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Strategic Ignorance and Perceived Control

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Abstract

Information can trigger unpleasant emotions. As a result, individuals might be tempted to strategically ignore it. We experimentally investigate whether increasing perceived control can mitigate strategic ignorance. Participants from India were presented with a choice to receive information about the health risk associated with air pollution and were later asked to recall it. Perceived control leads to a substantial improvement in information recall. We find that optimists react most to perceived control, both with a reduction in information avoidance and an increase in information recall. This latter result is supported by a US sample. A theoretical framework rationalizes our findings.

JEL classification: D83, I15, Q53
Keywords: information avoidance; information recall; perceived control; motivated cognition; air pollution

Be it online, in the newspapers, or through social interactions, our daily lives are filled with an array of information that has varying degrees of pleasantness. Most of us dislike distressing news related to our environment or personal well-being, such as a looming economic recession, reports of a violent conflict in our vicinity, the outbreak of a pandemic, or the threat of climate change. Because interacting with unsettling information can leave us feeling

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uneasy and anxious, we might find ourselves deliberately ignoring it, even when it has the potential to improve decision-making. Such strategic ignorance can manifest in two primary ways. First, one can actively avoid information altogether (see Golman, Hagmann and Loewenstein, 2017, and references therein). Second, as avoidance is not always possible, people may instead purposefully not recall unpleasant information they have been exposed to.[1]

Information ignorance – be it strategic or not – is commonly observed in settings where individuals have limited to no control over the realization of outcomes. Examples include medical testing for untreatable diseases or genetic conditions, and information on events such as yesterday's financial portfolio returns during a market decline, or performance evaluations in the workplace. Information ignorance can also arise in situations where actions to avoid adverse outcomes are available but awareness of these actions or their effectiveness is limited. In this context, *perceived control* – the belief that one's actions can influence a specific outcome – is typically low. Prime examples come from the health domain, where numerous diseases can be treated or their impacts alleviated, if detected early. Still, individuals are often reluctant to undergo medical screening.

In this paper, we test whether an increase in perceived control can reduce strategic ignorance of distressful information. We first present a simple theoretical framework to illustrate how perceived control affects information avoidance and recall. In the model, individuals hold a prior belief about the realization of an event that generates disutility. While there is a costly action to reduce the impact of the negative event, individuals vary with respect to the level of perceived control they have over the impact of this action. Building on previous work (Caplin and Leahy, 2001; Kőszegi, 2003; Oster, Shoulson and Dorsey, 2013; Schwardmann, 2019), we assume that individuals derive

[1]Not recalling information can result from *inattention* to information (*e.g.,* Sims, 2003; Caplin and Dean, 2015; Amasino, Pace and van der Weele, 2021), *biased processing* of information (*e.g.,* Eil and Rao, 2011; Glaeser and Sunstein, 2013; Peysakhovich and Karmarkar, 2016; Sunstein et al., 2016; Möbius et al., 2022) and the deliberate *forgetting* of information (*e.g.,* Zimmermann, 2020; Huffman, Raymond and Shvets, 2022). In our study, we only measure the absence of recall and do not make any claim about the specific path through which it arises.

anticipatory utility from their beliefs about the severity of a negative event before it unfolds and then experience realized utility once the event occurs. The trade-off between these two components determines an individual's decision to acquire or avoid (respectively recall or not recall) the information. We show that increasing perceived control can affect these decisions. For instance, optimistic individuals – who underestimate the threat – may offset some of the utility loss resulting from the realization of a negative event by strategically ignoring the information and thereby maintaining high anticipatory utility. Increasing perceived control can shift this trade-off: if the expected disutility of the negative event can be reduced, optimists will have less need for strategic ignorance.

We conduct a pre-registered experiment with an Indian sample (N=2,031) to study the influence of perceived control on the propensity to ignore information about the detrimental health effects of air pollution. First, we provide all participants with detailed information on air pollution to eliminate differences in awareness of the underlying issue. The general information includes the main sources of air pollution, associated illnesses, and how excessive exposure can be converted into an average loss of life expectancy. In the treatment group, we then increase participants' perceived control by listing various simple yet effective measures to protect one's health against outdoor and indoor air pollution. Subsequently, we measure information avoidance by eliciting participants' preference to receive personalized information about the average regional loss of life expectancy due to air pollution. Their preference is implemented with a 60% probability to ensure that the information is also shown to a share of participants that indicated a preference not to receive it. After participants complete an unrelated effort task, we measure information recall by asking participants who were randomly assigned to receive the information to recall it.

We focus on information about the health risk of air pollution for several reasons. First, the adverse health effects of air pollution are considered a major global health burden. According to the World Health Organization (WHO) in 2021, about 6.7 million deaths worldwide are attributable to ambient and household air pollution every year. How people attend to information about the health risks of air pollution therefore carries important policy implications. Second, health information appears especially prone to being avoided (Kőszegi, 2003; Oster, Shoulson and Dorsey, 2013; Schwardmann, 2019). In particular, attitudes toward air pollution and its effect on own health are oftentimes characterized by indifference or denial (Bickerstaff and Walker, 2001; Muindi et al., 2014).[2] Third, the topic offers scope to improve perceived control. There are various effective and to some extent also inexpensive ways in which individuals can protect their health from air pollution, including face masks, air purifiers, or the proper ventilation of indoor areas (Carlsten et al., 2020).

We find evidence of both information avoidance and lack of recall in our data. In the control group, 8% of participants prefer to avoid the information and about 27% of participants who receive the information do not recall it. The treatment – which successfully increases perceived control – does not change the propensity to avoid information but significantly decreases the share of participants that do not recall the information from 27% to 20%. Guided by our theoretical framework, we additionally explore heterogeneity in participants' prior beliefs about the air quality in their home district. In line with the model, we find that the treatment significantly reduces information avoidance and improves recall for optimistic participants, *i.e.*, those who believe to experience particularly good air quality at the beginning of the study. These findings suggest that strategic ignorance is especially problematic and perceived control particularly impactful for those that are *ex-ante* oblivious of the underlying threat.

The findings from our Indian sample highlight that increasing perceived control can encourage people to engage with distressing information in settings of significant health risks due to severe air pollution. However, our theoretical framework suggests that the impact of perceived control may be

[2]Particularly in developing countries, the consistently low demand for environmental quality in the face of ever more severe environmental catastrophes is puzzling (Greenstone and Jack, 2015; Pattanayak, Pakhtigian and Litzow, 2018; Greenstone, Lee and Sahai, 2021; Balietti, Budjan and Eymess, 2023).

less pronounced in settings characterized by lower air pollution levels and less severe health consequences. To investigate this matter, we conduct the same experiment with participants from the US (N= 2,272). The US provide a setting where air pollution levels are comparatively lower, but nonetheless above official recommendations and significantly detrimental to health (see Deryugina et al., 2019, on the sizable mortality effects of air pollution in the US). Our treatment successfully increases perceived control also in the US sample but we do not find aggregate treatment effects, neither on information avoidance nor recall. Yet, we find that the treatment leads to a substantial increase in recall for individuals with optimistic prior beliefs also in the US. Altogether, our findings provide substantial evidence that perceived control can be an effective tool to reduce strategic ignorance among optimists, even in contexts where the underlying threat is comparatively low but nonetheless highly relevant.

This paper contributes to the literature threefold. The main contribution is to provide direct evidence on the role of perceived control in reducing strategic ignorance of distressful information. We study its impact on two forms of strategic ignorance. First, we identify the effect of perceived control on information avoidance, so far only provided in the social psychology literature (*e.g.*, Trope, Gervey and Bolger, 2003). In the economic literature, we are not aware of a study that directly measures the effect of perceived control on individuals' engagement with information. Rather, a few studies indirectly support a negative correlation. For example, theoretical contributions by Kőszegi (2003) and Schwardmann (2019) predict that information avoidance of medical diagnoses decreases in the extent to which a disease can be treated.[3] In addition, we examine the role of perceived control with respect to the recall of information. There is robust empirical evidence that individuals strategically forget information that has negative valence, see Amelio and Zimmermann (2023) for a

[3]Without a focus on information acquisition and processing, the economics literature has so far focused on how an internal locus of control correlates with different economic behaviors, ranging from applications in labour (Coleman and DeLeire, 2003; Caliendo, Cobb-Clark and Uhlendorff, 2015; Caliendo et al., 2022), health (Kesavayuth et al., 2020; Churchill et al., 2020), development (Buddelmeyer and Powdthavee, 2016; Abay, Blalock and Berhane, 2017; Churchill and Smyth, 2021), and risk-taking and financial decisions (Pinger, Schäfer and Schumacher, 2018; Fehr and Reichlin, 2022).

review.[4] To the best of our knowledge, our study is the first to investigate whether perceived control affects information recall.

Second, this paper studies information avoidance and recall jointly in one experiment. The approach directly facilitates a test on whether these two forms of strategic ignorance act as complements or substitutes. The literature typically assumes complementarity in the sense that forgetting the information is treated as a last resort when information cannot be avoided (see Golman, Hagmann and Loewenstein, 2017, and references therein). We find support for this relationship as recall rates are lower among individuals who stated a preference against receiving the information but were randomly assigned to see it. Moreover, we find substantial rates of unsuccessful recall also among those participants that prefer to receive the information in the first place, especially when it contradicts prior beliefs. This suggests that not recalling the information can also act as a substitute for information avoidance. By documenting both substitutability and complementarity, we argue that studying information avoidance and recall separately may lead researchers to critically underestimate the extent of strategic ignorance.

Third, we demonstrate that information avoidance and the lack of recall are a relevant concern also with respect to aggregate-level information. The related literature is primarily concerned with information that is directly applicable to the individual that consumes it. In particular, negative feedback on personal intelligence or beauty, teacher evaluations, private financial outcomes, and medical test results are prominent instances of information that is often avoided or forgotten (*e.g.*, Eil and Rao, 2011; Möbius et al., 2022). With our experiment, we contribute to an expanding body of literature that examines attitudes towards aggregate-level information, where accurate individual

[4]For instance, Zimmermann (2020) finds that individuals who receive negative feedback about their results in an intelligence test are more likely to forget it after one month compared to individuals who receive positive feedback. Other studies have shown that individuals are more likely to forget when they behaved selfishly rather than pro-socially (Li, 2013; Saucet and Villeval, 2019) and unethically rather than morally (Galeotti, Saucet and Villeval, 2020). These empirical findings are consistent with theoretical models showing that individuals can strategically suppress undesirable signals (Bénabou and Tirole, 2002; Gottlieb, 2014) or wrongly recollect them as good signals (Chew, Huang and Zhao, 2020).

estimates are not accessible (*e.g.*, Carrillo and Mariotti, 2000; Loewenstein and O'Donoghue, 2006; Kahan et al., 2012).

Our findings carry significant policy implications for tackling strategic ignorance in situations where perceived control is low. A recent prominent example is the outbreak of the COVID-19 pandemic, which has highlighted how limited perceived control over infectious diseases can lead to widespread fear, uncertainty, and difficulties in implementing effective public health measures (Kaplan and Milstein, 2021). Similarly, the increasingly urgent issue of climate change is infamous for its tendency to be ignored (Norgaard, 2011; Zappalà, 2023) as individuals and communities may feel a lack of control over the broader consequences of environmental degradation and extreme weather events. Furthermore, the growing wealth gap and economic disparities can lead to reduced perceived control for disadvantaged populations. The preference for remaining uninformed about growing inequality may partly explain why support for redistributive public policies aimed at addressing the issue is limited, as documented in various studies (see Kuziemko et al., 2015; Hoy and Mager, 2021; Fehr, Mollerstrom and Perez-Truglia, 2022). Our results suggest that providing actionable information on how to cope with threats to one's health and overall well-being substantially reduces the propensity to ignore the underlying problem and as such clears a first hurdle towards lasting behavioral change.

I. Theoretical Framework

We propose a simple model to illustrate the role of perceived control on information acquisition and recall, building on work by Kőszegi (2003), Oster, Shoulson and Dorsey (2013), and Schwardmann (2019). Consider an individual whose utility is negatively impacted by an exogenous event Z. While the individual cannot directly influence the realization of Z, she can undertake action $a \in [0, 1]$ to reduce the impact of Z on her utility.[5] The utility function

[5]Examples for action a include wearing a face mask to protect oneself against air pollution exposure, doing physical exercise to reduce the incidence of illnesses, and seeking medical care to prevent a disease (*e.g.*, a vaccination), among many other.

is given by:

$$U(a, \gamma, Z) = -(1 - \gamma a)Z - a^2 C, \tag{1}$$

where taking action a is costly, as represented by the convex cost function a^2C, with $C > 0$.[6] Utility is decreasing in the severity of the negative event Z, with $\frac{\partial U(a,\gamma,Z)}{\partial Z} = -(1 - a\gamma) < 0$. The individual's level of perceived control is denoted by $\gamma \in [0, 1]$. It represents the belief about the extent to which action a can mitigate the impact of Z.

The individual chooses action a to maximize her utility, conditional on event Z and her perceived control γ. The optimal action a is chosen at the level where its marginal benefits equal its marginal costs:

$$a^*_Z = \operatorname*{argmax}_a U(a, \gamma, Z) = \frac{\gamma}{2C} Z. \tag{2}$$

Equation (2) illustrates that the optimal level of action a^*_Z increases in the magnitude of the event Z and decreases in the implementation cost C. Moreover, a^*_Z increases in the individual level of perceived control γ. Conditional on Z, the utility level at a^*_Z is given by $U(a^*_Z, \gamma, Z) = -Z + \frac{\gamma^2}{4C} Z^2$.[7]

A. Information Avoidance

We assume that the realization of event Z has occurred, but its impact on utility will only be experienced at a future date. The individual currently does not know the realized value of the event Z but knows its expected value $\mathbb{E}[Z]$. Similar to Oster, Shoulson and Dorsey (2013), we assume that the individual can choose to hold a belief π about the expected value of Z, which can differ from the true $\mathbb{E}[Z]$.[8] We do not make assumptions about how the

[6]We assume that implementing a follows a convex cost function conveys as mitigating the effect of Z becomes more costly at an increasing rate as a increases.

[7]As action a is bounded by $[0, 1]$, the utility level at a^*_Z is given by $U(a^*_Z, \gamma, Z) = -Z + \gamma Z \min\{\frac{\gamma}{2C} Z, 1\} - \left(\min\{\frac{\gamma}{2C} Z, 1\}\right)^2 C$. For simplicity, we assume that a^*_Z is always within the action space of the individual, implying that we only consider cases where the condition $C > \frac{Z}{\gamma}$ holds.

[8]In contrast to Oster, Shoulson and Dorsey (2013), we do not assume that the belief π is formed at the same time as action a is decided. Instead, we assume π to be a prior belief, formed before the individual considers to acquire information about the true value of Z.

belief is formed, considering it as determined by exogenous factors.

Consider a horizon with two time periods. At time $t = 0$, the individual has the opportunity to acquire information about the true value of Z at no material cost.[9] Let $D \in \{0; 1\}$ denote the decision to learn the true Z, with $D = 1$ as information acquisition and $D = 0$ as information avoidance. Conditional on her information acquisition decision, the individual chooses the optimal action a^*. If the individual chooses to know the true value of Z ($D = 1$), she will implement action $a^*_Z = \underset{a}{\text{argmax}}\, U(a, \gamma, Z)$. In contrast, if the individual chooses not to learn the true Z ($D = 0$), she will base her decision on her prior belief π and set $a^*_\pi = \underset{a}{\text{argmax}}\, U(a, \gamma, \pi)$. At time $t = 1$, the impact of event Z on the individual's utility is realized.

We follow a key assumption in the literature: until the event Z occurs, individuals incur *anticipatory utility* from holding certain expectations about their future utility level (Caplin and Leahy, 2001; Kőszegi, 2003; Oster, Shoulson and Dorsey, 2013; Schwardmann, 2019). At $t = 0$, the individual experiences a level of anticipatory utility that depends on her information acquisition decision. At $t = 1$, the impact of Z materializes and the individual experiences *realized utility*. Table 1 illustrates the anticipatory and realized utilities incurred for the decision to acquire ($D = 1$) or avoid the information ($D = 0$) in each time period.[10]

At time $t = 0$, the individual decides whether or not to learn the true value of Z by maximizing her total expected utility, as given by the sum of her expected anticipatory utility and her realized utility. Consequently, she will choose to acquire information about the true Z if her total expected utility from doing so is higher than her total expected utility from maintaining belief π. Let Δ^{IA} denote the difference in total expected utilities between the case of information acquisition and information avoidance. Then, Δ^{IA} will be given

[9] A model extension to account for a positive cost of learning the true value of Z is straightforward. However, such an extension does not have implications for our analysis of the role of perceived control on the decision to acquire or avoid information about Z, as the cost itself is not a function of γ.

[10] In line with Bénabou and Tirole (2002), a key assumption we make is that individuals take the information acquisition decision without being aware of the possibility to forget the information once received.

Table 1 – Information acquisition and incurred utility.

Timeline:	$t = 0$	$t = 1$
Decision type:	Info acquisition and action a	
Incurred utility:	Anticipatory utility	Realized utility
$D = 1$	$U(a^*_Z, \gamma, Z)$	$U(a^*_Z, \gamma, Z)$
$D = 0$	$U(a^*_\pi, \gamma, \pi)$	$U(a^*_\pi, \gamma, Z)$

by:

$$\begin{aligned}\Delta^{\text{IA}} &= \Big(\mathbb{E}[U(a^*_Z, \gamma, Z)] - U(a^*_\pi, \gamma, \pi)\Big) + \Big(\mathbb{E}[U(a^*_Z, \gamma, Z)] - \mathbb{E}[U(a^*_\pi, \gamma, Z)]\Big) \\ &= \left(1 - \frac{\gamma^2}{2C}\mathbb{E}[Z]\right)\pi - \left(\mathbb{E}[Z] - \frac{\gamma^2}{2C}\mathbb{E}[Z^2]\right). \end{aligned} \tag{3}$$

Equation (3) is linear and increasing in the prior belief π.[11] Importantly, it shows that for individuals who hold pessimistic beliefs about the expected value of Z, such that $\pi \geq \mathbb{E}[Z]$, it is always optimal to acquire information.[12] In contrast, for individuals who are optimistic ($\pi < \mathbb{E}[Z]$) there exists an indifference point where the total expected utility of learning the true Z is equal to the total expected utility of remaining ignorant. Let π^{IA}_{ind} denote the indifference point in prior beliefs. Using Equation (3), π^{IA}_{ind} can be derived as:

$$\pi^{IA}_{ind} = \frac{\mathbb{E}[Z] - \frac{\gamma^2}{2C}\mathbb{E}[Z^2]}{1 - \frac{\gamma^2}{2C}\mathbb{E}[Z]}. \tag{4}$$

Hence, it follows that optimistic individuals with prior beliefs below the indifference point are better off by avoiding information. In contrast, individuals with prior beliefs above the indifference point are better off by acquiring in-

[11] The slope of the function is positive, with $(1 - \frac{\gamma^2}{2C}\mathbb{E}[Z]) \geq 0$, as $\frac{\gamma^2}{2C}\mathbb{E}[Z] \in [0, 1]$.

[12] Let $\pi = \mathbb{E}[Z] + \epsilon$, with $\epsilon \geq 0$. Then, $\Delta^{\text{IA}} = \frac{\gamma^2}{2C}(\mathbb{E}[Z^2] - \mathbb{E}^2[Z]) + \epsilon(1 - \frac{\gamma^2}{2C}\mathbb{E}[Z]) \geq 0$, as $\mathbb{E}[Z^2] - \mathbb{E}^2[Z] > 0$ by Jensen's inequality, and $1 - \frac{\gamma^2}{2C}\mathbb{E}[Z] > 0$ with $\frac{\gamma^2}{2C}\mathbb{E}[Z] \in [0, 1]$.

formation.[13]

The role of perceived control. Equation (4) illustrates that the indifference point π_{ind}^{IA} above which information acquisition is optimal depends on the individual level of perceived control γ. Thus, an exogenous shock to perceived control can affect the decision of whether or not to acquire information about Z. To assess the direction of this effect, we compute the first derivative of π_{ind}^{IA} with respect to γ:

$$\frac{\partial \pi_{ind}^{IA}}{\partial \gamma} = -\frac{\frac{\gamma}{C} SD[Z]^2}{\left(1 - \frac{\gamma^2}{2C}\mathbb{E}[Z]\right)^2} \leq 0, \tag{5}$$

where $SD[Z]$ is the standard deviation of Z. Equation (5) shows that the indifference point of prior beliefs above which information acquisition is optimal decreases as perceived control increases.

In a given population, where prior beliefs are distributed according to function f, an exogenous increase in perceived control will increase the share of individuals that prefer to acquire the information, defined as $s^{IA} = 1 - \int_0^{\pi_{ind}^{IA}} f(\pi)\, d\pi$. Thus, we formulate the following prediction:

Prediction 1 *All other things equal, an exogenous increase in perceived control increases the share of individuals that prefer to receive information in a given population.*

Empirically, the aggregate effect of perceived control on information acquisition in a given population will depend on the distribution of prior beliefs, that is, the relative share of optimists and pessimists. Additionally, the effect of perceived control will be lower when the cost of mitigation C is higher. Finally, the effect of perceived control depends on the first and second moments of the distribution of the true Z. This implies that an increase in perceived

[13] The sign of π_{ind}^{IA} is given by the sign of the intercept of the linear Equation (3). First, if $\mathbb{E}[Z] - \frac{\gamma^2}{2C}\mathbb{E}[Z^2] < 0$, then $\pi_{ind}^{IA} < 0$. In such a case, it follows that $\Delta^{\text{IA}} > 0$ for all individuals, no matter their prior beliefs. Second, if $\mathbb{E}[Z] - \frac{\gamma^2}{2C}\mathbb{E}[Z^2] > 0$, $\Delta^{\text{IA}} < 0, \forall \pi \in [0, \pi_{ind}^{IA})$ and $\Delta^{\text{IA}} > 0, \forall \pi > \pi_{ind}^{IA}$.

control is expected to have a larger effect on information acquisition in situations where the expected value of the true Z is larger or its standard deviation is higher.

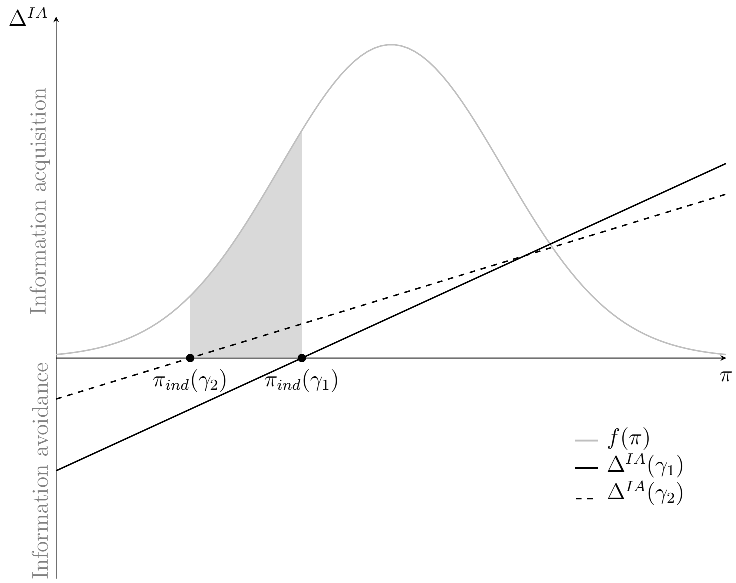

FIGURE 1 – INFORMATION ACQUISITION FOR DIFFERENT LEVELS OF PRIOR BELIEFS, BY LEVEL OF PERCEIVED CONTROL.

Notes: The figure illustrates the difference in total expected utility between the case of acquiring information or maintaining prior beliefs, following Equation 3. Two cases are presented. First, the black solid line depicts a case of low perceived control (γ_1). $\Delta^{\text{IA}}(\gamma_1)$ intersects the x-axis at the indifference point $\pi_{ind}(\gamma_1)$. Second, the dashed line depicts the case of high perceived control (γ_2). $\Delta^{\text{IA}}(\gamma_2)$ intersects the x-axis at the indifference point $\pi_{ind}(\gamma_2)$, which lies to the left of the indifference point in the case of low perceived control, *i.e.* $\pi_{ind}(\gamma_2) < \pi_{ind}(\gamma_2)$, where $\gamma_2 > \gamma_1$. The bell-shape curve depicts the distribution of prior beliefs in the population, following function $f(\pi)$. As perceived control increases from γ_1 to γ_2, a larger share of the population (illustrated by the gray area) will be better off by learning the true value of Z rather than avoiding it.

Figure 1 illustrates the relationship between prior beliefs π and the expected utility gain or loss from acquiring information Δ^{IA}, for two different levels of perceived control, with $\gamma_2 > \gamma_1$. In both cases, Δ^{IA} is linear and increasing in the prior belief π. When γ increases, the slope of Δ^{IA} decreases, and the indifference point represented by the intersection of Δ^{IA} with the x-axis shifts to the left. This illustrates that information avoidance is no longer optimal for individuals with a progressively lower (more optimistic) prior. The bell-shaped curve depicts a distribution of prior beliefs in the population. As perceived control increases and the indifference point moves to the left, an additional share of optimists (illustrated by the gray area under the curve) experience a positive Δ^{IA} and consequently prefer to receive the information.

B. Information Recall

Next, we consider the scenario where the individual receives information about the true level of Z, regardless of her own choices. The individual can now choose whether to recall the information. We assume that an individual who recalls the true level of Z will implement the corresponding optimal action a^*_Z. In contrast, if the individual does not recall the true Z, she reverts to her prior belief π and implements the corresponding action a^*_π. We assume that self-deception is costly such that utility decreases by $K > 0$ when the true value of Z is forgotten.

Let $R \in \{0; 1\}$ be the decision to recall ($R = 1$) or not recall ($R = 0$) the true level Z. We assume that the act of recalling or not takes place at time $t = 0$, while realized utility is incurred at $t = 1$. Table 2 illustrates the anticipatory and realized utilities experienced in each of the two situations. In contrast to the case of deciding between information acquisition and avoidance presented in Section I.A, here, the individual compares actual utility values instead of expected ones. The total utility difference between recalling or not is denoted by Δ^{IR}, and is given by:

$$\begin{aligned}\Delta^{\text{IR}} &= \Big[U(a^*_Z, \gamma, Z) - U(a^*_\pi, \gamma, \pi)\Big] + \Big[U(a^*_Z, \gamma, Z) - U(a^*_\pi, \gamma, Z)]\Big] + K \\ &= \left(1 - \tfrac{\gamma^2}{2C} Z\right)\pi - \left(Z - \tfrac{\gamma^2}{2C} Z^2 - K\right). \end{aligned} \tag{6}$$

Equation (6) is linear and increasing in the prior belief π. Hence, for a given Z, there is a unique point π^{IR}_{ind} at which the individual is indifferent between recalling and not recalling the information:

$$\pi^{IR}_{ind} = \frac{Z - \frac{\gamma^2}{2C} Z^2 - K}{1 - \frac{\gamma^2}{2C} Z}. \tag{7}$$

Individuals with prior beliefs below the indifference point π^{IR}_{ind} are better off not

Table 2 – Information recall and incurred utility.

Timeline:	$t = 0$	$t = 1$
Decision type:	Info recall and action a	
Incurred utility:	Anticipatory utility	Realized utility
$R = 1$	$U(a^*_Z, \gamma, Z)$	$U(a^*_Z, \gamma, Z)$
$R = 0$	$U(a^*_\pi, \gamma, \pi) - K$	$U(a^*_\pi, \gamma, Z)$

recalling the true Z and maintaining their belief π, as $\Delta^{\text{IR}} < 0, \quad \forall \pi < \pi^{IR}_{ind}$. In contrast, individuals with prior beliefs above the indifference point π^{IR}_{ind} are better off recalling the true Z, as $\Delta^{\text{IR}} > 0, \quad \forall \pi > \pi^{IR}_{ind}$. Importantly, recalling the information is the optimal strategy for all individuals with pessimistic prior beliefs, *i.e.*, $\Delta^{\text{IR}} > 0$ for all $\pi \geq Z$.

The role of perceived control. Increasing perceived control affects the position of the indifference point π^{IR}_{ind} and thereby the share of individuals that get more utility from recalling the true Z as opposed to not recalling it. The first derivative with respect to γ is given by:

$$\frac{\partial \pi^{IR}_{ind}}{\partial \gamma} = \frac{-\frac{\gamma}{C} Z K}{\left(1 - \frac{\gamma^2}{2C} Z\right)^2} \leq 0. \tag{8}$$

Equation (8) shows that an increase in perceived control decreases the indifference point above which recalling the true Z is optimal. For a given population, it follows that an exogenous increase in perceived control will increase the share of individuals that are better off by recalling the information, defined as $s^{IR} = 1 - \int_0^{\pi^{IR}_{ind}} f(\pi)\, d\pi$. We formulate the following prediction:

Prediction 2 *All other things equal, an exogenous increase in perceived control increases the share of individuals that recall the information in a given population.*

Empirically, the effect in the aggregate sample is expected to be population-specific. In line with Equation (8), we expect the effect to depend on the baseline level of perceived control of each individual, the magnitude of the negative event, the cost of implementing the mitigating action, as well as the cost of self-deception.

II. Materials and Methods

A. Experimental Design

To empirically investigate the role of perceived control for the decisions to acquire and recall distressing information, we present a large-scale online experiment in the context of information about the impact of air pollution on life expectancy.

Treatment. The treatment is designed to increase the perceived control over the adverse health effect of air pollution exposure. After all participants were provided with detailed information on air pollution, participants in the treatment group additionally received information about private measures to protect oneself against air pollution, see Figure 2. The treatment was randomized on the individual level. To ensure that participants engaged with the information, they were asked to provide a short summary of these protective measures and were only allowed to proceed in the experiment after correctly answering a comprehension question. Participants in the control did not receive any information about these protective measures.[14] To test whether the treatment successfully increased perceived control, we measured participants' perceived control both via the general perceived control questionnaire (Pearlin and Schooler, 1978) adapted to the context of air pollution, and via the one-item measure by Trope, Gervey and Bolger (2003). Both measures were elicited at the end of the experiment.

Information structure. At the core of the experiment, participants were given the opportunity to receive information about the average life expectancy

[14] To investigate whether an increase in perceived control reduces strategic ignorance, participant in the control group were not shown any information. This decision was made to avoid potential confounding effects that arise from exposing the control group to other (even irrelevant) information.

Figure 2 – Treatment: protection measures against air pollution.

Notes: This image displays the information presented to participants in the treatment group. The selection of protective measures follows Carlsten et al. (2020).

loss due to constant exposure to the level of air pollution in their home district. Figure 3 illustrates an example this additional information page for a participant from the Kolkata district in the state of West Bengal. Those who received the information were informed about how the level of air pollution in the participant's respective home district compares to the WHO recommendation and how the exposure translates into an average life expectancy loss.[15]

We chose to communicate the information about the aggregate health risk in the form of a loss of life expectancy for two main reasons. First, air pollution tends to be communicated in terms of the concentration of pollutants in the air which – assuming a layperson's understanding – is not quantifiable into the associated health risk in a straightforward manner. In contrast, a conversion to the expected loss of life expectancy provides a tangible interpretation. Second, the information regarding a loss of life expectancy is not only highly relevant

[15]The information is based on population-weighted yearly average $PM_{2.5}$ estimates in the raster data by Hammer et al. (2020). We then follow Ebenstein et al. (2017) for a conversion to a loss in life expectancy.

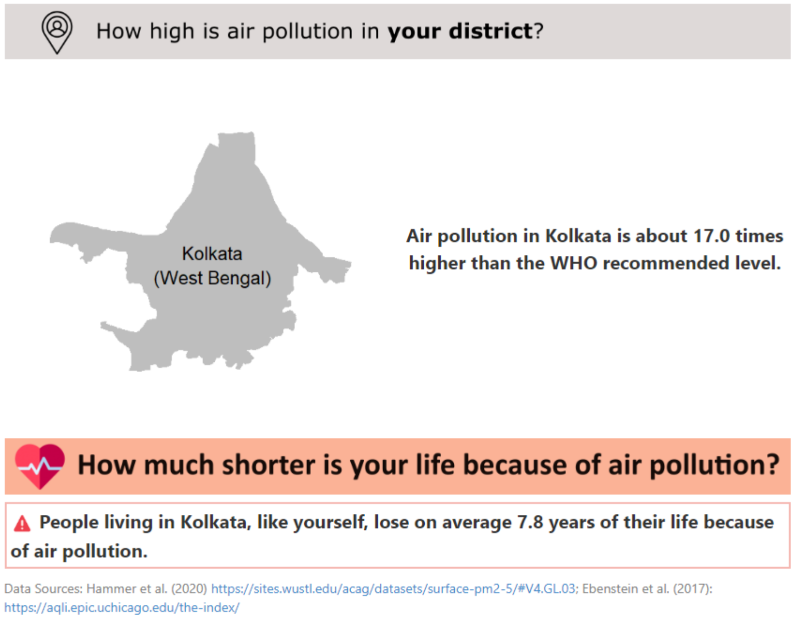

Figure 3 – Example of personalized information screen.

Notes: The figure illustrates an example of an information page that was displayed to experiment participants from the Kolkata district in West Bengal (India). The image shows the outline of the map of participant's home district (in gray). The text includes a comparison of air pollution levels in the participant's home district with the WHO recommendation, as well as information about the associated average loss of life expectancy.

but also notably distressing. That is, although information about a loss of life expectancy can serve as a compelling motivation for behavioral change, it may also trigger emotional discomfort and lead to information avoidance or a failure to recall the information. Customizing the information to the participant's home district aims to further increase relevance.

Information avoidance. To measure information avoidance, participants were asked to indicate whether they would prefer to receive information about the average loss of life expectancy in their home district due to air pollution (as described above and illustrated in Figure 3) or not. Following a similar approach to the one of Saccardo and Serra-Garcia (2023), participants were informed that their choice would be implemented with a 60% chance. This feature of the design ensures that the information was also shown to a share of participants that indicated a preference not to receive it. Thereby, we prevent self-selection issues that could arise from the fact that the choice of acquiring information is endogenous.

Information recall. To measure information recall, we asked participants who received the information about the average loss of life expectancy in their home district to recall the information. The recall task was incentivized by rewarding participants for perfectly recalling the number of life years lost (to the first decimal place) with 40 Indian Rupees (INR), *i.e.*, about USD 0.50. Recall within an error margin of ± 0.5 years was rewarded with INR 20. If participants were off by more than 0.5 years, they did not receive any reward. Between the information acquisition and the information recall tasks, participants worked on a real effort task for two minutes. The effort task was set as an incentivized coin counting exercise in which participants earned a fixed piece-rate of INR 2 for correctly counting the number of coins in a randomly generated image. The short delay generated by the task provided participants with an opportunity to strategically forget or misremember the information about the average loss of life expectancy due to air pollution in their home district if they wished to do so. Participants who did not receive the information also undertook the coin counting task.

B. Procedures

An overview of the experimental procedure is displayed in Table 3, for detailed instructions see Appendix D. After obtaining participants' informed consent, the online experiment started with an entry questionnaire on demographics, including age, gender, self-reported income, household size, education level as well as the district of residence. The participant's residence is particularly important for personalizing the information on the average loss of life expectancy later in the experiment.

Afterwards, all participants received general information on air pollution, including a list of main sources, associated illnesses, how air pollution is measured, the WHO recommendation of $5\mu g/m^3$ $PM_{2.5}$, how excessive exposure can generally be converted into an average loss of life expectancy, and that

Table 3 – Experimental procedure.

	Step	Control	Treatment
1.	Entry questionnaire	X	X
2.	General information on air pollution	X	X
3.	Belief elicitation (prior on air quality and worry about air pollution)	X	X
4.	Treatment		X
5.	Information acquisition decision	X	X
6.	Information on loss of life expectancy (cond. on randomization and 5.)	X	X
7.	Real effort task	X	X
8.	Information recall (cond. on 6.)	X	X
9.	Perceived control questionnaire	X	X
10.	Item recognition task	X	X

Notes: The table describes the experimental procedure in chronological order. The information acquisition decision in step 5 was implemented with a 60% probability.

there are approximately 1.7 million pre-mature deaths per year due to air pollution in India, as estimated by Pandey et al. (2021). To encourage attention, participants were asked to answer comprehension questions throughout. Moreover, we elicited their prior belief about air quality in their home district (on a scale from 1 – "best air quality" to 10 – "worst air quality") as well as how worried they are about air pollution in general (on a scale from 1 – "not worried at all" to 7 – "very worried").

Next, we introduced the treatment variation (as outlined above) to increase perceived control and elicited participants' preference to receive information about the loss in life expectancy due to air pollution. Participants who received the information were then tasked to recall it after undertaking an incentivized real effort coin-counting task for two minutes. Participants who did not receive the information moved straight to the coin-counting task. At the end of the study, we measure participants' perceived control over the health impacts of air pollution (see above) as well as their general memorization ability. The latter was measured using an incentivized item recognition task: Participants were instructed to memorize 30 items that were each displayed for one second. Their memory ability was then tested by showing 15 items and asking the participant whether each of them was part of the previous list. Of those 15 items, eight were previously shown while seven were not. For each correct answer, participants received a reward of INR 5. After the experiment concluded, participants in the control group who received the personalized information on the expected loss of life expectancy additionally saw a research disclaimer that included the list of private protection measures, see the instructions in Appendix D.

III. Data

The experiment was implemented with Dynata, a survey company commonly used for economic research (Stantcheva, 2022). Completion was rewarded by the survey company in the form of panel points that can be redeemed in various forms, including cash payments. In addition, participants received an average bonus incentive payment (the sum of earnings in the incentivized recall task, the effort task, and the item recognition task) of just under INR 75 (about USD 0.90).[16] Exclusion criteria that either prevented participants from completing the experiment or excludes them from the analysis were pre-registered.[17] The experiment was programmed in nodeGame (Balietti, 2017) and conducted in English in November 2022.

A total of 2,357 participants completed the experiment of which 2,031 observations are retained after applying exclusion criteria, see Table 4 for participant characteristics.[18] The sample is typical for online recruitment in developing countries (Dechezleprêtre et al., 2022). Participants are, on average, rather young (34 years old), predominantly male (66%), live in urban areas (89%), are rather rich (median household income between the 80$^{\text{th}}$ and

[16] Upon completing the experiment, participants were informed that they would be invited for another experiment two weeks later. Information on the purpose of the follow-up experiment was not provided. For details on the follow-up experiment, see Appendix C.

[17] We took several steps to ensure good data quality that we applied to the Indian and US sample: First, we included a question designed to detect straight-lining, *i.e.*, choosing the same response option multiple times in a row. Second, we check for consistency with respect to the participant's reported age by including a question with a free numerical input as well as a question with pre-defined age bins. Third, we exclude participants that give unambiguously automated or otherwise entirely nonsensical responses to the free text input feedback questions. Fourth, participants were excluded if they needed more than five attempts to correctly answer any of the comprehension questions during the general information on air pollution. And lastly, we excluded participants that completed the full experiment in less than five minutes. For the pre-analysis plan, see AEARCTR-0010083.

[18] 2,645 participants were initially recruited, *i.e.*, we observe an attrition rate of just over 10%.

Table 4 – Summary statistics of participant characteristics.

	Mean	Median	SD	Min	Max
Age	34.13	32.00	11.03	18	80.0
Female	0.34	0.00	0.47	0	1.0
Household size	4.34	4.00	2.01	1	63.0
Urban	0.89	1.00	0.31	0	1.0
Income group	7.97	9.00	2.63	2	10.0
High school degree	0.10	0.00	0.30	0	1.0
College degree	0.50	1.00	0.50	0	1.0
Masters degree or higher	0.40	0.00	0.49	0	1.0
Average number of life years lost in home county	5.85	4.50	2.69	1	11.8
Prior belief about air quality	4.94	5.00	2.51	1	10.0
Confidence in prior	4.13	4.00	0.78	1	5.0
Worried about air pollution	5.63	6.00	1.52	1	7.0

Notes: The table shows summary statistics of pre-treatment characteristics for a total sample of $N = 2,031$ participants from India after data cleaning according to the pre-registered exclusion criteria. The calculation of average number of life years lost follows (Ebenstein et al., 2017) and is based on the annual average population-weighted $PM_{2.5}$ concentration in the participant's district of residence (Hammer et al., 2020). For balance tests between control and treatment group, see Appendix Table A-1.

90^{th} percentile of the national distribution), and well educated (40% with a Masters degree or higher). The average loss of life expectancy in our sample is about 6 years (with values ranging between 1 and 12 years). When asked to rate the air quality in their district, the average response rate is a value of 4.9 on the 10 point Likert scale. Moreover, participants are rather worried about air pollution (average of 5.6 on the 7 point Likert scale).

IV. Aggregate Results

A. Perceived Control

Before presenting the results on information avoidance and recall, we examine whether the treatment (*i.e.*, providing participants with information on private protection measures) successfully increases participants' perceived control over the negative health effects of air pollution exposure. As detailed in Section II.A, we collected two measures of perceived control: a seven-item questionnaire adapted from Pearlin and Schooler (1978) to the context of air pollution as well as a one-item measure adapted from Trope, Gervey and Bolger (2003). Both measures are standardized following Kling, Liebman and

Katz (2007) such that the seven-item questionnaire is interpreted as an index. Figure 4 plots the distribution of the standardized index of perceived control for participants in the control (in light gray) and treatment group (in dark gray). The distribution in the treatment group is shifted to the right, indicating that the treatment successfully increases perceived control.

We substantiate the descriptive result by analysing statistical differences between treatment and control group on the two standardized measures of perceived control. We find that the treatment significantly increases perceived control in the index by 0.19 standard deviations ($p < 0.001$ in a Mann-Whitney U two-sample test, hereafter MW test, combined N=2,031) and in the one-item measure by 0.18 standard deviations ($p < 0.001$ in a MW test, combined N=2,031). Results on both measures of perceived control are supported by regression analyses in which we control for the actual average life years lost due to air pollution in the participant's home district, the prior belief about air quality, the confidence in this prior belief, and state fixed effects, see Appendix Table A-2. Note that the two measures of perceived control were elicited at the end of the study and may be impacted by participants' experience within the experiment. Hence, the results above should only be regarded as general evidence that the experimental variation achieved a shift in perceived control in the intended direction.

B. Information Avoidance

Our first main outcome of interest is participants' preference to receive information about the loss of life expectancy due to air pollution in their home district. Panel A in Figure 5 displays the shares of participants who prefer to receive (in light grey) or avoid (in dark gray) the information. In the control group, 7.9% of participants indicate that they prefer not to receive the information. The share is comparable to studies on the willingness to acquire health related information, such as getting tested for contagious medical conditions (*e.g.*, Sullivan et al., 2004; Ganguly and Tasoff, 2017).

In the treatment group, the proportion of participants who prefer to avoid the information is 8.2%, which is lower than in the control group but not sta-

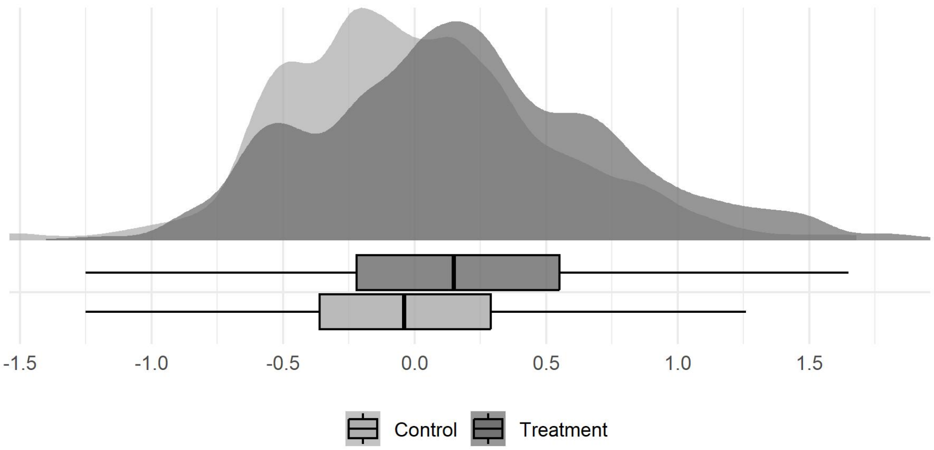

FIGURE 4 – DISTRIBUTION OF THE PERCEIVED CONTROL INDEX.

Notes: The figure presents the kernel densities of the distributions of perceived control, as measured by the standardized index of participants' answers to the 7-item questionnaire, adapted from Pearlin and Schooler (1978) to the context of air pollution. Two distributions are presented: light gray corresponds to responses in the control group and dark gray corresponds to responses in the treatment group. Perceived control was elicited after the main outcomes of interest, see Table 3 for the experimental procedure.

tistically different (Fischer exact test: $p = 0.807$, combined N=2,031). We find consistent results using both linear probability models and logistic regressions where we additionally control for the prior belief about the severity of air pollution and the confidence in this prior belief, see Appendix Table A-3.

Result 1 *We find no evidence that the treatment significantly increases the share of participants who prefer to receive the information, in the aggregate.*

C. Information Recall

To investigate the causal effect of the treatment on information recall, we now only consider participants that were randomized into receiving the information. Our primary measure of information recall is the share of participants who are able to recall the correct average loss in life expectancy in their home district within a ±0.5 year error margin. Panel B in Figure 5 shows the share of participants in each group that recalls the average loss of life expectancy in their home district (light gray bars) and the share of participants that does not (dark gray bars). We find that 26.5% of participants do not recall the

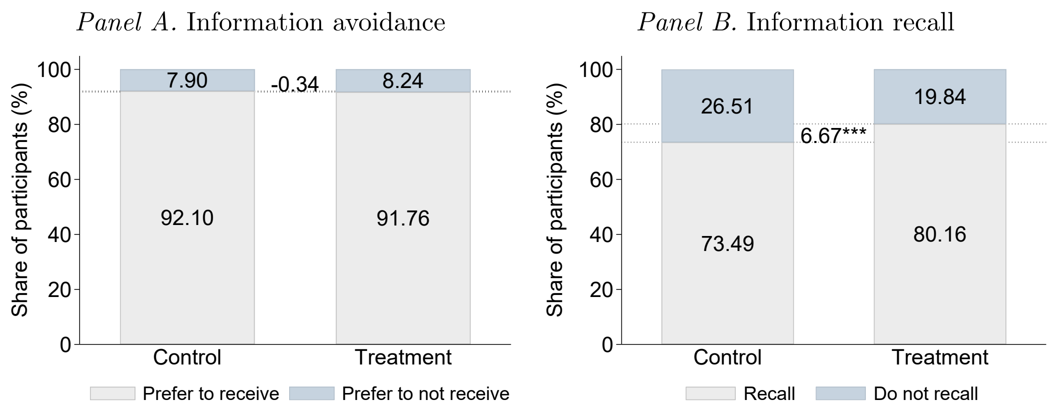

Figure 5 – Information avoidance and recall.

Notes: The figure plots the share of participants that prefer to receive and avoid the information (Panel A) and the share of participants that recall and do not recall the information (Panel B) in control and treatment groups (Indian sample).

information in the control group compared to 19.8% in the treatment group. The treatment thereby induces a decrease in the proportion of participants who do not recall the information by more than 25% (Fisher exact test: $p = 0.007$, combined N=1,196).

To probe these results further, we estimate the treatment effect on three measures of information recall, conditional on participants' preference to receive information, their prior belief about the air quality in the home district, their confidence in the prior belief, and their general memory ability, see Table 5. Beyond the binary measure of information recall described above (column 1), we analyze treatment effects on the recall error (column 2), and the absolute recall error (column 3). We define the recall error as the difference between participant's recall and the actual number of years of life lost, *i.e.*, how far off participants' recall is from the information they received. We find that the treatment increases the likelihood to recall the information by 6.8 percentage points ($p = 0.007$). The effect corresponds to a significant reduction in the absolute recall error by about 0.22 years ($p = 0.020$; column 3), the equivalent of a 21.6% reduction compared to the control group average. The treatment effect on the recall error is negative but not statistically significant

Table 5 – Estimated effects on information recall.

	Recall (1)	Recall error (2)	Abs. recall error (3)
Treatment	0.068***	-0.121	-0.224**
	(0.025)	(0.110)	(0.096)
Prior belief about air quality	0.019***	-0.092***	-0.077***
	(0.006)	(0.031)	(0.028)
Confidence in prior belief	0.001	0.084	-0.050
	(0.019)	(0.095)	(0.082)
Performance memory task	0.619***	-0.817	-2.355***
	(0.100)	(0.701)	(0.539)
Prefer to avoid	-0.136**	0.282	0.627*
	(0.067)	(0.372)	(0.336)
Observations	1,196	1,196	1,196
Control mean	0.73	0.16	1.02

Notes: This table presents the estimated average treatment effect on information recall in the Indian sample. Each column corresponds to a different outcome variable. The recall error is defined as the difference between participant's answer in the incentivized task asking them to recall the number and the corresponding correct value. The absolute recall error is the absolute value of that difference. All models control for participant's prior belief about air quality in her home district, confidence in the prior belief, performance in the visual memory task, and the preference to avoid information. Standard errors are clustered at the district level and reported in parentheses. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

($p = 0.272$, column 2), suggesting that although a lower level of perceived control makes recall of information less precise, it is not significantly biased in a particular direction.

Result 2 *The treatment significantly increases the share of participants that recall the information, in the aggregate.*

The regression analysis in Table 5 further indicates that the recall rate (and the associated recall error) is positively (negatively) associated with the performance in the memory task: as intuitively expected, those with a better general memory are also better at recalling the information on the average loss of life expectancy ($p < 0.001$).[19] In addition, we find a positive correlation between the recall rate and participants' prior belief about the air quality in their home district ($p = 0.001$),[20] which is in line with the theoretical

[19] We investigate participants' performance in the coin counting task and find no significant treatment effects (see Appendix B for details), suggesting that the treatment does not affect participants' general cognitive ability.

[20] Note that prior beliefs are coded such that lower values correspond to more optimistic beliefs about the experienced air quality.

framework outlined in Section I. Section V explores this relationship further by investigating whether the treatment interacts with participants' prior beliefs to affect information avoidance and recall.[21] Finally, we find that recalling the distressing information is negatively correlated with participants' preference to avoid receiving it in the first place. We come back to this result in Section D.

D. Complementarity and Substitutability

In the related literature on information ignorance, information avoidance and recall are generally studied separately. That is, the two strategies are regarded as complements: not recalling is treated as a last resort when distressful information cannot be avoided. The experimental procedure in this paper, which randomizes who receives the information, allows us to study the two strategies jointly. First, we can test whether the information is more likely to be forgotten among those that expressed a preference to avoid it, which would suggest complementarity. Second, we can examine whether not recalling is also common among those that prefer to receive the information, which would suggest substitutability.

To address this question, we estimate a model in which the treatment is interacted with an indicator variable equal to 1 if the participant prefers not to receive the information, and 0 otherwise. Table 6 presents the estimated coefficients for the three measures of information retention defined in Section IV.C. The results suggest that avoiding and not recalling information work both as complements and substitutes. First, we find that in the control group, participants who prefer to avoid the information are about 20 percentage points less likely to recall the information than those who prefer to receive it, see column 1. This is the complementary effect: when participants prefer to avoid

[21]With the intent of investigating the effect of the treatment on perceived control and information recall over time, we invited participants that received the information on the average life expectancy loss during the experiment to come back after two weeks (as per the pre-registration plan). However, participation in this follow-up study appears conditional on the main variables of interest from the first experiment. This prevents us from providing unbiased tests of the treatment effect over time. We provide details on the design of this follow-up, recruitment procedure, and estimated treatment effects on the main outcomes in Appendix C.

Table 6 – Estimated effects on information recall by preference to receive or to avoid information.

	Recall (1)	Recall error (2)	Abs. recall error (3)
Treatment	0.061**	-0.079	-0.202**
	(0.025)	(0.115)	(0.098)
Prefer to avoid	-0.196**	0.658	0.824*
	(0.089)	(0.632)	(0.493)
Treatment × Prefer to avoid	0.125	-0.788	-0.413
	(0.112)	(0.862)	(0.674)
Observations	1,196	1,196	1,196
Control mean, prefer to receive	0.75	0.11	0.97

Notes: The table presents the estimated coefficients in the Indian sample from regression models where the treatment dummy is interacted with an indicator variable equal to 1 if the participant states to prefer not receiving the information about the average loss of life expectancy in their home district, and 0 otherwise. Each column corresponds to a different outcome variable. The recall error is defined as the difference between participant's answer in the incentivized task asking them to recall the number and the corresponding correct value. The absolute recall error is the absolute value of that difference. All models control for the participant's prior belief about air quality in her home district, confidence in the prior belief, and performance in the visual memory task. Standard errors are clustered at the district level and reported in parentheses. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

information but are not able to, they are less likely to recall it. Second, among participants who express a preference for receiving the information in the control group, only 75% of them are able to recall it. Still, the treatment significantly increases the rate of recall for this subgroup. This indicates that the 25% rate of unsuccessful recall among participants who initially want to receive the information in the control group is not solely due to cognitive limitations but at least partly explained by motivated reasoning. The result suggests that information avoidance and a lack of recall can also be substitutes.

V. Heterogeneity by Prior Beliefs

The theoretical framework in Section I suggests that the aggregate effects of an increase in perceived control on information acquisition and recall will depend on the composition of prior beliefs in the sample. Namely, the model implies that perceived control should particularly impact the decisions of optimistic participants. In contrast, perceived control should not affect the decisions of pessimistic participants for whom acquiring and recalling the information is always optimal. In this section, we evaluate whether these predictions align with what is observed in the experiment.

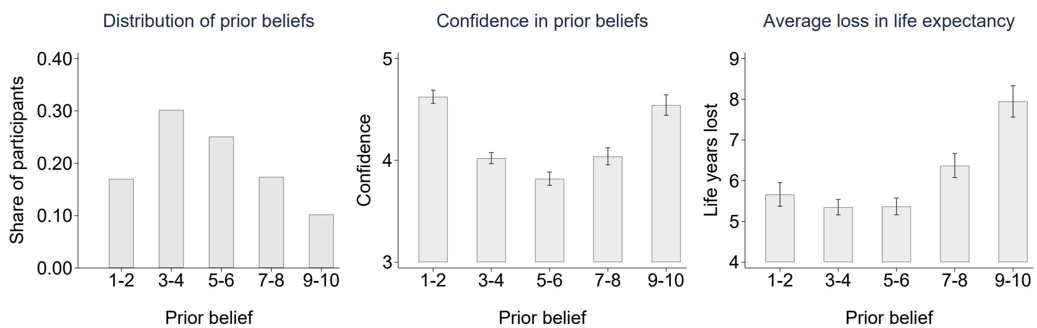

FIGURE 6 – PRIOR BELIEFS, AVERAGE CONFIDENCE, AND ACTUAL AVERAGE LOSS OF LIFE EXPECTANCY.

Notes: The figure presents the distribution of prior beliefs (left panel), the average confidence by prior belief (middle panel), and the associated average loss of life expectancy by prior belief (right panel) in the Indian sample. Prior beliefs are re-scaled to a 5 point from a 10 point scale from 1 – "best air quality" to 10 – "worst air quality". Whiskers indicate ±1 confidence interval.

Figure 6 gives an overview of participants' prior beliefs and their strength, contrasted to the actual loss of life expectancy.[22] The left panel captures the distribution of prior beliefs and documents substantial variation therein. About 18% of participants believe that the air quality in their respective district is very good (a prior of 1 or 2), while only about 10% believe it to be particularly bad (a prior of 9 or 10). Interestingly, the average confidence with which participants state their prior belief follows a U-shape, see the middle panel. While all participants appear to be generally confident in their prior belief (the lowest average is around 4 on a 5 point Likert scale), participants with more neutral priors are less confident than those who are optimistic or pessimistic.

The right panel of Figure 6 captures the average loss of life expectancy by prior belief, with two noticeable patterns in the data. First, priors seem fairly aligned with reality overall: Participants with more optimistic priors

[22]Recall that prior beliefs were elicited at the beginning of the experiment as a qualitative response about the air quality in the participant's home district, from 1 – "best air quality" to 10 – "worst air quality". To retain statistical power, we transform this measure into a variable with five categories, effectively grouping value pairs from the original scale.

generally live in districts with a lower average loss of life expectancy than participants with more pessimistic priors. However, the actual levels of air quality are strikingly similar for participants with prior beliefs between 1 and 6. Participants who believe that they are experiencing excellent air quality (a prior of 1 or 2) are considerably more optimistic than participants with more neutral priors (a prior of 3 to 6) although the respective losses of life expectancy are comparable.

To study heterogeneous treatment effects on information acquisition and recall, we estimate linear probability models where the treatment indicator is interacted with participants' prior beliefs. Figure 7 illustrates the estimated marginal treatment effects. Additionally, we print the respective average rate of information acquisition and successful recall rates in the control group. We find that the treatment significantly increases information acquisition for particularly optimistic participants (a prior of 1 or 2) by about six percentage points ($p = 0.024$). In contrast, for all other beliefs, *i.e.*, rather neutral or pessimistic priors, we observe no significant treatment effect. Moreover, we document no difference between optimistic and pessimistic participants with respect to information acquisition in the control group.

In the two right panels of Figure 7, we study treatment heterogeneity by prior beliefs on information recall. In the control group, a striking pattern is observed: participants with optimistic priors are less likely to recall the information on the loss of life expectancy than any other subgroup. Only 45% of participants with a very optimistic prior are able to recall the information, compared to 73.5% in the control group average and up to 82% among participants with more pessimistic priors. These results are consistent with findings from the related literature that suggest that a lack of recall occurs especially when the information contradicts prior beliefs (Budescu and Fischer, 2001; Bénabou, 2013; Oster, Shoulson and Dorsey, 2013). In addition, we find that the treatment is particularly effective for participants with optimistic priors. For this subgroup, information recall increases by about 15 percentage points ($p = 0.042$). In line with our theoretical predictions, optimistic individuals appear to be driving the positive treatment effect on information recall observed

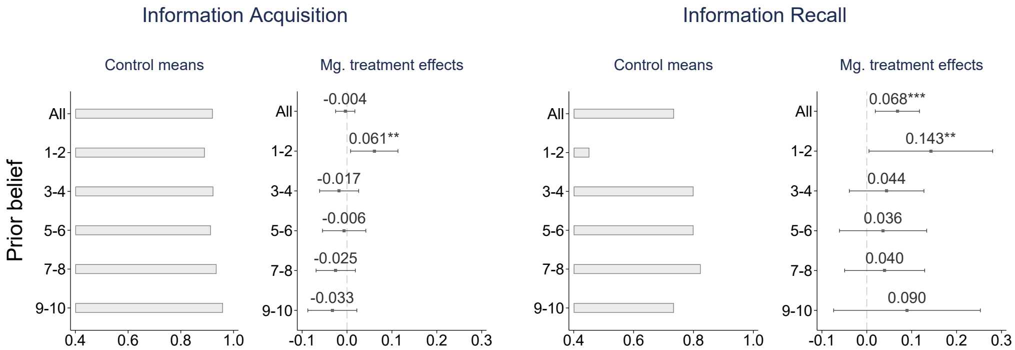

FIGURE 7 – CONTROL GROUP MEANS AND TREATMENT EFFECTS ON INFORMATION ACQUISITION AND INFORMATION RECALL BY PRIOR BELIEF.

Notes: The figure presents the control group means and marginal treatment effects on information acquisition and information recall in the Indian sample. The control mean for information recall refers to the share of participants in the control group that are able to recall the information within a ± 0.5 years error margin. The marginal treatment effects are based on an interaction between the treatment dummy and the participants' prior beliefs about the air quality in their district of residence. All models control for the participants' confidence in the prior belief and their performance in the item recognition task. The information recall models additionally control for participants' preference to receive information. Standard errors are clustered at the district level. For an illustration of results on the recall error and the absolute recall error, see Appendix Figure A-1. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

in the aggregate sample.

In summary, the analysis highlights heterogeneity in treatment effects by prior beliefs on both information acquisition and recall. We find that increasing perceived control significantly impacts the shares of participants that prefer to receive and recall the information about the average loss of life expectancy due to air pollution, among those that are particularly optimistic. These results are aligned with the insights of the theoretical model presented in Section I, whereby increasing perceived control positively affects information acquisition and recall among optimistic individuals, while having no effect on decisions taken by pessimistic individuals.

Result 3 *Among optimistic participants, the treatment significantly increases the share of participants that prefer to receive the information.*

Result 4 *Among optimistic participants, the treatment significantly increases the share of participants that recall the information.*

VI. Lowering the Threat? Evidence From the USA

The results presented so far show that increasing perceived control can be an effective strategy to reduce strategic ignorance, mostly among optimistic participants from India. The experiment was purposefully implemented in a setting where there is an ongoing air pollution crisis with severe health consequences. Thus, information on the health risks of air pollution is expected to be particularly prone to being dismissed while this decision can be especially sensitive to perceived control. Indeed, the theoretical framework presented in Section I suggests that the impact of increasing perceived control on information avoidance and recall will depend on the expected and observed pollution level, respectively. This raises the question whether and to what extent an increase in perceived control can be an effective tool to reduce information ignorance in a setting where the threat is considerably lower.

To answer this question, we implemented the same experiment with a sample from the USA, where the air pollution level is significantly lower than in India but still imposes substantial health risks in terms of mortality and morbidity (Deryugina et al., 2019). For the experiment with the US sample, the exclusion criteria were identical and the experimental procedure similar to the experiment with the Indian sample, as described in Section II.[23] We recruited 2,518 participants via Amazon Mechanical Turk of which 2,340 completed the experiment. We retain 2,264 observations after applying the exclusion criteria. We primarily sampled participants from states with the highest average air pollution, including California, Illinois, Missouri, Mississippi, Tennessee, Iowa, Nebraska, Kansas, Louisiana, Alabama, Georgia, and Arkansas. The

[23]The following was adjusted for the experiment in the US. First, we referred to the participant's home county instead of district. Second, we introduced a slight variation in the leaflet used for the treatment with the US sample. As the choice of cooking and heating fuels in developed countries is less of a health concern than in developing countries, we substituted the action "use clean cooking and heating fuels" under the "at home" category as shown in Figure 2 with the action "avoid smoke from open fires and waste burning". Participants in the US received a fixed reward of USD 3.00 for completing the experiment. Together with the variable incentives (USD 0.50 for a perfect recall of the information, USD 0.20 for recalling the information within a ± 0.5 year error margin, USD 0.02 for each correctly solved exercise in the effort task, and USD 0.05 for each correct response in the item recognition task), participants earned an average of USD 3.85.

average loss of life expectancy in the US sample was about 0.5 years (with values ranging between 0.1 and 1.5 years), which is substantially lower than the average loss of life expectancy in the Indian sample. Information on the expected average loss of life expectancy was provided at the county level.[24]

As in the Indian sample, our treatment manipulation successfully increased perceived control in the US sample by around 0.50 standard deviations for the index,[25] and by 0.53 standard deviations for the one-item measure. For both measures, the effect is significant with $p < 0.001$ in a MW test. Around 16.5% of participants prefer to not receive the information about the average life expectancy loss in the control group which increases to 17.7% in the treatment group, but the difference is not statistically significant ($p = 0.469$ in a Fisher exact test, combined N=2,264). Among participants who received the information, about 16.7% cannot recall the life expectancy loss within a ± 0.5 year error margin. The share of unsuccessful recall is 15.3% in the treatment group, again not statistically different than the control ($p = 0.545$ in a Fisher exact test, combined N=1,298), see Appendix Figure A-3 for an illustration.

We repeat the heterogeneity analysis of the treatment effect on information avoidance and recall with respect to participants' prior beliefs about air quality in their home county. Figure 8 displays a similar pattern to the one observed in the Indian sample. About 10% of the US participants are very optimistic (a prior belief of 1 or 2 on the 10 point Likert scale); a prior of 3 or 4 is the modal response, and confidence follows a U-shape in which participants with a more neutral belief are significantly less confident than those who believe to experience very good or very bad air quality. As in the Indian sample, participants with an optimistic prior (a prior of 1 or 2) do not reside in counties with lower average losses in life expectancy due to air pollution than participants with more neutral beliefs (a prior of 3 or 6).

Figure 9 shows the effect of the treatment by prior beliefs on information acquisition (left panel) and information recall (right panel) in the US sample. We find no significant treatment effect on information acquisition, irrespective

[24] For sample characteristics (incl. balance tests), see Table A-4.

[25] For an illustration, see Figure A-2.

Figure 8 – Prior beliefs, average confidence, and actual average loss of life expectancy (US sample).

Notes: The figure presents the distribution of prior beliefs in the US sample (left panel), the average confidence by prior belief (middle panel), and the associated average loss of life expectancy by prior belief (right panel). Prior beliefs are re-scaled from a 10 point to a 5 point scale. Whiskers indicate ±1 confidence interval.

of prior beliefs. In contrast, we replicate our previous finding that the treatment significantly improves information recall for the most optimistic participants. As in the Indian sample, participants with optimistic priors are the least likely to recall the information in the control group. For this subgroup, the treatment increases the share of participants who recall the information by almost 18 percentage points ($p = 0.029$). In comparison, the treatment has no effect on recall in any other subgroup.

These findings have two important implications. First, the pattern observed in the US sample is largely consistent – although weaker – with the Indian sample, indicating the robustness of the result. Second, we find evidence that increasing perceived control can be an effective tool to improve recall among those individuals who are the most likely to forget, even in contexts where the threat is less extreme.

VII. Conclusion

This paper studies whether an increase in perceived control, *i.e.*, the belief that a particular outcome can be influenced through one's actions, can reduce strategic ignorance of distressing yet potentially decision-enhancing information. We first present a simple model to illustrate how perceived control can

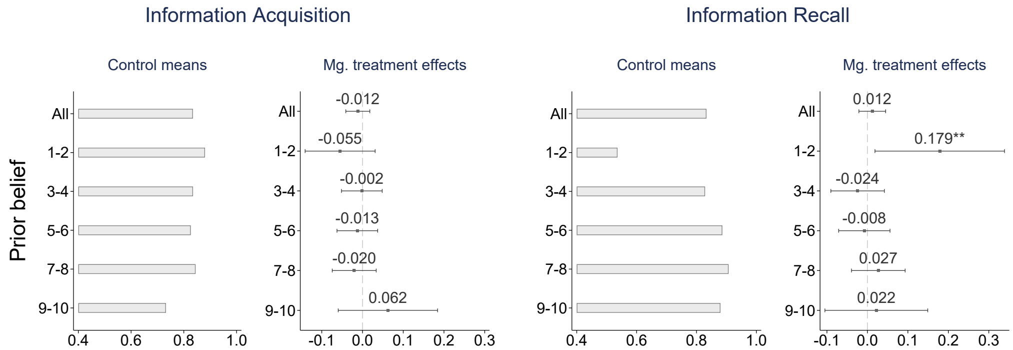

Figure 9 – Control group means and treatment effects on information acquisition and information recall, by prior beliefs about the severity of air pollution in the home county (US sample).

Notes: The figure presents the control group means and marginal treatment effects on information acquisition and information recall in the US sample. The control means for information recall refer to the share of participants in the control group that were able to recall the information within a ±0.5 years error margin. The coefficients are estimated using linear probability models. The marginal treatment effects are based on an interaction between the treatment dummy and the participants' prior beliefs about the air quality in their county of residence. All models control for the participants' confidence in the prior belief and their performance in the item recognition task. The information recall models additionally control for participants' preference to receive information. Standard errors are clustered at the county level. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

reduce avoidance and improve recall of distressing information. We then empirically examine the role of perceived control in the context of information about the adverse health effect of air pollution in an online experiment with an Indian sample. To do so, we introduce exogenous variation in participants' perceived control by providing half of our sample with a list of private measures that can protect against the adverse health effect of air pollution. Subsequently, we assess participants' preference for receiving distressing information and the recall rate. We observe that the treatment has no impact on information avoidance in the aggregate, but does significantly increase information recall. Furthermore, we find that the treatment reduces information avoidance and improves recall among those with highly optimistic prior beliefs but leaves the preferences of more pessimistic participants unaffected. A replication of our experiment with a US sample brings further evidence of the heterogeneous treatment effect on information recall. Overall, these findings indicate that increasing perceived control can be an effective tool for mitigating information ignorance, even in situations where the underlying threat is relatively low but highly pertinent.

The empirical application in this paper centers on studying how participants engage with information about the adverse health effects of air pollution. Air pollution is an example of a major global health crisis that is often not acknowledged, met with indifference, or easily drowned out by other, seemingly more pressing issues. We show that actionable advice on how to protect oneself against the adverse health effects of air pollution can reduce the extent to which the information is ignored. With a broader interpretation, our results may be informative for other types of distressful information, especially in situations where individuals perceive little control over how to cope with the underlying threat, such as the outbreak of infectious diseases, violent conflicts, and climate change.

A promising frontier for future research lies in exploring whether and to what extent increased attention to information will result in behavioral changes, including the adoption of private actions and changes in the demand for public policies. The effect on the latter is particularly difficult to predict. On the one hand, being less ignorant about certain problems should lead to higher support for public actions. On the other hand, if higher levels of perceived control are achieved through increasing awareness about existing coping mechanisms, demand for public action might stall.

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Appendix – For Online Publication

A. Additional Results from the Main Experiment

A-1. The Indian Sample

In the following, we present additional results from the main experiment with the Indian sample.

Balance Tests

In Table A-1, we present sample characteristics including mean comparison t-tests to examine the balance between control and treatment group. We find that the sample is balanced across control and treatment group with respect to all observable characteristics.

Table A-1 – Sample characteristics and balance tests for the India sample.

	C		T		T - C
	N	Mean	N	Mean	
Age	1,000	34.11	1,031	34.15	0.05
		(10.94)		(11.12)	(0.49)
Female	1,000	0.34	1,031	0.34	0.00
		(0.47)		(0.47)	(0.02)
Household size	1,000	4.33	1,030	4.34	0.01
		(2.38)		(1.57)	(0.09)
Urban	1,000	0.90	1,031	0.89	-0.01
		(0.31)		(0.31)	(0.01)
Income group	1,000	8.03	1,031	7.92	-0.11
		(2.58)		(2.69)	(0.12)
Education	1,000	2.31	1,031	2.29	-0.02
		(0.64)		(0.64)	(0.03)
District average life years lost	1,000	5.81	1,031	5.89	0.08
		(2.72)		(2.66)	(0.12)
Prior belief about air quality	1,000	4.90	1,031	4.99	0.09
		(2.56)		(2.47)	(0.11)
Confidence in prior	1,000	4.13	1,031	4.13	-0.00
		(0.78)		(0.78)	(0.03)
Worried about air pollution	1,000	5.61	1,031	5.66	0.05
		(1.56)		(1.49)	(0.07)
Joint orthogonality F-stat					0.28
					(0.99)

Notes: Summary statistics of pre-treatment participant characteristics and balance tests between means values in control and treatment groups in the main experiment (India sample). Standard deviations are reported in parentheses. The right-most column reports the difference in means between treatment and control, with the estimated standard errors in parentheses. C = control, T = perceived control treatment. Significant t-test estimates are denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Perceived Control

In Table A-2, we present regression results in the Indian sample for perceived control as measured by the 7 item index (columns 1 to 3) and the 1 item measure (columns 4 to 6). We find that the treatment effect on perceived control is robust to the inclusion of control variables (including the participant's prior belief about air quality, the confidence in this prior, and the life expectancy loss due to air pollution in the participant's home district, denoted by average LYL) as well as the inclusion of state fixed effects.

TABLE A-2 – ESTIMATED TREATMENT EFFECTS ON PERCEIVED CONTROL IN THE INDIAN SAMPLE.

	7-item Index (Pearlin and Schooler, 1978)			1-item Measure (Trope, Gervey and Bolger, 2003)		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.188***	0.188***	0.192***	0.179***	0.189***	0.185***
	(0.022)	(0.022)	(0.022)	(0.040)	(0.039)	(0.040)
Prior belief about air quality		0.018**	0.024***		-0.113***	-0.117***
		(0.008)	(0.008)		(0.009)	(0.009)
Confidence in prior belief		-0.042**	-0.036*		0.208***	0.205***
		(0.020)	(0.020)		(0.030)	(0.030)
Average LYL		-0.019**	0.006		-0.012*	0.045
		(0.007)	(0.021)		(0.007)	(0.037)
State FE	No	No	Yes	No	No	Yes
Observations	2,031	2,031	2,028	2,031	2,031	2,028
Control mean	0	0	0	0	0	0

Notes: This table presents OLS estimations of two standardized measures of perceived control adapted to the context of air pollution from Pearlin and Schooler (1978) and Trope, Gervey and Bolger (2003). Standard errors are clustered at the district level and presented in parentheses. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Information Avoidance

In Table A-3, we present regression results in the Indian sample for the preference to receive information, using both a linear probability model (columns 1 to 3) and a non-linear logistic regression (columns 4 to 6). Our finding that the preference to receive the information is not affected by the treatment is robust to the inclusion of control variables (prior belief and confidence in the prior) as well as the inclusion of state fixed effects.

Table A-3 – Estimated treatment effects on the preference to receive information in the Indian sample.

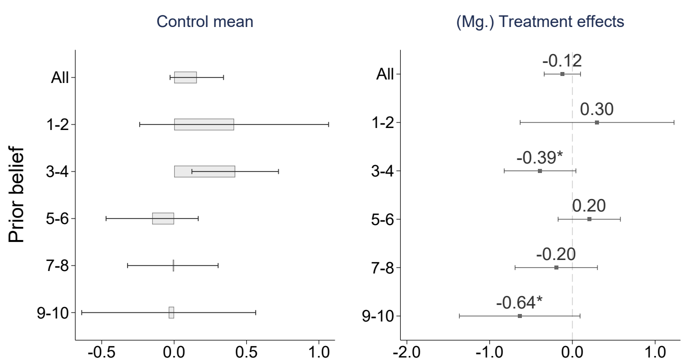
	Preference to receive information					
	LPM			Logistic		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.003	-0.004	-0.003	-0.004	-0.004	-0.002
	(0.011)	(0.011)	(0.011)	(0.012)	(0.011)	(0.010)
Prior beliefs about air quality		0.003	0.002		0.004	0.002
		(0.002)	(0.002)		(0.003)	(0.002)
Confidence in prior		0.051***	0.050***		0.045***	0.038***
		(0.009)	(0.009)		(0.007)	(0.010)
State FE	No	No	Yes	No	No	Yes
Observations	2,031	2,031	2,028	2,031	2,031	1,980
Control mean	0.92	0.92	0.92	0.92	0.92	0.92

Notes: This table presents estimates from linear probability models and logistic models on participants' preference to receive information about the life expectancy loss due to air pollution in their home district. Displayed coefficients of the logistic models refer to marginal effects. We use a conditional logit model for the fixed effect model in column 6. Standard errors are clustered at the district level. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Information Recall

Figure A-1 plots the control group mean (incl. the 95% CI) and the marginal treatment effects on the recall error (panel A) and the absolute recall error (panel B) by prior belief about the air quality in the participant's home region for the Indian sample. While we find no clear result pattern for the recall error, results on the absolute recall error support our results on recall rates presented in Figure 7. The treatment causes the absolute recall error for the most optimistic participants (a prior of 1 or 2) to significantly decrease, driving the negative treatment effect in the aggregate sample.

Panel A. Recall Error



Panel B. Absolute Recall Error

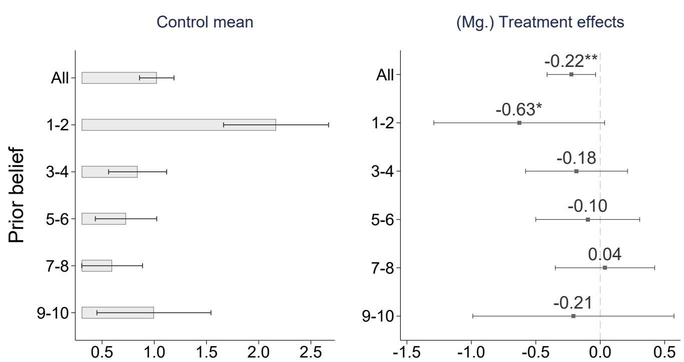


FIGURE A-1 – CONTROL GROUP MEANS AND TREATMENT EFFECTS ON THE INFORMATION RECALL ERROR AND ABSOLUTE RECALL ERROR, BY PRIOR BELIEF (INDIAN SAMPLE).

Notes: The figure presents the control group means (with 95% CI) and marginal treatment effects on the recall error and the absolute recall error in the Indian sample. The recall error is defined as participants' answer minus the true value. The marginal treatment effects are estimated on interaction models between the treatment and participants' prior beliefs about the regional air quality. All models control for the participants' confidence in the prior belief, their performance in the visual memory task, and their preference to receive information. Standard errors are clustered at the district level. Significance: *** p<0.01, ** p<0.05, and * p<0.1.

A-2. The US Sample

In the following, we present additional results from the main experiment with the US sample.

Balance Tests

In Table A-4, we present sample characteristics including mean comparison t-tests to examine the balance between control and treatment group in the US sample. We find that the sample is balanced across control and treatment group with respect to all observable characteristics, except for the confidence with respect to the prior belief about the regional air quality. Here, we observe that participants in the treatment group are marginally more confident.

Table A-4 – Sample characteristics and balance tests for the US sample.

	C		T		T - C
	N	Mean	N	Mean	
Age	1,124	39.19	1,140	38.62	-0.56
		(11.69)		(11.85)	(0.49)
Female	1,124	0.50	1,140	0.51	0.01
		(0.50)		(0.50)	(0.02)
Household size	1,118	3.12	1,136	3.06	-0.06
		(2.21)		(1.45)	(0.08)
Urban	1,124	0.74	1,140	0.74	-0.00
		(0.44)		(0.44)	(0.02)
Income group	1,124	5.09	1,140	5.07	-0.02
		(2.33)		(2.31)	(0.10)
Education	1,124	1.97	1,140	1.97	0.00
		(0.67)		(0.66)	(0.03)
County average life years lost	1,124	0.49	1,140	0.48	-0.02
		(0.29)		(0.28)	(0.01)
Prior belief about air quality	1,124	4.98	1,140	4.96	-0.02
		(2.12)		(2.20)	(0.09)
Confidence in prior	1,124	3.49	1,140	3.56	0.06*
		(0.88)		(0.90)	(0.04)
Worried about air pollution	1,124	4.45	1,140	4.47	0.03
		(1.72)		(1.73)	(0.07)
Joint orthogonality F-stat					1.02
					(0.42)

Notes: Summary statistics of pre-treatment participant characteristics and balance tests between means values in control and treatment groups in the main experiment (US sample). Standard deviations are reported in parentheses. The right-most column reports the difference in means between treatment and control, with the estimated standard errors in parentheses. C = control, T = treatment. Significant t-test estimates are denoted as follows: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

Perceived Control

Figure A-2 illustrates the positive treatment effect on our 7 item index measure of perceived control in the US sample. The distribution of the index in the treatment group (in dark gray) is shifted to the right when compared to the control group (in light gray).

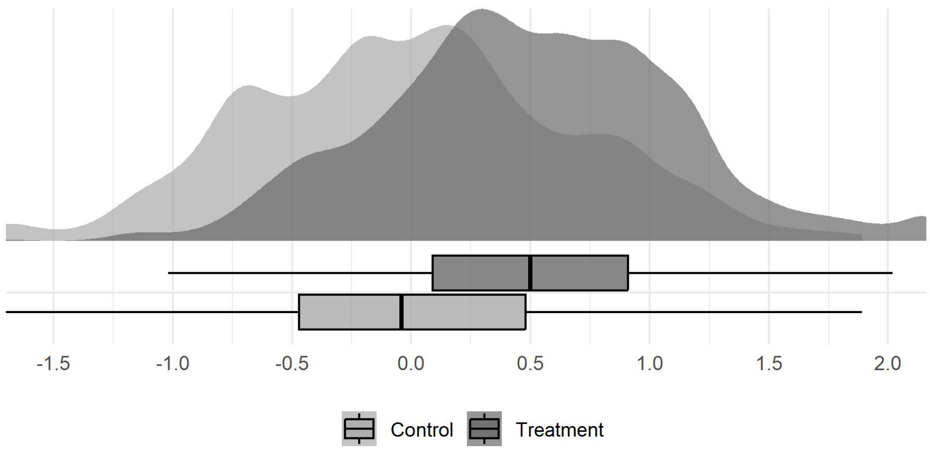


Figure A-2 – Distribution of the perceived control index (US sample).

Notes: This figure presents the kernel densities of the distributions of perceived control, as measured by the standardized index of participants' answers to the 7-item questionnaire, adapted from Pearlin and Schooler (1978) to the context of air pollution. Two distributions are presented: lighter gray corresponds to responses in the control group and darker gray corresponds to responses in the treatment group.

Moreover, Table A-5 reports regression results (both for the 7 item index and the 1 item measure) on perceived control. Results indicate that the positive treatment effect on in perceived control is robust, both to the inclusion of covariates (prior belief, confidence, and average LYL) as well as the inclusion of state fixed effects.

Table A-5 – Estimated effects on perceived control (US sample).

	7-item Index (Pearlin and Schooler, 1978)			1-item Measure (Trope, Gervey and Bolger, 2003)		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	0.495***	0.493***	0.494***	0.527***	0.514***	0.514***
	(0.029)	(0.029)	(0.029)	(0.043)	(0.042)	(0.042)
Prior belief about air quality		-0.016**	-0.014**		-0.097***	-0.096***
		(0.007)	(0.006)		(0.011)	(0.011)
Confidence in prior belief		0.012	0.014		0.165***	0.165***
		(0.016)	(0.016)		(0.021)	(0.021)
Average LYL		-0.061	-0.138		-0.036	-0.065
		(0.060)	(0.087)		(0.079)	(0.105)
State FE	No	No	Yes	No	No	Yes
Observations	2,251	2,251	2,251	2,262	2,262	2,262
Control mean	0	0	0	0	0	0

Notes: This table presents OLS estimations of two standardized measures of perceived control adapted to the context of air pollution from Pearlin and Schooler (1978) and Trope, Gervey and Bolger (2003). Standard errors are clustered at the district level and presented in parentheses. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Information Avoidance

Figure A-3 depicts descriptive results for information acquisition and recall for control and treatment group in the US sample. Results suggest that there is no treatment effect on either outcome which is supported by the regression results in Table A-6.

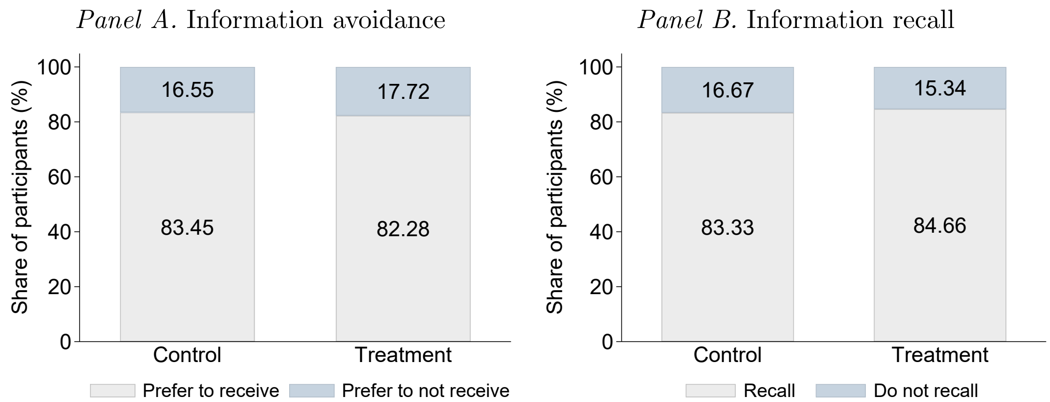


Figure A-3 – Share of information avoidance and recall (US sample).

Table A-6 – Estimated effects on participants' preference to receive information in the US sample.

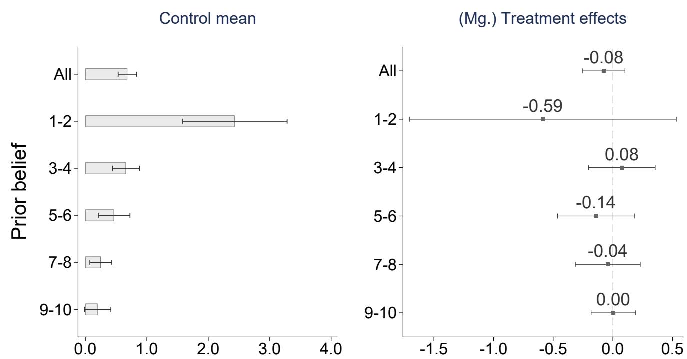
	Preference to receive information					
	OLS			Logistic		
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment	-0.012	-0.012	-0.011	-0.012	-0.012	-0.019
	(0.015)	(0.015)	(0.015)	(0.016)	(0.015)	(0.027)
Prior beliefs about air quality		-0.006*	-0.006		-0.006*	-0.010
		(0.003)	(0.004)		(0.003)	(0.006)
Confidence in prior		-0.003	-0.003		-0.003	-0.006
		(0.010)	(0.010)		(0.010)	(0.015)
State FE	No	No	Yes	No	No	Yes
Observations	2,264	2,264	2,264	2,264	2,264	2,264
Control mean	0.83	0.83	0.83	0.83	0.83	0.83

Notes: This table presents estimates from linear probability models and logistic models on participants' preference to receive information about the life expectancy loss due to air pollution in their home district. Displayed coefficients of the logistic models refer to marginal effects. We use a conditional logit model for the fixed effect model in column 6. Standard errors are clustered at the district level. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

Information Recall

Figure A-4 plots the control group mean (incl. the 95% CI) and the marginal treatment effects on the recall error (panel A) and the absolute recall error (panel B) by prior belief about the air quality in the participant's home region for the Indian sample. In the control group, the recall error and the absolute recall error for very optimistic participants (a prior of 1 or 2) is significantly higher than for all other subgroups. And while insignificant, marginal treatment effects appear generally negative for optimistic participants, lending weak support to our finding on recall rates presented in Figure 9.

Panel A. Recall Error



Panel B. Absolute Recall Error

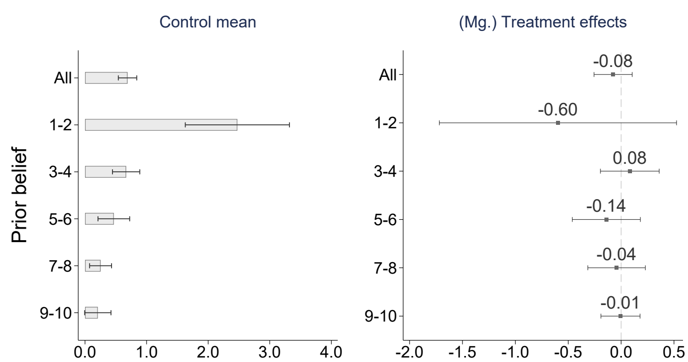


Figure A-4 – Control group means and treatment effects on the information recall error, by prior beliefs about air quality in home county (US sample).

Notes: This figure presents the control group means (with 95% CI) and marginal treatment effects on the retention error and the absolute retention error in the USA sample. The retention error is defined as participants' answer minus the true LYL value. The marginal treatment effects are estimated on interaction models between the treatment dummy and participants' prior beliefs about the regional air quality. All models control for the participants' confidence in the prior belief, their performance in the visual memory task, and their preference to receive information. Standard errors are clustered at the county level. Significance: *** p<0.01, ** p<0.05, and * p<0.1.

B. Performance in the Coin Counting Task

To study whether performance in the coin counting task is affected by the treatment, we first perform a Fligner-Pollicelo test to check for differences in participants' performance in the coin counting test between those that were randomized to see the information about the average loss of life expectancy in their home district/county and those that were not. In the Indian sample, the 1-tailed asymptotic p-value is equal to 0.457 according to a two-sample Fligner-Policello robust rank order test. In the US, the p-value is 0.371. We conclude that performance in the coin counting task is not affected by the treatment.

Our conclusion is supported by regression results presented in Table B-1. Results additionally suggest that performance in the coin counting task is positively correlated with performance in the memory task, a pattern that is likely due to overall cognitive ability. Furthermore, we find the prior is negatively associated with performance (pessimists perform better) and that the average expected life expectancy loss has a negative correlation with performance in the US sample.

Table B-1 – Estimated effects on performance in the filler task in the main experiment.

	USA (1)	India (2)
Treatment	0.021	0.049
	(0.120)	(0.128)
Prior belief about air quality	0.149***	0.132***
	(0.033)	(0.031)
Confidence in prior belief	-0.142*	-0.120
	(0.079)	(0.088)
Performance memory task	4.878***	5.344***
	(0.643)	(0.607)
Average LYL	-0.661***	-0.002
	(0.234)	(0.024)
Observations	1,298	1,196
Control mean	6.94	5.51

Notes: This table presents OLS estimates of the treatment effect on participants' performance in the coin counting task, as measured by the number of correct counts achieved within a two-minute task limit. Standard errors are clustered at the county/district level. This estimation employs only observations from participants that have been randomized into seeing the LYL information. LYL stand for "life years lost." Significance: *** p<0.01, ** p<0.05, and * p<0.1.

In Table B-2, we report regression results on the performance in the coin counting task when interacting the treatment with an indicator of whether the

Table B-2 – Estimated effects on performance in the filler task in interaction with being randomized to see the LYL information in the main experiment.

	USA (1)	India (2)
Treatment	0.088	0.333**
	(0.144)	(0.131)
Received info	-0.049	0.114
	(0.136)	(0.144)
Treatment x Received info	-0.063	-0.284
	(0.188)	(0.183)
Prior belief about air quality	0.135***	0.110***
	(0.028)	(0.021)
Confidence in prior belief	-0.176***	-0.097
	(0.058)	(0.059)
Average LYL	-0.347*	-0.007
	(0.196)	(0.026)
Observations	2,264	2,031
Control mean for non-randomized	6.99	5.3

Notes: This table presents OLS estimates of models where the treatment is interacted with a dummy variable equal to 1 for participants randomized to receive LYL information. Participants' performance in the coin counting task is measured as the number of correct counts achieved within a two-minute task limit. Standard errors are clustered at the county/district level. This estimation is performed relying on the full sample of observations. LYL stand for "life years lost." Significance: *** p<0.01, ** p<0.05, and * p<0.1.

participant was randomized to see the information on the expected average life expectancy loss. Here, we observe that conditional on not receiving the information, the treatment improves performance in the coin counting task. However, the magnitude of the negative interaction term between treatment and randomization into receiving the info suggests that there is no treatment effect on task performance for participants that received the LYL information.

Lastly, we study heterogeneous treatment effects on the task performance by prior belief about air quality, see Figure B-1 and Figure B-2 for results in India and the US, respectively. In the control group, we find that optimistic participants (a prior of 1 or 2) perform worse than all other subgroups (the result is more apparent in India than in the US). Yet, we do not find a conclusive result pattern in either sample when studying the treatment effect by prior belief.

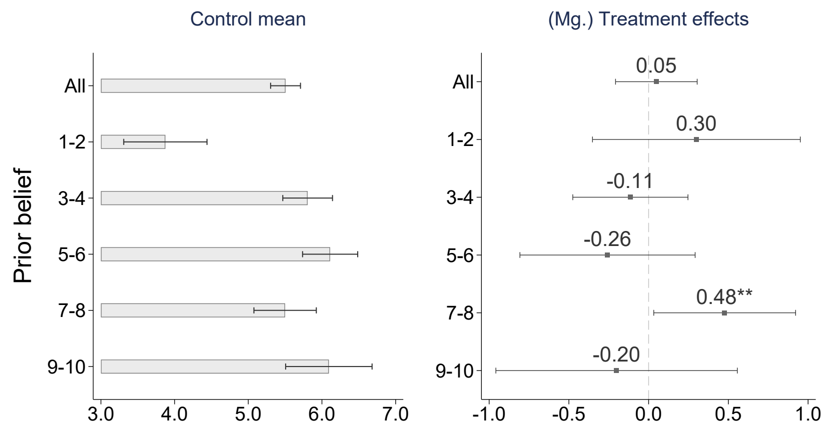


Figure B-1 – Control group means and treatment effects on participants' performance in the filler task by prior belief (Indian sample).

Notes: This figure presents the control group means (with 95% confidence intervals) and estimated marginal treatment effects on participants' performance in the filler task in the Indian sample. The marginal treatment effects are estimated on interaction models between the treatment dummy and participants' prior beliefs about the regional air quality. All models control for the participants' confidence in the prior belief, their performance in the visual memory task, and the regional average LYL. Standard errors are clustered at the district level. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

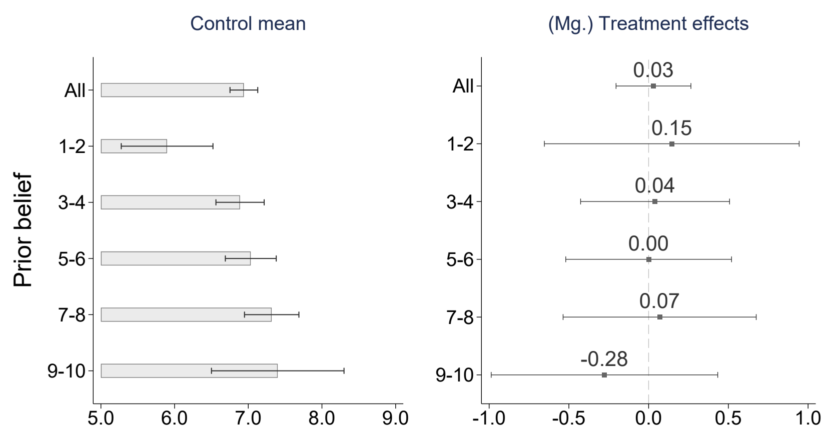


Figure B-2 – Control group means and treatment effects on participants' performance in the filler task by prior belief (US sample).

Notes: This figure presents the control group means (with 95% confidence intervals) and estimated marginal treatment effects on participants' performance in the filler task in the US sample. The marginal treatment effects are estimated on interaction models between the treatment dummy and participants' prior beliefs about the regional air quality. All models control for the participants' confidence in the prior belief, their performance in the visual memory task, and the regional average LYL. Standard errors are clustered at the county level. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

C. The Follow-Up Experiment

Design and objectives

We conducted a follow-up for both the Indian and the US sample. All participants who received the information on the average loss of life expectancy in their home region in the main study were invited to take part in the follow-up study two weeks later. First, we again elicited demographic variables to test for inconsistencies with responses in the main experiment. Then, participants were asked to recall the information on the number of life-years lost provided in the main experiment. The incentive scheme used for the recall task in the follow-up was identical to the one used in the main experiment. Participants were neither contacted nor reminded of any information in-between the main and follow-up experiments. The follow-up experiment concluded with two questionnaires: (i) we repeated the measurement of perceived control equivalent to the main experiment, and (ii) we asked participants how often they engage with various protective measures against air pollution exposure.[26]

Sample

In India, a total of 1,198 participants were invited to the follow-up, 626 (52%) were recruited, and 604 completed the follow-up experiment. 494 participants remain for the analysis after addressing inconsistency issues between the location information provided in the main and follow-up experiments. A total of 1,302 participants in the US sample received information on the number of life years lost in their home county in the main experiment and were therefore invited to partake in the follow-up study. 660 (51%) were recruited out of which 649 completed the follow-up experiment. After applying the location consistency criteria, a total of 502 participants remain available for the analysis.[27]

Selection

To test for potential selection issues, we compare participants who selected in with participants who selected out of the follow-up. We observe substantial

[26] All participants were invited to give open feedback at the end of each experiment. Additionally, we debriefed participants in the control group on the protective measures one can utilize to protect oneself against air pollution exposure. Participants who did not receive information on life years lost were debriefed after the main experiment as they were not re-invited for the follow-up. All others were debriefed after the follow-up experiment.

[27] As for the main study, Indian participants were rewarded by the survey company in panel points and received an additional average bonus payment of INR 22 (about USD 0.27). US participants received a fixed reward of US $1.00 for completing the follow-up (which took about 3 minutes). Together with the incentives that participants were able to earn, the average reward was US $1.24.

differences between both groups in both countries, see Appendix Tables C-4, C-5, C-6, and C-7. Importantly, we find that participation in the follow-up is conditional on our main variables of interest from the main study: in both the US and Indian samples, participants who selected into the follow-up i) scored higher on perceived control, and ii) were significantly better at recalling the number of life-years lost than those that selected out of the follow-up. Consequently, we cannot provide a clean test of the long term effect of perceived control on information retention and leave this question open for future research. For the sake of completeness, we report the results from our pre-registered analyses on our self-selected sample below but remind the reader that these results should be interpreted with care.

Results on Perceived Control

In the US follow-up sample, perceived control is 0.42 points higher in the treatment group than in the control group, a significant positive difference (MW test $p < 0.001$, combined N=501). In the Indian follow-up sample, perceived control is 0.12 points higher in the treatment group than in the control group, a marginally significant difference (MW test $p = 0.052$, combined N=494). We find similar results using our one-item measure: perceived control is 0.51 points higher in the treatment group than in the control group in the USA ($p < 0.001$) and 0.24 points higher in India ($p = 0.008$).

To assess changes in treatment effects over time, we estimate differences-in-differences regressions using data from both the main and follow-up experiments for the sub-sample of participants who took part in both the main and the follow-up study. Appendix Table C-1 presents the estimated treatment effects in interaction with a dummy variable for the follow-up study. First, we find a significant and positive effect of our treatment in the main study in all specifications for our self-selected sample of participants in both countries. In addition, the coefficient of the interaction term is negative and significant for the perceived control index. However, the overall effect of our treatment manipulation on perceived control is still positive and significant in the follow-up in both countries, see the *Treatment* × *Follow-up (margin)* coefficient in Appendix Table C-1. These results suggest that while the treatment effect on perceived control fades over time, it still has a positive and significant impact two weeks after participants' have been exposed to it.

Results on Information Recall

We pre-registered a test on whether participants in the treatment group are more likely to recall the information about the number of life-years lost in their home region two weeks after having been exposed to it. In both countries, the share of participants that is still able to recall the information is about 64%, and this proportion does not differ between the treatment and the control group.[28] To evaluate changes in treatment effects between the main and follow-up studies, we estimate differences-in-differences by interacting the treatment dummy with a follow-up dummy. Results are presented in Appendix Table C-2.

We find no treatment effect in the main experiment for the self-selected sub-sample of participants who completed both experiments in either country. It is therefore not surprising that we find no treatment effect in the follow-up either. Nonetheless, results point to a significant decrease in the recall rate over the two-week period of 24 percentage points in the US sample and 14 percentage points in the Indian sample ($p < 0.001$ in both samples). Yet, the decrease in successful recall over time does not differ between the treatment and control groups. Given that the sample that has selected into the follow-up study appears to be less susceptible to engage in strategic memory distortion, we view the estimated reduction in recall over the two-week period as a lower bound for the true effect.

Results on Protective Measures

We also pre-registered that we would test whether participants in the treatment group report engaging more often with the protective measures than participants in the control group. In the main study, participants in the treatment group were provided with information about a set of private measures to protect themselves against air pollution exposure. To test the effect of exposing participants to information about such measures on their reported preventive behavior, we asked participants to report how often they engage with these measures, offering five response options that range from "never" to "every day".[29] We standardized the responses for all nine activities to z-scores following Kling, Liebman and Katz (2007) and computed an equally-weighted index.

We find that among participants who completed both studies, partici-

[28] In the US sample, 63.6% of participants in the control group and 57.9% in the treatment group are able to recall the information within a 0.5 year error margin; the difference is not statistically significant (Fisher exact test: $p = 0.201$, combined N=501). In the Indian sample, 65.4% of participants in the control group and 65.4% of participants in the treatment group are able to recall the information within a 0.5 year error margin; the difference is not significant (Fisher exact test: $p = 1$, combined N=494).

[29] In particular, we asked about the following activities: wearing a face mask, using an air purifier indoors, checking the air quality in the area, avoiding highly polluted areas when commuting, opening windows to ventilate rooms, removing dust in the household, spending time in nature, burning waste, and handling open fires (*e.g.*, for cooking or heating).

pants in the treatment group report using the defensive measures more frequently than participants in the control group. This difference is significant (marginally for India) in both samples (MW test: $p = 0.011$, combined N=501 for the US sample and $p = 0.066$, combined N=494 for the Indian sample). In addition, we examine the effect of our treatment on each component of our aggregated measure separately. The regression results are displayed in Appendix Table C-3. We find that a change in commuting habits (in both the US and Indian samples) as well as a higher intention to undertake preventive medical tests (in the US sample) drive the treatment effect on the aggregate measure. These results suggest that providing information about protection measures moderately increases their reported use two weeks after receiving the information.

Table C-1 – Estimated effects on perceived control of air pollution in main versus follow-up experiments.

	7-item Index (Pearlin and Schooler, 1978)			1-item Measure (Trope, Gervey and Bolger, 2003)		
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: India					
Treatment	0.214***	0.221***	0.187***	0.286***	0.268***	0.241***
	(0.043)	(0.042)	(0.040)	(0.069)	(0.072)	(0.079)
Follow-up	-0.060*	-0.060*	-0.060*	0.089*	0.089*	0.089*
	(0.031)	(0.031)	(0.031)	(0.050)	(0.051)	(0.051)
Treatment × Follow-up	-0.097**	-0.097**	-0.097**	-0.044	-0.044	-0.044
	(0.045)	(0.045)	(0.046)	(0.070)	(0.070)	(0.071)
State FE	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes
Observations	988	988	988	988	988	988
Control mean Main	0.06	0.06	0.06	-0.09	-0.09	-0.09
Treatment × Follow-up (margin)	0.116**	0.124**	0.090*	0.242***	0.224**	0.196*
	(0.050)	(0.049)	(0.050)	(0.088)	(0.094)	(0.103)
	Panel B: USA					
Treatment	0.567***	0.572***	0.573***	0.640***	0.655***	0.657***
	(0.066)	(0.066)	(0.068)	(0.086)	(0.086)	(0.088)
Follow-up	0.028	0.028	0.028	0.099**	0.099**	0.099**
	(0.025)	(0.025)	(0.025)	(0.043)	(0.043)	(0.043)
Treatment × Follow-up	-0.153***	-0.153***	-0.154***	-0.127	-0.127	-0.127
	(0.039)	(0.039)	(0.040)	(0.080)	(0.080)	(0.081)
State FE	No	No	Yes	No	No	Yes
Controls	No	Yes	Yes	No	Yes	Yes
Observations	994	994	994	1,000	1,000	1,000
Control mean Main	-0.03	-0.03	-0.03	-0.10	-0.10	-0.10
Treatment × Follow-up (margin)	0.414***	0.419***	0.420***	0.513***	0.528***	0.530***
	(0.065)	(0.064)	(0.066)	(0.094)	(0.091)	(0.091)

Notes: This table presents estimated coefficients of difference-in-differences models. Models (2), (3), (5), and (6) control for participants' prior belief about air quality in the home region, their confidence in the prior belief, and the average number of life years lost due to air pollution in the home region. Columns (3) and (6) additionally include state fixed effects. All control variables have been collected in the main experiment. In all models, standard errors are clustered at the county/district level. The analysis relies only on answers from participants that took part in both the main and follow-up experiments, *i.e.*, a balanced panel. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Table C-2 – Estimated effects on information recall in the main versus follow-up experiments.

	Recall	Recall error	Abs. recall error
	(1)	(2)	(3)
	Panel A: India		
Treatment	0.050	0.033	-0.159
	(0.033)	(0.184)	(0.149)
Follow-up	-0.141***	0.056	0.141
	(0.050)	(0.227)	(0.191)
Treatment × Follow-up	-0.044	-0.212	0.264
	(0.054)	(0.245)	(0.217)
Observations	988	988	988
Control mean Main	0.79	0.05	0.82
Treatment × Follow-up (margin)	0.006	-0.178	0.106
	(0.042)	(0.168)	(0.169)
	USA		
Treatment	-0.003	0.010	0.009
	(0.031)	(0.113)	(0.113)
Follow-up	-0.242***	0.871***	0.884***
	(0.029)	(0.139)	(0.139)
Treatment × Follow-up	-0.054	0.041	0.046
	(0.041)	(0.191)	(0.191)
Observations	1,000	1,000	1,000
Control mean Main	0.88	0.37	0.37
Treatment × Follow-up (margin)	-0.056	0.051	0.055
	(0.044)	(0.212)	(0.212)

Notes: This table presents estimated coefficients of difference-in-differences models, where the treatment indicator is interacted with a dummy indicator for the follow-up study. Each column corresponds to a different outcome variable. The retention error is defined as participants' post-treatment answer minus the correct value. All models control for participants' prior belief about air quality in the home region, their confidence in the prior belief, and the average number of life years lost due to air pollution in the home region. All control variables have been collected in the main experiment. In all models, standard errors are clustered at the county/district level and presented in parentheses. The analysis relies only on answers from participants that took part in both the main and follow-up experiments, *i.e.*, a balanced panel. Significance is denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Table C-3 – Estimated effects on the adoption of defensive measures against air pollution in the follow-up experiment.

	Index (1)	Face mask (2)	Air purifier (3)	Medical tests (4)	Change in commute (5)	Frequent ventilation (6)	Dust removal (7)	Time in nature (8)	Avoid waste burning (9)	Avoid open fires (10)
Panel A: India										
Treatment	0.073*	0.104	0.059	0.089	0.195**	0.124	0.108	0.109	-0.052	-0.080
	(0.044)	(0.090)	(0.097)	(0.107)	(0.092)	(0.075)	(0.080)	(0.081)	(0.086)	(0.079)
Obs.	494	494	494	494	494	494	494	494	494	494
Panel B: USA										
Treatment	0.106***	0.069	0.086	0.178**	0.240***	0.086	0.106	0.102	0.016	0.066
	(0.035)	(0.087)	(0.077)	(0.087)	(0.085)	(0.076)	(0.086)	(0.099)	(0.082)	(0.077)
Obs.	500	500	500	500	500	500	500	500	500	500

Notes: The table presents estimated treatment effects on the adoption of various defensive measures against air pollution. Each column corresponds to a different defensive measure. All outcome measures have been collected in the follow-up experiment, approximately two weeks after the main experiment. Column (1) presents the estimated treatment effect on an index that equally weights the defensive measures used as outcome variables in Columns (2)-(9). Each component of the index has been standardized following Kling, Liebman and Katz (2007). All outcome variables have a mean value of 0 in the control group. All models control for participants' prior belief about air quality in the home region, their confidence in the prior belief, the average number of life years lost due to air pollution in the home region, and participants' performance in the visual memory task. All control variables have been collected in the main experiment. Standard errors are clustered at the county/district level and presented in parentheses. Significance is denoted as follows: *** $p<0.01$, ** $p<0.05$, and * $p<0.1$.

Balance tests: Main versus Follow-up

TABLE C-4 – SAMPLE CHARACTERISTICS AND BALANCE TESTS FOR THE INDIA CONTROL GROUP IN THE MAIN *versus* FOLLOW-UP EXPERIMENTS.

	Selected In		Main		Selected Out		In - Main	In - Out
	N	Mean	N	Mean	N	Mean		
Age	234	34.44	581	34.07	347	33.82	0.37	0.61
		(11.31)		(10.71)		(10.30)	(0.84)	(0.91)
Female	234	0.31	581	0.35	347	0.38	-0.04	-0.07*
		(0.46)		(0.48)		(0.49)	(0.04)	(0.04)
Household size	234	4.40	581	4.43	347	4.45	-0.03	-0.05
		(1.41)		(2.84)		(3.49)	(0.19)	(0.24)
Urban	234	0.90	581	0.90	347	0.90	-0.00	-0.00
		(0.30)		(0.30)		(0.29)	(0.02)	(0.03)
Income group	234	8.18	581	8.07	347	7.99	0.11	0.19
		(2.48)		(2.48)		(2.48)	(0.19)	(0.21)
Education	234	2.28	581	2.32	347	2.34	-0.03	-0.06
		(0.65)		(0.64)		(0.63)	(0.05)	(0.05)
Average LYL	234	5.72	581	5.84	347	5.92	-0.12	-0.20
		(2.70)		(2.73)		(2.75)	(0.21)	(0.23)
Prior belief about air quality	234	5.28	581	4.99	347	4.80	0.28	0.48**
		(2.41)		(2.59)		(2.68)	(0.20)	(0.22)
Confidence in prior belief	234	4.11	581	4.14	347	4.16	-0.03	-0.05
		(0.75)		(0.77)		(0.79)	(0.06)	(0.07)
Worried about air pollution	234	5.57	581	5.61	347	5.64	-0.04	-0.07
		(1.50)		(1.59)		(1.65)	(0.12)	(0.13)
Prefer to not receive info	234	0.05	581	0.06	347	0.06	-0.01	-0.01
		(0.22)		(0.23)		(0.24)	(0.02)	(0.02)
Time spent on LYL page (s)	234	25.87	581	23.34	347	21.62	2.54	4.25
		(56.92)		(50.52)		(45.71)	(4.06)	(4.27)
Recall	234	0.79	581	0.73	347	0.69	0.06*	0.10***
		(0.40)		(0.44)		(0.46)	(0.03)	(0.04)
Retention error	234	0.05	581	0.16	347	0.23	-0.10	-0.17
		(2.08)		(2.27)		(2.38)	(0.17)	(0.19)
Abs retention error	234	0.82	581	1.02	347	1.16	-0.21	-0.34**
		(1.92)		(2.03)		(2.09)	(0.15)	(0.17)
Perceived control (index)	234	0.06	581	-0.01	347	-0.05	0.07*	0.11***
		(0.48)		(0.50)		(0.51)	(0.04)	(0.04)
Perceived control (1 item)	234	-0.09	581	-0.00	347	0.06	-0.09	-0.15*
		(0.90)		(0.98)		(1.02)	(0.07)	(0.08)
Filler task performance	234	5.68	581	5.51	347	5.39	0.17	0.28
		(2.37)		(2.49)		(2.57)	(0.19)	(0.21)
Memory task performance	234	0.89	581	0.87	347	0.86	0.02*	0.03***
		(0.12)		(0.14)		(0.15)	(0.01)	(0.01)
Joint orthogonality F-stat							0.64	1.46
							(0.87)	(0.09)

Notes: The table presents summary statistics of participant characteristics and balance tests between the samples of participants that took part in the main and follow-up experiments, only in the control group. Selected In refers to participants that took part in both the main and follow-up experiments. Selected Out refers to participants that took part only in the main experiment. All characteristics have been collected in the main experiment. Parentheses underneath mean values are standard deviations of the respective observable characteristic. The two right-most columns report the difference in means between the sample that selected in the follow-up and the and sample in the main experiment or the sample that selected out of the follow-up, with estimated standard error in parentheses. Significant t-test estimates are denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Table C-5 – Sample characteristics and balance tests for the India treatment group in the main *versus* follow-up experiments.

	Selected In		Main		Selected Out		In - Main	In - Out
	N	Mean	N	Mean	N	Mean		
Age	260	34.15	615	33.85	355	33.63	0.30	0.52
		(11.37)		(11.24)		(11.15)	(0.83)	(0.92)
Female	260	0.28	615	0.31	355	0.34	-0.04	-0.06
		(0.45)		(0.46)		(0.47)	(0.03)	(0.04)
Household size	260	4.46	614	4.45	354	4.45	0.00	0.01
		(1.59)		(1.62)		(1.64)	(0.12)	(0.13)
Urban	260	0.93	615	0.89	355	0.87	0.04*	0.06**
		(0.25)		(0.31)		(0.34)	(0.02)	(0.03)
Income group	260	8.47	615	7.94	355	7.55	0.53***	0.91***
		(2.31)		(2.64)		(2.80)	(0.19)	(0.21)
Education	260	2.34	615	2.33	355	2.32	0.02	0.03
		(0.61)		(0.63)		(0.64)	(0.05)	(0.05)
Average LYL	260	5.77	615	5.90	355	5.99	-0.12	-0.21
		(2.61)		(2.65)		(2.69)	(0.20)	(0.22)
Prior belief about air quality	260	5.04	615	4.99	355	4.95	0.06	0.10
		(2.30)		(2.49)		(2.61)	(0.18)	(0.20)
Confidence in prior belief	260	4.13	615	4.16	355	4.17	-0.02	-0.04
		(0.73)		(0.75)		(0.76)	(0.05)	(0.06)
Worried about air pollution	260	5.68	615	5.69	355	5.69	-0.01	-0.02
		(1.47)		(1.47)		(1.47)	(0.11)	(0.12)
Prefer to not receive info	260	0.03	615	0.05	355	0.06	-0.02	-0.03*
		(0.17)		(0.22)		(0.24)	(0.02)	(0.02)
Time spent on LYL page	260	23.94	615	20.98	355	18.80	2.97	5.14***
		(31.45)		(24.14)		(16.62)	(1.96)	(1.96)
Recall	260	0.84	615	0.80	355	0.77	0.04	0.06*
		(0.37)		(0.40)		(0.42)	(0.03)	(0.03)
Retention error	260	0.12	615	0.04	355	-0.02	0.08	0.13
		(1.88)		(1.97)		(2.04)	(0.14)	(0.16)
Abs retention error	260	0.69	615	0.80	355	0.89	-0.12	-0.21
		(1.75)		(1.80)		(1.83)	(0.13)	(0.15)
Perceived control (index)	260	0.27	615	0.21	355	0.16	0.07	0.11**
		(0.57)		(0.56)		(0.55)	(0.04)	(0.05)
Perceived control (1 item)	260	0.20	615	0.21	355	0.22	-0.02	-0.03
		(0.93)		(0.95)		(0.96)	(0.07)	(0.08)
Filler task performance	260	5.98	615	5.53	355	5.20	0.45**	0.78***
		(2.21)		(2.45)		(2.56)	(0.18)	(0.20)
Memory task performance	260	0.88	615	0.87	355	0.86	0.01	0.02*
		(0.13)		(0.14)		(0.16)	(0.01)	(0.01)
Joint orthogonality F-stat							1.21	3.08
							(0.24)	(0.00)

Notes: The table presents summary statistics of participant characteristics and balance tests between the samples of participants that took part in the main and follow-up experiments, only in the treatment group. Selected In refers to participants that took part in both the main and follow-up experiments. Selected Out refers to participants that took part only in the main experiment. All characteristics have been collected in the main experiment. Parentheses underneath mean values are standard deviations of the respective observable characteristic. The two right-most columns report the difference in means between the sample that selected in the follow-up and the and sample in the main experiment or the sample that selected out of the follow-up, with estimated standard error in parentheses. Significant t-test estimates are denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Table C-6 – Sample characteristics and balance tests for the USA control group in the main *versus* follow-up experiments.

	Selected In		Main		Selected Out		In - Main	In - Out
	N	Mean	N	Mean	N	Mean		
Age	260	41.35	672	39.22	412	37.87	2.13**	3.48***
		(12.29)		(11.62)		(10.98)	(0.86)	(0.91)
Female	260	0.53	672	0.51	412	0.50	0.02	0.03
		(0.50)		(0.50)		(0.50)	(0.04)	(0.04)
Household size	260	2.96	669	3.21	409	3.37	-0.25	-0.41**
		(2.38)		(2.36)		(2.34)	(0.17)	(0.19)
Urban	260	0.78	672	0.74	412	0.72	0.04	0.06*
		(0.42)		(0.44)		(0.45)	(0.03)	(0.03)
Income group	260	5.09	672	5.22	412	5.31	-0.13	-0.22
		(2.42)		(2.37)		(2.34)	(0.17)	(0.19)
Education	260	1.96	672	1.97	412	1.98	-0.01	-0.02
		(0.63)		(0.65)		(0.67)	(0.05)	(0.05)
Average LYL	260	0.47	672	0.48	412	0.49	-0.02	-0.03
		(0.28)		(0.28)		(0.28)	(0.02)	(0.02)
Prior belief about air quality	260	5.02	672	4.94	412	4.89	0.08	0.13
		(1.93)		(2.06)		(2.14)	(0.15)	(0.16)
Confidence in prior belief	260	3.44	672	3.48	412	3.51	-0.04	-0.06
		(0.82)		(0.85)		(0.88)	(0.06)	(0.07)
Worried about air pollution	260	4.20	672	4.47	412	4.64	-0.27**	-0.44***
		(1.76)		(1.69)		(1.63)	(0.12)	(0.13)
Prefer to not receive info	260	0.15	672	0.13	412	0.11	0.02	0.03
		(0.35)		(0.33)		(0.32)	(0.02)	(0.03)
Time spent on LYL page	260	23.39	672	21.18	412	19.78	2.21	3.61*
		(25.50)		(25.76)		(25.86)	(1.88)	(2.04)
Recall	260	0.88	672	0.83	412	0.81	0.04*	0.07**
		(0.33)		(0.37)		(0.40)	(0.03)	(0.03)
Recall error	260	0.37	672	0.68	412	0.88	-0.31**	-0.51***
		(1.28)		(1.98)		(2.29)	(0.13)	(0.16)
Abs recall error	260	0.37	672	0.69	412	0.89	-0.32**	-0.52***
		(1.28)		(1.97)		(2.29)	(0.13)	(0.16)
Perceived control (index)	256	-0.03	665	0.02	409	0.06	-0.05	-0.08
		(0.71)		(0.67)		(0.64)	(0.05)	(0.05)
Perceived control (1 item)	260	-0.10	671	0.01	411	0.09	-0.11	-0.18**
		(0.95)		(0.99)		(1.00)	(0.07)	(0.08)
Filler task performance	260	7.25	672	6.94	412	6.75	0.31*	0.50**
		(2.51)		(2.48)		(2.45)	(0.18)	(0.20)
Memory task performance	260	0.91	672	0.91	412	0.90	0.01	0.01
		(0.10)		(0.11)		(0.12)	(0.01)	(0.01)
Joint orthogonality F-stat							1.19	2.78
							(0.26)	(0.00)

Notes: The table presents summary statistics of participant characteristics and balance tests between the samples of participants that took part in the main and follow-up experiments, only in the control group. Selected In refers to participants that took part in both the main and follow-up experiments. Selected Out refers to participants that took part only in the main experiment. All characteristics have been collected in the main experiment. Parentheses underneath mean values are standard deviations of the respective observable characteristic. The two right-most columns report the difference in means between the sample that selected in the follow-up and the and sample in the main experiment or the sample that selected out of the follow-up, with estimated standard error in parentheses. Significant t-test estimates are denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

Table C-7 – Sample characteristics and balance tests for the USA treatment group in the main *versus* follow-up experiments.

	Selected In		Main		Selected Out		In - Main	In - Out
	N	Mean	N	Mean	N	Mean		
Age	240	40.27	626	38.69	386	37.71	1.57*	2.55**
		(11.92)		(12.39)		(12.59)	(0.93)	(1.01)
Female	240	0.49	626	0.50	386	0.51	-0.01	-0.02
		(0.50)		(0.50)		(0.50)	(0.04)	(0.04)
Household size	239	2.85	625	3.04	386	3.16	-0.19*	-0.31***
		(1.41)		(1.42)		(1.42)	(0.11)	(0.12)
Urban	240	0.78	626	0.75	386	0.73	0.03	0.05
		(0.42)		(0.44)		(0.45)	(0.03)	(0.04)
Income group	240	5.32	626	5.05	386	4.89	0.27	0.43**
		(2.28)		(2.31)		(2.32)	(0.17)	(0.19)
Education	240	1.94	626	1.99	386	2.01	-0.04	-0.07
		(0.63)		(0.66)		(0.68)	(0.05)	(0.05)
Average LYL	240	0.45	626	0.48	386	0.50	-0.03*	-0.05**
		(0.24)		(0.27)		(0.29)	(0.02)	(0.02)
Prior belief about air quality	240	5.14	626	4.99	386	4.89	0.15	0.25
		(2.02)		(2.17)		(2.26)	(0.16)	(0.18)
Confidence in prior belief	240	3.40	626	3.51	386	3.58	-0.11	-0.18**
		(0.94)		(0.92)		(0.90)	(0.07)	(0.08)
Worried about air pollution	240	4.27	626	4.46	386	4.59	-0.19	-0.31**
		(1.69)		(1.72)		(1.73)	(0.13)	(0.14)
Prefer to not receive info	240	0.13	626	0.13	386	0.13	0.00	0.00
		(0.34)		(0.34)		(0.34)	(0.03)	(0.03)
Time spent on LYL page	240	20.13	626	19.55	386	19.19	0.58	0.94
		(21.31)		(25.44)		(27.72)	(1.85)	(2.09)
Recall	240	0.88	626	0.85	386	0.83	0.03	0.05
		(0.33)		(0.36)		(0.38)	(0.03)	(0.03)
Recall error	240	0.37	626	0.61	386	0.75	-0.24*	-0.38**
		(1.23)		(1.87)		(2.17)	(0.13)	(0.15)
Abs recall error	240	0.37	626	0.61	386	0.77	-0.24*	-0.40***
		(1.23)		(1.87)		(2.16)	(0.13)	(0.15)
Perceived control (index)	238	0.54	622	0.47	384	0.43	0.07	0.11**
		(0.63)		(0.62)		(0.61)	(0.05)	(0.05)
Perceived control (1 item)	240	0.54	625	0.53	385	0.53	0.01	0.02
		(0.89)		(0.89)		(0.90)	(0.07)	(0.07)
Filler task performance	240	7.34	626	6.98	386	6.76	0.36**	0.58***
		(2.35)		(2.37)		(2.36)	(0.18)	(0.19)
Memory task performance	240	0.92	626	0.91	386	0.91	0.01	0.01
		(0.10)		(0.10)		(0.11)	(0.01)	(0.01)
Joint orthogonality F-stat							1.17	2.58
							(0.28)	(0.00)

Notes: The table presents summary statistics of participant characteristics and balance tests between the samples of participants that took part in the main and follow-up experiments, only in the treatment group. Selected In refers to participants that took part in both the main and follow-up experiments. Selected Out refers to participants that took part only in the main experiment. All characteristics have been collected in the main experiment. Parentheses underneath mean values are standard deviations of the respective observable characteristic. The two right-most columns report the difference in means between the sample that selected in the follow-up and the and sample in the main experiment or the sample that selected out of the follow-up, with estimated standard error in parentheses. Significant t-test estimates are denoted as follows: *** p<0.01, ** p<0.05, and * p<0.1.

D. Experimental Instructions

D-1. Instructions Main Study

The following screenshots are the instructions for the Indian sample as seen by the participant during the online experiment. F the US sample we use the term "county" instead "district" when referring to a participant's home region.

Welcome Next

Welcome

We are a group of **non-partisan** and **non-profit university researchers**.
This survey is part of a larger study that we are leading over 2021-2023.

Instructions

Apart from any applicable base reward, this survey offers a **bonus of maximum 120 INR**. Your total payment will depend on decisions you will take during the survey.

All payments will be **translated to panel points**.

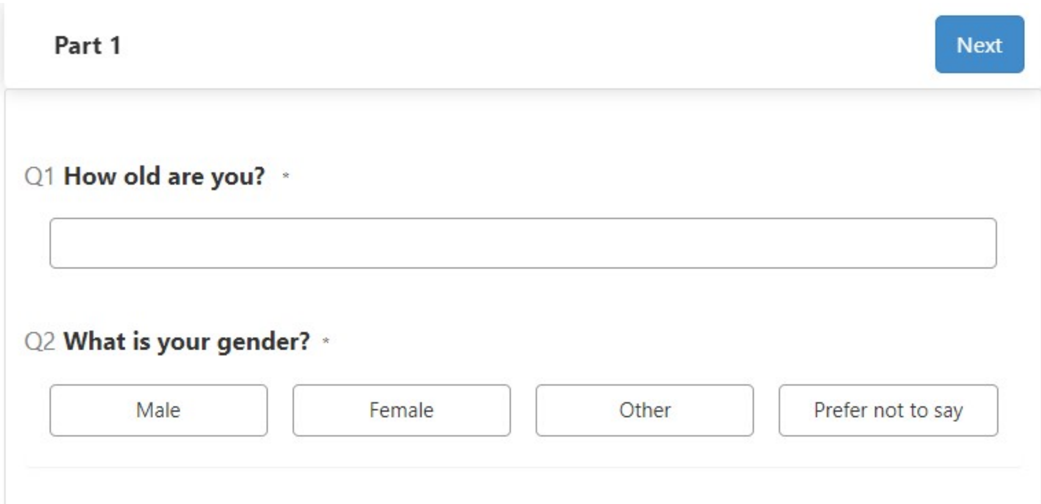
Please note that it could take up to 4-6 weeks for the additional rewards to be granted. Note also that it is up to the researcher's discretion to assess whether your responses are rushed, inattentive, or otherwise negligent which will result in the additional incentives being revoked without the possibility of dispute.

The expected completion time is around **10 minutes**. Please note that you have to finish the survey within *90 minutes*. If you take longer, the survey will automatically end and you will not receive any reward.

The task is divided into five parts:

- **Part 1:** A short survey about yourself.
- **Part 2:** Reading about and answering questions on a given topic.
- **Part 3:** A counting task in which you can earn a bonus.
- **Part 4:** Answering a few opinion questions.
- **Part 5:** An item recognition task in which you can earn a bonus.

Please press the "Next" button to begin with Part 1.

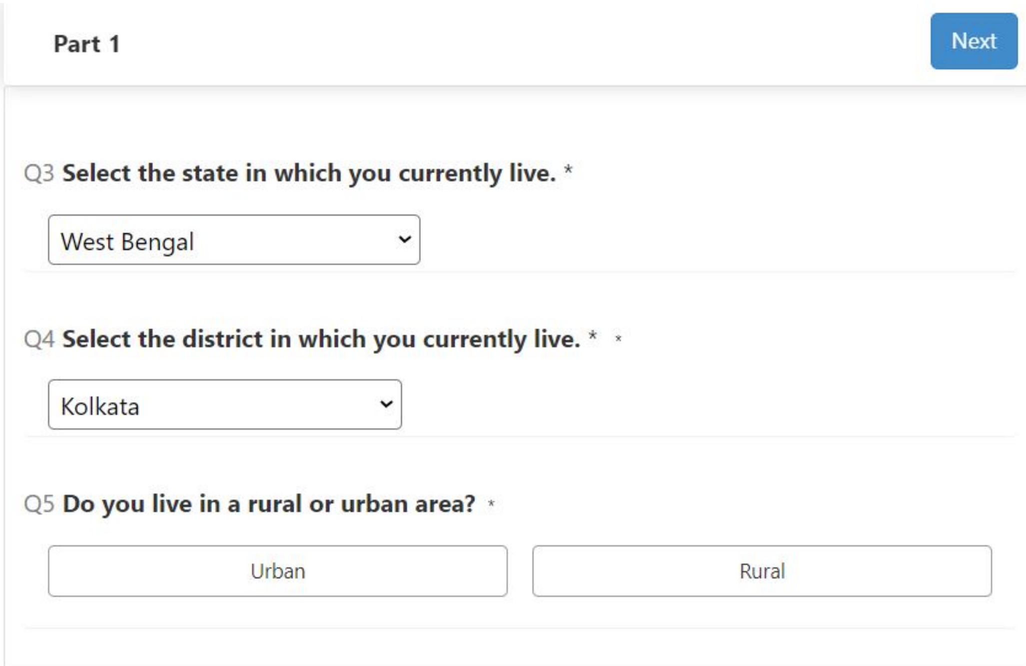


Part 1 Next

Q1 **How old are you?** *

Q2 **What is your gender?** *

Male | Female | Other | Prefer not to say



Part 1

Next

Q3 **Select the state in which you currently live.** *

West Bengal

Q4 **Select the district in which you currently live.** * *

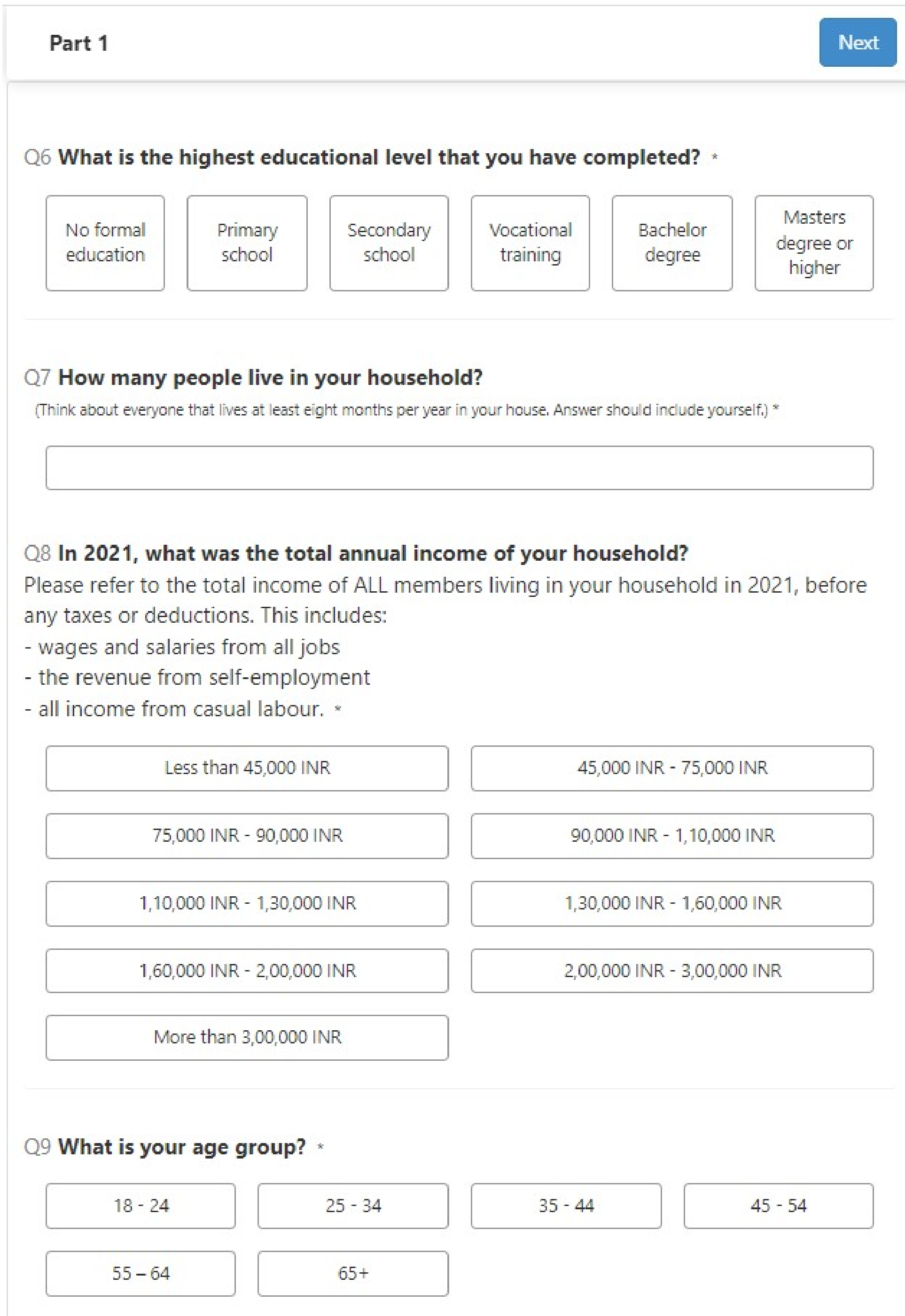
Kolkata

Q5 **Do you live in a rural or urban area?** *

Urban

Rural

**Note that in line with our pre-registered exclusion criteria, observations with inconsistent answers between Q1 and Q9 were dropped from the analysis.*



Part 1 Next

Q6 **What is the highest educational level that you have completed?** *

No formal education | Primary school | Secondary school | Vocational training | Bachelor degree | Masters degree or higher

Q7 **How many people live in your household?**
(Think about everyone that lives at least eight months per year in your house. Answer should include yourself.) *

Q8 **In 2021, what was the total annual income of your household?**
Please refer to the total income of ALL members living in your household in 2021, before any taxes or deductions. This includes:
- wages and salaries from all jobs
- the revenue from self-employment
- all income from casual labour. *

Less than 45,000 INR | 45,000 INR - 75,000 INR
75,000 INR - 90,000 INR | 90,000 INR - 1,10,000 INR
1,10,000 INR - 1,30,000 INR | 1,30,000 INR - 1,60,000 INR
1,60,000 INR - 2,00,000 INR | 2,00,000 INR - 3,00,000 INR
More than 3,00,000 INR

Q9 **What is your age group?** *

18 - 24 | 25 - 34 | 35 - 44 | 45 - 54
55 – 64 | 65+

Part 2: Instructions Next

Part 2

Thank you for answering all questions in Part 1! You are now starting **Part 2**.

In this section, you are asked to do a **reading and comprehension exercise**.

- You will be presented with several pages providing information on the topic of air pollution.
- Please read the information carefully.
- All information provided is true and the scientific sources are cited below the information boxes.
- On the bottom of each page, you are asked to answer 1 or 2 questions about the information contained in the box.
- **You can only proceed to the next page once you have answered all questions correctly.**

To start with **Part 2**, please click the "Next" button.

Part 2

Next

What is air pollution?

Air pollution refers to the presence of solid, liquid, and gas particules in the air, at levels that pose a health risk and can be detrimental for the environment.

What are the main SOURCES of air pollution?

Air pollution is generated both outdoors and indoors.

Outdoor sources: vehicle exhaust, industry (power generation, brick kilns), re-suspended dust on the roads due to vehicle movement and construction activities, open waste burning.

Indoor sources: combustion of various fuels for cooking, lighting, and heating, in-situ power generation via diesel generator sets.

Source: Box is our own representation of information from the WHO (https://www.who.int/health-topics/air-pollution)

Based on the box above, find the correct answer to the questions below.

(All your answers need to be correct in order to be able to proceed to the next page.)

Q1 **Which of the following statements is correct?** *

- Air pollution is mostly generated outdoors, but not indoors.
- Air pollution can be generated both indoors and outdoors.
- Air pollution is mostly generated indoors, but not outdoors.

Part 2 Next

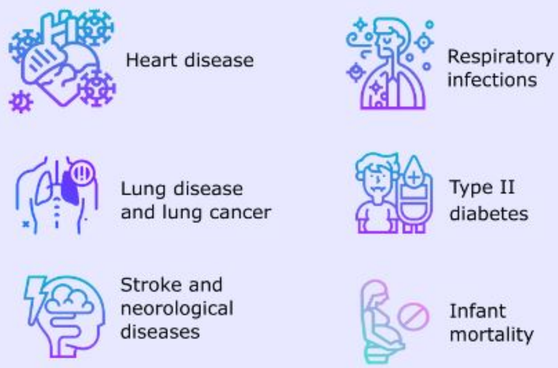
What are the main HEALTH effects of air pollution?

According to the World Health Organization (WHO, 2021):

1. Current research finds strong evidence that air pollution causes death and morbidity from cardiovascular and respiratory disease and from lung cancer and stroke.

2. Newer research also suggests that air pollution causes type II diabetes and impacts neonatal mortality from low birth weight and short gestation.

3. Air pollution may be linked to a larger number of neurological diseases, such as Alzheimer's.



Given current air pollution levels worldwide, **human lives are shorter** due to premature death from air pollution-related illnesses.

Source: Box is our own representation of information from the WHO (https://www.who.int/health-topics/air-pollution)

Based on the box above, find the correct answer to the questions below.

Q2 **Which of the following health conditions can be caused by exposure to air pollution?**

- HIV/AIDS
- Covid-19
- Lung cancer

Part 2

Next

How is air pollution measured?

One of the most dangerous pollutants is called **fine particulate matter (PM 2.5)**, which refers to a complex mixture of extremely small particles and liquid droplets.

PM 2.5 concentrations are commonly measured in micrograms per cubic meter, which is abbreviated as **$\mu g/m^3$**.

The World Health Organization (WHO) recommends that the annual average concentration of PM 2.5 stays below **5 $\mu g/m^3$** in order to avoid harmful health effects.

How much shorter is our life because of air pollution?

Every 10 $\mu g/m^3$ of PM 2.5 above the WHO standard shortens human life by almost **1 year** on average.

Data Sources: Ebenstein et al. (2017). https://aqli.epic.uchicago.edu/the-index/

Based on the box above, find the correct answer to the questions below.

Q3 **How many years of life do people lose on average by being exposed to annual air pollution concentrations that are 20 $\mu g/m^3$ higher than the WHO recommended level?** *

- 0 years
- 0.25 years
- 0.5 years
- 1 year
- 2 years

Part 1 Next

In India, exposure to air pollution is associated with almost 17 Lakh deaths annually.

(Source: Pandey et al., 2021)

Q4 **Think of your district Kolkata (West Bengal). How good do you think air quality is in Kolkata?**

Provide an answer on a scale from 1 to 10, where 1 means worst air quality and 10 means best air quality. *

Worst air quality 1 2 3 4 5 6 7 8 9 10 **Best air quality**

Q5 **How confident are you about your answer to the previous question?** *

Not confident at all | Not very confident | Neutral | Quite confident | Completely confident

Q6 **In general, how worried are you about the air pollution in Kolkata (West Bengal)?** *

Not worried at all 1 2 3 4 5 6 7 **Very worried**

Part 1 Next

What ACTIONS can YOU take to protect yourself against air pollution?

The following measures can be applied at home or outdoors to effectively reduce the impact of air pollution on your health.

Source: Carlsten et al., 2020. https://erj.ersjournals.com/content/55/6/1902056.short

Based on the leaflet above, answer the questions below.

Which of the following two sentences is correct?*

There is **nothing** I can do to protect myself effectively against air pollution.	There are **many things** I can do to protect myself effectively against air pollution, both indoors and outdoors.

Based on the box above, summarize the actions you can take to protect yourself against air pollution outdoors and indoors. (at least 20 characters)

20 characters needed

Part 2 Next

INSTRUCTIONS

On the next screen, you will make a choice between two options:

- Option 1: Receiving information about **how much shorter the life of the average person in your district is** because of air pollution levels.
- Option 2: Receiving **no information**.

Afterwards, a **random draw** will determine whether your choice is implemented.

Your preference has a 60% chance to be implemented.

Part 2 Next

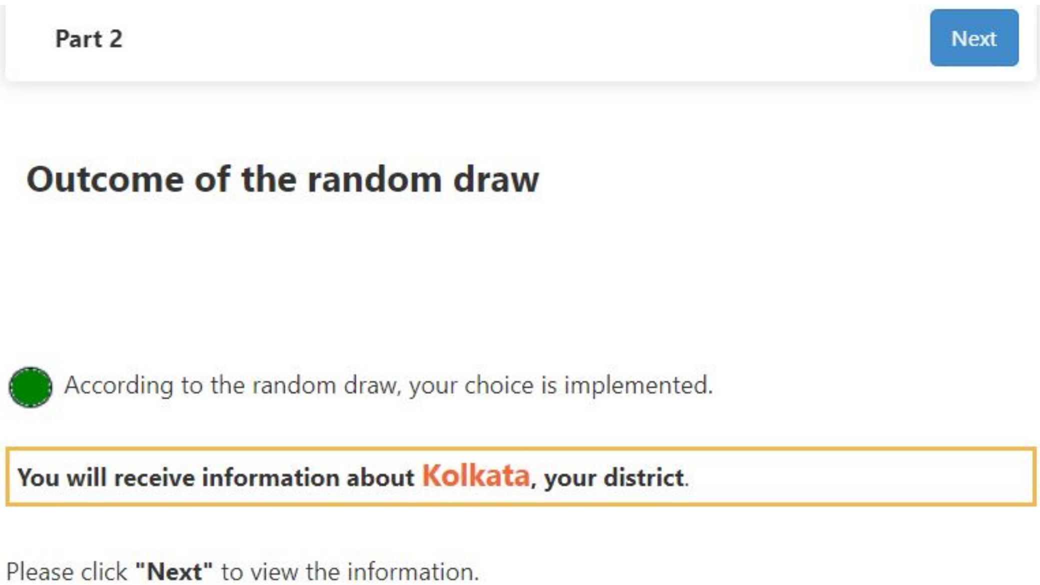
What do you prefer? *

I prefer not to receive any information.

I prefer to receive information about how much shorter my life is expected to be due to air pollution in **Kolkata** (West Bengal).

Your preferred choice is more likely to be implemented.

**Note that this is an example where the random draw decided to implement the choice of the participant (in this case the participant preferred to receive the information).*



**Note that this page is personalized to the participants home district reported during part 1. Also, the page is conditional on the random draw on the page before. That is, the page is only shown when they participant preferred to receive the information and the random draw implemented her choice or when the participants did not want to receive the information and the random draw did not implement her choice.*

Part 2 Next

How high is air pollution in **your district**?

Air pollution in Kolkata is about 17.0 times higher than the WHO recommended level.

How much shorter is your life because of air pollution?

People living in Kolkata, like yourself, lose on average 7.8 years of their life because of air pollution.

Data Sources: Hammer et al. (2020) https://sites.wustl.edu/acag/datasets/surface-pm2-5/#V4.GL.03; Ebenstein et al. (2017): https://aqli.epic.uchicago.edu/the-index/

Part 3 Next

Instructions

Thank you for completing Part 2! You are now starting **Part 3**.

In this task, you are asked to **count the number of coins** in a table.

For each correct answer, you earn a **bonus of 5 INR.**
(Note that all rewards will be translated into panel points.)

You have **120 seconds** to work on this task.

Below, you can see an example. You have to count the number of coins and enter the correct answer in the box below. Afterwards, you can click a "submit" button to learn whether your answer is correct. If your answer is correct, a new page with a new counting task will load. At the top of each page, the remaining time for the task is displayed.

When you are ready, click "Next" to start Part 3.

Part 3 - Your results Next

The time to work on this task is now up!
In total, you solved **6** boxes correctly. For each correct box, you earn **5 INR**.

This means, you earned a bonus of 30 INR from this task.

Please click "Next" to continue.

**Note that the page displays the case of a recall to the first decimal point (40 INR reward).*

Part 4 Next

Your task

Earlier in this survey, you have been shown information about **how much shorter your life is expected to be** because of air pollution in **Kolkata**.

We now ask you to recall this number.

Based on your answer, you can earn **an extra bonus**:

- If your answer is correct (the exact value from the earlier information page), you will earn a **bonus of 40** INR.
- If your answer is within half a year of the correct value, you will earn a **bonus of 20 INR**.
- If your answer is not within half a year of the correct value, you will earn no bonus in this question.

Note that any reward will be **translated into panel points**. Click **"Next"** to enter your answer.

How many years of life do people living in Kolkata lose on average because of air pollution?

(Move the slider to the desired position.)

0 years ***12 years***

You think people living in Kolkata lose on average 7.8 years of life due to air pollution.

Solution
The correct number of life years lost due to air pollution in Kolkata is **7.8**.

Your answer is **correct**! You receive a bonus of **40 INR**.

Part 4 Next

Indicate how much you agree or disagree with the following statements.

Statement 1

"I have little control of the negative effects of air pollution on my health." *

I strongly agree	I agree	I am neutral	I disagree	I strongly disagree

Statement 2

"There is really no way I can avoid negative effects from air pollution on my health." *

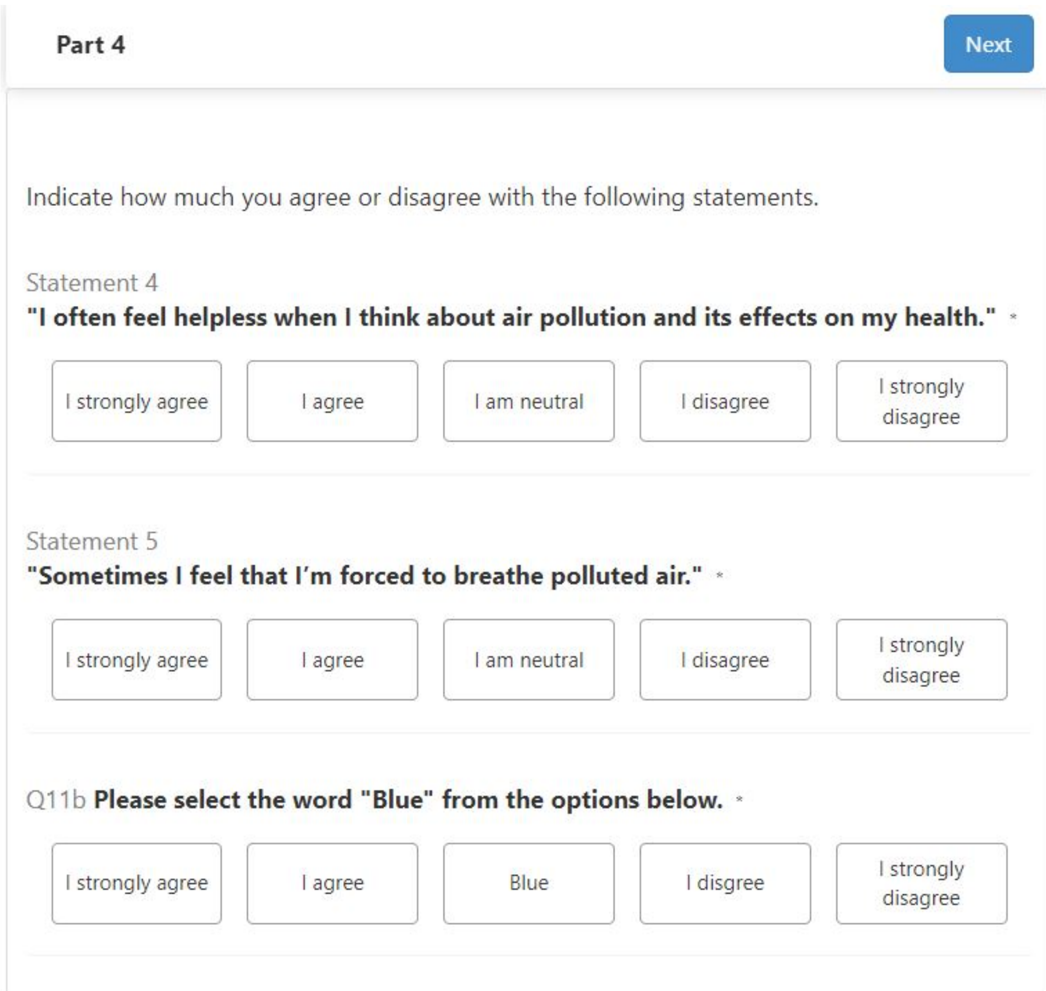
I strongly agree	I agree	I am neutral	I disagree	I strongly disagree

Statement 3

"There is little I can do to reduce the negative effects from air pollution on my health." *

I strongly agree	I agree	I am neutral	I disagree	I strongly disagree

**Note that the page includes a straight-line check. In line with our pre-registration, participants that did not select "Blue" in Q11b were dropped from the analysis.*


Part 4 Next

Indicate how much you agree or disagree with the following statements.

Statement 4
"I often feel helpless when I think about air pollution and its effects on my health." *

I strongly agree | I agree | I am neutral | I disagree | I strongly disagree

Statement 5
"Sometimes I feel that I'm forced to breathe polluted air." *

I strongly agree | I agree | I am neutral | I disagree | I strongly disagree

Q11b **Please select the word "Blue" from the options below.** *

I strongly agree | I agree | Blue | I disgree | I strongly disagree

Part 4 Next

Indicate how much you agree or disagree with the following statements.

Statement 6

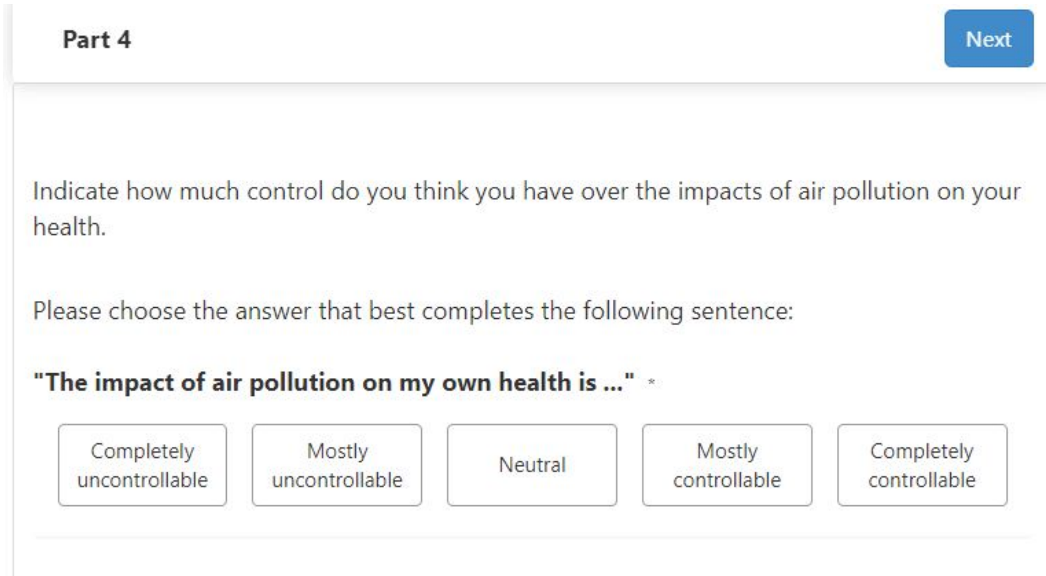
"How much air pollution will affect my health in the future mostly depends on me." *

I strongly agree	I agree	I am neutral	I disagree	I strongly disagree

Statement 7

"I can reduce the negative effect of air pollution on my health as much as I want if I really set my mind to it." *

I strongly agree	I agree	I am neutral	I disagree	I strongly disagree


Part 4 Next

Indicate how much control do you think you have over the impacts of air pollution on your health.

Please choose the answer that best completes the following sentence:

"The impact of air pollution on my own health is ..." *

Completely uncontrollable	Mostly uncontrollable	Neutral	Mostly controllable	Completely controllable

Part 5 Next

Thank you for completing Part 4! You are now starting **Part 5**.

In this part, you will work on an item recognition task.

- On the next page, you will see a set of 30 different items which you should **memorize** to the best of your ability.
- Each item is only displayed for **one second**.
- Afterwards, you will see another set of pictures.
- **For each item, we will ask you whether it was part of the first set.**
- For each correct response, you earn a **bonus of 2 INR**.
  (Note that all rewards will be translated into panel points.)

At the end of the task, we will let you know how many items you have correctly identified. **Have fun!**

To start with **Part 5**, please click the "Next" button.

Part 5 - Your results

Next

Thank you for finishing the memory task!
In total, you answered **10** out of all 15 memory questions correctly. For each correct answer, you earn **2 INR**.

This means, you earned a bonus of 20 INR from this task.

Please click "Next" to continue.

**Shown to participants in the control group who received the information on the expected loss of life expectancy in their home region:*

Disclaimer Next

Research Disclaimer

This survey is part of a research project aiming to understand people's attitude towards information about the impact of air pollution on their own health and general wellbeing. Our underlying purpose is to raise awareness regarding the potential damages that air pollution poses and motivate people to take action against it, while recognizing the challenges it raises.

There are actions all of us can take to reduce the impacts of air pollution on our health. See the image below for a list of things you can do to protect yourself.

If you are interested in reading more about protective measures against air pollution, we recommend the following source:

Carlsten, C., Salvi, S., Wong, G.W. and Chung, K.F., 2020. "Personal strategies to minimise effects of air pollution on respiratory health: advice for providers, patients and the public." *European Respiratory Journal*, 55(6). Article available online at: https://erj.ersjournals.com/content/55/6/1902056.short

Feedback Next

Thank you for participating.

If you want to get in touch with us for questions or suggestions, please write us an email at *pob.heidelberg@gmail.com*.

We are very interested in hearing your feedback about the following points:

1. ***Was the survey too long or too short?***
2. ***Did you find any question unclear or uncomfortable?***
3. ***Did you experience any technical difficulty?***
4. ***Were the images and maps loading correctly?***
5. ***How can we improve the study?***

If you do not have any comment, just type 'nothing' in the box below. (at least 5 characters)

5 characters needed

What do you think this study is about? (at least 5 characters)

5 characters needed

End Next

Thank you for participating!

You have now completed this task and your data has been saved. Please click "Next" to be redirected to the panel page.

IMPORTANT! We may invite you to a follow-up survey in 2 weeks!

**Treatment manipulation screen for the US sample. Note that the only difference is the pictogram in the bottom-left corner of the "at home" column. Instead of "Use clean cooking and heating fuels" as in the Indian sample, we instead use "Avoid smoke from open fires and waste burning".*

Source: Carlsten et al., 2020. https://erj.ersjournals.com/content/55/6/1902056.short

D-2. Instructions Follow-up Study

The screenshots below are the instructions for the Indian sample. The instructions for the US sample are similar except that we use the term "county" instead "district" when referring to a participant's home region.

Welcome **Next**

Welcome

We are a group of **non-partisan** and **non-profit university researchers**.
This survey is a follow-up to a survey you completed about 2 weeks ago.

Instructions

Apart from any applicable base reward, this survey offers a **bonus of maximum 40 rupees**.
Your total payment will depend on decisions you will take during the survey.

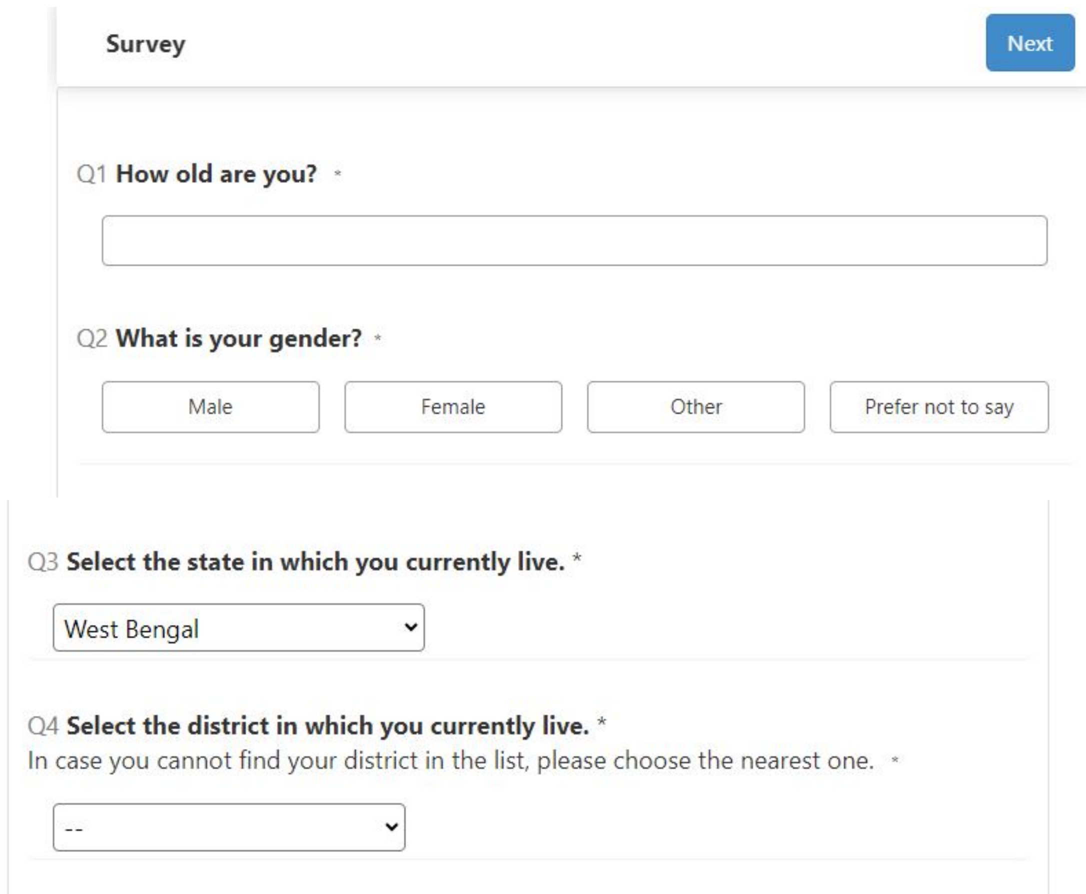
All payments will be **translated to panel points**.

Please note that it could take up to 4-6 weeks for the additional rewards to be granted. Note also that it is up to the researcher's discretion to assess whether your responses are rushed, inattentive, or otherwise negligent which will result in the additional incentives being revoked without the possibility of dispute.

The expected completion time is around **2-3 minutes**. Please note that you have to finish the survey within *90 minutes*. If you take longer, the survey will automatically end and you will not receive any reward.

Please press the "Next" button to begin.

**Note that we repeated the elicitation of the home region to identify participants that give inconsistent answers between the main experiment and the follow-up study.*


Survey

Next

Q1 How old are you? *

Q2 What is your gender? *

Male | Female | Other | Prefer not to say

Q3 Select the state in which you currently live. *

West Bengal

Q4 Select the district in which you currently live. *

In case you cannot find your district in the list, please choose the nearest one. *

--

Survey Next

Your task

Two weeks ago, you took part in one of our surveys. In that survey, you have been informed of **how much shorter your life is expected to be because of air pollution** in your district, **Kolkata**.

You can now earn an extra bonus by recalling this number.

- If your answer is correct (the exact value from the earlier information page), you will earn a **bonus of 40 INR**.
- If your answer is within half a year of the correct value, you will earn a **bonus of 20 INR**.
- If your answer is not within half a year of the correct value, you will not earn a bonus in this question.

Click **"Next"** to enter your answer.

How many years of life do people living in Kolkata lose on average because of air pollution?

(Move the slider to the desired position.)

0 years ***12 years***

You think people living in Kolkata lose on average 5.0 years of life due to air pollution.

Solution

The correct number of life years lost due to air pollution in Kolkata is **7.8**.

Your answer is **not correct**. Therefore, you receive no bonus for this question.

Survey Next

Indicate how much you agree or disagree with the following statements.

Statement 1
"I have little control of the negative effects of air pollution on my health." *

I strongly agree | I agree | I am neutral | I disagree | I strongly disagree

Statement 2
"There is really no way I can avoid negative effects from air pollution on my health." *

I strongly agree | I agree | I am neutral | I disagree | I strongly disagree

Statement 3
"There is little I can do to reduce the negative effects from air pollution on my health." *

I strongly agree | I agree | I am neutral | I disagree | I strongly disagree

Survey Next

Indicate how much you agree or disagree with the following statements.

Statement 4

"I often feel helpless when I think about air pollution and its effects on my health." *

I strongly agree	I agree	I am neutral	I disagree	I strongly disagree

Statement 5

"Sometimes I feel that I'm forced to breathe polluted air." *

I strongly agree	I agree	I am neutral	I disagree	I strongly disagree

Survey Next

Indicate how much you agree or disagree with the following statements.

Statement 6

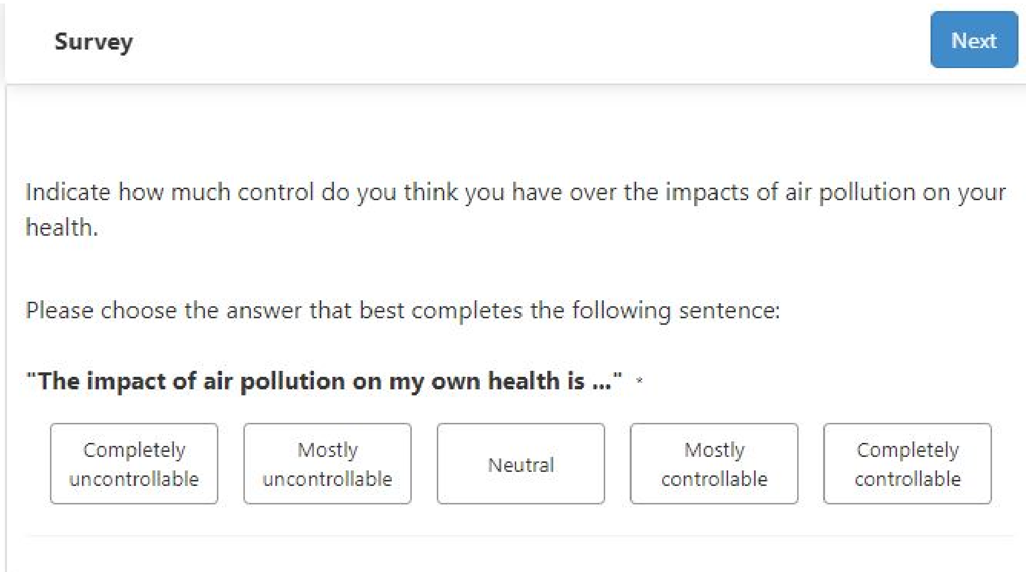
"How much air pollution will affect my health in the future mostly depends on me." *

| I strongly agree | I agree | I am neutral | I disagree | I strongly disagree |

Statement 7

"I can reduce the negative effect of air pollution on my health as much as I want if I really set my mind to it." *

| I strongly agree | I agree | I am neutral | I disagree | I strongly disagree |



Survey

Next

Indicate how much control do you think you have over the impacts of air pollution on your health.

Please choose the answer that best completes the following sentence:

"The impact of air pollution on my own health is ..." *

Completely uncontrollable | Mostly uncontrollable | Neutral | Mostly controllable | Completely controllable

Survey Next

In your daily life, how often do you engage in the following activitites? *

Wear a face mask	Never	Very rarely	About once per week	More than once per week	Every day
Use an air purifier indoors	Never	Very rarely	About once per week	More than once per week	Every day
Check the air quality in your area	Never	Very rarely	About once per week	More than once per week	Every day
Avoid highy polluted areas when commuting	Never	Very rarely	About once per week	More than once per week	Every day
Open the windows to ventilate rooms	Never	Very rarely	About once per week	More than once per week	Every day
Remove dust in your household	Never	Very rarely	About once per week	More than once per week	Every day
Spend time in nature	Never	Very rarely	About once per week	More than once per week	Every day
Burn waste	Never	Very rarely	About once per week	More than once per week	Every day
Handle open fires (e.g., for cooking, heating)	Never	Very rarely	About once per week	More than once per week	Every day

Disclaimer Next

Research Disclaimer
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There are actions all of us can take to reduce the impacts of air pollution on our health. See the image below for a list of things you can do to protect yourself.

If you are interested in reading more about protective measures against air pollution, we recommend the following source:

Carlsten, C., Salvi, S., Wong, G.W. and Chung, K.F., 2020. "Personal strategies to minimise effects of air pollution on respiratory health: advice for providers, patients and the public." *European Respiratory Journal*, 55(6). Article available online at: https://erj.ersjournals.com/content/55/6/1902056.short

Feedback Next

Thank you for participating.

If you want to get in touch with us for questions or suggestions, please write us an email at *pob.heidelberg@gmail.com*.

Two final questions:

1. Which questions do you remember from the survey you took with us two weeks ago? (at least 5 characters)

5 characters needed

2. What do you think this study was about? (at least 5 characters)

5 characters needed