



Promoting Healthy Food Choices for Children

*A strategic analysis on how to
incorporate behavioral economics
into nutrition education programs*

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Executive Summary

Rates of childhood obesity in the United States are high, which not only cause health problems later in life, but also have large costs on the economy. Given that childhood fruit and vegetable consumption can have a protective effect against obesity later in life, our policy project focuses on improving this behavior. Our client, Common Threads, is a nonprofit organization that seeks to combat childhood obesity through nutrition, cooking, and education programs. Common Threads is partnering with Dr. Anya Samek, an Associate Research Professor of Economics, to explore tools within the field of behavioral economics to integrate into their existing nutrition education curriculum for 3rd-5th graders called “Small Bites.” The policy question analyzed in this report is:

Which behavioral economic tools are the most effective for Common Threads to use to expand their fight against childhood obesity?

Through our literature review of available policy options, we found that behavioral economic tools were the best suited to increase fruit and vegetable consumption in children. Within the realm of behavioral economics, we narrowed our options down to four tools: Reciprocity, Commitment, Defaults, and Framing. Using model interventions from available studies to estimate impact, we evaluated each of these four policy options on four criteria: effect size, duration of effect, cost-effectiveness, and political feasibility.

In our analysis, we found that implementation costs would be exceptionally low, and it would be possible to combine some policy interventions while still falling within Common Threads' budget constraint of \$1 per student. Thus, our policy recommendation to Common Threads is to adopt the Reciprocity, Commitment, and Framing interventions simultaneously, and offer them to schools as a bundled package.

The outline of the report is as follows: Chapter 1 reviews our client, the policy problem we are trying to answer, the importance of the problem, and the limitations of current approaches; Chapter 2 reviews our policy options; Chapter 3 reviews our criteria for choosing a policy option; Chapter 4 evaluates each policy option using the criteria from Chapter 3; Chapter 5 is a sensitivity analysis of our findings; Chapter 6 outlines our policy recommendations for Common Threads and suggests implementation strategies; and Chapter 7 discusses the potential policy implications of our findings.



Chapter 1

The Client and the Problem

In this chapter, we discuss our client, the importance of their mission, and the limitations of current nutrition education programs in combating obesity.

1-1. Client

Our client is Common Threads, a 501(c)(3) nonprofit organization that uses nutrition and cooking programs to develop children's love of eating to prevent obesity. Common Threads currently serves over 113 schools and works in five cities: Chicago, Los Angeles, Miami, New York City, and Washington, D.C. Their programs target low-income, urban schools and work to empower children to make healthy choices both in school and at home. Common Threads is Common Core aligned, making it easier for schools to partner with them and provide nutrition education. Current programs offered by Common Threads include in-classroom nutrition lessons, after-school programs, teacher education, and parent-focused programs.

Common Threads is working to find ways to increase healthy eating behaviors in Small Bites, one of its nutrition programs for 3rd-5th grade students. The organization is currently examining how behavioral economic tools can impact behavior change in students. Behavioral economics is an economic analytic technique used to explain how individuals make decisions which draws concepts from several fields, including psychology and habit formation. Common Threads is partnered with Dr. Anya Samek, an Associate Research Professor of Economics at the University of Southern California, who has conducted previous studies using behavioral economic tools that

found positive effects on children’s eating habits.^{1,2} Given the success of her research, the partnership is optimistic that adding behavioral economic tools to the program will help Common Threads in its mission to prevent childhood obesity.

In addition to examining behavioral economic tools within the Common Threads curriculum, our own conversations with staff revealed the nonprofit’s interest in expanding its offerings to new cities, schools, and the broader community. Given this interest, we partnered with Common Threads and Dr. Samek to investigate which behavioral economic tools would be both effective at changing eating behaviors in children and easily implemented in schools.

With this in mind, our policy question is: *Which behavioral economic tools are the most effective for Common Threads to use to expand their fight against childhood obesity?*

1-2. Importance of Common Threads Mission

Today, 38% of adults in the US are obese³ and another 33% are overweight, with statistically significant differences between ethnicities. For example, there are higher rates of childhood obesity for Hispanics (21.9%) and non-Hispanic blacks (19.5%) compared to non-Hispanic

¹ Anya S. Samek, “Gifts and Goals: Behavioral Nudges to Improve Child Food Choice at School” (CESR-Schaeffer working paper no. 2016-007, 2016), doi:10.2139/ssrn.2729579.

² John A. List and Anya S. Samek, “The Behavioralist as Nutritionist: Leveraging Behavioral Economics to Improve Child Food Choice and Consumption,” *Journal of Health Economics* 39 (2015): 135-146, doi:10.1016/j.jhealeco.2014.11.002.

³ The CDC defines obesity using Body Mass Index, or BMI, which is based on a weight to height ratio and does not directly measure body fat.

whites (14.7%).⁴ In addition, 17% of children and adolescents aged 2-19 years old are obese.⁵ That percentage is higher among adolescents (20.5% of 12-19 year olds) compared to young children (8.9% of 2-5 year olds). Obese children are more likely to be obese in adulthood and to be exposed to the health risks associated with obesity.⁶

Reducing obesity in children is incredibly important because of the comorbidities, or diseases associated with obesity. Comorbidities include but are not limited to: hypertension, cholesterol problems, type II diabetes, heart disease, stroke, and mental illness.⁷ There are also social stigmas surrounding obesity, which could have negative psychological impacts on obese children.⁸ Not only does obesity have serious consequences for an individual's health, it harms the U.S. economy with lower job productivity and higher medical and human capital costs.⁹ In 2008, estimated medical costs of obesity were \$147 billion, and the annual productivity costs of obesity-related absenteeism was \$3.38 billion.¹⁰ Common Threads and similar providers of nutrition education play an integral part in helping reduce childhood obesity and later adult obesity.

⁴ "Prevalence of Obesity Among Adults and Youth: United States, 2011–2014," Centers for Disease Control and Prevention (CDC), last modified October 28, 2015, <https://www.cdc.gov/nchs/data/databriefs/db219.htm>.

⁵ Ibid.

⁶ S.S. Guo and W. C. Chumlea, "Tracking of Body Mass Index in Children in Relation to Overweight in Adulthood," *American Journal of Clinical Nutrition* 70 (1999): 145S–8S.

⁷ "Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report," NIH Obesity Education Initiative, National Heart, Lung, and Blood Institute. *NIH Publication* 98, no. 4083 (September 1998).

⁸ R.M. Puhl and J.D. Latner, "Stigma, Obesity, and the Health of the Nation's Children," *Psychological Bulletin* 133, no. 4 (July 2007): 557-580, doi:10.1037/0033-2909.133.4.557.

⁹ Ross A. Hammond and Ruth Levine, "The Economic Impact of Obesity in the United States," *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy* 3 (2010): 285-295, doi:10.2147/DMSOTT.S7384.

¹⁰ "Prevalence of Obesity Among Adults and Youth: United States, 2011-2014."

1-3. Schools as an Intervention Location

When considering the relevance of behavior change on obesity, research has found that consumption of fruits and vegetables during childhood is inversely associated with metabolic syndrome (obesity's comorbidities, such as diabetes, hypertension, blood pressure) as an adult, even after taking into account adult vegetable consumption.¹¹ Increasing intake of fruits and vegetables as a child could have a protective effect against obesity.¹² Thus one of the most effective ways to prevent adult onset obesity is to increase fruit and vegetable consumption of children.

Schools are the primary location of intervention efforts for children, as students spend nearly half of their day at school. Children consume on average 35% of their food at school, and this increases to nearly half for students who participate in the National School Lunch Program.¹³ Thus, schools are opportune places to influence student health outcomes. However, they are not maximized, despite the attention it received in the last decade with the Healthy, Hunger-Free Kids Act (2010).

¹¹ P. Jaaskelainen et al., "Childhood Nutrition in Predicting Metabolic Syndrome in Adults: the Cardiovascular Risk in Young Finns Study," *Diabetes Care* 35, no. 9 (2012): 1937-1943, doi:10.2337/dc12-0019.

¹² Ibid.

¹³ Claire K. Berezowitz, Andrea B. Bontrager Yoder, and Dale A. Schoeller, "School Gardens Enhance Academic Performance and Dietary Outcomes in Children," *Journal of School Health* 85, no. 8 (2015): 508-518, doi:10.1111/josh.12278.

1-4. Limitation of Current Nutrition Education

Current traditional nutrition education efforts in public schools are not effective methods for changing the eating behaviors of students and improving health outcomes. This is especially true given the budget necessary to implement meaningful programs. Across the country 68% of states, including California, require public schools to offer nutrition education as part of general health instruction for elementary schools.¹⁴ While the Healthy, Hunger-Free Kids Act requires all schools to have a wellness policy for their students, it does not specifically require nutrition education.¹⁵

In order to discover the impact and limitations of current nutrition education programs, we conducted a literature review of various nutrition studies. Our extensive review included:

- A review of 49 randomized control trial or quasi-experimental studies that Dudley et al. (2015)¹⁶ identified in their meta-study, and
- Eight additional studies that met the same criteria as the initial study.¹⁷

For each study, we calculated a standardized effect size commonly used in the literature, Cohen's d , which is defined by the following equation:

$$d = \frac{\bar{x}_t - \bar{x}_c}{SD_{pooled}}$$

¹⁴ "Nutrition Education," National Association of State Boards of Education (NASBE), *State School Health Policy Database*, last modified June 3, 2013, http://www.nasbe.org/healthy_schools/hs/bytopics.php?topicid=1150.

¹⁵ United States, *An Act to Reauthorize Child Nutrition Programs, and for Other Purposes: The Healthy, Hunger-Free Kids Act*, Washington, DC: GPO, 2010.

¹⁶ Dean A. Dudley, Wayne G. Cotton, and Louisa R. Peralta, "Teaching Approaches and Strategies that Promote Healthy Eating in Primary School Children: a Systematic Review and Meta-Analysis," *International Journal of Behavioral Nutrition and Physical Activity* 12, no. 1 (2015), doi:10.1186/s12966-015-0182-8.

¹⁷ While these studies are not explicitly cited in this paper, they are listed in the bibliography for reference.

where \bar{x}_t is the mean of the treatment group, \bar{x}_c is the mean of the control group, forming a difference of means SD_{pooled} is the pooled standard deviation of the treatment and control conditions. Although the studies we analyzed did not always report these exact values, other Cohen's d equations allowed us to use reported t-statistics or standard errors.

Calculating a standardized effect size allowed us to compare studies' different outcomes and thus allowed us to compare across interventions. This measure is a commonly reported effect size due to its simplicity and comparability; effect sizes calculate the number of standard deviations of the study sample and can be standardized across samples. For example, no common definition of a "serving" of fruit or vegetable exists, and those values often vary by the type of fruit or vegetable consumed. When a study reports that 1.5 additional servings were consumed, on average, and the standard deviation of the treatment and control group are both .90, the Cohen's d is 1.67. Other studies reported results in the mass of food consumed, the volume consumed, or the number of items taken; because these aren't directly comparable, a standardized effect size is necessary.

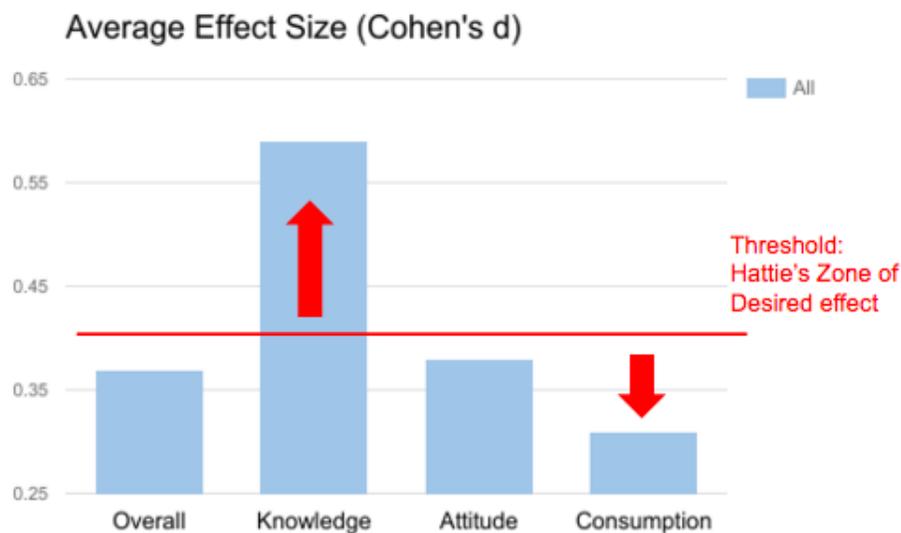
The relative magnitude of Cohen's d effect sizes must be compared to other studies in the same field. Often, these are then assigned qualitative values such as "high," "medium," and "low." In the field of education meta-analysis, the recommended cutoff for a high effect size is .40; interventions above this threshold are deemed to be in the "zone of desired effects."¹⁸ In the field of nutrition and public health, the cutoffs vary; however, many studies use similar cutoff

¹⁸ John Hattie, *Visible Learning: A Synthesis of Over 800 Meta-Analyses Relating to Achievement* (London: Routledge, 2009).

points,¹⁹ while others consider large effect sizes to be greater than .80²⁰ or .70.²¹

After calculating Cohen's d for each of these studies, we found that the average impact of nutrition education on knowledge was 0.59, while the average standardized effect size on consumption was only 0.31, as seen in Figure 1.²² It should also be noted that these studies examined carefully designed educational interventions in a controlled, experimental setting, and thus might not be representative of nutrition education broadly.

Figure 1: Average Effect Sizes of Traditional Nutrition Education Programs



¹⁹ Lenny R. Vartanian, Marlene B. Schwartz, and Kelly D. Brownell, "Effects of Soft Drink Consumption on Nutrition and Health: A Systematic Review and Meta-Analysis," *American Journal of Public Health* 97, no. 4 (2007): 667–675, doi:10.2105/ajph.2005.083782.

²⁰ Rik Crutzen, "Adding Effect Sizes to a Systematic Review on Interventions for Promoting Physical Activity Among European Teenagers," *International Journal of Behavioral Nutrition and Physical Activity* 7, no. 1 (2010): 7-29, doi: 10.1186/1479-5868-7-29.

²¹ N. Santesso et al., "Effects of Higher- versus Lower-Protein Diets on Health Outcomes: A Systematic Review and Meta-Analysis," *European Journal of Clinical Nutrition* 66, no. 7 (2012): 780-788, doi:10.1038/ejcn.2012.37.

²² Cohen's d is calculated for studies included in Dudley et al. (2015) up through May 2014, as well as studies published after May 2014 selected through similar methodology.

Using John Hattie's cutoff effect size of $d > 0.40$ ²³, we conclude that while traditional nutrition education has substantial effects on knowledge, it does not have equivalent effects on consumption. Given the importance of actualizing healthy eating habits, not merely knowing what is healthy, this is not reassuring.²⁴

There is little evidence of an enduring effect of either the increase in knowledge or consumption from nutrition education, despite frequently long periods of intervention. The treatment durations of the included studies ranged from two weeks to six years, with an average duration of nearly 29 weeks. However, the majority of studies did not conduct a long-term follow-up, and we cannot determine the duration of the effects post-treatment. From our review of the literature on existing nutrition education efforts, we found that there are positive effects on improving knowledge, but not substantive impacts on fruit and vegetable consumption, and neither of these effects are proven to be long lasting.

In light of this discouraging evidence, it is necessary for school staff, nutrition program developers like Common Threads, and other stakeholders to examine the options available to bolster these outcomes during a child's developmental years. While Common Threads' programs tackle multiple sides of the issue — from parents to students to teacher education — much of the programming is still done in the form of traditional nutrition education: an instructor teaches a

²³ John Hattie, *Visible Learning*.

²⁴ We also looked solely at outcomes that studies indicated had statistically significant effects. For the statistically significant outcomes, the Cohen's *d* for knowledge, positive attitude towards healthy choices, and consumption are 0.69, 0.47, and 0.38 respectively. Although this method increases the average calculated effect sizes, it is likely an overestimate for typical nutrition education interventions, as it selectively eliminates interventions that have effects not statistically significant different from zero.

lesson, the students absorb information, and then they do an activity. This method is well received by schools, students, and the communities in which Common Threads works, and also has been proven to have substantive effects on students' knowledge (Cohen's $d > 0.40$). However, Common Threads' recent internal data show that its own programs are not effective at *changing healthy behaviors*.²⁵ This is the problem Common Threads wishes to address moving forward. Given that the traditional nutrition education is not effective, what tools could and should be utilized to create behavior change in students? Common Threads has a budget constraint of \$1 per student to integrate new tools into their Small Bites curriculum. Limited financial resources and constrained classroom time make finding cost-effective, durable solutions a difficult, yet necessary task.

²⁵ From UCLA APP Team internal calculations of confidential data. (Fall 2016). Common Threads. "Common Threads SY1516 SB Final Matched Data USC APP." This data uses self-reported measures of consumption, which are less reliable than the direct observations of consumption used in the literature and would likely be subject to reporting bias.



Chapter 2

Policy Options

Our initial analysis established the ineffectiveness of current nutrition education in creating durable changes in healthy food consumption. This chapter identifies two alternative types of interventions, strict paternalism and conditional (financial) incentives, and explains why we chose to examine interventions in the realm of behavioral economics.

2-1. Strict Paternalism

One method schools have previously used to advance students' health is a strictly paternalistic approach - restricting access to unhealthy foods or eliminating them altogether. However, this conflicts with Common Threads' mission, and the power to set school- or district-wide policy is outside its control. These interventions are politically contentious and have a varied history, such as LA Unified School District's recent decision to un-ban chocolate milk to decrease food waste.²⁶ Although a district can require that every student be served a healthy option, they cannot force children to consume the food, which leads to waste. Nationally, 42% of vegetables and 22% of fruit is thrown away as plate waste.²⁷ Finally, school-based restrictions may not have a net impact on health if students can substitute snacks. For example, studies on eliminating vending machines from schools have found evidence that eliminating soda had no effect,²⁸ or potentially even increased overall soda consumption.²⁹ For these reasons, we eliminated strict

²⁶ Anna M. Phillips, "The Drought is Over at L.A. Schools. For Chocolate Milk, Anyway," *Los Angeles Times*, October 18, 2016, <http://www.latimes.com/local/education/la-me-edu-chocolate-milk-20161018-snap-story.html>.

²⁷ Jean C. Buzby and Joanne F. Guthrie, "Plate Waste in School Nutrition Programs: Final Report to Congress," Economic Research Service/USDA. E-FAN-02-009 (March 2002).

²⁸ Jason M. Fletcher, David Frisvold, and Nathan Tefft, "Taxing Soft Drinks And Restricting Access To Vending Machines To Curb Child Obesity," *Health Affairs* 29, no. 5 (2010): 1059-1066, doi:10.1377/hlthaff.2009.0725.

²⁹ Daniel R. Taber et al., "How State Taxes and Policies Targeting Soda Consumption Modify the Association

paternalism as an option for Common Threads.

2-2. Conditional Incentives

Direct conditional incentives are used to subsidize healthy decisions and assume that subjects will respond rationally to these concrete, tangible payoffs. The simplest example would be to pay children for eating more fruits and vegetables. These interventions, while potentially effective in the short-term,^{30,31} encounter difficulties in implementation. First, they are expensive to run, given the costs of the incentives and monitoring participant behavior.³² Second, these interventions may negatively affect internal motivation, tying the habit to the incentive and thus undermining an individual's intrinsic interest when the incentive ends.^{33,34} Finally, these interventions are infeasible to implement and monitor outside of a controlled setting, such as the choices made by students after school. These types of interventions also do not fall within the scope of our client's services. Considering the above discussion, we also eliminated this option for Common Threads.

Between School Vending Machines and Student Dietary Behaviors: A Cross-Sectional Analysis," *PLoS ONE* 9, no. 8 (2014), doi:10.1371/journal.pone.0098249.

³⁰ Edward L. Deci, Richard Koestner, and Richard M. Ryan, "A Meta-Analytic Review of Experiments Examining the Effects of Extrinsic Rewards on Intrinsic Motivation," *Psychological Bulletin* 125, no. 6 (1999): 627-668, doi:10.1037//0033-2909.125.6.627.

³¹ David R. Just and Joseph Price, "Using Incentives to Encourage Healthy Eating in Children," *Journal of Human Resources* 48, no. 4 (2013): 855-872, doi:10.1353/jhr.2013.0029.

³² Ibid.

³³ Deci et al., "A Meta-Analytic Review."

³⁴ Judy Cameron and W. David Pierce, "Reinforcement, Reward, and Intrinsic Motivation: A Meta-Analysis," *Review of Educational Research* 64, no. 3 (1994): 363-423, doi:10.2307/1170677.

2-3. Behavioral Economics

In light of the limitations of the aforementioned approaches, we turn to the field of behavioral economics. Our analysis relies on the assumption that health and nutrition habits are malleable and can be influenced by external factors. That is, consumption behaviors are not fixed, exogenous variables but are, in fact, endogenously determined based on a series of factors. Therefore, manipulating these factors can improve eating habits and subsequently important health outcomes. This model suggests that a more permanent effect on eating behavior or consumption is indeed possible and surely desirable.

One mechanism through which behavior change of consumption can occur is taste exposure. Birch and Marlin (1982)³⁵ and, recently, Wardle et al. (2003)³⁶ find that children learn to like and *consume* more of a food they had more exposure to. These findings suggest that interventions that directly encourage consumption, even in the short term, may have an enduring effect beyond positive reactions driven solely by knowledge gleaned through classroom education. Furthermore, literature on habit formation in nutrition as well as across fields suggests that targeted and sustained interventions on changing actions can have a continued effect even after the intervention has ended.^{37,38,39} These considerations indicate the need to look towards policy

³⁵ Lean L. Birch and Diane W. Marlin, "I Don't Like It; I Never Tried It: Effects of Exposure on Two-Year-Old Children's Food Preferences," *Appetite* 3, no. 4 (1982): 353-360, doi:10.1016/S0195-6663(82)80053-6.

³⁶ Jane Wardle et al., "Modifying Children's Food Preferences: the Effects of Exposure and Reward on Acceptance of an Unfamiliar Vegetable," *European Journal of Clinical Nutrition* 57, no. 2 (2003): 341-8, doi:10.1038/sj.ejcn.1601541.

³⁷ George Loewenstein, Troyen Brennan, and Kevin G. Volpp, "Asymmetric Paternalism to Improve Health Behaviors," *JAMA* 298, no. 20 (2007): 2415-2417, doi:10.1001/jama.298.20.2415.

³⁸ Laura McGowan et al., "Healthy Feeding Habits: Efficacy Results From a Cluster-Randomized, Controlled

alternatives that incorporate these factors. Given the vastness of this field, and the lack of a specific taxonomy for interventions, we distinguished between two broad types of interventions: choice architecture and internal behavioral tools.

First, we classified interventions aimed at changing the *settings* of choice as “**choice architecture.**”⁴⁰ We distinguished these interventions as those that do not aim to change the internal decision mechanisms of a student, but instead design a setting or context that favorably leverages pre-existing beliefs or habits. These include interventions such as framing, defaults, and feedback.^{41,42} These interventions usually are effective in changing consumption and have high cost-efficiency and external validity, but may not align with our client’s mission nor easily extend to settings outside of the manipulated context. For example, studies that modify school lunchroom or cafeteria layouts have proven to be highly effective in promoting healthy food consumption,^{43,44} but do not have an effect once the student leaves the manipulated environment.

Second, we categorized interventions that aim to change a student’s specific preferences or mental processes as “**internal behavioral tools.**” These tools attempt to induce behavior change

Exploratory Trial of a Novel, Habit-Based Intervention with Parents,” *American Journal of Clinical Nutrition* 98, no. 3 (September 2013): 769-777, doi: 10.3945/ajcn.112.052159.

³⁹ Reshmaan Hussam et al., “Habit Formation and Rational Addiction: A Field Experiment in Handwashing” (working paper, Yale University, November 10, 2016), http://media.wix.com/ugd/b51e74_d9113402644647ccbafbae1500276c3c.pdf.

⁴⁰ Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness* (New York, NY: Penguin Books, 2009).

⁴¹ Thaler and Sunstein, *Nudge*.

⁴² See Table 1 in Appendix A for more details.

⁴³ David R. Just and Brian Wansink, “Smarter Lunchrooms: Using Behavioral Economics to Improve Meal Selection.” *Choices* 24, no. 3 (2009), doi:10.1016/j.jneb.2014.04.261.

⁴⁴ H. Ensaff et al., “Food Choice Architecture: An Intervention in a Secondary School and its Impact on Students’ Plant-based Food Choices,” *Nutrients* 7, no. 6 (2015): 4426-4437, doi:10.3390/nu7064426.

and habit formation directly and can be assigned to one of six categories, including Reciprocity and Commitment.^{45,46} A growing number of studies and meta-analyses describe the success of these interventions in general, as well as identify those that are the most effective.^{47,48,49} By manipulating the behaviors and internal processes of students, these interventions prove to have positive effects on consumption of healthy foods. These are also highly cost-effective, often requiring few additional resources or staff; are easy to reproduce; and align with our client's mission and programs. Currently, the primary topic for research in this field pertains to the duration of effects and whether or not they engender long-term habit formation. As previously mentioned, given the newness of this field and the perpetual difficulty in long-term follow up studies, duration remains an elusive factor. Our initial findings from the literature show mixed durations for behavior change at three and six months post-treatment. However, these lingering effects are generally larger than those measured for traditional nutrition education, and may extend beyond the setting of a school cafeteria.

⁴⁵ Based on Cialdini's "Weapons of Influence." Robert B. Cialdini, *Influence: The Psychology of Persuasion* (New York, NY: Collins, 2007).

⁴⁶ See Table 2 in Appendix A for more details.

⁴⁷ Samek, "Gifts and Goals."

⁴⁸ Alice S. Ammerman, "The Efficacy of Behavioral Interventions to Modify Dietary Fat and Fruit and Vegetable Intake: A Review of the Evidence," *Journal of Preventative Medicine* 35, no. 1 (2002): 25-41, doi:10.1006/pmed.2002.1028.

⁴⁹ Cynthia A. Thomson and Jennifer Ravia, "A Systematic Review of Behavioral Interventions to Promote Intake of Fruit and Vegetables," *Journal of the American Dietetic Association* 111, no. 10 (2011): 1523-1535, doi:10.1016/j.jada.2011.07.013.

2-4. Policy Options for Evaluation

We assessed each of the choice architecture and internal behavioral tools and narrowed our scope to four policy options that we evaluate in depth in Chapter 4. For more detail on the selection process of our policy options, see Table 3 in Appendix A. Our policy options are: Reciprocity and Commitment (internal behavioral tools), and Defaults and Framing (choice architecture).

1. RECIPROCITY⁵⁰

Reciprocity involves exchanging something with another in which both people benefit. The type of reciprocity intervention we will be evaluating is known as “unconditional incentives.” This strategy involves the teacher handing out a sticker to each student before lunch and saying, “Thank you for making the healthier choice today.” The incentive is unconditional as each student receives a sticker regardless of whether they choose to eat healthy or not. However, reciprocity theory leads us to believe that in exchange for receiving the sticker, students will feel a sense of obligation in response and choose to eat healthy.

2. COMMITMENT⁵¹

Commitment theory states that people are more likely to follow through with something that is aligned with internal beliefs or goals. The type of commitment intervention we will be evaluating is known as “goal setting.” This strategy involves each student writing

⁵⁰ Cialdini, *Influence: The Psychology of Persuasion*.

⁵¹ Ibid.

down a goal related to consuming fruits and vegetables, as part of the Common Threads curriculum. When the students leave for lunch, they will be more inclined to choose healthier foods because they have written a goal, and therefore committed to that goal.

3. DEFAULTS⁵²

Defaults involve making the default option the healthier food. While there are many restrictions on which foods can be provided in the cafeteria, schools have some flexibility in changing the way foods are offered or displayed. The default intervention we will be evaluating is the default entree or side being the healthier option and the unhealthier option not on display. When students are in line for their meal, they will automatically be handed a healthy meal and will only receive the less healthy option if they ask to change it. As most people tend to accept the default option, we expect an increased in healthy food consumption.

4. FRAMING⁵³

Framing involves changing the presentation to encourage a desired behavior. Common Threads' curriculum is offered in school, so the cafeteria would be "framed" in a way to encourage children to choose healthier foods. This intervention would rename the fruits and vegetables to be fun and more appealing to children. For example, replacing "carrots"

⁵² Thaler and Sunstein, *Nudge*.

⁵³ Ibid.

with “X-ray vision carrots.”⁵⁴ Changing the presentation of the food, in conjunction with the Common Threads nutrition program, may push the effect size of consumption of fruits and vegetables over our 0.4 Cohen’s d threshold.

⁵⁴ Brian Wansink, Brian, David R. Just, Collin R. Payne, and Matthew Z. Klinger, “Attractive Names Sustain Increased Vegetable Intake in Schools,” *Journal of Preventative Medicine* 55 (July 2012): 330-332, doi:10.1016/j.ypped.2012.07.012



Chapter 3

Policy Evaluation Criteria

Any policy option should not only have substantive effect sizes for changing consumption, but also be feasible for Common Threads to implement given its role providing nutrition education to schools. Therefore, in order to evaluate policy interventions for Common Threads, we employed four criteria: effect size, duration of effect, cost-effectiveness, and political feasibility. For reasons explained further in Chapter 4, political feasibility is weighted most important, then cost-effectiveness (effect size included in this), and duration weighted least important in evaluating our policy options.

1. EFFECT SIZE

Effect size will help us determine the size and significance of fruit and vegetable consumption change that occurs under each policy intervention. Similar to our analysis of traditional nutrition education, this is quantified using Cohen's *d* to standardize effect size. Again, we consider a value of 0.40 to be a medium-to-large outcome worthy of consideration.⁵⁵

2. DURATION OF EFFECT

For duration, we note the longevity of the behavior change. Although it is rare to find long-term follow up in a study, we look for the length of time before which no statistically significant differences are observed between the treatment and control groups. We are also mindful of any potential crowding out effects, where outcomes may return to lower than pre-intervention levels post-intervention. Unfortunately, duration is unavailable for a majority of

⁵⁵ Based on Hattie's "Zone of Desired Effect." Hattie, *Visible Learning*.

the studies listed. For this criterion, we thus rely on broader theories of duration of effect for each intervention.

3. COST-EFFECTIVENESS

For cost-effectiveness, we compare the effects on consumption against the monetary value of the intervention. Although few studies list precise costs, these costs are inferred through stated intervention techniques, required teacher time, and other tangible inputs.

4. POLITICAL FEASIBILITY

Under political feasibility, we explore stakeholder feedback from those who might have a say in implementation. Feedback from students, families, teachers, school administrators, and other parties could affect adoption of certain interventions. This measure of feasibility also includes the relative ease with which Common Threads could reproduce and monitor the program at new sites. If either the studied population or the particular implementation procedure is not representative or easily duplicated, an intervention will score poorly.



Chapter 4

Evaluation of Policy Options

In this chapter, we evaluate our four policy alternatives: Reciprocity, Commitment, Defaults, and Framing.

In order to evaluate the policy options, we chose a model intervention that represented the most replicable and effective program for each of the four intervention types. These archetypal interventions were drawn from literature as well as our discussions with researchers. With a specific intervention in mind, we are thus able to more accurately gauge effect size, duration, costs, and political feasibility.

4-1. Effect Size

Schools can be studied at different levels: the school level, the classroom level, and the individual student level. These levels are nested within each other, and thus studies focused on schools involve multi-level designs. In most cases, studies involving school students employ a cluster randomized design, in which groups of students, either a whole school or a whole classroom, are assigned to treatment and control. It is important to note that in these multi-level models, a different effect size for our policy options can be calculated for each different level.⁵⁶

In our survey of literature, we identified studies with one, two, and three levels of nesting. However, because most of these studies did not report the necessary statistics to calculate a single type of effect size comparable across all of the studies, we were limited to reporting effect sizes of different types (effect sizes at the individual, classroom, and school level). This is a

⁵⁶ Larry V. Hedges, "Effect Sizes in Nested Designs," *The Handbook of Research Synthesis and Meta-Analysis*, eds. Harry Cooper, Larry V. Hedges, and Jeffrey C. Valentine (New York: Russell Sage Foundation, 2009), 337-353.

limitation of our literature review, because in order to compare effect sizes across studies, the same type of effect size must be used.⁵⁷

Ignoring these multi-level structures in meta-analyses may substantially underestimate standard errors and deviations and thus overestimate effect sizes, especially when treatment and control groups differ in the number of students per classroom or classrooms per school.⁵⁸ *Therefore, in calculating effect sizes for the various archetypal studies in our four options, we attempted to select the same type of effect size that ignores these levels in order to compare them.*

The remainder of the criteria analysis section will continue to report treatment effects as the standardized Cohen's *d* for the purpose of comparisons. However, these effect sizes are often unintuitive. In the Policy Recommendation section, these effect sizes will be translated into the outcome variable units initially reported in the studies for ease of interpretation.

4-1-1. Internal Behavioral Tools

To calculate the effects of the internal behavioral tools, we used data from Samek's *Gifts and Goals*.⁵⁹ This study is our model treatment for both Commitment and Reciprocity. The study uses a multisite cluster randomized trial, for which individual classrooms within a school are randomly assigned to one of two treatment conditions or control. The dependent variable of

⁵⁷ Ibid.

⁵⁸ Ibid.

⁵⁹ Samek, "Gifts and Goals."

interest is milk choice, where the healthy option is to choose white milk and the unhealthy option is to choose chocolate milk or no milk at all. These choices are aggregated at the classroom level to calculate differences in the percent of students choosing the healthy option over the unhealthy option. Results are measured at the classroom aggregate level, and not by the individual student. The study's population ranges from K-6, thus falling just above and just below the initial grade level we are targeting in our intervention and well within the population that Common Threads works with in its programs. The study population includes 1,483 children divided among 90 classrooms in 8 schools.

In the reported results of the study for the Reciprocity treatment, in which students are given a sticker before lunch thanking them for making a healthy decision, 15% more students in the average classroom chose white milk. In the Commitment treatment, where students were asked to set a goal for a milk choice, there was a 10% increase of students in the class who chose white milk, controlling for grade level. These findings were statistically significant at the .1 and .05 levels, respectively.

Multi-Level Modeling of Effect Size

Because of the nested structure of the study, effect sizes are more difficult to calculate. However, if we ignore this structure and calculate Cohen's d as we did in our literature review, we arrive at naïve estimates of 0.75 for Reciprocity and 0.47 for Commitment. Although both are likely overestimates, these are still well above the thresholds for large education effects and between medium and large nutritional effects, and are more comparable to the other studies cited for

Framing and Defaults.

Reciprocity and Commitment HLM Effect Sizes

To compare these outcomes to other research which acknowledges the correct, nested structure of the data, we calculate the appropriate standardized effect sizes of .574 and .410 for Reciprocity and Commitment, respectively.⁶⁰ These effect sizes are slightly smaller than the estimates in the unnested model, but still in the zone of desired effects, and should represent more accurate estimates. However, because our estimates for Framing and Defaults do not account for this nested data, and we do not have the raw data to accurately incorporate that structure, *the simple, non-HLM model is likely more reliable for comparison.*

4-1-2. Choice Architecture Tools

To estimate expected effect sizes for Framing and Defaults, we first reviewed literature to find a study that was: (1) most similar to our archetypal intervention, (2) studied in a controlled research setting, and (3) reported the information necessary to calculate effect size.

Defaults

Under the Healthy, Hunger-Free Kids Act (2010), school lunches are required to include a fruit or vegetable serving in order to qualify for federal reimbursement as part of the National School

⁶⁰ See Appendix B for the full Hierarchical Level Model.

Lunch Program.⁶¹ Previously, students could choose among multiple options to comprise a fully reimbursable meal and not have to necessarily choose a fruit or vegetable. This change in policy allows us to approximate the effect of a default: students received a fruit or vegetable, but can opt out of its consumption by throwing it away. The research is mixed on the program's effect on consumption and waste.^{62,63} Schwartz et al. (2015) find different results for fruits and vegetables in a study of middle school students: fruit choice increased and consumption among those choosing fruit remained constant, while vegetable choice decreased but consumption among those choosing vegetables increased.⁶⁴ In a more isolated examination of defaults on their own in an elementary school that opted into the fruit and vegetable requirement before the other aspects of the new Act's requirements took effect, the proportion of students that ate at least one serving of fruits or vegetables increased by 8 percentage points.⁶⁵ This yields a very large effect size of 1.18. However, given the null results in the same study's cross-district comparison, as well as other studies' lack of significant or substantial findings, this effect size may be considered an overestimate, or upper limit for true effect size. The mandated serving for a fruit and vegetable leads to a considerably higher proportion of students taking a serving, even if they're not eating it. It is thus unlikely that, given the option to switch to a different item, the same number of

⁶¹ Cynthia Long, *Updated Offer versus Serve Guidance for the National School Lunch Program and School Breakfast Program in School Year 2013-2014*. Memorandum SP 45-2013, United States Department of Agriculture, Food and Nutrition Service (June 2013).

⁶² Andrew S. Hanks et al., "Healthy Convenience: Nudging Students Toward Healthier Choices in the Lunchroom," *Journal of Public Health (Oxf)* 34, no. 3 (August 2012): 370-376, doi:10.1093/pubmed/fds003.

⁶³ David R. Just and Joseph Price, "Default Options, Incentives and Food Choices: Evidence from Elementary-School Children," *Public Health Nutrition* 16, no. 12 (December 2013): 2281-2288, doi:10.1017/S1368980013001468.

⁶⁴ Marlene Schwartz et al., "New School Meal Regulations Increase Fruit Consumption and Do Not Increase Total Plate Waste," *Journal of Child Obesity* 11, no. 3 (June 2015): 242-7, doi:10.1089/chi.2015.0019.

⁶⁵ Just and Price, "Default Options."

students will take a fruit or vegetable.

Framing

The study used for Framing is by Wansink et al.⁶⁶ The researchers conducted two studies on the effects of giving vegetables attractive names on consumption. In the first study, consumption of carrots that were named “X-ray vision carrots” were compared to carrots simply called “food of the day.” Students ages 8-11 ate 6.6, or 140% more attractively named carrots than plainly named carrots. This study uses the same target student population and setting as our policy recommendations, and thus will likely reflect the effect size of our intervention. From the reported differences in means and standard deviations, we calculated the effect size for this difference as 0.547, a large effect.

Total Effect

The effect sizes presented in this section, summarized in Table 1, represent the expected change for an average individual in a single meal, during or immediately following the treatment or intervention.

⁶⁶ Brian Wansink et al., “Attractive Names Sustain Increased Vegetable Intake in Schools,” *Journal of Preventative Medicine* 55 (July 2012): 330-332, doi:10.1016/j.jpmed.2012.07.012.

Table 1: Intervention Effect Sizes

Intervention	Effect Size (Cohen's d)
Reciprocity (simple)	0.75
Reciprocity (HLM)	0.574
Commitment (simple)	0.47
Commitment (HLM)	0.410
Defaults	1.18
Framing	0.547

Because the policy options presented here represent on-going efforts, either through the eight weeks of the Small Bites curriculum or through sustained changes to the cafeteria and lunch lines, we can consider the total effect of the program to include all meals over the course of intervention. Thus, for a typical eight week lesson timeline, we can expect approximately 40 school lunches are consumed by a typical student.

It is certainly feasible that the novelty of each intervention will wear off from the initial peak. However, in the studies cited for the choice architecture interventions, post-treatment results are recorded over a span of days following the transition to the new intervention. Similarly, our internal behavioral tool interventions include an active reminder by the teacher, the gift-given, or an on-going, weekly food log where students can remind themselves of their goals. At present, the permanence of these effect sizes across the span of treatment remain indeterminate, but there is little evidence to suggest that certain interventions will differ dramatically from their initial effect sizes after the first week. Therefore, when determining the total effect, or the cumulative

amount of additional fruits and vegetables consumed, we can be reasonably justified in considering the effect size similar for each of the interventions, if not stable, across the eight week time span. Nevertheless, for the purposes of comparison, both the single instance effect size and the eight week total effect are proportionally similar, and the analysis does not rely on selecting one over the other.

4-2. Duration of Effect

As mentioned in Chapter 2, duration of effect represents the longevity of behavior change. We examined previous research on each policy option and judged whether there was evidence of longevity of effect. One way to conduct this evaluation would be to use a quantitative method, establishing the effect-size declination formula for each policy option and estimating the time for the effect-size to become zero. This was the first method by which we tried to estimate duration. However, because there are very few studies that report long-term follow-up data and even fewer that target child nutrition habits, there were significant validity issues in estimating a solid declination formula of duration for each option using current literature. We share our results using this quantitative evaluation in Appendix C for further discussion, but ultimately decided to use a simpler theoretical approach and evaluate each option's duration of effect on a scale of "High," "Medium," or "Low" duration of effect. This did not completely solve all of our issues with the lack of literature, but was the best option given the current literature and data. Due to the aforementioned problems, duration was weighted the least when we reviewed our policy options for recommendation. The studies we use to investigate the duration of effect can be found in

Tables 1-4 of Appendix C.

Reciprocity

Brock et al. (2014) investigated how clinician's clinical efforts increased by giving them a one-time conditional or unconditional incentive. The results show that the effect of unconditional incentives declines sharply after the intervention and becomes zero about nine weeks after finishing the intervention. This implies that we cannot expect a long duration of effect for Reciprocity. It should be noted that the study's subjects are adults and there is therefore an external validity problem.⁶⁷ Considering that a student's reciprocal action to an unconditional incentive from a teacher is driven by the same sense of "fairness equilibrium"⁶⁸ as adults, it makes sense that the duration of effect does not last long after the intervention, absent the imbalance of fairness. Therefore, we found the potential duration of effect for Reciprocity was "Low."

Commitment

For Commitment we used Raju et al. (2010),⁶⁹ which examined the effect of incentives, goals, and competition on elementary and secondary school students' healthy food choices. The results showed that the effect of goal setting lasts not only for the short-term, but also for the long-term.

⁶⁷ Michelle J. Brock, Andreas Lange, and Kenneth L. Leonard, "Giving and Promising Gifts: Experimental Evidence on Reciprocity from the Field" (working paper, European Bank for Reconstruction and Development, February 2014), http://kangur.uek.krakow.pl/bibl_ae_zasoby/siec_lokalna/Ebor/w165.pdf.

⁶⁸ Matthew Rabin, "Incorporating Fairness into Game Theory and Economics," *American Economic Review* 83 (1993): 1281–1302, <http://www.jstor.org/stable/2117561>.

⁶⁹ Sekar Raju, Priyali Rajagopal, and Timothy J. Gilbride, "Marketing Healthful Eating to Children: The Effectiveness of Incentives, Pledges, and Competitions," *Journal of Marketing* 74, no. 3 (May 2010): 93-106, doi:10.1509/jmkg.74.3.93.

The treatment effect dropped by 66% the first week after treatment but the effect remained at 56% the original level even 10 weeks post-treatment. The result shows the contrast between the sharp drop right after treatment and the very slight drop afterwards. This aligns with our findings on habit formation theory. The study's subjects, treatment, and outcome variables are quite similar to our policy option, so it is reasonable to suggest that we can apply this result to the duration of effect. However, we should note that the follow-up data was taken 10 weeks after intervention, so we do not have evidence that the effect will last beyond this time. Therefore, we found the potential duration of effect for Commitment was "Medium."

Defaults and Framing

For Defaults and Framing, we did not find individual studies for each option with post-intervention follow-up, so used one study exploring both Defaults and Framing to construct our duration model.⁷⁰ Defaults and Framing have an advantage over Commitment and Reciprocity for potential duration of effect. This advantage comes from the low operational costs of Defaults and Framing. They require very low costs once the tools are implemented, with little long-term maintenance. Therefore, when we implement programs using these options, we do not have to restrict the length of the program — we can use the intervention as long as it is effective. For example, once we set the default choice of the school lunch menu, no additional costs will be required to maintain the change. This advantage leads us to believe that Defaults and Framing has higher potential to create long-term effects considering their long-run interventions.

⁷⁰ Ensaff et al., "Food Choice Architecture."

There is also research that shows choice architecture's potential duration of effect. Ensaff et al. (2015)⁷¹ investigated how improving choice architecture in a cafeteria increased students' healthy food purchases. This study's subjects, treatment, and outcome variables are quite similar to our policy options. In this study, the treatment effect at three weeks post-intervention was 41% the original effect size. Since the results show that the effect remained even without the treatment, it is not unrealistic to think that the effect would be higher if the treatment continued.

Though these interventions do not have a time limit, the effect size of the program would not be constant. It is reasonable to assume that students' responsiveness to the program would decline as time goes on, so the effect size will also gradually decline. Based on our interview with one of the leading choice architecture experts,⁷² the decrease in effect size is fast. This is especially true for Framing because the unique names of fruits and vegetables quickly lose their attraction if names aren't changed within certain time periods (within several weeks).

Based on these factors, we found the potential duration of effect for Defaults was "High" and Framing was "Medium." A summary of our duration findings is below (Table 2).

⁷¹ Ibid.

⁷² David R. Just (Cornell Center for Behavioral Economics in Child Nutrition Programs), interview by Jonathan McIlroy, February 1, 2017.

Table 2: Duration of Effect Evaluation Summary

Policy Option	Evaluation
Reciprocity	Low
Commitment	Medium
Default	High
Framing	Medium

4-3. Net Behavior Change

Effect size and potential duration of effect are two sides of the same coin when it comes to evaluating the total impact of each policy option on children’s habits. Though students frequently eat fruit and vegetables right after a program ends, if they stop eating them soon after, the total impact of the program on students’ behavior change is quite small. As discussed previously, habit formation and taste exposure theories reveal that when students repeat a healthy choice for a longer time period, the potential to form a healthy food habit increases.^{73,74,75}

Hence, we decided to create a new concept, Net Behavior Change (“NBC”), by combining the effect size and duration of effect to evaluate each policy option from the perspective of total behavior change induced by the interventions. In this section, we investigate the potential NBC for each option by reviewing each intervention’s effect size and duration of effect. We first tried to calculate NBC quantitatively by taking the integral of the formula of duration of effect, but, as

⁷³ Wardle et al., “Modifying Children's Food Preferences.”

⁷⁴ McGowan et al., “Healthy Feeding Habits.”

⁷⁵ Hussam et al., “Habit Formation and Rational Addiction.”

mentioned previously, there were validity concerns about the formula of duration of effect.⁷⁶ Instead, we relied on a simpler evaluation of NBC.

The results of the effect size and the duration analysis implied that Defaults had the highest potential NBC. Reciprocity had the second highest effect size, but no evidence of the duration of effect, so its potential NBC was “Medium.” Commitment and Framing both had medium effect sizes as well as medium duration of effect, so their potential NBC was also “Medium” (See Table 3).

Table 3: Potential Net Behavior Change Evaluation Summary

Policy Option	Effect Size	Duration	Potential NBC
Reciprocity	0.75	Low	Medium
Commitment	0.47	Medium	Medium
Default	1.18	High	High
Framing	0.547	Medium	Medium

4-4. Costs

The marginal costs of implementing any of these tools on top of the Small Bites curriculum are integral in helping Common Threads choose between policy options. For the purposes of this analysis, we will be using the \$1 per student target as the budget constraint, as provided to us by Common Threads’ Director of Research and Evaluations. Costs include physical costs as well as

⁷⁶ See Appendix D for further discussion and our theoretical calculations of NBC.

cost of time for Common Threads staff, cafeteria workers, teachers, and administrators to train or implement the intervention.⁷⁷

We calculated costs for both Common Threads and the school for the 8-week Small Bites curriculum. The costs to Common Threads is important because our client would like to know which behavioral tool is cheapest but also has a large impact on fruits and vegetable consumption. The costs to the school are important to calculate as costs are considered the primary barrier to implementing a tool inside the school. Table 4 shows the additional costs of each policy option on top of the Small Bites curriculum at the student, classroom, and school levels.

It should be noted that we are using the composition of the average elementary school in LA Unified School District to understand costs and impacts of each policy option. That is, an elementary school serving grades K-5 with 22 total classrooms and a 1:24 teacher to student ratio.⁷⁸

⁷⁷ To see the costs used to estimate cost of time, please see Table 1 in Appendix E. To see the breakdown of costs for each behavioral tool, please see Tables 2-5 in Appendix E. Opportunity costs have not been included in this analysis, as there are many different outside options teachers could pursue instead of the behavioral tools and it is nearly impossible to estimate the opportunity cost for all.

⁷⁸ For the full school model, please see Table 6 in Appendix E.

Table 4: Summary of Costs at Each Level^{79,80,81,82,83}

	School Costs	Common Threads Costs
Reciprocity		
Per Student	\$0.75	\$0.27
Per Classroom	\$18.00	\$6.56
Per School	\$396.00	\$144.32
Commitment		
Per Student	\$0.90	\$0.23
Per Classroom	\$21.60	\$5.40
Per School	\$475.20	\$118.80
Defaults		
Per Student	\$0.25	\$0.05
Per Classroom	\$6.04	\$1.13
Per School	\$132.85	\$25.00
Framing		
Per Student	\$0.48	\$0.05
Per Classroom	\$11.50	\$1.13
Per School	\$252.85	\$25.00

4-5. Cost-Effectiveness

All of the policy options fall below Common Threads’ budget constraint of \$1 per student. While we calculated costs and determined the effect size of each policy option, doing a cost-

⁷⁹ Staffing costs estimated from: "Los Angeles Unified School District: Personnel Commission July 1, 2016 Classified Salary Schedule," Los Angeles Unified School District ("LA Unified"), July 1, 2016, <http://achieve.lausd.net/cms/lib08/CA01000043/Centricity/Domain/356/July%201%202016%20-%20Salary%20Schedule%20020617.pdf>.

⁸⁰ Teachers costs estimated from: Thomas Himes, "LAUSD Educators Typically Earned \$75,504 Last Year," *LA Daily News*, March 23, 2015, <http://www.dailynews.com/social-affairs/20150321/lausd-educators-typically-earned-75504-last-year>.

⁸¹ Client costs estimated from James Bell (Common Threads Program Manager), interview by Sydney R. Ganon, February 23, 2017.

⁸² Sticker estimates from: "TREND Sticker Assortment Pack, Super Stars and Smiles, 738 pk," Walmart.com, accessed January 25, 2017, <https://www.walmart.com/ip/Trend-Enterprises-Sticker-Pad-Super-Stars-and-Smiles-Assorted-Colors-738-Stickers-per-Pack/14879090>.

⁸³ Printing costs from: "Copies and Documents," Staples.com, accessed February 9, 2017, <http://www.staples.com/sbd/content/copyandprint/copiesanddocuments.html>.

effectiveness analysis allowed us to directly compare each policy option by impact per dollar. The outcome we compared is the percent increase in student consumption of the healthy choice compared to control groups (Table 5). To estimate this outcome, we used the same intervention models that were used to determine effect size.

Table 5: Cost-Effectiveness⁸⁴

	Intervention Treatment Effect	Cost	CE Ratio
Reciprocity	67.6 -51.8= 15.8	\$6.56	2.4 per dollar
Commitment	61.8-51.8 = 10	\$5.40	1.85 per dollar
Defaults	27.9-20.4 = 7.5	\$1.13	6.63 per dollar
Framing	11.3-6.8 = 4.5	\$1.13	3.98 per dollar

There are limitations to this cost-effectiveness analysis. First, we needed a model for each intervention, and given the lack of literature on this topic, we had at most 1-2 studies that were similar enough to our proposed interventions. Each intervention measured the percent impact of the behavioral tool, but length and time of each intervention varied and that difference could have an impact on the size of the effect. Second, not all outcomes are exactly the same. For example, the model intervention for Reciprocity and Commitment measured milk choice and Framing measured vegetable choice. However, we broadened our outcome to choosing a healthy option over an unhealthy option so that we could compare between options. These limitations

⁸⁴ Both percentage points and our costs are calculated at the classroom level, and therefore the cost-effectiveness ratio can be interpreted as percentage point increase in healthy food consumption per dollar spent on a classroom.

should be kept in mind when weighing this criterion for each intervention. We consider this further in Chapter 5: Sensitivity Analysis.

4-6. Political Feasibility

To understand the political feasibility of our interventions we conducted interviews with Los Angeles Unified School District (LA Unified) administrators, LA Unified elementary school teachers, and teachers who use the current Common Threads curriculum. We also analyzed LA Unified food and curriculum policies and observed a Common Threads lesson. In addition, we observed an elementary school cafeteria/kitchen set-up, spoke with a Food Services Manager, and looked at the costs that might be imposed on the school itself. Below we examine the general categories of internal behavioral tools and choice architecture, then divide those categories by our interventions: Reciprocity, Commitment, Defaults, and Framing. The marginal costs per school are in Table 6.

Table 6: Marginal Costs per School by Policy Option

	Cost per School	Points
Reciprocity	\$396.00	2
Commitment	\$475.20	1
Defaults	\$132.85	4
Framing	\$252.85	3

4-6-1. Internal Behavioral Tools

We found that there are multiple levels of stakeholders when considering whether or not to implement internal behavioral tools (Figure 2). Within LA Unified, it is the district's responsibility to work with nonprofits to offer nutrition education programs and the school's responsibility to provide nutrition materials to all grade levels that align with California's core curriculum standards.⁸⁵ In addition to ensuring materials are provided to all grade levels, it is the school's responsibility to incorporate the idea that cafeterias are places of learning⁸⁶ and to provide nutrition education consistent with the USDA's Dietary Guidelines and MyPlate⁸⁷ plan.⁸⁸ In tandem, the school district should incentivize teachers to provide appropriate nutrition education that is *focused on behavior change*.⁸⁹ Once the school provides the materials, it is the responsibility of the classroom teacher to implement the nutrition education into the school day.

⁸⁵ "Food and Nutrition Policy Motion Implementation Plan Appendix A," Los Angeles Unified School District ("LA Unified") (2012), <http://achieve.lausd.net/cms/lib08/CA01000043/Centricity/Domain/126/Food%20and%20Nutrition%20Policy%20Motion-Implementation%20Plan%20Appendix%20A%2011.9.12.pdf>.

⁸⁶ Ibid.

⁸⁷ The updated version of the Food Pyramid, see Figure 4 in the Political Feasibility Summary section.

⁸⁸ "Blueprint for Wellness: Healthy Choices for Lifelong Health, the LAUSD Health and Wellness Policy," Los Angeles Unified School District ("LA Unified") (January 2016), <http://achieve.lausd.net/cms/lib08/CA01000043/Centricity/domain/453/files/Blueprint%20for%20Wellness%20Aug%202014%20FINAL.pdf>.

⁸⁹ "Food and Nutrition Policy Motion Implementation Plan."

Figure 2: Stakeholders for Implementing Internal Behavioral Tools



Based on the current LA Unified nutrition education policies described above, our proposed internal behavioral tools would be a good fit for elementary schools. Both Commitment (goal-setting) and Reciprocity (thanking students for making a healthy choice with a sticker) use the idea that the cafeteria is a place of learning. Common Threads' basic nutrition lessons are aligned to California's Common Core state standards and also utilize the USDA Dietary Guidelines and MyPlate concept within its curriculum. In addition, as shown in the effect and duration evaluations, both Reciprocity and Commitment are focused on behavior change, albeit with varying levels of effectiveness.

The primary challenge for teachers would be fitting lessons in with all of the other requirements of the school day. One teacher stated that she does twenty minutes of preparation work and one hour of teaching nutrition education monthly. How much time a lesson would take would be a

large factor in creating teacher buy-in for a nutrition intervention. Some differences arise between the two internal behavioral tools within classroom teacher preferences and costs to the school.

Reciprocity: Thank You Sticker

Our interviews found that elementary school teachers were quite willing to try thank you stickers as part of a nutrition intervention. All teachers and administrators we interviewed said stickers are frequently used with students and work well at any age (even up through high school). As for time, we estimate that the marginal time this intervention would take on top of the curriculum is five minutes, slightly less than the Commitment option. With this consideration, teachers are likely to favor this option more highly than Commitment.

Interviews with administrators found that principals would not have an issue if teachers wanted to teach the curriculum in their own classrooms, but in order for it to be a school-wide intervention the curriculum would have to align with state required curriculum. Administrators also looked favorably on the idea of positive reinforcement for students.⁹⁰ One assistant principal shared that his school had used wristbands and stickers in the past to remind students of goals and it helped demonstrate solidarity within the students. He believed that stickers for health would work similarly.⁹¹ Reciprocity would also cost a school \$79.20 less than Commitment which may lead to a slight preference for this option by school administrators.

⁹⁰ M.G. (School Administrator), interview by Sydney Ganon, February 16, 2017 and A.O. (School Administrator), interview by Sydney Ganon, February 21, 2017, interviews #2 and #3 (Appendix F).

⁹¹ A.O., interview.

Commitment: Goal-Setting

Our interviews found that elementary school teachers were willing to try goal-setting in their nutrition education and some were even very enthusiastic about the idea, having seen it work well in other settings.^{92,93,94} One teacher who currently teaches the Common Threads' Small Bites curriculum suggested goal setting would work very well with the homework she currently does. She also suggested that the parents frequently review students' homework, so it could be good way to engage entire families.⁹⁵ As for time, we estimate that the marginal time this intervention would take on top of the traditional curriculum is 15 minutes, which is slightly more than the Reciprocity option but not substantially. With this consideration, teachers are likely to favor this option less highly than Reciprocity.

Interviews with administrators found that principals and other site leadership would not have an issue if teachers wanted to teach the curriculum in their own classrooms, but in order for it to be a school-wide intervention the curriculum would have to align with state required curriculum. In general, administrators wanted teachers to use curricula they believed in and were favorable to the idea of using goal sheets to influence healthy eating behaviors.^{96,97} One assistant principal we spoke with believed that goal-setting would be a beneficial addition to his school's current

⁹² S. S. (Elementary School Teacher), interview by Sarah M. White, February 19, 2017.

⁹³ M. V. (Elementary School Teacher), interview by Sarah M. White, February 14, 2017, interview #1 (Appendix F).

⁹⁴ J. B. (Elementary School Teacher), interview by Hiroto Iwaoka, February 27, 2017.

⁹⁵ M.S. (Elementary School Teacher), interview by Sydney R. Ganon, February 23, 2017.

⁹⁶ M.G., interview.

⁹⁷ A.O., interview.

nutrition lessons.⁹⁸ However, Commitment would cost a school site \$79.20 more than Reciprocity which may lead to a slight preference for Reciprocity by school administrators.

4-6-2. Choice Architecture Tools

We found there were multiple levels of stakeholders when considering whether or not to implement choice architecture tools. In addition to the school district and school site responsibilities enumerated above, these interventions would most heavily involve the Food Services Division of LA Unified (Figure 3).

Figure 3: Stakeholders for Implementing Choice Architecture Tools



In LA Unified, it is the Food Services Division’s (“FSD”) responsibility to manage menu presentation and display (including signage) as well as to train all Food Services staff about meal programs with specific training on how to educate children about their food choices. It also falls

⁹⁸ Ibid.

to this department to identify ways to increase the number of students choosing a full and complete meal each day. LA Unified policy states that FSD should actively facilitate input from parents, students, teachers, non-profits, and involve students in developing and marketing menus. FSD should also incorporate the idea that cafeterias are places of learning, using appropriate signage and display materials.⁹⁹

Based on LA Unified policies, the Food Services Division would be an integral part of implementing choice architecture tools in the cafeteria. With this in mind, we consider the political feasibility of our two choice architecture tools (Defaults and Framing) below.

Defaults: Defaulting to the Healthy Choice

Based on our review of LA Unified's policies, Defaults are the least politically feasible option to implement in schools. While this option aligns with the idea that schools should focus on behavior change, it does not align with the way that school food is currently offered. In order to qualify for federal reimbursement for the Free and Reduced Lunch Program, a meal must meet USDA nutritional standards. Each meal must have three items from the following categories: Fruit, Vegetable, Grain, and Protein. In addition, at least one of these items must be a fruit or a vegetable. Since our default intervention was to have the cafeteria offer food that seemingly excludes a choice, this option is not politically feasible.

Our interviews supported this conclusion. The teachers interviewed were uncertain this type of

⁹⁹ "Food and Nutrition Policy Motion Implementation Plan."

intervention would work in their schools considering lunch logistics.¹⁰⁰ The administrators we spoke with wouldn't personally mind this intervention, but suggested that they would have difficulty with implementation due to USDA restrictions. With this consideration, they would not have the power to implement Defaults.¹⁰¹ One principal suggested that since everything served is approved by the USDA, food services staff would argue that everything they serve is already healthy.¹⁰²

In addition, we observed a typical school kitchen and cafeteria and spoke with a Food Services Manager. Based on this interview and observation, school kitchens are not well-equipped to implement Defaults. The kitchen is basically a warming station and K-5 students do not get a choice in lunch entree, though can choose between two fruits and two vegetable options. There was also only one staff person who worked in the kitchen.¹⁰³

Additional research found further consequences. One study found that implementing a Defaults option at elementary schools increased plate waste. The study estimated an additional 0.7 servings per lunch served were thrown away as a result of this intervention.¹⁰⁴ Plate waste is a serious concern, especially in LA Unified where studies have found significant plate waste and translates to dollars lost. One LA Unified study found that of the students who chose fruits and

¹⁰⁰ S.S., interview; M.V., interview; M.S., interview; and J.B., interview.

¹⁰¹ M.G., interview and A.O., interview.

¹⁰² M.G., interview.

¹⁰³ Glenfeliz Elementary School, observations by Sydney R. Ganon and Hiroto Iwaoka, February 23, 2017.

¹⁰⁴ Just and Price, "Default Options."

vegetables, 31.4% discarded their vegetables and 22.6% discarded their fruits.¹⁰⁵ Some plate waste may be a byproduct of students trying new foods and, as previously discussed, simply trying new foods can help reduce picky eating and increase consumption of healthy foods.¹⁰⁶ However, this is not what is occurring when using default options in this study.

We conclude that the logistics of implementation, plate waste issues, and staffing considerations outweigh the slightly cheaper costs that this policy option provides for the Food Services Division and subsequently LA Unified as well and thus rank it low on political feasibility.

Framing: Naming Foods

The administrators we interviewed saw Framing as a potentially positive influence on students.^{107,108} One site leader thought that naming, presented in an attractive fashion, could take on obesity and help nutrition efforts. He pointed out that his students are attracted to marketing tools that add unique names to things like clothes and technology.¹⁰⁹

Based on our interviews, teachers are in favor of naming lunch choices in a way that is designed to increase choice and consumption of healthier items.¹¹⁰ This would, however, be more likely to

¹⁰⁵ Lauren N. Gase et al., "Student Receptivity to New School Meal Offerings: Assessing Fruit and Vegetable Waste Among Middle School Students in the Los Angeles Unified School District," *Preventive Medicine* 67 (2014): S28-33, doi:10.1016/j.ypmed.2014.04.013.

¹⁰⁶ Wardle et al., "Modifying Children's Food Preferences."

¹⁰⁷ M.G., interview.

¹⁰⁸ A.O., interview.

¹⁰⁹ Ibid.

¹¹⁰ S.S., interview; M.V., interview; and M.S., interview.

work with younger children and may become less effective with older middle school students and high school students. One teacher brought up the idea that schools may not like the idea of using subconscious messaging with students,¹¹¹ but further research into LA Unified Schools suggest the opposite.

LA Unified's *Blueprint for Wellness* specifically highlighted Marina Del Rey Middle School for its use of renaming to influence healthy choices. The Food Services Manager at this school modified water to include fruits and/or vegetables and labeled it, "Spa Water." This simple modification led to an increased consumption of water over other beverages.¹¹² Although this increase was self-reported, the inclusion of this concept in LA Unified's report indicates that similar choice architecture adjustments, like the naming of fruits and vegetables, would be highly politically feasible.

This aligns with our kitchen observations in an LA Unified elementary school.¹¹³ While the setup would make it difficult to implement Defaults, Framing could be implemented into the cafeteria's current setup. One Food Services Manager we spoke to said she put a sign out each day for what was included on the menu and that this could potentially be customized with new names.¹¹⁴ In addition, having students pick appealing names for fruits and vegetables aligns well with LA Unified's policy to have input from students on developing and marketing menus.

¹¹¹ M.V., interview.

¹¹² "Blueprint for Wellness."

¹¹³ Glenfeliz Elementary School, observations.

¹¹⁴ S. (Glenfeliz Food Services Manager), interview by Sydney R. Ganon, February 23, 2017.

However, it is worth noting that Framing costs \$120.00 more than Defaults and these costs would have to be covered by the Food Services Division.

Political Feasibility Summary

The curriculum used by Common Threads, Small Bites, utilizes the same portion size concepts as the California Department of Education which are built off of the USDA MyPlate concept. Within Common Threads' curriculum students are taught that, "The Chef's Plate is a guide for how a healthy plate should look... each plate of food we eat should be half vegetables and fruits, a quarter whole grains, and a quarter lean protein."¹¹⁵ LA Unified Schools display the below poster (Figure 4) in their cafeterias.¹¹⁶ For comparison, the Common Threads' version also shown.

Figure 4: CDE MyPlate Poster (left)¹¹⁷ vs. Common Threads Chef's Plate (right)¹¹⁸



¹¹⁵ "Small Bites Curriculum: 3rd - 5th Grade In-School Nutrition Program," Common Threads, (Confidential Curriculum 2016).

¹¹⁶ "Blueprint for Wellness."

¹¹⁷ Ibid.

¹¹⁸ "Small Bites Curriculum: 3rd - 5th Grade In-School Nutrition Program."

When compared to everything else a teacher must cover in a day, nutrition education often is ranked somewhere in the middle of a teacher's priorities.¹¹⁹ This occurs even though all are aware of its importance, especially in schools that serve primarily Latino and black students who come from low-income families with the highest rates of diabetes. We found that teacher interest in nutrition curriculum increased when told that there was evidence of positive impact on students, so any program should also have a teacher education component in which teachers are taught the impact of the intervention.¹²⁰ Based on our interviews, we suspect that this would increase the likelihood of teachers regularly utilizing the curriculum in their classrooms. We also found that teachers who do not currently participate in Common Threads' programs want strong materials to use in their required nutrition education but that curriculum and resources were frequently lacking.¹²¹

Resources and materials should connect with other lessons in the classroom, as Common Threads has done with its Common Core alignment. One teacher cited Small Bites' alignment with her other lessons as an incredible bonus. She was able to integrate her classroom lessons on health, science, and math directly into Small Bites lessons. The Common Core alignment also meant she could use the lessons to teach the day's required state standards.¹²²

Additional interviews brought up the idea that external resources are more likely to be adopted if

¹¹⁹ A.O., interview.

¹²⁰ S.S., interview; M.V., interview; M.S.; interview; and J.B., interview.

¹²¹ S.S., interview and M.V., interview.

¹²² M.S., interview.

teachers can implement the lessons at a time of their choosing throughout the school year. This type of intervention could remove many perceived constraints of classroom implementation.¹²³ This is also a feature that Common Threads programs currently use, though the lack of consistent implementation may add complications to the effect of the program based on what we know about habit formation.

Additional challenges arise when trying to implement an intervention that may not align with LA Unified's regulations or state education standards. The lack of choice within a school cafeteria further restricts what policy options are most feasible. Given how pressed for time teachers often are to cover all classroom requirements, the amount of time an intervention takes to prepare and deliver as a lesson is key to the actual implementation of a nutrition education program. Based on these constraints, we find that the Common Threads' curriculum is well aligned to serve LA Unified Schools.

Adding the Reciprocity or Commitment tools would not negate this alignment and would, in fact, enhance it. Both categories had high feasibility ratings from teachers and administrators as well as alignment with LA Unified's nutrition policies. Considering the positive alignment of Framing for LA Unified's policies, this category also ranked highly for political feasibility. Based on our interviews and reviews of district policy, we found that Defaults were the least politically feasible option out of our interventions. Table 7 shows our political feasibility rankings.

¹²³ S.S., interview.

Table 7: Political Feasibility Rankings of Policy Options by Stakeholder Importance¹²⁴

Stakeholder	Measure	Commitment	Reciprocity	Framing	Defaults
Classroom Teachers	Points	3	4	2	1
	Weight	0.65	0.65	0.05	0.05
	Score	1.95	2.60	0.10	0.05
School Site Admin	Points	3	4	2	1
	Weight	0.20	0.20	0.15	0.10
	Score	0.60	0.80	0.30	0.10
LA Unified Food Services Division	Points	3	2	4	1
	Weight	0.05	0.05	0.70	0.75
	Score	0.15	0.10	2.80	0.75
LA Unified School District	Points	1	2	4	3
	Weight	0.10	0.10	0.10	0.10
	Score	0.10	0.20	0.40	0.30
Average Points		2.5	3.0	3.0	1.5
Total Score		2.8	3.7	3.6	1.2

Each policy option was weighted by stakeholder importance. For example, teachers were the most important stakeholders for classroom-based interventions, so teacher rankings received the highest weight for those options (65% for Reciprocity/Commitment). Each weighted score was then summed to find the highest total score. Based on this analysis, Reciprocity was the most politically feasible and Defaults was the least.

¹²⁴ Note: Points given number 1-4, with 4 the best option and 1 the worst option. The total is the summed score across stakeholders, weighted by estimated stakeholder importance and/or influence for each policy option.

4-7. Policy Option Evaluation Summary

In summary, we rank each of our four policy options (Table 8) by how they perform in each criteria. We weighed our criteria based on strengths and limitations in relation to our final policy recommendation and more information on this follows. Each of our policy options falls under our budget constraint of \$1 per student so cost is wrapped into cost-effectiveness criteria.

The points given to each policy option within a criteria assessment number 1-4, with 4 as the best option. Weights for each policy option add up to 1.0 across criteria and a greater weight indicates that the criteria is more important to our client. We weighed political feasibility at 50%, cost-effectiveness at 30%, and duration at 20%, considering the limitations previously discussed. The score is the weight for that particular criteria multiplied by points earned. Total weighted score is the summed scores for each criteria and total average points is the averages across points given in each criteria for that policy option. For both total weighted score and average points, a higher number indicates a more preferable policy option.

Based on our evaluation, the most feasible and preferred policy option is to use Framing to improve healthy eating habits in third, fourth, and fifth grade students participating in Common Threads' program. After Framing, Reciprocity is the most feasible option, followed by Defaults, and finally, Commitment.

Table 8: Policy Option Evaluation Summary

Criteria	Measures	Commitment	Reciprocity	Framing	Defaults
Duration	Points	2	1	3	4
	Weight	0.2	0.2	0.2	0.2
	Score	0.4	0.2	0.6	0.8
Cost-Effectiveness	Points	1	2	3	4
	Weight	0.3	0.3	0.3	0.3
	Score	0.3	0.6	0.9	1.2
Political Feasibility	Points	2	4	3	1
	Weight	0.5	0.5	0.5	0.5
	Score	1	2	1.5	0.5
Average Points		1.7	2.3	3	3
Total Weighted Score		1.7	2.8	3	2.5

It should be noted that while we use ordinal rankings and weighting to evaluate our options on our criteria this method has its weaknesses. We further discuss the alternative methods and results in Chapter 5, but the largest weakness we find in our above analysis is the placement of Defaults. While Defaults may be able to work well in some environments, we find that the political infeasibility of the option for our client and LA Unified to be insurmountable for our final recommendation. Therefore, despite its ranking of third place in our policy options, we remove it from our final consideration. While ranking systems such as the one used above are helpful to conceptualize the different issues at stake, they are not perfect and we want to recognize their shortcomings in terms of our final recommendations.



Chapter 5

Sensitivity Analysis

In Chapter 5, we discuss our sensitivity analysis for selecting among our policy options.

Although the four policy options presented in this report do not represent a high risk, high cost departure from the status quo for Common Threads, the selection of specific alternatives over others is very sensitive to small changes in estimates. As this report has noted throughout, limited research exists exploring these types of interventions on childhood nutrition and fruit and vegetable consumption. The evidence available suggests that these low-cost, moderate-impact tools likely play a crucial but often overlooked role in the success of various programs. Given the prominence of schools as the battlegrounds of obesity, short-term costs may be far outweighed by long-term benefits. Thus, the need for certainty in programmatic decisions becomes all the more important.

The uncertainty in evaluating our alternatives and thus the need for a sensitivity analysis proceeds from uncertainty in measuring our criteria. As discussed in each of these chapters, variability and inconsistency across studies, as well as the paucity of available data, make estimates sensitive to minor differences.

For example, the reported effect sizes for the four interventions are drawn from either observational studies conducted at only a handful of schools, or in a controlled, one-off experiment. Thus, the true effect size for each of these interventions forces a reordering of their assigned point values.

Simultaneously, the extremely low cost of these interventions make their corresponding cost-effectiveness ratios highly sensitive to changing costs. For example, the choice to print handouts in color versus black and white can have a significant impact on the costs for the goal-setting intervention. Likewise, extended naming exercises beyond the time accounted for in the analysis, even by a few hours each month, can also change the cost-effectiveness of that intervention. Similarly, the names created for various fruits and vegetables might dramatically change consumption of a specific item week to week.

Finally, in our initial evaluation matrix, we weighted the criteria of duration low not because of its relative lack of importance but because of our lack of certainty regarding the long-term, persistent effects of these interventions. Indeed, duration might have the single greatest impact, provided that one or more of these interventions succeed in creating sustained behavior change.

To account for these uncertainties in effect, cost, and duration, we vary both the relative weightings and the assigned point values in the analysis that follows.

5-1. Weighting

Our initial scenario assigned a relatively low weight to cost effectiveness and duration, together equal to political feasibility. However, if both effect size and the duration of effect were estimated with greater certainty and at optimistic values, we could increase their weightings accordingly. Although political feasibility might remain equally important, if every intervention

were shown to have slightly higher effects, lower costs, and longer durations, those relative criteria would be of greater importance.

To account for weighting sensitivity both cost-effectiveness and duration received a weight 1.5X larger than previously calculated, with political feasibility halving in importance.¹²⁵ In this analysis, Defaults became the highest scored intervention, while the other three maintained their relative positions. However, because Defaults remains politically unfeasible, we continued to eliminate it from consideration and our policy recommendations did not change.

5-2. Political Feasibility

Returning to our initial weightings, we tested for changes in political feasibility. In our analysis of political feasibility, Reciprocity and Framing received nearly identical weighted scores, 3.7 to 3.6, respectively (Table 7). It is reasonable to assume that these two scores might be reversed, such that Framing might be more politically feasible than reciprocity.

Our results were not sensitive to this reversal.¹²⁶ In fact, our results provided further support for Framing as the first choice. Nevertheless, as our final recommendation (discussed further in the next chapter), is to implement a suite of options including both Reciprocity and Framing, this change does little to alter our conclusions. It is only relevant in the case where Common Threads and the school will opt to adopt only one practice — an unlikely scenario.

¹²⁵ See Table 1 in Appendix G.

¹²⁶ See Table 2 in Appendix G.

5-3. Cost-Effectiveness

In capturing both the effect size and expected costs of the intervention, the cost-effectiveness measure is very sensitive to subtle changes. As seen in Table 6, extremely low per-classroom costs as well as varying percent effects drawn from the literature could easily alter the ranking. In the case of Defaults, for example, some studies showed substantial, statistically significant effects while others showed almost no effect. Defaults' costs are also highly variable depending on how plate waste is accounted for. We also switched the relative positions for Commitment and Reciprocity, as their cost-effectiveness ratios were similar and might change from even minor deviations in costs or site-to-site effectiveness.¹²⁷

In this case, Defaults was the lowest scored intervention though Framing, Reciprocity, and Commitment maintained their relative order. This suggests that our results are not sensitive to these relative changes in cost or effect.

5-4. Continuous Point Values

As previously noted, one potential limitation is our ordinal ranking system, in which we assigned values based solely on the order of the interventions from best to least within a particular criterion. While simplifying and standardizing our evaluation, this method also ignored the relative differences between them. In the prior sensitivity analyses, we simply swapped close outcomes. However, to more fully account for these relative differences, we also calculated

¹²⁷ See Table 3 in Appendix G.

points based on the values assigned. These values were then placed on a 1-4 point scale, with the highest scoring intervention receiving a 4 and the other interventions receiving a score adjusted to their value relative to a score of 4.¹²⁸ This scoring system did not change the final recommended order, but did more accurately illuminate the relative differences between the options. For example, while Reciprocity was still second to Framing, the difference in scores was considerably wider, and the gap between Commitment and Reciprocity was considerably smaller. This suggests that our interventions were more similar in preferability than our initial analysis revealed.

¹²⁸ See Table 4 in Appendix G.



Chapter 6

Policy Recommendations and Implementation Strategies

In this chapter, we present our recommended policy options based on the results of our Chapter 4 analysis. We also suggest ways to incorporate and implement recommended tools into curriculum and schools and explain the limitations of our research.

Given Common Threads' budget constraint of \$1 per student, the exceptionally low combined costs incurred by Common Threads for all of these interventions, and the interventions' mutual compatibility, we recommend that Common Threads adopt the Reciprocity, Commitment, and Framing interventions simultaneously, and offer them to schools either as a bundle or individual packages. The recommended single intervention is Framing.

6-1. Bundled Interventions

Our examination of the literature on behavior change and our analysis of cost structures suggest that executing multiple interventions simultaneously will be more effective than their independent effects.

We find support for utilizing more than one tool to support healthy nutrition in children from the, albeit limited, literature on habit formation. We hypothesize that combining internal behavioral tools and choice architecture could, in fact, speed up the process of habit formation. Studies have not yet been done on this exact phenomenon and we therefore do not rely on this concept for our final recommendation. However, we believe this combination is worth exploring further.

Internal behavioral tools are, at their core, reflective tools. Setting a goal or reciprocating a gesture rely on some type of *deliberate action* on the part of the individual. On the other hand, choice architecture is a reflexive tool.¹²⁹ The environment is set up so that an individual makes a choice *without* contemplating their actions. These two types of actions mirror stages of behavior change theory (Table 9), and both support the ultimately desired habit formation.

Table 9: Model of Behavior Change¹³⁰

Stage of Change	Description
Precontemplation	Individual unaware of desire/need to change behavior
Contemplation	Individual aware of desire or need to change, thinking of change
Preparation	Individual prepares to change behavior, creates plan to change
Action	Individual completing actions towards change
Maintenance/ Automaticity ¹³¹	Individual completed change, monitoring to prevent relapse, behavior automatic

Based on these concepts within behavior change, we view internal behavioral tools and choice architecture as part of the “Action” stage. We also hypothesize that utilizing choice architecture

¹²⁹ R.J. Dolan and P. Dayan, “Goals and Habits in the Brain,” *Neuron* 80, no. 2 (2013): 312-325, doi:10.1016/j.neuron.2013.09.007.

¹³⁰ J.O. Prochaska, C.C. DiClemente, and J.C. Norcross, “In Search of How People Change: Applications to the Addictive Behaviors,” *American Psychologist* 47, 9 (September 1992): 1102-1114, doi:10.1037/0003-066X.47.9.1102.

¹³¹ Benjamin Gardner, Phillippa Lally, and Jane Wardle, “Making Health Habitual: the Psychology of ‘Habit-Formation’ and General Practice,” *The British Journal of General Practice* 62, no. 605 (December 2012): 664–666, doi:10.3399/bjgp12X659466.

tools in the cafeteria will help prevent decision fatigue. Studies have shown that decision making and self-regulation stem from the same resource within an individual and that making repeated choices can exhaust the pool from which these actions are drawn, leading to poorer decisions.^{132, 133} By supporting students' commitments to eating healthy foods with the environmental structures of choice architecture, it may be possible to reduce decision fatigue for students and allow them to maintain healthy choices for a longer period and reach the automaticity stage more easily.

In addition to the potentially positive interaction between the choice architecture and internal behavioral tools, the internal behavioral tools themselves benefit from economies of scope due to overlap in the underlying cost structure. In our initial analysis, costs for both Reciprocity and Commitment were estimated separately. However, for both Common Threads and the participating school, both interventions can be simultaneously implemented at a cost lower than the raw total cost of the two combined. For example, Common Threads' retraining and curriculum redevelopment costs are largely fixed costs, and implementing those interventions simultaneously will be dramatically cheaper than completing the process twice. Likewise, a classroom teacher can hand out stickers during the time when children are completing the commitment worksheet. The marginal costs of an internal behavioral tools package for Common Threads and a typical classroom are \$10.40 and \$21.60, respectively, which are lower than the

¹³² Roy F. Baumeister et al., "Ego Depletion: Is The Active Self a Limited Resource?" *Journal of Personality and Social Psychology* 74, no. 5 (1998): 1252-1265, doi:10.1037//0022-3514.74.5.1252.

¹³³ Kathleen D. Vohs et al., "Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account of Decision Making, Self-Regulation, and Active Initiative," *Motivation Science* 1, no. 5 (August 2014): 19-42, doi:10.1037/2333-8113.1.S.19.

simple summation of their independent costs, \$11.96 and \$39.66, respectively.¹³⁴ Therefore, offering the internal behavioral tools package yields a savings of 13.04% for Common Threads and 45.54% for a typical school compared to the simple total costs (Table 10).

In order for the package to be an attractive, non-dominated choice, the effect sizes would have to be at least 86.96% and 54.46% as large as their simple totals for Common Threads and a school, respectively. That translates to a necessary minimum combined treatment effect of 22.4 and 14.0 percentage points, respectively. Although we can expect some cannibalization of treatment effects, the combined effects are likely to be at least as high as 14.0 percentage points, increasing the political feasibility of this option. For Common Threads, with a typical classroom size of 24, the per classroom marginal budget is \$24 for the full 8 week program. Excluding Defaults, the total cost to Common Threads for Reciprocity, Commitment, and Framing combined is \$11.53, well under the budget constraint (Table 4.) Therefore, even if there is cannibalization that reduces the combined internal behavioral tools treatment effect to below 22.4 percentage points, it would still have a positive cost-effectiveness ratio and fall within Common Threads' budget constraint.

¹³⁴ See Table 4 above and Table 7 in Appendix E.

Table 10: Internal Behavioral Tools Package Savings

Intervention	Common Threads Cost	School Cost
Reciprocity	\$6.56	\$18.00
Commitment	\$5.40	\$21.66
Simple Total	\$11.96	\$39.66
IBT Package	\$10.40	\$21.60
IBT/Simple Total	86.96%	54.46%

Because there are increased costs for the bundle, and not all schools would be interested in implementing both simultaneously, we recommend that Common Threads follows a mixed bundling strategy, in which schools can opt in to an individual plan or the bundle. Although marginal costs are low, large scale implementation with tight school budgets and limited teacher time suggest that mixed bundling will be more politically feasible. However, it is likely that the package option will be more attractive than the individual interventions on average.¹³⁵

6-2. Monitoring and Evaluation

The scarcity of available data for effect sizes and duration, as well as concerns over fidelity of implementation¹³⁶ necessitates ongoing monitoring and preliminary evaluation of effectiveness. As a consequence of Common Threads' train-the-trainer model, it is likely that there will be heterogeneous implementation of the interventions across school sites and classrooms.

¹³⁵ See Table 5 in Appendix G.

¹³⁶ N.N. (VP of Programs and Evaluation), interview by Sarah M. White, November 11, 2016.

To limit potential variation across sites, we created a set of teacher instructions and student worksheets to be implemented alongside the Small Bites curriculum for the Reciprocity and Commitment interventions.¹³⁷ Before rolling these out, feedback from students, teachers, and Common Threads core staff should be solicited for readability and fit into the existing curriculum. For the first year after roll out, Common Threads' school site staff should pay careful attention to how these interventions are implemented and ask for additional feedback during their regularly scheduled observation.

Additionally, organizational and research interests support the adoption of an impact evaluation study. Dr. Samek has a proposed multi-site cluster randomized trial, to be conducted on a sample of schools in LA, which will be pivotal in studying the effectiveness of these specific interventions. We suggest schools be assigned treatments consisting of individual interventions as well as the various bundles of Framing, Commitment, and Reciprocity to study both their independent and combined effects on actual consumption. Although these lunchtime observations are expensive to run, directly measuring consumption and waste for all students in the experiment will guarantee accurate results. Ideally, this study should include baseline and immediate post-treatment measures, as well as an end-of-year followup evaluation to study the duration of effects. Given that the duration of effect is the least measured but potentially most important outcome affecting habit formation and later in life health, this information will be very valuable. Given the number of schools currently teaching the Small Bites curriculum in Los Angeles, there should be a sufficient number of sites to randomize different treatment

¹³⁷ See Appendix H for instructions and worksheet examples.

combinations and control assignments in the first year. By offering these interventions to some schools earlier than others, but at random, the study can ensure a strong experimental design while not unfairly excluding schools entirely.



Chapter 7

Policy Implications

While our applied policy project focused on interventions for Common Threads, our findings also have broader implications. Below, we briefly consider some of the findings as applied to federal, state, school district, and school policies.

Federal

Adjustments to federal policies around school nutrition could come from Congress or the President of the United States. Given the current administration, however, it is unlikely that the White House will look to expanding the Healthy, Hunger-Free Kids Act, the most recent legislation addressing issues within the scope of this report.¹³⁸

However, it is within the scope of the U.S. Department of Agriculture’s Food and Nutritional Services Division to implement changes to its department policies. Based on our interviews with teachers and school administrators, additional resources are desired to help implement nutrition education compliant with USDA regulations. For example, the USDA could add resources for schools on how to teach nutrition using Commitment or Reciprocity. The USDA could also encourage districts to utilize attractive naming techniques to increase consumption of healthy items, perhaps advertising the method as a way to decrease plate waste. The website for school supports are already in place,¹³⁹ so the implementation would merely be a matter of adding links to resource pages.

¹³⁸ “An Act to Reauthorize Child Nutrition Programs.”

¹³⁹ “Healthier School Day,” United States Department of Agriculture (USDA), Food and Nutrition Services (2017), Last modified February 1, 2017. <https://www.fns.usda.gov/healthierschoolday>.

In addition, while we found Defaults to be politically infeasible for our client, this is an area that the USDA could consider utilizing in the future. Considering the potential for lasting impact, Defaults has the potential to greatly increase the health of public school children who participate in the Free or Reduced Lunch Program. The USDA currently uses an offer versus serve method of lunch distribution in an attempt to reduce food waste,¹⁴⁰ but may consider changing this policy in light of the potential impact Defaults have on long-term health. Additional research has found that combining Defaults with an incentive has significant positive effects on healthy food consumption and negates increased plate waste.¹⁴¹

State of California

The California State Department of Education supports Team California for Healthy Kids (TCHK), an initiative led by the State Superintendent of Public Instruction. One of TCHK's main goals is to, "increase access and consumption of healthy food."¹⁴² This initiative could be a good platform to support and encourage the use of the tools described in this report. The initiative also has broad reach via its partner organizations and could further influence healthy consumption habits through these channels. Partner organizations include California Action for Healthy Kids, California School Board Association, the Center for Nutrition in Schools, and the

¹⁴⁰ "Offer Versus Serve: Guidance for the National School Lunch Program and the School Breakfast Program," United States Department of Agriculture (USDA), Food and Nutrition Services (2015), https://www.fns.usda.gov/sites/default/files/cn/SP41_2015a.pdf.

¹⁴¹ Just and Price, "Default Options."

¹⁴² "What We Do," California Department of Education (CDE), Team California for Healthy Kids, accessed February 26, 2017, <http://teamcaliforniaforhealthykids.org/what-we-do/>.

California Department of Public Health.¹⁴³

Los Angeles Unified School District

Based on our findings, LA Unified School District should look to partner with nonprofits and organizations that utilize the tools described in this report. Such partnerships are part of the District’s responsibility on nutrition education. These tools utilize the cafeteria as a place of learning, which is one of the ideas the District is meant to incorporate in that nutrition education. In addition, such tools emphasize behavior change both in the classroom and the cafeteria, another one of the district’s goals.¹⁴⁴

Los Angeles Unified School District Food Services Division

LA Unified’s Food Services Division could fairly easily implement some of the policy options discussed above. The primary option the Food Services Division (FSD) should consider is Framing. As discussed previously, FSD highlighted an example of Framing within a recent report.¹⁴⁵ However, Framing itself was not explicitly called out as a tactic and, based on the findings of this report, we would urge the Food Services Division to include it specifically as a method for schools to increase consumption of healthy choices. FSD is well-situated to include this as a way to combat obesity within LA Unified schools.

¹⁴³ Ibid.

¹⁴⁴ “Food and Nutrition Policy Motion Implementation Plan.”

¹⁴⁵ “Blueprint for Wellness.”

Individual School Sites

Individual school sites can implement goal setting and reciprocity interventions without a nonprofit partner. As schools are required to teach nutrition to their students as part of California state law,¹⁴⁶ these could be integrated with those mandatory lessons. These tools are not limited to use by classroom teachers, if a school has a parent volunteer or a health class that covers these topics, the internal behavioral tools could easily be adapted for their use. Based on our findings of the potential long-term impact of these tools, schools seeking to improve this aspect of their educational programming could benefit from these practices.

¹⁴⁶ NASBE, “Nutrition Education.”

Glossary

Authority: See “Internal Behavioral Tools.”

Behavior Change Theory: Health and nutrition habits are malleable and can be influenced by external factors. Manipulating these factors can improve eating habits in the short and long term. This is based on the idea that targeted and sustained interventions on changing actions can have a continued effect even after the intervention has ended.^{147,148,149}

Behavioral Economics: Based on a combination of fields, including the economic concept that preferences are flexible and manipulable. Utilizes this concept, as well as ideas from psychology, to influence individual or group actions based on predictable individual behaviors.

Choice Architecture:¹⁵⁰ This subtype of behavioral economics deliberately changes the external environment or setting of choice to influence behaviors. Examples of this include:

- **Framing:** Structuring the environment to promote certain choices. *E.g. Moving the salad bar so all students have to walk around it to check-out.*
- **Defaults:** Choosing the desired, default option. *E.g. The default option in the lunch line is that you get carrots unless you specifically ask for french fries.*
- **Feedback:** Changing an action based on system/human feedback. *E.g. A cafeteria worker asks student, “Are you sure you want to make that food choice?”*

Cohen’s d: A measure of standardized effect size used to compare studies’ different outcomes of interest. Commonly reported effect size due to simplicity and comparability using standard deviations.

Commitment: See “Internal Behavioral Tools.”

Common Core:¹⁵¹ The Common Core State Standards are national standards in math and

¹⁴⁷ Loewenstein et al., “Asymmetric Paternalism.”

¹⁴⁸ McGowan et al., “Healthy Feeding Habits.”

¹⁴⁹ Hussam et al., “Habit Formation.”

¹⁵⁰ Thaler and Sunstein, *Nudge*.

¹⁵¹ “Preparing America’s Students for Success,” Common Core State Standards, accessed February 27, 2017, <http://www.corestandards.org/>.

English that set goals for what students should have learned in each grade in these fields. They were created so that all children graduate from high school with the skills needed for college and career, no matter the state in which they received their education.

Conditional Incentives: Providing an incentive, such as money, to complete a particular action. The incentive is only given once the action is completed. In this project, this could be a policy that gives a child a quarter if they consume their serving of vegetables at lunch.

Cost-Effectiveness: The measurement comparing effect sizes to behavior change to the monetary costs of the intervention. When costs were unable to be obtained from our client or a particular study of interest, they were inferred using market rates. One of four criteria.

Decision Fatigue:^{152,153} The concept that decision making and self-regulation stem from the same internal resource within an individual and that making repeated choices can exhaust the pool from which these actions are drawn, leading to poorer decisions.

Defaults: See “Choice Architecture.”

Duration of Effect: The longevity of the behavior change which resulted from a particular intervention. This particular project relies on theory of duration due to the lack of literature on this subject. One of four criteria.

Effect Size: The size and significance of the behavior change that occurs under each policy option. This is quantified using Cohen’s *d* and we consider a value of 0.40 standard deviations to be a medium/large outcome worthy of further consideration based on education, nutrition, and public health fields of measurement. One of four criteria.

Fairness Equilibrium:¹⁵⁴ The theory that people are willing to sacrifice their own well-being in order to help those who were kind to them. Under this theory, a person who received a kind gesture from another will reciprocate with an offer of higher value, even if they do not maximize their material benefit by doing so.

Feedback: See “Choice Architecture.”

Framing: See “Choice Architecture.”

Hattie’s Zone of Desired Effects:¹⁵⁵ This represents the zone at which an effect size can be

¹⁵² Baumeister et al., “Ego Depletion.”

¹⁵³ Vohs et al., “Making Choices.”

¹⁵⁴ Rabin, “Incorporating Fairness.”

¹⁵⁵ Hattie, *Visible Learning*.

considered significant, based on education literature. This is based on John Hattie's research which incorporates over 50,000 educational studies and meta-analyses in an effort to understand what works in education. Using this research, Hattie finds that the average effect of an education intervention is 0.40, which we also use to consider a worthy outcome for our own interventions.

Healthy, Hunger-Free Kids Act, The (2010):¹⁵⁶ Federal legislation passed by President Obama which reauthorizes funding and policies for the U.S. Department of Agriculture's child nutrition programs.

Internal Behavioral Tools:¹⁵⁷ Behavioral economic tools that work to directly influence internal motivations and behaviors. Examples of this include:

- Reciprocity: Returning a gift/favor to someone who has initiated a gift/favor
- Commitment: Remaining internally consistent with personal goals or beliefs, goal setting
- Social Proof: Following the actions of others
- Liking: Doing an action based on how much you like or identify with the person asking you to do that action
- Authority: Doing an action because of a real or perceived authority figure
- Scarcity: Valuing an object based solely because it is rare

Liking: See "Internal Behavioral Tools."

Meta-Analysis: An analysis of many analyses. Used to understand treatment effects across studies.

Net Behavior Change: ("NBC") The combination of effect size and duration of effect. Used in this research to theorize the total behavior change possible for a policy option, during and after the intervention is completed.

Paternalism (Strict): Paternalism is based on the economic concept that individuals are not rational and require a higher authority to make choices in their best interest. In this instance, paternalism could include policies such as completely banning a particular food from school campus.

¹⁵⁶ "An Act to Reauthorize Childhood Nutrition Programs."

¹⁵⁷ Cialdini, *Influence: the Psychology of Persuasion*.

Plate Waste: The food that was served at a meal but thrown away uneaten.

Political Feasibility: The relative ease by which a particular policy option could be implemented at a site and the level of difficulty in reproducing the intervention at new locations, based on the expertise and opinions of stakeholders. This could include students, families, teachers, school administrators, policy experts, and/or staff at Common Threads. One of four criteria.

Reciprocity: See “Internal Behavioral Tools.”

Scarcity: See “Internal Behavioral Tools.”

Sensitivity Analysis: Analysis performed when the selection of specific alternatives over others is very sensitive to small changes in estimates. As this report notes, limited research exists exploring these types of interventions on our population of interest. Therefore, the uncertainty in our research necessitates a sensitivity analysis, as seen in Chapter 5.

Social Proof: See “Internal Behavioral Tools.”

Taste Exposure Theory:^{158, 159} The concept that increasing exposure to a particular food increases consumption and preference for that food in children.

Transtheoretical Model:¹⁶⁰ A model of behavior change frequently used in habit formation literature. Created by Prochaska et al. (1992), there are five stages of change in this model: (1) precontemplation, (2) contemplation, (3) preparation, (4) action, and (5) maintenance.

¹⁵⁸ Birch and Marlin, “I Don't Like It.”

¹⁵⁹ Wardle et al., “Modifying Children's Food Preferences.”

¹⁶⁰ Prochaska et al., “In Search of How People Change.”

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Appendix

Appendix A

Table 1: Choice Architecture Interventions¹⁶¹

Influence Intervention	Description
Framing	Structuring the environment to promote certain choices <i>E.g. Putting fun stickers on the healthy snacks or moving the salad bar so all students have to walk around it to check-out.</i>
Defaults	Choosing the desired, default option <i>E.g. The default option in the lunch line is that you get carrots unless you specifically ask for French fries.</i>
Feedback	Changing an action based on system/human feedback <i>E.g. A cafeteria worker asks student, “Are you sure you want to make that food choice?”</i>

Table 2: Internal Behavioral Tools¹⁶²

Influence Intervention	Description
Reciprocity	Returning a gift/favor to someone who has initiated a gift/favor
Commitment	Remaining internally consistent with personal goals or beliefs
Social Proof	Following the actions of others
Liking	Doing an action based on how much you like or identify with the person asking you to do that action
Authority	Doing an action because of a real or perceived authority figure
Scarcity	Valuing an object based solely because it is rare

¹⁶¹ Thaler and Sunstein, *Nudge*, offers a more complete taxonomy of examples.

¹⁶² Based on Cialdini’s “Weapons of Influence.” Cialdini, *Influence: the Psychology of Persuasion*.

Table 3: Choosing Between Behavioral Economic Interventions

Tool	Criteria	Behavior Change	Duration	Political Feasibility	Cost Effectiveness	Type of BE Intervention*
Defaults	Yes	No	Yes	Yes	Yes	CA
Feedback	Yes	Unknown	Unknown	Yes	Yes	CA
Framing	Yes	No	Yes	Yes	Yes	CA
Reciprocity	Yes	Unknown	Yes	Unknown	Unknown	IBT
Commitment	Yes	Unknown	Yes	Unknown	Unknown	IBT
Social Proof	Yes	Unknown	No	No	No	IBT
Liking	No	Unknown	No	Yes	Yes	IBT
Authority	No	Unknown	No	Yes	Yes	IBT
Scarcity	No	No	No	No	No	IBT

*CA= Choice Architecture; IBT=Internal Behavioral Tool

Note: Interventions failed to pass our initial criteria for a variety of reasons. Liking and Authority’s effect on behavior change are highly dependent on the specific teacher-student relationship, which is itself highly dependent on age. Social Proof and Scarcity are exceptionally hard to manipulate in a school setting, while feedback has a relatively high training cost and relies on a student’s pre-existing knowledge of nutrition to conceptualize the feedback.

Appendix B: Multi-Level Modeling of Effect Size

We also wanted to take into account the nested structure of schools to test how far off our naive estimates of effect size were. To do this, we used a two-level model to calculate more accurate effect sizes for Reciprocity and Commitment. This first level describes the between-classroom data:

Level 1

$$milk_{post_{ij}} = B_{0j} + D_{1j}(\underline{gift}_{ij} - \underline{gift}_j) + D_{j2}(\underline{goal}_{ij} - \underline{goal}_j) + B_{3j}(\underline{milk}_{pre_{ij}} - \underline{milk}_{pre_j}) + r_{ij}$$

$r_{ij} \sim N(0, \sigma^2)$

where:

B_{0j} : is true mean milk consumption for classroom i in school j

D_{1j} : is effect of the reciprocity treatment on milk chose for school j

\underline{gift}_{ij} : takes 1 if received the reciprocity treatment, 0 otherwise for classroom i in school j

\underline{gift}_j : represents percentage of students getting the reciprocity treatment in school j

D_{j2} : is the effect of the goal setting treatment for school j

\underline{goal}_{ij} : takes 1 if received the goal setting treatment, 0 otherwise for classroom i in school j

\underline{goal}_j : represents the percentage of students getting the goal-setting treatment in school j

B_{3j} : controls for the prior level of milk consumption in school j on post-consumption

$\underline{milk}_{pre_{ij}}$: represents the pre-treatment proportion of milk consumed by classroom i in school j

milk_pre_j: represents the proportion of white milk consumed by school j pretreatment

r_{ij}: the deviation of class i's milk consumption from expectation in school j

σ²: The variance of the level 1 residuals, or within school residuals, assumed normally distributed with mean 0.

The second level describes the between-schools data:

Level 2

$$B_{0j} = \lambda_{00} + u_{0j}, \dots u_{0j}N(0, \tau_{00})$$

$$D_{1j} = \lambda_{10} + u_{1j}, \dots u_{1j}N(0, \tau_{11})$$

$$D_{2j} = \lambda_{20} + u_{2j}, \dots u_{2j}N(0, \tau_{22})$$

$$B_{1j} = \lambda_{30} + u_{3j}, \dots u_{3j}N(0, \tau_{33})$$

where:

λ₀₀: is the grand mean of percent while milk across all schools post-treatment

λ₁₀: is the grand mean of the reciprocity treatment effect

λ₂₀: is the grand mean of the goal setting treatment effect

λ₃₀: is the grand mean of percent white milk across all schools pre-treatment

u_{0j}, u_{1j}, u_{2j}, u_{3j}: are the deviations (random effects) for post-treatment outcomes, reciprocity treatment, goal setting treatment, and pre-treatment outcomes, respectively

τ₀₀, τ₁₁, τ₂₂, τ₃₃: are the variances of the post-treatment outcomes, reciprocity treatment, goal setting treatment, and pre-treatment outcomes, respectively

Our treatment effects of interest are λ_{10} and λ_{20} representing the grand mean, or overall average, treatment effect. In a hierarchical linear model (HLM), there are multiple different standardized effect sizes that can be calculated using different combinations of estimated variances for each level; these effect sizes must be compared to effect sizes of the same type.¹⁶³ In our case, we are comparing studies that often use a two-level structure, but do not report standard errors from mixed models. Given the structure of the data, we can expect our effect sizes to vary greatly. We divide the grand mean treatment effects λ_{10} and λ_{20} by the square root of the error variance, σ , to arrive at effect sizes of .574 and .410 for Reciprocity and Commitment, respectively.

¹⁶³ Hedges, "Effect Sizes in Nested Designs," 337-53.

Appendix C: Quantitative Analysis of Duration of Effect

Reciprocity

Brock et al. (2014)¹⁶⁴ investigated how clinician’s clinical effort increases by giving conditional or unconditional incentive to them. The results show that the effect of unconditional incentives declines sharply after the intervention and becomes zero about 9 weeks after finishing the intervention. The most optimistic way of modeling this declination is that the effect size declines linearly by 11.1% every week. However, in light of habit formation theory, the decrease in effect size will get slower more gradually because the better choice that has already been made will help an individual make the better choice in the future. Therefore it is more realistic to assume exponential decrease in effect size where the slope of the effect size decrease is very steep at first but becomes close to flat as weeks pass. We estimated an approximated exponential curve¹⁶⁵ in which the effect size decreases by 75% in 4.5 weeks and becomes close to zero in 9 weeks as a standard scenario. Finally, we estimated an approximated exponential curve in which the effect size decreases by 75% in 2 weeks and becomes close to zero in 9 weeks as a worst scenario. The data used as well as the assumed and estimated model is summarized in Table 1. The shape of each model is shown in Figure 1.

Table 1: Model Estimation Summary (Reciprocity)

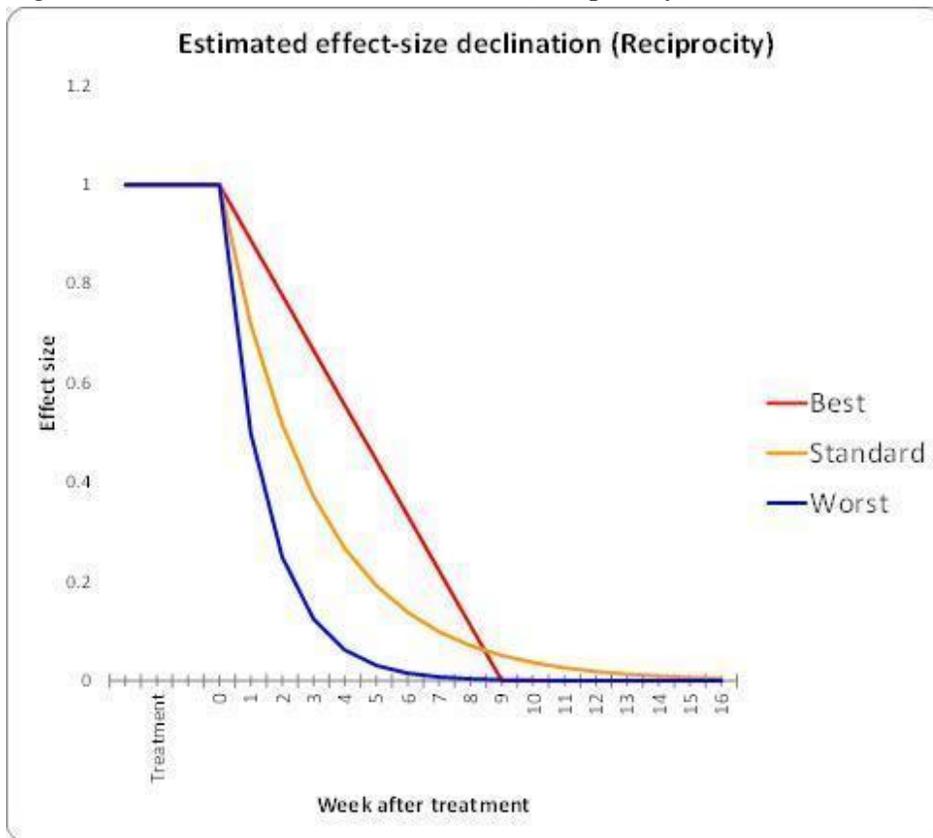
Study	Treatment effect	Scenario	Treatment effect (follow-up)	Follow up date (weeks after treatment)	Linear or exponential assumption	Estimated Model Equation
Brock et al. (2014)	4.44	Best	0	9	Linear	$y_t = (-0.11111 \times t \times d) + d$
		Standard	0.11 (assumed)	4.5 (assumed)	Exponential	$y_t = d \times 0.71871^t$
		Worst	0.11 (assumed)	2 (assumed)	Exponential	$y_t = d \times 0.4993^t$

※ y_t : Effect size t weeks after treatment ;t: Weeks after treatment, d: Effect size right after treatment

¹⁶⁴ Brock et al., “Giving and Promising Gifts.”

¹⁶⁵ Estimation was conducted using online graph service, <https://www.desmos.com/>.

Figure 1 : Effect-size declination model (Reciprocity)



Commitment

Raju (2010)¹⁶⁶ examined the effect of incentives, pledges, and competition on elementary and secondary school students' healthy food choices and the results show that the effect of goal setting (the pledge) lasts not only for the short-term, but also for the long-term. The treatment effect dropped by 66% in the first week after treatment but the effect remained at 56% of the original level even after 10 weeks post-treatment. The result clearly shows the contrast between the sharp drop right after the treatment and the slight (or no) drop afterwards and it is in line with our findings on habit formation theory. Therefore, we estimated three exponential models of effect size declination for best, standard and worst scenarios. For the best scenario, we estimated an approximated exponential curve by which the treatment effect drops by only 44.4% in 10 weeks. For the worst scenario, we drew an approximated exponential curve by which the treatment effect drops by 66% in the first week post-treatment. We also assumed a standard scenario in which the treatment effect decreases by 38.9% in 5 weeks. The data used as well as

¹⁶⁶ Raju et al. "Marketing Healthful Eating to Children."

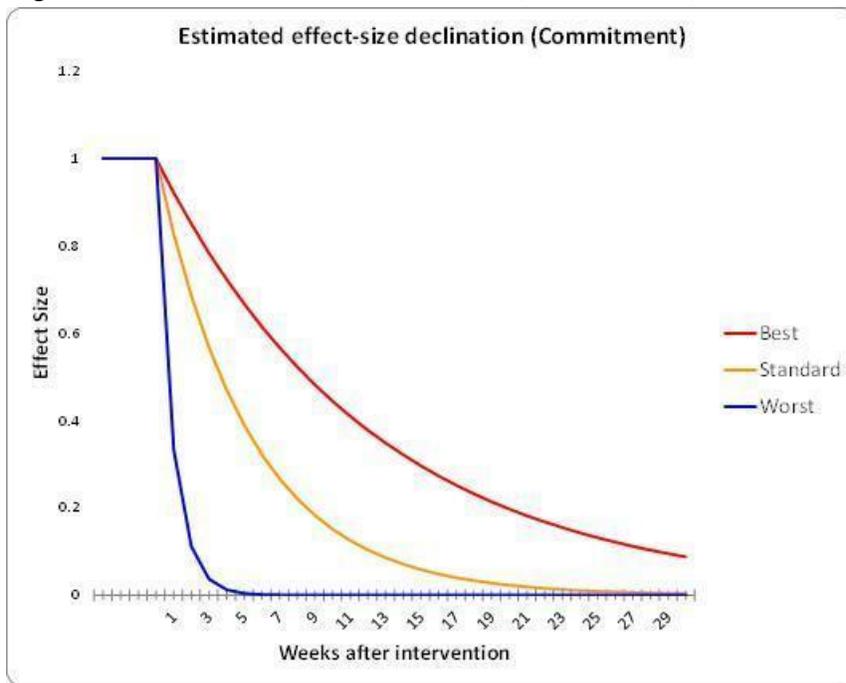
the assumed and estimated model is summarized in Table 2. The shape of each model is shown in Figure 2.

Table 2: Model Estimation Summary (Commitment)

Study	Treatment effect	Scenario	Treatment effect (follow-up)	Follow up date (weeks after treatment)	Estimated Model Equation
Raju et al. (2010)	0.9	Best	0.4	10	$y_t = d \times 0.92211^t$
		Standard	0.35 (assumed)	5 (assumed)	$y_t = d \times 0.82788^t$
		Worst	0.1	1	$y_t = d \times 0.33333^t$

※ y_t : Effect size t weeks after treatment t: Weeks after treatment, d: Effect size right after treatment

Figure 2: Effect-size declination model (Commitment)



Defaults

Defaults and Framing, our choice architecture behavioral economic tools, require a different set of assumptions than Commitment and Reciprocity. This difference comes from the low operational costs of Defaults and Framing; they require very low costs once the tools are

implemented. Therefore, when we actually implement programs using choice architecture, we do not have to decide for how long we will implement the program and we can use the intervention for as long as it's effective. For example once we set the default choice of the school lunch menu, no additional costs will be required to maintain the change. For that reason, it is not useful to estimate an effect-size declination model such as we used for Commitment and Reciprocity.

Though these interventions do not have a time limit, the effect size of the program would not be constant. It is reasonable to assume that students' responsiveness to the program would decline as time goes on, so the effect size will decline gradually. This assumption is backed up by our qualitative interviews with choice architecture experts. Therefore, as with Framing and Defaults, we assumed that the effect size is the highest at the beginning of the treatment and estimate the declination model of the effect size after this point.

For Defaults, we used the data from Ensaff et al. (2015)¹⁶⁷ to estimate the declination model. Ensaff et al. investigated how much improving the choice architecture in a school cafeteria affected students purchases of healthy foods containing vegetables. In this study, the treatment effect at three weeks post-intervention was 41% of the original effect size. The most optimistic interpretation of this result is that the treatment effect would not have gone below 41% of its original level if the intervention had continued. Again, in light of habit formation theory, it is reasonable to assume that the decrease of the effect size will be exponential rather than linear. Therefore, for the best scenario we estimated an exponential curve which never goes below 41 % of the original effect size. However, there is no guarantee that the effect size never goes below that line, so for the worst scenario, we estimated an exponential curve by which the effect size becomes nearly zero in the end. For the standard scenario, we estimated an exponential curve which never goes below 20.5% of the original effect size. The data used as well as the assumed and estimated model is summarized in Table 3. The shape of each model is shown in Figure 3.

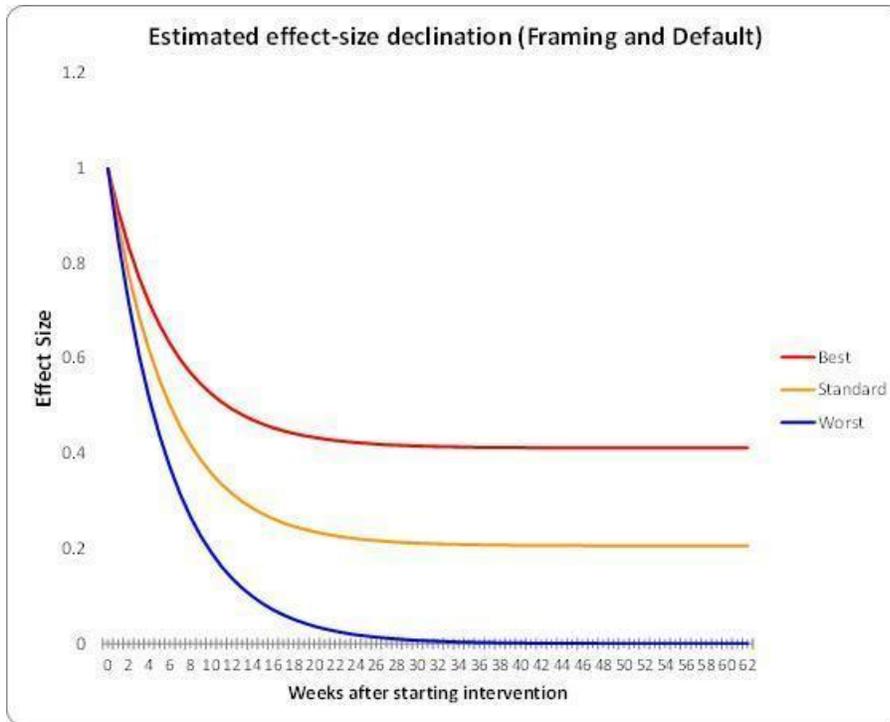
¹⁶⁷ Ensaff et al., "Food Choice Architecture."

Table 3: Model Estimation Summary (Defaults)

Study	Treatment effect (during treatment)	Scenario	Treatment effect (after intervention) = lower limit	Estimated Model Equation
Ensaft et al. (2015)	1.7	Best	0.7	$y_t = (d - d \times 0.4118) \times 0.8489^t + d \times 0.4118$
		Standard	0.35 (assumed)	$y_t = (d - d \times 0.2059) \times 0.84839^t + d \times 0.2059$
		Worst	0 (assumed)	$y_t = d \times 0.84799^t$

※ y_t : Effect size t weeks after starting treatment ;t: Weeks after treatment, d: Effect size at the start of treatment

Figure 3: Effect-size declination model (Default)



Framing

For Framing, we also used the data from Ensaft (2015)¹⁶⁸ to estimate the duration model, but we needed to estimate it using a different assumption. Because our qualitative interview with the

¹⁶⁸ Ibid.

pioneers of choice architecture indicates that the effect of attractive naming tapers off and ends up being ineffective after a time, it is unrealistic to assume that the effect will last forever. Therefore, we interpreted the data in a different way and estimated another duration model for Framing. We estimated the best, standard and worst scenario based on the decreasing speed of the effect size, assuming that the effect size will end up becoming zero at some point in the future.

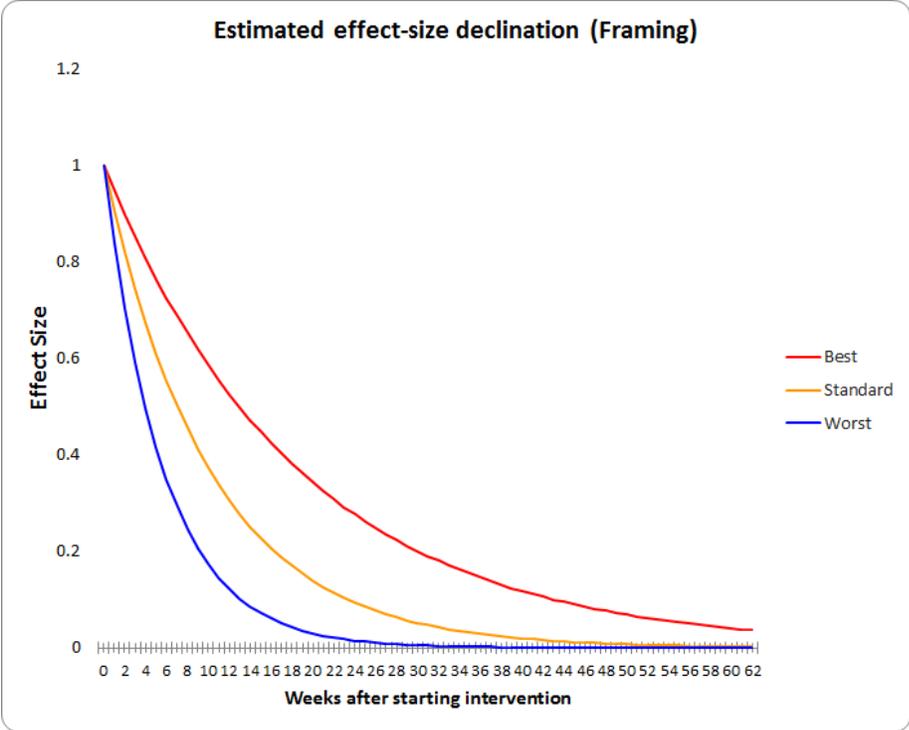
According to Ensaff et al., the effect size remained 41% of the original level at week 9 after starting the intervention even post-treatment, so in our best scenario, we estimated the exponential curve by which the effect size remained 62% of the original level at week 9, assuming that the effect size would be 50% higher than reported if the intervention continued. For the standard scenario, we estimated the exponential curve by which the effect size remained at 41% of the original level, as reported in the study. Finally, for the worst scenario, we assumed that the effect size will become zero at week 9 post-treatment. The data used as well as the assumed and estimated model is summarized in Table 4. The shape of each model is shown in Figure 4.

Table 4: Model Estimation Summary (Framing)

Study	Treatment effect (during treatment)	Scenario	Treatment effect (9 weeks after start)	Estimated Model Equation
Ensaff et al. (2015)	1.7	Best	1.05 (assumed)	$y_t = d \times 0.94787^t$
		Standard	0.7 (assumed)	$y_t = d \times 0.90611^t$
		Worst	0 (assumed)	$y_t = d \times 0.83895^t$

※ y_t : Effect size t weeks after starting treatment t: Weeks after treatment, d: Effect size at the start of treatment

Figure 4: Effect-size declination model (Framing)



In order to compare each option’s duration of effect, we calculated how many weeks it would take for the effect size to reach below 10 % of its original level (Table 5).

Table 5: Necessary weeks for the effect size to reach below 10%

Option	Scenario	Necessary weeks	Ranking
Commitment	Best Scenario	29 weeks	3 rd
	Standard Scenario	13 weeks	
	Worst Scenario	3 weeks	
Reciprocity	Best Scenario	9 weeks	4 th
	Standard Scenario	7 weeks	
	Worst Scenario	4 weeks	
Defaults	Best Scenario	Never	1 st
	Standard Scenario	Never	
	Worst Scenario	14 weeks	
Framing	Best Scenario	44 weeks	2 nd
	Standard Scenario	24 weeks	
	Worst Scenario	14 weeks	

In summary, we can expect the longest duration of effect for Defaults and the shortest duration of effect for Reciprocity. This result is in line with the theoretical analysis in the body of the report.

Appendix D: Quantitative Analysis of NBC

We have the estimated effect size and its duration models for each policy option. In this section, we calculate the estimated Net Behavior Change (NBC) of each policy option by using the effect size (in Cohen's d) and the duration model equation. NBC was basically calculated by taking the definite integral of each duration model's equation multiplied by 5 (Number of times lunch is offered in a week), so NBC stands for "How much in standard deviation does the policy potentially change a student's fruits and vegetables consumption in lunchtime during and after the program as a total?" The mathematical formula used to calculate NBC for each option and calculated NBC is summarized in Table 1. NBC average was calculated under the assumption that best, standard and worst scenario would happen with the same probability.

Here, we have to add an assumption to make the NBC of Reciprocity & Commitment and the NBC of Default and Framing, because we estimated the model of the effect size after *finishing* the program for Commitment and Reciprocity while we estimated the duration model of the effect size after the *beginning* of the program for Default and Framing. Therefore, if we simply take the definite integral of duration of effect formula for all policies, we are not taking into account the behavior change during the intervention for Commitment and Reciprocity. Hence, we added estimated behavior change during the program to the behavior change after the program for Commitment and Reciprocity. The behavior change during the intervention was calculated as "Effect size \times 8 weeks \times 5 meals", because our client's current offered nutrition education program is for 8 weeks and there is no explicit evidence for us to think that the effect size will decline in such a short term with full of novel materials to learn.

Also, for the best and standard scenario in Default, the NBC will be infinite unless we constrain the treatment length because we are assuming that the effect size would never go below certain level. To make Default's NBC comparable to other options, we temporarily set the treatment length of Default as 40 weeks (one school year) because most of the effect size for every policy option and every scenario taper off by 90% after 40 weeks. Calculated NBC is summarized in Table 1.

Table 1: Estimated Net Behavior Change for each option

Policy Option	Scenario	Formula	NBC	NBC (avg.)
Reciprocity	Best	$(9 \times d \div 2) \times 5 + d \cdot l \times 5$	35.88	31.54
	Standard	$\int_0^{\infty} d \cdot 0.71871^t dt \times 5 + d \cdot l \times 5$	31.66	
	Worst	$\int_0^{\infty} d \cdot 0.4993^t dt \times 5 + d \cdot l \times 5$	27.09	
Commitment	Best	$\int_0^{\infty} d \cdot 0.9221^t dt \times 5 + d \cdot l \times 5$	41.68	29.06
	Standard	$\int_0^{\infty} d \cdot 0.82788^t dt \times 5 + d \cdot l \times 5$	27.24	
	Worst	$\int_0^{\infty} d \cdot 0.3333^t dt \times 5 + d \cdot l \times 5$	18.27	
Default	Best	$\int_0^{\infty} (d - d \cdot 0.4118) \cdot 0.8489^t dt \times 5 + d \cdot 0.4118 \times t \times 5$	118.35	77.06
	Standard	$\int_0^{\infty} (d - d \cdot 0.2059) \cdot 0.84839^t dt \times 5 + d \cdot 0.2059 \times t \times 5$	77.08	
	Worst	$\int_0^{\infty} d \cdot 0.84799^t dt \times 5$	35.75	
Framing	Best	$\int_0^{\infty} d \cdot 0.94787^t dt \times 5$	51.09	31.45
	Standard	$\int_0^{\infty} d \cdot 0.90611^t dt \times 5$	27.73	
	Worst	$\int_0^{\infty} d \cdot 0.83895^t dt \times 5$	15.56	

※ Reciprocity and Commitment, t: Weeks after treatment, d: Effect size right after the treatment, l: length of treatment (8 weeks) Default and Framing: t: Weeks after starting treatment d: Effect size at the start of treatment

In conclusion, in terms of the potential Net Behavior Change to be induced by each policy option, Default potentially has the highest average score and Commitment has the lowest average score. However, the average NBC for Commitment, Reciprocity and Framing is quite similar to each other. Considering the naive assumptions made for this analysis, we cannot conclude the potential NBC assertively for these three options.

Appendix E: Costs ^{169,170,171,172,173}

Table 1: Costs Utilized in Cost-Effectiveness Analysis

Common Threads Cost Info	
Training Costs (2 hours)	\$150.00

LAUSD Teacher Cost Information	
Highest Salary	\$80,074.00
Base Salary	\$45,637.00
Average Teacher Salary	\$62,855.00
Pay per day (182 days/year)	\$345.36
Pay per hour (8 hours/day)	\$43.17

LAUSD Senior Food Production Assistant Cost Information	
Hourly Wage	\$15.00

LAUSD Principal Cost Information	
Average Principal Salary	\$112,400.00
Pay per day (249 days/year)	\$451.41
Pay per hour (8 hours/day)	\$56.42

¹⁶⁹ "LA Unified School District: Personnel Commission July 1, 2016 Classified Salary Schedule."

¹⁷⁰ Himes, "LAUSD Educators Typically Earned \$75,504 Last Year."

¹⁷¹ J.B., interview.

¹⁷² "TREND Sticker Assortment Pack."

¹⁷³ "Copies and Documents."

Table 2: Reciprocity Option

Expense	Description	Expense Level	Estimated Costs
Costs to Common Threads			
Stickers	Stickers come in a pack of several sheets, and each teacher will be provided a sticker pack for the duration of the Small Bites Curriculum (8 weeks).	Classroom	\$5.00
15 min Teacher Training	Common Threads provides a 2-hour Small Bites training for a minimum of 12 teachers at a cost of \$150. The marginal time needed to instruct teachers on implementing this tool will take an estimated extra 15 minutes. Costs are determined by taking the estimated costs of an additional 15 minutes ($\$150/8=\18.75) and dividing by the minimum number of teachers attending (12).	Classroom	\$1.56
Costs to School			
15 min Teacher Training	The costs of teachers attending the training are taken into account as well, as teachers are compensated for required additional training. Costs for this additional 15 minutes in training is estimated by using average LAUSD teacher salary.	Classroom	\$10.80
10 min Teacher Time	Time it would take a teacher to pass out all of the stickers to each student. Costs are calculated using average LAUSD teacher salary.	Classroom	\$7.20

Table 3: Commitment Option

Expense	Description	Expense Level	Estimated Costs
Costs to Common Threads			
Goal Setting Worksheets	Teachers will be provided with the worksheets for setting a goal. There is 1 goal sheet per lesson, so each student should receive 8 goal sheets throughout the program. Average printing costs are \$0.02/sheet.	Individual	\$0.16
15 min Teacher Training	Common Threads provides a 2-hour Small Bites training for a minimum of 12 teachers at a cost of \$150. The marginal time needed to instruct teachers on implementing this tool will take an estimated extra 15 minutes. Costs are determined by taking the estimated costs of an additional 15 minutes ($\$150/8=\18.75) and dividing by the minimum number of teachers attending (12).	Classroom	\$1.56
Costs to School			
15 min Teacher Training	The costs of teachers attending the training are taken into account as well, as teachers are compensated for required additional training. Costs for this additional 15 minutes in training is estimated by using average LAUSD teacher salary.	Classroom	\$10.80
15 min Teacher Time	Time it would take a teacher to pass out all of the worksheets to each student and have them complete it. Costs for additional 15 minutes of work spent on Small Bites program is estimated by using average LAUSD teacher salary.	Classroom	\$10.80

Table 4: Default Option

Expense	Description	Expense Level	Estimated Costs
Costs to Common Threads			
20 min Cafeteria Worker Training	Common Threads provides a 2-hour Small Bites training for a minimum of 12 teachers at a cost of \$150. The marginal time needed to instruct a cafeteria worker on implementing this tool will take an estimated extra 20 minutes. Costs are determined by taking the estimated costs of an additional 20 minutes ($\$150/6=\25).	School	\$25.00
Costs to School			
20 min Cafeteria Worker Training	The costs of cafeteria workers attending the training are taken into account as well, as workers are compensated for required additional training. Costs for this additional 20 minutes in training is estimated by using hourly wage of LAUSD Food Production Assistant.	School	\$5.00
1 hour Implementation Costs	The default option requires a rearranging and set up of the cafeteria food, and implementation costs are calculated using estimated time it would take a LAUSD Food Production Assistant to make these changes.	School	\$15.00
2 hours Approval from Food Services Dept.	To make changes at the cafeteria level, school administrators will need to gain approval from the Food Services Division before they can implement this tool. Approval costs are estimated using Principal median salary and two hours over a time period of two weeks dedicated to getting approval.	School	\$112.85

Table 5: Framing Option

Expense	Description	Expense Level	Estimated Costs
Costs to Common Threads			
20 min Cafeteria Worker Training	Common Threads provides a 2-hour Small Bites training for a minimum of 12 teachers at a cost of \$150. The marginal time needed to instruct a cafeteria worker on implementing this tool will take an estimated extra 20 minutes. Costs are determined by taking the estimated costs of an additional 20 minutes ($\$150/6=\25).	School	\$25.00
Costs to School			
20 min Cafeteria Worker Training	The costs of cafeteria workers attending the training are taken into account as well, as workers are compensated for required additional training. Costs for this additional 20 minutes in training is estimated by using hourly wage of LAUSD Food Production Assistant.	School	\$5.00
1 Hour Design Costs of New Names	The framing option requires creating new and fun names for the fruit and vegetables of the day. These design costs are calculated using estimated time it would take an LAUSD Food Production Assistant to design these names.	School	\$15.00
1 hour/month Design Costs (Replacing New Names)	The framing option includes the variable costs of consistently updating names of the fruits and vegetables to sustain the size of the effect. These variable costs are calculated using time it would take an LAUSD Food Production Assistant to design these names each month (8 additional school months).	School	\$120.00
2 hours Approval from Food Services Dept.	To make changes at the cafeteria level, school administrators will need to gain approval from the Food Services Division before they can implement this tool. Approval costs are estimated using Principal median salary and two hours over a time period of two weeks dedicated to getting approval.	School	\$112.85

Table 6: Model LA Unified Elementary School Used for Policy Option Analysis¹⁷⁴

Grade	Avg Class Size	# Classrooms
K	22	5
1	23	4
2	23	4
3	23	4
4	27	3
5	28	3
Total	24	22

¹⁷⁴ Based on data from Ed-Data. "Los Angeles Unified School District: 2015-16." Accessed February 10, 2017, <http://www.ed-data.org/district/Los-Angeles/Los-Angeles-Unified>.

Table 7: Internal Behavioral Tools Package

Expense	Description	Expense Level	Estimated Costs
Costs to Common Threads			
Stickers	Stickers come in a pack of several sheets, and each teacher will be provided a sticker pack for the duration of the Small Bites Curriculum (8 weeks).	Classroom	\$5.00
Goal Setting Worksheets	Teachers will be provided with the worksheets for setting a goal. There is 1 goal sheet per lesson, so each student should receive 8 goal sheets throughout the program. Average printing costs are \$0.02/sheet.	Individual	\$0.16
15 min Teacher Training	Common Threads provides a 2-hour Small Bites training for a minimum of 12 teachers at a cost of \$150. The marginal time needed to instruct teachers on implementing this tool will take an estimated extra 15 minutes. Costs are determined by taking the estimated costs of an additional 15 minutes ($\$150/8=\18.75) and dividing by the minimum number of teachers attending (12).	Classroom	\$1.56
Costs to School			
15 min Teacher Training	The costs of teachers attending the training are taken into account as well, as teachers are compensated for required additional training. Costs for this additional 15 minutes in training is estimated by using average LAUSD teacher salary.	Classroom	\$10.80
15 min Teacher Time	Time it would take a teacher to pass out all of the stickers and worksheets to each student and have them complete it. Costs for additional 15 minutes of work spent on Small Bites program is estimated by using average LAUSD teacher salary.	Classroom	\$10.80

Appendix F: Qualitative Interviews and Observations

Interview #1: M.V. (Elementary School Teacher)

Interviewer: Describes research and what the interview will cover. Asks permission to record, which is granted.

Interviewer: So the first thing I want to ask is what grades you teach.

Interviewee: Second and third grade, and I teach a special day class.

Interviewer: And what is a special day class?

Interviewee: It's for students that have mild to moderate learning disabilities or learning [inaudible comment].

Interviewer: So the first question that we wanted to ask is, do you currently teach any form of nutrition education?

Interviewee: We do Harvest of the Month, or I do Harvest of the Month, which is a fruit or a vegetable determined by our nutrition department, and then we teach all about that. And then the nutrients of it and the food group, where it comes from and different things and then the students try it. They eat it. They try it.

Interviewer: Oh, great.

Interviewee: Yeah, but I'm not really doing the MyPlate to be honest.

Interviewer: Is this nutrition education something that all classes at Barton does? Or is this something that you personally like to implement?

Interviewee: Classes at Barton do it. It's for schools that have a certain percentage of students who are on a free lunch and breakfast. So those schools get the program.

Interviewer: Got it. And so for Harvest of the Month, how much time in a typical year is dedicated to that?

Interviewee: Just for my part or the whole –

Interviewer: If there are two different versions we'd love to hear both.

Interviewee: Well I don't know how much – the people in the nutrition office who put it

together, 'cause they send the teachers a whole slide show and a parents' education pamphlet, and then the teacher gets one. And so they're all putting that stuff together. And then my part is teaching from the slide show and there's like a booklet that goes with it, like a student workbook. So I don't know. My part is probably for prep is probably maybe just 20 minutes but for the actual teaching it's probably an hour. So I don't know.

Interviewer: And this happens once a month?

Interviewee: Yes, once a month.

Interviewer: Great. And the other thing we wanted to ask was just relative to the other lessons that you have to teach your students, how important do you personally find the nutrition education portion?

Interviewee: In comparison to the other stuff? I would not rank it at the top. Maybe fifth on the list maybe. I know that sounds bad but it's true.

Interviewer: No, we completely understand. And one of the things that we wanted to glean from this is we know that teachers have a lot of constraints and so we just want to figure out what those are.

Interviewee: Right, right. Okay, that's good.

Interviewer: So do you see any benefits from doing these education lessons with the students when you do Harvest of the Month? Or do you see any problems with it?

Interviewee: I don't see any problems with it. I see the benefit because a lot of my students hadn't tried the fruit or the vegetable before and then they'll tell me the next day or the next week that they saw it at the store and they asked their parents to buy it. They get really excited about it, which I like to see. So I do see a big benefit from it. They're trying something that they've never tried before and if they like it they're asking their parents to buy it.

Interviewer: And it sounds like the Harvest of the Month that you do is inside the school. But how likely would you or the school be to adopt a third-party curriculum? So working with an organization outside of the school to adopt a nutrition education program?

Interviewee: Well I would be open to it. I'm not sure how much other teachers would. I guess it would depend on how much time per week or per day or whatever it would take to implement the program I think. That would be a major factor I think.

Interviewer: Right. So we have four different slight versions to this curriculum, so we just want to ask you a question about each one. How likely would you be to support nutrition education in the form of completing a goal setting worksheet and a food diary type of worksheet

in the classroom?

Interviewee: I don't know. That would be what the students were eating at home and at school. I don't know. Is that what you mean? They would be tracking what they're eating at home and at school?

Interviewer: Our initial idea was setting a goal to consume the healthy food from their school lunch. So when they go to the cafeteria, if they get fruits and vegetables, to actually set the goal that you [*crosstalk*] –

Interviewee: Oh, okay. Yeah, I would do that.

Interviewer: And how likely would you be to support handing out stickers to encourage eating their healthy food at lunch?

Interviewee: Oh, I would do that.

Interviewer: Do you find that there's a lot of student response to stickers?

Interviewee: My students might because when they try the Harvest of the Month there's an I tried it sticker that they get and they seem to really like that. And then it helps them when they go home, their parents ask them what did you try? And then that [*inaudible comment due to crosstalk*].

Interviewer: And then the third one –

Interviewee: Sorry. My principal's on the loud speaker. Okay, go ahead.

Interviewer: That's okay. The third one would be, and I know this is outside of your control, so I guess just your response about the school's openness to this. But rebranding some of the school foods to make them sound more appealing to kids. So changing the names of the fruits and vegetables to fun names to make them sound more appealing.

Interviewee: I don't know. 'Cause I think with the name change all the way, like a totally different name than what it really is? Or it would be like – or would it be a cute name in combination with the fruit name or the vegetable?

Interviewer: Yeah. Sorry, I should have clarified. So not completely changing the name to not say what it is, but for example power peas. So it's the name of the fruit or the vegetable but trying to make it sound, I don't know, cooler or more [*crosstalk*] –

Interviewee: Yeah. Actually I think that's a really good idea. I don't know how open the school would be, but yeah. I like that idea, too. It would make the kids feel more like a

subconscious message like if you eat peas you're gonna have more power, you'll have more energy or whatever. Whatever it is.

Interviewer: And then the last one of our four different versions is kind of like setting default in the lunchroom, so where they're automatically given a healthy option and then they have to ask if they want something else. I'm not really sure how your school cafeteria does it where they have to get everything.

Interviewee: Yes, they have to get one – yes. It's pretty much a set lunch that they have to get. They could choose yogurt or the main entrée. They have two choices. If they don't like the main entrée they can get a yogurt, but that's about it as far as choices.

Interviewer: And then we have two more questions for you. Would any of these interventions make a nutrition education program more appealing to you if you knew they were shown to improve consumption of healthy food?

Interviewee: If the data showed that they worked?

Interviewer: Yeah. Would it be –

Interviewee: Yeah, definitely that would be more appealing for sure if it had already been studied and it had shown that it works. Yeah.

Interviewer: And then my last question, and please don't hold back on this, what barriers or challenges would you anticipate or applying any of these into your school or classroom?

Interviewee: The biggest challenge would just be the time. It would just be getting it into my schedule. That would be the biggest challenge I think. And I think for most of the teachers because we have a STEM program, an engineering program, there's all kinds of things that we have and it's hard to even do the basics, just the basics. Teaching the kids how to read and math and writing, and so anything extra is really, really difficult. Even though it's super important and necessary, it's really hard. It's really hard to do it.

Interviewer: Okay, I think those are all of our questions.

Interviewee: Okay, I hope that helped.

Interviewer: It helps a lot. We really appreciate it. Getting teacher feedback is the most important. Because if you don't have time for it there's no point in what we're doing. So we want to make sure we can produce a really good project.

Interviewee: Yeah, it sounds very exciting.

Interviewer: Hopefully.

Interviewee: Yeah, because nutrition education is really lacking. We don't really have a curriculum to follow. Years ago we got some information about My Plate and that's kind of it. We got like a poster of the plate and that's it. We don't have any materials really or anything except what we find on our own.

You picked a really good topic to go on for sure because really I don't have anything in my classroom except what I bought myself. Yeah, I would as a teacher loved more direction with that kind of thing. I'm not like an expert on nutrition or anything. So yeah. It's a great idea. Really good.

Interviewer: Yeah, the organization we're working with partners with schools but they have created a curriculum. So it's a lot more about implementation than having the teachers have to come up with their own.

Interviewee: Which is awesome. That's awesome. Yeah, I would say that's what we need.

Interviewer: Great.

[End of Audio]

Interview #2: M.G. (Principal)

Interviewer: Nice. And then I think that your school actually does quite a bit around cooking and nutrition, but could you tell me a little bit about how you currently teaches nutrition education?

Interviewee: In order to receive nutrition education is basically you have to take an elective of nutrition/culinary class. We also have an afterschool program through our culinary class that works with the students. But other than that, if you didn't take that elective class you wouldn't have much information on healthy eating habits.

Interviewer: Okay. And then the afterschool class and the smaller unit class during the school day, are those taught by Santee staff or do you partner with an outside nonprofit or something?

Interviewee: So the school, during the school day, the teacher has an afterschool it is a partner.

Interviewer: And what's the name of the partner?

Interviewee: Her name is Mel Nicolía. She's just an LAUC volunteer. And then through her connections they do yoga and – 'cause she's a chef so she invites some of her friends to come and work with kids and their parents.

Interviewer: Very cool. And then in general, how important do you find student nutrition kind of like relevant to I imagine many other concerns that you have about running a school?

Interviewee: I mean it's definitely with the high rates of diabetes between African American and Latino students, that's 99 percent of our students, I would say very important.

Interviewer: And do you see any primary benefits from most nutrition education programs?

Interviewee: Yeah, I mean the kids that are in it they learn to not only learn what is healthy food but also they learn how to cook it and how to cook traditional Hispanic food in a healthier way.

Interviewer: That's awesome. And do you see any weaknesses in general of nutrition education programs or yours specifically?

Interviewee: For me specifically the challenges that it's not an A through G approved course, so if you think about the college-bound kid that wants to be Valedictorian or that wants to be the top kid, they're not gonna take that class because it's not gonna help them on their college application much.

Interviewer: Right.

Interviewee: So they do get elective credits but it's not like an A through G approved. It's a culinary art, so you can take culinary art or an art class. No, they still have to take art, they still have to take their other elective stuff. This is just an extra fluff, what they would call like a fluff class.

Interviewer: So are there certain types of students that you see that are more likely to take that course?

Interviewee: I would say, I don't know, if you know the avid programs, but it would be like our – kids that are not failing other classes, because those kids are trying to make up their courses. But like the DCB kids that are middle of the road type kids that [*inaudible comment due to audio cutting out*] – they're not failing classes so they have room in their schedule to take more electives.

Interviewer: Gotcha.

Interviewee: And then every once in a while you get the high flyers that want to do culinary professionally and have great grades and they do a great job in the kitchen as well.

Interviewer: And then how actively do you manage or can you manage the nutritional offerings in the schools, like the lunches offered to the kids or do you have vending machines or do people do bake sales? That sort of thing.

Interviewee: Can you repeat that question?

Interviewer: How actively do you kind of manage what food is offered in the school? I know with the free and reduced lunch program, correct me if I'm wrong but I don't think that you have too much control over which lunches are offered through that program unless you have another vendor.

Interviewee: We really don't have a say as to what food is offered, like it's through LAUSD, through the district and they pretty much set the menu. The kids when they go into the lunch line they do have an option usually between two different options. It's a pretty strict requirement as to what they can sell in the vending machines.

It has to meet the health requirements, so a lot of the stuff when I was in school, probably when you were in school they don't sell in the vending machines anymore. It's a strict guideline that schools and vendors have to follow.

And you said something about bake sales or other types of sales, legally schools are not allowed to compete with the cafeteria food. We can't sell stuff at the same time that lunch is going on. So we don't bring an outside vendor to sell to our kids during lunchtime, so our kids either get the cafeteria food or they don't eat.

Interviewer: Gotcha. Then I know you currently are doing an in-school class on nutrition education, but if you weren't given the constraints of working within LA Unified School District, would you be likely to adopt a third-party curriculum for a nutrition education for the whole school?

Interviewee: Yeah, that would be the decision of the teacher. If the teacher enjoys the curriculum they have – my big thing is if we can have a push to make it an elective that matters in the A through G course that would be great. Then we can change the type of kid that goes in there.

Interviewer: Gotcha. So for the most part you'd say it's kind of up to the teacher what curriculum they could use?

Interviewee: Yeah. I mean as long as it meets the standards and the things that they're supposed to teach I don't see any – as long as the kids are engaged and the teachers enjoy the curriculum I don't see a problem with it.

Interviewer: Okay. Now I'm gonna ask you about specific types of interventions, and I should preface this by saying that the population that we're specifically working with is third through fifth grade, so I know that some of the options might seem not really a good fit for your high school students, but just thinking about how these types of interventions just might fit in with the school day in general.

So how likely would you be to support these actions in your school? So the first one is within a nutrition program completing a goal-setting worksheet with a food diary to kind of help kids take ownership and commitment with their personal nutrition.

Interviewee: Within the class? Yeah –

Interviewer: Yep.

Interviewee: *[Inaudible comment due to audio cutting out]*

Interviewer: And then handing out stickers to encourage healthy food choices before lunch, so this gets at the idea that people like to reciprocate good actions. So if a teacher gives you a sticker and says thank you for making a healthy choice at lunch today, students have been shown to be more likely to actually make healthier choices. Although this is up to eighth grade. I don't know if it would apply to high schoolers.

Interviewee: The kids like stickers and they like positive reinforcement. So I think any nice little thing like that would be a plus.

Interviewer: Okay. Then the other two questions are around kind of the lunch itself. Would you be willing to support kind of rebranding the school lunch to make them sound more appealing? An example of this might be having students rename all the fruits and vegetables. Like in elementary school it might be something like x-ray vision carrots or something like that.

Interviewee: Yeah, that's a little too elementary-ish I think.

Interviewer: And then the next the school lunch option is to provide a default option. So you mentioned that your students get kind of two different lunch options. Would you be willing to make the healthier option kind of the default that they would automatically get handed unless they specifically requested the other option?

Interviewee: I don't know if that's an issue with the cafeteria. [*Inaudible comment due to audio cutting out*] as long as we can [*inaudible comment*] the other.

Interviewer: Oh, sorry. Could you repeat that? It cut out a little.

Interviewee: I don't know if that's an issue with the cafeteria manager, whether we hand one item over the other. I do know that everything that is in the cafeteria, and I'm sure someone with _____ everything is approved to be under the health requirements and so they would probably push back and say everything that we give is healthy. But I think what you're saying is hand out the healthier one.

Interviewer: Mm-hmm.

Interviewee: Yeah, I don't see a problem with that. However, I don't know if it's allowed.

Interviewer: Okay. Specifically allowed by the person that manages your cafeteria or by the USDA Food Services?

Interviewee: Well I'm sure that the cafeteria manager would be able to tell you rather quickly the answers to that.

Interviewer: Okay.

Interviewer: So the first is kind of thinking about adopting kind of an entire nutrition package for your school. So that would be things like the goal-setting worksheets and the stickers and maybe changing where the cafeteria salad bar is located, kind of as a whole kind of environmental intervention to help improve nutrition. Is that something that if it was a low cost for you to implement that you'd be interested in?

Interviewee: It would just have to rely on the teacher. So at my school the teachers have funding for the program. And if it's something that catches their attention then they would be the ones that would fund it out of the budgets that we give them.

Interviewer: Go ahead.

Interviewee: So it would have to be something that they would want to buy into and own.

Interviewer: Okay, is that practice common across other schools or is that unique to your school?

Interviewee: I think it depends on – personally as a principal I wouldn't want to force a curriculum on a teacher that may not believe in it. Or if they already have something that they deem similar, I wouldn't want them to spend money on something that they're doing or something that they may be doing better.

Interviewer: And is that something that you've heard at other high schools? For example, that they do that as well?

Interviewee: Yeah, I would say in general at the high school level the principals would definitely speak with the teacher ahead of time.

Interviewer: And we had talked a little bit about some of the kind of barriers or challenges that might happen with making any changes to how the school lunch was offered or doing defaults. But would you anticipate any other barriers for your school implementing interventions like this other than as long as the teacher is interested?

Interviewee: Can you repeat that again? I'm sorry.

Interviewer: Sorry. Would you see any other barriers or challenges for implementing different nutrition curriculums or interventions, like the handing out of stickers or things like that?

Interviewee: No. I think the biggest challenge would be if it sticks to the curriculum of the teacher and then as always making sure that the rules and regulations of the district are followed when it comes to different things like handing stuff out or changing the name of things. But with regards to the class, making sure that the big sell needs to be with the teacher ahead of the principal. They're the ones that would go vouch for the program.

[End of Audio]

Interview #3: A.O. (Assistant Principal)

Interviewee: I taught Social Studies. That would be mainly focusing on seventh grade and eighth grade Social Studies.

Interviewer: Okay, great. And then could you tell me a little bit about how [y] currently teaches Nutrition Education?

Interviewee: I believe that it is taught through their science curriculum in the seventh grade. I'm not so well informed on the sixth grade curriculum, if they see or hear anything through their sixth grade science class, or the eighth grade. I'm pretty sure that the eighth grade science curriculum does not have - doesn't focus on the eating habits or nutrition, but I'm very sure the seventh grade does.

Interviewer: Okay, great. Thank you. And then obviously, you have a whole school to be concerned about. So how would you say - how would you rank Nutrition Education relative to the other concerns that you have about your school and your students?

Interviewee: I think that the Nutrition Education is, I think it currently falls short, to be honest with you, based on the current needs and trends that I see, you know, our kids in terms of their consumption, food consumption. In the last few years, you know, I don't know if this answers your question, but in the last few years, I do - I have seen a tremendous increase in the consumption of food that is, you know, opposite to healthy and actually very unhealthy food. It's an all-day from morning to lunch that I see kids, you know, digging into their bags of chips or into their candy, and I believe that, I mean, whatever the curriculum is in the seventh grade, clearly it's not sending the message. I believe also that the message should be - any curriculum should also involve the whole. Yes, because parents play a, you know, obviously, parents play a big role in this. And I am going to say that parents, our parents, anyway, they play a role not in the playing game of you know, what their kids are eating, but they're certainly not helping.

Interviewer: Right. That makes sense. And then do you or another one of the Carver Middle School staff actively manage kind of what food is offered by the school? By this I mean, do you choose what might go into vending machines if you have them or monitor bake sales or other food fundraisers?

Interviewee: I can't say that I do. And this year, I am, you know, the administrator over the cafeteria and I work shoulder to shoulder with our cafeteria manager. We also have a student store that sells, you know, again, we are part of the, you know, eliminate that with a stakeholder that needs to improve and clean up their act because they also sell chips and other things. Now the chips that they sell, I'm not very well versed on chips and qualities and calorie intake of the chips that we are selling, but I believe that they are not the usual, you know, Doritos, Cheetos, and that kind of more popular stuff among the kids. So the chips that we do sell here at the school are probably I'm going to say a little bit of a healthier kind of a quality, if that actually exists. Yeah. And in terms of the food that they eat from the cafeteria, we do not have any - I do not have any control over that, because that menu is put together by higher powers at the District.

Interviewer: And then do you know or could you tell me what the process might be if you wanted to kind of lobby to change what was offered in the school lunchroom or how it might be presented?

Interviewee: Say that again.

Interviewer: So you mentioned that the items that are offered for school lunch are kind of, like, the higher power, the Food Services Division of the District.

Interviewee: Of the District, right.

Interviewer: Do you know if there's any process by which the school could ask the District to change any of that? Or is that not an option?

Interviewee: I don't know if it is an option, Interviewer. I don't know about the process, yeah. This is the first year that I'm working with the Food Services personnel here at the school. So I would have to ask, you know, and I would start with my cafeteria manager if we could as a school independently of the District, could we, if we could offer some alternative to what the District, you know, recommends.

Interviewer: Okay. Could you tell me a little bit about what the relationship is between you and the food manager in the cafeteria. Like how do you work together?

Interviewee: Sure. The lady, Miss Jenny Martin her name is. It's a very collegial and professional relationship to begin with. My role with her is that her staffing, she informs me of her staffing whenever is short for any reason or whenever she needs personnel, she comes and informs me. Pretty much Miss Jenny, Miss Martin manages the operations of the cafeteria, because that is the way that it is supposed to run. I am working with her, but she manages - she is the manager. You know, she's a manager. And so she manages the staff. She manages their hours. And so basically, at this point the way that it works, she just keeps me in the loop, so to speak.

Interviewer: Okay. And so she works for the District, not really the school, right?

Interviewee: That is it. That is correct, yeah.

Interviewer: Okay. Great. That's really helpful to know. Okay. And then in terms of nutrition curriculum, how likely do you think your school as a whole school would be to adopt a third party curriculum for Nutrition Education if it was Common Core aligned and went with State standards?

Interviewee: We would have to definitely discuss it, Interviewer and I, but to which grade would you-- would it be for the entire school? So the question is would it be for sixth, seventh and eighth grade students? Or just focusing on one grade? You know, how would you envision this? To the whole school or just a specific grade?

Interviewer: For so, probably I'm curious about both. So as a whole school.

Interviewee: As a whole school.

Interviewer: How likely would you be?

Interviewee: We would have to - I think that - let me see. Let me ask then another question. Would it be embedded through, let's see, shall we say, through a science class?

Interviewer: It could definitely be embedded within another class, because I know that makes it easier for teachers to implement.

Interviewee: Right. Because I'm trying to think where it could be, you know, embedded in the curriculum. Certainly if it's within science classes, specifically in the seventh grade, because the seventh grade science class as far as I know, it has a huge unit on Health, right. So that is the subject of the seventh grade curriculum. I'm not so well-informed of sixth grade. I think that eighth grade science is more about organic matter, okay. And so I'm trying to think if it were not possible to bring it through the science classes, there is another - We have a homeroom, right. We have a home room. We also, we call it Advisory. So it's a 20-minute block of time, the first 20 minutes of the school day, and I'm wondering whether we could, you know, present the project by adding it and presenting it through the homeroom classes. Now currently, we have the homeroom where we have curriculums being taught by teachers through our homeroom. They have to do with Restorative Justice practices. Teachers are supposed to be running community building circles, talking to the kids about their grades and, you know, that kind of like us, to improve our school climate, overall school climate. So there is two curriculums that the teachers are running through their homeroom. One of them is again Restorative Justice curriculum and practices, and the other one is called Second Set, which is another kind of a little bit similar to Restorative Justice, but the whole effort is to improve our overall school climate and improve student to student and student to teacher relationships. So if we were to infuse this health

nutrition curriculum, how long would you say it would take? I mean, does it require an hour every day? Is it an hour every single day or is it an hour once a week? What is the logistics of it? Do you know at this time?

Interviewer: Sure. The curriculum that we're looking at is currently there are eight lessons. Each lesson is about an hour long, but the teachers have the flexibility to do the lesson whenever it's just most convenient for them throughout the school year.

Interviewee: Okay.

Interviewer: So it would be eight hours total for the whole year.

Interviewee: Eight hours for the whole year.

Interviewer: Mm-hmm.

Interviewee: Okay. That sounds - An hour each - For the whole year. And in your summation, does it include also activities that are involved that can be done in that one hour block of time?

Interviewer: Yes.

Interviewee: Okay. So eight lessons. And what would be the culminating activity? Is there some sort of culminating conclusion or activity to it?

Interviewer: Sure. So as the curriculum currently stands, each lesson also has like a food making component. So students would also like learn about the different nutrients, about proteins and then also kind of make their own snack at the end of the lesson. And then we are also considering adding some additional things into the curriculum that we think would make it more effective, such as goal setting and different kind of behavioral interventions that we think would increase the effectiveness of the curriculum.

Interviewee: I see. Would the teachers require any kind of training to impart this curriculum?

Interviewer: There would be initial training. It's probably an hour of training that would happen before the school year starts.

Interviewee: So this is being projected to get it running if, you know, if we can implement it to get it running for the next school year, is that correct?

Interviewer: Yeah. So we're actually, we're partnered with a non-profit that currently does regular nutrition education in schools, and they do this model that I've been talking about.

And they're called "Common Threads," and we're working with them to increase the effectiveness of their lessons because, you know, like you said with the seventh graders at your school, the regular nutrition curriculum doesn't seem to be really creating changes in what kids are eating. So we're trying to come up with ways to make their curriculum better.

Interviewee: Okay. So we would have to have the teachers present, I presume sometime during their summer school vacation, so that they can go to the one hour training, is that correct?

Interviewer: Mm-hmm.

Interviewee: Okay. So that they could try to begin to implement it at the beginning of the year and proceed with the lessons. You know, I can definitely, Interviewer, it sounds, you know, it sounds like it is and I believe that it is a very needed instruction that our kids need to, you know, need to know. I can certainly present it to my principal and, you know, and the other admin, and Miss Jenny, Miss Jenny Martin the cafeteria manager, I'm sure that she will play a very, you know, we can have her play a definitely active role in this. And we would have to, you know, relate this information to my principal, Natasha Buck to see if we can, you know, I don't know as I talk to you right now, I don't know if we are going to have the teachers at any time during the summer. And I remember that last year during the summer there was, we had the teachers and this was a whole new theory kind of a training that we had. We had them here for a couple of days but it was voluntary that they, you know, they were able to come during the summer for two days for a training. And clearly not all the teachers came on that day. So I'm trying to, what I'm trying to say is, I want to know from Miss Buck if she plans to have the teachers during summertime for any kind of training. And we could, you know, have a one hour, hour and a half portion of that training dedicated to this project, you know, so that perhaps it could be implemented here in the coming year.

Interviewer: Sure. So right now, I am more than happy to send you the information about the non-profit that we're working with if you are interested in doing this implementation. Right now, what I am just interested in is kind of understanding how the different L.A. unified schools work to see how we could just best help our non-profit partner improve their curriculum. Just don't worry, this isn't - I'm not trying to sell you specifically on this curriculum, especially if your school already has something, although I'm happy to send you the information. But that was all very helpful information for us to know.

Interviewee: Have you - have you implemented this curriculum to any other L.A. school as we speak?

Interviewer: Yes. So, the non-profit that we're helping out does have this curriculum in several L.A. unified schools right now, and they offer grade-targeted curriculum for grades three through eight. But for our just kind of general research purposes, we're just trying to understand the general L.A. unified environment so we can make recommendations to them for future improvements.

Interviewee: Sure. Sure. What are some of the schools that you have been working with?

Interviewer: I don't know the names of the schools that the non-profit is partnered with. Right now, I'm just contacting folks to just get more information for the non-profit and for our Capstone project.

Interviewee: Okay. Okay. Okay, so why don't if you do me a favor then, send me the non-profit information.

Interviewer: Sure.

Interviewee: I will relay it to my principal, to Miss Buck, and discuss the possibilities of initiating, you know, we could start by thinking about what date will be a feasible date during the summer to have the teachers, you know, be here and be presented with information that they need in order to implement this program here. You know, I'm going to run it by Miss Buck and you know, if you send me the e-mail, we can discuss it at greater length. And, you know, if she says it's good to go, then I'm fine with it. You know, I will be really happy to support this for next year. I know that the school is going to go through some transition for next year, Interviewer. Currently, we enjoy, we do enjoy we have the principal and three other administrators. But for next year, that number, the number of administrators and/or APs is going to most likely change drastically. So what I'm trying to say is that even I might not be here next year, because of the number of students, you know, every year we lose a large number of kids to the surrounding charter schools and, you know, for all of the reasons. So but as far as I know, you know, I don't know who - which one of us is going to be here next year, but, you know, I can give the dual support if Miss Buck decides and tells me, you know, let's run with it, I will give this project the dual support, you know, until, you know, until I know whether I'll be here next year or not.

Interviewer: Sure. I'm definitely happy to send you the information if you're interested. Just a couple more quick questions.

Interviewee: Sure.

Interviewer: So if, for example, the seventh grade science teacher wanted to adopt a third party curriculum, would they just be able to do that themselves? Or would they go through you and other administrators?

Interviewee: That's a good question. I don't know. I mean, yeah, I don't know the answer to that question. If we just -

Interviewer: Okay.

Interviewee: Decide to just go with a segment, right, a seventh grade portion of the school, I don't know if we can, you know, if we can just implement it here locally. And because it is one hour sessions, right.

Interviewer: Mm-hmm.

Interviewee: So it would have to be, you know, I don't know if we have to alert somebody in the District. Or I just don't know about that kind of promising that it will require.

Interviewer: Okay.

Interviewee: But, you know, but if it is doable with just with the seventh graders, you know, just implement activities or lessons throughout the year, you know, I'm pretty sure that it can be done. But in terms of injecting this new curriculum on top of the science curriculum, I don't know if we would have to, you know, get some sort of permission or anything like that or it's a local type of decision, you know.

Interviewer: Okay. And then I just wanted to get your opinion on some things that we're thinking about adding to the curriculum. So one thing that we were thinking about adding on top of kind of the traditional education is doing some goal setting and food diaries. In your experience with students, do you think that that would be helpful?

Interviewee: Food diaries?

Interviewer: Yeah. And some teaching kids about goal setting.

Interviewee: Sure, sure. I think so. I would think that it would be a beneficial, you know, addition to the lessons and to the activity.

Interviewer: Okay.

Interviewee: I think so, yes.

Interviewer: Another idea that we had is handing out kind of these unconditional small incentives. So we were thinking about recommending that teachers after or before lunch hand out, like, stickers or buttons or something to students and just say, "Thanks for making a healthy choice today," kind of getting at this idea that, you know, if somebody gives you something, you're more likely to want to respond to that gift.

Interviewee: Sort of like commitment kind of buttons type of thing?

Interviewer: Yeah, mm-hmm.

Interviewee: Like I commit to, you know, make healthy - Yeah, I think so. You know, I think that - I think that, you know, well, I'm thinking that the teachers, that the teacher plays a very important part, Interviewer, in how should I say? In applying this curriculum, right.

Interviewer: Yes.

Interviewee: And, you know, and I'm sure that you know this, that if the teacher is very much of a - excited about the curriculum and, you know, presents it in an important - in an interesting fashion and is excited and kind of buys into the curriculum and helps the students also buy into the curriculum, I think that buttons like that, commitment buttons, and I say this because we do use wrist bands and I think we have used stickers in the past, where, you know, students show their commitment as to stay drug free, you know, and so these are perhaps that the District has been implementing for a while. So this, a button where the kids demonstrate their support and solidarity to healthy eating I think would be a good idea.

Interviewer: Great.

Interviewee: Yeah.

Interviewer: Another idea that we had, which I think would be - would have to go through the Food Services Division, but I wanted to get your opinion if you thought it might work for kids, is kind of this idea of rebranding or renaming school lunches and the healthy portions of school lunches to make them sound more appealing. So this may be, I don't know, it would be a good target for a middle school student, but some things that we've seen be effective are, like, renaming carrots, like, "x-ray vision carrots," or renaming water "spa water" instead regular water. Do you think that kids would respond to that sort of rebranding?

Interviewee: I would think so. Again, presented in a very attractive fashion in a very attractive way and being spoken about in a very - dynamically, I think that it could take off. Yes.

Interviewer: Okay.

Interviewee: Because kids, that's the language that kids, you know, speak about this. Everything has a, you know, you look - you look at any normal, good, old-fashioned catalogue and all kinds of shoes have names now, you know, and *[laughs]* and blouses and shirts and pants, they all have it. It's not just pants anymore, it's just some sort of name. So I think that it's the new trend and it would be, you know, applying what the kids are used to already and they see it on a daily basis.

Interviewer: Okay. Great. And then I don't know if this would work with the - with how the cafeterias are currently set up, but having the student lunch kind of default to, like, the healthiest option. I know students currently get to pick a couple different options for lunch. But

having it kind of default to the absolute healthiest out of those options and then kids would have to ask to have it changed.

Interviewee: Yeah, that would be something that I would have to, you know, research with Jenny to see if it could be done.

Interviewer: Okay.

Interviewee: Yeah.

Interviewer: No problem at all. And then do you see, I know that your school is undergoing some transitions, but do you see any other barriers or challenges for implementing any of the ideas that I just talked about in your school?

Interviewee: None that I can think of. Interviewer, again, I'm not well-versed in the protocols and diplomacy of the District. I mean, you said that you have already implemented this project in some of the L.A. unified schools, so that is why I would be interested to find out if they found any difficulty in red tape, in, you know, getting, you know, I don't know, permits or okays from personnel in the District. So, you know, but what has been the experience of other schools in terms of bringing in this third party program having to do with nutrition, I would like to know what was their experience in getting this enacted on the campuses, you know, and accepted by the District.

[End of Audio]

Site Visit to LA Unified Elementary School

Small Bites Curriculum Observation and Interviews

Attended: Hiroto, Sydney, J.B.

23 February 2017, 11:00 am - 1:00 pm

J.B. Notes

- Teacher Training
 - CT prefers in person, but also does online
 - Timing of when training happens is at discretion of partner organization
 - Some do it in summer, some do it on professional development days
 - In person takes 2 hours
 - Online takes 1 hour 40 minutes (no demonstrations)
 - Teachers get professional development credit for doing the training (necessary for LA Unified teachers to get these credits)
 - Training is mostly done by Trainer Facilitators, though James is open to the idea of using chefs as trainers if they are well trained themselves
 - Costs \$150 for training

- This includes the trainer, between 12-25 or 30 teachers, supplies, and food for demonstrations (min 12 people required for training)
- Los Angeles programs
 - ~15 sites doing the cooking classes
 - 205 sites doing Small Bites
 - 45-50 during academic year, 100-110 during the summer
 - Partner orgs outside of schools include: LA's Best, Beyond the Bell, Youth Policy Institute, LA Conservation Corps
- Logistics
 - Varies who pushes for the curriculum, can be teacher or can be principal
 - Both are the drivers of the implementation
 - Teachers are "our champions"
 - Some schools have the program only in some classes, others have it school-wide
 - Timing of lesson is very variable across schools
 - Varies what days/weeks the teacher does the lesson
 - Standard timing is 1 hour for lesson and snack
 - Used to do 90 minutes, but found that was too long
 - Commented that Mrs. S. was really stretching out her lesson (we were about an hour in at this point)

Teacher Notes: Mrs. S.

- Happy to answer any more questions, gave us her email
- Taught 3rd grade last year (and the 3rd grade CT curriculum)
- Found that there were differences in book and recipes in online curriculum (Common Bites)
 - James said that's because online one is more versatile
 - Slow roll out of Common Bites online version, some teachers like it others don't
- Parents
 - Very supportive, parents donate all the food/supplies for the lessons (knives, forks, cutting boards, bananas, etc.)
 - James said that some schools get need-based food donations from Common Threads, but this school didn't need that
 - Parents love the program, she will share recipes with them via email from the online recipes, some students have mentioned that they do the cooking lessons at home so there is some trickle down effect
- Timing
 - Usually now does it before lunch, found that later in the day the activities riled the kids up too much but might also do it in the morning (did this for soup so that it could cook throughout the day and eat it later)
 - Usually preps during recess, prepping takes 15-20 minutes but is quite easy
 - She stretches out the lessons and adds things in from her curriculum and other things the kids are learning. We saw the lesson/activity for 1.5 hours, likely would have been another 30 minutes after lunch as well.

- Impressions
 - She pulls Small Bites lessons that align with the other curriculum she is doing in class, find it all aligns really well
 - Everything ties into her curriculum somehow, aligns really well with math. They are currently working on fractions and they were going to do a worksheet with fractions for Healthy Hydration.
 - Would absolutely recommend Small Bites to other teachers
 - Loves Kitchen Times, has good fun facts, also uses it for kids homework assignments
- Obstacles
 - No real obstacles, mostly what comes up is LAUSD tech issues (projector or internet not working or something)
 - Currently looking more at using the website material now, blending the book and online curriculum/recipes
- On our policy options
 - Goal Setting - Awesome, could be added into homework which they currently write 2 paragraphs on the lesson and how they liked the food. Parents still check over homework so could be a good way to get them involved.
 - Reciprocity - Love stickers, she was surprised she hadn't already thought about using this idea. Everyone agreed stickers are the best.
 - Framing - Didn't know
 - Defaults - Didn't know
 - 6th grade students are the only ones given options on the entree, not lower grades but they get to pick a fruit/veggie

Kitchen Observation

- Spoke with the food manager at the elementary school
- She works for the Food Services Division of LAUSD
 - Seemed like she was the only staff for the kitchen, although we didn't ask this to confirm
- Kitchen is basically a warming area for food delivered from a central location
- Kids get an option of 2 veggies, 2 fruits, milk, and then one entree (unless they are 6th grade, then they get a choice between 2 entrees)
 - One of the fruit options is now a "frozen fruit cup" which we didn't see but didn't sound very healthy...
- Food is placed on table in front of the building window (kids line up outside, building is quite small and separate from the rest of the school, "bungalow" style)
- Based on the setup of the kitchen, don't think defaults would be easy to do in this location
- Framing could still be possible, they put a sign out with what's on the menu each day, could potentially be customized

Appendix G: Sensitivity Analysis and Criteria Alternative Matrices

Table 1: Weighting Sensitivity

Criteria	Measures	Commitment	Reciprocity	Framing	Defaults
Duration	Points	2	1	3	4
	Weight	<u>0.3</u>	<u>0.3</u>	<u>0.3</u>	<u>0.3</u>
	Score	0.6	0.3	0.9	1.2
Cost-Effectiveness	Points	1	2	3	4
	Weight	<u>0.45</u>	<u>0.45</u>	<u>0.45</u>	<u>0.45</u>
	Score	0.45	0.9	1.35	1.8
Political Feasibility	Points	2	4	3	1
	Weight	<u>0.25</u>	<u>0.25</u>	<u>0.25</u>	<u>0.25</u>
	Score	0.5	1	0.75	0.25
Total Average Rank		1.7	2.3	3.0	3.0
Total Weighted Score		1.55	2.2	3	3.25

Table 2: Political Feasibility Sensitivity

Criteria	Measures	Commitment	Reciprocity	Framing	Defaults
Duration	Points	2	1	3	4
	Weight	0.2	0.2	0.2	0.2
	Score	0.4	0.2	0.6	0.8
Cost-Effectiveness	Points	1	2	3	4
	Weight	0.3	0.3	0.3	0.3
	Score	0.3	0.6	0.9	1.2
Political Feasibility	Points	2	<u>3</u>	<u>4</u>	1
	Weight	0.5	0.5	0.5	0.5
	Score	1	1.5	2	0.5
Total Average Rank		1.7	2.0	3.3	3.0
Total Weighted Score		1.7	2.3	3.5	2.5

Table 3: Cost-Effectiveness Sensitivity

Criteria	Measures	Commitment	Reciprocity	Framing	Defaults
Duration	Points	2	1	3	4
	Weight	0.2	0.2	0.2	0.2
	Score	0.4	0.2	0.6	0.8
Cost-Effectiveness	Points	3	2	4	1
	Weight	0.3	0.3	0.3	0.3
	Score	0.9	0.6	1.2	0.3
Political Feasibility	Points	2	4	3	1
	Weight	0.5	0.5	0.5	0.5
	Score	1	2	1.5	0.5
Total Average Rank		2.3	2.3	3.3	2.0
Total Weighted Score		2.3	2.8	3.3	1.6

Table 4: Point Values

Criteria	Measures	Commitment	Reciprocity	Framing	Defaults
Duration	Points	2.66	1.33	2.66	4.00
	Weight	0.20	0.20	0.20	0.20
	Score	0.53	0.27	0.53	0.80
Cost-Effectiveness	Points	1.11	1.45	2.40	4.00
	Weight	0.30	0.30	0.30	0.30
	Score	0.33	0.44	0.72	1.20
Political Feasibility	Points	3.02	4.00	3.89	1.30
	Weight	0.50	0.50	0.50	0.50
	Score	1.51	2.00	1.94	0.65
Total Average Rank		2.26	2.26	2.98	3.10
Total Weighted Score		2.38	2.70	3.20	2.65

Table 5: Internal Behavioral Tools Package

Criteria	Measures	Commitment	Reciprocity	Framing	Defaults	<u>IBT Package</u>
Duration	Points	2	1	3	4	<u>2</u>
	Weight	0.2	0.2	0.2	0.2	<u>0.2</u>
	Score	0.4	0.2	0.6	0.8	<u>0.4</u>
Cost-Effectiveness	Points	1	2	3	4	<u>3</u>
	Weight	0.3	0.3	0.3	0.3	<u>0.3</u>
	Score	0.3	0.6	0.9	1.2	<u>0.9</u>
Political Feasibility	Points	2	4	3	1	<u>4</u>
	Weight	0.5	0.5	0.5	0.5	<u>0.5</u>
	Score	1	2	1.5	0.5	<u>2</u>
Total Average Rank		1.7	2.3	3.0	3.0	<u>3.0</u>
Total Weighted Score		1.7	2.8	3	2.5	<u>3.3</u>

Teacher Instructions

These instructions are to be used in conjunction with the Small Bites curriculum. Please refer to these instructions for each lesson to successfully implement the intervention.

Objective

This intervention's objective is to promote students' healthy food choices at lunch through a goal setting activity and unconditional incentives. The goal setting activity will increase students' ownership of healthy decisions and the unconditional incentives will induce a healthy food choice as a reciprocal action to the teacher's gift. Through this activity, we expect to maximize the effect of the Small Bites curriculum and directly affect student behavior change.

Necessary Supplies

For the intervention, teachers will need the following supplies to handout to the students:

1. The corresponding worksheet for each lesson (1 per student)
 - Lesson 1: Use "Lesson 1: The Chef's Plate"
 - Lesson 2: Use "Lesson 2: The Nutrition Label"
 - Lesson 3: Use "Lesson 3: Fruits and Vegetables"
 - Lesson 4: Use "Lesson 4: Protein"
 - Lesson 5: Use "Lesson 5: Whole Grains"
 - Lesson 6: Use "Lesson 6: Healthy Hydration"
 - Lesson 7: Use "Lesson 7: Facts on Fat"
 - Lesson 8: Use "Lesson 8: Make it Count"
2. A pen or pencil
3. Stickers (1 per student) (To be provided by Common Threads)

¹⁷⁵ Developed by APP Team ROOTS for Common Threads *Small Bites* Curriculum (2017).



Lesson 3. Fruit and Vegetable

Step 1. Pre-Lesson Pledge

For every Small Bites lesson, you are encouraged to try a “no thank you bite” for each new food before deciding if you like it or not.

In today's Small Bites lesson, my goal is: I am going to try a “no thank you bite” of each new food!



Step 2. Review and This Week's Goal

Today we learned about _____.
Fruits and vegetables make up _____ of my Chef's Plate.

At lunch this week, my goal is: I am going to try to eat _____ of my fruits and vegetables.

Step 3. Follow-up

Draw or write down all fruits and vegetables you ate for lunch this week on your Chef's Plate!

Once you are done, show your plate to a friend next to you!

