

Measuring Information Preferences

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## Abstract

Advances in medical testing and widespread access to the internet have made it easier than ever to obtain information. Yet, when it comes to some of the most important decisions in life, people often choose to remain ignorant, because they fear what they may learn. We design and validate an information preference scale to measure an individual's desire to obtain or avoid information that may be unpleasant, but could improve their future decisions. The scale measures information preferences in three domains that are psychologically and materially consequential: health, consumer finance, and personal characteristics. We present tests of the scale's reliability and validity and show that the scale predicts a real decision to obtain (or avoid) information in each of the domains, as well as decisions from unrelated domains. We find that across settings, many respondents prefer to remain in a state of active ignorance even when information is freely available, and that information preferences are a stable trait but that an individual's preference for information can differ across domains.

*Keywords:* environmental policy, carbon taxes, behavioral economics, nudges

## Measuring Information Preferences

**Introduction**

We live in an unprecedented age of information. Advances in genetic testing can reveal conditions decades before symptoms emerge, calories in our meals are prominently displayed on menus, and social media “likes” tell us how receptive others are to the thoughts we share. Much of this information is available at little or no (financial) cost and can be consequential for the decisions individuals make. Conventional economic models, dating back to George Stigler’s seminal paper on information as a scarce resource (Stigler 1961), suggest that decision-makers would be eager to obtain such news and make full use of it. At worst, information that turns out not to be useful can simply be ignored.

Contrary to this perspective, a substantial body of experimental and field evidence finds that people are often unwilling to learn information that could be painful. Oster et al. (2013), for example, find that only 7% of individuals at high risk for Huntington’s disease elect to find out whether they have the condition, despite the availability of a genetic test that is generally paid for by health insurance plans. Ganguly and Tasoff (2016) find that participants in a laboratory experiment are willing to forgo part of their earnings in order to not learn the outcome of a test for a sexually transmitted disease and that such avoidance is greater when the disease is more severe. Information avoidance is not limited to health decisions. Sicherman et al. (2016) show that investors are less likely to log on to their stock portfolios on days when the market is down, when they might expect to observe losses in their own investments. Similarly, potentially unpleasant information about one’s personal characteristics may be avoided. (???) find, in a laboratory experiment, that many participants who expect to be rated as relatively less attractive or intelligent compared to other participants are willing to pay to avoid learning their true rank. Across contexts, people appear to deliberately and actively avoid information, even when it could be

instrumental and lead to better decisions.

What could explain such avoidance? Recent models of belief-based utility propose that people derive value not merely from their consumption, but also from their beliefs about themselves and the world as well as their expectations about the future (Falk and Zimmermann 2014, Koszegi and Rabin 2006, Loewenstein 2006). That is, information itself can have hedonic costs and benefits that have to be traded off against the decision utility of the information. When decision-makers fear that the information could be unfavorable, they may decide to not obtain it in an effort to protect the value they derive from their (potentially false) belief, even as that may undermine the quality of subsequent decisions. For example, learning one's level of attractiveness does not merely provide value because it informs other decisions (e.g., whom to target for a date), but learning that one is (un)attractive may provide (dis)utility regardless of whether the information changes one's decisions. The mechanism of anticipated regret (Zeelenberg 1999), whereby we imagine a better outcome had an alternative been chosen, may cause people to avoid information in expectation that they will regret knowing the truth.

Failure to obtain information can have implications for society at large. Communicable diseases such as HIV may fail to get diagnosed and proliferate as a result (Caplin and Eliaz 2003, Sullivan et al. 2004). Voters may not consider information which challenges their ideological views, potentially causing insufficient and biased updating that may contribute to political polarization (Druckman et al. 2013). In the case of climate change, active avoidance of scientific consensus may contribute to policymakers' failure to take actions to deal with the problem (???, Ho et al. 2017). In an organizational context, managers at firms may (deliberately) fail to learn about ethical transgressions of their employees (Bazerman and Sezer 2016), with costly consequences for society as well as, often, the firm itself.

Of course, not all individuals avoid potentially unpleasant information in all situations. Some people routinely get tested for sexually transmitted diseases or expose themselves to

political views contrary to their own. This suggests that information preferences may be an important source of individual differences, similar to time and risk preferences. Unlike for those two important characteristics, however, there is no commonly used measure to assess preferences for information. Indeed, despite the many serious consequences that avoiding information may have for society or the individual, we know little about who these avoiders are, and hence cannot identify them in empirical research or develop potential interventions that target them. Although psychology and economics both offer potential explanations for information avoidance (Golman et al. 2017, Sweeny et al. 2010), to date there has been no empirical work clarifying information preference as a psychological construct. Existing studies primarily test one-time, context-specific decisions and, with one exception that we discuss below (Howell and Shepperd 2016), there is no direct method of eliciting such individual preferences across a variety of situations. This leaves unanswered questions about the generality of information avoidance across domains, its prevalence, and its consequences.

In this paper, we develop and validate a scale measuring information preferences. Our scale asks respondents to imagine themselves in a series of hypothetical scenarios in which they can choose to obtain (or not obtain) information. The scenarios cover three domains that span many high-stakes decisions, and for which there exists empirical evidence of avoidance: health, e.g. obtaining an estimate of one's life expectancy; finance, e.g. learning about the performance of alternative investments that one could have pursued; and personal characteristics, e.g., how attractive others believe one to be. We rely on scenarios to make salient the potential hedonic cost of obtaining the information. This is a deviation from scales measuring other constructs that rely on abstract questions and we show that our scenarios better predict consequential information acquisition decisions than do abstract questions.

We first outline the development of the Information Preferences Scale (IPS) building on insights from four pilot studies. Then, in Study 1, we identify the latent factors underlying information preferences and show prevalence of information avoidance across a

variety of scenarios and domains. We also compare the discriminant and convergent validity of information preferences with established measures of related theoretical constructs. We predict that information preferences will differ across domains. For example, individuals afraid of learning potentially negative health news may not be averse to learning about their attractiveness. In Study 2, we confirm the latent factor structure of information preference on a new sample using a confirmatory structural equation model, and we verify test-retest reliability of the scale via two scale administrations that were four weeks apart. Using the theoretical constructs most related to information preferences from the prior study, we refine the conceptual (dis)concordance of information preferences by further comparing the IPS with additional established measures.

Study 3 further tests the extent to which the scale can predict real-world decisions to acquire information in all three domains, and provides an additional test of convergent validity by comparing our measurement to an alternative scale designed to measure information avoidance using abstract questions, rather than specific scenarios (Howell and Shepperd 2016). Study 4 tests the scale's ability to predict information acquisition decision in a domain different from any of the three included in the scale itself.

We show that our scale predicts not just intentions, but actual behaviors related to information acquisition. We conclude with recommendations for applications of the scale.

### **Scale Development**

Given the difficulty of capturing the diverse and almost infinite situations in which one seeks, or more interestingly, avoids information, our scale development process focuses on three domains in which information avoidance has been empirically demonstrated and which plausibly provide information that people may be motivated to avoid: health, consumer finance, and personal characteristics. These are topics for which information of uncertain

valence may induce anxiety and discomfort but for which attaining more accurate beliefs can yield considerable benefits. Early health interventions can extend life expectancy, learning about financial mistakes can improve future financial well-being, and accurate information about how one is perceived by others can improve self-presentation and social interactions. The three domains allow us to cover a broad range of information acquisition decisions and to explore whether avoidance in one domain (e.g. health) is also predictive of avoidance in another domain (e.g. finance).

Ajzen and Fishbein (1977) point out that attitudes and behaviors often do not correspond unless the attitude is related to the behavior. To that end, rather than elicit attitudinal dispositions, we design each item to contain a specific hypothetical scenario in which a decision-maker has an option to acquire potentially useful information, though perhaps at a risk of a negative surprise (e.g. learning one has made a mistake in the past). Learning an outcome can increase the quality of later decisions, but at a possible emotional expense.

The scenarios are written to represent situations that people may typically encounter and may already have experience with, e.g. whether to look at the performance of an investment opportunity they did not pursue. This increases content validity, or the extent to which the scale is representative of a general population's experiences. To make the framing more natural and to minimize asking leading questions that might exaggerate information avoidance, all items ask about the desire to obtain the information (rather than avoid it).

In our first pilot study, we categorized people according to a four-fold classification of information preferences by giving participants in each scenario the choice of whether to either completely avoid an item of information, avoid the information only if a) they expect a negative outcome (e.g., to not look at credit score if they suspect it is low), b) avoid the information only if they expect a positive outcome (e.g., that they are viewed as more attractive than they thought), or c) seek information regardless of their expectations. Some

items also tapped into the temporal aspect of avoidance: the choice to delay, but not entirely avoid consumption of information, e.g., by setting aside an envelope with a bill to be opened at a later date. A general information preference question described the tendency for people to avoid information when it could be painful or seek it even when it may be painful, and asked participants to rate themselves along this continuum.

Respondents were generally less receptive to information when they expected negative outcomes, confirming similar experimental evidence (???, Ganguly and Tasoff 2016, Oster et al. 2013). We retained pilot items if they exhibited a biserial correlation of greater than 0.25 for at least one part of the question with both the general information preference question and the total sum-score. Items examining delay in information seeking were not predictive of either criterion and were excluded, along with three items that describe situations less commonly encountered outside the United States that could have restricted international usage of the scale.

In the second iteration, participants evaluated separately whether they would obtain or avoid the information in two circumstances: when the expected outcome was positive and when it was negative. Again, participants typically reported more avoidance with a negative expected outcome. As a higher proportion of participants avoided information when it was expected to be negative, we rewrote and tested a net set of general information preference items which measured the inclination to remain ignorant in a situation even when others may know bad news about the individual.

The penultimate pilot study tested a revised set of items such that no outcome (positive or negative) was explicitly stated, but the possibility of either outcome was implicit. The new items, in line with previously generated successful items, sought to capture universal experiences and situations (e.g., whether to check that your recommendation to a friend was well-received). The four-fold classification was initially distilled into a binary decision: simply the decision to acquire or avoid information. However, a final pilot study



that used a four-point ordinal response scale yielded higher internal consistency (measured by Cronbach's  $\alpha$ ) than when participants were presented only with a dichotomous choice; hence, the final resulting scale incorporates the ordinal responses.

In all the scenario-based questions, the information is depicted in a way so that (1) information is of uncertain valence, i.e. it could be favorable or unfavorable, and (2) the potential discomfort is experienced when the information is obtained while the potential benefits of obtaining the information are in the future. Prevalence of information avoidance is defined by proportion of respondents who definitely or probably did not want to know a piece of information. The final scale contains 13 items (5 personal characteristic items, 3 health items, 3 finance items, and 2 general items; Table 1).

## Study 1

Study 1 explores the latent factor structure underlying the measure of information preference devised in earlier pilot studies. Additionally, we examine the relationship between the Information Preferences Scale (henceforth IPS) and other conceptually-related measures. Experiments frequently measure participants' time and risk preferences and we expect those measures to correlate with the desire for information. Because the psychological cost (e.g., anxiety, disappointment) occurs immediately and the benefits (e.g., realization of better financial decisions) occur in the future, those who discount the future more will also be less likely to desire information. We predict that those with high discount rates overweigh the anticipated pain that comes with immediately consuming the information, and underweigh the positive utility that such knowledge may bring in the future. Similarly, because the valence of the information is uncertain, individuals face the prospect of either learning favorable news or unfavorable news. We hypothesize that individuals who are more tolerant of risk are then also more willing to obtain information.

## Method

**Subjects.** We recruited 400 participants (52.89% male with a mean age = 34.92,  $SD = 9.99$ ) via Amazon Mechanical Turk. Of those, 18 participants failed the attention check and 2 were incomplete. We analyze data from the remaining 380 participants.

**Procedure.** Participants completed the 13-item scale generated from the pilot studies. To ensure consistency in response format across items, the response scale for all items was on a 1-4 Likert scale, from 1 = “Definitely don’t want to know” to 4 = “Definitely want to know” (see Appendix A for the experimental material). Each item was standardized. To assess the relationship between information preference and other established constructs hypothesized to be related to our measurement, participants also completed measures for risk aversion (Gneezy and Potters 1997), time preferences (Kirby et al. 1999), openness to opposing views (Minson and Chen 2017), preference for coherence (Antonovsky 1993), need for cognition (Cacioppo et al. 1984), preference for consistency (Cialdini et al. 1995), as well as several general personality traits (BFI; John and Srivastava 1999). We presented the measures and scales (including our own) in random ordering to prevent order effects. Items in each measure were appropriately reverse-coded and, with the exception of the time discounting task, averaged to produce a mean score. The time discounting measure was calculated by identifying the point of indifference between two valuations and using the ranking in Kirby et al. (1999) to assign rank order to each participant.

## Results

Across all scenarios we observe a considerable degree of avoidance, suggesting that information avoidance is highly prevalent. On average across all participants and items, 32.46% of responses indicated a definite or probable preference for not obtaining the information. The fraction of avoidant responses across items ranged from 20.52% to 51.05%

(Table 1). To produce an information preference score, items were averaged ( $M_{score} = 0.67$ ,  $SD_{score} = 0.16$ ). The distribution of scores for all studies are in Figure 1.

To determine whether demographic variables influence information preferences, we regress gender, education, political affiliation, income, and age on the scale scores. No coefficient was significant at the  $\alpha = 0.05$  level; nor is the resulting model,  $F(25, 354) = 0.73$ ,  $p = 0.82$ . This suggests that information preferences do not differ across any broadly defined demographic group.

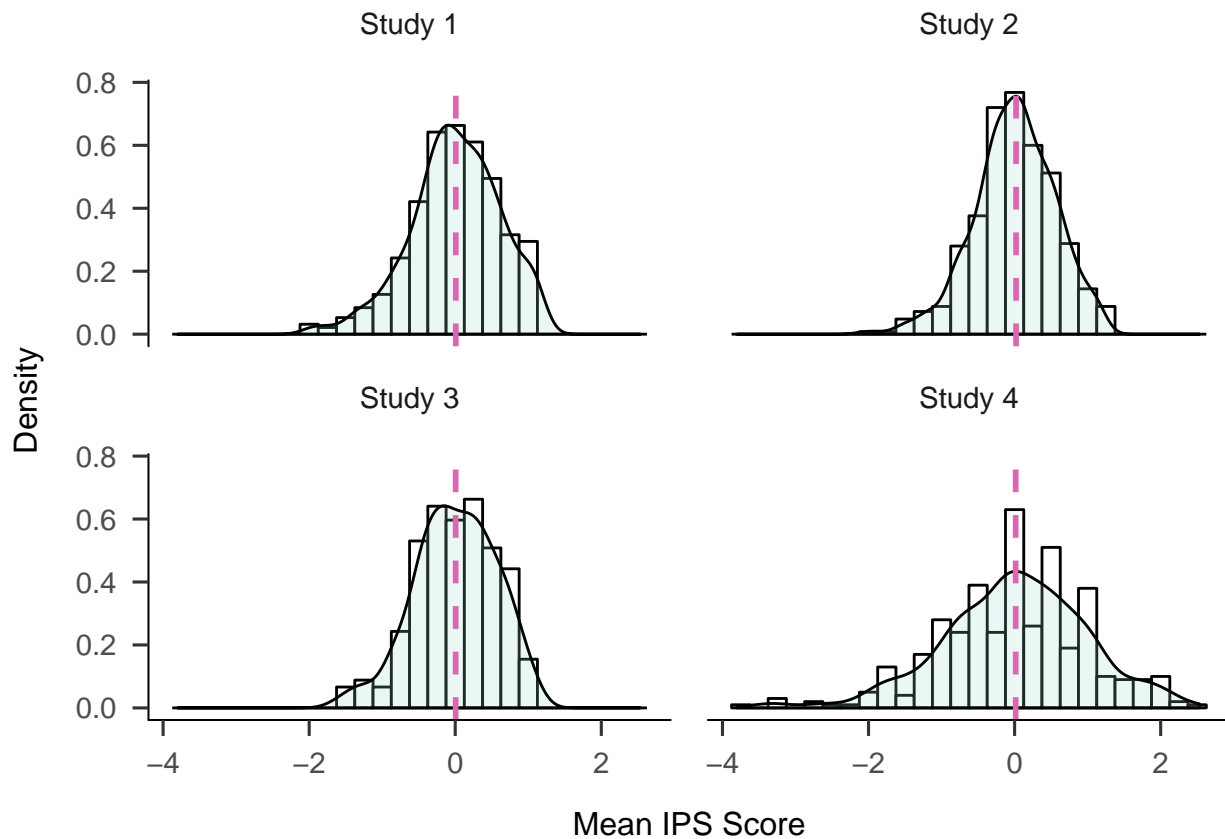


Figure 1. IPS score distribution density plots with median (Studies 1-5).

**Exploratory Factor Model.** To examine the latent factor structure of information preference, we perform exploratory factor modeling on the scale in a two-step procedure. First, to determine the number of latent factors, we apply Kaiser’s rule (1960), which retained 4 latent factors from the scale’s 13 items. We hypothesize that information

preference consists of three domain factors as well as general information preference factor. Then, we fit an exploratory factor analysis on the 11 domain items using an oblimin factor rotation, which accounts for correlations across latent factors. A three-factor model provides the best model fit. As predicted, the items have high loadings on their intended domains, e.g., all health items cluster together to form an individual factor. This implies that the propensity to obtain information is conditional on the particular topic. The two general information preference items exhibited moderate correlations with items from all the three domains. To incorporate the additional two general information preference items, we fit an exploratory structural equation model (Asparouhov and Muthén 2009) on all 13 items into a general factor whilst simultaneously accommodating the three-factor structure uncovered in the domain items. The exploratory factor loadings are presented in Table 2. We verify this model in a confirmatory analysis in Study 2.

**Divergent Validity.** To examine the divergent validity of the 13-item scale, we compare the correlations between established measures, the IPS, and the domain-specific items (Table 3).

***Preference for cognitive activities.***

To examine information preferences are related to a propensity for satisfying other types of knowledge gaps, we examined the correlation between our scale and the Need for Cognition scale (NFC; Cacioppo et al. 1984). The correlation between information preferences and the NFC was positive,  $r(379) = 0.21$ ,  $p < 0.00$ , indicating that those with a high need for cognition also have a tendency to desire information (Table 2). The Receptiveness to Opposing Views scale (Minson and Chen 2017) assesses the tendency to listen to opinions that are contrary to one's own, closely-held beliefs. As one might expect, participants who preferred information in general were also more likely to be receptive to hearing viewpoints that differed from their own,  $r(379) = 0.23$ ,  $p < 0.00$ .

Need for Closure (Webster and Kruglanski 1994) measures a preference for order, structure, and predictability, over ambiguity (Kruglanski 2013). We hypothesize that those exhibiting a great need for closure would be more willing to disregard evidence that either does not correspond with already formulated opinions or induces re-evaluation. We observe a low but significant negative correlation between Need for Closure and the IPS,  $r(379) = -0.12$ ,  $p < 0.05$ , suggesting that those who prefer order and structure are more likely to avoid psychologically discomfiting information. The Preference for Consistency-Brief Scale (Pfc-B; Cialdini et al. 1995) was not correlated with the IPS,  $r(379) = -0.07$ , *ns*, perhaps because the Pfc-B scale measures both an individual preference for consistency and also a self-reported perception of how others see one in this regard, whereas the IPS measures only the individual trait.

### ***Risk, Time, and Information Preferences.***

Because getting information always entails risks, in the sense that it could turn out to be better or worse than expected, we hypothesized that people who are more open to taking risks may also be more willing to obtain information that could be either positive or negative. As predicted, risk-seeking attitudes (measured by Gneezy and Potters 1997) are positively related to the desire to obtain information,  $r(379) = 0.12$ ,  $p < 0.05$ .

Similarly, as obtaining potentially painful information (e.g., watching a video of oneself giving a talk) often involves an immediate cost in exchange for a delayed gain (e.g., improved teaching in the future), we also anticipated that information avoidance would be associated with high rates of time discounting. Analogously and in line with prior work, temporal discounting might also influence people's decision to obtain information immediately or delay consumption to the future (Falk and Zimmermann 2014). As predicted, we observe a negative relationship between immediate information consumption and individual discount rate (Kirby et al. 1999),  $r(379) = -0.16$ ,  $p < 0.00$ .

### ***General Personality Traits.***

We look at the relationship between information preference and the Big Five Personality Inventory (BFI; John and Srivastava 1999). The desire for information was uncorrelated with agreeableness ( $r(379) = 0.04$ , *ns*), but positively correlated with extraversion ( $r(379) = 0.11$ ,  $p < 0.05$ ), conscientiousness ( $r(379) = 0.14$ ,  $p < 0.05$ ), and openness to new experiences ( $r(379) = 0.22$ ,  $p < 0.00$ ). Information preference is negatively correlated with neuroticism ( $r(379) = -0.17$ ,  $p < 0.00$ ). Extraversion, characterized by high sociability and expressiveness, may induce those exhibiting high levels of this trait to also seek information more. Exhibiting high conscientiousness, i.e., a tendency towards perseverance, may be the counterpoint against information-delaying inclinations.

Conversely, neuroticism, the tendency to more readily experience unpleasant emotions, may increase the hedonic cost of obtaining unfavorable information and hence make one less likely to take a chance in obtaining it. People who score high on the openness to new experiences factor, which relates to a tendency towards intellectual pursuits, also score high on curiosity (John and Srivastava 1999), and may incur a cost from *not* having information that they know is available, irrespective of its valence.

## **Discussion**

Study 1 examines the factor structure of the IPS and its relationship to a broad range of other measured constructs.

In a purely exploratory model, the domain items all load onto their respective latent factors (e.g., health items all mapped onto the same factor), providing a clear multi-dimensional factorial structure of information preference. This result implies that information preferences are sensitive to the context in which the information is embedded, providing support for our second hypothesis that information preferences are sensitive to

domain. Yet, we also sought to capture a more general and contextless aspect of information preference with our two general items, and the exploratory factor model fitted suggests the latent factor structure of information preference can accommodate both individual personality differences and context-dependent dimensions (Mischel and Shoda 1995). To the best of our knowledge, this is the first empirical evidence comparing within-subjects' differential propensities towards information; previous studies (e.g., Sullivan et al. 2004, Glaeser and Sunstein 2013) have focused instead on specific, one-time situations where usually only a single decision is involved. We see sizable proportions of avoidance across the wide variety of situations depicted in the IPS. To the extent that self-reporting behavior introduces bias (e.g. because participants want to project a favorable view of themselves), and to the extent that information-seeking is viewed as normative, we are if anything underestimating the extent of avoidance. The discriminant validity of information preferences' psychological uniqueness is affirmed by its lack of correspondence with potentially related constructs such as measures of need for consistency, closure, cognition, risk attitudes, receptiveness to opposing views, time discounting, and general personality traits. The scale appears to measure a distinct construct, with none of the correlations between the scale and potentially related measurements exceeding an absolute value of 0.3. Additionally, information preferences are not predicted by standard demographic characteristics such as gender, income, age, or political affiliation. In concert, these findings suggest the mechanisms underlying the latent construct of information preference are unique and cannot be explained solely by existing measurements. To further confirm and replicate these results, in Study 2 we administer the IPS to another sample at two time points, allowing us to assess test-retest reliability as well as providing additional, empirically motivated tests of convergent and discriminant validity.

## Study 2: Test-retest reliability

We confirm the proposed exploratory factor model from Study 1 with a new and larger sample. By eliciting the scale from the same respondents at two points in time, we were able to assess test-retest reliability. We further test, beyond the measures in Study 1, the discriminant validity of the information preference scale by comparing it with additional constructs that have potential theoretical overlap. This allows a further clarification of the correspondence between information preferences and other established personality traits. We selected measures that bore the most theoretical similarity to the constructs most highly correlated with information preference in Study 1: curiosity, self-efficacy, and different learning styles. For example, a moderate correlation between information preference and openness to new experiences in Study 1 suggests that information preference may also be linked to curiosity, which is typified by search for information that may not be particularly useful (Loewenstein 1994). Recently, receptiveness to oppositional political views has also been linked to curiosity (Kahan et al. 2017), further lending support to a potential relationship between preferences for information and curiosity.

### Method

**Subjects.** We recruited 601 participants (52.80 % male with a  $M_{age} = 36.71$ ,  $SD_{age} = 12.01$ ) on Amazon Mechanical Turk to complete the scale at two time points about four weeks apart. To avoid biasing our results, we report results for the 500 participants who completed both stages in our analysis. Those who failed to respond to the follow-up survey do not differ on any demographic measure from those who did complete the follow-up.

**Procedure.** To examine the stability of the psychological trait over time, participants completed the assessment twice, with a four-week lag between the two administrations. For the first administration of the IPS only, we included additional



psychological measures: the Curiosity and Exploration Inventory (CEI-II; Kashdan et al. 2009) and the General Self-Efficacy Scale (GSE; Schwarzer and Jerusalem 1995).

## Results

We observe high internal consistency in both the first (measured by average inter-item correlations; Cronbach's  $\alpha = 0.80$ ) and second ( $\alpha = 0.83$ ) administration of the IPS.

Test-retest reliability, measured by the correlation of respondents' average scores across both time points, was  $r = 0.64$ , indicating that the IPS reliably measures the construct over time.

**Confirmatory factor analysis.** We fit a confirmatory structural equation model on the responses for the first administration of the scale. Due to the ordinal (non-continuous) response type, the IPS is non-normally distributed,  $M_{\text{skewness}} = 1,188.56$ ,  $p < 0.00$ ,  $M_{\text{kurtosis}} = 17.99$ ,  $p < 0.00$  (Mardia 1970). In such a situation, Floran and Curran (2004) recommend using the diagonal weighted least squares estimation procedure to estimate the confirmatory latent model.

Confirming the exploratory factor model in Study 1, the resulting latent factor structure (Figure 2) contains four correlated factors: the three domains and a general information preference factor. The general factor loads onto the latent domains as well as the two general information preference observed items (Table 2). The root mean square error approximation (RMSEA), a model fit index (Steiger and Lind 1980), is  $\epsilon = 0.03$ , 90% confidence interval,  $[0.02, 0.04]$ , and falls within guidelines of good model fit ( $< 0.08$ ; (Hooper et al. 2008)). This is corroborated by other fit statistics, Tucker-Lewis Index = 0.98 (Tucker and Lewis 1973), and Comparative Fit Index = 0.99, above recommended cutoffs of 0.90 and 0.95, respectively (Hu and Bentler 1999). The latent factor correlations are in Table 4.

	Health	Finance	Personal	General
<b>Health</b>				
<b>Finance</b>	0.39			
<b>Personal</b>	0.54	0.48		
<b>General</b>	0.76	0.44	0.53	

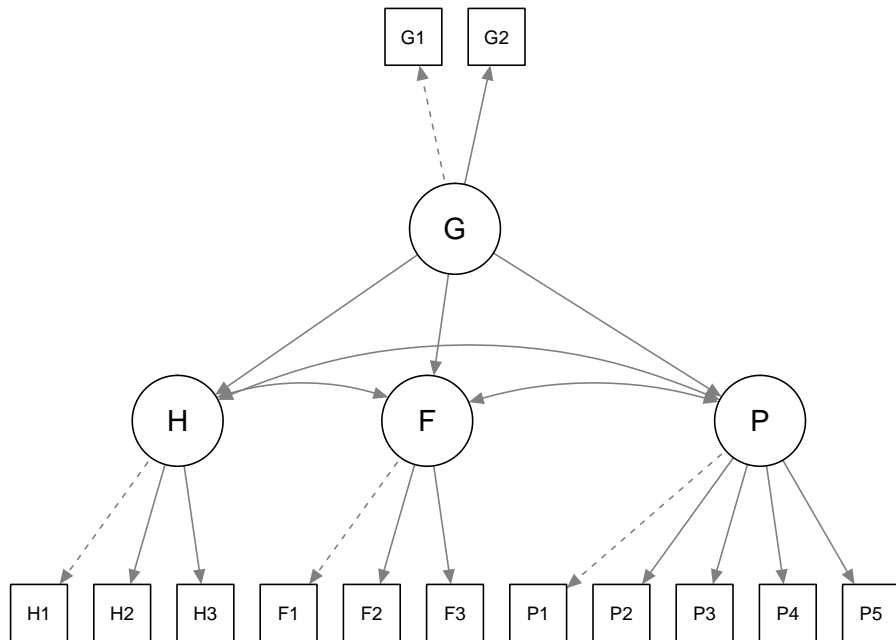


Figure 2. SEM Plot (Study 2).

**Curiosity, Self-Efficacy, and Learning Style.** We further assess the theoretical correspondence between information preferences and other personality traits. As predicted, curiosity was positively related to information preference, ( $r(585) = 0.22, p < 0.00$ ). Conscientiousness, which relates to being motivated and persevering, exhibited a positive relationship in Study 1 with self-efficacy, or the extent to which individuals believe

themselves to be capable of performance on a task, both academically (Caprara et al. 2011) and in the workforce (Lee and Klein 2002, Martocchio and Judge 1997). Such efficacious attitudes are linked to goal-oriented behaviors and motivation (Bandura 1986), and Schunk (1990) has suggested that those with low reported self-efficacy may avoid learning to prevent confirming personal suspicions of inadequacy. We hypothesized that self-efficacy may influence the perceptions of information usefulness; that is, those exhibiting high self-efficacy would feel more confident in their ability to make better decisions in face of potentially negative information and thus be more likely to obtain such information. We see a positive relationship between information-seeking preferences and the GSE,  $r(585) = 0.21$ ,  $p < 0.00$ .

## Discussion

Study 2 demonstrates the psychometric stability of the scale over time. In addition, using a latent model approach, our confirmatory factor model provides further evidence that IPS reliably and validly measures both domain-specific preferences for information as well as information preferences as a general psychological trait: individuals may have different information-seeking preferences for health, finance and personal characteristics. We further clarify the unique construct of information preference as compared to other psychological constructs most closely aligned with those possessing highest convergent validity in Study 1. The correlations, while statistically significant, remain moderate (Study 1 range: [-0.17, 0.23]; Study 2 range: [0.21, 0.31], further lending evidence that the desire to seek or avoid information can be reliably measured by the IPS, and that information preference is not simply an amalgamation of other existing constructs.

### Study 3: Predicting Information Choices

Studies 1 and 2 show that the scale is reliable, contains a stable factorial structure, and possesses adequate discriminant and internal validity. Having illustrated the psychometric

robustness of the scale, we next explore the potential external validity of the scale. Here, we provide a systematic test of the IPS and all its subscales on domain-related information seeking and avoiding behaviors. We test, on a more diverse sample, whether our validated scale can predict behaviors associated with information preference across all domains represented in the IPS. In line with evidence from the first two studies suggesting that construct of information preference is domain-specific, we hypothesize that the scores from the domain-specific items can predict a related decision to obtain information. Moreover, as the IPS was designed to be predictive across a variety of contexts, we also hypothesized that scores from the complete IPS would predict information acquisition decisions across domains. Additionally, we compare our scale to an alternative assessment measuring information avoidance using abstract questions (Howell and Shepperd 2016), providing an additional test of convergent validity and a benchmark for our scenario-based approach.

## Methods

**Subjects.** We recruit readers of a science message board **Reddit r/science** via a discussion about information avoidance and listeners of a behavioral science podcast *You're Not So Smart* in an episode on the same topic. We thus reached a sample that was both geographically diverse (40.33% from outside the US) and highly educated (32.04% with graduate degree). In total, 181 participants (61.33% male with a  $M_{age} = 35.57$ ,  $SD_{age} = 11.28$ ) completed our study.

**Procedure.** Participants completed the 13-item scale and were asked to make a consequential decision to obtain (or avoid) information in one of the three domains represented in the scale. If participants chose to obtain the information, they were forwarded to the relevant website upon completion of the study. Participants were randomly assigned to make this decision in the health domain (a website calculating their life expectancy), the personal characteristic domain (an algorithm that would estimate their age from a picture),

or the consumer financial domain (a website to estimate their income in retirement). We also varied whether we highlighted potentially positive information (e.g. you might live longer than you expected) or negative information (e.g., you might not live as long as you expected). Because fewer respondents completed the survey than expected, we are not sufficiently powered to detect differences in that framing and combine both in our analyses. Because the issue of retirement savings is less relevant in many countries outside of the United States, non-US participants were not assigned to this condition. Finally, participants also completed a recently published alternative measure for information preferences (HS; Howell and Sheperd 2016). The format of HS is open-form (example item: “I would rather not know \_\_\_\_\_”). These sentence stems allow the test-maker to complete the sentence as they wished. In line with the phrases used in the Howell and Sheperd (2016) study, the sentences were completed using the phrases “my health”, “my finances”, and “how attractive others find me” for the three domains. We counterbalanced the order of the questions as follows: the behavioral measure was asked either first or last and we randomized the order of the IPS and the alternative scale.

## Results

The IPS and the HS scale were moderately negatively correlated,  $r(180) = -0.66$ ,  $p < 0.00$ , indicating an oppositional correspondence between information preference and information avoidance, as expected. To examine the relationship between our scale and HS scores on propensity to opt for information, we conducted logistic regressions. The IPS in conjunction with the HS scale, the total IPS scale, its individual subscales, the total HS scale, and the individual HS subscales were regressed separately on the decision to seek or avoid information.

The complete IPS scale significantly predicts information seeking across all three decision tasks,  $OR_{Overall} = 1.11$ , 95% CI = [1.06, 1.16],  $p < 0.00$ . The HS scale is, in

contrast, only weakly significant,  $OR_{Overall} = 0.99$ , 95% CI = [0.98, 1],  $p = 0.09$ . When both scales are compared in a multiple logistic regression, the total IPS score significantly predicts information-seeking behaviors over the HS score,  $OR_{IPS | HS} = 1.09$ , 95% CI = [1.04, 1.15],  $p < 0.00$ . The HS score is non-predictive,  $OR_{HS | IPS} = 1.00$ , 95% CI = [0.99, 1.02], *ns*.

This suggests that the IPS exhibits ecological validity, as it is able to succinctly predict information-seeking behaviors across multiple contexts. A statistical comparison of the two scales shows clearly that the IPS can significantly explain variations in information-seeking and -avoidant behaviors beyond what the alternative scale can provide. We confirm this finding by applying dominance analysis (Azen and Budescu 2003, Azen and Traxel 2009) to the logistic regression specification containing both scales. This approach uses changes in model fit statistics (i.e.,  $R^2$  in ordinary least squares regression) to determine predictor importance. Rather than the standard variance-explained index, logistic regression relies instead on quasi- $R^2$  indices (Cox 1985, Estrella 1998, McFadden 1974, Nagelkerke 1991). The Nagelkerke index shows that the contribution of the IPS scale ( $R^2_N = 0.05$ ) is larger than that of the HS scale ( $R^2_N = 0.00$ ). This pattern replicates in the three other quasi- $R^2$  indices tested, establishing dominance of the IPS over the HS scale.

Next, we examine whether the IPS subscales can predict domain-related behaviors.

**Domain-specific results.** For information on one's life expectancy, having a high score on the health subscale significantly predicted the odds that participants would seek the information (rather than avoid it),  $OR_{Health\ Seeking} = 1.52$ , 95% CI = [1.10, 2.18],  $p < 0.05$ . (Equivalently, scoring low on the subscale significantly increased the odds of *avoiding* the information,  $OR_{Health\ Avoidance} = 0.73$ , 95% CI = [0.65, 0.82],  $p < 0.00$ .) In the personal characteristics domain, having a high score on the characteristics subscale also significantly predicted the odds of seeking information on how old the participant looked, based on an algorithm scoring a self-portrait,  $OR_{Personal} = 1.31$ , 95% CI = [1.09, 1.61],  $p < 0.01$ . In the consumer finance condition, participants scoring high on the corresponding subscale tended

to also wanted to know more about their retirement savings, though this was not significant at the usual level,  $OR_{\text{Finance}} = 1.32$ , 95% CI = [0.98, 1.86],  $p = 0.08$ . Because we had a large group of international participants and fewer respondents than we had expected, we had low power only for this domain. In a similar series of logistic regressions, the HS subscales do not significantly predict any related behaviors.

For ease of interpretation, we present results of a linear probability regressions. We rescale the range of the HS predictor to 1-4 and use the mean score (rather than the sum score) so that the effect size of the different scales can be directly compared. Both the IPS and HS scales were averaged and the latter was linearly transformed so that it conformed to a 4-point scale. The reported coefficient represents the predicted percentage point increase in obtaining the information when the IPS shifts by one SD. Across all domains, with every additional one-unit SD increase in the IPS the probability of seeking information increases by 27%,  $p < 0.00$ , whereas an equivalent shift in the HS scale leads to a non-significant 11% percentage point increase in avoidance. The domain-specific linear probability models for both scales are in Table 5.

The IPS significantly predicts specific domain-related information seeking or avoiding behaviors, as well as overall information seeking and avoiding across domains.

## Discussion

Study 3 investigates the predictive validity of the IPS with domain-specific behavioral measures. We also compare our scale with a related elicitation (Howell and Shepperd 2016). The two scales are moderately and negatively correlated, suggesting that, while the scales overlap in what they measure; the IPS is able to predict a variety of real-world behaviors related to information acquisition, but the HS is not. Moreover, the subset of items pertaining to a particular domain is also able to predict the domain-specific domain,

suggesting that it may not be necessary to present all scenarios in some instances. Compared to a more abstract scale, relying on specific hypothetical scenarios, as we do in the IPS, appears to be better capture the trade-off between the gains of obtaining useful information and the risk of learning something unpleasant. As Maul (2017) notes, attempting to measure noncognitive constructs by inserting phrases in open-ended sentence stems may result in statistical patterns apparently confirming validity but may lack correspondence to theoretical and behavioral outcomes. The IPS achieves both the former and the latter in its ability to use both the targeted items, as well as the entire scale, to predict behaviors related to the IPS domains.

Yet, can the IPS predict information avoidant behaviors out-of-sample, i.e., beyond domains represented in the IPS? In the next study, we expand the predictive range of the scale into the domain of politics.

#### Study 4

The previous study demonstrated the scale's capability to link scores to behaviors, both within domain and across the scale. In Study 4, we test whether the IPS can predict a decision to obtain information unrelated to the domains already present in the scale. We hypothesize that, given the out-of-sample nature of the task, scores from the entire IPS would predict the decision to avoid or acquire information.

Selective exposure to information can lead to political polarization (Druckman et al. 2013), so we selected politics as the out-of-sample domain. We ask participants whether they want to read a testimonial by someone affected by the Deferred Action for Childhood Arrivals (DACA) policy. DACA is an immigration policy enacted under the Obama Administration that enables undocumented immigrants who entered the country as minors to apply for a renewable two-year deferral for deportation, in addition to a permit to work.



At the time the study was conducted, the Trump administration called for an end to DACA, leading to a national debate on the consequences for individuals and potential alternatives to the policy. Contrary to political polarization typically found in other immigration policies, both liberals and conservatives generally favor amnesty and pathways to citizenship for undocumented immigrants (???, @YouGov2017), so we suspected that both would have reasons to avoid obtaining information about it: for those on the left, it would be painful to contemplate the dismantling of a policy they supported, and those on the right may want to avoid the cognitive dissonance their party's president wants to dismantle a policy they support (Festinger 1962). The potential existence of reasons for a broad spectrum of the policy to avoid information about the policy made it fertile ground for examining information preferences. Because there are different reasons for people across the political spectrum to avoid the information, we hypothesize that the scale can predict the decision to read the article for both conservatives and liberals, but that we will nonetheless see differences by affiliation.

## Methods

**Subjects.** We recruited 400 participants (50.25 % male with a  $M_{age} = 35.54$ ,  $SD_{age} = 10.82$ ) on Amazon Mechanical Turk. In our sample, 26.50% of respondents identified anywhere between slightly to extremely politically conservative.

**Procedure.** Participants read and rated their support for the DACA policy, and then were asked whether they wanted to be forwarded to a personal testimonial from an undocumented immigrant. This article chronicled how DACA has positively impacted his life, and the implications that a policy repeal would have on him. They also completed the IPS. We counterbalanced whether participants first completed the IPS or made the decision to be forwarded to the information. Participants then answered demographic questions. For all analyses, a median split dichotomized political affiliation.

## Results

In our sample, only 32% of participants supported repealing DACA, and this effect was significantly associated with identifying as politically conservative,  $\chi^2(1) = 59.90$ ,  $p < 0.00$ . As we found in Study 1, there was no relationship between political affiliation and IPS scores,  $t(318.53) = -1.16$ ,  $p = 0.25$ .

Controlling for political affiliation and the interaction between political affiliation and the IPS scores, the IPS significantly predicts avoiding the personal testimonial,  $OR_{IPS|conservative} = 0.51$ ,  $p < 0.05$ . Providing an indication of the strength of the relationship, a one-unit SD decrease in the IPS corresponds to a 33.74% decrease in the individual's likelihood of opting to obtain the information. Conservatives were 6.38% less likely than liberals to seek the information, though this effect is not significant,  $OR_{conservative|IPS} = 0.07$ ,  $p = 0.05$  (Figure 3). The interaction is non-significant ( $OR = 2.20$ ,  $p = 0.09$ ). Using the IPS alone to predict avoidance was also non-significant ( $OR_{IPS} = 0.83$ ,  $p = 0.08$ ), underscoring the need to include other individual characteristics when predicting a behavior outside of the domains specified in the IPS. We note that including only the 11 domain items (excluding the two general information preference items) in the a logistic regression specification including political affiliation and the IPS x political affiliation interaction also renders the effect of the scale statistically significant, with a comparable effect size;  $OR_{IPS\ Domain} = 0.56$ ,  $p < 0.05$ . For the distilled scale, every one-unit SD decrease in the scale increases the likelihood of avoiding the testimonial by 36.06%.

Participants who elected to not read the testimonial ( $N = 254$ ) gave a variety of reasons for their decision. Some participants (52.76%) expressed a belief that the link would not provide them with any instrumental information beyond what they already knew. Another 34.65% of participants believed the information would be irrelevant to them. Some participants (12.60%) also reported that they avoided the information because it would be

painful or unpleasant to read.

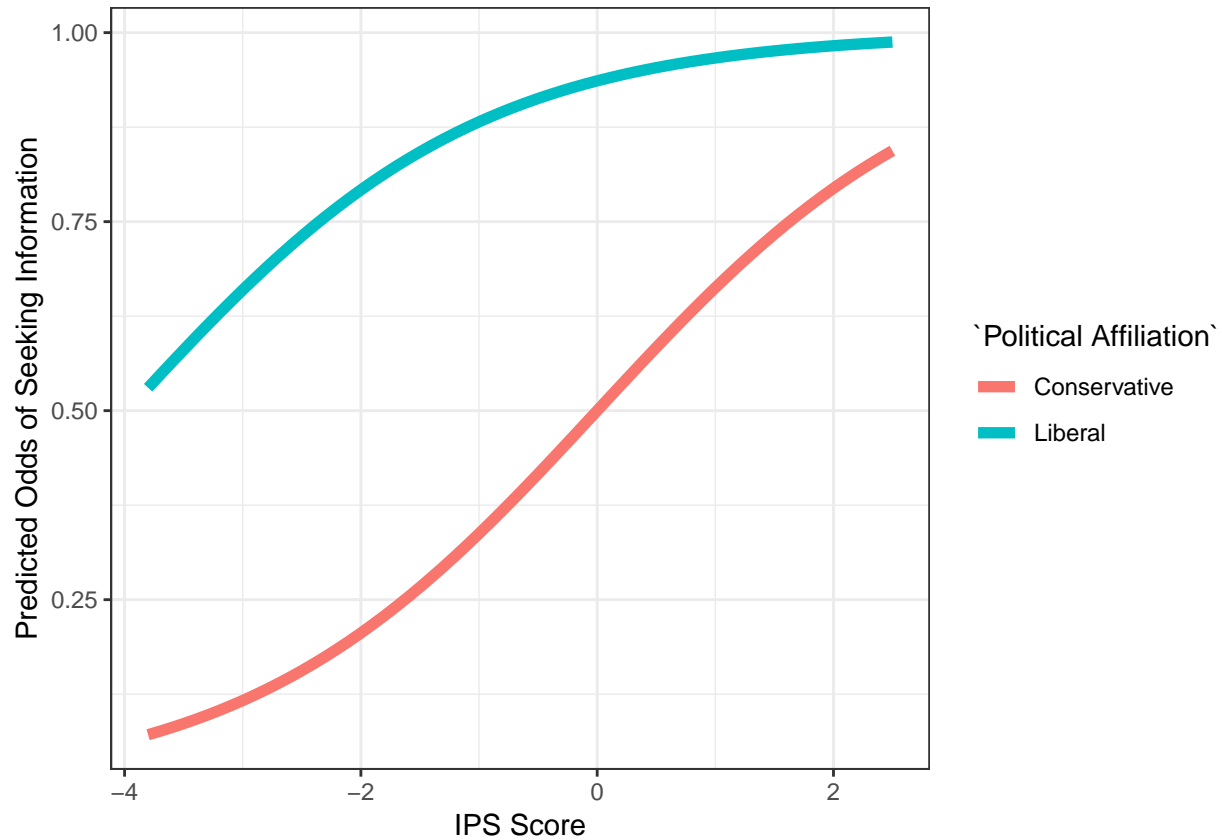


Figure 3. Influence of political affiliation and IPS on information seeking.

## Discussion

This study investigated the ability of the IPS to predict information avoidance on a topic not covered in the scale. We chose a timely out-of-sample task in the political realm. The IPS is able to predict the odds of avoiding the personal testimonial, suggesting the IPS is able to predict behaviors not related to domains represented in the scale. Although political affiliation was significantly associated with supporting the repeal, it did not fully explain the variation in the tendency to seek or avoid information, suggesting that individual-level information preferences may play an important role in how political knowledge is spread (Huckfeldt and Sprague 1987). Similarly, support for the policy did not

predict information seeking or avoiding, indicating prior stances and beliefs of an issue cannot explain avoidant behavior. The IPS alone also did not significantly predict avoidance in the politics domain, suggesting that combining the IPS with targeted individual characteristics, in this case political affiliation, may yield higher predictive capacity.

### **General Discussion**

Making good decisions is often contingent on obtaining information, even when that information may be painful to think about. Substantial empirical evidence suggests that people are often ready to make worse decisions in the service of avoiding potentially painful information. We propose that this tendency to avoid potentially painful information is a trait that is separate from those measured previously, and sought to measure it using a set of items specific enough to enable respondents to imagine how they would behave if placed in the position, but sufficiently universal to capture preferences for information in a broad range of domains.

In five studies, we test the validity and reliability of the Information Preferences Scale, with a particular focus on its capacity as a behaviorally predictive tool. The IPS differs from scales that have been used to measure many other individual difference constructs in three important ways. First, it uses realistic and actionable scenarios as a foundation for defining the construct of information preference. In contrast with measures that generally rely on dispositional attributes and often lends themselves to abstracted interpretation, the IPS is oriented towards behavioral outcomes. The response type elicits the propensity that one would seek the specific information described in the item. Second, IPS items tap into a wide range of situations that are both psychologically and economically consequential in the domains of health, finance, and personal attributes. Third, the IPS was behaviorally validated using a series of contextualized decision to acquire information across domains, and shows promise in predicting information acquisition behavior in a domain not included in the

scale itself.

Our results show that the tendency to avoid information varies substantially across individuals, but not along any of the standard demographics one might have assumed (e.g. education). This may have especially important implications for disseminating information and raising awareness. Governments (and private actors) currently apply such campaigns broadly based on the assumption that individuals are receptive to the information. However, the impact of information campaigns may (predictably) differ based on people's tendency to avoid information. The expectation of a hedonic cost might motivate some to sidestep such policy efforts. For example, financial education literacy interventions, have been found to have small impacts on behavior (e.g., Fernandes et al. 2014). Similarly, the presence of calorie labels does not always help consumers make healthier choices (Elbel et al. 2009). However, information disclosure may be effective for a subset of consumers who are not predisposed to avoid potentially unpleasant information.

Given the welfare implications of avoidance, people's preferences for information ought to be accounted for when designing interventions to help reduce an unwanted behavior (e.g., smoking cessation) or increase uptake of actions with positive outcome (e.g., more annual physicals). Studies in health behavioral phenotyping have begun to personalize care based on behavioral trends and prior responses to health interventions (Jethwani et al. 2010). Automated algorithms in the form of robo-advisors now guide the information that is delivered to consumers based on balance and prior investing experience (e.g., Betterment and Wealthfront). Personalized interventions are considered promising in drug development (Ginsburg and McCarthy 2001, Schork 2015, Swan 2009); similarly, personalized messaging campaigns may make informational campaigns more effective. Knowing who is likely to engage with certain kinds of information could improve the effectiveness of informational campaigns and avoid exposing people to information they would be better off not obtaining (in terms of their belief utility) and are unlikely to act on. Information seekers and avoiders

may benefit from different messaging, much like extremely risk-averse investors may desire different products than do those who are more tolerant of volatility.

With the recent emergence of information avoidance as a central topic in economics and other disciplines, measuring information preferences in laboratory and field experiments may become as important as measuring risk and time preferences. We hope that the availability of a valid and reliable scale to measure individual differences will prove useful to a diverse set of researchers.

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Scale Item	Avoidance
As part of a semi-annual medical checkup, your doctor asks you a series of questions. The answers to these questions can be used to estimate your life expectancy (the age you are predicted to live to). Do you want to know how long you can expect to live?	43.68%
You provide some genetic material to a testing service to learn more about your ancestors. You are then told that the same test can, at no additional cost, tell you whether you have an elevated risk of developing Alzheimer's. Do you want to know whether you have a high risk of developing Alzheimer's?	21.32%
At your annual checkup, you are given the option to see the results of a diagnostic test which can identify, among other things, the extent to which your body has suffered long-term effects from stress. Do you want to know how much lasting damage your body has suffered from stress?	25.52%
Ten years ago, you had the opportunity to invest in two retirement funds: Fund A and Fund B. For the past 10 years, you have invested all your retirement savings in Fund A. Do you want to know the balance you would have, if you had invested in Fund B instead?	51.05%
You decide to go to the theater for your birthday and give your close friend (or partner) your credit card so they can purchase tickets for the two of you, which they do. You aren't sure, but suspect that the tickets may have been expensive. Do you want to know how much the tickets cost?	20.52%
You bought an electronic appliance at a store at what seemed like a reasonable, though not particularly low, price. A month has passed, and the item is no longer returnable. You see the same appliance displayed in another store with a sign announcing 'SALE.' Do you want to know the price you could have bought it for?	37.37%
You gave a close friend one of your favorite books for her birthday. Visiting her apartment a couple of months later, you notice the book on her shelf. She never said anything about it; do you want to know if she liked the book?	23.68%
Someone has described you as quirky, which could be interpreted in a positive or negative sense. Do you want to know which interpretation he intended?	31.31%
You gave a toast at your best friend's wedding. Your best friend says you did a good job, but you aren't sure if he or she meant it. Later, you overhear people discussing the toasts. Do you want to know what people really thought of your toast?	39.21%
As part of a fund-raising event, you agree to post a picture of yourself and have people guess your age (the closer they get, the more they win). At the end of the event, you have the option to see people's guesses. Do you want to learn how old people guessed that you are?	24.21%
You have just participated in a psychological study in which all the participants rate one-anothers' attractiveness. The experimenter gives you an option to see the results for how people rated you. Do you want to know how attractive other people think you are?	39.21%
Some people seek out information even when it might be painful. Others avoid getting information that they suspect might be painful, even if it could be useful. How would you describe yourself?	28.69%
If people know bad things about my life that I don't know, I would prefer not to be told", "Proportion of Avoiders	33.69%

Table 1

*Scale Items and Proportion of Avoiders.*

Table 2

*Standardized factor loadings for the EFA (Study 1) and CFA (Study 2).*

	Item	EFA Loadings	CFA Loadings
Health	H1	0.66	0.71 ***
	H2	0.80	0.72 ***
	H3	0.75	0.69 ***
Finance	F1	0.37	0.64 ***
	F2	0.29	0.27 ***
	F3	0.49	0.70 ***
Personal	I1	0.96	0.40 ***
	I2	0.54	0.59 ***
	I3	0.59	0.56 ***
	I4	0.73	0.66 ***
	I5	0.75	0.68 ***
General	G1	0.81	0.81 ***
	G2	0.81	0.67 ***

<sup>a</sup> .  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

<sup>b</sup> EFA = Exploratory Factor Analysis.

<sup>c</sup> CFA = Confirmatory Factor Analysis

Table 3

*Divergent validity correlations (Study 1 and 2)..*

	Comparison Scale	Health	Consumer Finance	Personal
Study 1	Need for Consistency	-0.06	0.03	-0.03
	Need for Closure	-0.07	0.04	0.04
	Receptiveness to Opposing Views	0.13 **	-0.02	0.09 .
	Need for Cognition	0.12 *	0.09 .	0.15 ***
	General Risk	0.05	0.07	0.13 **
	Time Discounting	-0.07	-0.08	-0.12 *
	BFI: Extraversion	0.00	0.11 *	0.13 **
	BFI: Agreeableness	0.02	-0.04	0.07
	BFI: Conscientiousness	0.03	0.13 **	0.04
	BFI: Neuroticism	-0.03	-0.08 .	-0.03
	BFI: Openness	0.18 ***	0.10 *	0.18 ***
Study2	Curiosity	0.13 ***	0.03	0.13 ***
	Self-Efficacy	0.14 ***	0.08 *	0.18 ***
	Learning Styles	0.23 ***	0.11 **	0.25 ***

<sup>a</sup> .  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

Table 5

*Latent factor correlations (Study 2).*

	Health	Finance	Personal	General
Health				
Finance	0.39			
Personal	0.54	0.48		
General	0.76	0.44	0.53	

Table 6

*Linear Probability Model (Study 3)*

	N	IPS	HS
Health	75	0.2 **	-0.09
Finance	36	0.18 .	0.06
Personal	70	0.29 ***	-0.11
All Domains	181	0.27 ***	-0.11 .

<sup>a</sup> . p < 0.10, \* p < 0.05, \*\* p < 0.01, \*\*\* p < 0.001