Measuring the fast food environment
Results from a reliability study

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Presenter Disclosure

Christopher M. Quinn

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose
Bridging the Gap
Research Informing Practice and Policy for Healthy Youth

- A collaborative effort to assess the impacts of *policies, programs* & *other environmental factors* on a variety of adolescent health-related behaviors

- A RWJF initiative begun in 1997 with focus on adolescent alcohol, tobacco, and other drug use and related outcomes

- Expanded in recent years to include youth eating practices, physical activity, and weight outcomes

- Linked to the ongoing, NIDA-funded, *Monitoring the Future* study
Background

Source: Glanz et al. 2005

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Background

• Variability in consumer nutrition environment by community characteristics such as SES and race/ethnicity (Morland et al. 2002, Block et al. 2004, Sturm 2007).

• Location/density of food outlets alone does not explain trends in health outcomes or obesity (Jeffery et al. 2006, Powell 2009).

• Price of fast food has been linked to BMI of teenagers in longitudinal analyses (Powell 2009) and reported by youth in focus groups as an influence on consumption of fast food (Barker et al. under development).

• Relatively few studies involving direct observation of the consumer nutrition environment have documented the reliability of their measures (Larson et al. 2009, Zenk et al. 2010, Ohri-Vachaspati & Leviton 2010).
## Instrument Development

Measures adapted from existing instruments:

<table>
<thead>
<tr>
<th>Source</th>
<th>Instrument</th>
<th>Types of Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Pennsylvania (Glanz et al.)</td>
<td>Nutrition Environment Measures Survey – Restaurants (NEMS-R)</td>
<td>Restaurant Characteristics and Accessibility, Menu Review, Product Availability</td>
</tr>
<tr>
<td>Network for a Healthy California - CA Department of Public Health</td>
<td>Communities of Excellence in Nutrition, Physical Activity &amp; Obesity Prevention (CX3) Fast Food Marketing Environment Survey</td>
<td>Advertising and Marketing, Menu labeling/Nutrition info measures</td>
</tr>
</tbody>
</table>

➢ Input was also provided by a panel of expert researchers, practitioners, and food policy advocates

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Measures

• Exterior advertising and child-targeted marketing
• General menu and kids’ menu review
• Food and beverage product availability and pricing
• Menu labeling and nutrition information at point-of-purchase
• Other restaurant characteristics and presence of incivilities
SECTION B. EXTERIOR MARKETING — SKIP THIS PAGE IF IN A MALL OR FOOD COURT

B1. Number of ads on Building Exterior
B2. Number of ads on Property

- Food only ads
- Includes a price promotion
- Beverage only ads
- Includes a price promotion
- Food and beverage ads
- Includes a price promotion

B3. Are there any ads with a...
   a. Dollar menu promotion?
      NO   YES
   b. Health claim?
      IF YES, RECORD WORDS AND PHRASES USED IN CLAIMS
   c. Quality claim?
      IF YES, RECORD WORDS IN B3c.1.

B4. Child-targeted marketing on building exterior or property?
   NO   YES
   a. Extender play area
   b. Indoor play area visible from outside
   c. 3-D cartoon character
   d. Poster with cartoon character(s)
   e. Poster with child-oriented TV or movie star(s)
   f. Poster showing kids’ meal toy(s)
   g. Other, Specify:

B5. Types of child-targeted marketing on building exterior or property
   NO   YES
   a. Extender play area
   b. Indoor play area visible from outside
   c. 3-D cartoon character
   d. Poster with cartoon character(s)
   e. Poster with child-oriented TV or movie star(s)
   f. Poster showing kids’ meal toy(s)
   g. Other, Specify:

SECTION C. DRIVE-THRU

C1. Does restaurant have a drive-thru?
   C2. Does menu board provide calorie info for menu items?
   C3. Does menu board have statement on suggested daily calories?
   C4. Does menu board have “nutrition info on request” statement?

- NO SKIP TO SECTION D
- YES
- NO ITEMS
- SOME ITEMS
- ALL ITEMS
- NO
- YES
- NO
- YES

SECTION G. FOOD ITEMS

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
<th>N/A</th>
<th>G2. Record Price</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>

- French Fries (select smallest available and specify below)
  - Small
  - Other
  - Large
  - Other
- Hamburger, 1/4 lb with cheese
- Chicken sandwich, with roasted/grilled chicken
- Entrée salad, with roasted/grilled chicken
- Fried Chicken, 1 leg/drumstick and 1 thigh
- Cheese Pizza, thin crust, 10-12"
- Taco, crunchy/crispy with ground beef
- Sub Sandwich, 6-inch with turkey and cheese

SECTION H. KIDS MENU REVIEW

H1. Kids’ menu or kids’ meal available? IF NO, SKIP TO SECTION J
   NO   YES
H2. Kids’ meal offers a healthy beverage option (i.e., low-fat milk or 100% juice) IF NO, SKIP TO H3
   NO   YES
H3. Kids’ meal offers a healthy side dish option (i.e., fruit, vegetable or yogurt) IF NO, SKIP TO H4
   NO   YES
H4. Toys or other child-oriented giveaways included with kids’ meal
   NO   YES

SECTION J. NUTRITION INFORMATION

J1. Is item available at the point of purchase?
   NO   YES
J2. Provides calorie info for menu items?
   NO ITEMS
   SOME ITEMS
   ALL ITEMS
J3. Has statement on suggested daily calories?
   NO   YES
J4. Has “nutrition info on request” statement?
   NO   YES

- Menu board
- Food display tags
- Posted material
- Printed material
- Printed menu

J5. Asked employee for nutrition information?
   IF YES, REASON:
   NO   YES
- Referred to posted material
- Referred to printed material
- Referto website
- Doesn’t know
- Other, explain:

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Reliability Study Objectives

• Test the inter-rater reliability of direct observation measures in fast food restaurants

• Identify unreliable or otherwise problematic measures

• Test data collection procedures on a large scale in different types of chain restaurants

• Collect feedback from data collection staff to improve form design, measure specifications, and training

• Revise and refine training materials and presentations
Study Design and Methods

Sample

• Chain fast food restaurants identified via web research
  • 24 brands

• Convenience sample (n=135) selected based on relative location and demographics:
  - Sample of census tracts stratified by income and racial/ethnic composition
  - ½ of tracts in city of Chicago, ½ in suburbs
Chain Fast Food Brands

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Study Design and Methods

Data Collection Protocol

• 24 hours of classroom training and field practice for 6 data collectors

• Data collected over 2 weeks in December 2009

• 2 staff visited each restaurant and observed simultaneously

• Each pair observed a minimum of 40 restaurants, with 131 total restaurants observed across all pairs

<table>
<thead>
<tr>
<th>Fast Food Restaurant Type</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burger and Fries</td>
<td>31</td>
</tr>
<tr>
<td>Fried Chicken/Fish</td>
<td>24</td>
</tr>
<tr>
<td>Mexican</td>
<td>13</td>
</tr>
<tr>
<td>Chinese/Pan-Asian</td>
<td>9</td>
</tr>
<tr>
<td>Sandwich/Sub</td>
<td>26</td>
</tr>
<tr>
<td>Pizza</td>
<td>13</td>
</tr>
<tr>
<td>Donut/Coffee Shop</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
</tr>
<tr>
<td>Total Completed Observations</td>
<td>131</td>
</tr>
</tbody>
</table>
Study Design and Methods

Analysis

- Categorical variables:
  - Simple Kappa
  - Proportion of Agreement

- Continuous variables:
  - Intraclass Correlation (ICC)

<table>
<thead>
<tr>
<th>Strength</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>≤ 0.0</td>
</tr>
<tr>
<td>Slight</td>
<td>.01 - .20</td>
</tr>
<tr>
<td>Fair</td>
<td>.21 - .40</td>
</tr>
<tr>
<td>Moderate</td>
<td>.41 - .60</td>
</tr>
<tr>
<td>Substantial</td>
<td>.61 - .80</td>
</tr>
<tr>
<td>Almost Perfect</td>
<td>.81 – 1.0</td>
</tr>
</tbody>
</table>
## Results – Exterior Advertising

<table>
<thead>
<tr>
<th>Measure</th>
<th>ICC for ads on Building Exterior</th>
<th>ICC for ads on Property</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count of food-only ads</td>
<td>0.75</td>
<td>0.85</td>
</tr>
<tr>
<td>Count of beverage-only ads</td>
<td>0.68</td>
<td>0.79</td>
</tr>
<tr>
<td>Count of food and beverage ads</td>
<td>0.48</td>
<td>0.51</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure</th>
<th>Kappa</th>
<th>Total agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any ads with dollar menu promotion</td>
<td>0.82</td>
<td>0.94</td>
</tr>
<tr>
<td>Any ads with health claim</td>
<td>0.85</td>
<td>0.97</td>
</tr>
<tr>
<td>Any ads with quality claim</td>
<td>0.35</td>
<td>0.81</td>
</tr>
</tbody>
</table>
## Results - Child-targeted Marketing

<table>
<thead>
<tr>
<th>Measure</th>
<th>Kappa</th>
<th>Total agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any child-targeted marketing</td>
<td>0.62</td>
<td>0.87</td>
</tr>
<tr>
<td>Poster with cartoon character(s)</td>
<td>0.86</td>
<td>0.93</td>
</tr>
<tr>
<td>Poster with child-oriented TV or movie star(s)</td>
<td>0.81</td>
<td>0.93</td>
</tr>
<tr>
<td>Poster showing kids’ meal toy(s)</td>
<td>0.86</td>
<td>0.93</td>
</tr>
<tr>
<td>Interior Play area</td>
<td>0.79</td>
<td>0.98</td>
</tr>
<tr>
<td>Exterior Play area</td>
<td>*</td>
<td>1.0</td>
</tr>
<tr>
<td>3-D cartoon character</td>
<td>*</td>
<td>1.0</td>
</tr>
</tbody>
</table>

* Negative agreement only, Kappa calculation not possible
# Results – Menu Labeling

<table>
<thead>
<tr>
<th>Item at Point of Purchase</th>
<th>Calorie information provided</th>
<th>States “Nutrition Info is Available Upon Request”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kappa</td>
<td>Total agreement</td>
</tr>
<tr>
<td>Interior Menu Board</td>
<td>0.77</td>
<td>0.92</td>
</tr>
<tr>
<td>Posted Material</td>
<td>0.60</td>
<td>0.84</td>
</tr>
<tr>
<td>Printed Material</td>
<td>0.89</td>
<td>0.94</td>
</tr>
<tr>
<td>Food Display Tags</td>
<td>*</td>
<td>1.0</td>
</tr>
<tr>
<td>Printed Menu</td>
<td>*</td>
<td>1.0</td>
</tr>
<tr>
<td>Drive-thru menu board</td>
<td>1.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

* Negative agreement only, Kappa calculation not possible
# Results – Menu Review

<table>
<thead>
<tr>
<th>Measure</th>
<th>Kappa</th>
<th>Total agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General Menu Review</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant has Dollar/Value menu</td>
<td>0.77</td>
<td>0.88</td>
</tr>
<tr>
<td>Healthy option on Dollar/Value menu</td>
<td>0.53</td>
<td>0.78</td>
</tr>
<tr>
<td>Any salad options</td>
<td>0.94</td>
<td>0.97</td>
</tr>
<tr>
<td>Any vegetable sides (non-fried, w/o sauce)</td>
<td>0.70</td>
<td>0.85</td>
</tr>
<tr>
<td>Any unsweetened fruit sides</td>
<td>0.97</td>
<td>0.98</td>
</tr>
<tr>
<td><strong>Kids’ Menu Review</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restaurant has Kids’ meal</td>
<td>0.98</td>
<td>0.99</td>
</tr>
<tr>
<td>Kids’ meal offers healthy beverage option</td>
<td>0.85</td>
<td>0.93</td>
</tr>
<tr>
<td>Kids’ meal offers healthy side dish option</td>
<td>0.83</td>
<td>0.93</td>
</tr>
<tr>
<td>Toys or other child-oriented giveaways</td>
<td>0.87</td>
<td>0.94</td>
</tr>
<tr>
<td>included</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Results – Menu Review

<table>
<thead>
<tr>
<th>Measure</th>
<th>Kappa</th>
<th>Total agreement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Menu designations for healthier options</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low fat</td>
<td>0.81</td>
<td>0.91</td>
</tr>
<tr>
<td>Low carbohydrate</td>
<td>0.92</td>
<td>0.99</td>
</tr>
<tr>
<td>Low calorie or “light”</td>
<td>0.79</td>
<td>0.91</td>
</tr>
<tr>
<td>Low saturated fat</td>
<td>*</td>
<td>1.0</td>
</tr>
<tr>
<td>Low sodium</td>
<td>*</td>
<td>1.0</td>
</tr>
<tr>
<td>Heart healthy</td>
<td>*</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Other characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-service fountain drinks</td>
<td>0.98</td>
<td>0.99</td>
</tr>
<tr>
<td>Free water for customers</td>
<td>0.86</td>
<td>0.93</td>
</tr>
<tr>
<td>Sweets for sale at counter</td>
<td>0.86</td>
<td>0.93</td>
</tr>
</tbody>
</table>

* Negative agreement only, Kappa calculation not possible
Additional Results

- Measures of **beverage product availability** were highly reliable (Kappa between 0.78 and 1; Total agreement between 0.91 and 1.0)

- Measures of **food item availability** were also highly reliable (Kappa between 0.92 and 0.99; Total agreement between 0.95 and 0.99)

- Measures of **restaurant accessibility**, including presence of parking, sidewalk on street, bicycle parking, and drive-thru had mixed reliability (Kappa between 0.56 and 0.97; Total agreement between 0.90 and 0.99)

- Measures of **incivilities** such as graffiti on restaurant exterior, bars on windows, or security barrier at interior service counter also had somewhat mixed reliability (Kappa between 0.62 and 1.0; Total agreement between 0.96 and 1.0)
Reliability Study Limitations

- No non-chain (i.e., independent) fast food restaurants included in the reliability study
- Sample limited to one metro region, and census-defined rural areas not included
- No non-traditional fast food (e.g., quick service food counters w/in convenience stores) unless branded
- Pricing measures not reported due to data collection methodology—need for additional reliability testing
- No test-retest reliability
Changes to the 2010 Instrument

• Revised exterior advertising categories
• Dropped quality claims
• Refined types of child-targeted marketing included
• Tightened definitions of healthy options (i.e., vegetable, fruit, or yogurt sides)
• Tightened definitions for accessibility and incivility measures, including sidewalk on street, bicycle parking, and graffiti
• Refined training protocol for menu labeling measures
• Plan for additional reliability testing of price measures in chain and non-chain restaurants in 2011
BTG Contributions to the field: Fast Food Observation Form

- Comprehensive assessment of environment within fast food restaurants
- Measurement of the extent of exterior advertising
- Presence of several forms of child-targeted marketing inside and outside restaurants
- Menu labeling at point of purchase, including drive-thru
- National data on food and beverage product prices
- Examine variation in chain and non-chain restaurants nationally and across communities
Acknowledgements

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• Karen Glanz, PhD, MPH
• Punam Ohri-Vachaspati, PhD, RD
• Valerie Quinn, MPH
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• Joe Sharkey, PhD, MPH, RD
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Find out more at bridgingthegapresearch.org
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