A Cross-Cultural Comparison of Eating Behaviors and Home Food Environmental Factors in Adolescents From São Paulo (Brazil) and Saint Paul–Minneapolis (US)

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Brazil

- Population: 190,732,694 people (51.1% female)
  - Population by age
    - Children (0-9 years old): 28,765,533 (15.08%)
    - Adolescents (10-19 years old): 34,157,633 (17.9%)
    - Adults (20-60 years old): 107,242,036 (56.22%)
    - Elderly (>60 years old): 20,590,597 (10.79%)

South America

Capital: Brasília

Language: Portuguese

5 main regions
Traditional Brazilian Foods

- Cassava
- Guaraná
- Açaí
- Fruits
Traditional Brazilian Dishes

- Rice and Beans
- Farofa
- Feijoada
- Churrasco
Brazilian street markets
Most consumed foods in Brazil: National Dietary Survey 2008-2009

Rice (84%)

Coffee (79%)

Beans (73%)

Bread (63%)

Red Meat (49%)
Introduction - Brazilian traditional foods

[Images of various Brazilian foods and fast foods]
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ABSTRACT

Objective: Describe cross-cultural differences in nutrition-related factors among adolescents from São Paulo, Brazil and St Paul–Minneapolis, US.

Design: Two large-population-based studies with cross-cultural comparisons.


Participants: A total of 1,148 adolescents from São Paulo and 1,632 adolescents from St Paul–Minneapolis.

Main Outcome Measure(s): Meal consumption, family meals, fast-food consumption, and home food availability.

Analysis: Binomial regressions, weighted for age distributions and adjusted for gender, were used to compare identical measures from each sample.

Results: Generally, São Paulo adolescents reported healthier nutritional outcomes than St Paul–Minneapolis adolescents. São Paulo adolescents were 7 times less likely to report high fast-food consumption than St Paul–Minneapolis adolescents ($P < .001$). Whereas most measures of the home environment indicated healthier home environments in São Paulo, more São Paulo adolescents reported that sugar-sweetened beverages were usually available at home than did St Paul–Minneapolis adolescents ($P < .001$).

Conclusions and Implications: São Paulo youth tended to have healthier eating behaviors and home food environment factors than St Paul–Minneapolis youth. Brazilian eating patterns tend to be healthier and support a connection with food and culture. Interventions are needed to encourage youth and their families to maintain these patterns.

Key Words: cultural comparison, food pattern, adolescents, meal, sugar-sweetened beverage, Brazil (J Nutr Educ Behav. 2014;46:370-375.)

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Introduction – Nutrition Transition in Brazil

Secular trend in nutritional status in adolescents from 10-19 years old.
Introduction - Brazilian traditional foods
Introduction - Adolescent eating habits
Introduction – Home food availability

- Children exposed to foods at home increase their consumption
  - Fruits
  - vegetables

- But at the same time not having those foods at home do not promote their consumption
Objective and Hypothesis

- Objective → describe similarities and differences in eating behaviors and home food environment in two large metropolitan samples of adolescents in São Paulo, Brazil and Saint Paul/Minneapolis, USA.

- Hypothesis → adolescents from São Paulo would have healthier behaviors and a healthier home food environment
<table>
<thead>
<tr>
<th>Study</th>
<th>Objective</th>
<th>Population</th>
<th>Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project EAT</td>
<td>Objective: examine nutrition, physical activity and weight related factors</td>
<td>1,632 Adolescents from St. Paul/Minneapolis</td>
<td>10 public schools</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-19 years old</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 technical schools</td>
<td></td>
</tr>
<tr>
<td>São Paulo study</td>
<td>Objective: assess eating and weight-related attitudes and behaviors</td>
<td>1,148 adolescents</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>14-19 years old</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mirrored latest version of project EAT (1999)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>12 technical schools</td>
<td></td>
</tr>
</tbody>
</table>
Methods – Survey and measures

- Project EAT survey (1998-1999) was translated into portuguese and back translated to english by fluent english speaker
- Only measures used in both surveys were used in the present study
Methods - Measures

Home Food Availability

Healthy foods
- Fruits and vegetables;
- Fruit juice
- Milk served at meals

Unhealthy foods
- Chips and salty snacks
- Chocolate and candy
- Sugar sweetened beverages
Methods – Statistical analysis

- Regression models adjusted for gender and weighted for age: produced similar results so were not included here

- Race/ethnicity was not included since was not evaluated in the São Paulo study

- Socioeconomic status was not evaluated because different methods were used in each study
Results

- Adolescents from São Paulo consumed significantly more breakfast and lunch.

- Breakfast skipping was almost double in Saint Paul adolescents;

- 70% of adolescents consume regularly breakfast in São Paulo when compared to less than half of the Minneapolis population.

- Nobody in the São Paulo sample skipped lunch.

- The majority of the São Paulo population have regular lunch.

### Table 1. Frequency of Meal Consumption, Family Meals, and Fast Food in Past Week Among Adolescents From São Paulo and St Paul–Minneapolis

<table>
<thead>
<tr>
<th></th>
<th>Never, n (%)</th>
<th>Irregular (1-4 times), n (%)</th>
<th>Regular (≥ 5 times), n (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Breakfast</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo</td>
<td>68 (6%)</td>
<td>294 (26%)</td>
<td>790 (69%)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>St Paul–Minneapolis</td>
<td>180 (11%)</td>
<td>699 (42%)</td>
<td>771 (47%)</td>
<td></td>
</tr>
<tr>
<td><strong>Lunch</strong></td>
<td></td>
<td></td>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td>São Paulo</td>
<td>–</td>
<td>205 (18%)</td>
<td>942 (82%)</td>
<td></td>
</tr>
<tr>
<td>St Paul–Minneapolis</td>
<td>59 (4%)</td>
<td>332 (20%)</td>
<td>1258 (82%)</td>
<td></td>
</tr>
<tr>
<td><strong>Dinner</strong></td>
<td></td>
<td></td>
<td></td>
<td>.88</td>
</tr>
<tr>
<td>São Paulo</td>
<td>21 (23%)</td>
<td>207 (18%)</td>
<td>918 (80%)</td>
<td></td>
</tr>
<tr>
<td>St Paul–Minneapolis</td>
<td>33 (2%)</td>
<td>288 (18%)</td>
<td>1328 (81%)</td>
<td></td>
</tr>
<tr>
<td><strong>Family meals</strong></td>
<td></td>
<td></td>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td>São Paulo</td>
<td>61 (5%)</td>
<td>507 (45%)</td>
<td>560 (50%)</td>
<td></td>
</tr>
<tr>
<td>St Paul–Minneapolis</td>
<td>264 (16%)</td>
<td>713 (44%)</td>
<td>640 (40%)</td>
<td></td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>Never</td>
<td>(1-2 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo</td>
<td>630 (54%)</td>
<td>481 (42%)</td>
<td>39 (3%)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>St Paul–Minneapolis</td>
<td>429 (25%)</td>
<td>867 (53%)</td>
<td>353 (21%)</td>
<td></td>
</tr>
<tr>
<td><strong>Regular</strong></td>
<td></td>
<td>(≥ 3 times)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo</td>
<td>630 (54%)</td>
<td>481 (42%)</td>
<td>39 (3%)</td>
<td></td>
</tr>
<tr>
<td>St Paul–Minneapolis</td>
<td>429 (25%)</td>
<td>867 (53%)</td>
<td>353 (21%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: t tests were used for continuous nonadjusted variables, chi-square tests were used for categorical nonadjusted variables, and binomial regression was adjusted for gender and weighted for age.
Results

- Family meals were three times more skipped in Minneapolis adolescents than in the São Paulo sample

- Despite adolescents from São Paulo have more regular family meals, only half of the sample had this frequency

- More than half of the São Paulo reported never eating fast food

- The prevalence of eating fast food more than 5 times in a week was 7 times higher in Minneapolis adolescents than in São Paulo
Results

- Home food availability had significant difference for all foods and beverages.
- Healthy foods: fruits/vegetables; vegetables served at dinner and milk served at meals were more frequent in São Paulo sample’s houses.
- Fruit juice was more present in Minneapolis sample’s houses however chocolate was more frequent among the Brazilian adolescents.
- Sodas were more present at Brazilian homes.

Table 2. Home Food Availability as Reported by Adolescents in São Paulo and St Paul-Minneapolis

<table>
<thead>
<tr>
<th></th>
<th>Never/Sometimes, n (%)</th>
<th>Usually/Always, n (%)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fruits/vegetables</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo</td>
<td>71 (6%)</td>
<td>1,080 (94%)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>273 (17%)</td>
<td>1,374 (83%)</td>
<td></td>
</tr>
<tr>
<td><strong>Fruit juice</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo</td>
<td>512 (45%)</td>
<td>637 (55%)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>465 (27%)</td>
<td>1,188 (72%)</td>
<td></td>
</tr>
<tr>
<td><strong>Vegetables served at dinner</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>São Paulo</td>
<td>316 (28%)</td>
<td>830 (72%)</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>573 (35%)</td>
<td>1,073 (65%)</td>
<td></td>
</tr>
<tr>
<td><strong>Milk served at meals</strong></td>
<td></td>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td>São Paulo</td>
<td>215 (19%)</td>
<td>927 (81%)</td>
<td></td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>1,027 (63%)</td>
<td>611 (37%)</td>
<td></td>
</tr>
<tr>
<td><strong>Salty snacks</strong></td>
<td></td>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td>São Paulo</td>
<td>846 (73%)</td>
<td>304 (26%)</td>
<td></td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>849 (52%)</td>
<td>796 (48%)</td>
<td></td>
</tr>
<tr>
<td><strong>Chocolate or other candy</strong></td>
<td></td>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td>São Paulo</td>
<td>826 (54%)</td>
<td>524 (46%)</td>
<td></td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>1,114 (68%)</td>
<td>532 (32%)</td>
<td></td>
</tr>
<tr>
<td><strong>Soda</strong></td>
<td></td>
<td></td>
<td>&lt; .001</td>
</tr>
<tr>
<td>São Paulo</td>
<td>504 (44%)</td>
<td>646 (56%)</td>
<td></td>
</tr>
<tr>
<td>St Paul-Minneapolis</td>
<td>910 (56%)</td>
<td>725 (44%)</td>
<td></td>
</tr>
</tbody>
</table>

Note: t tests were used for continuous nonadjusted variables, chi-square tests were used for categorical nonadjusted variables, and binomial regression was adjusted for gender and weighted for age.
Discussion

- Results indicate that adolescents from São Paulo had healthier nutrition-related factors.
- Local influences may influence healthier eating patterns.
  - But few similarities suggest that poor eating habits may be common in different parts of the world.

Public health strategies should be done regarding this results

Policies to help the widespread infiltration of fast food restaurants in Brazil
A major finding was the difference between both samples according to fast food consumption

- Foods from fast food outlets are expensive, especially to low-income populations

Public health strategies should be done regarding this result.

Policies to help the widespread infiltration of fast food restaurants in Brazil.
Discussion - Family meals

- Despite the prevalence of regular family meals in São Paulo is higher than in Minneapolis, only half of the sample reported having regular family meals.

- Family meals benefits:
  - Weight gain prevention
  - Improvement in cognition aspects
  - Offer an opportunity to engage in healthy eating
  - Family members connection
  - Having foods typical from each meal (milk consumed in breakfast)
  - Lower prevalence of unhealthy weight control methods and substance use
Discussion – sugar sweetened beverages (SSB)

- The presence of sugar sweetened beverages at São Paulo’s homes was another major finding from the present study.

- It was not expected that sodas were more prevalent in São Paulo’s homes than in American’s homes.

- This finding corroborates national Brazilian data that Brazilian adolescents are increasing their beverage consumption with sugar added options, which have a lot of calories and may be a risk factor to weight gain.

- In a 30-year period almost 500% of sugar-sweetened beverages increased in Brazilian population and recent data showed that SSB is the 5th most commonly consumed item.
Discussion

- Home environment in São Paulo seems healthier than in Saint Paul/Minneapolis
  - Higher percentage of having always/usually:
    - fruits and vegetables at home
    - Vegetables served at meals

- It is important to acknowledge that home food availability does not guarantee that individuals are consuming those foods and beverages
Implications

▪ Nutritionists and other health professionals should encourage the maintenance of traditional eating patterns

▪ Having healthier foods and beverages at home has been found to predict greater consumption of fruits and vegetables

▪ Important to work with parents, mainly the mothers
  - They are the responsible for choosing and purchasing foods that will be consumed from the whole family