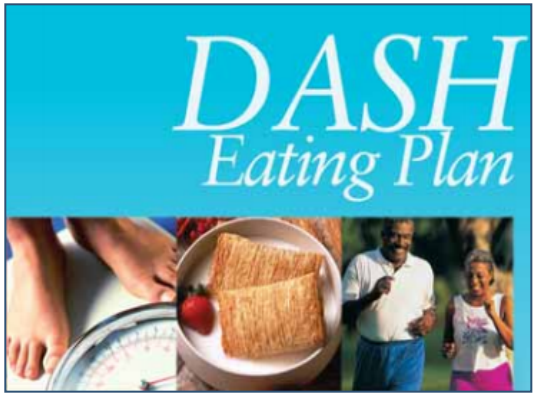
Tips / Strategies:

1) Choose extra-lean (95% FF) beef or turkey instead of lean (80% FF) and add 2 tsp herbs/spices per 2 pounds meat in meatloaf, burgers taco meat or meat sauce.
2) Try garlic powder, onion powder, and dill and reduce butter (or choose olive oil) on vegetables like broccoli and cauliflower in place of using butter and salt.
3) Use tomato based sauce instead of cream sauce on pasta and stir 1 teaspoon dried oregano leaves into 2 cups low sodium jarred (or homemade) tomato sauce.
4) In cream sauces, choose low fat milk instead of cream and try garlic, onion powder, Italian seasoning, chervil, chives or other blends in place of salt.

Spices/Herbs and Adherence to a Reduced Sodium Diet

Testing:

- Whether the current recommended sodium intake can be maintained with a behavioral intervention encouraging the (low sodium) DASH diet enhanced with herbs and spices.



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Presented March 2014 at AHA Meeting.

Spices/Herbs and Adherence to a Reduced Sodium Diet

Controlled Feeding All Subjects, n=40

(Sodium <1500 mg/day)

Sensory Assessment of Meal

(week 0) **(week 4)**

Control Group (n=20)
– advice only

Intervention Group (n=20)
– DASH diet instruction, spice rack, spice/herb cooking instruction

(week 14) **(week 24)**

Phase 1: "Getting Started" 4 weeks (low-sodium DASH)

Phase 2: "Staying on Track" 20 weeks, randomized into two groups

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Spices/Herbs and Adherence to a Reduced Sodium Diet

Findings:

- Intervention group taught to flavor food with spices and herbs showed a **966 mg sodium/day decrease** compared to people who tried to reduce sodium on their own. **1,000 mg ~1/2 tsp**

Flavor may be the key in adhering to lower sodium diet, like DASH

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Potential implications:

½ teaspoon (*daily*)

- Strokes ↓ 23K
- Heart attacks ↓ 35K
- Deaths ↓ 32K

(annually)

Bibbins-Domingo et al. NEJM, 2010: 362(7).

Science to the Table

Spices/Herbs in a Reduced Sodium Diet

Tips / Strategies:

1) **Shake garlic powder.** Stir into mashed potatoes, add to pasta sauces, or mix into bean dips and marinades for fish or chicken.
2) In **salad dressings,** instead of salt, get the punch of flavor from a little lemon juice or balsamic vinegar. Add some Italian Seasoning blend or a mix of oregano, black pepper, and a hint of cayenne.
3) Purchase **salt-free jarred tomato sauce** and limit the salt you add to 1/4 teaspoon per 2 cups max and add garlic powder, black pepper, oregano and thyme.
4) **Sauté, grill or roast veggies** in a mix of olive oil and salt free seasonings – homemade mixtures or salt-free blend from the market.
5) Instead of salt in your **morning eggs**, use thyme and black pepper.

Additional Flavor Studies in Progress

UNIVERSITY of MARYLAND
SCHOOL OF MEDICINE

- Baltimore high schools, testing intervention with herbs and spices to help teens make healthier choices and improve diet quality

University of Reading

- Spices and herbs may increase liking of lower salt foods

Spices & Herbs

The Transformative Power of Flavor

Spices and Herbs:
Why again?

Plant-based origins; technically fruits and vegetables (like “mini salads”)
Big phytonutrient punch in a very compact package and no nutritional liabilities
Boosts flavor of foods while making it easier to reduce or replace salt, fat and sugar
They are part of the total diet and *fit* the guidelines to help promote health and reduce risk of disease.

Communicating the Role of Flavor

Spices and herbs belong on the **forefront of the health and wellness conversation**

Flavor and health can happily coexist

Flavor is the #1 driver in meal selection – and spices and herbs can **help healthy food taste good!**

Integrated approach from a simple tip to add an herb or spice to a new recipe, flavor can help **transform the plate** by the sprinkle, shake or spoonful.

Remember. . .

Flavor is NOT an Area of Compromise

Source: IFIC Food & Health Survey, 2013

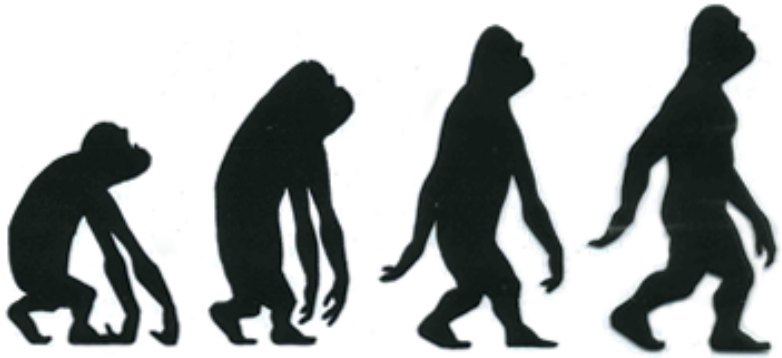
Herbs and Spices *by Day*. . .

FLAVOR!

The Transformative Power of Herbs and Spices on Health. . .

PRICE $3.00 THE NEW YORKER MAR. 13, 2000

From



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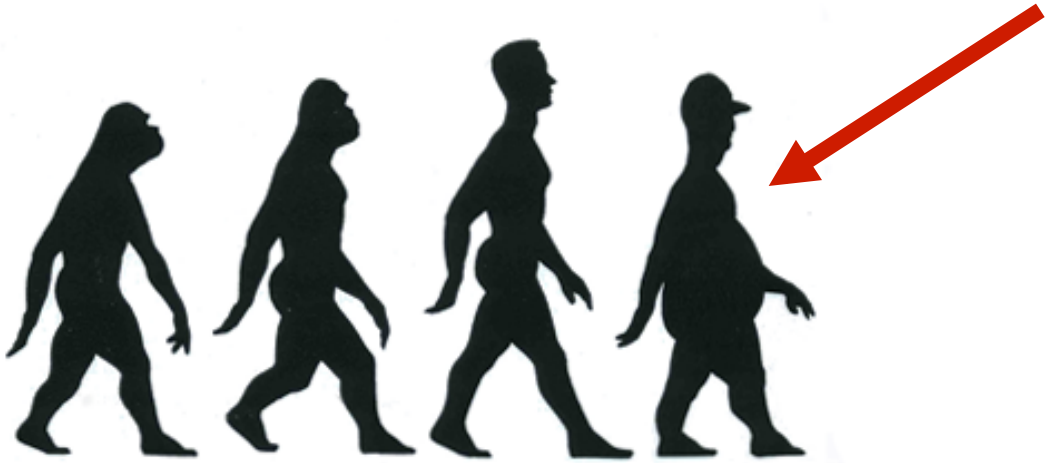

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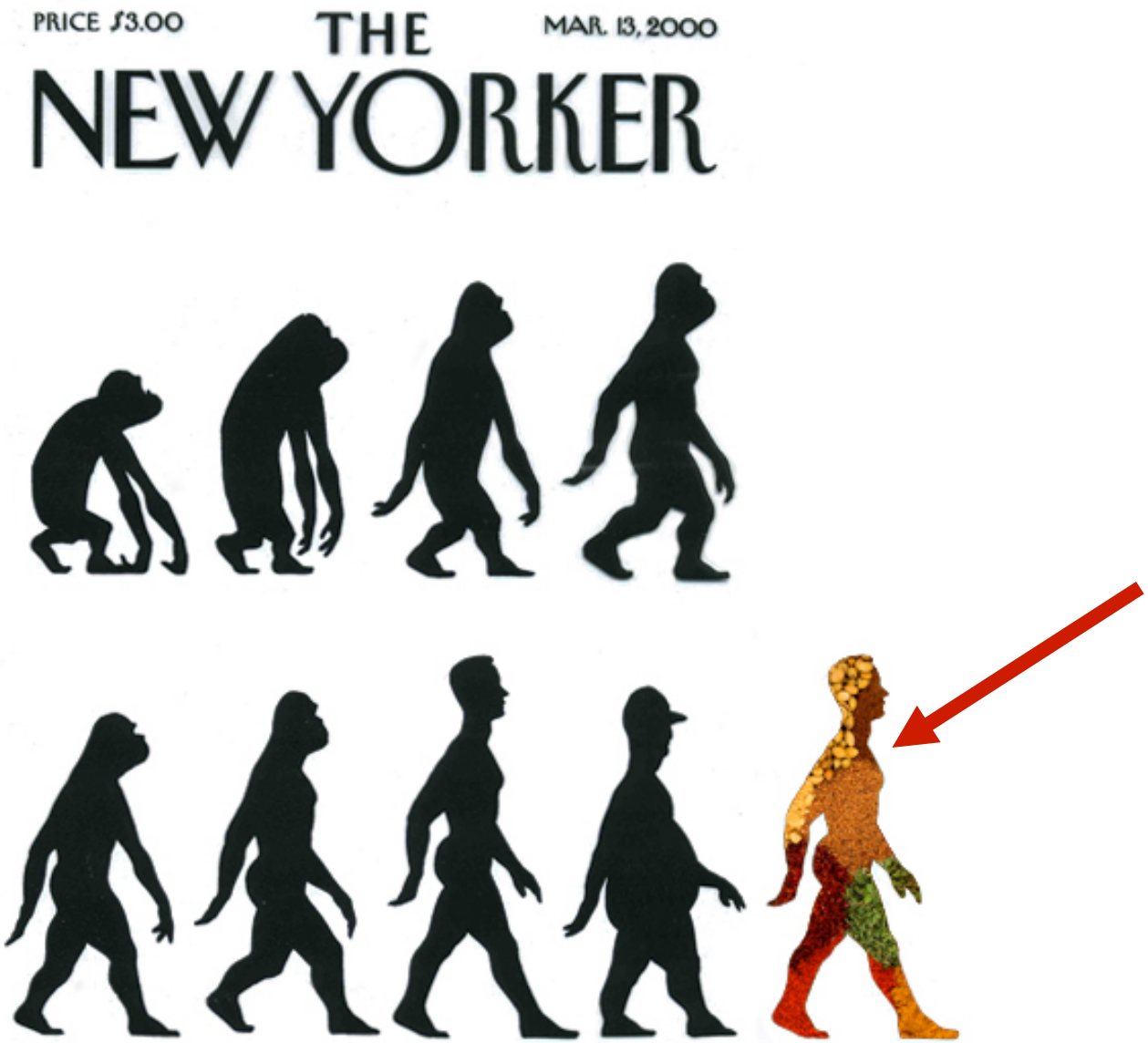

Simple—*delicious*—practices.

- Have a fruit and/or vegetable at every meal.

- Enjoy nuts—like walnuts, pistachios, almonds and peanuts.

- Have tea-time daily.

- Take time for a dark chocolate treat.

- Enjoy a glass of wine with meals in the company of friends.

- Move daily and Be Healthy.

Simple—*delicious*—practices.

- Have a fruit and/or vegetable at every meal.

Favor flavor—add herbs and spices at each meal.

- **Enjoy nuts**—like walnuts, pistachios, almonds and peanuts.

- Have tea-time daily.

- Take time for a dark chocolate treat.

- Enjoy a glass of wine with meals in the company of friends.

- Move daily and Be Healthy.

Favor Flavor with Herbs and Spices

while Reducing Salt, Fat, and Sugar

Bazilians of thanks.

The Transformative Power of Flavor

Flavor + Nutrition

Bazilians – Eat well, Move daily, Be Healthy. ®

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