

Exposing Non-consumers to the Taste and Experience of Bottled Water: Evidence from a Randomized Controlled Trial in Two African countries

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SEEDec, May 30th-31st, 2019

Outline

- Literature Review
- Research Questions
- Hypotheses
- Background
- Methodology
- Results
- Discussion & Conclusions

Literature Review

- Nudging
 - Mosquito net take up (Cohen & Dupas, 2008; Dupas, 2014)
 - Water adoption and use (Datta et al., 2015; Devoto et al., 2012)
 - Healthy eating habits (Downs et al., 2009; Hanks et al., 2012; Pitts et al., 2016; Thomas et al., 2011)
- Marketing and innovation
 - Effect of promotions on product purchase (Song, 2009, Bawa et al, 2004)
 - Bottled water/choice of water in developing countries (Cohen et al., 2017; Francisco, 2014; Quansah et al., 2015; Vásquez, 2017)

Literature Review

- Limited behavioral studies on business interventions in developing countries
- Behavioral drivers to purchase products like clean drinking water
- Cross country comparison

Research Questions

- 1) What is the effect of provision of simplified information on consumption behavior of bottled drinking water?
- 2) What is the effect of a nudge on consumption behavior of bottled drinking water, in presence of simplified information?

Hypotheses

H1: Provision of simplified personal information is positively related to consumption behavior.

H2: In the presence of simplified personal information, a nudge that provides exposure to a physical experience is positively related to consumption behavior.

Study Context



Study Context: Fresh Water Delivery in East Africa

- General: rapid urbanization and poor planning
 - Decrease in improved water sources particularly in urban areas (Dos Santos et al., 2017)
 - Market for low cost bottled drinking water
- Kenyan Coast
 - Brackish water
 - Insufficient supply
 - High non-revenue water
 - Tax increase on bottled drinking water
- Rwanda
 - Insufficient supply
 - Old infrastructure

Cases-Dutch Water Limited

- Kenyan registered company with investment from the Netherlands
- Main mission: “healthy drinking water for all”
- Central purification, sales to vendors (kiosk shops)
- Reverse osmosis
- Tax increase



Cases-Dutch Water Limited

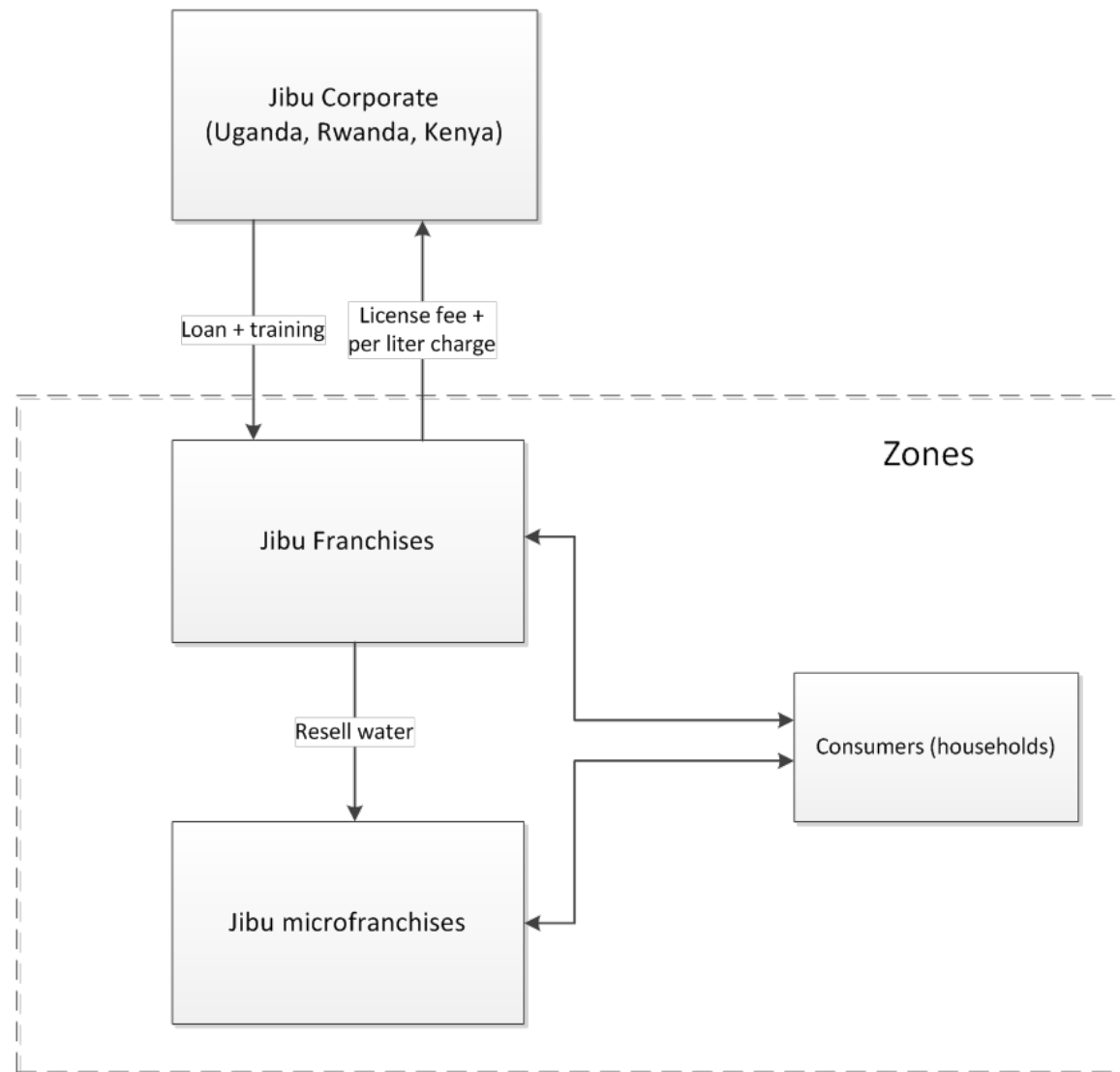


Cases-Jibu Water

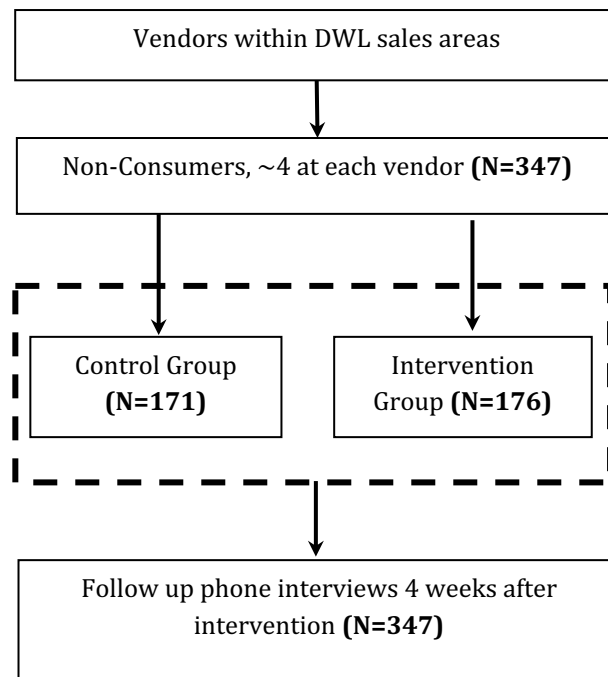
- Decentralized water purification
- Registered “benefit corporation”
- Franchise model
- Based in Rwanda and Kenya initially



Cases-Jibu Water

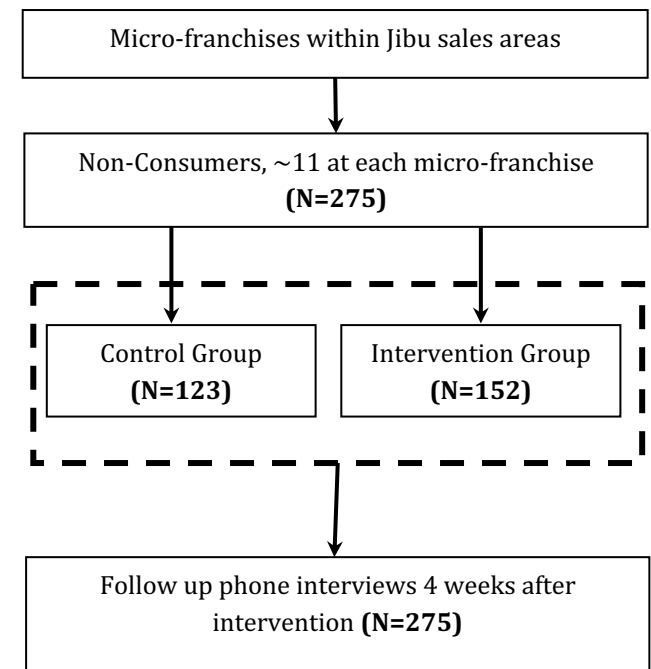


Methodology



Kenya
a

Randomized
Control Trial



Rwanda

Methodology

- Interviewed non-consumers of both companies (control and intervention group)
- Nudge: free bottle of water (10L jerry can-DWL, 2x 5L bottles-Jibu)
- All participants received information on how and where to purchase water
- Problems: one area in Rwanda had trouble collecting water

Methodology

- Employed an OLS regression on three outcome variables related to bottled water consumption: *purchase*, *purchase frequency*, *future purchase*
- **Control variables:** gender, household size, income, occupation, education, age, children, prior bottled water user, location

$$Y_{si} = \alpha_0 + \beta_1 Nudge_{si} + \beta_2 Controls_{si} + \lambda_s + \varepsilon_{si}$$

Methodology

Dependent Variables	Description
Purchased bottled water	Yes/no response to question of purchasing bottled water in the last month
Plans to purchase in the future	Yes/no
Purchase frequency	Number of times respondent purchased water in last month (0-4)
Nudge	
Received free water sample	Yes/no, represents a nudge that changes physical environment

Methodology

Control Variables	Description	Related literature
Household size	Categories up to more than 9	(de Queiroz et al., 2013; Quansah et al., 2015; Vásquez, 2017)
Respondent has children	Yes/no	(de Queiroz et al., 2013; Quansah et al., 2015; Vásquez, 2017)
Age	Respondent age (only available for Kenya)	(Rogers, 2003)
Gender	Female=1, 0 otherwise	(A. Cohen et al., 2017; de Queiroz et al., 2013)
Education level	Categories of education (primary, secondary, university) Excluded category: No education	(Francisco, 2014; Henrich, 2001; Quansah et al., 2015; Vásquez, 2017)
Employment	Informal sector, self employed vs. formal sector respondents Excluded category: all other types of employment	(Ramani et al., 2012)
Perceived Wealth	Self reported wealth on a scale from 1-5 (Very poor to very rich)	(Francisco, 2014; Quansah et al., 2015; Vásquez, 2017)
Previous experience with bottled water	Whether respondents has used bottled water before	(Rogers, 2003)
Sales location	Sales areas where respondent are located to control for the local context	(Ernst et al., 2015)

Results: Descriptives Kenya

Panel A: Kenya	Mean	Std. Dev.	Mean Control	Mean Treatment	DiM p-value
Dependent variables					
Purchased bottled water	0.579	0.494	0.485	0.670	0.000***
Plans to buy bottled water in the future	0.850	0.357	0.801	0.898	0.012**
Purchase frequency	1.236	1.337	1.088	1.381	0.041**
Nudge	0.507	0.501			
Control variables					
Household size	3.535	2.056	3.351	3.714	0.100
Respondent has children	0.363	0.482	0.339	0.386	0.362
Age	30.89	9.455	30.45	31.318	0.393
Respondent is female	0.507	0.501	0.462	0.551	0.097*
Education (Excluded category: No education)					
Primary	0.297	0.458	0.292	0.301	0.859
Secondary	0.458	0.499	0.485	0.432	0.318
University	0.216	0.412	0.205	0.227	0.610
Employment (Excluded category: All other)					
Formal sector employment	0.343	0.475	0.368	0.318	0.326
Self-employed	0.389	0.488	0.351	0.426	0.151
Perceived wealth					
Very poor	0.035	0.183	0.029	0.04	0.593
Poor	0.207	0.406	0.240	0.176	0.145
Not poor, not rich	0.663	0.473	0.649	0.676	0.596
Rich	0.081	0.273	0.070	0.091	0.480
Very rich	0.014	0.119	0.012	0.017	0.677
Previous experience with bottled water	0.352	0.478	0.339	0.364	0.635

Results: Descriptives Rwanda

Panel B: Rwanda	Mean	Std. Dev.	Mean Control	Mean Treatment	DiM p-value
Dependent variables					
Purchased bottled water	0.731	0.444	0.667	0.783	0.031**
Plans to buy bottled water in the future	0.724	0.448	0.667	0.770	0.058*
Purchase frequency	1.702	1.467	1.472	1.888	0.019**
Nudge	0.553	0.498			
Control variables					
Household size	3.465	1.801	3.39	3.526	0.534
Respondent has children	0.440	0.497	0.415	0.461	0.448
Respondent is female	0.429	0.496	0.439	0.421	0.766
Education (Excluded category: No education)					
Primary	0.320	0.467	0.285	0.349	0.259
Secondary	0.320	0.467	0.374	0.276	0.085*
University	0.218	0.414	0.195	0.237	0.407
Employment (Excluded category: All other)					
Formal sector employment	0.196	0.398	0.187	0.204	0.726
Self-employed	0.418	0.494	0.423	0.414	0.890
Perceived wealth					
Very poor	0.185	0.389	0.146	0.217	0.134
Poor	0.276	0.448	0.276	0.276	0.998
Not poor, not rich	0.316	0.466	0.325	0.309	0.778
Rich	0.178	0.383	0.211	0.151	0.197
Very rich	0.044	0.205	0.041	0.046	0.828
Previous experience with bottled water	0.549	0.498	0.553	0.546	0.911

Results OLS Regression

	Kenya			Rwanda excluded areas		
	1	2	3	7	8	9
	Purchase	Planned future purchase	Frequency of purchase	Purchase	Planned future purchase	Frequency of purchase
Nudge	0.197**	0.100**	0.324*	0.156**	0.147**	0.484**
	(0.064)	(0.036)	(0.174)	(0.064)	(0.060)	(0.219)
Household size	-0.022	-0.004	-0.056*	-0.008	-0.008	0.008
	(0.012)	(0.017)	(0.029)	(0.016)	(0.016)	(0.075)
Respondent has children	0.031	0.008	0.179*	-0.059	-0.050	-0.533***
	(0.046)	(0.051)	(0.089)	(0.054)	(0.050)	(0.172)
Age	0.000	0.001	-0.004			
	(0.002)	(0.002)	(0.006)			
Respondent is female	0.009	-0.038	-0.053	-0.005	-0.011	0.147
	(0.073)	(0.064)	(0.182)	(0.055)	(0.055)	(0.139)
Education (Excluded category: No education)						
Primary	0.125	0.156	0.259	-0.031	-0.031	-0.419
	(0.178)	(0.175)	(0.353)	(0.151)	(0.151)	(0.366)
Secondary	0.160	0.187	0.504	-0.067	-0.066	-0.261
	(0.172)	(0.167)	(0.356)	(0.127)	(0.125)	(0.458)
University	0.190	0.158	0.400	-0.082	-0.091	-0.727
	(0.199)	(0.162)	(0.371)	(0.167)	(0.175)	(0.473)

Results OLS Regression

	Kenya			Rwanda excluded areas		
	1	2	3	7	8	9
	Purchase	Planned future purchase	Frequency of purchase	Purchase	Planned future purchase	Frequency of purchase
Employment (Excluded category: All other)						
Formal sector employment	0.091 (0.081)	0.056 (0.051)	0.229 (0.258)	0.157 (0.098)	0.133 (0.087)	0.321 (0.334)
Self-employed	0.139* (0.076)	0.020 (0.039)	0.568** (0.182)	0.125 (0.104)	0.121 (0.102)	0.222 (0.341)
Perceived wealth (Excluded category: Very poor)						
Poor	0.052 (0.122)	0.048 (0.103)	-0.057 (0.445)	-0.070 (0.099)	-0.074 (0.099)	-0.047 (0.412)
Not poor , not rich	-0.032 (0.149)	0.013 (0.110)	-0.317 (0.458)	0.140** (0.058)	0.137** (0.057)	0.266 (0.241)
Rich	-0.149 (0.213)	0.055 (0.107)	-0.404 (0.632)	0.118 (0.109)	0.115 (0.111)	0.310 (0.404)
Very rich	0.288 (0.219)	0.094 (0.128)	1.427* (0.764)	-0.065 (0.148)	-0.151 (0.119)	-0.256 (0.495)
Previous experience in the use of bottled water	0.004 (0.066)	0.059 (0.047)	0.042 (0.173)	0.083 (0.063)	0.077 (0.062)	0.263 (0.259)
# of observations	347	347	347	210	210	210

Discussion & Conclusions

- Even provision of information has an effect on purchase (more than 50% in each country purchased)
- Nudge was the main statistically significant effect on purchase decision although the effect size was relatively small
- Product experience may play a larger role than income or education in decision to purchase clean drinking water
- External validity: similar results for both countries

Limitations

- Small sample size--limited power
- Similar companies but slightly different products and contexts
- Two areas in Rwanda that had problems with water pick up

Questions



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