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Abstract

We examine *strategic self-ignorance*—the use of ignorance as an excuse to over-indulge in pleasurable activities that may be harmful to one's future self. Our model shows that guilt aversion provides a behavioral rationale for present-biased agents to avoid information about negative future impacts of such activities. We then confront our model with data from an experiment using prepared, restaurant-style meals—a good that is transparent in immediate pleasure (taste) but non-transparent in future harm (calories). Our results support the notion that strategic self-ignorance matters: nearly three of five subjects (58 percent) chose to ignore free information on calorie content, leading at-risk subjects to consume significantly more calories. We also find evidence consistent with our model on the determinants of strategic self-ignorance.

JEL-codes: D03; D81; D83

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1. Introduction

In classical expected-utility theory, the value of information is non-negative (Machina, 1989). A person should never be worse off gathering free information about a choice. Dana et al. (2007) find, however, that if the choice affects the well-being of other people, and if the person feels conflicted about doing what he wants versus "doing the right thing" (based on social norms such as fairness), he may exercise *strategic ignorance*: he reduces his internal conflict by choosing to avoid free information on what he "should" do.[1]

In this paper, we present evidence that a person may similarly exercise strategic *self*-ignorance when the choice he faces affects only his *own* well-being. We show that if a person engages in a pleasurable activity that may be harmful to his future self, and experiences feelings of guilt when over-indulging in that activity, he may avoid free information on the future consequences of his actions to reduce his guilt.[2]

We consider a guilt-averse person who experiences an inner conflict due to present-biased preferences: he believes he *should* behave rationally (i.e., in a manner consistent with discounting utility at a constant rate over all future time periods), but since his true preferences are present-biased, he puts too much emphasis on today's well-being.[3] He over-indulges in activities that impose negative externalities on his future selves.[4] We assume that feelings of guilt arise when the present-biased person gives in to immediate gratification, at the expense of future well-being.

We also assume that self-ignorance can be bliss. By ignoring information on the potential harmful future consequences of present activities, he mitigates the inner conflict between what he should and wants to do and reduces feelings of guilt. As a result, he may use

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[1] In a dictator game, Dana et al. (2007) find that 74 percent of dictators choose the fairer distribution of money between themselves and a recipient when they are informed of the impact of their choice on the recipient. When dictators may choose to remain ignorant of that impact, however, only 47 percent of dictators both choose to be informed and choose the fairer option. Van der Weele (2012) finds that even when ignorance is associated with a small cost, more than 30 percent of subjects are strategically ignorant.

[2] Carillo and Mariotti (2000) develop a theoretical model showing that agents may choose ignorance to keep themselves from engaging in harmful activities. Although concerned with a similar tradeoff between current pleasure and future harm, the model's implications are very different from the findings presented here.

[3] There is a rich literature on dynamically inconsistent, or present-biased, preferences: see, e.g., Strotz (1955), Thaler (1980), Akerlof (1991), Ainslie (1992), Loewenstein and Prelec (1992), Laibson (1997), and O'Donoghue and Rabin (1999, 2003).

[4] This holds for a person who is unaware of his present-bias (is naive). A person who is aware of his present-bias (is sophisticated) may commit himself to a decision path equivalent to that of a time-consistent person. For more on the implications of naiveté vs. sophistication, see O'Donoghue and Rabin (1999).

ignorance strategically, i.e., as an excuse to pursue his preferences for immediate gratification.

People may exercise strategic self-ignorance to over-engage in a wide array of risky activities—impulsive spending, gambling, alcohol or drug abuse, extreme sports, unprotected sex—or to under-engage in protective activities—saving for old age, buying insurance, getting health check-ups, exercising. All these activities involve a tradeoff between transparent immediate pleasure and less-transparent future harm, which provides scope for ignoring information about that harm. Our lab experiment, designed to test the prevalence of strategic self-ignorance, uses restaurant-style ready meals; consumption of such meals, too, is transparent in immediate pleasure (taste) but non-transparent in future harm (calories). We find strong evidence of strategic self-ignorant behavior, and support for our model's predictions about the determinants of such behavior.

2. Analytical framework

Consider a person with present-biased intertemporal preferences. Following self-control models (e.g., O'Donoghue and Rabin, 1999), we represent his utility from time t onwards as

$$U_t(u_t, u_{t+1}, \dots, u_T) = E_t\left(u_t + \beta \sum_{\tau=t+1}^{T} \delta^{\tau-t} u_\tau\right), \quad (1)$$

where u_t is utility in period t, δ is a standard discount factor, and $0 \leq \beta < 1$ represents a time-inconsistent preference for immediate gratification, i.e., the present-bias. Assume the person is naive, i.e., unaware that his present bias will persist over time—he believes his present-bias will vanish tomorrow, but when tomorrow comes, he still has the same present-biased preferences. Being present-biased, the person is prone to over-indulging today in activities with harmful future consequences. Being naive, he each time perceives this behavior as limited in scope ("just this once"). When tomorrow comes, however, he makes the same choice to over-indulge, and so on. Tomorrow's self discounts future utility more than today's self would prefer, and expect, tomorrow's self to do.

The novel element we add to this standard self-control model is a feeling of guilt about the time-inconsistent behavior. Suppose at time t the person faces a choice at what level x to engage in a potentially harmful activity. To fix ideas, let x be the quantity consumed of a food that may be either "healthy" (low calorie) or "unhealthy" (high calorie). Assume his

utility from the activity has three additively separable components, e_t, f_τ, and g_t, each of which depends on x. Component $e_t(x)$ represents his immediate "enjoyment." We assume this component is strictly concave, with an interior maximum. If the person knows that the food is healthy, then this is the only component of utility. The person then optimally chooses x^{ih} (superscript ih for "informed" that the food is "healthy") given by first-order condition

$$e_t'(x) = 0. \tag{2}$$

If, however, the food is unhealthy, two additional utility components kick in. The first, $f_\tau(x)$, enters utility negatively with a weighting parameter ϕ, and represents the harmful "future consequences" of his consumption at some time $\tau > t$. We assume this component is strictly increasing and weakly convex, with $\phi f_\tau'(0) < e_t'(0)$. The second, $g_t(x - x^*)$, enters utility negatively with a weighting parameter γ, and represents the guilt experienced by the person if he consumes more of the unhealthy food than some reference level x^* that he feels he "should" consume. We assume this component is strictly increasing and weakly convex in $x - x^*$ for all $x > x^*$, and that $g_t'(0) = 0$.

A natural way to determine x^* is to consider how much of the unhealthy food the person would anticipate consuming at time t when pondering the decision at some earlier time $s < t$. Being naive about his present-bias, the person would anticipate rationally weighing the immediate enjoyment $e_t(x)$ against the future consequences $\phi f_\tau(x)$, whereby the future consequences are discounted only by the standard factor $\delta^{\tau - t}$. For simplicity we normalize δ to unity so the person anticipates facing the problem

$$\max_x U_t(x) = e_t(x) - \phi f_\tau(x), \tag{3}$$

with solution x^* given by first-order condition

$$e_t'(x) - \phi f_\tau'(x) = 0. \tag{4}$$

When period t actually arrives, however, the preference β for immediate gratification kicks in, and the possibility of over-consumption and associated guilt $g_t(x - x^*)$.

The basic idea is the same as in the existing literature on guilt aversion, in which guilt arises when a person betrays *another person's* expectations. Here, a person experiences guilt if he betrays *his own* expectations about today's consumption.[5]

The problem that the person actually faces at time t if he knows that the food is unhealthy becomes

$$\max_x U_t(x) = e_t(x) - \beta\phi f_\tau(x) - \gamma g_t(x - x^*), \tag{5}$$

with solution x^{iu} (superscript iu for "informed" that the food is "unhealthy") given by first-order condition

$$e_t'(x) - \beta\phi f_\tau'(x) - \gamma g_t'(x - x^*) = 0. \tag{6}$$

Comparing (4) and (6) shows that $x^{iu} > x^*$, so the person over-consumes and experiences guilt.

Suppose the person initially does not know whether the food is healthy. He only has a prior belief the food is unhealthy with probability θ. If offered free information on whether the food is unhealthy, even a present-biased person subject to feelings of guilt would always choose to obtain the free information so that he can "do the right thing," i.e., make a fully informed consumption decision. But if ignorance about the potential harm from consuming the food reduces his feelings of guilt, the person may gain from staying uninformed.

To illustrate this point, assume that under ignorance, the level of guilt experienced by the person is $\theta\gamma(1-\rho)g_t(x - x^*)$, where $\rho \in (0,1]$. He feels less guilt, the lower his prior θ that the food is unhealthy—which holds in an expected sense also if he is informed—but in addition, staying ignorant reduces his guilt by a factor ρ. His optimization problem then becomes

$$\max_x EU_t(x) = e_t(x) - \theta\beta\phi f_\tau(x) - \theta\gamma(1-\rho)g_t(x - x^*), \tag{7}$$

with solution x^n (superscript n for "non-informed") given by first-order condition

$$e_t'(x) - \theta\beta\phi f_\tau'(x) - \theta\gamma(1-\rho)g_t'(x - x^*) = 0. \tag{8}$$

Comparing (6) and (8) shows that $x^n > x^{iu}$: *if the food is unhealthy, the person consumes more under ignorance than under full information.*[6]

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[5] Guilt aversion has previously been studied in *inter*-personal conflicts: people experience a utility loss if they betray other people's expectations, thereby letting them down (see, e.g., Charness and Dufwenberg, 2006; Vanberg, 2008; Reuben et al., 2009; and Ellingsen et al., 2010). To our knowledge, our analysis is the first to incorporate guilt in an *intra*-person conflict.

For a person to gain from ignoring free information, his indirect utility from doing so, which we can write (hereafter dropping time subscripts as understood) as

$$V^n = (1-\theta)e(x^n) + \theta\{e(x^n) - \beta\phi f(x^n) - \gamma(1-\rho)g(x^n - x^*)\}, \quad (9)$$

must exceed that from obtaining the information,

$$V^i = (1-\theta)e\left(x^{ih}\right) + \theta\left\{e\left(x^{iu}\right) - \beta\phi f\left(x^{iu}\right) - \gamma g(x^{iu} - x^*)\right\}. \quad (10)$$

By revealed preference and strict concavity of the utility function, we have that $e\left(x^{ih}\right) > e(x)$ for any $x \neq x^{ih}$, and similarly $e\left(x^{iu}\right) - \beta\phi f\left(x^{iu}\right) - \gamma g\left(x^{iu} - x^*\right) > e(x) - \beta\phi f(x) - \gamma g(x - x^*)$ for any $x \neq x^{iu}$. It follows that if ignorance did not reduce the person's guilt, so $\rho = 0$, V^i would strictly exceed V^n, making ignorance suboptimal. If ignorance does reduce guilt, however, a useful reference point is the indirect utility level

$$\hat{V} = (1-\theta)e\left(x^{ih}\right) + \theta\{e(\hat{x}) - \beta\phi f(\hat{x}) - \gamma(1-\rho)g(\hat{x} - x^*)\} \quad (11)$$

that the person would obtain if he was both fully informed and experienced the same reduction in guilt as a self-ignorant person. Since $e(\hat{x}) - \beta\phi f(\hat{x}) - \gamma(1-\rho)(\hat{x} - x^*) > e(x) - \beta\phi f(x) - \gamma(1-\rho)(x - x^*)$ for any $x \neq \hat{x}$, including both x^n and x^{iu}, we have that both $V^n < \hat{V}$ and $V^i < \hat{V}$. The comparison between V^n and V^i therefore depends on which falls further short of reference utility $\hat{V}$, which in turn depends on the person's characteristics β, ϕ, γ, ρ, and θ.

Suppose, for example, that $\rho = 1$, so the person experiences no guilt at all if he remains ignorant and the guilt terms drop out of the expressions for V^n and $\hat{V}$. In this case, if additionally $\beta = 1$, so the person has no present-bias, the guilt term drops out of the expression for V^i as well, because $x^{iu} = x^*$. As a result, we have $V^i = \hat{V} > V^n$, so the person strictly prefers to become informed. If, at the other extreme, $\beta = 0$, the future-consequences term $\beta\phi f(x)$ drops out of all three indirect-utility expressions, and $x^n = \hat{x}$. As a result, we have $V^n = \hat{V} > V^i$, so the person strictly prefers to stay ignorant. Moreover, since by the envelope theorem $\partial V^n / \partial\beta = -\theta\phi f'(x^n) < -\theta\phi f'\left(x^{iu}\right) = \partial V^i / \partial\beta$, there must be a critical value of β between 0 and 1 where the preference switches.

In sum, we find that *a guilt-averse, present-biased person may optimally use ignorance as an excuse to over-consume harmful goods.* We label this behavior strategic self-ignorance.

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[6] In contrast, comparing (4) and (8) shows that $x^n < x^{ih}$: if the food is healthy, the person consumes *less* under ignorance than under full information.

When we take the model to our experimental data, we need to add a random term ε reflecting unobserved attributes of either the subject or the choice situation. The subject chooses to ignore free information if $V^n - V^i + \varepsilon \geq 0$, i.e., with probability

$$\Pr(n) \equiv \Pr\left(\varepsilon \geq V^i - V^n\right) = 1 - F\left(V^i - V^n\right), \tag{12}$$

where F is the cumulative distribution of ε. As a result, for any parameter y,

$$\frac{d\Pr(n)}{dy} \triangleq \frac{d\left(V^n - V^i\right)}{dy} = \frac{\partial V^n}{\partial y} - \frac{\partial V^i}{\partial y}, \tag{13}$$

where "$\triangleq$" denotes equality of sign, and the second step follows by the envelope theorem.

To understand the factors underlying the comparative statics, it is useful to decompose the change in utility $V^n - V^i$ from staying ignorant into four probability-weighted terms:

$$\begin{aligned} V^n - V^i = &-(1-\theta)\underbrace{\left[e\left(x^{ih}\right) - e(x^n)\right]}_{L^h} + \theta\underbrace{\left[e(x^n) - e\left(x^{iu}\right)\right]}_{G^u} \\ &-\theta\underbrace{\left[\beta\phi f(x^n) - \beta\phi f\left(x^{iu}\right)\right]}_{L^u} + \theta\underbrace{\left[\gamma g\left(x^{iu} - x^*\right) - \gamma(1-\rho)g(x^n - x^*)\right]}_{\Delta^g} \end{aligned} \tag{14}$$

The first term, L^h, represents the enjoyment lost when the food is healthy, by consuming x^n rather than the optimal, higher level x^{ih}. The second term, G^u, represents the enjoyment gained by consuming x^n also when the food is unhealthy, rather than the guilt-induced, lower level x^{iu} that the person perceives to be optimal when informed. The third term, L^u, represents the loss incurred because the increase in consumption of unhealthy food also increases perceived future harm. The fourth term, Δ^g, represents the guilt avoided through self-ignorance. Paradoxically, it can be shown (by numerical example), that unless guilt reduction is complete, i.e., $\rho = 1$, this term need not be positive. Even though ρ must be positive for self-ignorance to ever be optimal (choosing ignorance must reduce feelings of guilt *on the margin*), the self-ignorant person may increase his consumption so much that he ends up feeling more guilt *overall*. As we show below, this implies also that a person with greater guilt sensitivity γ may paradoxically have *less* incentive to avoid guilt through ignorance.

Consider first how the incentive changes with β and ϕ. Using (14), we can write

$$\frac{d\Pr(n)}{d\beta} \triangleq -\theta\frac{\partial L^u}{\partial \beta} = -\theta\phi\left[f(x^n) - f(x^{iu})\right] < 0. \tag{15}$$

An increase in β, which implies a reduction in the person's present-bias, increases perceived future harm from consuming unhealthy food in both the uninformed and informed states. Because consumption is higher in the uninformed state, however, the perceived increase in harm is larger as well. The incentive to stay ignorant unambiguously falls.

Also,

$$\frac{d\Pr(n)}{d\phi} \triangleq \theta\left\{\frac{\partial \Delta^g}{\partial \phi} - \frac{\partial L^u}{\partial \phi}\right\} = -\theta\beta\left[f(x^n) - f\left(x^{iu}\right)\right]\theta$$

$$-\theta\gamma\left[g'\left(x^{iu} - x^*\right) - (1-\rho)g'(x^n - x^*)\right]\frac{dx^*}{d\phi} \gtreqless 0. \quad (16)$$

An increase in the severity of future consequences, ϕ, has two effects. First, it increases perceived future harm, just as an increase in β does. All else equal, this increases the person's incentive to become informed, since he can then reduce the harm if the food turns out to be unhealthy. Second, an increase in ϕ also intensifies the person's guilt in the informed state, by lowering the benchmark level x^* that he feels he ought to consume.[7] If $\rho = 1$, so guilt reduction from ignorance is complete, this unambiguously increases his incentive to stay ignorant. If $\rho < 1$, however, the effect is ambiguous, depending among other factors on the curvature of the guilt function. Overall, the effect of an increase in ϕ is ambiguous even if $\rho = 1$.

Next,

$$\frac{d\Pr(n)}{d\gamma} \triangleq \theta\frac{\partial \Delta^g}{\partial \gamma} = \theta\left[g\left(x^{iu} - x^*\right) - (1-\rho)g(x^n - x^*)\right] \gtreqless 0. \quad (17)$$

If $\rho = 1$, an increase in the person's sensitivity to guilt, γ, unambiguously increases his gain from avoiding that guilt, and thereby his incentive to stay ignorant. If $\rho < 1$, however, the effect is ambiguous. Although $\Pr(n)$ must be small at low values of γ (since $V^i > V^n$ in the limit as $\gamma \to 0$), it may be relatively large at intermediate values of γ, where the positive G^u term in (14) dominates, but then relatively small again at large values of γ, where the Δ^g term may be negative and dominate.

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[7] From (4),

$$\frac{dx^*}{d\phi} = \frac{f'(x^*)}{e''(x^*) - \phi f''(x^*)} < 0.$$

Lastly,

$$\frac{d\Pr(n)}{d\rho} \triangleq \theta \frac{\partial \Delta^g}{\partial \rho} = \theta\gamma g(x^n - x^*) > 0. \quad (18)$$

An increase in the effectiveness of ignorance at reducing guilt unambiguously increases the person's incentive to stay ignorant.[8]

3. Experimental design

Our experimental design follows the work on strategic ignorance by Dana et al. (2007), Larsson and Capra (2009), and van der Weele (2012). They used a dictator-game design given their focus was on fairness. Subjects were randomly matched into pairs, a dictator and a recipient, whereby the dictator decided the payments of both players. Dictators chose between two monetary outcomes, A or B. Outcome A was more beneficial to the dictator but risked a negative outcome for the recipient (relative to outcome B). Monitors offered each dictator the opportunity to learn whether the outcome that was more beneficial to himself was more unfair to the recipient than the alternative. Decisions were made anonymously, i.e., the recipient did not know if the dictator chose to be ignorant, and the dictator knew his decision was secret.

In our context of strategic *self*-ignorance, we can think of today's self as the dictator and tomorrow's self as the recipient. An important difference is the recipient (tomorrow's self) is necessarily known to the dictator (today's self), and the dictator's decision is not anonymous to the recipient. If anything, however, this should reduce the incentive to make a decision that is bad for one's future self, and reduce the incentive to stay ignorant.[9]

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[8] In the next section, we discuss our experimental application of the model. A minor complication is that, rather than deciding how much to consume of a single meal, subjects were asked to choose between two meals, knowing up front that one meal was high calorie and the other low calorie, but not knowing which meal was which. Only after indicating their preferred meal did treatment-group subjects face the further decision of whether to find out the calorie content of both meals, while control-group subjects were given this information without any choice in the matter. Moreover, in a final stage of the experiment following the information stage, subjects were told that, if they wanted to, they could switch meals. Since subjects had no reason to anticipate this switching option, our analysis goes through unchanged, except that the function $e(x)$ mapping calories to enjoyment presumably differed across meals. This implies, if we use A and B to denote the high- and the low-calorie meal, subjects who initially chose A (hereafter referred to as "high-calorie-meal lovers") faced the problem with enjoyment function $e_A(x)$, whereas subjects who initially chose B faced it with enjoyment function $e_B(x)$. Only at the final stage did high-calorie-meal lovers who had learned that A was unhealthy face the further choice of either sticking with their initial choice and obtaining indirect utility $v_A^{iu} = e_A(x_A^{iu}) - \beta\phi f(x_A^{iu}) - \gamma g(x_A^{iu} - x_A^*)$, or switching and obtaining $v_B^{ih} = e_B(x_B^{ih})$.

[9] Evidence suggests dictators are fairer towards recipients when they are observed by the recipients (Bohnet and Frey, 1999a) and when anonymity of the recipient is decreased (Charness and Gneezy, 2008).

We used restaurant-style ready meals in our experiment, offering subjects a choice between two meals: chicken and bulgur, containing 900 calories, and roast beef and glass noodles, containing 490 calories.[10] Subjects in a focus group had been unable to determine which of these meals was high calorie and which was low calorie.[11]

A recruitment firm was hired to recruit 150 people in the Stockholm area of different age, education, and income levels and of both genders. Vegetarians and people with food allergies were excluded for practical reasons. Subjects were told that they were going to participate in a survey during lunch hour and that lunch would be provided on site. They were also told they would, privately, be measured and weighed.[12] The experiment lasted for an hour and subjects received a gift card worth SEK 400 (approximately USD 60) for participating. Of the 148 subjects who showed up to participate, 55 were assigned to the control group and 93 to the treatment group. Subjects participated in groups of size 15-20 and were reminded on arrival that they had been recruited to fill in a survey. Subjects were asked not to communicate with each other during the session. The survey elicited background characteristics including health, label knowledge, nutritional knowledge, and nutritional interest, and also included a set of questions designed to measure general time preferences.

We followed a six-step procedure in the experiment.

Step 1. Subjects were told that they could choose between a meal containing chicken and bulgur or a meal containing roast beef and glass noodles (portions of the lunch meals were displayed), and that one of these meals (at that point still unknown to the subjects) contained 900 calories, whereas the other contained 490 calories. Subjects were also informed that their preferred meal would have to be consumed on site.

Step 2. On private sheets of paper, subjects were asked to rate the expected taste of the two meal choices (from 1= "very bad" to 5 = "very good"), and then state their choice of meal.

Step 3. Subjects in the *control group* were visually (on a sheet of paper) and verbally provided with information on which meal was high calorie and which was low calorie. Subjects in the *treatment group* were asked to choose one of two folded sheets of paper in

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[10] For comparison, Dumanovsky et al. (2009) report that the average calorie content of fast-food lunches is 823 calories.

[11] This is consistent with research by Burton et al. (2006) showing that people are generally unable to accurately determine the calorie content of prepared meals served away from home.

[12] The recruitment firm reported that subjects' willingness to participate in the study was unaffected by the fact that they would be measured and weighed.

front of them. They were told that the paper to the right contained information on the calorie content of both meals, while the paper to the left did not. It was equally costly to choose ignorance as it was to become informed.[13] The decision on whether or not to become informed was visible to other subjects in the group, which, if anything, should reduce the incentive to choose ignorance.[14]

Step 4. Subjects were given the option of revising their meal choice, based on the information they got, or, in the case of the treatment group, chose to get.

Step 5. Subjects were asked to complete the survey and eat the meal they had chosen.

Step 6. Subjects were individually weighed and measured in a separate room, and leftovers from subjects' meals were weighed. The fraction of the meal consumed (categorized as 25, 50, 70, 85 or 100 percent) was multiplied by the meal's total calorie content to determine each subject's calorie consumption.[15]

4. Results I: Existence of strategic self-ignorance

Table I reports our results pertaining to the existence of strategic self-ignorance. Of all subjects in the treatment group, 58 percent (54 out of 93) chose not to learn the calorie content of the meals, thereby actively avoiding information about the possibly harmful effect of their consumption on their future selves. However, this finding by itself need not imply that the self-ignorance was *strategic*, i.e., used as an excuse to increase calorie consumption. Investigating the strategic behavior requires examining the subgroup of 56 subjects in the treatment group and 36 subjects in the control group who indicated an initial preference for the high-calorie meal. This is the subgroup for which we can observe potential over-consumption due to self-ignorance.

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[13] The information provided was short—it simply stated which meal contained what number of calories. Subjects already knew that one meal contained 490 calories and the other 900 calories. We left the "no information" sheet blank due to the risk of any message on that sheet distorting the results (e.g., if subjects chose the no-information sheet out of curiosity).

[14] Evidence suggests that being observed, even by people other than the recipient, increases generosity in dictator games, while anonymity decreases it (see Hoffman, McCabe, and Smith, 1996; Bohnet and Frey, 1999b; Andreoni and Bernheim, 2009; Andreoni and Petrie, 2004; and Soetevent, 2005). If being observed similarly pressures subjects to "do the right thing" even for behavior that does not directly impact others, then it may reduce their incentive to choose ignorance.

[15] Six subjects (all in the control group) lacked recorded amount of consumption. We assigned these subjects 100 percent consumption of their consumed meal. In doing so, we assured that if anything, the calorie consumption of our control group would be overestimated.

Table I: Average calorie consumption of different sub-groups

Group	N		Ave. calorie consumption
All	145ϟ		564
Treatment	93		582
Self-ignorant	54	(58%)	626
Informed	39	(42%)	522
Control	52ϟ		532
High-calorie-meal lovers	92		630
Treatment	56		676
Self-ignorant	29	(52%)	798
Informed	27	(48%)	546
Control	36		558

ϟ Calorie consumption was not obtained for three subjects.

For this subgroup of high-calorie-meal lovers, we find that endogenous information indeed significantly increased average calorie consumption. Those in the treatment group consumed on average 676 calories, whereas those in the control group consumed on average 558 calories. A *t*-test strongly rejects the hypothesis of equal intake (*p*-value = 0.005). Figure I adds detail by comparing kernel density estimates of both groups' calorie consumption. The density for the treatment group is heavily skewed towards higher values, and a non-parametric Kolmogorov-Smirnov test strongly rejects the null that the underlying distributions of calorie-intake levels are the same (*p*-value = 0.022).

The higher average calorie intake of the 56 high-calorie-meal lovers in the treatment group is moreover clearly driven by the behavior of self-ignorant subjects. Compared to the control group's average intake of 558 calories, the average intake of 798 calories by the 29 subjects who ignored information is significantly higher (*p*-value < 0.001), whereas the average intake of 546 calories by the 27 subjects who chose information is not significantly different (*p*-value = 0.767). The kernel density estimates shown in Figure II similarly indicate that the skew of the treatment group's density shown in Figure I comes from self-ignorant subjects, whereas the density for informed subjects seems similar to that of the control group. Kolmogorov-Smirnov tests add further support: the control-group distribution differs significantly from that for self-ignorant subjects in the treatment group (*p*-value < 0.001), but not from that for informed subjects (*p*-value = 0.571).

Figure I: Kernel density estimates for subjects who preferred the high-calorie meal

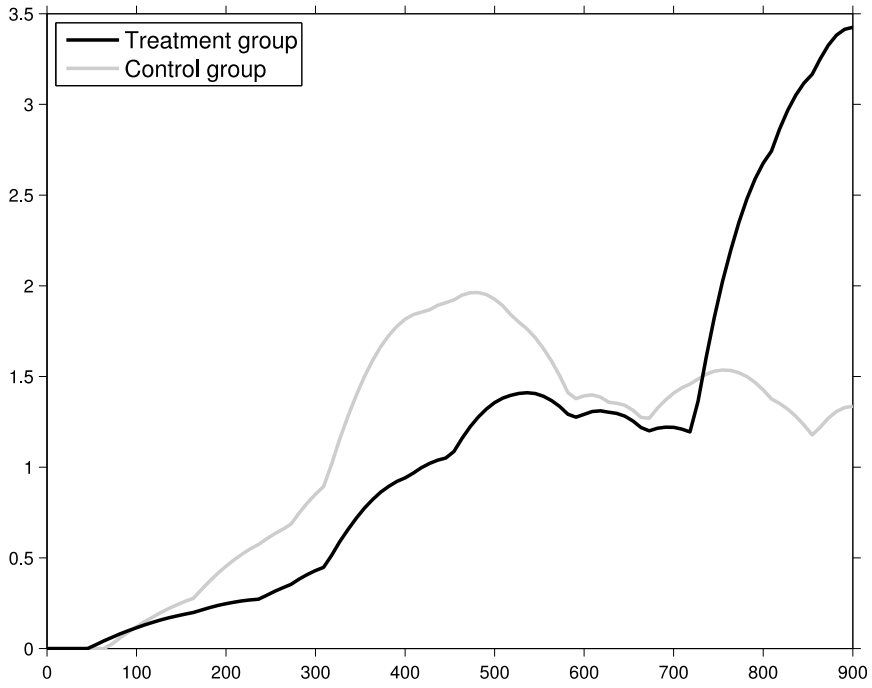
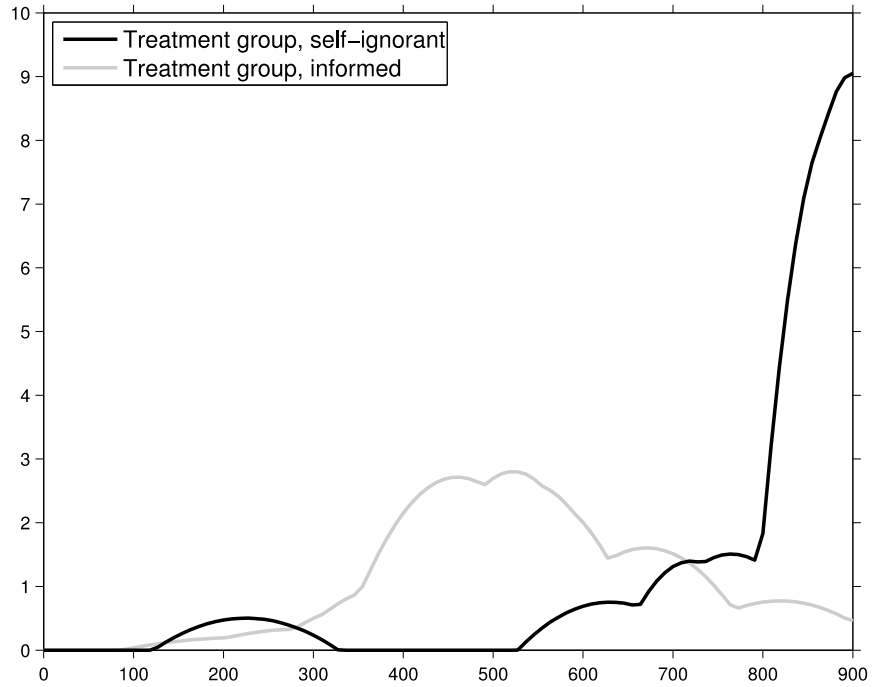


Figure II: Kernel density estimates for treatment-group subjects who preferred the high-calorie meal



We conclude that our data provide strong empirical support for the existence of strategic self-ignorance.

5. Results II: Determinants of self-ignorance

We next explore the determinants of the choice to ignore calorie information. The analytical framework of Section 2 suggests that the probability of choosing self-ignorance should be increasing in a person's present-bias, i.e. decreasing in β, and increasing in his ability to avoid guilt through ignorance, as captured by parameter ρ. The net effects of the person's sensitivity to guilt, γ, and concern about future consequences, ϕ, are both ambiguous, however. Table II provides descriptive statistics of the covariates used in our analysis.

Table II: Descriptive statistics of Probit covariates

	All				Treatment		Control		
Variable	mean	sd	min	max	mean	sd	mean	sd	*t*-test
β	1.005	0.032	0.848	1.157	1.002	0.031	1.011	0.035	(1.669)*
Female	0.534	0.501	0	1	0.538	0.501	0.527	0.504	(-0.121)
Age	39.950	12.704	20	61	40.153	12.748	39.630	12.748	(-0.236)
BMI	25.182	4.185	18	48	25.097	3.909	25.327	4.647	(0.323)
Health knowledge	6.483	1.528	2	10	6.407	1.584	6.611	1.433	(0.778)
Health concern	4.315	1.461	1	7	4.363	1.487	4.236	1.427	(-0.505)
Light exercise	5.905	8.277	0	50	6.413	9.085	5.055	6.707	(-0.963)
Moderate exercise	4.062	7.355	0	70	4.739	8.840	2.907	3.416	(-1.458)
Strenuous exercise	2.083	2.815	0	14	2.082	2.942	2.086	2.614	(0.0101)
Smoker	0.174	0.380	0	1	0.135	0.343	0.236	0.429	(1.565)
Above-ave. income	0.559	0.498	0	1	0.582	0.496	0.519	0.504	(-0.745)
College education	0.606	0.490	0	1	0.596	0.494	0.623	0.489	(0.318)

Exercise measured in hrs/wk. * $p < 0.10$.

To estimate subjects' present-bias β, we used two hypothetical questions. The first asked subjects if they preferred receiving SEK 5,000 today or SEK X in 2 months, for a range of X values from SEK 5,010 to SEK 5,905. The second asked subjects if they preferred receiving SEK 5,000 in 1 month or SEK X in 3 months. The present-bias estimate β was calculated as the ratio of the two X values at which a given subject switched preferences (the second divided by the first). As shown in Table I, β ranged from 0.85 to 1.16 in the sample, with a mean of close to 1. This implies that subjects were rational on average, but some were prone to over-consume in the present relative to what time-consistent behavior would dictate, while

others were prone to under-consume. This is in line with previous empirical findings on self-control problems (Ameriks et al., 2007).

We are unable to directly measure subjects' sensitivity to guilt from high-calorie food consumption, or their experienced guilt reduction from ignorance. Rather, we use *Female* and *Age* as variables that are associated with guilt in food consumption: Dewberry and Ussher (2001), Wansink et al. (2003), and Steenhuis (2008) find that women and younger people generally feel guiltier about unhealthy food consumption than do men and older people.

We include *BMI*, the subject's Body Mass Index calculated from on-site height and weight measurements,[16] as a variable that may affect the severity of future consequences from unhealthy food consumption. Wansink et al. (2003) find that age also impacts *perceived* impact from unhealthy food consumption: compared to younger people, older people are less likely to perceive consumption of high-calorie snacks as unhealthy.

Nayga (1996), Cowburn and Stockley (2005), and Drichoutis et al. (2005) find that people with greater knowledge of and interest in health issues more frequently pay attention to nutritional information, possibly because they are more aware of health impacts. We include a number of variables that plausibly capture these factors. *Health knowledge* is the number of correct responses by the subject on 11 health-related questions. *Health concern* is the subject's stated level of agreement (from 1="totally disagree" to 7="fully agree") with the statement "I am very concerned about the food I eat being healthy." *Light*, *moderate*, and *strenuous exercise* are the average hours per week that the subject reported engaging in each. We also include a *Smoker* dummy, both as an additional (in this case negative) indicator of general health interest, and as a possible indicator of the subject's ability to avoid guilt about future harmful consequences of current behavior.

Lastly, we include income and education as additional demographic controls. *Above-ave. income* is a dummy taking value 1 if the subject's stated income exceeded SEK 20,000/ month. *College education* is a dummy taking value 1 if the subject had any college or other post-secondary education.

Table III reports Probit estimates of the average marginal effects of our covariates on subjects' decision to ignore calorie information. Note we multiply the β variable by 100, so the reported effect is that of an increase by 0.01. Also note the effects for the dummy

[16] BMI is calculated by dividing a person's body mass (weight in kg) by the square of his or her height (in meters). A person with a BMI between 18.5 and 25 is considered normal, a BMI between 25 and 30 overweight, and a BMI above 30 obese.

variables *Female*, *Smoker*, *Above-ave. income*, and *College education* are discrete, i.e., estimates of $\Pr(n|y=1) - \Pr(n|y=0)$ rather than of $\partial \Pr(n)/\partial y$.

Table III: Determinants of self-ignorance

	(1) $\partial \Pr(n)/\partial x$	(2) $\partial \Pr(n)/\partial x$
β*100	0.021	-0.084***
	(0.013)	(0.026)
Female	-0.348***	-0.383***
	(0.093)	(0.084)
Age	0.022***	0.025***
	(0.005)	(0.005)
BMI	-0.049***	-0.040***
	(0.013)	(0.013)
Health knowledge	-0.073**	-0.102***
	(0.034)	(0.028)
Health concern	-0.062*	-0.093**
	(0.034)	(0.037)
Light exercise	0.002	0.000
	(0.006)	(0.006)
Moderate exercise	-0.016	-0.013
	(0.011)	(0.010)
Strenuous exercise	0.058**	0.041*
	(0.023)	(0.021)
Smoker	0.356***	0.391***
	(0.074)	(0.068)
Above-ave. income	-0.196**	-0.212***
	(0.082)	(0.069)
College education	0.208**	0.328***
	(0.083)	(0.062)
N	79	74
pseudo R^2	0.41	0.54

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Entries show average marginal effects for continuous variables, and average discrete effects—i.e., $\Pr(n|y=1) - \Pr(n|y=0)$—for dummy variables. Standard errors are in parentheses. Model (2) drops five β outliers.

The hypothetical nature of the questions used to estimate subjects' present-bias may have contributed to five clear outlier values of β (one lower than 0.9 and four larger than 1.05) that turn out to strongly influence our estimate of β's effect. A non-parametric smooth using locally weighted regression (see Figure III in the Appendix) indicates that, except at these outliers, self-ignorance has the negative relationship to β predicted by our model. Removing the outliers, as we do in the second column of Table III, does not materially change our results for any of the other covariates.

Focusing on the second column, we find that all covariates other than the exercise variables are highly statistically significant, and economically significant as well. An increase

in β by 0.01, i.e., just one percentage point, reduces the probability of choosing self-ignorance by more than 8 percentage points; compared to men, women are on average 38 percentage points less likely to be self-ignorant; aging by just one year increases the probability of self-ignorance by 2.5 percentage points; for every unit increase in BMI, the probability of self-ignorance drops by 4 percentage points, etc.[17]

Our finding that women and younger people are much less likely to ignore information compared to men and older people is not inconsistent with the above-mentioned findings in the psychology literature that the former tend to feel guiltier about unhealthy food consumption. However, we showed in Section 2 that, as long as ignorance leaves some residual guilt, the predicted relationship between self-ignorance and guilt sensitivity is non-monotonic; in particular, a person with relatively low guilt sensitivity (e.g., an elderly man) may gain from ignorance, whereas a person with high sensitivity (e.g., a young woman) may be better off choosing to become informed, and then reducing guilt by consuming less.

We also showed in Section 2 that an increase in future harm has an ambiguous effect on self-ignorance. First, future harm drives down the "guilt-free" reference consumption level x^*, thereby increasing the person's guilt and possibly his incentive to avoid that guilt through ignorance (this effect is itself ambiguous, though, when guilt avoidance is imperfect). The counter-point is that it increases the person's incentive to reduce expected harm by becoming informed. It seems plausible that the second effect will typically dominate, consistent with our finding of a strong negative relationship between self-ignorance and BMI. The negative relationship for the health-knowledge and health-concern variables is consistent with the second effect dominating as well.

The insignificance of the exercise measures may be explained by two offsetting effects. Subjects that exercise regularly are likely to be more interested in health issues, and more aware of high-calorie foods' health impacts. However, they may also be less concerned about those impacts, given that they burn more calories anyway. Strenuous (but not moderate or

[17] To check for robustness, we estimated a number of alternative specifications. A dummy for whether subjects *perceived* themselves to be overweight has the same negative effect as actual BMI, but is statistically insignificant. A continuous estimate of income, using the midpoints of the income intervals that subjects were asked about, has the same negative and statistically highly significant effect as the dummy for above-average income. Similarly, a continuous estimate of education, using reasonable guesses at the years required to attain subjects' reported degrees, has the same positive and statistically highly significant effect as the dummy for college education.

light) exercise is marginally positively related to self-ignorance is consistent with this explanation.

Our finding that smokers are much more likely to avoid health information seems unlikely to be due to differences with non-smokers in either guilt sensitivity or future harm from overeating. More plausibly, it indicates high facility at reducing guilt through ignorance—a facility likely also applied to guilt about future consequences of smoking. In terms of our model, smokers may have a high value of ρ.

As for the strong effects of income and education (both unanticipated), it seems similarly unlikely that either of these variables correlates with guilt sensitivity or harm from overeating. We speculate these variables correlate with ρ. Could it be that people with high emotional awareness (low ρ) select into business, whereas people with low awareness (high ρ) select into academic pursuits?

6. Concluding Remarks

Classical expected-utility theory presumes the value of information is always non-negative. Herein we define a counterpoint to this view—*strategic self-ignorance*. People may avoid free information and use their ignorance strategically, i.e., as an excuse to over-indulge in activities that provide immediate pleasure and potential future harm. We show that a person with present-biased preferences who is conflicted about doing what he wants versus "doing the right thing" (as defined by time-consistent preferences) may benefit from ignoring free information on future consequences of his actions if doing so reduces his internal conflict—for him, ignorance can be bliss.

We empirically test for the existence of strategic self-ignorance in relation to consumption of high-calorie food. Based on an experiment using restaurant-style ready meals, we find strong evidence of strategic self-ignorant behavior. Nearly 60 percent of our subjects chose to ignore free information on the calorie content of their meal, and these subjects consumed significantly more calories. We also find that people with stronger present-bias, men, younger people, people with a lower BMI, people with little knowledge of or interest in health, smokers, low-income earners, and highly-educated people are more likely to be self-ignorant.

Strategic self-ignorance may apply to a wide range of behavior, contributing not just to over-engagement in risky activities such as impulsive spending, gambling, alcohol or drug abuse, extreme sports, unprotected sex, or eating high-calorie foods, but also to under-

engagement in protective activities such as saving for retirement, buying insurance, getting health check-ups, or exercising. People may use ignorance of the risks associated with their behavior to allow themselves to "enjoy the moment," leaving their future selves to deal with debts, hangovers, broken bones, unwanted pregnancies, and health issues.

The central implication of strategic self-ignorance is that, because risk information is in fact not free—it comes with a psychic cost of guilt—information is inefficient at discouraging over-indulgence in risky behavior. For instance, to combat the so called "obesity epidemic" in the US, the ("Obamacare") *Patient Protection and Affordable Care Act* of 2010 has mandated that, starting in 2013, chain restaurants post calorie counts on their menus. But studies of a similar mandate enacted by New York City in 2008 have found that menu labeling has little or no impact on food consumption (Borgmeier and Westenhoefer, 2009; Elbel et al., 2009, 2011; Vadiveloo et al.,2011). Strategic self-ignorance could help explain why labeling does little to encourage healthier choices.

Overcoming the psychic cost of information may require either imposing additional costs on ignorance or providing additional benefits to being informed. Liability waivers, for instance, raise the cost of ignorance—they shift the responsibility of future harm to the person that engages in a risky activity, and could be used in areas ranging from extreme sports to food choices. Benefits from being informed could, for instance, consist of small rewards at schools and work places (e.g., financial rewards, extra credits, time off) associated with learning about risky or protective behavior. Increasing the salience of costs and benefits may also help. Evidence indicates, for example, that graphic, fear-arousing images on cigarette packages are more effective at deterring smoking than are simple text messages (Azagba and Sharaf, forthcoming).

Alternatively, strategic self-ignorant behavior may be pre-empted altogether by making use of people's tendency to go with default or salient options, thereby encouraging optimal decisions without relying on people fully informing themselves. Examples of "nudges" (Thaler and Sunstein, 2003) of this type are automatic enrollment in retirement or insurance plans and careful placement of healthy food options in supermarkets or cafeterias. We encourage future research on policy measures aimed at counteracting strategic self-ignorance, and research on strategic self-ignorance in the context of activities other than consuming tasty meals that stick around future waistlines.

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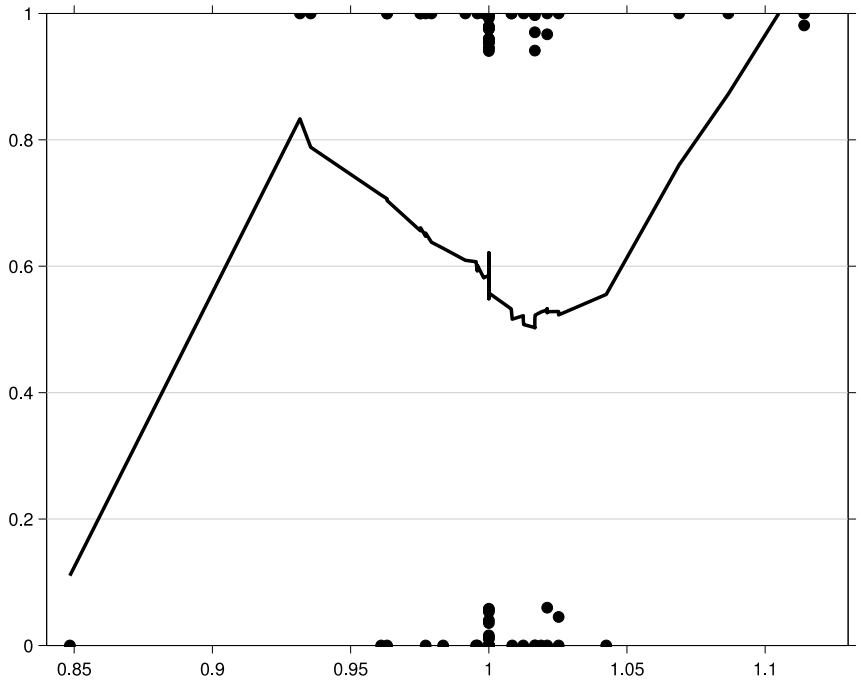
Appendix

Figure III shows a non-parametric scatterplot smooth, using locally weighted regression, of our data on self-ignorance against our proxy for present-bias (overlapping data points were vertically jittered to give a better sense of their distribution). The figure indicates that, except for one outlier with $\beta < 0.9$ and four outliers with $\beta > 1.05$, self-ignorance is negatively related to β.

Figure III: Data on self-ignorance against β, with non-parametric smooth



Appendix for reviewers

Experimental instructions (provided verbally)
[translated from the original Swedish]

(1) Welcome. You have been asked to come today to fill in a survey on ”Consumer evaluations of food.” Please choose a seat. In front of you, you have a few documents you will be asked to complete. Also in front of you are the two different lunch meals you can choose from today. You are asked to finish your lunch before leaving today. When you are done with lunch and filling out the survey and the forms, please bring your filled-out forms and your meal left overs over to the back room, where we will be waiting. There will be a couple of additional questions asked there, and you will be weighed and measured. This exercise is individual, so please refrain from communicating with one another in any way during this session, verbally or with body language.
(2) Please start off by filling out the first form: the form of consent to participate in this study.
(3) Under the form of consent, you will find a form of meal choice. On that form, you are now asked to rate how well you *believe* the meals of choice taste. You are also asked to choose a meal. One of the meals contains 900 calories, and the other meal contains 490 calories. You make your choice of meal by ticking a box on the form in front of you.

Control group:

(4) As implied on this sheet of paper [instructor holds up a sheet of paper—the same as the information sheet offered to the treatment group—saying: “chicken and bulgur: 900 calories, roast beef and noodles: 490 calories”], the chicken and bulgur meal contains 900 calories, while the roast beef and noodles contains 490 calories.
(5) Please turn over the form of meal choice. Now, you may revise your choice of lunch meal. Please tick the box for your final choice of lunch meal.
(6) Please proceed by filling out the survey and finishing your lunch.

Treatment group:

(4) If you would like to know the calorie content of each meal, please pick a sheet from the pile to your right. If you do not want this information, please pick a sheet from the pile to your left.
(5) Please turn over the form of meal choice. On the second page of the form, you are now asked to indicate if you choose to find out the calorie information or not.
(6) Now, you may revise your choice of lunch meal. Please tick the box for your final choice of lunch meal.
(7) Please proceed by filling out the survey and finishing your lunch.

LUNDS UNIVERSITET

Consumers' evaluation of food

Consent to participate in the study on consumers' evaluation of food.

Hereby I confirm that I have got information on the purpose of the research project and the proceedings of the study. I have had the opportunity to pose questions, and my questions have been answered.

I give my consent to participate in the study on evaluations of food, and my consent to use the personal information I am providing, in anonymized form, for research purposes.

Name and family name: .....

Phone number:.....

E-mail:.....

Participant number (last 6 digits of personnumber[18]):.....

Date: .....

Signature: .....

Print your name: .....

Thank you for your help!

Best regards,

XXXXXX (project manager), e-mail: xxxxxx@xxxxx, phone: xxxxxx
YYYYYY, e-mail: yyyyyy@yyyyy, phone: yyyyyy

[18] To reviewers: the Swedish "personnumber" is equivalent to the social security number in the U.S., and consists of 10 digits in total.

[Meal-choice form – control group]

Please state the <u>last</u> 6 digits of your personnumber:

□□□□□□-□□□□

Today you can choose between two meals: chicken and bulgur or roast beef and noodles. Please state how good you <u>believe</u> these meals taste on a scale 1-5, where 1=very bad and 5=very good.

(1) Chicken and bulgur:

1	2	3	4	5

Tastes very bad Tastes very good

(2) Roast beef and noodles:

1	2	3	4	5

Tastes very bad Tastes very good

(3) Please state your choice of meal:

❑ Chicken and bulgur ❑ Roast beef and noodles

[Page break]

(4) Do you want to revise your choice of meal? Tick the box in front of your final choice of meal.

❑ Chicken and bulgur ❑ Roast beef and noodles

[Meal-choice form – treatment group]

Please state the last 6 digits of your personnumber:

□□□□□□-□□□□

Today you can choose between two meals: chicken and bulgur or roast beef and noodles. Please state how good you believe these meals taste on a scale of 1-5, where 1=very bad and 5=very good.

(1) Chicken and bulgur:

1	2	3	4	5

Tastes very bad Tastes very good

(2) Roast beef and noodles:

1	2	3	4	5

Tastes very bad Tastes very good

(3) Please state your choice of meal:

❑ Chicken and bulgur ❑ Roast beef and noodles

[Page break]

(4) Did you choose to find out the nutritional information of the meals?

❑ Yes ❑ No

(5) Do you want to revise your choice of meal? Tick the box in front of your final choice of meal.

❑ Chicken and bulgur ❑ Roast beef and noodles

LUNDS UNIVERSITET

Department of economics

Consumers' evaluations of meals

We are a research group working on how consumers evaluate different attributes in meals.

It is important to know that all information about you will be classified according to 'Offentlighets- och sekretesslagen (2009:400)' (Swedish law) and that publication of statistics and research results will be in a manner that does not enable identification.

Your cooperation is valuable, since your participation will generate important knowledge. It is of course voluntary to participate and you can interrupt your participation in this study at any time, without further explanation.

This project is financially supported by the Swedish Council for Working Life and Social Research (FAS).

If you have questions on the study, ask them directly or contact us by e-mail or phone.

To be able to relate your answers in the survey to your proceeding answers, we ask you to fill out the last 6 digits of your personnumber below:

State the last 6 digits of your personnumber: ☐☐☐☐☐☐-☐☐☐☐

Best regards,

XXXXXX (project manager)
[Title, department]
E-mail: xxxxxx@xxxxx
Phone: XXXXXXXXXX

YYYYYYYY
[Title, department]
E-mail: yyyyyy@yyyyy
Phone: YYYYYYYYY

[Survey questions used in the analysis]

Background variables

2. Please state the age and gender of you and your household members

	Year of birth	Gender
You	_____	❑ Female ❑ Male
Spouse/partner	_____	❑ Female ❑ Male
Oldest child	_____	❑ Female ❑ Male
Next oldest child	_____	❑ Female ❑ Male
Third oldest child	_____	❑ Female ❑ Male
Forth oldest child	_____	❑ Female ❑ Male
Fifth oldest child	_____	❑ Female ❑ Male

3. What is your highest level of education?

(1) ❑ Elementary school 9 years
(2) ❑ High school
(3) ❑ Vocational training
(4) ❑ College education 1-2 years
(5) ❑ College education 3-5 years
(6) ❑ Other post-high school education
(7) ❑ Graduate school
(8) ❑ Other education
(9) ❑ No education

(10) ❑ I do not know

4. What is your total income per month (pre tax)?

(1) ❑ Less than SEK 10 000
(2) ❑ SEK 10 001 – 20 000
(3) ❑ SEK 20 001 – 30 000
(4) ❑ SEK 30 001 – 40 000
(5) ❑ SEK 40 001 – 50 000
(6) ❑ SEK 50 001 – 60 000
(7) ❑ SEK 60 001 – 80 000
(8) ❑ SEK 80 000 – 100 000
(9) ❑ SEK 100 001 – 150 000
(10) ❑ more than SEK 150 000

(11) ❑ I do not know

6. Exercise

We ask you to think of an average week over an entire year, i.e., not a particular winter or summer week, and state your exercise habits.

We have divided exercise into three levels: **light exercise, active exercise, and sports**.

Light exercise is for instance walking stairs, cleaning the house and gardening
Active exercise is for instance riding your bike to work and walking the dog
Sports is for instance running, swimming, playing soccer, badminton or other sports that raise your heart rate.

Please note the average number of hours for each activity during an average week:

Light exercise (number of hours per week)	
Active exercise (number of hours per week)	
Sports (number of hours per week)	

[...]

Time preferences

24. Below you face two alternatives, A or B, in a range of different scenarios. Imagine that you can either receive the amount stated under A <u>today</u> or the amount stated under B <u>in two months</u>. Mark your preferred alternative (A or B) after each scenario.

Scenario	Payment alternative A (will be paid to you <u>today</u>)	Payment alternative B (will be paid to you <u>in 2 months</u>)	I choose (mark the column of your preferred alternative):	
			A	**B**
1	**SEK 5000**	**SEK 5010**		
2	**SEK 5000**	**SEK 5020**		
3	**SEK 5000**	**SEK 5025**		
4	**SEK 5000**	**SEK 5033**		
5	**SEK 5000**	**SEK 5042**		
6	**SEK 5000**	**SEK 5063**		
7	**SEK 5000**	**SEK 5084**		
8	**SEK 5000**	**SEK 5105**		
9	**SEK 5000**	**SEK 5127**		
10	**SEK 5000**	**SEK 5148**		
11	**SEK 5000**	**SEK 5169**		
12	**SEK 5000**	**SEK 5213**		
13	**SEK 5000**	**SEK 5300**		
14	**SEK 5000**	**SEK 5434**		
15	**SEK 5000**	**SEK 5665**		
16	**SEK 5000**	**SEK 5905**		

25. Below you face two alternatives, A or B, in a range of different scenarios. Imagine that you can either receive the amount stated under A <u>in one month</u> or the amount stated under B <u>in three months</u>. Mark your preferred alternative (A or B) after each scenario

Scenario	Payment alternative A (will be paid to you <u>in 1 month</u>)	Payment alternative B (will be paid to you <u>in 3 months</u>)	I choose (mark the column of your preferred alternative):	
			A	**B**
1	**SEK 5000**	**SEK 5010**		
2	**SEK 5000**	**SEK 5020**		
3	**SEK 5000**	**SEK 5025**		
4	**SEK 5000**	**SEK 5033**		
5	**SEK 5000**	**SEK 5042**		
6	**SEK 5000**	**SEK 5063**		
7	**SEK 5000**	**SEK 5084**		
8	**SEK 5000**	**SEK 5105**		
9	**SEK 5000**	**SEK 5127**		
10	**SEK 5000**	**SEK 5148**		
11	**SEK 5000**	**SEK 5169**		
12	**SEK 5000**	**SEK 5213**		
13	**SEK 5000**	**SEK 5300**		
14	**SEK 5000**	**SEK 5434**		
15	**SEK 5000**	**SEK 5665**		
16	**SEK 5000**	**SEK 5905**		

26. The Confederation of the Food and Drink Industries of the EU (CIAA) gives recommended levels of the daily intake of energy, i.e. calories. Approximately how many calories should an average active middle aged woman eat per day?

(1) ❑ Appr 1000 calories per day.
(2) ❑ Appr 2000 calories per day.
(3) ❑ Appr 3000 calories per day.
(4) ❑ Appr 4000 calories per day.

(5) ❑ I do not know

27. Assume men and women are equally physically active and of equal age. Mark the statement that is correct.

(1) ❑ Men should eat *fewer* calories per day than women to maintain a healthy body weight.
(2) ❑ Men should eat *more* calories per day than women to maintain a healthy body weight.
(3) ❑ Men should eat *an equal amount* of calories per day as women to maintain a healthy body weight.

(4) ❑ I do not know

28. Assume younger and older people are equally physically active. Mark the statement that is correct.

(1) ❑ Younger people should eat *fewer* calories per day than older people to maintain a healthy body weight.
(2) ❑ Younger people should eat *more* calories per day than older people to maintain a healthy body weight.
(3) ❑ Younger people should eat *an equal amount* of calories per day as older people to maintain a healthy body weight.

(4) ❑ I do not know

Below are a number of statements regarding Swedish nutritional recommendations and guidelines for meals (from the Swedish National Food Administration).

The recommendations are based on the average diet in Sweden and there may be large individual variations. You are asked to think of the recommendations of <u>the average person</u> when you answer questions 29-34.

Please mark the correct answer.

29. Fruit and vegetables one should:

(1) ❑ Eat more of
(2) ❑ Eat less of
(3) ❑ Eat as much of as you do know, i.e. unchanged
(4) ❑ Avoid

(5) ❑ I do not know

30. Sugar one should:

(1) ❑ Eat more of
(2) ❑ Eat less of
(3) ❑ Eat as much of as you do know, i.e. unchanged
(4) ❑ Avoid

(5) ❑ I do not know

31. Saturated fats one should:

(1) ❑ Eat more of
(2) ❑ Eat less of
(3) ❑ Eat as much of as you do now, i.e. unchanged
(4) ❑ Avoid

(5) ❑ I do not know

32. Trans fatty acids one should:

(1) ❑ Eat more of
(2) ❑ Eat less of
(3) ❑ Eat as much of as you do now, i.e. unchanged
(4) ❑ Avoid

(5) ❑ I do not know

33. Dietary fiber one should:

(1) ❑ Eat more of
(2) ❑ Eat less of
(3) ❑ Eat as much of as you do now, i.e. unchanged
(4) ❑ Avoid

(5) ❑ I do not know

34. Salt one should:

(1) ❑ Eat more of
(2) ❑ Eat less of
(3) ❑ Eat as much of as you do now, i.e. unchanged
(4) ❑ Avoid

(5) ❑ I do not know

35. The energy intake (i.e. the intake of calories, or kilo joule) and the nutritional intake should, according to the Swedish National Food Administration:

(1) ❑ Be the highest in the morning
(2) ❑ Be the highest at lunch
(3) ❑ Be the highest at dinner
(4) ❑ Be equally distributed during the day

(5) ❑ I do not know

36. Children and adults are recommended by the Swedish National Food Administration to:

(1) ❑ Eat 3 main meals during the day and refrain from snacking
(2) ❑ Eat 2 main meals during the day and snack 2 times
(3) ❑ Eat 3 main meals during the day and snack 1-3 times
(4) ❑ Eat 3 main meals during the day and snack 4 times

(5) ❑ I do not know

Mark how well the below statements describe you, where 1 means "totally disagree" and 7 means "fully agree."

37. I am very concerned about the food I eat being healthy.

1	2	3	4	5	6	7

Totally disagree Fully agree

[...]

44. How would you describe your body weight?

(1) ❑ As underweight
(2) ❑ As normal weight
(3) ❑ As over weight

(4) ❑ I do not know

45. Do you smoke?

(1) ❑ Yes
(2) ❑ No

(3) ❑ I do not know

[*Form filled out after having completed the survey and lunch*]

To be able to associate your answers in the survey to your answers below, we ask you to fill out the last 6 digits of your personnumber below:

State the <u>last</u> 6 digits of your personnumber: ☐☐☐☐☐☐-☐☐☐☐

[*Treatment group only:*]
(1) Did you choose to find out the calorie information?

❑ Yes ❑ No

If you answered 'yes' to the above question, proceed to question (2). If you answered 'no' to the above question, proceed to question (5).

[*Treatment and control group:*]
(2) Did the calorie information affect the amount of lunch you consumed?

❑ Yes ❑ No

If you answered 'no' to the above question, proceed to question (4). If you answered 'yes', proceed to question (3).

(3) How was your meal consumption affected by the calorie information?

❑ I ate less than I would have if I had been unaware of the calorie content
❑ I ate more than I would have if I had been unaware of the calorie content

(4) How much do you think you would have eaten of your lunch meal if you had been unaware of the calorie content?

❑ ca 25%.
❑ ca 50%
❑ ca 70%.
❑ ca 85%
❑ ca 100%

(5) How much did you eat of your lunch meal?

❑ ca 25%.
❑ ca 50%
❑ ca 70%.
❑ ca 85%
❑ ca 100%

Information filled out by the instructor for each subject:

Weight of meal (leftovers): _____
Body height: _____
Body weight: _____
Waist circumference:_____