Comparing dietary patterns of college students when eating in America versus eating in China: Impact on nutrition intake, body weight and waist circumference

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Eating in China vs. eating in America

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Attractive?
What is culture (1)
- Also refers to ethnicity
- Values, beliefs, attitudes and practices accepted by a community of individual
- Culture is learned by living in groups, not inherited
- Pass within generations through enculturation

Same culture/ethnicity share same behavior patterns (1)
- Eating behavior
- Dress
- Language
- Family structure
- Religion
Eating is highly associated with culture (2,3)
- Food availability. What kind of food is available in one culture. It also relates to agriculture and geography factors
- Food preference. The given priority over other food choices
- Food acceptance. Unique definition about the edible kind of food
Acculturation is the process of adopting the cultural traits of a society different from one’s own.

Food acculturation is a complex process combining ethnic eating practices and acceptance of foreign eating habits (4).

Studies compared American subjects, American born Chinese subjects and Chinese born Chinese subjects.
Consumed more vitamin C ($127 \pm 2$ mg), calcium ($720 \pm 88$ mg) and iron ($13 \pm 2$ mg) (4)

Chinese-American subjects had the highest energy level ($1801 \pm 112$ kcal) (4)

Similar energy distribution from CHO$(49\%, 50\%, 50\%)$, protein $(14\%, 16\% 15\%)$ and fat $(34\%, 33\%, 34\%)$ categories. (5)

Low iron intake for Chinese born Chinese subjects ($10 \pm 1$ mg), failed to meet RDAs level($18$mg/day) (5)

Different food sources of fat intake. (6)
  * Cooking oil and meat for Chinese subjects
  * Diary, fried food and salad dressing for American subjects
Traditional habits and beliefs of Chinese diet (1)

- Balance of yin (light) and yang (dark)

- Moderation in diet. No excess intake from any food groups

- Starch sources: mainly from rice (south) and wheat (north) (7)

- Tea consumption as beverage
Typical Chinese diet

* Only eat fresh vegetables and fruits that are in season

* Most food is cooked

* Widely use of soy beans
  * Sauces: soy sauce, oyster sauce and hoisin sauce
  * Tofu
  * Soy milk
Typical American diet

* Balance eating and eating in variety
* My plate: Six groups of food (8)
  * Fruits: fresh, canned, frozen or dried fruit or 100% fruit juice
  * Vegetables: fresh, canned, frozen, or dehydrated vegetable or 100% vegetable juice
  * Protein: meat, poultry, seafood, beans and peas, eggs, soy products, nuts and seeds
Typical American diet

* Dairy: fluid milk and milk products. Fat-free and low free preferred

* Grain: food made from wheat, rice, oats, cornmeal, barley or another cereal grain. More whole grains, less refined grains

* Oils: canola oil, corn oil, cottonseed oil, safflower oil, soybean oil and sunflower oil. Plant sources is preferred
Purpose

* Compare the dietary intake of Chinese international students
  * while living at CSBSJU during fall semester
  * while living at home in China over summer

* Comparing the dietary intake of American CSBSJU students
  * while living at CSBSJU during spring semester
  * while living in China during the summer

* Examine the impact of dietary changes on body composition by measuring
  * body weight
  * waist circumference
Method

- Received IRB approval
- Chinese international students (n=17) and American students participated in China summer program (n=3) were recruited through emails.
- Consent forms were signed.
- 7-day food blog and body measurements were asked two times from all participants.
- Super tracker for diet analysis
- Paired t test for statistical test
Research design

Chinese subjects

First diet blog during summer in China → First body measurements right in the first week of fall semester → Second diet blog in November → Second body measurements in late November

American subjects

First diet blog during summer in China → First body measurements in late July while in China → Second diet blog in November → Second body measurements in late November
Mean value of body measurements in MN and Chinese students

- MN students in CSBSJU
- MN students in China
- Chinese students at CSBSJU
- Chinese students in China

Body weight (pound)
## Waist circumference and BMI

<table>
<thead>
<tr>
<th></th>
<th>Mean BMI</th>
<th>Mean Waist circumference (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MN students in CSBSJU</td>
<td>22.2</td>
<td>30.2</td>
</tr>
<tr>
<td>MN students in China</td>
<td>22.3</td>
<td>30.2</td>
</tr>
<tr>
<td>Chinese students in CSBSJU</td>
<td>22.6</td>
<td>22.6</td>
</tr>
<tr>
<td>Chinese students in China</td>
<td>22.3</td>
<td>22.3</td>
</tr>
</tbody>
</table>
Calorie intake of MN and Chinese students

- MN students at CSBSJU: 1493.7 kcal
- MN students in China: 1197.3 kcal
- China students at CSBSJU: 1250.8 kcal
- China students in China: 1128 kcal

Calories (kcal)
Protein, CHO and fat intake in MN and Chinese students

MN students at CSBSJU
- Protein: 183.3 gm
- CHO: 78.7 gm
- Fat: 47.3 gm

MN students in China
- Protein: 140.7 gm
- CHO: 33.4 gm
- Fat: 66.4 gm

China students at CSBSJU
- Protein: 147.4 gm
- CHO: 43.2 gm
- Fat: 30.8 gm

China students in China
- Protein: 134.1 gm
- CHO: 66.4 gm
- Fat: 30.8 gm

Categories: protein (gm), CHO (gm), fat (gm)
Result

* For both groups, no significant change in
  * body weight
  * BMI
  * waist circumference
  * nutrients intake
* While living at CSBSJU, Chinese students consumed
  * More fat (47.3±9 grams)
  * More energy (1498±21 kcals)
* While living in CSBSJU, American students consumed
  * More fat (47±13 grams)
  * More energy (1250±41 kcals)
* Protein intake was higher when subjects were in China
  * American students (78±7 grams)
  * Chinese students (66+12 grams)
Discussion

* Body weight, BMI and waist circumference kept consistent
* Nutrients intake showed slight changes, but not significant in statistical level
* Protein intake was higher in China
  * More food choices during break
  * For Chinese participants, feel more comfortable while eating
  * For American participants, want to try new food in a new culture
* Iron intake in American participants was due to
  * More protein intake in American participants
  * American students consume more bread while at CSBSJU
Discussion

* Possible Limitations
  * Limited amount of subjects, especially American participants
    * In other studies, average participants amount was sixty
    * Total participants in my study was 20 (Chinese=17, American=3)
  * Short range of research length
    * Most researches study Chinese immigrants that had lived in the USA for couple years.
    * In my study, Chinese international students all went back to China during breaks. American participants only stayed in China for no more than 3 months
  * Super tracker was used for nutrients analysis, which is an American diet based system
Conclusion

* Significant changes in body composition did not occur despite some changes in nutrients intake

* Different culture shapes different eating behavior
  * Nutrients intake
  * Food choices
1, Spindler AA, Schultz JD. (1996) Comparison of dietary variety and ethnic food consumption among Chinese, Chinese-American, and White American women. Agriculture and human values, 13(3), 64-73, ISSN: 0889048X.


8, Choose my plate. http://www.choosemyplate.gov/
Question?