IMPLICATIONS OF COMMUNITY SUPPORTED AGRICULTURE—FARMSHARE PROGRAMS AS ALTERNATIVE FOOD NETWORKS

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Background: Obesity Problem in the US

- Currently, more than **35 percent** of American adults are obese
  - About one-third of children and teens are either obese or overweight (Ogden, Carroll, Kit, & Flegal, 2014).

- Obese children have poor quality of life: physically, emotionally, socially, psychosocially, and generally—quality of life (Poeta, Duarte, & Giuliano, 2010).

- Future obesity projections:
  - In 20 years, it may reach 44% in all states; 60% in 13 states (TFAH/RWJF, 2012)
  - Obesity related expenses accounts for about $75 billion yearly (Resnik, 2007).
## Background: San Bernardino City

<table>
<thead>
<tr>
<th>Population</th>
<th>San Bernardino</th>
<th>California</th>
<th>United States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>2,088,371</td>
<td>38,332,521</td>
<td>316,128,839</td>
</tr>
<tr>
<td>Person per Household</td>
<td>3.33</td>
<td>2.93</td>
<td>2.61</td>
</tr>
<tr>
<td>Per capital income</td>
<td>$21,636</td>
<td>$29,551</td>
<td>$28,051</td>
</tr>
<tr>
<td>Median Household income</td>
<td>$54,750</td>
<td>$61,400</td>
<td>$53,046</td>
</tr>
<tr>
<td>Persons below poverty level</td>
<td>17.6%</td>
<td>15.3%</td>
<td>14.9%</td>
</tr>
</tbody>
</table>

(United States Census Bureau, 2014)

*Note. The Supplemental Poverty Measure indicate that California residents may not be as financially buoyant as assumed, persons below poverty: 23.8% (Gabe, 2014).*
In the U.S. (2010-2012)–CA ranked the highest in poverty w/ 23.8% (ACS as cited in Gabe, 2014).

- People with low income are likely to consume less fruits and vegetables (Di Noia, J., & Byrd-Bredbenner, 2014).

- Low fruit and vegetable consumption (FVC) are associated with diabetes, cardiovascular diseases (Montonen et al., 2005; Liu et al., 2012).

  - Low FVC correlated with high BMI (Spense et al., 2009; He et al., 2010)

  - High body mass index (BMI) is associated with diabetes, hypertension, hypercholesterolemia and coronary risks (Chapman, Redfern, McGovern, & Giral, 2010; Flegal et al., 2012)
Note. RFEI is a rating of number of unhealthy food stores to healthy ones in an area; HS RFEI is the average RFEI within 0.5 miles of Adolescent’s Home and School (HS) in selected area.
Farmers partner with local residents to supply them direct (prepaid) farm goods: poultry, diary, meats, fruits, vegetables, etc. for a planting season.

- Reduces food mile (fossil-fuel from undue transportation/environmental carbon imprint) from harvest to consumers' tables
- Sustains agriculture
- Enhance community interactions
- Promotes environmental responsibility
- Contribute to local economy
- Provide fresher fruits, and vegetables

(Follett, 2009; Press & Arnould, 2011; Uribe, Winham, & Wharton, 2012)
# Research Questions

#1
- Is there any significant difference in health outcomes of participants who participate in Community Supported Agriculture (CSA) Farmshare programs compared to another group who do not (comparison group)?

Dependent Variables (DVs):
- BMI
- % of body fat
- % of muscle
- body age difference
- resting metabolism
- visceral fat
- heart rate,
- blood pressure
- Health Quality of Life

#2
- How do CSA Farmshare participants’ behavioral intentions, attitudes, and perceived behavioral control for fruits and vegetable consumption differ from non-participants (comparison group)?

Dependent Variables (DVs):
- Attitudes
- Behavioral Intentions
- Perceived Behavioral Control
- Fruit and Vegetables consumption

#3
- What lessons can be learned from participants’ accounts of factors that promote or discourage their choices of fruit and vegetables in their diets?
### Study Design:
**Mixed, Longitudinal, Quasi-experimental w/Non-equivalent Comparison Group**

<table>
<thead>
<tr>
<th></th>
<th>Pre-test (weeks 0-1)</th>
<th>Post test: 7-8 weeks</th>
<th>Post test 12-13 weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>‡ NR</td>
<td>O₁</td>
<td>X</td>
<td>O₂</td>
</tr>
<tr>
<td>† NR, <strong>‡ NR</strong></td>
<td>O₁</td>
<td>O₂</td>
<td>O₃</td>
</tr>
</tbody>
</table>

**‡ NR, Intervention Group (Non-randomized)**
**† NR, Comparison Group (Non-randomized)**

O, Survey Cohorts at indicated milestones
X, Interventions: Weekly Farmshare + Health Education
Interventions

**Intervention Group**  
*n=60*

- **Group (G1)**  
  **Farmshare Study Participants—Waterman Gardens Residents**
  - Free weekly Farmshare produce
  - Free 1-hour weekly health education session
  - Free 1-hour weekly physical activity participatory program
  - Free health screening
  - Free weekly health education materials

**Comparison Group**  
*n=60*

- **Group (G2)**  
  **San Bernardino Latino Health Collaborative Striders’—Comparison Group**
  - Free 1-hour weekly physical activity participatory program
  - Free health screening
  - $10 Gift card
  - Gift Raffle Items
  - Free Health Education Materials *(at the end of the 13 weeks).*

**N=120**
### Research Question

1. **Is there any significant difference in health outcomes of participants who participate in CSA programs compared to another group who do not (comparison group)?**
   - **Dependent V/ Type:** BMI, percentage [%] of body fat, % of muscle, body age difference, visceral fat, resting metabolism, heart rate, and blood (pulse) pressures [Continuous V]
   - **Independent V/ Type:** Time: I, II, III Groups: 1 & 2 [Categorical V]
   - **Statistical Analysis:** *Repeated Measures ANOVA*
     - Within and Between Group Analysis
     - Test interaction between time and group
     - Determine whether simple or main effect
     - Pairwise comparisons (post hoc)

2. **How do CSA Farmshare participants’ behavioral intentions, attitudes, and perceived behavioral control for fruits and vegetable consumption differ from non-participants’?**
   - **Dependent V/ Type:** Fruit and Vegetable scores; Attitudes/ Behavioral intention/ Perceived Behavioral Control [To be treated as Continuous V]
   - **Independent V/ Type:** Time: I, II, III Groups: 1 & 2 [Categorical V]

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**Study Variables (V) and Measurements**

<table>
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<th>Statistical Analysis</th>
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| 1. Is there any significant difference in health outcomes of participants who participate in CSA programs compared to another group who do not (comparison group)? | BMI, percentage [%] of body fat, % of muscle, body age difference, visceral fat, resting metabolism, heart rate, and blood (pulse) pressures [Continuous V] | Time: I, II, III Groups: 1 & 2 [Categorical V] | *Repeated Measures ANOVA*
| 2. How do CSA Farmshare participants’ behavioral intentions, attitudes, and perceived behavioral control for fruits and vegetable consumption differ from non-participants’? | Fruit and Vegetable scores; Attitudes/ Behavioral intention/ Perceived Behavioral Control [To be treated as Continuous V] | Time: I, II, III Groups: 1 & 2 [Categorical V] | *Repeated Measures ANOVA*
| | | | - Within and Between Group Analysis
| | | | - Test interaction between time and group
| | | | - Determine whether simple or main effect
| | | | - Pairwise comparisons (post hoc) |
Qualitative Component

**BACKGROUND THEORY:**
(Glaser and Straus, 1967; Bulawa, 2014)
Modified/Grounded Theory

**GOAL:**
To explore participants’ barriers to accessing healthy foods

**METHODOLOGY:**
1. Semi-structured interviews (till saturation)
2. Focus groups
3. Observations (Farmshares, physical activities)
4. Memos/ informal conversations

**THEORY ELEMENTS TO INCORPORATE:**
1. Theoretical sensitivity
2. Theoretical sampling
3. Coding process (open, axial, selective)
4. Comparative analysis
5. Theoretical memoing

**RESULTS:**
1. To develop a conceptual model that explains participants’ healthy food access experience.
2. Make suggestions for improving healthy food access in the community
Anticipated Study Limitations: Some Validity Threats

- **Experimental Mortality (Attrition):** People may drop out for many reasons; to be minimized by adding 8 additional participants to the estimated sample.

- **Diffusion of treatment:** Comparison participants do not receive Farmshare produce.

- **Selection:** possible though participants have to be in either of the study populations already.

- **Non random selection:** External validity threat. Precludes generalization of study findings to other populations.

**Other Limitations:**

- Farmshare cost
- Sample size
- Study is still progress