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MEASURING THE ENVIRONMENTAL COST OF HYPOCRISY

by

Elliot Jordan Anderson

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Applied Economics

Approved:

Arthur Caplan Major Professor	Charles Sims Committee Member
Ryan Bosworth Committee Member	Mark McLellan Vice President for Research and Dean of the School of Graduate Studies

UTAH STATE UNIVERSITY
Logan, UT

2012

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ABSTRACT

Measuring the Environmental Cost of Hypocrisy

by

Elliot J Anderson, Master of Science

Utah State University, 2012

Major Professor: Dr. Arthur Caplan
Department: Applied Economics

My thesis offers one example of a cost associated with hypocrisy, environmental loss. Hypocrisy is defined as "the practice of professing standards, beliefs, etc., contrary to one's real character or actual behavior" (Collins Dictionary, 2003). In order to measure hypocrisy two types of data are needed: (1) a measure of a person's "professed standards" and (2) a measure of "actual behavior." A study of the various ways in which hypocrisy affects an individual's entire life is obviously beyond the scope of any single study. Therefore, my thesis demonstrates how hypocrisy, or hypocritical bias, can be measured with a single professed standard and actual behavior, namely environmental concern and use of non-reusable coffee/ tea cups (i.e., cardboard and plastic cups). A coffee or tea drinker who is very concerned for the environment should, if he eschews hypocritical bias, avoid the use of non-reusable cups when he purchases coffee/tea at a coffee shop. Individuals are given a hypocrisy score, calculated as a weighted average of non-reusable cups per number of trips to coffee shop per week and a respondent's general concern for the environment (0="unconcerned", 0.25, 0.5, 0.75, 1 = "very concerned"). A higher score (i.e., greater hypocrisy) is given to individuals who use relatively more non-renewable cups and yet profess to have a relatively higher concern for the

environment. Controlling for need for convenience, laziness, and ignorance, in the econometric analysis we are able to isolate the marginal effect of hypocrisy on environmental cost of using non-reusable cups.

(36 pages)

PUBLIC ABSTRACT

Measuring the Environmental Cost of Hypocrisy

This thesis proposes a method for quantifying hypocrisy's environmental costs. The question naturally arises, why attempt to measure people's hypocrisy? The answer is that the possible spillover effects associated with educating people about their quantified hypocritical choices in life likely far outweigh those that would be obtained through standard price incentives. Hopefully the business adage “that which gets measured gets managed”, holds true in this case. Through deeper introspection, we would be taking personal ownership of the externalities to which we contribute, perhaps with a longer-lasting effect on our consumptive behaviors.

The survey will be administered at four different coffee shops located in Logan, Utah. Two of the shops are located in the downtown area (Citrus and Sage and Café Ibis), the other two are located on Utah State University campus (Quad Side Café and the TSC building). Due to time and budget constraints the surveys were placed in high traffic, high visibility areas of the coffee shops, and customers voluntarily chose to participate. No incentives were offered to prospective participants. However, baristas at each location were given a simple script reminding them to ask their customers to participate. One of the key points in the script was a statement attesting to how participation “will help further scientific research at the university.” Utah State University is one of the largest institutions in Logan, and many residents have strong formal or informal ties to the school. Our hope was that these ties would encourage customers to participate in the survey. Second, the survey is intentionally short. It is estimated that the average participant was able to finish the survey in less than five minutes.

A study of the various ways in which hypocritical bias affects an individual’s entire life is obviously beyond the scope of any single study. Therefore, this thesis demonstrates how hypocritical bias can be measured with a single professed standard and actual behavior, namely environmental concern and use of non-reusable coffee/ tea cups (i.e., cardboard and plastic cups). A coffee or tea drinker who is very concerned for the environment should, if he eschews hypocritical bias, avoid the use of non-reusable cups when he purchases coffee/tea at a coffee shop. Alternatively stated, a coffee drinker who states he is very concerned for the environment but actually uses non-reusable cups regularly is acting hypocritically

Elliot J Anderson

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INTRODUCTION

Hypocrisy, or acting contrary to one's professed standards, is a foible nearly all humans possess to some degree. Jane Addams stated, "The essence of immorality is the tendency to make an exception of myself" (Aadams, 1931). Indeed Addams' aphorism gets at the heart of hypocrisy. In order for a person to make an exception of himself, he needs to first set a standard of behavior. When he makes that exception for himself he is acting hypocritically. In 2008 Piercarlo Valdesolo and David DeSteno, both psychologists, added their voice to the issue of hypocrisy. They asserted, "Moral hypocrisy refers to a fundamental bias in moral judgment in which individuals evaluate a moral transgression enacted by themselves to be less objectionable than an identical transgression enacted by others" (Valdesolo & Desteno, 2008). Using their definition of hypocrisy, Valdesolo and DeSteno designed a series of social experiments that empirically measured the existence of hypocrisy in individuals as well as in groups. For economists, the key question associated with its existence is hypocrisy's social cost. My thesis offers one example of how to estimate an environmental cost associated with hypocrisy.

Economic experiments show that people dislike losses. For example, Thaler (Thaler, 2009) found that people actually dislike losses more than they enjoy gains by a factor of about 2 to 1. It is therefore natural to ask, how can people be averse to losses due to their own hypocrisy if it is not assigned a real cost? This thesis demonstrates how economic losses associated with hypocrisy can be accounted for in our consumptive behaviors. Hopefully, assigning a cost associated with this foible will induce individuals to reevaluate their consumptive behaviors and correct for what we are calling "hypocritical bias."

In this thesis, hypocrisy is defined as "the practice of professing standards, beliefs, etc., contrary to one's real character or actual behavior" (Collins Dictionary, 2003). In order to measure hypocrisy two types of data are needed: (1) a measure of a person's "professed

standards" and (2) a measure of "actual behavior." At first glance what we are calling hypocritical bias may seem like a special case of hypothetical bias. Hypothetical bias is a disconnect between what an individual says he would do in a hypothetical setting and what he actually does when given the opportunity to do so in a real setting (Loomis, 2011). Formally, hypocritical bias is defined as a disconnect between what an individual actually does in a real setting and what an individual would do if his decision were motivated by his self-evaluated (and perhaps exaggerated), professed characteristics. There are two important differences between these two types of biases. First, hypothetical bias requires a hypothetical situation. When we study hypocrisy we study a person's real belief system; no hypothetical question is ever asked. Second, hypothetical bias gives no thought to an individual's motivations. Hypocritical bias, in contrast, asserts that an individual would behave differently if he were truly motivated by his professed standards. It is an inconsistency in an individual's behavior that we feel is especially prevalent in environmental valuation.

A study of the various ways in which hypocritical bias affects an individual's entire life is obviously beyond the scope of any single study. Therefore, my thesis demonstrates how hypocritical bias can be measured with a single professed standard and actual behavior, namely environmental concern and use of non-reusable coffee/ tea cups (i.e., cardboard and plastic cups). A coffee or tea drinker who is very concerned for the environment should, if he eschews hypocritical bias, avoid the use of non-reusable cups when he purchases coffee/tea at a coffee shop (for expository convenience we will henceforth refer to "coffee/tea" as simply "coffee"). Alternatively stated, a coffee drinker who states he is very concerned for the environment but actually uses non-reusable cups regularly is acting hypocritically.

For this thesis, information about individual environmental concern and use of non-reusable cups was obtained via a survey conducted in four in coffee shops located in Logan,

Utah, during the months of November 2011 to February 2012.[1] Coffee shops are a convenient venue for conducting a survey like this because (1) substitutes for non-reusable cups are readily available, (2) there are few confounding factors that might influence participants' cup choices, and (3) there is a relatively well-defined, environmental cost associated with using non-reusable coffee cups. The next section describes the survey instrument designed for this study.

[1] A full version of the survey can be found in the Appendix. The survey was approved by Utah State University Institutional Review Board, Protis number 4132.

THE COFFEE SHOP SURVEY

As mentioned above, the survey (provided in the Appendix) was recently administered at four different coffee shops located in Logan, Utah. Two of the shops are located in the downtown area (Citrus and Sage and Café Ibis), the other two are located on Utah State University campus (Quad Side Café and the TSC building). Due to time and budget constraints the surveys were placed in high traffic, high visibility areas of the coffee shops, and customers voluntarily chose to participate. No incentives were offered to prospective participants. However, baristas at each location were given a simple script reminding them to ask their customers to participate. One of the key points in the script was a statement attesting to how participation "will help further scientific research at the university." Utah State University is one of the largest institutions in Logan, and many residents have strong formal or informal ties to the school. Our hope was that these ties would encourage customers to participate in the survey. Second, the survey is intentionally short. It is estimated that the average participant was able to finish the survey in less than five minutes.

One obvious weakness of how the survey was conducted was its inability to capture every type of coffee drinker. There is a sample selection bias towards people who are inclined to participate in surveys and that have time to complete the survey. However, there is no evidence to suggest that more rushed coffee drinkers or those who are not inclined to participate in surveys necessarily exhibit any more or less hypocrisy that other types of coffee drinkers. Therefore, we are unsure as to which, if any, direction potential sample-selection bias might be affecting the survey data.

We are also concerned with framing. Framing occurs when word choice, answer options, or question order influence the participant's responses (de Bruin, 2010). If any part of the survey signals to the participant that we are looking for a disconnect between his professed

environmental standards and his actual behavior he may return to previous questions and change his answers. This would introduce framing bias into our survey. We believe that a short survey helps us avoid framing bias. If we were instead to have asked multiple questions about an individual's attitudes towards the environment, we may have tipped them off as to the survey's true intention.

Presentation order is another technique used to avoid introducing framing bias into survey responses. The survey has three important questions. The first two are used to determine the number of non-reusable cups and individual uses per week; the third determines his concern for the environment. These questions bookend our survey, with other demographic questions located in between. Our goal was to have the demographic questions distract participants from seeing any intended connection between the key questions.

The questions dealing with the use of non-reusable cups are,

1. On average, approximately how many times per week do you visit a coffee shop to get a cup of coffee or tea?
2. On average, approximately what percentage of the time during a typical week do you take your coffee or tea in a cardboard cup or plastic cup provided by the coffee shop(s)? (Please provide answers for both Cardboard Cup and Plastic Cup).

To gauge a participant's environmental concern we asked,

Using the scale (1, 2, 3, 4, 5), with 1 meaning completely "unconcerned" to 5 meaning "very concerned," how would you rate your concern for the environment in general?

These three questions enable us to calculate the key econometric variables: *envcon* (environmental concern), *envcost* (environmental cost), and *hyp* (hypocrisy score). Specific definitions of each variable created for this study are included in Table 1 below.

TABLE 1: *Variable Definitions and Summary Statistics*

Variable	Description	Mean	(SD)
envcost	Weekly carbon cost (in $)	0.01	(0.01)
envcon	General concern for the environment (0=”unconcerned”, 0.25, 0.5, 0.75, 1 = “very concerned”)	0.80	(0.22)
totcups	Number of non-reusable cups per week	2.31	(2.59)
ptotcups	cups per number of trips to coffee shop per week	0.60	(0.44)
hyp1	Hypocrisy score calculated as $(0.25 \times \%\text{cups}) + (0.75 \times \text{envcon})$	0.74	(0.19)
hyp2	Hypocrisy score calculated as $(0.5 \times \%\text{cups}) + (0.5 \times \text{envcon})$	0.69	(0.23)
hyp3	Hypocrisy score calculated as $(0.75 \times \%\text{cups}) + (0.25 \times \text{envcon})$	0.65	(0.32)
WTPp	Predicted willingness to pay for convenience of using non-reusable cups	-0.19	(0.28)
WTP_p^*	Adjusted WTP_p	0.04	(0.10)
t	Randomized tax (bid) values (in $), $\text{t}_\text{i} \in (0.05, 0.10, 0.15, 0.20, 0.25)$	0.15	(0.07)
accept	1= accepted t, 0= otherwise	0.32	(0.47)
male	1=male, 0=female	0.44	(0.50)
young$^\alpha$	1=25 years old or less, 0= otherwise	0.35	(0.48)
middle	1=between 26 and 50 years old, 0=otherwise	0.55	(0.50)
married	1=currently married, 0=otherwise	0.43	(0.50)
lowinc	1=annual income less than $50,000, 0= otherwise	0.65	(0.48)
midinc	1=annual income between $50,001 and $100,000, 0=otherwise	0.23	(0.42)
lowed	1=obtained less than an associate’s degree, 0=otherwise	0.38	(0.49)
mided	1=obtained either an associate’s or bachelor’s degree, 0=otherwise	0.28	(0.45)
politic	Political Identity (0=”very liberal, 0.25, 0.5, 0.75, 1=”very conservative”)	0.30	(0.25)
polinf	How informed about politics (0=”uninformed”, 0.25, 0.5, 0.75, 1 = “very informed”)	0.66	(0.26)
envinf	How informed about the environment (0=”uninformed”, 0.25, 0.5, 0.75, 1 = “very informed”)	0.71	(0.23)
loc1	1=survey completed at Citrus & Sage coffee shop (off campus), 0=otherwise	0.15	(0.36)
loc2	1= survey completed at Café Ibis (off campus), 0=otherwise	0.53	(0.50)
loc3	1=survey completed at Taggart Student Center (on campus), 0=otherwise	0.20	(0.40)

α the youngest person to complete the survey was 17years of age

envcon is calculated as a transformation from a rank to a uniform percentage, starting at 0% if the individual’s rank is “1”, and 100% if the rank is “5”.

envcost is calculated as the product of (1) the number of non-reusable cups used per week, (2) the amount of embodied carbon per non-reusable cup (in pounds), and (3) the per-

pound equivalent carbon price. Embodied carbon dioxide (CO2) per cup is estimated to be 0.25 pounds (Alliance for Environmental Innovation, 2000; Carbonrally.com, 2012), and the per-pound equivalent price of $35 per ton represents the expected average carbon price through the year 2020 (Point Carbon, 2010). Thus, for example, an individual who uses five non-reusable cups per week is estimated to produce the equivalent of roughly $0.02 in weekly environmental costs associated with the carbon emitted through the life-cycle of the cups:

$$\left(5\frac{cups}{week}\right) \times (0.25\ lbs\ of\ embodied\ carbon) \times (\$0.175\ pound\ price\ of\ carbon) = \$0.02$$

An individual's hypocrisy score is calculated as a weighted average of (1) non-reusable cups per number of trips to coffee shop per week and, (2) a respondent's general concern for the environment (0="unconcerned", 0.25, 0.5, 0.75, 1 = "very concerned"). A higher score (i.e., greater hypocrisy) is therefore assigned to individuals who use relatively more non-renewable cups and yet profess to have a relatively higher concern for the environment. Low scores are given to those who use relatively fewer non-reusable cups and who have a lower professed concern for the environment.[2]

Each individual is given a set of scores; calculated by varying the weights on non-reusable cup usage and environmental concern. The varying weights address the ambiguity in the definition of hypocrisy regarding whether actual behavior or self-evaluation is more important when measuring the extent of hypocrisy. Specific formulations for the hypocrisy scores (*hyp[#])* are,

$$hyp1 = (0.25 \times \%cups) + (0.75 \times envcon)$$

$$hyp2 = (0.5 \times \%cups) + (0.5 \times envcon)$$

[2] There is also a third case in which a respondent has a low concern for the environment and uses either a low amount of non-reusable cups per week or a high amount of non-reusable cups per week. In this case the low concern for the environment effectively pushes hypocrisy scores to lower.

$$hyp3 = (0.75 \times \%cups) + (0.25 \times envcon)$$

where *ptotcup* is the percentage of times a coffee drinker uses a non-reusable cup in a week. *hyp1* weights a respondent's professed standard more heavily than his actual behavior. Conversely, *hyp3* weights actual behavior more heavily. *hyp2* weights behavior and standards equally.

The hypocrisy scores are designed to increase, or indicate a greater level of relative hypocrisy, when either *envcon* or *ptotcup* increase, all else equal. The maximum score that could be assigned to a participant is 1, achieved by using 100% non-reusable cups each week and having a very high concern for the environment. The minimum score is 0, which is given to those who use no non-reusable cups and have no concern for the environment.[3]

The lower bound (*ptotcup=0, envcon=0*) potentially introduces an interesting issue. Consider two respondents, A and B, each has *hyp[#]*=0. If we hold respondent A at *ptotcup=0* and *envcon=0* and increase respondent B to *ptotcup=0* and *envcon>0,* according to the design of *hyp[#]*, B's score will increase and A will remain at 0. However, should B be considered a greater hypocrite than A? According to the definition B is behaving without hypocrisy. B is concerned for the environment and he does not use non-reusable cups. We should also not punish B when *ptotcup>0* and *envcon=0.* If B is not concerned about the environment and uses non-reusable cups he is not acting hypocritically.[4] The hypocrisy scores properly represent any individual who has *ptotcup>0* and *envcon>0.* In the results section we will show how we checked for this particular lower bound issue.

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[3] The minimum hypocrisy score in our data is 0 and the maximum score is 1, for any *hyp[#]*.

[4] The upper bound *ptotcup=1* and *envcon=1* doesn't present the same issue. If we move to *ptotcup=1* and *envcon<1* or *ptotcup<1* and *envcon=1*, *hyp[#]* gives higher scores to those whose actual behavior is contrary to their professed standard.

It is important to point out that by holding strict to the definition of hypocrisy we can eschew the need to be concerned with other foibles such as need for convenience, laziness, or ignorance that might confound our measure(s) of hypocrisy. Put more bluntly, a hypocrite is a hypocrite no matter what his circumstances are. We are also unconcerned if a hypocrite is acting rationally or not. Relying strictly on the definition of hypocrisy enables us to ignore these potential confounding foibles when we create the hypocrisy scores.

However, controlling for need for convenience, laziness, and ignorance, is an important issue when it comes to the econometric analysis. We will need to isolate the effect of hypocrisy, free of these potentially confounding factors. Towards this end, we include two additional variables in our econometric analysis: (1) willingness to pay for convenience (*wtpconv*) and (2) environmental information (*envinfo*). *wtpconv* controls for the effects of convenience and laziness. *envinfo* controls for the effect of ignorance.

Further, *wtpconv* will be estimated by using a dichotomous choice model with random bids. The specific willingness-to-pay question used for this purpose is,

"Before you answer this question, please think about 1) your income level, 2) your monthly expenses, and 3) how many times you visit a coffee shop during an average week. If the coffee shop(s) you visit on a regular basis begin charging you an extra **$xx** per cardboard cup and per plastic cup, would you switch to using a reusable cup for every visit to the coffee shop(s)? (By "reusable cup" we mean any metal or plastic container that you bring with you to the coffee shop, or ceramic cup provided by the coffee shop, that can be reused multiple times, year after year.)

_____Yes, I would switch to using a reusable cup for each trip to the coffee shop.

_____No, I would not switch to using a reusable cup for each trip to the coffee shop.

_____Unsure"

Individuals were given one of five random bids for the extra charge (**$xx)** (bid values ∈ 0.05, 0.10, 0.15, 0.20, 0.25) associated with using a non-reusable cup.

Also, included in the survey was a question enabling us to rank a respondent's political persuasion. The initial purpose of this question is to further disguise the survey's intentions. As an added benefit we are able to use this information to control for political persuasion among participants. (See Appendix questions 10 and 11 for the specific questioning used.)

EMPIRICAL MODEL AND RELUSTS

We estimate a simple ordinary least squares model of hypocrisy's effect on an individual's environmental cost,

$$envcost_i = \boldsymbol{X}_i\boldsymbol{\alpha} + \varepsilon_i \tag{1}$$

where $\boldsymbol{X}_i$ is a vector of explanatory variables including individual demographic characteristics and professed standards from Table 1. Also included in vector $\boldsymbol{X}_i$ is the individual's hypocrisy score and predicted willingness to pay for convenience. The $\boldsymbol{\alpha}$ vector represents the corresponding coefficients to be estimated, and ε_i is an i.i.d, constant-variance error term.

The individual's predicted willingness to pay is derived from interval regression analysis following Wooldridge (2002). Accordingly, based on his response to a given bid value t_i, the individual's latent willingness to pay (WTP_{li}) is placed in one of two regions: (-∞, t_i) in the event of answering "no" to the WTP question, and (t_i, ∞) in the event of answering "yes." WTP_{li} for an individual (in its reduced form, as a solution to a standard random-utility model) is assumed linear in both its deterministic and random components,

$$WTP_{li} = \boldsymbol{Y}_i\boldsymbol{\beta} + \mu_i \tag{2}$$

where, $\boldsymbol{Y}_i$ represents a vector of explanatory variables (which in this case includes t_i), $\boldsymbol{\beta}$ represents the corresponding coefficients to be estimated, and μ_i is a corresponding i.i.d., constant-variance error term. For estimation purposes we define binary choice variable, accept, as equaling one if the respondent accepts t_i and zero if not. Thus, $accept_i$= 1 responses imply WTP_{li} > t_i and $accept_i$ = 0 implies WTP_{li} ≤ t_i (Caplan, Jackson-Smith, & Marquart-Pyatt, 2010). Using equation (2), the probability that respondent *i* accepts bid t_i is,

$$P_i = \Pr[accept_i = 1] = \Pr[WTP_{li} > t_i] = \Pr[\mu_i > t_i - \boldsymbol{Y}_i\boldsymbol{\beta}] = \Phi(\boldsymbol{Y}_i\boldsymbol{\beta} - t_i) \tag{3}$$

where $\Phi(\cdot)$ is a standard normal cumulative distribution function, with the last equality following from $\Phi(\cdot)$'s symmetry. Using (3), the associated log likelihood function defined over all individuals *i = 1,…,N*,

is,

$$LogL = \sum_{i=1}^{n} [accept_i(\ln(P_i)) + (1 - accept_i)(\ln(1 - P_i))] \quad (4)$$

where, $LogL$ is estimated using an interval regression model (Woolridge, 2002).

Table 2 presents our results for the estimation of equation (1).[5] Of primary interest is the set of coefficient estimates for *hyp[#]*, each of which is positive and statistically significant at the 1% level of significance. For example, the coefficient estimate for hyp1 indicates that as the average individual's hypocrisy score increases by one percent he contributes roughly $0.02 in additional carbon costs, all else equal. Convenience also has a positive marginal contribution to carbon costs (the marginal effect of a one-cent increase in an individual's WTP for a non-reusable cup is roughly $0.09 in weekly carbon costs). These results suggest that a coffee drinker's penchant for hypocrisy and need for convenience do indeed take an environmental toll. Similar tolls on the environment can be attributed to an individual's (1) being relatively uninformed about environmental issues, (2) being female, (3) being low or middle income, and (4) not having attained a relatively high education level. These marginal effects are robust in all three models (except, perhaps, with respect to being female). Further, the F and R2 statistics for each model show that they are relatively good statistical fits of the data, with roughly half of the total variation in *envcost* explained by the models' respective covariates.

[5] Results from the estimation of equation (4) are provided in the Appendix as Table 4

Table 2: *Regression Results for envcost*

Explanatory Variable	Model with *hyp1* (Standard Error [a])	Model with *hyp2* (Standard Error [a])	Model with *hyp3* (Standard Error [a])
constant	-0.004	-0.009***	-0.007***
	(0.003)	(0.003)	(0.002)
hyp1	0.015***	---	---
	(0.003)		
hyp2	---	0.024***	---
		(0.002)	
hyp3	---	---	0.019***
			(0.001)
WTP_p^b	0.089***	0.078***	0.074***
	(0.009)	(0.009)	(0.009)
male	-0.002*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
young	-0.000	-0.001	-0.002
	(0.002)	(0.002)	(0.001)
middle	-0.002	-0.002	-0.002**
	(0.001)	(0.001)	(0.001)
lowinc	0.005**	0.005***	0.005***
	(0.002)	(0.002)	(0.002)
midinc	0.006***	0.005***	0.005***
	0.002	(0.001)	(0.002)
lowed	0.009***	0.008***	0.007***
	(0.001)	(0.001)	(0.001)
mided	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)
politic	0.003	0.002	0.001
	(0.002	(0.002)	(0.002)
envinf	-0.008***	-0.005***	-0.002
	(0.002)	(0.002)	(0.002)
loc1	-0.003*	-0.003*	-0.002*
	(0.002)	(0.002)	(0.001)
loc2	-0.002	-0.003	-0.003
	(0.002)	(0.001)	(0.001)
loc3	-0.006***	-0.006***	-0.006***
	(0.002)	(0.002)	(0.002)
Number of Observations[c]	463	463	463
R^2	0.40	0.54	0.60
F (14,448)	15.29***	31.90***	45.98***

[a] *Standard errors are robust for heteroscedasticity using White's (1980) method.*
[b] *Standard errors are bootstrapped (5000 replications).*
[c] *Number of observations dropped from 532 to 463 due to missing data points.*
**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

Table 3 presents results for the interaction of our demographic variables with *hyp[#]*. For ease of interpreting the interactive effects of political identity and the perception of being informed about environmental issues, we have created two new dummy variables. Variable liberal equals one if the individual's corresponding value for *politic* is less than 0.5, i.e., the individual rates himself “left-of-center" on the political scale, and zero otherwise. Similarly, variable *hinfo* equals one if the individual's corresponding value for *envinf* is greater than 0.5, i.e., the individual rates himself “higher-than-middle" on the environmentally-informed scale, and zero otherwise.

As the table indicates, with respect to *hyp1* the hypocrisy effect is larger for younger, male, lower educated, more-conservative, and less-environmentally informed individuals. However, the larger effect only holds for lower-educated, more-conservative males when considering *hyp2*, and only for males when considering *hyp3*. These results suggest that different types of hypocrites affect the environment to different extents.

Table 3: *Regression Results for Interaction Terms* [a]

Explanatory Variable	Interacted with *hyp1* (Standard Error [b])	Interacted with *hyp2* (Standard Error [b])	Interacted with *hyp3* (Standard Error [b])
male	0.002*	0.003**	0.004***
	(0.001)	(0.001)	(0.002)
Young	0.003*	0.001	0.000
	(0.001)	(0.001)	(0.002)
Middle	-0.002	-0.001	-0.000
	(0.001)	(0.001)	(0.001)
Lowinc	-0.000	0.000	-0.000
	(0.001)	(0.001)	(0.002)
Midinc	-0.001	-0.001	-0.001
	(0.002)	(0.002)	0.002
Lowed	0.004***	0.003***	0.002
	(0.001)	(0.001)	(0.001)
Mided	-0.001	-0.000	-0.000
	(0.002)	(0.002)	(0.002)
Liberal	-0.003***	-0.003*	-0.002
	(0.001)	(0.001)	(0.002)
Hinfo	-0.004***	-0.002	0.001
	(0.001)	(0.001)	(0.001)

[a] *Separate regressions were run for each interaction term, which included only a constant and hyp[#], along with the interaction term itself.*
[b] *Standard errors are robust for heteroscedasticity using White's (1980) method.*
**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

As mentioned previously there is a potential problem with the hypocrisy score associated with the lower bound where *ptotcup=0* and *envcon=0.* To test whether it was present in our data we estimated equation (1) two additional times, dropping potentially problematic observations each time. The first estimation dropped any observation where *ptotcup=0*. The second estimation dropped any observation where *envcon=0*. In each test the results were not qualitatively different.[6] We therefore conclude that the lower bound problem is not present in our data.

[6] Results of these regressions are reported in the appendix as Tables 5 and 6

SUMMARY AND CONCLUSIONS

My thesis has shown a quantitative assessment of hypocrisy's environmental costs. In studying the choices coffee and tea drinkers make with respect to the type of cup in which their drink is taken (reusable vs. non-reusable) we find that each percentage increase in an individual's “hypocrisy score" results in roughly $0.02 in additional costs associated with carbon emissions per week. This hypocrisy effect is larger for younger, male, lower-educated, more-conservative, and lesser-environmentally informed individuals when equal weight is assigned to the “actual behavior” and “professed standards” components of their hypocrisy scores. Although the actual size of the estimated cost associated with this foible is small for coffee drinkers, this study of hypocrisy offers interesting results to be considered.

First, here appears to be plenty of room for a reduction in hypocrisy, the average drinker scores range from 65% to 74% on the hypocrisy scale (Table 1). These results could be used in an educational campaign that would help coffee and tea drinkers correct for hypocrisy in their purchasing behaviors. We believe this will be a preferable course of action over a tax or subsidy because of the possible spillover effects. Coffee drinkers who are aware of the environmental cost of their hypocrisy in regards to their cup usage might become more introspective about other consumptive behaviors. For example, a coffee drinker, aware of their hypocrisy, may also make better choices when choosing their mode of transportation for day-to-day travel.

Second, my thesis has shown that some of what stated-preference researchers call hypothetical bias may be attributed to an individual’s hypocrisy. Controlling for hypocritical bias would therefore refine our measurements of the bias we heretofore have attributed solely to the hypothetical nature of the survey instrument.

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APPENDICES

Appendix A. The Coffee Shop Survey

Coffee Shop Survey

Thank you for agreeing to complete this survey. Your responses will help inform research being conducted by Drs. Arthur Caplan and Charles Sims, Department of Applied Economics, College of Agriculture, USU. Once you have completed the survey, please fold it and slip it into the cardboard box marked "coffee shop survey" located near the cash register. The USU Institutional Review Board for the protection of human participants (IRB) has approved this study. If you have any questions or concerns you may contact Dr. Caplan at (435)797-0775 or email arthur.caplan@usu.edu. If you would like to contact someone other than the research team, you may contact the IRB Administrator at (435) 797-0567 or email irb@usu.edu.

1. On average, approximately how many times per week do you visit a coffee shop to get a cup of coffee or tea?

_____ times per week.

2. On average, approximately what percentage of the time during a typical week do you take your coffee or tea in a cardboard cup or plastic cup provided by the coffee shop(s)? (***Please provide answers for both Cardboard Cup and Plastic Cup***).

Cardboard Cup _____ % Plastic Cup _____ %

If you answered anything greater than 0% to Cardboard Cup or Plastic Cup in Question 2, please answer the next two questions (Questions 3 and 4). Otherwise, you can skip to Question 5.

3. Before you answer this question, please think about 1) your income level, 2) your monthly expenses, and 3) how many times you visit a coffee shop during an average week. If the coffee shop(s) you visit on a regular basis begin charging you an extra *$xx* per cardboard cup and per plastic cup, would you switch to using a reusable cup for every visit to the coffee shop(s)? (By "reusable cup" we mean any metal or plastic container that you bring with you to the coffee shop, or ceramic cup provided by the coffee shop, that can be reused multiple times, year after year.)

_____ Yes, I would switch to using a reusable cup for each trip to the coffee shop.

_____ No, I would not switch to using a reusable cup for each trip to the coffee shop.

_____ Unsure

If you answered "Unsure" to Question 3, please skip to Question 5. Otherwise, answer Question 4 first.

4. On a scale from 1 – 5, with 1 meaning "uncertain" to 5 meaning "certain" how certain are you of your answer to the previous question (Question 3)? (*Please circle one number*.)

Uncertain				Certain
1	2	3	4	5

5. What is your gender? _____ Male _____ Female

6. What is your age? _____ years.

7. What is your current marital status? _____ Single _____ Living as domestic partners

_____ Married _____ Divorced _____ Widowed

PLEASE TURN OVER TO COMPLETE SURVEY

8. What is your approximate average annual income from both earned (i.e., your salary) and unearned (i.e., mom and dad, inheritance, etc.) sources? (*Please check one category*.)

_____ Less than or equal to $25,000 per year.

_____ $25,001 – $50,000 per year.

_____ $50,001 – $75,000 per year.

_____ $75,001 – $100,000 per year.

_____ $100,001 – $150,000 per year.

_____ Greater than $150,000 per year.

9. What is the highest level of education you have completed at this point in time? (*Please check one category*.)

_____ 0 – 8 years, no high school diploma or GED

_____ 9 – 12 years, no high school diploma or GED

_____ High school diploma or GED

_____ Some college, no degree yet obtained

_____ Associate's degree

_____ Bachelor's degree

_____ Master's degree

_____ Doctorate or professional degree

10. On a scale from 1 – 5, with 1 meaning “very liberal” to 5 meaning “very conservative,” how would you rate your political views? (*Please circle one number*.)

Very Liberal				Very Conservative
1	2	3	4	5

11. On a scale from 1 – 5, with 1 meaning “uninformed” to 5 meaning “very informed,” how would you rate the degree to which you are informed about political issues in general? (*Please circle one number*.)

Uninformed				Very Informed
1	2	3	4	5

12. On a scale from 1 – 5, with 1 meaning “unconcerned” to 5 meaning “very concerned,” how would you rate your concern for the environment in general? (*Please circle one number*.)

Unconcerned				Very Concerned
1	2	3	4	5

13. On a scale from 1 – 5, with 1 meaning “uninformed” to 5 meaning “very informed,” how would you rate the degree to which you are informed about environmental issues in general? (*Please circle one number*.)

Uninformed				Very Informed
1	2	3	4	5

The End! Thanks again for completing this survey. You may now put it in the cardboard box near the cash register. If you borrowed one of our little pencils, we would appreciate it if you would also return it to the pencil box.

Appendix B. Additional Empirical Results

Table 4: Empirical Results for Willingness to Pay.

Explanatory Variable	Regression Coefficients (Standard Error [a])	Marginal Effects (Standard Error [a])
constant	-0.079	
	(0.394)	
t_i	-1.656*	-0.571*
	(0.993)	(0.342)
cups	0.065**	0.022**
	(0.028)	(0.009)
male	0.225	0.078
	(0.149)	(0.052)
young	0.053	0.018
	(0.293)	(0.102)
middle	0.183	0.063
	(0.244)	(0.083)
lowinc	-0.346	-0.122
	(0.239)	(0.086)
midinc	-0.312	-0.102
	(0.245)	(0.076)
lowed	-0.415*	-0.139*
	(0.214)	(0.069)
mided	-0.212	-0.074
	(0.205)	(0.067)
loc1	-0.735**	-0.212**
	(0.312)	(0.070)
loc2	-0.047	-0.016
	(0.228)	(0.079)
loc3	0.256	0.092
	(0.253)	(0.093)
Mean WTP[a]	-0.19 (-2.12, 2.03)	
Adjusted Mean WTP[b]	-0.25 (-2.41, 1.87)	
Log likelihood	-200.48	
χ^2 (LR)	41.68***	
Pseudo R^2	0.09	
Number of Observations[c]	355	
$\Omega_1 = \frac{Predicted\ accept = 1}{Observed\ accept = 1}$	0.04	
$\Omega_1 = \frac{Predicted\ accept = 0}{Observed\ accept = 0}$	0.99	

**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

[a] *Krinsky and Robb (1986) 95% confidence intercal in parentheses.*

[b] *Adjusted according to Champ et al.'s (1997) recording method.*

[c] *Number of observations dropped from 532 to 355 due to missing data points.*

Table 5: Regression Results for *envcost* Dropping *ptotcup*=0.

Explanatory Variable	Model with *hyp1* (Standard Error [a])	Model with *hyp2* (Standard Error [a])	Model with *hyp3* (Standard Error [a])
constant	0.005	-0.002***	-0.003
	(0.003)	(0.003)	(0.002)
hyp1	0.005*	---	---
	(0.003)		
hyp2	---	0.016***	---
		(0.002)	
hyp3	---	---	0.016***
			(0.001)
WTP_p^b	0.088***	0.084***	0.080***
	(0.008)	(0.008)	(0.008)
male	-0.002*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)
young	-0.003	-0.003	-0.003
	(0.002)	(0.001)	(0.001)
middle	-0.003	-0.003	-0.003**
	(0.001)	(0.001)	(0.001)
lowinc	0.005**	0.005***	0.005***
	(0.002)	(0.002)	(0.001)
midinc	0.006***	0.006***	0.006***
	0.002	(0.001)	(0.002)
lowed	0.009***	0.009***	0.008***
	(0.001)	(0.001)	(0.001)
mided	0.007***	0.007***	0.006***
	(0.001)	(0.001)	(0.001)
politic	0.002	0.001	0.000
	(0.002)	(0.002)	(0.002)
envinf	-0.005***	-0.004***	-0.002
	(0.002)	(0.002)	(0.002)
loc1	-0.005*	-0.004*	-0.003*
	(0.002)	(0.002)	(0.001)
loc2	-0.003	-0.004	-0.003
	(0.001)	(0.001)	(0.001)
loc3	-0.005***	-0.007***	-0.006***
	(0.003)	(0.002)	(0.002)
Number of Observations	363	363	363
R^2	0.41	0.47	0.51
F (14,448)	12.98***	18.52***	28.62***

**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

[a] *Standard errors are robust for heteroscedasticity using White's (1980) method.*

[b] *Standard errors are bootstrapped (5000 replications).*

Table 6: Regression Results for *envcost* Dropping *envcon*=0.

Explanatory Variable	Model with *hyp1* (Standard Error [a])	Model with *hyp2* (Standard Error [a])	Model with *hyp3* (Standard Error [a])
constant	-0.004	-0.009***	-0.006
	(0.003)	(0.002)	(0.002)
hyp1	0.016***	---	---
	(0.002)		
hyp2	---	0.024***	---
		(0.001)	
hyp3	---	---	0.019***
			(0.001)
WTP_p^b	0.088***	0.078***	0.073***
	(0.008)	(0.009)	(0.008)
male	-0.001*	-0.001	-0.001
	(0.000)	(0.000)	(0.000)
young	-0.000	-0.001	-0.002
	(0.001)	(0.001)	(0.001)
middle	-0.001	-0.001	-0.002**
	(0.001)	(0.001)	(0.001)
lowinc	0.004**	0.004***	0.004***
	(0.001)	(0.001)	(0.001)
midinc	0.006***	0.005***	0.005***
	0.001	(0.001)	(0.001)
lowed	0.008***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)
mided	0.006***	0.006***	0.005***
	(0.001)	(0.001)	(0.001)
politic	0.002	0.001	0.000
	(0.001)	(0.001)	(0.001)
envinf	-0.008***	-0.005***	-0.002
	(0.002)	(0.001)	(0.001)
loc1	-0.002*	-0.002*	-0.002*
	(0.001)	(0.001)	(0.001)
loc2	-0.001	-0.002	-0.002
	(0.001)	(0.001)	(0.001)
loc3	-0.005***	-0.005***	-0.005***
	(0.003)	(0.001)	(0.001)
Number of Observations	459	459	459
R^2	0.41	0.54	0.60
F (14,448)	16.21***	33.11***	45.80***

**** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level*

[a] *Standard errors are robust for heteroscedasticity using White's (1980) method.*

[b] *Standard errors are bootstrapped (5000 replications).*

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