



# Effect of Proportional Pricing versus Value Pricing on Fountain Drink Purchases **Results from a Field Experiment**

**Sarah E. Gollust, PhD**, Xuyang Tang, MS, Simone French, PhD, Carlisle Runge, PhD, James M. White, PhD, and Alexander Rothman, PhD

March 31, 2016  
Society of Behavioral Medicine

Twitter: @sarahgollust

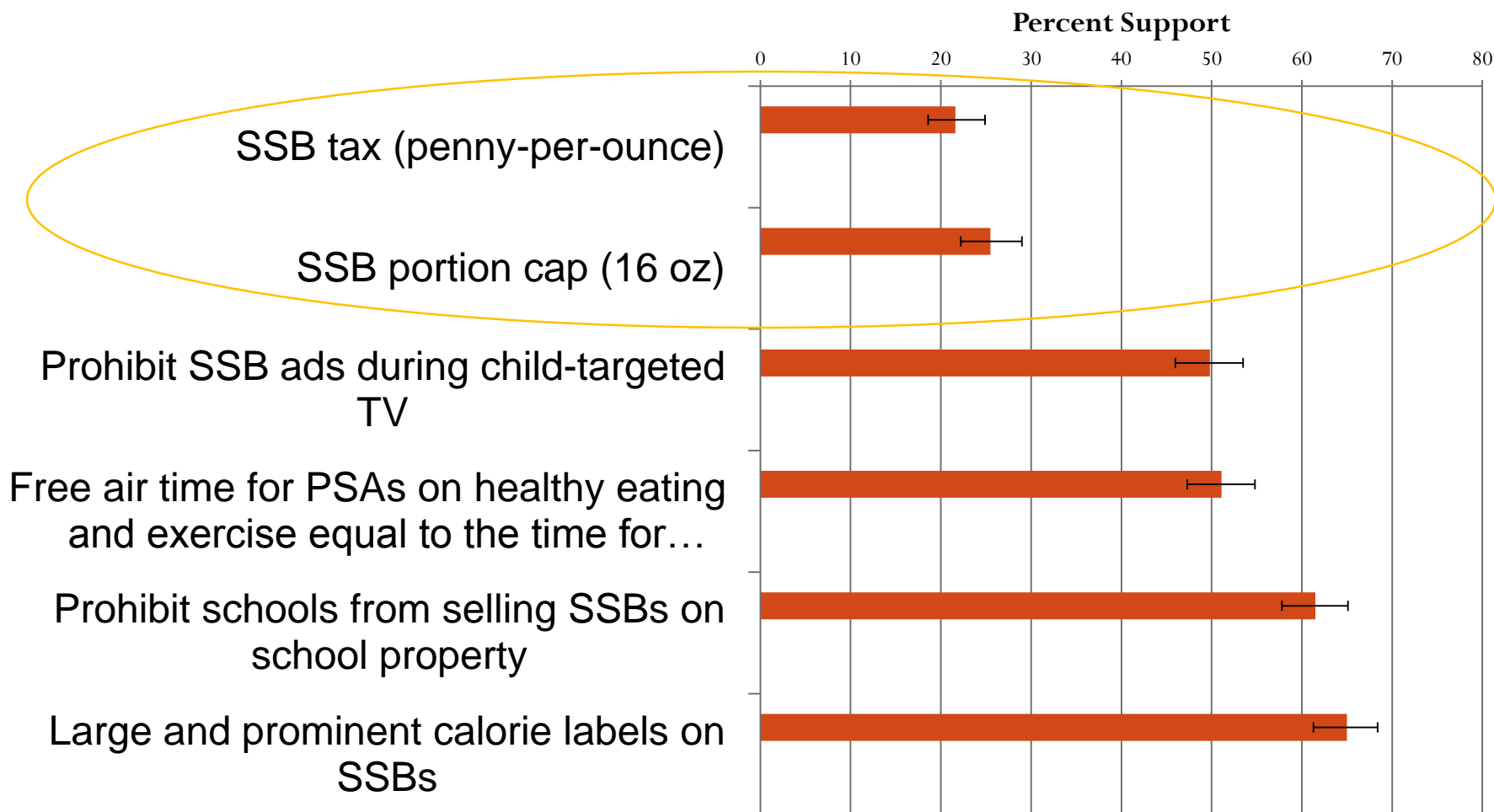
# Acknowledgements

- Financial support from the U of Minnesota
  - Healthy Food Healthy Lives Institute (planning grant and pilot grant)
  - Obesity Prevention Center Working Interdisciplinary Group
- U of Minnesota staff
  - Allison Stivland, Angela Wong (Research Assistants)
  - Elaine Caspers, Michele Lorenz
  - Concession stand staff

# Countervailing Pressures on Public Health



# Support for Sugary Beverage Policies, 2012



# An Alternative: Proportional Pricing?



## Value Pricing:

\$1.59 for 16 oz (9.9 cents/oz)

\$1.79 for 24 oz (7.5 cents/oz)

\$1.99 for 32 oz (6.2 cents/oz)

## Proportional Pricing:

\$1.79 for 24 oz (7.5 cents/oz)

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## Proportional Pricing:

\$1.20 for 16 oz (7.5 cents/oz)  
\$1.79 for 24 oz (7.5 cents/oz)  
\$2.40 for 32 oz (7.5 cents/oz)



# Legal Precedent

- Removing value-pricing subsidy has not been implemented before (to my knowledge), but is on the menu...

**Sec. [XX.080]. Cost-Per-Ounce Pricing for Sugar-Sweetened Beverages.** No Food Establishment that offers a Sugar-Sweetened Beverage for sale in more than one size Container shall charge a lower Cost-Per-Ounce for any size Container of Sugar-Sweetened Beverage than the Food Establishment charges for the identical Sugar-Sweetened Beverage in the smallest Container offered for sale.

**COMMENT:** Section [XX.080] would reduce one financial incentive for a Consumer to purchase a larger size serving of an SSB. Extremely large servings (for example, the large sizes at movie theaters and liter-sized bottles) are often much cheaper per ounce than smaller sizes, and there is little overall difference in sales price between a large size and a small size. This provision requires uniformity in per-ounce pricing; whatever the price-per-ounce for the smallest size sold, the larger sizes must be offered at the same price-per-ounce.

*[Alternative provision to Section [XX.080]:* **Sec. [XX.085]. Minimum Price for Sugar-Sweetened Beverages.** No Food Establishment shall sell a Sugar-Sweetened Beverage in any Container at a Cost-Per-Ounce that is less than *[six (6)]* cents.]

ChangeLab  
Solutions,  
Model  
Ordinance  
Regulating  
Sales  
of Sugar-  
Sweetened  
Beverages,  
11/2014

Also cited in Chaloupka & Davidson in Tobacco Control Legal Consortium, 2010

# Evidence of Effectiveness

- Larger portion sizes → people consume more of the product, more calories, more weight gain (e.g., French et al. 2014)
- Intervention work on pricing-portion structure is limited
  - Harnack et al. 2008, no differences
    - Small price shifts, not beverages (French fries from \$1.59 to \$1.63)
  - Vermeer et al. 2009
    - Among participants who were overweight, proportional pricing reduced likelihood of choosing a large size drink
    - But *hypothetical* scenario
    - No per-ounce labels: “Needs to be more attention to *putting emphasis on the altered price proportions*” so consumers will still think large sizes are relatively cheaper

**Our Research Question: Does proportional pricing—with or without a per-ounce label—influence actual fountain drink purchases?**



# Study Design: Field Experiment

| Condition                                 | Small<br>(16oz)       | Medium<br>(24 oz)    | Large<br>(32 oz)     |
|---|-----------------------|----------------------|----------------------|
| (A) Value price (“usual”)                 | \$1.69                | \$1.79               | \$1.89               |
| (B) Value price, plus per oz label        | \$1.69<br>(10.56¢/oz) | \$1.79<br>(7.46¢/oz) | \$1.89<br>(5.91¢/oz) |
| (C) Proportional price                    | \$1.19                | \$1.79               | \$2.39               |
| (D) Proportional price, plus per oz label | \$1.19<br>(7.46¢/oz)  | \$1.79<br>(7.46¢/oz) | \$2.39<br>(7.46¢/oz) |

# Student Cinema Concession Stand



# Hypotheses

- H1: People will purchase fewer large-sized drinks under proportional pricing compared to value pricing
- H2: Adding a per-ounce label should make these shifts more pronounced (i.e., more large drinks in value priced scenario, fewer large drinks in proportional pricing)

# Implementation

- Randomly assigned price/label condition (A, B, C, or D) to each film time over 10 weekends (February-May 2015, 5 showings per weekend)
- Study staff at every screening checked that correct signs (menu and cups) up by 15 mins before show and tallied consumers in a 10 minute period



# Outcomes

- Receipt data
  - Quantity of fountain drinks, by size, sold at each showing
  - Bottles of water sold
- Attendance data (at movies overall)

# Results: Large Drinks Sold

|          | Condition Description   | Fountain Drinks |       |       |       |          |
|----------|-------------------------|-----------------|-------|-------|-------|----------|
|          |                         | Quantity sold   |       |       |       |          |
|          |                         | Not 32 oz       |       | 32 oz |       | Subtotal |
| A        | Value price             | 65              | 65.7% | 34    | 34.3% | 99       |
| B        | Value price w/ labels   | 53              | 63.9% | 30    | 36.1% | 83       |
| C        | Proportional price      | 62              | 68.1% | 29    | 31.9% | 91       |
| D        | Prop. price w/ labels   | 65              | 74.7% | 22    | 25.3% | 87       |
| A + B    | Both value price        | 118             | 64.8% | 64    | 35.2% | 182      |
| C + D    | Both proportional price | 127             | 71.3% | 51    | 28.7% | 178      |
| Subtotal |                         | 245             |       | 115   |       | 360      |
| Total    |                         | 360             |       |       |       |          |

Any difference between A, B, C, or D:  $\chi^2=2.71$ ,  $p=0.439$ . Any difference between A/B vs C/D:  $\chi^2=1.76$ ,  $p=0.185$ . Any difference between A and B:  $\chi^2=0.06$ ,  $p=0.80$ . Any difference between C and D:  $\chi^2=0.94$ ,  $p=0.322$



# First Four Weeks (N=161)

| Condition Description |                         | Fountain Drinks |       |       |       |          |
|-----------------------|-------------------------|-----------------|-------|-------|-------|----------|
|                       |                         | Quantity sold   |       |       |       |          |
|                       |                         | Not 32 oz       |       | 32 oz |       | Subtotal |
| A                     | Value price             | 27              | 64.3% | 15    | 35.7% | 42       |
| B                     | Value price w/ labels   | 23              | 57.5% | 17    | 42.5% | 40       |
| C                     | Proportional price      | 14              | 41.2% | 20    | 58.8% | 34       |
| D                     | Prop. price w/ labels   | 34              | 75.6% | 11    | 24.4% | 45       |
| A + B                 | Both value price        | 50              | 61.0% | 32    | 39.0% | 82       |
| C + D                 | Both proportional price | 48              | 60.8% | 31    | 39.2% | 79       |
| Subtotal              |                         | 98              |       | 63    |       | 161      |
| Total                 |                         | 161             |       |       |       |          |

**Any difference A, B, C, or D:  $\chi^2=10.0$ ,  $p=0.019$ .** Any difference between A/B vs C/D:  $\chi^2=0.001$   $p=0.185$ . Any difference between A and B:  $\chi^2=0.39$ ,  $p=0.52$ . **Any difference between C and D:  $\chi^2=9.6$ ,  $p=0.002$ .**

# Last Six Weeks (N=199)

| Condition Description |                         | Fountain Drinks |       |       |       |          |
|-----------------------|-------------------------|-----------------|-------|-------|-------|----------|
|                       |                         | Quantity sold   |       |       |       |          |
|                       |                         | Not 32 oz       |       | 32 oz |       | Subtotal |
| A                     | Value price             | 38              | 66.7% | 19    | 33.3% | 57       |
| B                     | Value price w/ labels   | 30              | 69.8% | 13    | 30.2% | 43       |
| C                     | Proportional price      | 48              | 84.2% | 9     | 15.8% | 57       |
| D                     | Prop. price w/ labels   | 31              | 73.8% | 11    | 26.2% | 42       |
| A + B                 | Both value price        | 68              | 68.0% | 32    | 32.0% | 100      |
| C + D                 | Both proportional price | 79              | 79.8% | 20    | 20.2% | 99       |
| Subtotal              |                         | 147             |       | 52    |       | 199      |
| Total                 |                         | 199             |       |       |       |          |

Any difference A, B, C, or D:  $\chi^2=5.06$ ,  $p=0.167$ . Any difference between A/B vs C/D:  $\chi^2=3.59$   $p=0.058$ . Any difference between A and B:  $\chi^2=0.11$ ,  $p=0.74$ . Any difference between C and D:  $\chi^2=1.62$ ,  $p=0.203$ .

# Other Evaluations

- No differences across conditions comparing % of people who order water vs. any fountain drink
- No differences in the gender/age composition by condition (according to RA tallies)

# Limitations and Conclusions

- Very slight evidence of effectiveness of proportional pricing on behavior
- Price differences between value and proportional conditions was (only) 50 cents; prices cheaper than at most movie theaters
- Context matters:
  - Students at free movies may not be price-sensitive
  - Bring snacks and drinks (<10% of attendees buy drinks)
- Did not distinguish diet vs. regular beverages
- Exposure to prices changed at every showing—confusing to repeat customers or could cause them to ignore it
- Longer exposure may be needed to shift the very established and expected value pricing scheme

# Future Research and Policy Questions

- Maybe proportional pricing has some potential...
- Are there contexts and settings where proportional pricing works better?
- What types of labeling and information is needed to help people attend to the price shift?
- Differential impact on low-income vs. high-income?
- What do we want: **policy debate** or the **policy implementation**?
  - If behavioral change is the goal, we are seeing that with sugary drink consumption already even with limited policy implementation



Thank You!

Contact me at [sgollust@umn.edu](mailto:sgollust@umn.edu) or @sarahgollust



# Results – Full Sample

|       | Condition Description |               |       |       |       |       |       | Any Fountain Drink |
|-------|-----------------------|---------------|-------|-------|-------|-------|-------|--------------------|
|       |                       | Quantity sold |       |       |       |       |       | N                  |
|       |                       | 16 oz         |       | 24 oz |       | 32 oz |       |                    |
| A     | Value price           | 28            | 28.3% | 37    | 37.4% | 34    | 34.3% | 99                 |
| B     | Value price (labels)  | 19            | 22.9% | 34    | 41.0% | 30    | 36.1% | 83                 |
| C     | Proportional price    | 24            | 26.4% | 38    | 41.8% | 29    | 31.9% | 91                 |
| D     | Prop. price (labels)  | 17            | 19.5% | 48    | 55.2% | 22    | 25.3% | 87                 |
| A + B | Both value price      | 47            | 25.8% | 71    | 39.0% | 64    | 35.2% | 182                |
| C + D | Both prop. price      | 41            | 23.0% | 86    | 48.3% | 51    | 28.7% | 178                |
|       |                       | 88            | 24.4% | 157   | 43.6% | 115   | 31.9% | 360                |
| Total |                       | 360           |       |       |       |       |       |                    |

Any difference between A, B, C, or D:  $\chi^2=7.27$ ,  $p=0.296$ . Any difference between A/B vs C/D:  $\chi^2=3.27$ ,  $p=0.195$ . Any difference between A and B:  $\chi^2=0.70$ ,  $p=0.705$ . Any difference between C and D:  $\chi^2=3.23$ ,  $p=0.199$