

Information Avoidance

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We commonly think of information as a means to an end. However, a growing theoretical and experimental literature suggests that information may directly enter the agent's utility function. This can create an incentive to avoid information, even when it is useful, free, and independent of strategic considerations. We review research documenting the occurrence of information avoidance as well as theoretical and empirical research on reasons for why people avoid information, drawing from economics, psychology, and other disciplines. The review concludes with a discussion of some of the diverse (and often costly) individual and societal consequences of information avoidance.

What sense had I of her stol'n hours of lust?
I saw't not, thought it not, it harm'd not me: I
slept the next night well, was free and merry;
I found not Cassio's kisses on her lips:
He that is robb'd, not wanting what is stol'n,
Let him not know't, and he's not robb'd at all.

Othello

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The standard economic analysis of decision making holds that information is valuable to the extent, and only to the extent, that it leads to better decisions. A straightforward implication is that valid information should never be actively avoided, except for situations in which ignorance confers a strategic advantage. Even if information has no prospect of improving decision making, one can, according to standard economic assumptions, ignore it at no cost.

Consistent with standard theory, there are countless situations in which information is useful and sought after. There are, in fact, situations in which people seek out, and are even willing to pay for, apparently useless information (see Eliaz and Schotter 2007, 2010; Loewenstein 1994; Powdthavee and Riyanto 2014). Our focus in this review is, however, on the opposite phenomenon – on the many situations in which people avoid information, even when it is free and could improve decision making.² As we will discuss, information avoidance occurs not only when there is a strategic rationale for it but also when beliefs directly enter the utility function.

Casual observation, as well as considerable laboratory and field research that we review, suggests that information avoidance is common. Investors avoid looking at their financial portfolios when the stock market is down, an “ostrich effect” (Karlsson, Loewenstein and Seppi 2009; Sicherman et al. 2016). Individuals at risk for health conditions often eschew medical tests (e.g., for serious genetic conditions or STDs) even when the information is costless and should, logically, help them to make better decisions (Ganguly and Tasoff 2014; Lerman et al. 1996, 1999; Lyter et al. 1987; Oster, Shoulson and Dorsey 2013; Sullivan et al. 2004; Thornton 2008). Managers often avoid hearing arguments that conflict with their preliminary decisions (Deshpande and Kohli 1989; Schulz-Hardt et al. 2000; Zaltman 1983), even when such arguments could help them avoid implementing measures that are ill-founded. These examples only scratch the surface of a wide variety of situations in which people avoid information.

We do not review the broad, and almost infinite, range of situations in which people fail to obtain information that is in their power to secure, but focus on a narrower range of phenomena that we term ‘active information avoidance’. Although people often fail to collect

² There is some evidence that information avoidance is not limited to humans. In one classic, though admittedly somewhat difficult to interpret, study, Jenkins and Boakes (1973) pigeons were presented with periodic feedings that were preceded by the illumination of buttons which were generally white, but in some trials turned different colors one second before the (possible) presentation of the food. In one condition, the change in light color was uncorrelated with the subsequent delivery of food, in another a change in light color always preceded food delivery, and in a third a change in light color always preceded non-delivery. The information was, thus, equally diagnostic in the two latter conditions. Using different methods, the researchers monitored the pigeon’s focus of attention. Pigeons were more likely to attend to the illuminated keys in the condition in which they preceded food, and less likely in the condition in which they preceded no food, both relative to the condition in which they were uninformative.

or attend to potentially helpful information, only a small fraction of such instances qualify as active avoidance. We specify two necessary criteria for avoidance to be classified as 'active': (1) the individual is aware that the information is available, and (2) the individual has free access to the information or would avoid the information even if access were free.

First, for information avoidance to be 'active', the individual has to be aware that the information exists. It is hardly a choice to avoid information that one does not even know is available. Knowing that information exists does not, of course, generally mean knowing its valence, much less its specific content. Thus, a course instructor can know that teaching ratings have been collected, but not know how favorable or unfavorable they are, particularly in comparison to her expectations.

Even if people know the content of information, they may yet choose to avoid attending to it (an information avoidance tactic we discuss below). This may seem counterintuitive, but if you know that your bank account is depleted, you might still choose not to log on to your bank's website and peruse your balance, and if you know that your paper got rejected, you may still not want to read the reviewers' comments. In the context of information seeking, Sicherman et al. (2016) found that, when the stock market was up, investors were more likely to log in multiple times on weekends, even though logins beyond the first did not reveal new information because the market was closed. Investors seemingly gain pleasure from observing gains even when no new information is revealed, and likewise prefer to avert attention from outcomes known to be adverse. In these types of cases, one is aware quite precisely of what information will be revealed by looking, but can still, for attentional reasons, be motivated to not look.

Second, for information avoidance to be 'active', the individual should choose to not obtain the information even if it were costless to obtain, or even costly to avoid obtaining. In most situations, information *is* costly to obtain (carrying an opportunity cost, at least), so it will often be difficult in practice to tell if a particular piece of information is being actively avoided. If a medical test is expensive, an individual who foregoes the test may do so due to its cost, a preference to not find out the information, or a combination of the two. Indeed, it is even possible that people could use the cost to justify, to themselves or to others, a decision to avoid getting tested that actually had other motives. If getting tested is costless (and we can rule out confounding factors such as an impact on insurance rates), or avoiding getting tested is costly, then failing to get the test clearly qualifies as active information avoidance. Even when information is costly to obtain, but the individual who chooses not to obtain it would continue to do so if it were free or costly to avoid obtaining, we will classify this situation as a case of active information avoidance. Because the remainder of the paper focuses exclusively on active

information avoidance, we drop the word “active” for brevity, and, in what follows, refer simply to information avoidance.

Information avoidance should be of interest to economists because it is personally and economically consequential. Most obviously, it deprives people of potentially valuable inputs into decision making. A person who could, but does not, get tested for a transmittable disease, for example, could not obtain treatment for their condition and might transmit it to others. Both of these consequences are present for HIV/AIDS, where drug treatments both prolong life and decrease the risk of transmission.

Information avoidance also deprives people of potentially useful feedback they could use to fine-tune their behavior. Teachers who fail to peruse their teaching ratings, for example, miss out on information they could use to improve their teaching. Executives and leaders who don’t tolerate criticism, likewise, deprive themselves of information that could help them make valuable changes to their behavior. In fact, for reasons we will discuss, the people who could most benefit from feedback are often, paradoxically, the most likely to eschew it.

Information avoidance can also lead, or at least ‘license’, people to take selfish or immoral actions (or fail to take altruistic actions), as highlighted by the research on ‘moral wiggle room’ (Dana, Weber and Kuang 2007). A classic example of this effect is the propensity of prosperous people to avoid poor neighborhoods where observing the residents’ living conditions might induce guilt about their own relative privilege and, potentially, compel them to give to charity (Cain, Dana and Newman 2014; Dana, Cain and Dawes 2006; McGoey 2012).

Avoiding information that might challenge existing beliefs (one of varieties of information avoidance we discuss) can contribute to political polarization as voters and legislators are less likely to find common ground (Kahan et al. 2012). The political paralysis resulting from such polarization may, in turn, prevent potentially advantageous legislation to deal with problems such as climate change (Marshall 2014). Information avoidance can also promote media bias. If people pay attention only to media outlets that provide information consistent with their beliefs, those outlets will be discouraged from airing contradictory points of view (Gentzkow and Shapiro 2010).³ The desire to avoid information discordant with one’s beliefs can, more generally, lead to a wide range of economically consequential outcomes: geographic sorting by beliefs,⁴ proselytizing, and even to violence toward those one would like to silence (Golman et al. 2015).

³This is in addition to the incentives a media source may have to influence public opinion.

⁴“Political segregation: The Big Sort.” *The Economist*, June 19, 2008. <http://www.economist.com/node/11581447>

Information avoidance is not, however, always a bad thing. People would avoid information much less often if they did not obtain direct and immediate utility benefits from doing so. For example, dieters who opt for dessert may enjoy it more if they avoid caloric information, bad teachers who don't look at their course ratings may have higher levels of utility (although their students may not), and persons at risk of diseases, such as genetic disorders, may be able to lead perfectly happy lives until emerging symptoms or test results force the reality of their situation upon them. The (dis)utility people derive from beliefs should be considered a legitimate ingredient in their welfare.

Information avoidance can also confer practical benefits for decision making and daily functioning. The weak teacher who avoids his⁵ teaching ratings might even teach better, at least in the short-run. A student who is already suffering from performance anxiety might only do worse after having her fears confirmed with low performance on a practice test. The ostrich effect may also help investors not to panic-sell when markets are down. Information-avoidance that contributes to self-serving biases in negotiations might help self-righteous negotiators secure better deals, even if the same biases contribute to higher rates of impasse. And, by using uncertainty to excuse inaction (similar to taking advantage of moral wiggle room), a cuckolded lover may be able to maintain, and continue to enjoy and benefit from, a fulfilling relationship by ignoring information that might, if obtained, make him feel compelled to act on.

Section 1 of the paper discusses the different tactics that people use to avoid information. Although one might view information avoidance as a straightforward matter of simply not looking, there are many other tactics that people can and do use to avoid information. People may, for example, not draw obvious conclusions from data. They can also divert their attention from, or conveniently forget, information they wish they had not obtained in the first place.

In section 2, we review empirical research and theory, in economics, psychology, and other disciplines, dealing with information avoidance. We organize the literature according to the reasons for why people avoid information. Some of these reasons are consistent with standard economic theory, broadly construed. For example, information can be avoided for strategic reasons; ignorance can be a very useful commitment device (Schelling 1960). Other reasons are inconsistent, or less consistent, with standard theory. Most importantly, information can have direct hedonic value (positive or negative), separate from its usefulness. Behavioral theories that incorporate such 'belief-based utility' can help explain why a person might avoid information that has material value.

⁵ For simplicity and consistency, we use the male pronoun; all such uses would equally apply to females.

In Section 3, we discuss diverse individual and societal consequences of information avoidance, most of which are negative, but some of which are potentially beneficial. Section 4 concludes with a few final comments about the history of, and future directions for, research on information avoidance.

1. *Methods of information avoidance*

Although it is natural to think of information avoidance as a matter of simply not obtaining information, there are, in fact, a diversity of tactics that people use to avoid information. We construe information avoidance broadly, to include any behavioral or cognitive process that enables one to avoid reaching the conclusions that an unbiased perusal and analysis of information would lead to.

Physical avoidance: People can choose to avoid reading specific newspapers or magazines, listening to specific radio or television shows, looking at their teaching ratings, or having conversations with specific people. In some cases, they can, and do, even pay to avoid being exposed to such information. In a clever and particularly clean demonstration of such an effect, Eil and Rao (2011) had experimental subjects either take an IQ test or have their attractiveness rated by other subjects. Subjects then received private preliminary feedback on a subset of IQ questions or attractiveness ratings which hinted at how their final IQ test or attractiveness rating was likely to come out. People who received initial unfavorable information about their appearance or intelligence, relative to their expectations, were less likely to choose to obtain the full information, and some were even willing to pay to avoid obtaining it.

Ganguly and Tasoff (2014) presented participants with the possibility of getting tested for herpes simplex virus 1 (HSV-1) and virus 2 (HSV-2). Both are incurable, but the latter, which is an incurable sexually transmitted disease, was viewed by most subjects as a more serious condition. Seven percent of participants were willing to forgo a \$10 payment to avoid obtaining the test results for HSV-1, while twelve percent were willing to forgo the same amount for the HSV-2 test, suggesting that people found the latter test more threatening. Moreover, 77 percent of those who sacrificed \$10 to avoid a HSV-1 test also avoided a HSV-2 test, whereas among those who did not avoid an HSV-1 test, only 8 percent avoided an HSV-2 test. Additionally, participants who reported being worried about their STD status were more likely to forgo money to not be tested, and those who reported being in positive mood states were also more likely to avoid getting tested (although an explicit manipulation of mood did not have a significant effect).

Getting tested for an STD may require people to return to obtain the results and they may avoid information by failing to do so. Sullivan et al. (2004) surveyed more than 2,200 people who were at high risk of contracting HIV and found that of those who had been tested for HIV, 18 percent failed to return to the test center to obtain the results. Of those, 23 percent said they did not go back because they were afraid to get the results.

Inattention: Even when people do physically obtain information, or have it at their fingertips, they often have the ability to not focus their attention on it. Cognitive psychologists have long known that attention is a limited resource, selectively employed to facilitate information processing (Broadbent 1958; Schneider and Shiffrin 1977; Simon 1971). Research by economists has built on this insight, proposing that, like any scarce resource, attention ought to be allocated efficiently and the optimal allocation may involve rational inattention to some pieces of information (Caplin and Dean 2014; Sallee 2014; Sims 2003). Although these lines of research highlight the fact that people have an ability to deliberately direct their own attention, rational inattention for the purpose of conserving scarce cognitive resources would not qualify as ‘active avoidance’ under our definition, since obtaining the information in these situations does incur an (opportunity) cost.

Once one recognizes that information is a source of utility in its own right (apart from objective outcomes), it follows that people may also allocate attention in ways that respond to hedonic motivations. For example, people may choose to pay attention to information that is likely to be positive, while remaining inattentive to unfavorable or threatening information (even when that information may be somewhat more useful). Although inattention motivated by hedonic considerations has not been treated as a form of ‘rational inattention’, we note that there is nothing inherently irrational about avoiding information that one suspects will undermine one’s well-being.

Inattention can take a range of forms, some of which border on physical avoidance. For example, if one glances at a headline, then decides not to pay attention to (i.e., read) the associated article, this could be classified either as a case of inattention or physical avoidance. However, if one reads the article but then willfully and successfully chooses not to think about it, this would be an unambiguous case of inattention. Brock and Balloun (1967) presented participants in a lab experiment with speeches that supported or rejected a link between cancer and smoking and that were favorable or unfavorable toward Christianity. The speeches were masked by noise, which participants could remove by repeatedly pressing a button. In four experiments, smokers were more eager to remove static in the speech that rejected a link between smoking and cancer than the speech that supported a link between the two, and vice

versa for non-smokers. They found a weaker link (but significant in three of the four experiments) between a higher frequency of self-reported praying and reduced removal of static from the anti-Christianity message.

Biased interpretation of information: When information is obtained and attended to, and its implications are adverse, it is still possible for an individual to avoid drawing the most logical conclusions from it. Psychologists have long believed that people filter out negative information in order to maintain mental health and wellbeing (Taylor and Brown 1988). A number of studies in both psychology (e.g. Lord, Ross and Lepper 1979) and economics (e.g. Babcock et al. 1995) find that people weigh and interpret evidence in a fashion that supports what they are motivated to believe, and that they tend to denigrate the quality of evidence that contradicts beliefs that they hold or would like to hold. In one of the strongest demonstrations of the effect, Babcock et al. (1995) had negotiators read case materials either before or after they were assigned to the role (plaintiff or defendant) they would be negotiating. Then, they predicted how the judge on the case would rule, and were paid for their accuracy, and finally attempted to negotiate a settlement (in an incentive-compatible design). When they were assigned their role before reading the case materials, they were far more biased than when they were assigned after, and, as a result, they were more likely to reach costly impasse. In a secondary analysis, they had subjects rate the importance of eight arguments favoring the plaintiff and eight favoring the defendant. Plaintiffs rated arguments favoring their side as more compelling than those favoring the defendant, and vice versa. The study supports the idea, later embodied in a model of confirmation bias proposed by Rabin and Schrag (1999), that people do not simply arrive at self-serving beliefs at will, but become biased because they update their beliefs differently when information supports their pre-existing (or desired) beliefs than when it fails to support those beliefs. Providing even more direct evidence for Rabin and Schrag's model, Mobius et al. (2014) find, in an experiment, that people update more when receiving a positive signal about their ability than when they receive a negative signal. Even with a positive signal, however, they update less than predicted by Bayesian updating. Asymmetric and conservative updating seem to work in tandem to provide a good balance between protecting one's ego utility while avoiding a potentially costly overestimation of one's ability.

Peysakhovich and Karmarkar (2015) test the effect of favorable and unfavorable information on the valuation of an ambiguous gamble. Participants report a willingness to pay for a gamble in which their chance of winning is determined by a draw of a red ball from an urn containing 100 balls. They are further told that there are at least X red balls and at most Y red balls, which imposes lower and upper bounds on their likelihood of winning. After offering a price to play

the gamble, participants either receive favorable information (X is higher) or unfavorable information (Y is lower). Favorable information, predictably, increases their willingness to pay. However, the same does not hold for unfavorable information: after adjusting the upper bound downward, their valuation of the gamble does not change.

Lord, Ross and Lepper (1979) recruited subjects who had strong views in favor of, or in opposition to the death penalty, and presented to both groups two research studies, one suggesting the death penalty is effective at deterring crime and one indicating it is not. Subjects were then asked to evaluate the quality of both studies and how convincing they thought they were. Research that conflicted with their previously held beliefs scored lower on both measures than research that supported their prior beliefs. As a result, presenting both sides with the same evidence increased, rather than decreased, belief polarization.

Glaeser and Sunstein (2013) examine two mechanisms that can cause balanced news to give rise to increased polarization. First, even if people process information in a Bayesian fashion, the same information can have opposite effects if people begin with different priors (see also Benoît and Dubra 2011). Information recipients whose views are reinforced by the information will simply accept it, whereas those whose beliefs conflict with the message will tend to dismiss it and to question the quality or impartiality of the source. Second, in a process involving somewhat more nuanced psychology, the memories and convictions activated by the receipt of information are likely to depend on an individual's prior convictions, which can produce what Glaeser and Sunstein call a "memory boomerang." New and conflicting information may remind people of evidence reinforcing their beliefs, and this reminder can outweigh the new information, leading to an overall affirmation of their existing views.

In the IQ and attractiveness rating study discussed previously, Eil and Rao (2011) also asked subjects who had received preliminary feedback to provide their own evaluations of where the ultimate ratings were likely to come out, incentivizing subjects for accuracy. Those who received initially favorable information about their appearance or intelligence tended to upwardly adjust their beliefs about these attributes. However, the reception of negative information about these attributes led to no comparable downward adjustments of self-perceptions.

Families who suffer an ambiguous loss of loved ones (e.g., those missing-in-action in war, 'disappearances' caused by authoritarian regimes, abductions, or outdoor sports-related disappearances) often refuse to accept the reality of the individual's death, even in the face of overwhelming evidence (Boss 1999). Such families seem to experience a kind of expectational purgatory, facing but not adapting to their loss (Frederick & Loewenstein 1999:317). Denial of

reality in this situation can be viewed as a form of information avoidance with great negative hedonic consequences.

While one might expect people who are more intelligent to be less likely to misinterpret information in a motivated fashion, there is some research which suggests quite the opposite—i.e., that people marshal their intelligence in the service of believing what they want to believe. One paper by Gino and Ariely (2012) found that research subjects who scored higher on a measure of creativity (not, in fact, intelligence) were better able to come up with moral justifications for dishonest behavior, and behaved more dishonestly as a result. Kahan et al. (2012) have also found that increased scientific expertise does not lead to convergence on scientific issues such as the reality of climate change. Indeed, the opposite is the case: the beliefs of people with the highest levels of scientific literacy exhibited the most extreme levels of polarization.

Forgetting: Even when information has been received and attended to, a final information-avoidance strategy available to individuals is to forget the information. Although often thought of as a passive process, people may deliberately and selectively fail to rehearse negative information and therefore forget it over time (Benabou and Tirole 2002). Motivated forgetting may help people deal with unpleasant life experiences (Anderson and Huddleston, 2012) or reduce cognitive dissonance (Akerlof and Dickens 1982).

Shu and Gino (2012) conducted four laboratory experiments in which participants completed an ability-based task and were paid according to their performance. The task was designed to give participants in some conditions the opportunity to over-report their performance (and thus increase their earnings by cheating). When given an opportunity to cheat, those who cheated recalled fewer previous items from a moral code—consistent with motivated forgetting. This difference persisted even when participants were paid to accurately remember the items.

Ehrlich et al. (1957) conducted a lab experiment to test whether people avoid information that challenges the wisdom of a previous choice. In a lab experiment, they asked participants who had purchased cars to recall their exposure to car advertisements. Participants who had bought a new car (but not owners of older cars) were more likely to recall reading advertisements promoting their car than ads promoting other models. They then presented participants with advertisements of eight makes of cars and asked them to provide comments on two of them. Owners of both new and old cars preferred evaluating advertisements of their own make than of different makes. However, less consistent with an information avoidance story, participants who reported other makes they had considered buying were not less likely to look at and comment on the advertisements of those makes.

Even when people are unable, or for other reasons fail, to engage in motivated forgetting, they could still expend greater effort in remembering information they wanted to remember, as compared with information that they would prefer to forget. Bernheim and Thomadsen (2005) suggest, for example, that people with unbiased but imperfect memory might leave themselves reminders that bring to mind pleasant memories, but choose not to leave themselves reminders about events that evoke unpleasant thoughts. Benabou and Tirole (2011) suggest that people make investments based on their beliefs to remind themselves of their social identities.

Self-handicapping: Self-handicapping is a highly specialized form of information avoidance that is difficult to classify into one of the other, broader, categories. Self-handicapping refers to people’s tendency to choose tasks that are poorly matched to their own abilities—either too easy or too difficult—or to take actions that undermine their performance, as a strategy for avoiding information about their abilities (see Benabou and Tirole 2002, for a theoretical perspective; also Alaoui, 2012). In a classic study of self-handicapping, Berglas and Jones (1978) randomly assigned participants to complete a test consisting of either soluble or insoluble questions. After completing the test, they were given positive feedback about the number of questions they answered correctly (irrespective of how they really did). Then, prior to taking a second test that they were told would be similar to the first, participants were offered a choice between a performance enhancing or a performance debilitating drug. In the condition with insoluble questions (in which subjects believed that their strong performance was a fluke that would unlikely be repeated), significantly more participants preferred the drug that interfered with performance.

2. Varieties of information avoidance

In this section, we review theories that predict information avoidance, as well as empirical research providing evidence for or against the specific mechanisms implicated by the theories. We organize this section of the review by the cause of (i.e. the reason for) information avoidance.

A generic time-line of decision making can help to fix the discussion.

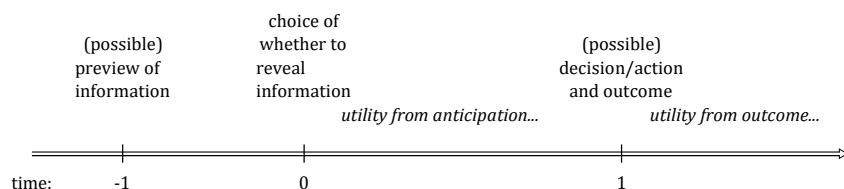


FIGURE 1. TIME-LINE OF DECISION MAKING

At time $t = -1$, an individual receives a preview of some information that will be in his power (at $t = 0$) to obtain. At $t = 0$, the individual then decides whether to reveal information. At time $t = 1$, in some, although not all, situations, the individual can then make a decision or take an action that could be informed by the information. An investor, for example, might listen to the evening news at $t = -1$, learn that the stock market had fallen, but retain some uncertainty about the change in his own portfolio. At time $t = 0$, he could then decide whether to log in to his brokerage account and learn how his portfolio had actually performed. At time $t = 1$, in part based on whether or not he logged in and if so what he discovered, he might then decide to engage in trades.⁶

As the figure shows, there are two ways that the first information acquisition decision could affect the individual's utility. First, deciding whether to reveal the information can have a direct impact on utility from anticipation or realization. The investor, for example, will feel differently depending on whether he logs on or not. In most scenarios, he will have expectations (and some uncertainty) about what choosing to 'look' will reveal and hence how he will feel if he does reveal the information. Second, the information could inform a subsequent decision. The investor's decision to trade, and if so what trade to make, could be affected by the choice of whether to reveal the information and, if information is revealed, its content. The quality of the action—whether it has beneficial or adverse consequences—could, then, also affect his utility.

The examples of information avoidance that we have already mentioned, as well as many others that we discuss in this section, can be classified into two broad categories corresponding to this division of utility effects: those driven by hedonic considerations (typically a desire to avoid bad news because it will make one feel bad) and those driven by strategic considerations. Within strategic considerations, we draw a further distinction between those involving only the decision maker, and those involving other parties. As an example of the former, an individual who was about to give a significant public address might choose not to view a video of himself giving a previous talk, so as to prevent a presentation-debilitating plunge in confidence or a surge of self-consciousness. As an example of the latter, during collective bargaining, a labor union leader could choose not to poll workers about their willingness to accept management's

⁶ The time-line presents a simplified setting that could be enriched with various complexities. For example, the situation might be repeated (as in the case of an investor who every day faces the option of logging in), and the two decisions might be linked in some fashion (for example, the investor cannot trade without logging in). Similarly, someone may have multiple opportunities to acquire a fixed piece of information (e.g. the results of a genetic test).

first offer, thus maintaining credible uncertainty about workers' actual reservation wages and positioning him to bargain more effectively on their behalf (Schelling 1956; 1960).

2.1. Hedonically-driven information avoidance

The category of hedonic reasons for avoiding information itself encompasses a diversity of different motives, and a wide range of theories incorporate these motives and make it possible to examine their implications. Here, we examine seven distinct psychological mechanisms that can produce information avoidance: preferences for resolution of compound lotteries, disappointment aversion, anxiety, regret aversion, optimism maintenance, attention effects and belief investments. We examine each of these in turn.

Preferences for resolution of compound lotteries: Imagine an individual who is coming up for tenure, and a series of committees each have to approve the case for tenure to be ultimately granted. Would the individual prefer to know of the intermediate committees' decisions, or only to be appraised of the final decision? Avoidance of information about the resolution of intermediate stages of compound lotteries, as in the example, can derive from risk preferences violating expected utility. In general, receiving information about a future lottery creates a two-stage compound lottery. An individual would choose not to find out the results of the first stage of the lottery if he preferred the reduced compound lottery to the distribution of second-stage lotteries that results from realization of the first stage (see, e.g., Grant, Kajii, and Polak 1998; Hoy, Peter and Richter 2014; Snow 2010).⁷

Kreps and Porteus (1978) provide a mathematical framework in which a lottery is specified by its time of resolution along with its possible outcomes and probabilities, so that a wager that pays off tomorrow based on a coin flip today is different from an identical wager based on a coin flip taking place tomorrow (just in time to determine the payoff). Their model provides a representation of preferences for earlier or later resolution of lotteries, and, if later resolution is preferred, then an individual would choose to avoid information about the outcome of the lottery until the payoff is to be received. Grant, Kajii and Polak (1998) characterize preferences to obtain or avoid information that result from a wide range of preferences regarding compound lotteries. Their framework generalizes that of Kreps and Porteus (1978). In Grant,

⁷ We typically conceive of avoiding information about the first stage of a compound lottery as reducing that compound lottery, implicitly adopting an ex-ante view in which the compound lottery will unfold in the future. Alternatively, one could conceive of proceeding through the first stage of a two-stage lottery as exchanging a compound lottery for a randomly selected simple lottery. Given that ex-post perspective, avoiding information about the first stage would mean continued exposure to both stages of uncertainty rather than exposure to just the single remaining stage.

Kajii and Polak's framework, the preference to avoid information in order to preserve a lottery's desired profile of uncertainty is indistinguishable from the preference to have that simple lottery rather than a materially equivalent two-stage compound lottery. Avoiding information, in effect, reduces the compound lottery. A preference for later resolution of uncertainty (i.e., temporary information avoidance) can also be accommodated within a restricted class of recursive models of ambiguity aversion (Strzalecki 2013).

Following a similar line of reasoning, Palacios-Huerta (1999) and Dillenberger (2010) suggest that preferences about compound lotteries could stem from preferences to have them resolved gradually or all at once (not just from preferences for earlier versus later resolution). (See also Li (2015) in the domain of ambiguity.) If individuals prefer one-shot resolution of lotteries, then they may avoid partial information about their prospects and instead wait to find out just the eventual outcome. Similarly, if individuals prefer gradual resolution, then they may temporarily avoid full information about the resolution of the compound lottery and instead gather this information in pieces. Indeed, Zimmermann (2014) finds that people have heterogeneous preferences about gradual or one-shot resolution of lotteries; about half of subjects in his experiment addressing the issue did, in fact, choose to avoid receiving early information about the outcome of a lottery, but instead chose to get this information in pieces over the course of a few days.

Risk-, Loss- and Disappointment aversion: If we assume that utility depends directly on beliefs, then information avoidance can be derived from simple assumptions. Utility function concavity alone, perhaps somewhat surprisingly, implies that information should generally be avoided, in the absence of adverse material consequences for doing so. The logic is simple: the utility down-side of coming out below expectations is simply greater than the up-side, an effect also predicted by models that incorporate loss aversion (Kőszegi 2010; Kőszegi and Rabin 2009). Acquiring information and resolving uncertainty would be akin to accepting the risk of possible disappointment or elation rather than simply maintaining one's prior expectations. More generally, Gul (1991) shows that risk aversion implies disappointment aversion, and recursive disappointment aversion in a dynamic setting (such that individuals are disappointment-averse every time some uncertainty is resolved) necessarily leads to information avoidance until all uncertainty can be resolved at once (Andries and Haddad 2014; Artstein-Avidan and Dillenberger 2015; Dillenberger 2010).⁸ The strength of this account of information avoidance – that the prediction is so robust – is also its major weakness. It predicts information avoidance

⁸ When information is instrumental, of course, risk aversion can be eclipsed by the usefulness of the information, e.g., to treat a medical condition if it is diagnosed (see, for example, Fels 2015).

that is much more widespread than what is actually observed. In Eliaz and Schotter (2010), for example, participants were faced with a decision under uncertainty about the state of the world. The same decision was optimal in any state of the world (i.e. the state of the world would not have given them any useful information), yet they were willing to pay to find out which state of the world they were in. Such findings may suggest an inherent curiosity that often motivates information acquisition (see Golman and Loewenstein 2015a; Loewenstein 1994), even when the expected (hedonic) impact of receiving the information is negative (Kruger and Evans 2009).

Disappointment aversion leading to information avoidance may emerge naturally in some situations, without assuming utility function concavity, if people use information to make coarse categorical judgments (Kőszegi 2006). If the balance of evidence is just above the threshold necessary for a positive judgment, additional information could reaffirm one's belief (a neutral outcome) or could disappoint (a negative outcome), but would be unlikely to elate (a positive outcome). In these cases, information would be avoided to guard against disappointment.

In Bell (1985) and Loomes and Sugden (1986), decision makers are more disappointed if they receive the low payoff that had a small probability than if the probability of receiving a low payoff is large, holding constant the expected value. Outcomes farther below one's expectation give rise to more disappointment. Bell (1985) applies this assumption to delegated informational preferences. His model implies that in breaking bad news to a recipient, the delegate should shield the recipient and disclose the information in small pieces to slowly adjust the recipient's expectations. Good news, in contrast, should be revealed immediately.

Anxiety: Feelings of anxiety could cause an individual to avoid potentially useful information. Maslow (1963) suggested that people sometimes avoid finding out about a risk – e.g. of experiencing a disease or disaster -- to reduce anxiety about such events. Indeed, many medical patients do find it stressful to be given more information about an unpleasant impending procedure than they absolutely require (Miller and Mangan, 1983). Some cancer patients avoid information about the state or prognosis of the disease so as to retain hope of recovery (Case et al. 2005; Leydon et al. 2000; Nosarti et al. 2000). These motives can be represented in an expected utility model in which people derive utility from anticipation of future events (as well as from eventual outcomes) (Caplin and Leahy 2001; Kőszegi, 2003).

In Caplin and Leahy's (2001) model, utility is derived from psychological states, which encompass not only present material outcomes but also beliefs about the probability of material outcomes that may occur in the future. When getting incomplete information runs the

risk of engendering anxiety about uncertainties that cannot be resolved, a person might choose to avoid this information. For example, obtaining a medical test that would diagnose a disease exposes one to the prospect, if the test comes out positive, not of just knowing one has the disease, but of anxiety and stress about the course of the disease. Avoiding the diagnosis cannot help one to avoid the disease (and, may even eliminate an opportunity to treat it), but it can help one avoid the stress and anxiety. Note, however, (as will be discussed momentarily) that people's intuitions about the effect of information on anxiety are often wrong – i.e., that knowing the worst often engenders less anxiety than suspecting the worst.

Kőszegi (2003) also proposes a model in which individuals derive utility from their beliefs. Learning about a bad health state may lead to gains in utility from any subsequent treatment, but causes disutility from the change in beliefs (i.e. the patient no longer thinks of himself as healthy). The model predicts, contrary to standard economic theory, that individuals would be less likely to seek a diagnosis for more serious potential conditions, because obtaining the diagnostic information in these cases is riskier. However, conditional on getting a diagnosis, patients should want the most accurate available. Sensibly, the model also predicts that individuals would not want to avoid information about conditions known to be perfectly treatable.⁹

Eliasz and Spiegler (2006) point out that, while incorporating anticipatory feelings into expected utility allows for information avoidance due to anxiety, it predicts that disliking information is independent of one's prior beliefs about the issue. In reality, of course, people tend to experience more anxiety when they suspect that very bad outcomes are likely, and information avoidance is more prevalent when individuals have more negative prior beliefs. Women with breast cancer symptoms that are getting worse, for example, wait longer to visit a physician than those whose symptoms are steady or disappearing (Caplan 1995), despite the patent self-destructiveness of doing so. Women who have first-hand experience with a family member's breast cancer are also more likely to delay getting tested (Meechan, Collins and Petrie 2002).¹⁰ Persoskie et al. (2013) find that people over 50 are more likely to avoid visiting a doctor when they are more worried about getting cancer, and that there is a positive interaction with the subjective probability of getting cancer in the future. When asked whether they "avoid visiting their doctor even when they suspect they should [visit]," 40.4% of those under 50 and 29.4% of those over 50 said they did so. Ferrer et al. (2015) show that the

⁹ Consistent with this prediction, Emanuel et al. (2015) find that, against the backdrop of 39% of survey respondents who reported that they would "rather not know [their] chance of getting cancer," those who believed that there isn't much one can do to prevent cancer were more likely to not want to obtain the information.

¹⁰ See, also, the aforementioned studies by Eil and Rao (2011) and Ganguly and Tasoff (2014).

expected affective response to finding out unfavorable information (being devastated by the results and being unable to cope with having a high risk of a fatal disease) significantly reduces the desire to obtain the information – except when people believe there are actions they can take to reduce any risk that that is uncovered.

The decision to get tested for a genetic condition may depend on a number of factors. For example, a test that is perfectly diagnostic eliminates all worry in the event of a negative result, but also leaves no room for hope if the result is positive. On the other hand, tests which result in more accurate expectations but do not produce certainty may leave hope in the event of a positive result, but do not eliminate worry if the result is negative. Yaniv et al. (2004) vary the base rate of a condition, whether it is treatable, and the diagnostic accuracy of a test. They find that neither the base rate nor the diagnosticity have an effect on the proportion of people who would like to avail themselves of the test, perhaps because the two effects involving worry and hope operate in opposing directions, or perhaps because the preference is largely driven by powerful heterogeneity in personal preferences. However, much as in Ferrer et al. (2015), the potential for treatment does have a big effect; the proportion of people willing to get tested increases from 33%-47% with no treatment to 80%-93% when a treatment is available.

Information avoidance due to anxiety can clearly be counterproductive if it delays beneficial action. Avoidance can also be counterproductive if it leaves individuals in a state of expectational limbo which impedes their adaptation. A paper titled “happily hopeless” by Smith et al. (2009) illustrates such a potential consequence. The researchers elicited the happiness and life satisfaction of people who had colostomy or ileostomy operations one week, one month and six months after the operation. The main focus of the study was a comparison between those who had operations that were irreversible, and those who had procedures that were potentially reversible in the future. Apart from instances in which the procedure was in fact reversed, uncertainty in this situation turned out to be a bad thing; people with irreversible procedures became progressively happier over time until their happiness and life satisfaction was indistinguishable from that of the general population. People who had potentially reversible operations, in contrast, although starting off marginally happier than those with irreversible ones, became progressively more miserable, ultimately reporting happiness far below that of the irreversible group. These results didn’t examine information avoidance per se, but do show how the kind of uncertainty that information avoidance can produce can impede adaptation and induce long-term misery.

Attention: New information tends to be surprising, which means that it attracts attention and has a disproportionate impact on utility (Golman and Loewenstein 2015a; 2015b; Karlsson,

Loewenstein and Seppi 2009; Tasoff and Madarasz 2009). If information is expected to be adverse, therefore, people may have an incentive to avoid it. To find out something bad, at least in the short run, tends to be worse than only to suspect it. In the long run, however, as we have already discussed (see Smith et al. 2009), knowing can be better if it enables an individual to adapt to adverse circumstances.

Karlsson, Loewenstein and Seppi (2009) propose a model in which news about one's investment portfolio, relative to lagged expectations, has a greater impact on utility when one is attentive. Given the lag in updating one's expectations, there is a motive to be inattentive when the investor suspects that the news from looking would likely be unfavorable. In the same paper the authors present empirical data on the frequency of logins to retirement investment accounts when the broad market shows gains vs. losses. When markets overall go up, then it is likely that individual stocks held by investors have appreciated as well. In that case, logging on to check one's savings is likely to present good news. On the other hand, if the market has declined, then logging in is more likely to reveal bad news. Investor behavior is consistent with a desire to avoid bad information: investors are more likely to log in on days when the market went up. In doing so, they avoid information about current losses that may be relevant to their trading strategy.

A follow-up paper analyzing a very large sample of individual 401k investors over a two-year period (Sicherman et al. 2016) provides additional insights. One is that, reminiscent of Kőszegi's (2003) prediction that patients facing worse outcomes (who, arguably, need the information most) are least likely to seek a diagnosis, investors with large holdings are more likely to avoid information. Another is that information avoidance seems to be the product of stable character traits; investors who were ostriches in 2007 (logging in selectively when the market went up) also tended to be ostriches in 2008, despite dramatically different market conditions. The authors' analysis of multiple logins on weekends, mentioned briefly above, is also quite revealing. Weekend logins after the first provide no new information because the market is closed and portfolio information is not updated on the web, so the main purpose of such logins appears to be to 'savor' the information by paying attention to it, much as a child might shake a coin-packed piggy-bank. Indeed, these non-informative logins display an even stronger ostrich pattern than do logins during the week.

Golman and Loewenstein (2015a) propose a model of information acquisition and avoidance in which information is surprising to the extent that it generates more drastic revisions of beliefs. Surprise produces a short-run boost in the attention devoted to these beliefs, and, in turn, these beliefs have a greater impact on one's utility. Thus, information that is expected to

produce negative beliefs can lower one's utility even though a prior expectation of a negative outcome was already a source of disutility. When there is a suspicion that the news revealed by information might be undesirable – for example, teaching ratings when a course seems to have gone badly, or the value of one's own portfolio when one learns from the news that the market has fallen – people will be motivated to avoid getting this information to avoid the increase in attention, and hence weight in utility, that is likely to accompany its receipt.

Empirical studies provide support for an attentional mechanism underlying avoidance of information when bad news is suspected. Miller (1987) finds that many individuals (identifiable through self-reports) distract themselves from threatening information, for example about an impending electric shock (as in Averill and Rosenn 1972) or about warning signs of poor academic performance. Falk and Zimmermann (2014) find that people are more inclined to avoid information about whether they will be receiving electric shocks (clearly bad news if they are) when they can distract themselves by playing a quiz game.

Regret aversion: Regret occurs when people compare the outcome of a decision to what would have happened if they had made a different choice (e.g. Loomes and Sugden 1982, 1987). Regret aversion, like disappointment aversion, can generate information avoidance, but in the case of regret-aversion the information avoided is about what the outcome would have been had one taken an alternative course of action. Kraemer and Stone (2013) model anticipated regret as a cause of information avoidance in the context of choice under epistemic uncertainty. Additionally, there is a large empirical literature in psychology documenting consumers' avoidance of information about unchosen products, or of information about the risks of products they have chosen (e.g. Frey and Stahlberg 1986; Jonas et al. 2001). Ehrlich et al. (1957), for example, found that new car owners pay more attention to advertisements for the model they purchased than for models they had considered but did not buy. Brock and Balloun (1967) observed that smokers attend more to pro-smoking messages and that nonsmokers attended more to anti-smoking messages.

Optimism maintenance: Both theoretical models in economics (Brunnermeier and Parker 2005) and a very large literature in psychology (summarized in Sharot 2011) recognize, and provide theoretical foundations for, the prevalence and benefits of optimism. In Brunnermeier and Parker's (2005) model, people can choose to hold optimistic beliefs, which are a source of anticipatory utility and thus improve immediate well-being (potentially at the risk of intensifying future disappointment). Information avoidance can occur in this context because acquiring information can interfere with the ability to maintain unwarranted optimism. To the extent that

people are motivated to maintain optimistic expectations, they will be similarly motivated to avoid information that could force a downward revision of those expectations.

Oster, Shoulson and Dorsey (2013) provide evidence of information avoidance that is consistent with optimism maintenance by people at risk of Huntington's disease. Many people at known risk of carrying the disease fail to get tested, despite the manifest usefulness of such information for decisions such as whether to have children. Two key pieces of evidence that are consistent with optimism maintenance, as opposed to other explanations for information avoidance, are that: (1) people who fail to get tested (but know they are at risk) make life decisions that are indistinguishable from those who get tested and discover they do not carry the disease, but very different from those who get tested and discover they do carry the disease, and (2) people at risk for Huntington's appear to be generally optimistic about the (un)likelihood that they have the disease.

Also consistent with optimism maintenance are findings from the experiment, discussed earlier, by Eil and Rao (2011). Presenting people with a hint about the value of attributes they care about (their own intelligence or attractiveness), the researchers find that people who receive hints which suggest that more detailed information might fall below their expectations (which tend to be generally optimistic), avoid obtaining the information, even when it is costly to do so.

People appear to exhibit optimism maintenance in decisions about the order in which stages of a compound lottery will be resolved. Consider a compound lottery consisting of two independent events that must both obtain in order to win a prize. Suppose one event has a high success probability while the other event has a low success probability. Budescu and Fischer (2001) find that participants prefer to have a high probability of a gain followed by a low probability of gain and in effect are choosing to have much of the uncertainty resolution delayed to the future. In the loss domain, the pattern reverses and people prefer a low probability of loss followed by a high probability of loss. Both preferences allow a person to keep hope alive as long as possible.¹¹

¹¹ In the real world, the preference for resolution of uncertainty is likely to be influenced by other psychological factors such as superstitious thinking (e.g., that 'looking' in the middle of a lottery will 'jinx' the outcome) and an aversion to celebrating events that are at all uncertain. When Loewenstein (an author on this paper) came up for tenure many years ago, he was first informed that his department had voted in favor, at which point the probability that he would get it was high. He did not want to celebrate the news, however, even in his own mind, because it wasn't certain. Subsequent stages led to similar upward revisions of the probability of tenure, but all, for the same reason, without celebration. Finally, there was only one step left; the provost had

Benabou (2013) also presents a model on the phenomenon of “groupthink” that could be interpreted in terms of optimism maintenance. In Benabou’s model, groups of people decide whether to invest in a project, and, before the project does or does not pay off, each group member experiences anticipatory utility based on their own degree of optimism and on the beliefs of other group members. Under certain adverse equilibria, group members engage in collective denial, ignoring ‘red flags’ (via inattention, misinterpretation, and forgetting) so as to maintain the collective illusion that an unfavorable project will, in fact, succeed.

Dissonance avoidance: Psychologists going back to Festinger (1957) have recognized that people dislike being exposed to information that conflicts with existing beliefs (see Abelson et al., 1968, for a wide-ranging volume taking stock of research on Festinger’s theory approximately a decade later). Research on managerial decisions finds that managers avoid exposing themselves to arguments that would conflict with their preliminary decisions (Schulz-Hardt et al. 2000). Managers in German firms who were recruited for a lab experiment were given a hypothetical case about a firm considering relocation. They were presented with an equal number of arguments in favor and against the move and asked to make a decision on their own. They were then split into groups of five, based on their individual decision: groups consisted of people who either all made the same decision, or in which a minority of one or two participants chose differently. Participants were then given the option to receive additional arguments, up to five in favor and five against, with the condition that everyone in the group had to read the chosen arguments. Although the information was free, the expected effort to read the information imposed a cost that gave participants an excuse for being selective. All groups chose to obtain more information that conformed to the majority’s view than that conflicted with it. Moreover, this difference was greatest in groups in which everyone held the same view, less pronounced in groups with a one-person minority, and was even lower in groups in which two people held the minority view. These findings suggest a tendency to avoid information that might conflict with prior decisions, even though such information might well be viewed as especially valuable since it could lead to a warranted reversal of the decision. Information confirming a decision, in contrast, is unlikely to influence the decision, especially in a homogeneous group.

to sign to make it official. Though there were no episodes on record in which the provost had not signed, Loewenstein was still reluctant to celebrate, but when the provost did finally sign, it felt silly to celebrate: there had only been a microscopic increase in the probability, from 99.99% to 100%.

Scherer et al. (2013), in a study of biased information seeking, observe confirmatory information acquisition even when the initial decision was made arbitrarily, which they argue is driven by a desire to be right in a prediction or belief. In one of their studies, participants had to decide which of two pieces of art would be preferred by other college students. They made the decision based on pictures that were either unobscured, partially obscured, or completely obscured (in the last case, they picked between labels A and B with no further information). They were then given a choice to look at comments by other students on the two art pieces. They made their choice of what to look at based on a small preview snip that revealed which art piece had been commented on and whether the comment was favorable. Participants were more likely to choose to look in detail at comments that were favorable toward the art work that they thought other students favored. Notably, this preference did not differ by how much information they had in their own decision: those who simply picked from two art pieces without having any idea what they were engaged in confirmatory search just as much as those who had full information.

Chater and Loewenstein (in press) propose that an inherent drive for sense-making (see also Dervin, 1998) may lead people to avoid information that might not fit with their current understanding of the world. The almost willful failure of mid-century western communists to accept evidence of Stalin's atrocities illustrates the concept, and is only one of myriad examples from history. Discussing this example and many others, in a characteristically brilliant and insightful discussion of "Systems of Belief,"¹² Jonathan Glover critiques Descartes's view that systems of beliefs can be built up from scratch from objective evidence and axioms, much, as Glover depicts it, as you might build a house up from its foundation. Glover, instead, argues in favor of "an alternative model, put forward by the Austrian philosopher Otto Neurath in the 1930s," according to which constructing a belief system from conflicting pieces of evidence "is not like rebuilding a house; it's like rebuilding a boat which happened to be afloat at sea. Maybe the whole thing needs rebuilding, but at any point inevitably you have to keep enough afloat for you to do the rebuilding." One could extend the analogy by positing that keeping the boat afloat requires avoiding the kinds of structural damage or serious punctures that could be suffered from the reception of information with obvious dissonant implications.

Belief investments: Many of the varieties of hedonically driven information avoidance involve a motive to not form, or focus on, an unpleasant belief. While some beliefs are intrinsically

¹² Philosophy bites: "Podcasts of top philosophers interviewed on bit-sized topics." Accessible at: <http://philosophybites.com/2011/10/jonathan-glover-on-systems-of-belief.html>

unpleasant—e.g., believing that one has contracted a serious disease—others are unpleasant because an individual has committed himself to an opposing belief. In many situations people invest time, money or effort—often very large amounts—based on beliefs. For example, a devout Catholic will spend large amounts of time going to church, money supporting the church, and effort complying with its doctrines. In such situations, information that could potentially challenge the beliefs underlying the investments threatens the investments themselves. If the down-side risk that new information could undermine beliefs is greater than the up-side potential for beliefs to be bolstered (which is likely in a wide range of situations), people may choose to avoid information. Benabou and Tirole (2011) propose that people use these investments to signal their own core values and social identities to themselves. Avoiding information that would threaten a person's conception of his own identity helps the person continue to enjoy his sense of self and preserve his motivation to live up to his ideals. Golman et al. (2015) follow Benabou and Tirole in adopting the basic premise that people become attached to their belief investments. They propose, however, that people avoid information that would conflict with investments they have made based on their beliefs, because they experience a kind of sunk-cost bias and do not want to consider that the beliefs which informed these investments might be wrong.

2.2. Strategically-driven information avoidance

People may avoid information as a kind of commitment device because they anticipate that it will influence either their own future behavior or that of others. We refer to this as strategically-driven information avoidance. Surprisingly, as we discuss in the ensuing subsection, some of these situations arise with single individuals— i.e., in the absence of interpersonal interactions.

INTRAPERSONAL/STRATEGIC

Intrapersonal strategic information avoidance may arise as a person tries to bind his own hands while facing an inner conflict. Someone who has the choice between an appealing piece of cake today and better health in the future may not want to learn just how unhealthy the cake is, so that she can justify (and enjoy) the cake right now. We might think of such an internal conflict as a struggle between the present and future selves, modeled as distinct players in a strategic game. The inner conflict could stem from a variety of psychological mechanisms, such

as incoherent preferences, time inconsistency, projection bias, or self-serving notions of fairness.

Avoiding dynamic inconsistency: Wakker (1988) illustrates how decision makers whose preferences do not conform to expected utility could recognize that resolution of the first stage of a compound lottery would shift their preference for accepting or rejecting another lottery in the second stage. If they are sophisticated about this preference reversal, Wakker shows, it might lead them to avoid information about the outcome of the first lottery to commit themselves to their plan for behavior with respect to the second lottery. Suppose a gambler wants to make a parlay bet on his favorite baseball team in a doubleheader (a bet that pays only if his team wins both games), but he suspects that, conditional on winning a bet on his team in the first game, he may prefer not to bet his winnings on the second game. To ensure that he goes through with the parlay bet, he may choose to not watch the first game until bets can no longer be placed on the second game. In this situation, information avoidance is a kind of internal commitment device to deal with risk preferences that violate dynamic consistency.

Resisting temptation: Information avoidance can be used as a commitment device for other self-control problems as well. If people are sophisticated about having time inconsistent preferences (Carrillo and Mariotti 2000), for example, they can use information avoidance to prevent themselves from reconsidering decisions in the future when they might otherwise succumb to temptation. Non-smokers, for instance, who are aware that nicotine is addictive but who overestimate the health risk it poses, might avoid information that makes them reconsider these risks -- for fear that less frightening information about risks might tempt them to start smoking (Carrillo and Mariotti 2000).

In an incentivized study, Woolley and Risen (unpublished) asked visitors at a museum if they wanted to bet on a student's performance. The bet would pay between \$0 and \$25 if they won, and there was no cost to accepting the bet. In one condition, they would win the bet if the student finished the class with an A or A+ grade, whereas in the other condition, they would win if the student got a B- or below. Before deciding whether to accept the bet, participants were offered the option to find out exactly how much the bet would pay out if they won. Participants were significantly more likely (at the 5% level) to avoid the payout information when offered the bet against the student than when offered the bet that was contingent on the student's success (57.8% to 42.9%). Participants appeared to be avoiding the information so that they could resist the temptation of betting against the student, which many of them clearly found distasteful.

Motivation maintenance: In some cases people avoid information out of fear that some types of information they might obtain would be demotivating. Goulas and Megalokonomou (2015) show that such a fear may be well founded. They analyze a natural experiment in which a policy change in Greece led students to no longer observe their own and their peers' scores on a national exam prior to taking the exam a required second time. Students in cohorts that did observe their peers' scores and who learned they were low-achieving compared to their peers performed 0.3 standard deviations worse the next time they took the exam compared to cohorts that did not learn their relative position. Feedback was helpful for those who found themselves among the high-achievers; they increased their performance by 0.2 standard deviations.

Rogers and Feller (2016) analyze data from a large online class in which students rated three randomly assigned essays written by their peers. Grades for the class were not relative, so others' performance had no impact on a student's likelihood of passing the class. Students who rated essays of average quality had a 68% completion rate for the course. Students who rated higher quality essays (with an average score 1.6 standard deviations above the mean) had a completion rate of only 45%. To benchmark this effect, the authors note that being assigned to rate a higher quality essay hurt a student's chances of passing the course more than (hypothetically) lowering one's own grade by replacing the maximum possible score for the essay with the mean score in the class.

Huck et al. (2015) test the effect of information on motivation in a laboratory study. Participants completed tedious real-effort tasks and were told that half of all participants would earn 1 EUR for each task they completed and that the other half would earn 0.10 EUR per task. In the full information condition, participants learned what their pay rate was prior to working on the real-effort task; in a no information condition, they did not obtain this information until after they had worked on the task. In a third condition, participants could choose whether to learn their pay rate prior to starting the task. When given a choice, 31.6% of participants decide not to obtain information about their piece rate. In a follow-up questionnaire, many of those who chose not to get the information reported that they avoided it either so as to not be demotivated by the low wage or so as to not be pressured by the high rate. Comparing performance across the groups, those who chose not to learn their own wage rate performed no different from those who found out they had a high wage, and significantly outperformed those who had a low wage. There was no difference between the group with a choice and the group that did not have an option to learn their wage. Given a choice of whether to learn their

wage, many appear to have strategically chosen to not obtain information so as to maintain their own motivation, which, the experimental results suggest, was an effective strategy.

Benabou and Tirole' (2002) propose a model of information avoidance as a strategy for dealing with problems caused by present bias. Present-bias leads people to put too little effort into tasks with high but delayed payoffs, and, according to their model, people avoid information about their own true ability so as to maintain overconfidence for the purpose of offsetting this motivational deficiency. By similar logic, to the extent that extreme levels of motivation can in some cases undermine performance (see, e.g. Ariely et al. 2009), one could imagine situations in which people might avoid information to prevent themselves from becoming excessively motivated. A novice teacher, for example, might avoid looking at teaching ratings not (only) out of fear that the information would make them miserable but also out of fear that the information might lead to counterproductively high levels of anxiety about teaching.

Avoiding projection-biases: In some situations, such as teaching or strategic interactions, it is useful for an individual to make a guess about what other individuals believe. For example, the seller of a defective product, in setting a fixed price, would like to know whether potential buyers will notice the product's defects. A teacher, likewise, can convey information more effectively armed by knowledge of what students already know. In such situations, research has documented a phenomenon in which better informed individuals 'project' their superior knowledge on less well informed individuals. Because this "curse of knowledge" (Camerer, Loewenstein and Weber 1989) distorts individual judgments and is generally detrimental, people should be (and sometimes are) motivated to avoid information to avoid being 'cursed'. There is, however, evidence that people do not appreciate how information can distort these types of judgments, and hence obtain, and even pay for, information that distorts their judgments and causes them to lose money (Loewenstein, Moore and Weber 2006). Information avoidance for the purpose of lessening projection bias is, therefore, a theoretical possibility, but there is little if any evidence that people actually avoid information for this reason. Information avoidance can be an effective antidote to any type of projective bias involving information. For example, researchers have found that evaluations of other people's decisions are overly harsh as a result of hindsight bias – the mistaken view that the outcome of a decision should have been foreseeable (Baron and Hershey 1988). Evaluating the decision prior to learning about whether it produced a favorable or unfavorable outcome would eliminate this problem.

Abdicating responsibility: In some situations, people may not want to obtain information for purposes of 'plausible deniability' – i.e., because they fear that obtaining it will make them feel

more culpable for negligent or ethically questionable behavior, leading to self-condemnation. Although we have classified this in the intrapersonal/strategic category, plausible deniability can also help to shield one from condemnation, and possibly apprehension and punishment, by others, so this motivation could equally well fit into the following subsection on interpersonal/strategic considerations. An individual taxpayer who honestly believes he is entitled to a tax deduction might choose not to consult with an accountant who could only talk him out of taking the deduction. Indeed, often the law encourages such behavior by holding a person criminally responsible for negligence only if the person knows or could reasonably be expected to know of a danger to human life or safety.

Rayner (2012) uses the example of a pollution mitigation program in the Chesapeake Bay to illustrate how organizations may skirt accountability by avoiding information about their efficacy. As part of the program, a complex computational model of the environment was constructed to assess the impact of environmental protection interventions. Although the model showed continued improvement in water quality, actual water samples showed no discernable change. Little attention and funding was, however, directed at field measurements that could confirm the program's ineffectiveness; instead 'virtual' improvements coming from the model became the benchmark for the program's success.

According to the concept of 'moral wiggle room', people are not necessarily inherently altruistic, but like to appear so, not only to others but also to themselves (Dana, Weber and Kuang 2007; see, also, Broberg, Ellingsen and Johannesson 2007; Dana, Cain and Dawes 2006; Grossman 2014; Lazear, Malmendier and Weber 2012). Even if they would not behave in a blatantly selfish or immoral fashion, when they can interpret a situation in a way that allows them to behave selfishly without compromising their identity as moral people, they will do so and behave selfishly (Shalvi et al. 2015). Thus, when people have the types of complex motives inherent in the concept of moral wiggle room, they may similarly be motivated to avoid information.

Consider, for example, the payoff matrix in Table 1 (from Dana, Weber and Kuang 2007), in which a 'dictator' chooses between A and B. In one of the experiments reported in their paper, subjects played this game, but the recipient's payoffs were hidden. However, dictators had the option to costlessly and privately reveal the recipient's payoff. This would be valuable information for someone with other-regarding preferences or with preferences for efficiency, but could make the decision more difficult for a selfish dictator who wanted to maximize his own payoff while minimizing guilt. Consistent with a desire to avoid the information, only 56 percent of dictators chose to reveal the recipient's payoff, and in the condition in which information-

revelation was optional, more dictators chose the “selfish” payoff than in the corresponding game in which the recipient’s payoffs were automatically revealed. Follow-up research (Van der Weele 2014) shows that decision makers are sensitive to the cost of being prosocial, and are more likely to reveal the state when the altruistic action is cheap. However, making the selfish action costlier to the recipient does not affect the decision to reveal.

TABLE 1—THE DICTATOR KNOWS HIS OWN PAYOFFS AND CAN CHOOSE TO COSTLESSLY REVEAL HIS PARTNER’S PAYOFFS, WHICH DEPEND ON THE STATE.

		State	
		I	II
Choice	A	6,1	6,5
	B	5,5	5,1

Similarly, people with social preferences may not want to hear that a possible action that would entail a personal cost would have greater benefits to others. With this information, they might feel compelled to take the action, i.e., to give others these benefits, leaving them worse off overall than had they not known (Andreoni, Rao and Trachtman 2011; Nyborg 2011). Naturally, consumers buying products have opportunities to learn about environmental and labor practices of producing firms. There may, however, be little upside to learning that best practices have been adhered to, whereas finding out that the firm engages in bad practices would impose disutility from the renunciation, or purchase and use, of the product. Paharia, Vohs and Deshpande (2013) find, in a hypothetical scenario study, that consumers use moral disengagement to justify purchasing items manufactured using sweatshop labor, suggesting that this information is indeed unpleasant. Consequently, people may rationally avoid finding out this information in the first place and may even be willing to pay to avoid it (Ehrich and Irwin 2005; Grossman and van der Weele 2013). The same principle appears in charitable giving: donors may want to avoid information about the effectiveness of a charity they are emotionally drawn to, so as to avoid learning that their contributions do not have the impact they imagine (Niehaus 2013).

Grossman and van der Weele (2013) propose a theoretical model in which decision makers avoid information so as to weaken the signal that their choice in the dictator game will send about their own prosociality. Avoiding information itself sends a signal, but doing so is less informative than choosing the selfish action after having obtained the information. They make, and find evidence for, five predictions about moral wiggle room: (1) there is a smaller incentive to act pro-socially when there is initial uncertainty about others’ outcomes; (2) those who act selfishly are more likely to not obtain the information; (3) selfish actions are judged more

harshly if actors acted selfishly knowing the other's payoffs than if they chose to remain ignorant; (4) more people will choose to obtain information after having made the decision as dictator than before (as obtaining the information after the decision does not send a bad signal); and (5) decision makers who choose to avoid the information and are selfish are willing to pay to remain ignorant.

In a lab experiment on dishonesty, Pittarello et al. (2015) showed participants two cards from a deck and ask them to indicate whether one of the cards was a Joker. Each time they reported a Joker, they lost 1 EUR from their endowment of 60 EUR. In this setup, there is a strong incentive to cheat and report that no Joker is present even when there is. They measure how long participants looked at one card or the other and found that, in trials in which participants cheated, they spent less time looking at the Joker card and more time looking at the other card. When they are incentivized to be untruthful, the authors surmise, dishonest participants engage in a self-deception strategy and shift attention away from the object reminding them of their dishonesty.

Just as people avoid information to behave in a selfish fashion with respect to others, they also sometimes avoid information to justify succumbing to immediate temptation. People about to succumb to a temptation sometimes avoid information that could make them feel guilty about succumbing, or even dissuade them from doing so. In a state of craving, for example, an individual may choose not to learn about the long-term health consequences of indulging in the behavior motivated by the craving. For example, cigarette smokers who are not motivated to quit might prefer to not know about the health risks associated with smoking. By the same token, a hungry diner who wants to enjoy a high-calorie meal might well choose not to obtain nutritional information before ordering (Loewenstein and O'Donoghue 2006). In such a situation, inattention to the information can be perfectly rational, and imposing the information on helpless diners via prominent calorie displays may detract from their welfare.

Woolley and Risen (unpublished manuscript) offered participants a hypothetical choice of whether to eat a slice of cake and asked if they wanted to know how many calories it contained before deciding whether to order it. They found that 62.7% of participants stated that they would not want to obtain caloric information. All participants, irrespective of whether they wanted to see the information, were then shown either a low, medium, or high number of calories prior to making their decision to order. Those who had initially indicated they did not want to know the calories were more likely to order the cake. Regardless of whether they had expressed a desire to see the information or not, showing a higher number of calories discouraged participants from ordering the cake; the information was taken into account, whether it was wanted or unwanted. In a second study, the authors show that people who

believe that a menu with caloric information is likely to discourage them from ordering dessert are more likely to request a menu without caloric information. This suggests that information is avoided precisely because it could lead someone to change his mind.

Saving it for later: Strategic information avoidance is a device to influence the action taken at time $t=1$. An interesting case arises when the decision at this later time is once again whether to acquire or avoid the information. If information will be even more pleasurable to discover at a later time, an individual may strategically save it (e.g., ask others not to spoil the ending of a good book or show). Such a motive requires contextual reasons why the information will be more valuable in the future than in the present. One possible reason could be that delayed information will come along with other pieces of information, and that these pieces of information are complements. Kocher, Krawczyk and van Winden (2014) show that lottery players enjoy spreading out drawings (not immediately finding out whether they've won each drawing) so they can savor thoughts of possibly winning (though, unsurprisingly, people do not enjoy spreading out information about whether they will be forced to receive electric shocks; Falk and Zimmermann 2014). Another reason may be that not knowing creates suspense, thus enhancing the experience of discovering information (Ely, Frankel and Kamenica 2015). Someone watching a recorded soccer game, for example, may not want to know when goals were scored, as that would make the ultimate outcome of each play predictable. In these cases, avoiding information at time 0 increases the utility of acquiring that information at time t .

If an uncertain outcome is known to be positive (e.g. a participant has won one of two desirable prizes, but does not yet know which one), delaying the resolution may increase the enjoyment derived from the anticipation (Loewenstein 1987). Wilson and Gilbert (2003) argue that an inability to make sense of a positive experience enhances its pleasure. Lingering uncertainty inhibits hedonic adaptation, preventing a person from taking the good outcome for granted. Golman and Loewenstein (2015a; 2015b) describe the *belief-resolution effect*, whereby attention fades after uncertainty has been resolved. Avoiding information, and thus maintaining uncertainty, would allow a person to continue to enjoy thinking about the set of possible good outcomes. Such behavior may be rare, however, because a person must be sophisticated and quite patient to be willing to forego the immediate excitement of realizing a good outcome so as to savor the lasting anticipation. One example that may be familiar to some readers is that of expectant parents avoiding information about their baby's sex until the birth. For the duration of the pregnancy, they may anticipate the pleasures of having a girl as well as the pleasures of having a boy, and they may particularly enjoy resolving this uncertainty when it is most salient, at the event of childbirth.

INTERPERSONAL/STRATEGIC

In interpersonal interactions, information may be avoided in public as a strategy for manipulating another player's actions. This can take a variety of forms. In some cases, obtaining information may make it publicly available to others, which could be problematic (e.g. a charity allowing outside researchers to assess its effectiveness). In these cases, information avoidance is an incidental consequence of wanting *others* to remain uninformed, so we do not dwell on these examples (but, see Brocas and Carrillo, 2007, for a discussion of this situation). In other cases, an individual may make it known that he will not obtain private information as a kind of commitment device, so that other players cannot rely on his knowledge of this information in their own actions. This commitment to an ex-post suboptimal course of action can change the optimal strategy for others and lead to a better outcome for the individual, much like the decision to remove the steering wheel in a game of chicken serves as a commitment device and all but guarantees victory (Schelling, 1960; Ponsard, 1976).

There is a large literature on credible commitment in game theory that goes beyond the scope of our review. We focus on cases of commitment that directly involve information avoidance. Information avoidance is a particular kind of commitment device that does not make all commitments possible. For example, the agent in a trust game cannot use information avoidance to commit to returning the principal's investment. Information avoidance allows a player only to commit to what would be optimal given prior beliefs.

Game theorists familiar with strategic moves – maneuvers intended to influence other players – recognize many situations in which players want to be seen avoiding private information because they can benefit from others knowing that they are uninformed. Schelling (1960) points out that strategic information avoidance can be useful for resisting another player's first-mover advantage in a variety of games. For example, in a Stackelberg duopoly game the leader can take market share from the follower by announcing (and committing to) its production level first. Similarly, in some games with multiple equilibria (e.g., battle of the sexes) players can signal an intention to play their preferred equilibrium strategy by moving first and "burning money" before the game begins (van Damme, 1989; Ben-Porath and Dekel, 1992). In both of these situations, if a second-mover commits to not observe the first player's strategic move, he wipes out its intended effect, which is, simply, to influence him.

Strategic avoidance of information can also strengthen one's bargaining position (Schelling 1956; 1960). The intuition for real-world bargaining situations is that information avoidance

supports a kind of brinkmanship, which forces the other party to make (or accept) a higher (lower) offer. For example, labor union leaders aware (but, of course, not sure) that their rank and file members might be growing weary of a strike could publicly avoid meeting with them to credibly convey to management that the union has no intention to end the strike and that management will have to make a better offer to resolve the dispute. Lab studies have documented that people engaged in ultimatum bargaining avoid information to induce the other party to accept a proposal that they would not have accepted otherwise (Conrads and Irlenbusch 2013), and that people engaged in sequential Nash bargaining avoid information to induce the other party to propose a more generous offer than they otherwise would have (Poulsen and Roos 2010).

Conrads and Irlenbusch (2013) set up a one-shot bargaining game in which a proposer can make one of two offers. The proposer always prefers one of them. For the respondent, which offer is more favorable depends on a chance event. The proposer has the option to reveal the outcome of the chance event prior to choosing one of the offers and thus can uncover the respondent's payoffs. When the decision to reveal was disclosed to the respondent, many proposers chose not to obtain information about the chance event. Effectively, they created plausible deniability, and respondents were less likely to reject the offer. When the decision to reveal was not disclosed, and hence there was no strategic motivation to avoid the information, very few proposers decided not to reveal the outcome of the chance event.

Poulsen and Roos (2010) had pairs of subjects play a Nash bargaining game in which two players allocate a resource pie by demanding a share of it for themselves. If the sum of their demands does not exceed 100% of the pie, they each get what they demand. But if the total demands exceed the size of the pie, they each get nothing. Poulsen and Roos allowed the second mover before the bargaining begins to make a public decision whether or not to observe the first mover's demand. If he chooses to observe the demand, the first mover has a strategic advantage, as the game effectively becomes an ultimatum game. However, if the second mover chooses not to observe the first demand, the game is effectively a simultaneous-move Nash bargaining game in which the focal equilibrium calls for an even split.¹³ Thus, committing not to obtain information about the first mover's demand significantly increases the second mover's expected earnings. After some practice rounds, over 80% of second movers figured this out and chose not to obtain the information. However, when the decision to reveal the first demand was private and thus not an effective strategic move, over 80% of second movers chose to

¹³ Asymmetric equilibria with uneven splits exist, too, but there would be no reason to expect one player to have a systematic advantage.

reveal it, showing that information avoidance in this context is strategic rather than driven by hedonic motivations.

Strategic bargainers could also use a public commitment to avoid information to induce another party to make an investment (Tirole 1986; Rogerson 1992; Gul 2001; Lau 2008; Hermalin and Katz 2009). These models analyze relationship-specific investments in the context of an imbalance in bargaining power that may create a hold-up problem. For example, a firm may want to work with an advertising agency to lay out their vision for a possible ad campaign before agreeing to terms and payments. However, once the firm has put time and money into establishing this relationship, the advertising agency might come back and ask for ancillary fees, taking advantage of the firm's sunk costs to expropriate more of the surplus. If the advertising agency cannot assuage fears that they will engage in such behavior, the firm might be reluctant to work with the agency in the first place. One tactic that may be available to the agency is to make clear to the firm that they do not inquire about the firm's sales projections until after they reach a deal. If the agency does not know the value of the ad campaign for the firm, it cannot demand the entire surplus without jeopardizing the deal. Tirole (1986) and Rogerson (1992) suggest that allowing a vulnerable party to keep its information private may help them work around the holdup problem. Building on this insight, Gul (2001) develops a theoretical model in which the imbalance in bargaining power stems from one party (e.g., the advertising agency) having the exclusive opportunity to make offers. Gul shows that by committing to avoid information about the other party's investment (and by allowing oneself the freedom to make additional offers if the initial one(s) is not satisfactory), the party with the bargaining power can effectively promise not to exploit it too onerously and can thus provide incentives for optimal investment in the relationship.¹⁴ In the context of our example above, the advertising agency can indeed bring the firm to the table as long as they do not pry into their operations.

Sloof, Oosterbeek and Sonnemans (2007) ran a laboratory experiment in which subjects assigned to the role of buyers chose whether to invest (i.e., pay a cost) to raise their valuation of a seller's good before entering a transaction stage in which the seller set the price. (The seller's good was simply a laboratory currency that only the buyer could convert into real money, and the investment increased this monetary value.) The investment was at risk for a hold-up because the seller held all the bargaining power in the transaction stage. If the buyer invested, the seller had an incentive to set a higher price, because the rules did not allow buyers

¹⁴ Lau (2008) and Hermalin and Katz (2009) show that when bargaining is constrained to a single take-it-or-leave-it offer, the party with bargaining power can provide better incentives for the other party to invest by avoiding some (i.e., partial) information about (the value of) the investment.

to reject profitable transactions. The experiment manipulated whether the decision to invest was public or private. When the decision to invest was public, buyers less frequently chose to invest and, thus, sellers earned less. While sellers were not given the opportunity to avoid information about the investments in this study, the results suggest that they would have been wise to avoid this information if they could have made a public commitment to do so because buyers, in this situation, would have been more willing to invest.

A commitment to avoid information can also be used to enhance or counteract market power. Palfrey (1982) proposes a Cournot duopoly game in which two firms have different levels of risk tolerance and have an option to obtain information about uncertain consumer demand. If a firm obtains information about consumer demand, it would set its production in response to that information. Importantly, it would produce less if demand is low. However, if it chooses not to reveal consumer demand, there is a risk that it overproduces when demand is low, which would cause the price to crash and impose losses on both firms. The firm that is more risk-tolerant hence has an incentive not to obtain this information. By not responding to actual demand, they increase the likelihood of losses imposed on the other firm, which makes that firm more cautious. The more risk-averse firm must scale back production, and the more risk-tolerant firm then benefits from higher prices. Strategic information avoidance (by the less risk-averse firm) is used in this case as a competitive weapon, to create risk that the other firm cannot tolerate.

Roesler (2015) shows that a consumer can counter a monopolist's pricing power by strategically avoiding information about its product. In a world of perfect information a monopolist expropriates consumer surplus by charging the consumer his maximal willingness-to-pay. When the consumer has private information about his valuation of the product, the monopolist's belief about the distribution of possible valuations creates a perception of a downward-sloping demand function. The monopolist maximizes expected revenue, but the consumer retains some surplus in expectation. In Roesler's model, the consumer chooses to not obtain some information about the monopolist's product to remain somewhat uncertain about his valuation of it. He shapes his information structure (by skewing the distribution of signals he obtains) so that he often has an expected valuation slightly below the price the monopolist would have charged if he had obtained full information (and, in balance, so that he occasionally has a higher valuation). The monopolist must, in response, lower the price to capture the consumer with this valuation. In effect, the consumer uses strategic information avoidance to commit to buying the product even when he has a low ex-post valuation, and this increases the consumer surplus because it drives down the monopolist's price.

Information avoidance can also be employed to deal with an adverse selection problem (Akerlof, 1970). In theory, if both parties are sophisticated, they could publicly avoid acquiring asymmetric information that would break the other party's trust that they could get a fair deal. For example, a casino could promise to shuffle its cards in real time rather than to use a pre-shuffled deck so that players would know that the casino could not know the deal ahead of time (and thus could not remove unfavorable decks), in order to convince patrons that they can get a fair game at that casino.

Two or more parties who engage in risk sharing might publicly avoid information about the hazard to preserve their risk-sharing arrangement. There are several situations in which weakly risk-averse agents would like to agree to a state-contingent contract so that no single risk-averse agent needs to bear all of the environmental risk; but, if any party were to discover ahead of time whether and/or when the hazard would in fact occur, that party would be unwilling to agree to contracts that would turn out to be ex-post losses, and the entire arrangement would unravel. Hirschleifer (1971) provides a simple example in which risk-averse individuals endowed with state-contingent claims would like to share some risk. Suppose that a farmer can hedge his risk of incurring losses from a drought by contracting with an insurer. Both the farmer and the insurer agree to the transaction as long as they have no information about the weather forecast. However, if they knew whether or not a drought would happen, the party that inevitably would incur losses would back out. While Hirschleifer presents his example in a setting of public information, its force remains even in the case of private information (as long as it is common knowledge that information is released). Even if the farmer does not have access to the forecast, if he knows that the insurer has obtained a forecast and still wants to make a deal, he can infer that no drought was predicted and call off the deal. Hence both parties would still want to avoid the forecast to keep the deal in place.¹⁵

Efficient risk sharing in a health insurance market is similarly jeopardized by adverse selection. Some people may be unable to obtain insurance if they acquire private information (Rothschild and Stiglitz 1997). Suppose it would be economically efficient for individuals to purchase health insurance from a cooperative with many members, and suppose that the insurance cooperative charges people who suffer from pre-existing conditions higher premiums (and offers corresponding discounts for clean bills of health) in order to avoid the adverse selection problem. If members were obligated to inform the insurance cooperative of positive

¹⁵ Schlee (2001) points out that while individuals will want to avoid information to preserve efficient risk-sharing arrangements, a representative agent for the full economy will not reflect this dislike for information.

test results (i.e., if the information could become public), they might avoid the diagnosis (even if it is free) because they prefer to have the risk covered by their insurance policy. Moreover, even if they had the right to keep test results confidential (but could not hide records indicating that a test had been performed), they might still prefer not to get tested because the insurance cooperative could reasonably assume that failure to disclose a clean bill of health is evidence of a pre-existing condition when a test has been performed. Hence, only a publicly observable choice not to obtain the diagnostic test ensures they can hedge their risk of being ill.¹⁶

Principal-agent problems arise when one party (the principal) finds it difficult to incentivize another, more informed party (the agent) to act on his behalf. In theory, avoiding information about the agent's action could sometimes be a wise strategy that the principal can use to improve the agent's incentives. If a subordinate would be more motivated with the power to make decisions on his own, for example, a manager might avoid information about the details of the subordinate's work in order to make a commitment not to micromanage him (Aghion and Tirole 1997).¹⁷ In a laboratory experiment, Dominguez-Martinez, Sloof and von Siemens (2014) find evidence that subjects in a managerial role do indeed strategically avoid information so as to delegate decision making authority to subjects assigned to be workers, consistent with Aghion and Tirole's (1997) prediction.

Dewatripont and Maskin (1995) and Cremer (1995) show that information avoidance can be a useful commitment device in repeated contracting in order to prevent unfavorable renegotiation when the initial contract opens up again. In Dewatripont and Maskin's (1995) model, the principal hires a risk-averse agent to do a job with uncertain costs. The agent will obtain private information about his costs and take two potentially observable actions that depend on his cost signal. Dewatripont and Maskin show that in some cases, when the agent

¹⁶ In some market settings, parties can agree on contracts despite an adverse selection problem. Kessler (1998) considers optimal contracting between a contractor who can acquire private information about the costs of a project and a client who authorizes a larger project when the contractor reports lower costs. The contractor can extract a strategic rent by committing to occasionally avoid information about the project costs. In these cases, the client will assume the worst and authorize a smaller project with a smaller fee, but the contractor will be able to keep all of the cost savings when realized costs are low. Of course, a contractor who finds he has low costs can always claim to have high costs and keep all of the savings for himself. The tradeoff between keeping the cost savings and foregoing the additional work merely breaks even, so there is no incentive to lie. The benefit of occasionally avoiding information about project costs is that the smaller project becomes more lucrative in expectation because of occasional unanticipated cost savings. Taking account of this effect, the client proposes a slightly larger project with a higher fee than he otherwise would have.

¹⁷ See also Prat (2005) for a more obscure example of a principal wanting to avoid information about an agent's action to improve his incentives.

can reopen contract negotiations after his first action but the second action is even more revealing of his true costs, the principal will strategically choose to not observe the first action and monitor just the second action. If the principal were to observe the first action, it would convey information about the agent's costs. The two parties could then renegotiate the contract on the basis of this new information. Because the agent is risk averse, the optimal contract ex ante effectively involves a transfer from an agent with low costs to an agent with high costs (with the principal providing insurance). Renegotiation interferes with such risk sharing. After discovering he has low costs, the agent would no longer want to make the ex-ante optimal transfer. If the principal were to observe the agent's first action and thus obtain evidence about his costs, they would renegotiate the contract to reduce this transfer. So, ex ante, the risk-averse agent would be exposed to more risk. The principal would then have to pay more in expectation to compensate the agent for bearing this additional risk. By avoiding information about the agent's first action, the principal makes a credible commitment to not reopen negotiations after the agent has acquired his private information.

In a model proposed by Cremer (1995), firms (i.e., principals) enter into arm's length relationships with suppliers (i.e., agents) in which they observe the suppliers' production, but choose not to listen to excuses if that product is subpar. Were they to entertain excuses, firms might find them reasonable and give their suppliers second chances. By committing not to give suppliers second chances, they maintain stronger incentives for good effort. Firms that avoid information about their suppliers' operations may thus be taking a lesson from the strict teacher who pays no mind to any excuses for late homework and thereby demands accountability. Applying similar logic to a key policy issue, Schmidt (1996) suggests that, as part of a commitment to not rescue failing firms and to push managers to behave more responsibly, governments may privatize (or choose not to nationalize) firms in order to avoid information about their operations.

3. *Consequences of information avoidance*

Beneficial and counterproductive effects on decision making: Perhaps the most general and obvious consequence of information avoidance is that it robs people of potentially useful information that could be used to enhance decision making. For example, teachers who fail to read teaching evaluations will not obtain feedback that could, potentially, improve their teaching. Likewise, stock market investors who do not look up the value of their portfolio when the market is down deprive themselves of potentially useful information. Yet, it is possible that

asymmetric look-ups occur for sensible, intrapersonal-strategic, reasons. Perhaps, for example, investors are aware of their own predilection for panicking and selling at the bottom of the market; if so, then ignoring information could actually improve investor returns (see Sicherman et al. 2016, for a detailed discussion of this issue). More generally, in evaluating whether information avoidance produces a net welfare gain or loss, one needs to take account of the fact that people often avoid information for perfectly good reasons. The hedonic consequences of information acquisition or avoidance, in particular, should be part of any welfare calculation. Caplin and Leahy (2004), Schweizer and Szech (2013), and Lipnowski and Mathevet (2015) recognize this in proposing mechanisms for the optimal provision of information to patients with anxiety.

Ethical transgressions: Bazerman and Sezer (in press) note that in the wake of revelations about unethical behavior on a large scale, ranging from Bernie Madoff to corruption at FIFA (the world soccer federation), it is difficult to imagine how so many people could have failed to notice the unethical behavior. With the benefit of hindsight, the instances of wrongdoing are obvious. Bazerman and Sezer point out, however, that unethical situations are often ambiguous and, if motivated to do so, one could maintain a belief of propriety. Someone observing the returns on Bernie Madoff's fund, for example, may think it a good product to invest in. However, a professional with years of training ought to know that the fund's return looked suspicious (exceeding returns of the broader market with no additional volatility). This suspicion, in turn, should have prompted additional due diligence, especially before advising clients to invest in the fund. Yet, in such ambiguous cases, people may be motivated not to look closer so as to avoid potentially unearthing unethical behavior – an illustration of what they call “bounded ethicality.” They argue that failing to examine questionable behavior more closely, and hence enabling potentially unethical behavior, is itself unethical.

Failing to learn about unethical behavior (by avoiding information) may reduce how harshly others judge an action. Bazerman (2014) recounts his own failure to notice and act on corruption he observed in an ambiguous situation and notes that others are quick to absolve him of guilt. Executives may, for example, implement policies that induce unethical behavior and then fail to obtain information about whether employees behave unethically. For example, a consulting firm that charges clients for hours billed may offer large bonuses to long-working employees, but not check whether the number of hours billed across all clients is feasible. In not collecting the information, executives maintain ‘plausible deniability’ in the event that unethical behavior is discovered (Dana 2006; Simon 2005). Agents may strategically remain ignorant not in an effort to commit themselves to an action, but to avoid repercussions for what

they must know is a likely effect of their action (Dana 2005). Heimer (2012) suggests that organizations may deliberately divide tasks and establish bureaucratic barriers to foster such “distributed ignorance.” This is particularly problematic, as little blame appears to be assigned to those who did not, but should have, known about wrongdoing. Pharmaceutical companies holding the patent to a drug with no substitutes, for example, may sell, at a high price, the marketing rights of the drug to a small firm that can then subsequently increase the price. If this leads to a public backlash, the ire is directed at the firm with the marketing rights, protecting the reputation of the manufacturer.¹⁸

In some cases, discovering information confers a moral responsibility to inform others. For example, individuals with STDs could be seen as morally compelled to share the information with prospective sexual partners. An individual who is fearful that he has an STD might choose to not get tested so as to not confront the ethical dilemma of sharing any bad news that the test reveals. Moreover, any disease with a hereditary component, once diagnosed, provides information that is relevant to parents, children, and siblings. In a study with Jewish women, Lehmann et al. (2000) find that virtually all respondents (100% and 97% in two scenarios) believe there is a duty to inform at-risk relatives if the disease is preventable, and 85% believe it to be a duty even when the disease cannot be prevented. A decision to get tested may, in such cases, affect not just one’s own level of knowledge, but that of others who were not involved in the decision to get tested. If someone feels compelled to disclose genetic risk information to relatives upon obtaining it, they may take their relatives’ (perceived) information preferences into account before deciding whether to get tested themselves.

Spread of disease: Avoidance of medical testing about contagious diseases, such as AIDS, can contribute to the spread of these diseases. While an individual may choose to avoid testing – perhaps rationally, given hedonic considerations (Brashers, Goldsmith and Hsieh 2002) – out of fear of getting a positive diagnosis, this kind of information avoidance imposes a negative externality on others. An untested individual may fail to take precautions that prevent the spread of the disease to others, and societal welfare could be reduced (Caplin and Eliaz 2003).

Groupthink: When decisions are made in groups, information avoidance can play an especially pernicious role, not only because many of the most important decisions are made by groups, but because interpersonal interactions can magnify motives leading to information avoidance. Benabou (2013) provides an elegant model of such effects in a paper on

¹⁸ See, for example, <http://www.nytimes.com/2015/09/21/business/a-huge-overnight-increase-in-a-drugs-price-raises-protests.html>

“groupthink,” a phenomenon first identified and discussed by (Janis, 1972). When collective opinion tends toward unanimity, people often find it individually rational to adopt the shared belief as their own rather than to gather their own information, even when the shared belief is irrational. The dearth of new information, in turn, makes it hard for the group to correct their irrational belief. Benabou (2013) also draws a link between groupthink in organizations and collective delusions in markets that can lead to irrational exuberance, bubbles, and panics (Kindleberger, Aliber and Solow 2005; Reinhart and Rogoff 2009; Shiller 2005). Just as people choose to go along with collective opinion in groups, they also choose to buy into the herd mentality of the market and, in doing so, contribute to the momentum of extreme price swings.

Confirmation bias: As already noted in the section on information avoidance via distorted processing of information, confirmation bias (Nickerson 1998) is a common pattern of distorted beliefs that is associated with, and partly the result of, selective exposure to (and avoidance of) information (Jonas et al. 2001; Hart et al. 2009). Confirmation bias has diverse negative manifestations. It can, for example, causes people to accept ineffective medical treatments (and then to judge them as more effective than they actually are) (Nickerson 1998), and can also lead to scientific atrophy when scientists fail to challenge their own beliefs or to update them in response to valid challenges from others. As Max Planck noted, “a new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.” Researchers suffering from confirmation bias may rationalize failed experiments, attributing them to chance or flawed design, and repeat similar experiments until they “work,” and then conclude overconfidently that their initial hypotheses are correct. This is a recipe for producing invalid scientific conclusions (see Simmons, Nelson and Simonsohn 2011).

In situations of joint authorship in academia, and numerous other situations in which people cooperate or delegate responsibility outside of academia, people rely on the integrity and good will of those they are working with. Having delegated parts of a joint task, however, they may then avoid information that could reveal misplaced trust. An academic who has engaged in productive collaborations with a colleague or graduate student may be blind to warning signs of sloppy or fraudulent practices that would be more apparent from a distance (see, e.g., Bazerman and Sezer in press).

Media bias: If people eschew information that threatens their existing beliefs and demand only information that supports these views, it is natural for the media to supply the information they demand. In the competition for more readers and viewers, media outlets have an incentive to provide biased coverage that aligns with the perspective of their target audience. In his book

Republic.com 2.0, Sunstein (2007) notes that the internet holds great promise as a democratizing technology by enabling the dissemination of a greater diversity of information than was previously possible. Yet, he points out, the greater diversity of information also makes it possible for people to selectively expose themselves to perspectives that accord with, and fail to challenge, their existing views, and he cautions against “the risks posed by any situation in which thousands or perhaps millions or even tens of millions of people are mainly listening to louder echoes of their own voices.” Supportive of Sunstein’s concerns, Gentzkow and Shapiro (2010) find that newspapers readers are more likely to demand news slanted toward their own political ideology, and that firms respond strongly to readers’ preferences (for a subtly different perspective, see Garrett, Carnahan and Lynch, 2011). Similarly, users of social networks are more likely to be exposed to (and click through to) news stories congruent with their political beliefs than cross-cutting content (Bakshy, Messing and Adamic 2015).

Political polarization: Closely related to, and both derivative of and contributing to, the problem of media bias, is that of political polarization. Such polarization occurs not only because people selectively attend to media that supports their pre-existing opinions, but because they engage in a wide range of behaviors that contribute to selective exposure to information. An example of such a behavior is relocating to a geographic region in which residents share one’s views. A recent trend in the United States provides striking evidence of such values-based residential segregation. As The Economist reports it: “Americans are increasingly choosing to live among like-minded neighbors... Some folks in Texas recently decided to start a new community ‘containing 100% Ron Paul supporters’.”³ (Ron Paul is a staunch libertarian and was a Republican presidential candidate in the 2008 race.) A recent book, *The Big Sort*, (Bishop and Cushing, 2008) documents that the Ron Paul community is only one example of a more general trend for Americans to form like-minded clusters.

Even when people cannot avoid encountering other people they disagree with, they can avoid having conversations that bring out such differences. Sugden (2005, pg. 67) provides an elegant description of the phenomenon of “conversational minefields” whereby “different topics are gradually introduced into the conversation, exploiting connections with what has already been said, with the general aim of finding a topic on which the two partners have common opinions or beliefs. If a topic begins to provoke disagreement, it is dropped.”

While avoiding contrary information may lead to polarization, (Druckman, Peterson and Slothuus, 2013) show that polarization can lead back to information avoidance. In a polarized environment, partisan cues drown out reasoned arguments. People not only form opinions based on weaker evidence; they also believe that the arguments endorsed by those holding their position are in fact stronger, so they rationalize not listening to opposing arguments.

Climate change denial: One polarizing issue of special importance, given the threat it constitutes to humanity, is climate change. Although the vast majority of scientists believe that climate change is real, caused by humans, and could potentially be mitigated by a concerted human response, large numbers of individuals in the U.S. reject these conclusions. Rejection of the reality of climate change makes it difficult if not impossible for the U.S., which was until recently the world's largest emitter of greenhouse gases, to enact policies to reduce such emissions. Rejection of a scientific consensus almost by definition requires information avoidance. Kahan, Jenkins-Smith and Braman (2011) (see, also, Kahan et al. 2012) find that people with different political positions disagree sharply about how serious a threat climate change is, and that both groups tend to denigrate research that contradicts their views. For example, presented with a PhD scientist who is a member of the US National Academy of Sciences, climate believers and deniers disagree about whether he really is an 'expert', depending on whether his view matches their own (Kahan, Jenkins-Smith and Braman 2011). Surprisingly for believers, belief in climate change bears no connection to an individual's level of scientific literacy or expertise (Kahan et al. 2012). Kahan provides a kind of rational account of such polarization, pointing out the tremendous costs that an individual would bear for deviating from the dominant views of the group within which they are embedded. As a result, as summarized in a recent Nature column on Kahan's work, "social science suggests that citizens are culturally polarized because they are, in fact, too rational at filtering out information that would drive a wedge between themselves and their peers."¹⁹

In a book about climate change denial aptly (for the theme of this review) titled *Don't Even Think About It*, George Marshall (2014) seeks to make sense of why the nations of the world are largely ignoring an unfolding problem that threatens to immiserate even generations alive today. Much of his explanation for the riddle involves information avoidance—e.g.,

The bottom line is that we do not accept climate change because we wish to avoid the anxiety it generates and the deep changes it requires. In this regard, it is not unlike any other major threat. However, because it carries none of the clear markers that would normally lead our brains to overrule our short-term interests, we actively conspire with each other, and mobilize our own biases to keep it perpetually in the background (page 228).

¹⁹ <http://www.nature.com/news/why-we-are-poles-apart-on-climate-change-1.11166>

4. Final Comments

Since George Stigler pioneered the economic analysis of information, we have become used to thinking of information as a means to a (typically material) end. Information is seen as valuable to the extent, and only to the extent, that it enhances decision making. Among the stylized assumptions of economics, this may be one of the most unrealistic, and most consequential.

Considerable research in economics, psychology, and neuroscience points to the conclusion that people derive utility not only from possessions and experiences, but also from beliefs. Seminal early contributions to this perspective include Thomas Schelling's 1987 paper "The Mind as a Consuming Organ," and a 1986 paper by the psychologist Robert Abelson titled "Beliefs are Like Possessions." Neuroscience research (e.g. Knutson and Peterson 2005) shows that people derive immediate utility—pleasure and pain—from learning about gains and losses, and also provides strong support for the reality of anticipatory utility (Berns et al. 2006; Loewenstein 1987). Research on topics such as ego, meaning, framing, and mental accounting provides further support for a point that should perhaps be seen as obvious: most of what matters happens 'inside our heads', and, given that there are often multiple ways to interpret the same piece of information, how we construe information is often as important as the objective content of the information. The burgeoning economic literature dealing with belief-based utility (e.g. Caplin and Leahy 2001; Geanakoplos, Pearce and Stacchetti 1989; Kőszegi 2010) suggests that economists are beginning to grapple with these complexities.²⁰

Information avoidance provides a superb lens into the true complexities of *consumption in the mind*. On the one hand, people avoid information for conventional economic reasons: for strategic purposes that promote material outcomes. But people also avoid information for reasons not well captured by conventional economic analysis. In some cases they avoid information to, in effect, license them to behave as they would really like to behave—providing 'plausible deniability' of unethical behavior not only to other people but also to themselves. Even more tellingly, people often avoid information simply because the information would make them feel bad—because information carries direct, and often negative, utility.

As we have shown, there are many streams of research in both economics and psychology that either directly address, or can be connected to, information avoidance. Given the diverse mechanisms leading to information avoidance, literature on the topic has not been structured as a coherent body; nor we suspect can it or should it. Given the important consequences of

²⁰ Psychologists have a longer tradition of recognizing information avoidance (see Sweeny et al. 2010 and Hertwig and Engel in press).

information avoidance, however, research on the mechanisms that produce it could have immediate and important policy applications—e.g., in encouraging at-risk individuals to test frequently for HIV, or in overcoming resistance to confronting the scientific evidence on climate change. We hope that this review will not only help to introduce a relatively unknown topic to economists, but will help to inspire new lines of theoretical and empirical investigation.

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