

# *Leafleting Effectiveness Survey (LES)*

*Jack Norris<sup>1</sup> & Eric Roberts<sup>2</sup> & Jonathon Smith<sup>3</sup>*

*June 2017*

Near the beginning of Fall semester 2017, a total of 65000 students will be handed a leaflet with a pro animal rights message (**test books**). Each booklet will have a sticker advertising a "\$5 Starbucks or Amazon Gift Card for taking brief survey" (**Part 1 Survey**). Students answering the survey will be asked about their current consumption of animal products (**base rate**) and given a gift card. One month later, these same students will receive an email, "Thanks for taking our previous survey! We have a few more questions, of course for another \$10 gift card!" (**Part 2 Survey**). Students will again be asked about their current animal consumption. The data will be examined to see if the pro-animal leaflets reduce the amount of animal products consumed by the students (**post-test rate**), particularly to zero (the "**One Week Vegan**").

THE LEAFLETING EFFECTIVENESS SURVEY (LES) will attempt to quantify the impact of pro-animal leafleting on the later consumption of animal products. In particular it will look for "one week vegans", or leaflet recipients who report no consumption of animal products in the post-test survey week. The relationship between leafleting and one week vegans is of real concern for the organization leading LES, Vegan Outreach (VO). VO's primary intervention on behalf of animals is to hand out pro-vegetarian, anti-speciest literature to college students. Verifying the impact of this intervention has become an organizational priority at the highest level. VO also understands that this is a general concern of the broader animal protection community, and has sought the support and advice of partner organizations to carry out LES.

## **LES AT A GLANCE**

Utilizes a pre- and post- survey to measure the impact of leafleting on self-reported animal product consumption. Pilot studies indicate that a brightly colored sticker attached to leaflets advertising an incentivized survey (\$5 for P1, \$10 for P2, \$15 total per participant) can generate a response rate of roughly 5%. A total of 65000 will be handed out, enabling the study to detect a conversion of approximately 1.5% or greater of the test population into a one week vegan with 80% power.

The leaflets will be handed out at 32.5 schools in September 2017. Recipients have one week after the leaflets are handed out to complete the Part 1 survey. An email will be sent out to students who completed Part 1 in mid-October, inviting them to fill out the Part 2 survey.

In particular, VO seeking the participation of Animal Charity Evaluators (ACE) as a partner on LES. This document outlines VO's formal request for a grant from ACE's Animal Advocacy Research Fund.

<sup>1</sup> Executive Director, Vegan Outreach (jack@veganoutreach.org), *LES Roles:* Study Lead, Logistics, Reporting

<sup>2</sup> Research Manager, California Department of Health Services (trax11@16mail.com), *LES Roles:* Statistical Analyst

<sup>3</sup> Technical Group Supervisor, Jet Propulsion Laboratory (jonathon.j.smith@gmail.com), *LES Roles:* Consultant



Figure 1: Vegan Outreach was founded in 1993 and has since handed out more than 30 million pro-vegetarian leaflets. They are the organization leading the proposed LES Study.

VO is looking to ACE to finance (1) the printing of 65000 survey-advertising stickers (\$9750.0), and (2) the purchase of 3250.0 gift cards to distribute as incentives for taking the survey (\$48750.0). This brings the total amount of money requested for the study to **\$58500.0**.

An overview of the study design is provided below, and elaborated on in more length throughout the rest of the document.

## *Background*

THERE HAVE BEEN a number of previous attempts to measure the effectiveness of leafleting (summarized below). These studies have helped characterize this largely unexplored landscape, however none of them were designed or powered appropriately to answer the question of whether leafleting college campuses produces vegans at a reliable rate.

### PREVIOUS LEAFLETING STUDIES

In the fall of 2012, Farm Sanctuary and The Humane League partnered in evaluating the impact of leafleting at the University of Delaware and the University of Maryland by surveying 403 students who had received a Vegan Outreach leaflet during their college career. With corrected arithmetic, **1.7 percent** of the recipients said they went vegetarian as a result of the leaflet. Limitations included the absence of a control group comparison, regression analysis, and analysis of statistical significance.

In the fall of 2013, Animal Charity Evaluators coordinated a similar study, again using Vegan Outreach leaflets with students from ten American colleges and one Canadian college. The sample sizes were 123 and 477 for the treatment group and the control group respectively. Using a generalized linear model and a chi-square test, the differences in change in consumption of red meat and poultry (but not fish) between the experimental group and the control group were statistically significant at the 99 percent confidence level. Limitations include the absence of a large sample size for each school, and a heavy dependence on the subjects' recollection of their diet three months prior to the survey.

Beyond this literature, Vegan Outreach has run a total of three pilot studies in preparation for a full-scale LES. These pilots have focused primarily on crafting an approach that results in a sufficiently high survey response rate to make a fully powered LES tractable. The current study design (brightly colored stickers and \$15 incentive for 5% response rate) is a direct result of these studies, summarized below.

### LES PILOT STUDIES

#### Pilot 1: Fall 2015

The first pilot study utilized a test group of 5000 and a control group of 1000. It used plain white stickers (Figure 2) to advertised a \$5 incentivized survey, and achieved an overall response rate of 1.88%.

#### Pilot 2: Spring 2016

The second pilot used two separate tests groups, each with 100 participants, and no control group. Plain white stickers advertised \$10 (group 1)



Figure 2: Stickers used to advertise incentivized surveys, pilot 1 and 2 (top), pilot 3 (bottom).

and \$20 (group 2) incentivized surveys and achieved response rates were 3% and 2% respectively.

### Pilot 3: Spring 2016

The third pilot used a single test group with 600 participants (no control). This time colored stickers (Figure 2) advertised a \$5 incentivized survey, and an additional \$10 was offered to complete Part 2 of the survey for a response rate of 5%.

The full-scale LES will use the strategy from Pilot 3. The key elements are (1) colored stickers, (2) \$5 incentive for Part 1 survey, (3) \$10 for Part 2 survey.

### Methods

*Note: A detailed description of the study methodology is provided in the Appendix named "Study Design and Power Considerations."*

THE MOTIVATION OF THIS STUDY is to quantify the effect of a leafleting as an intervention. It uses a pre-test / post-test design where each participant is evaluated before and after the intervention. Because each subject's covariates are identical both before and after the intervention, comparison of pre and post test outcomes becomes relatively straightforward. Each participant effectively serves as their own control, except for the confounding influence of time, which will be addressed later.

Both pre-test and post-test surveys will include diet frequency questions asking subjects to quantify their consumption of various foods during the previous week, with response options presented as Likert scales.<sup>4</sup> To maximize both statistical validity and measurement reliability, outcomes will be analyzed as the percent of subjects consuming non-vegan foods less than once per week or never (binary variable). Such subjects are termed "one-week vegans" (OWV), and measuring the number of OMVs created as the result of leafleting is the prime goal of this study.<sup>5</sup>

The study will employ two treatment arms using two different leaflets. This is in part to make sure that a single, low-performing leaflet doesn't sway the overall results of the study. These treatment groups will be pooled when analyzing the survey results for OMVs. The number of subjects required for the treatment arms depends on the quantities described in Table 1.

Table 2 shows the assumed pre-test probabilities and expected odds ratios that were used to size the treatment group. These are largely based on the results of the LES Pilot Studies mentioned above, as well as "Pay-Per Read" (PPR) studies undertaken by VO.<sup>6</sup>

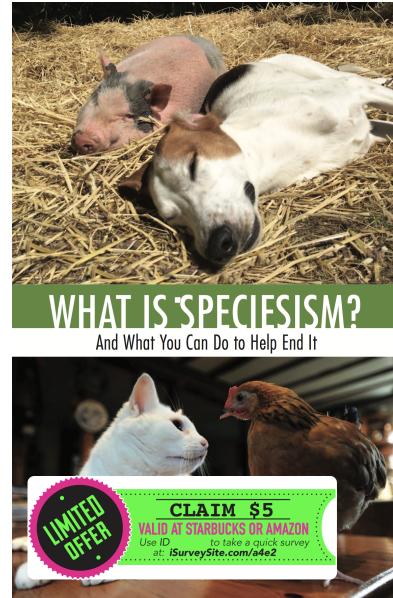


Figure 3: Mockup of test booklet with survey sticker.

<sup>4</sup> An example of the survey can be examined at [isurveysite.com](http://isurveysite.com)

<sup>5</sup> The study will also examine the number of people reporting no beef consumption ("one-week beef avoiders" (OWBA)) and no meat consumption of any kind except fish ("one-week pescatarians" (OWP)).

<sup>6</sup> The PPR studies used Amazon's Mechanical Turk platform to enlist people to read leaflets and fill out surveys afterward.

Quantity	What this is	Reason this is important
Pre-test probability	How common the outcome is at baseline (that is, prior to the intervention)	The more rare a phenomenon, the more subjects needed to quantify its frequency, or changes in its frequency due to the intervention
Expected odds ratio	How much of an effect the intervention is anticipated to have on the outcome	Small effects require more subjects to observe compared to large effects

Table 1: LES Statistical Drivers

Group	Pre-test Rate	Expected ratio	# for 80% power	# leaflets to distribute
OWV	2.5%	1.5	3190	63800
OWBA	37.5%	1.6	200	6000
OWP	2.9%	1.7	1540	30800

Table 2: LES Power Calculation Assumptions

### *Control group*

For this design, the potential confounder is time; that is, if students are rapidly becoming vegan independently of the leaflets, this effect could be misattributed to the intervention. This is the argument for a separate control group, which would undergo the same pre-test and post-test measurements as the treatment groups but would receive a spurious intervention (that is, a leaflet unrelated to veganism) in between.

The inclusion of an equal sized control group will roughly double the cost of the study by roughly, increasing the amount requested from ACE to \$117000. If ACE is willing to provide these additional funds, a full control group will be utilized for the study. If not, than a series of mitigating actions will be employed to minimize the impact of time on the study.

#### TIME-VARIABLE MITIGATION MEASURES

##### Shorten pre-post test span

The nominal time span between administering the pre and post test surveys is two months (this was used in the pilots). For an uncontrolled study, this will be shortened to one month to minimize the opportunity for non-study parameters to influence the results.

##### Minimize other campus outreach activities

VO will engage with other players in the AR community and ask that they impose a moratorium on campus outreach activities for the duration of the study.

### *Plan and Budget*

VO WILL LEAD the execution of the study. This will include printing and stickering the test booklets (and possibly control booklets) and shipping them to its distributed network of outreach coordinators (OC). The OCs will hand out the leaflets over a two week period, and VO will field Part 1 survey responses on its survey website ([isurverysite.com](http://isurverysite.com)). After the wait time has elapsed, VO will send out the email invitation to participate in Part II of the survey, which will be taken at the same web address used during Part I. This timeline is summarized below.

#### LES STUDY TIMELINE

**Aug 14** Ship test / control booklets and stickers to leafleters.

**Aug 28** Complete applying stickers to booklets.

**Sep 5** Begin handing out booklets

**Sep 19** Complete handing out leaflets

**Sep 25** Close Part 1 survey

**Oct 16** Send invitations for Part 2 survey

**Oct 20** Send second notice for Part 2 survey

**Oct 22** Close Part 2 survey.

The main cost drivers for the study are listed in Table 3, along with the cost sharing between partner organizations. Based on this plan, VO will be contributing **\$12512.5** to the study (primarily in labor) and ACE will be contributing **\$58500.0**. Note that the time spent by the study team is not counted in VOs labor contribution. Also shown in the table is the budget adjusted for inclusion of a control group, in case ACE prefers to pursue that study plan.

Category	Cost	Cost (controlled)	Partner
<b>Labor</b>			
Attaching stickers	\$4062.5	\$8125.0	Vegan Outreach
Leafleting	\$3900.0	\$7800.0	Vegan Outreach
<b>Materials</b>			
Booklets	\$4550.0	\$6500.0	Vegan Outreach
Stickers	\$9750.0	\$19500.0	ACE
Gift Cards	\$48750.0	\$97500.0	ACE
<b>Totals</b>			
	\$12512.5	\$22425.0	Vegan Outreach
	\$58500.0	\$117000.0	ACE

Table 3: Detailed LES Budget (Uncontrolled)

# **Jack Norris**

**1212 Farragut Cir • Davis, CA 95618  
Phone: 916.752.1583 • E-Mail: JackNorris3@gmail.com**

## **Experience**

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### **Executive Director, Vegan Outreach**

**2014 to Present**

Oversees the programs, fundraising, and administration of a \$1.7 million, 501c3 non-profit, animal protection organization that spreads a vegan lifestyle. Designed and oversaw two online, prospective booklet studies and three pilot leafleting studies.

### **President, Vegan Outreach**

**1993 to 2014**

Ran the Adopt a College program which involved volunteer and paid leafleters handing booklets to hundreds of thousands of students at hundreds of schools each semester.

### **Registered Dietitian**

**2001 to Present**

Maintains VeganHealth.org, one of the premier websites for evidence-based information on vegan diets.

Blogs at JackNorrisRD.com on research relevant to vegetarian diets.

Co-authored the book, Vegan For Life, with Ginny Messina, MPH, RD, published in 2011.

Created nutrition analysis website, PeaCounter.com.

## **Education**

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Georgia State University, Atlanta Georgia 2000-20001

Certificate, Dietetic Internship

18 semester hours graduate course work

Life University, Marietta, Georgia 1997-2000

Bachelor of Science, Nutrition and Dietetics

Cornell College, Mt Vernon, Iowa 1985-1989

Bachelor of Special Studies, Sociology and Philosophy

## **Awards**

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Animal Rights Hall of Fame, 2005

Life University Alumni Undergraduate Scholarship, 1999

Life University Nutrition Program Academic Scholarship, 1999

Georgia Dietetic Foundation Scholarship, 1999

Phi Beta Kappa, 1989-2001

GTE Academic All-American, 1989

Moots Scholarship in Philosophy, 1988

Alice R. Betts Award for Academic Excellence, 1987

Herbert A. Wilkinson Memorial Scholarship for Politics, 1986

Clyde C. Tull Award in Humanities, 1986

# Jonathon J. Smith

CONTACT INFORMATION	199 S. Madison Ave. #12 Pasadena, CA 91101	Mobile: +1-626-319-2164 E-mail: <a href="mailto:jonathon.j.smith@gmail.com">jonathon.j.smith@gmail.com</a>
EDUCATION	<b>University of Southern California</b> , Los Angeles, CA  M.S., Astronautical Engineering, May 2012  Emphasis in probability theory. Focused coursework in astrodynamics, orbit determination, estimation theory, modeling and simulation of stochastic systems	
	<b>Embry-Riddle Aeronautical University</b> , Daytona Beach, FL  B.S., Engineering Physics, May 2004  <i>Magna cum Laude</i> , Minor in Mathematics	
PROFESSIONAL EXPERIENCE	<b>Jet Propulsion Laboratory</b> , Pasadena, CA  Technical Group Supervisor, <i>Mission Design and Navigation System Engineering</i>  Supervise a group of 12 technologists, infrastructure, and systems engineers. Also manage an infrastructure Service Center that provides computing resources to the Mission Design and Navigation Section with \$2M annual budget.  Group Lead, <i>Mission Design and Navigation Software</i>  Work extensively with outreach, training and development for the Monte project, JPLs astrodynamical computing Python library. — Leading development of non-linear navigation filter and uncertainty propagator in conjunction with UT Austin. — Co-lead on the Spacecraft In The Shot project.  Orbit Determination Analyst, <i>Outer Planets Navigation Group</i>  Orbit determination (OD) analyst on the Equinox and Solstice segments of NASA's Cassini mission, the EPOXI encounter with comet Hartley-2, and the return-to-Earth leg of JAXA's Hayabusa mission.	<b>October 2008 to Present</b>
	<b>KinextX Inc.</b> , Tempe, AZ  Orbit Determination / Maneuver Analyst <i>Space Navigation and Flight Dynamics Group</i>  Navigation analyst (OD and Maneuver Design) for NASA's <b>New Horizons</b> mission, from pre-launch through the Jupiter flyby in 2007. Also provided navigation support for NASA's <b>MESSENGER</b> mission, serving as prime-analyst for Deep Space Maneuver 2 (DSM-2).	<b>August 2005 to October 2008</b>
SOFTWARE COMPETENCIES	Python (NumPy / SciPy, IPython, matplotlib, Sphinx, Jinja, unittest, more), Python package development, LaTeX, MATLAB, C++  Tools <ul style="list-style-type: none"><li>• DVCS: Mercurial, Git</li><li>• Database systems: (MySQL, MongoDB)</li><li>• Web Development: HTML4, CSS, Django, Apache</li><li>• Operating Systems: Apple OSX, Linux, other Unix variants</li></ul>	
AWARDS	NASA Group Achievement Awards for EPOXI Navigation (2010), Hayabusa Earth Return Navigation Support (2010), and New Horizons Spacecraft Development (2006) First Place, 2004 AIAA Undergraduate Team Space Competition Embry Riddle Math Student of the Year, 2003	

# ***Leafleting Effectiveness Survey (LES)***

## **Study Design and Power Considerations**

By Eric Roberts, June 2017



### ***1. Study Design***

Because the motivation behind this study is to quantify the effect of an intervention, we will use a pre-test/post-test design. For this design, each subject is evaluated both before and after the intervention, effectively serving as its own control. As each subject's covariates are identical both before and after the intervention, comparison of pre-test and post-test outcomes becomes relatively straightforward.

We propose that roughly equal numbers of subjects receive each of two leaflets promoting veganism (that is, we will have two intervention arms). While the main question is whether leaflets in general have an effect, it is of interest to the researchers to compare effects of the two different leaflets as well. The analysis (random-effects modeling described Section 3) will account for the existence of two interventions and enable us to generate a “combined effect” estimate. For simplicity, the power considerations (Section 4) will focus on this combined effect estimate.

For this design, the potential confounder is time; that is, if students are rapidly becoming vegan independently of the leaflets, this effect could be misattributed to the intervention. This is the argument for a separate control group, which would undergo the same pre-test and post-test measurements as the treatment groups but would receive a spurious intervention (that is, a leaflet unrelated to veganism) in between.

In our previous experience, the effect of the genuine intervention is generally large enough so that temporal confounding is not a serious possibility. However, we recognize that the audiences for the study still may desire a separate control group, so one is included in the present plan.

### ***2. Outcome Variables***

Both pre-test and post-test surveys will include diet frequency questions asking subjects to quantify their consumption of various foods during the previous month, with response options presented as Likert scales. To maximize both statistical validity and measurement reliability, outcomes will be analyzed as binary variables. This is to say that outcomes will be expressed as the percent of subjects consuming non-vegan foods less than a pre-selected cut-point (e.g. less than once per week or never). When applicable, comparisons between percentages (e.g. pre-test versus post-test results) will be formulated as odds ratios.

In practice, we will have the opportunity to explore the results using a variety of cut-points. To avoid the perception of fishing for results, however, it is helpful to declare the intended cut-point prior to the onset of data collection. For this purpose, our intended cut-point will be less than once per week or never for the following groups of foods:

- Any non-vegan food
- Beef
- Any non-vegan food except fish

### **3. Statistical Analysis**

As noted above, there will be two non-control arms in our design to enable us to compare the effects of two different leaflets. For each of these, standard logistic regression will be employed to quantify the effect sizes as odds ratios with associated 95%-confidence intervals. For comparison, an identical procedure will be conducted for the control group.

The primary motivating question, however, is whether leaflets in general have an effect; this means that it will be helpful to analyze the data when pooling together subjects from both treatment arms. To maintain statistical validity in this setting, we will make use of random effects logistic regression modeling for this purpose.

### **4. Power Considerations**

The number of subjects required for the treatment arms depends on quantities described in the table below.

Quantity	What this is	Reason this is important
Pre-test probability	How common the outcome is at baseline (that is, prior to the intervention)	The more rare a phenomenon, the more subjects needed to quantify its frequency, or changes in its frequency due to the intervention
Expected odds ratio	How much of an effect the intervention is anticipated to have on the outcome	Small effects require more subjects to observe compared to large effects

Because of previous research conducted by Vegan Outreach related to pay-per-read interventions, we have a pretty good idea what each of these quantities will be. Therefore we have used these quantities (second and third columns, below) in simulation studies to determine the sample sizes we will need, with the following results.

<b>Food avoided (never or less than once per week)</b>	<b>Pre-test probability (based on PPR)</b>	<b>Expected odds ratio (based on PPR)</b>	<b>Number of respondents for 80% power</b>	<b>Number of leaflets to distribute assuming 5% completion rate</b>
<b>Any non-vegan food</b>	2.5 %	1.5	3,190	63,800
<b>Beef</b>	37.5 %	1.6	300	6,000
<b>Any non-vegan food except fish</b>	2.9 %	1.7	1,540	30,800

Finally, we consider the number of subjects for inclusion in the control group. Because control subjects are particularly expensive (that is, data cannot be collected as part of ongoing leafleting activities), we anticipate that proving the null effect to be different from the treatment effect will lie beyond the budget of this project; therefore we will only seek to demonstrate that the treatment effect for the control group will be statistically similar to zero (odds ratio similar to 1.0).

Because of this, our goal is no longer the avoidance of Type I error, and the standard logic of power analysis does not apply. Instead we will aim to enroll 500 control subjects (requiring the distribution of approximately 10,000 control booklets). Assuming an effect size of 1.0, we can therefore anticipate that our 95%-confidence intervals will be similar to the following:

<b>Food avoided (never or less than once per week)</b>	<b>Pre-test probability (based on PPR)</b>	<b>Expected odds ratio (based on PPR)</b>	<b>Approximate 95%- confidence intervals</b>
<b>Any non-vegan food</b>	2.5 %	1.0	0.4 - 2.2
<b>Beef</b>	37.5 %	1.0	0.8 - 1.3
<b>Any non-vegan food except fish</b>	2.9 %	1.0	0.5 - 2.1