

Unethical Investments: The Baseline Propensity to Invest and the Susceptibility to Moral Decay

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Data, materials, and code availability. The pre-registration documents, data, materials, and code are available at: https://osf.io/u8g2r/?view_only=c059ee64508f4185823357a2ea6bbc9b.

CRedit authorship contribution statement

Paweł Niszczoła: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Abstract

Who is tempted by versus resilient to investment premiums from ‘sin stocks’ that produce social harm? We present a correlational ($N = 218$) and experimental study ($N = 646$) to examine a) willingness to invest in sin stocks without a return premium, b) how temptation increases as premiums increase, and c) moderation by individual differences in deontological and utilitarian sacrificial dilemma inclinations and dark personality traits. People exhibit an aversion to sin stocks without a premium, but most become increasingly willing to invest as premiums increase. However, people high in deontological inclinations demonstrated resilience, with lower baseline investment and lower responsiveness to premium returns. Conversely, people high in utilitarian inclinations and Dark Triad traits showed higher responsiveness to premium returns. Results suggest two independent aspects contribute to sin stock investment decisions: deciding whether to invest in sin stocks or not, and sensitivity to return premiums.

Keywords: moral psychology; sin stocks; controversial investments; judgment and decision making; deontology; utilitarianism; moral dilemmas; Dark Triad; psychopathy

1. Introduction

After Russia invaded Ukraine in February 2022, many countries imposed sanctions on Russia, but there was also opposition to banning Russian hydrocarbon imports (Arnold et al. 2022). Governments around the world faced a dilemma between buying Russian hydrocarbons—thereby stabilizing energy prices for their citizens at the social cost of funding Russia’s invasion—or banning such imports, reducing standards of living due to higher energy prices but avoiding the social cost of funding Russian aggression.

Investors frequently face similar dilemmas when deciding whether to invest in socially harmful companies. Companies that produce social costs—*sin stocks*—such as tobacco producers or casinos, harm society in some way, such as increasing cancer rates or facilitating gambling addiction. People appear sensitive to such costs (e.g., Bonnefon et al. 2022), yet sin stocks may provide greater investment returns than less controversial companies (Hong and Kacperczyk 2009). Therefore, investors face a dilemma: should they invest in sin stocks to earn higher returns despite funding social ills?

In this paper, we examined how people respond to such investment dilemmas. Specifically, we examined a) baseline aversion to investing in sin stocks that offer no premium, b) a decay of moral concerns about sin stocks as the premium for investing increases, and c) moderation of these patterns by people high in moral concern—assessed via utilitarian and deontological tendencies on moral dilemmas—and low in moral concern—assessed via dark triad personality traits like psychopathy. Specifically, we expected people higher in moral concern to demonstrate higher baseline aversion to sin stocks and weaker decay in response to premium returns, whereas people higher in antisocial personality traits should demonstrate the opposite pattern.

1.1. Attitudes Towards Sin Stocks

People are less willing to invest in unethical companies than neutral or ethical companies. For example, Bonnefon et al. (2022) created synthetic companies with various stock prices that participants could invest in for dividend payouts. Some companies were unethical, as part of

their dividend payouts took money away from charity; ethical companies instead gave to charity (i.e., ‘saint’ stocks). They found that people were willing to pay more for saint stocks and less for sin stocks. Hence, people appear to price in social costs to their investment decisions. Chew and Li (2021) likewise found evidence of aversion to sin stocks and an affinity to ethical ‘saint’ stocks, with the aversion effect stronger than the affinity effect.

People may be averse to sin stocks because of the psychological effect of “dirty money” (Tasimi and Gelman 2017). The idea is that owning money with an immoral past is like wearing a sweater worn by Hitler: a sign one is willingly associated with its past, possibly also implying an endorsement of its origins. For example, the Metropolitan Museum of Art declined generous contributions from a business that earns its money by selling opioids, which more than 100 Americans overdose on and die from every day (Tasimi and Gross 2020). Hence, people may be averse to owning tainted money (here – profiting from owning stocks) because they do not want to be associated with its origins.

However, there may also be benefits to investing in sin stocks. For example, Hong and Kacperczyk (2009) found that sin stocks generally trade at lower prices, thus leading to higher returns for their investors. They argued that sin stocks may be undervalued because some investors shun them, so sin stocks can produce a premium return to investors willing to forego moral concerns (at least under some conditions; see Pedersen et al. 2021). Therefore, although people may demonstrate moral aversion to sin stocks compared to regular stocks with a similar return, this aversion may decay as the relative sin stock investment premiums increase. We studied this possible moral decay effect. In the current work, we entertain three plausible moral decay patterns: full resilience, sin-deduction, and full decay.

Full resilience model. This model assumes that people are resilient to the lure of increased sin stock returns. There is no moral decay, so the amount people invest in sin stocks will not increase much, if at all, in response to increased returns, reflecting a general unwillingness to trade morality for money. Conversely, people will respond to increased returns for conventional stocks. Hence, the difference between conventional versus sin and investments will increase as returns increase.

Sin deduction model. This model proposes two independent elements to investment decisions: allocating money depending on expected returns, and a flat deduction for sin versus conventional stocks. In this case, people should invest more in both sin and conventional stocks as returns increase at a similar rate, but consistently show a main effect of aversion to sin stocks.

Full decay model. Finally, people may demonstrate a decay in moral concerns as returns increase, suggesting a ‘crowding out’ of moral concerns for financial gain. People may initially demonstrate baseline aversion to sin versus conventional stocks. However, as the temptation to invest increases with the prospect of a larger return, but the aversion remains constant, the relative strength of the two motives will change. Hence, financial motivations will gradually dominate moral motivations as people reach a price where they trade moral concerns for monetary ones. The difference in allocations to sin and conventional stocks will gradually disappear with increasing returns.

1.2. Individual Differences

Prior work suggests that people higher in moral concerns make different economic choices than people low in such concerns (Bénabou et al. 2018; Bénabou and Tirole 2011; Chen and Schonger 2022). For example, women are more averse to sin stocks than men (Niszczota and

Białek 2021a, 2021b), as are people who act generously during a Dictator Game (Chew and Li 2021). Niszczoła and colleagues (2022) showed that both deontological (harm rejection) and utilitarian (outcome-maximization) response inclinations in sacrificial dilemmas predicted sin stock aversion. However, they did not examine cases where sin stocks provide a greater financial return than conventional stocks, raising questions about whether people who focus on utilitarian outcomes might abandon moral concerns for financial success when sin stocks ‘sweeten the pot’ with premium returns (i.e., when the utility of investing is higher). After all, sin stock aversion might reflect not only deep-seated moral values, but also shallower concerns such as perceived integrity or social reputation (Rom and Conway 2018).

In the current research, we attempt to a) replicate the finding that people high in both inclinations demonstrate higher baseline sin stock aversion, and b) extend past work to examine whether people high in both inclinations demonstrate lower moral decay—i.e., reduced sensitivity to increasing returns from sinful investment. Additionally, we investigated whether people higher in dark personality traits demonstrate increased willingness to invest in sin stocks and have an increased sensitivity to moral decay.

Deontological inclinations. People high in deontological inclinations refuse to accept sacrificial harm regardless of consequences, e.g., refusing to torture even to prevent a terrorist attack. Conceptually, such decisions align with philosophical arguments for inflexible moral rules, but empirically, such decisions reflect an array of processes including affective concern for victims, adherence to rules, and general inaction (see Conway 2023). As people high in deontological inclinations appear inflexible and sensitive to harming others, they should not only reject sin stocks at baseline, but also demonstrate relative insensitivity to increasing the size of sin stock returns, thus showing a pattern resembling the full resilience model.

Utilitarian inclinations. People high in utilitarian inclinations accept sacrificial harm—but only when harm arguably maximizes outcomes, such as torture to prevent a terrorist attack. Conceptually, such decisions align with philosophical arguments for maximizing overall outcomes, but empirically, such decisions reflect an array of processes including cognitive processing, moral concern for groups, and pragmatism (Conway 2023). Though we anticipated replicating that people high in utilitarian inclinations reject sin stocks at baseline, their flexibility and pragmatic approach to morality may result in moral decay—i.e., increased willingness to invest in sin stocks as returns increase, consistent with the full decay model.

Dark personality traits. We also investigated how moral decay varies with dark personality traits—Machiavellianism, narcissism, and psychopathy—that reflect a callous indifference to harming others. Like people high in utilitarian inclinations, those high in dark traits tend to accept sacrifices in dilemmas, but unlike people high in utilitarian inclinations, they appear insensitive to outcomes, so they may be willing to torture to prevent moderate inconvenience rather than a serious attack (see Conway et al. 2018). Moreover, utilitarian decision-makers appear focused on benefits for everyone (Kahane et al. 2018), whereas dark personality scorers focus mostly on their own benefit. Accordingly, we anticipated that people high in dark traits would not only demonstrate higher sin stock investment at baseline, but also higher sensitivity to moral decay—i.e., the full decay model.

1.3. Present Work

The current work builds on previous findings suggesting people are averse to sin stocks (Bonnenon et al. 2022), and work suggesting that sin stocks may offer a premium (Hong and

Kacperczyk 2009) to examine how people resolve the dilemma of investing in unethical companies as returns increase. We test three hypotheses.

First, we expect people to show *baseline sin stock aversion*: an aversion toward sin stocks in the (hypothetical) absence of a premium (higher return) from investment in them. Second, we tested the *moral decay hypothesis*: that aversion to sin versus conventional stocks will decrease as investment returns increase. We test three alternative models: the full resilience model, the sin-deduction model, and the full decay model. Rejection of the full resilience model will be consistent with moral decay. Third, we extend previous work to test the *moral concern moderation hypothesis*: that people who care more about morality (deontological and utilitarian inclinations) will demonstrate higher sin stock aversion and lower moral decay, whereas people who care less (dark traits) will show lower sin stock aversion and higher moral decay.

We tested these hypotheses via two studies. Study 1 was a preliminary correlational study examining how individual differences predict sin stock investment, replicating and extending Niszczota et al. (2022) by including dark personality traits. Study 2 was experimental, and assessed all hypotheses simultaneously: baseline sin stock aversion, moral decay, and the moral concern moderation.

2. Study 1

In Study 1, participants reported hypothetical allocations to companies operating in controversial industries (sin stocks) versus the rest of the Standard & Poor's 500 Index (S&P 500). Unlike Study 2, participants were told that sin and conventional stocks have similar returns and riskiness, and we did not provide any reference value for investments (e.g., market capitalization, which could serve as a heuristic for how much to invest) – so participants lacked numeric guidance for the size of the investment).

2.1. Method

We pre-registered this study at: https://aspredicted.org/MVK_WMK. Data and materials are available at: https://osf.io/u8g2r/?view_only=c059ee64508f4185823357a2ea6bbc9b.

2.1.1. Participants

We recruited American Amazon Mechanical Turk participants with >1000 tasks completed and 95% approval ratings. G*Power (Faul et al. 2009) yielded $N = 300$ for ~95% power ($\alpha = .05$) to detect an effect of $r = .20$. We collected data from 450 participants as we expected to exclude ~33.3% of participants for either incorrectly selecting which dilemma was presented, or incorrectly recalling how much they allocated to controversial companies. Ultimately, these questions were harder than we expected, leaving only 218 participants, 75 female (34.4%), $M_{\text{age}} = 38.0$ years ($SD = 11.4$).

2.1.2. Procedure

2.1.2.1 Sin Stock Investments

Participants imagined receiving a small windfall they must invest in companies from the S&P 500 index. Specifically, we asked what portion they would invest in companies operating in 14 controversial industries used in Trinks and Scholtens (2017), including alcohol, tobacco, and gambling, knowing that the remainder of their investment will go to the rest of the companies in the S&P 500 index (see Appendix). For example, participants could invest 20% of their capital in the sin stocks, with the remaining 80% invested in the remainder of companies in the index. We advised participants to diversify rather than ‘put all their eggs into one basket’ and

that selected stocks averaged similar rates of risk and return as the rest of the index (and would thus have similar Sharpe ratios, i.e., similar returns per unit of risk).

2.1.2.2 Individual Differences

Moral inclinations. Participants also completed the process dissociation dilemma battery (Conway and Gawronski 2013). They judged whether it is *acceptable* or *not acceptable* to harm someone to achieve a specific outcome across 10 incongruent dilemmas (benefits of harm arguably greater than costs) and 10 congruent dilemmas (benefits arguably not greater than costs) in a fixed order. We employed the six equations described by Conway and Gawronski to algebraically estimate the *D*- and *U*-parameters independently, representing the strength of harm-rejection (deontological) and outcome-maximization (utilitarian) response tendencies. This method allows people to vary in each response tendency rather than forcing these tendencies to be opposites, as in conventional dilemma analyses.

Dark personality traits. Next, we measured how each participant scored on dark triad personality traits (i.e. Machiavellianism, narcissism, and psychopathy) using the Short Dark Triad (Jones and Paulhus 2014; Paulhus and Williams 2002). This short scale is composed of 27 items (9 for each dark personality trait; $\alpha_{\text{Machiavellianism}} = .88$, $\alpha_{\text{narcissism}} = .85$, $\alpha_{\text{psychopathy}} = .78$), rated on scales from 1 (*disagree strongly*) to 5 (*agree strongly*). For example, people rated statements like “*I like to use clever manipulation to get my way*” (Machiavellianism), “*Many group activities tend to be dull without me*” (narcissism), and “*People often say I’m out of control*” (psychopathy).

Risk tolerance. Participants answered one item assessing risk tolerance (“*How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?*”) on a scale of 0 (*not at all willing to take risks*) to 10 (*very willing to take risks*; (Dohmen et al. 2011).

Investment knowledge. Participants completed a six-item objective investment knowledge test, e.g., *Considering a long time period (e.g., 10 or 20 years), which asset normally gives the highest return: savings accounts, bonds or stocks?* (van Rooij et al. 2011) and one item assessing subjective investment knowledge (“*My investment knowledge is good.*”).

2.2. Results

Participants allocated on average 29.0% ($SD = 26.9\%$) of their money in morally dubious industries, and 71.0% in the remainder of companies in the S&P 500. Notably, 14.7% of participants allocated 0% into sin stocks, which is unsurprising given that there was no incentive to do so.

Correlational analyses (see Table A1 in Appendix) showed that allocations to sin stocks correlated negatively with deontological inclinations, $r = -0.39$, and utilitarian inclinations, $r = -0.28$, and positively with Machiavellianism, $r = 0.28$, narcissism, $r = 0.24$, and psychopathy, $r = 0.38$, and a composite score of dark personality traits, $r = 0.35$. All dark traits correlated with one another.

We next performed a series of beta regression analyses (models SI 1-10) to assess how individual differences predicted sin stock investment: deontological inclinations, utilitarian inclinations, and dark personality traits controlling for gender, age, risk tolerance, and objective and subjective investment knowledge (see **Table 1**). We examined both a composite of dark

personality traits and each trait separately (in separate models as they were heavily correlated with each other).

Given that participants allocated a proportion of funds to sin versus conventional stocks, OLS regressions are inappropriate. The dependent variable was bounded between 0 and 1, and such data often leads to heteroscedasticity, hurting model fit and quality of inferences. Therefore, we conducted beta regressions (Cribari-Neto and Zeileis 2010), which are suitable for proportion analyses (Kieschnick and McCullough 2003). Given that such regressions require that the dependent variable takes values in the open interval (0, 1), and our dependent variable was equal to zero in many cases (i.e., there was an “active floor”), we transformed it using the formula $(y \cdot (n - 1) + 0.5)/n$ (Smithson and Verkuilen 2006).

As predicted, people higher in moral concern invested less in sin stocks. Consistent with Niszczoła and colleagues (2022), participants high in deontological inclinations invested less in sin stocks, and there was an interaction such that people high in both deontological and utilitarian inclinations especially invested less in sin stocks. However, in contrast to Niszczoła and colleagues, there was no significant main effect of utilitarian inclinations.

Table 1. Predictors of Investment in Sin Stocks in Study 1

	Investment in sin stocks									
	SI 1	SI 2	SI 3	SI 4	SI 5	SI 6	SI 7	SI 8	SI 9	SI 10
(Intercept)	-1.28 ** (0.44)	-1.35 ** (0.44)	-1.34 ** (0.44)	-1.40 ** (0.44)	-1.52 *** (0.44)	-1.48 *** (0.44)	-1.35 ** (0.44)	-1.31 ** (0.44)	-1.63 *** (0.44)	-1.53 *** (0.44)
Deontological PD Parameter (<i>D</i>)		-0.40 *** (0.09)		-0.40 *** (0.09)	-0.38 *** (0.09)					-0.32 ** (0.10)
Utilitarian PD Parameter (<i>U</i>)			-0.12 (0.09)	-0.09 (0.09)	-0.08 (0.09)					-0.11 (0.09)
<i>D</i> × <i>U</i>					0.22 ** (0.08)					
Dark personality score (<i>Dark</i>)						0.38 *** (0.10)				0.27 * (0.11)
Machiavellianism							0.37 *** (0.09)			
Narcissism								0.11 (0.10)		
Psychopathy									0.36 *** (0.10)	
Female (0 = no, 1 = yes)	0.24 (0.18)	0.34 (0.18)	0.22 (0.18)	0.33 (0.18)	0.34 (0.18)	0.34 (0.18)	0.25 (0.18)	0.26 (0.18)	0.40 * (0.19)	0.39 * (0.18)
Risk tolerance	0.09 (0.10)	0.03 (0.10)	0.07 (0.10)	0.01 (0.10)	0.02 (0.10)	-0.03 (0.10)	0.03 (0.10)	0.05 (0.11)	-0.00 (0.10)	-0.06 (0.10)
Objective inv. knowledge	-0.30 *** (0.09)	-0.27 ** (0.08)	-0.28 ** (0.09)	-0.25 ** (0.09)	-0.18 * (0.09)	-0.20 * (0.09)	-0.23 ** (0.09)	-0.28 ** (0.09)	-0.20 * (0.09)	-0.18 * (0.09)
Subjective inv. knowledge	0.23 * (0.11)	0.17 (0.11)	0.20 (0.11)	0.15 (0.11)	0.12 (0.11)	0.18 (0.11)	0.19 (0.11)	0.21 (0.12)	0.20 (0.11)	0.13 (0.11)
Age (logged)	-0.23 ** (0.09)	-0.17 (0.09)	-0.24 ** (0.09)	-0.18 * (0.09)	-0.22 * (0.09)	-0.20 * (0.09)	-0.18 * (0.09)	-0.23 ** (0.09)	-0.21 * (0.09)	-0.16 (0.09)
<i>N</i>	218	218	218	218	218	218	218	218	218	218

	Investment in sin stocks									
	SI 1	SI 2	SI 3	SI 4	SI 5	SI 6	SI 7	SI 8	SI 9	SI 10
<i>Pseudo-R</i> ²	0.113	0.159	0.119	0.162	0.175	0.147	0.154	0.116	0.146	0.177
<i>AIC</i>	-390.128	-406.698	-389.603	-405.677	-409.964	-401.475	-403.758	-389.237	-400.931	-409.668

Notes: This table reports beta regressions, computed using the *R* package *betareg* (Cribari-Neto and Zeileis 2010). SI 1-10 refer to ten different regressions with the proportion of funds invested in the sin industries – or the Sin stock Investment (SI) – serving as the dependent variable. We used logit as the link function, and thus estimates are log-odds ratios. All non-indicator variables are standardized. Robust standard errors are shown in parentheses. We controlled for socioeconomic status by using the logged mean of the income bracket and dummy variables for education level.

* $p < .05$, ** $p < .01$, *** $p < .001$

Moreover, as predicted, people with dark personality traits allocated a larger portion of the endowment in sin stocks. This pattern held for overall dark traits, and individually for Machiavellianism and psychopathy but not narcissism. In the final specification (SI 10), both deontological inclinations and dark traits remained as simultaneous significant predictors of sin stock investment.

In addition, objective investment knowledge predicted lower sin stock investment, and younger people invested less in sin stocks. In a few models, subjective knowledge predicted increased sin stock investment and women invested less in sin stocks, but these patterns were not robust across analyses so should be interpreted with caution. Risk tolerance did not predict sin stock investment in any model.

2.3. Discussion

These results are consistent with the claim that people high in moral concern avoid sin stocks, whereas people low in moral concern invest more in sin stocks. People high in deontological inclinations invested less in sin stocks, and deontological inclinations are associated with prosocial emotions like empathic concern (Conway and Gawronski 2013). In addition, people high in both utilitarian and deontological responding invested less in sin stocks, and they score high in measures like moral identity and moral conviction that harm is wrong (Conway et al. 2018).

Conversely, people high in dark traits—particularly psychopathy and Machiavellianism—invested more in sin stocks. These patterns remained significant when both dilemma responding and dark traits were entered in the model simultaneously. Hence, even though people high in dark traits score lower on deontological and utilitarian inclinations (Conway et al. 2018), dark traits have predictive power independent of deontological inclinations. Results held above demographic predictors and investment knowledge.

Although we did not replicate the finding from Niszczoła and colleagues (2022) that utilitarian inclinations uniquely predicted reduced sin stock investments, we interpret this finding with caution. It could be that the potency of utilitarian inclinations depends on deontological inclinations (see specification SI 5), or it could be that we did not have the power to detect all effects.

Overall, these results are consistent with the argument that people higher in moral concern avoid sin stock investments and people lower in moral concern embrace sin stock investments (at least when there is no premium). However, in reality, sin stocks may outperform regular stocks (Hong and Kacperczyk 2009). Thus, the question remains as to how well these findings will hold when investors can be ‘bribed’ to abandon moral concerns by earning a greater financial return from sin than regular stocks.

Therefore, in Study 2, we manipulated an increase in expected returns from either sin or conventional stocks and tested both baseline sin stock aversion as well as moral decay—a possible reduction in sin stock aversion as premiums increase, and moderation by deontological and utilitarian inclinations and dark traits.

3. Study 2

3.1. Method

3.1.1. Participants

We recruited American Amazon Mechanical Turk participants with >5000 tasks completed and 99% approval ratings. G*Power yielded $N = 645$ to aim for ~80% power to detect effects of $f^2 = .02$ (the omnibus $\alpha = .05$ type I-error rate was Holm-Bonferroni corrected to account for the number of tests). We collected data from 760 participants to account for an expected ~15% exclusion rate of inattentive participants, estimated using a pilot study ($N = 100$). As preregistered, we excluded 116 participants for whom allocations did not monotonically increase (or, alternatively, did not remain constant) as expected returns increased, leaving a final sample of 644: 294 (45.5%) female, $M_{age} = 44.3$ ($SD = 12.9$).

3.1.2. Procedure

As in Study 1, we presented participants with 14 industries and asked them to imagine receiving an endowment which they could split between stocks from the 14 industries versus the remainder of stocks from the S&P 500 index. However, we manipulated – via a between-subjects design experiment – whether the 14 industries were sin industries or conventional industries (see Appendix for exact instructions).

We also manipulated the premium for investing in the selected stocks within-subjects. Participants learned that a set of stocks from 14 industries either had a 0% premium (i.e., an identical return to the rest of S&P 500), or had an additional premium of 1, 2, 4, 8, or 16 percentage points relative to the rest of the index. Each participant reported the percent they would invest in the selected 14 industries, with the remainder going toward the rest of the index. Participants reported investment decisions across all six scenarios.

To illustrate, in the 1 p.p. premium case, participants read the following:

If the stocks from the industries listed above had a 1% (percentage points) higher expected return than the remainder of industries from the S&P 500 (e.g., 7% instead of 6%), then I would invest [...] % in them.

We assessed two dependent variables. First, we examined Baseline Investment (BI), i.e., investment in the absence of a premium. Second, we measured Area Under the Curve (AUC) to test for *moral decay*, that is, increasing temptation to invest in stocks as the premium increases from baseline (see **Figure 1**). The AUC measures the sensitivity to an increase in the return from an investment from the baseline for that stock type.

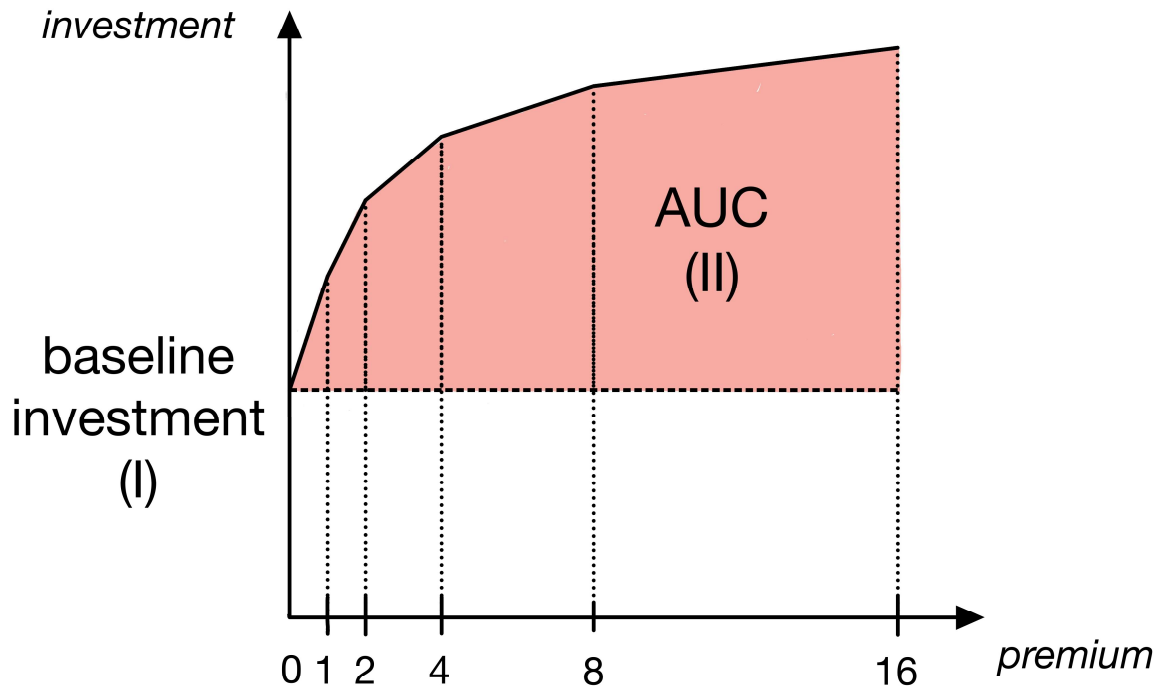


Figure 1. Study 2 Dependent Variables

Note: Premium refers to how much higher the expected return from investment in the selected group of stocks is relative to the remainder of stocks, in percentage points.

The patterns corresponding to each model are presented in **Figure 2**. In all cases, $AUC_{\text{conventional}} > 0$, indicating that people should increase the proportion invested in conventional stocks as premiums increase. The key question is how $AUC_{\text{conventional}}$ compares to AUC_{sin} . In the case of full resilience, $AUC_{\text{sin}} = 0$. In the sin deduction model $AUC_{\text{sin}} = AUC_{\text{conventional}}$ as only the intercept is different (i.e., baseline sin aversion). However, in the full decay model, $AUC_{\text{sin}} > AUC_{\text{conventional}}$ because investment in sin stocks eventually catches up to conventional stocks as premiums increase despite starting at a lower intercept. Each model illustrates a boundary case where one model perfectly describes the data. We also considered intermediate cases where the data partially align with more than one model. For example, cases between full resilience and sin deduction would show people increasing investment in sin stocks as premiums increase, but less aggressively than in conventional stocks.

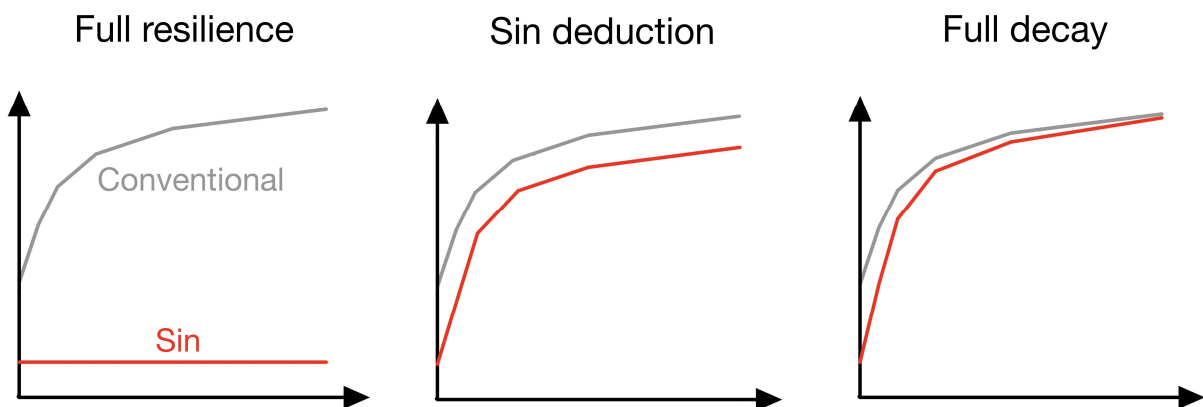


Figure 2. Competing moral decay patterns

Notes: This figure shows premium-investment patterns reflecting each possible model. The blueprint for these patterns can be found in **Figure 1**.

We pre-registered the procedure at: https://aspredicted.org/DLN_EII. Data and materials are available at: https://osf.io/u8g2r/?view_only=c059ee64508f4185823357a2ea6bbc9b. In **Table A2** (in the **Appendix**), we report descriptive statistics and bivariate correlations for sin stocks and conventional stock groups, separately and for the pooled dataset.

3.2. Results

3.2.1. Baseline Investment and AUC for Sin and Conventional Stocks

In **Figure 3 Panel A**, we illustrate omnibus investment decisions as expected return premiums increase for sin stocks (red line) and conventional stocks (gray line). Results show that overall investment increased as premiums increased. For conventional stocks, this meant that participants rationally allocated more money to stocks with a higher expected return on average. For sin stocks, this meant people exhibited moral decay in aggregate—however, not all people exhibited decay, as we will later show.

Consistent with the baseline *sin stock aversion hypothesis* and past work, people demonstrated baseline aversion to sin versus conventional stocks, as evidenced by the negative coefficient for the *Sin stock* dummy variable in **Table 2** specifications BI 1-4. Concerning the *moral decay hypothesis*, people consistently preferred to invest in conventional versus sin stocks as premiums increased: $AUC_{\text{sin}} < AUC_{\text{conventional}}$ due to the negative coefficient for *Sin stock* in **Table 2** specifications AUC 1-4. Hence, overall investment patterns were in between the full resilience model, in which $AUC_{\text{sin}} = 0$, and the sin deduction model, in which $AUC_{\text{sin}} = AUC_{\text{conventional}}$. Finally, consistent with the *moral concern moderation hypothesis*, the premium-allocation pattern depended in part on individual differences.

In **Panel B**, we illustrate how decay patterns differ across moral inclinations and dark personality traits, based on median values. As predicted, results show that people high (versus low) in either deontological or utilitarian inclinations showed a more substantial gap between sin and conventional stocks even as investment premiums increased, suggesting both higher baseline aversion to sin stocks and higher resistance to moral decay among people high in moral concern. Conversely, people high in dark personality traits showed the opposite pattern: baseline sin stock aversion was lower and moral decay was higher as sin stock investments approached conventional investments at higher premiums, suggesting a crowding out of moral concerns by financial gain for people low in moral concern. Hence, people high in moral concern deviated toward the full resilience model (although being far from it) and people low in moral concern deviated toward the full decay model (or more conservatively speaking, away from the full resilience model).

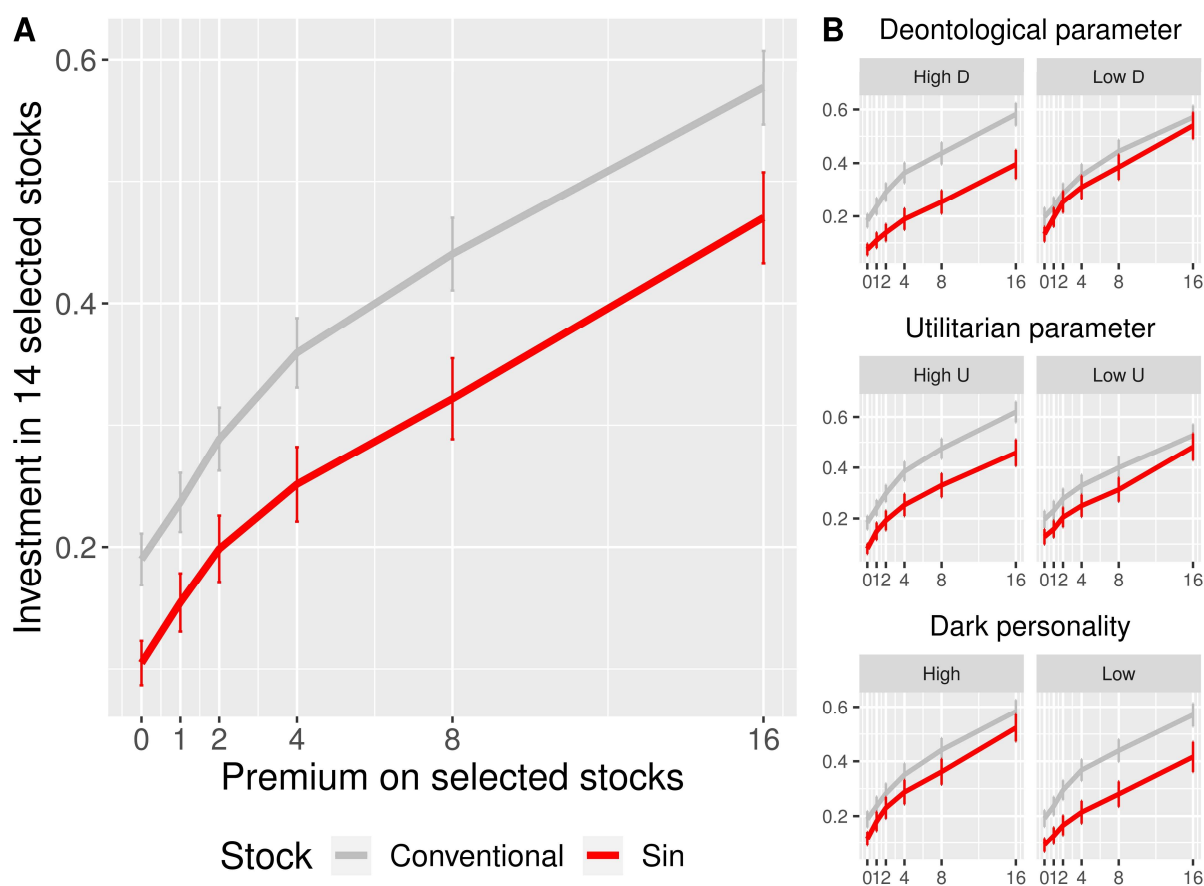


Figure 3. Omnibus Investment in Sin and Conventional Stocks as Premiums Increase and Moderation by Deontological and Utilitarian Inclinations and Dark Personality Traits

Notes: Error bars show 95% CIs. In Panel B, participants are divided into groups based on the median value of each predictor.

Notably, 24.4% participants allocated 0% to stocks from the 14 selected industries when there was no premium for doing so, a pattern more common for sin (39.2%) than conventional stocks (9.8%; $\chi^2 = 73.6, p < .001$). A similar picture emerged for AUCs: 12.3% of participants had an AUC equal to zero, which was again much more common for sin stocks (21.0%) than conventional stocks (3.7%; $\chi^2 = 43.2, p < .001$). Put differently, 21% of people investing in sin stocks behaved in accordance with the full resilience model, remaining insensitive to higher expected returns of sin stocks in the hypothetical scenario. This pattern was more common among people high in deontological inclinations and less common among people high in dark traits (see Table 3 below).

3.2.2. Predictors of Baseline Investment and AUC for Sin and Conventional Stocks

In Table 2, **Błąd! Nie można odnaleźć źródła odwołania.** we present predictors for investment in sin and conventional stocks at baseline (specifications BI 1-4), and investment changes with increasing premiums (specifications AUC 1-4). Since the *Sin Stock* indicator variable was coded as *conventional* = 0, *sin* = 1, single terms of deontological inclinations (*D*), utilitarian inclinations (*U*), and dark personality traits (*Dark*) correspond to how investment in the conventional industries change for people scoring higher on these inclinations or traits, while *Predictor* × *Sin Stock* show how these patterns for each predictor are different for sin stocks (i.e., relative to the single term (conventional stocks)).

Table 2. Predictors of Baseline Investment and AUC

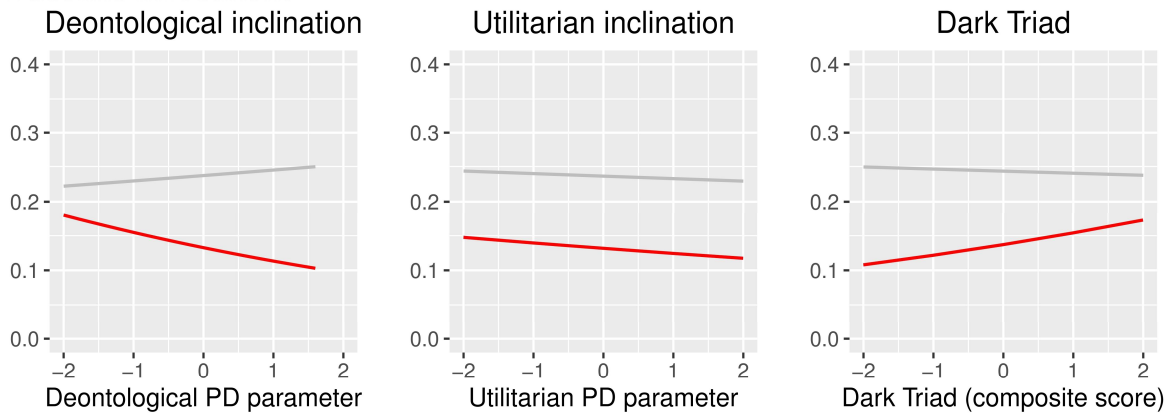
	Baseline investment				AUC			
	BI 1	BI 2	BI 3	BI 4	AUC 1	AUC 2	AUC 3	AUC 4
(Intercept)	-1.11 *** (0.27)	-1.15 *** (0.27)	-1.13 *** (0.27)	-1.11 *** (0.27)	-2.80 *** (0.24)	-2.81 *** (0.24)	-2.75 *** (0.24)	-2.79 *** (0.24)
Sin stock (0 = no, 1 = yes)	-0.71 *** (0.09)	-0.71 *** (0.09)	-0.71 *** (0.09)	-0.71 *** (0.09)	-0.32 *** (0.07)	-0.32 *** (0.07)	-0.31 *** (0.07)	-0.32 *** (0.07)
Deontological PD Parameter (<i>D</i>)		0.04 (0.06)				0.02 (0.05)		
<i>D</i> × Sin stock		-0.22 ** (0.09)				-0.17 * (0.07)		
Utilitarian PD Parameter (<i>U</i>)			-0.02 (0.06)				0.14 * (0.05)	
<i>U</i> × Sin stock			-0.05 (0.09)				-0.06 (0.07)	
Dark personality score (<i>Dark</i>)				-0.02 (0.06)				-0.05 (0.05)
<i>Dark</i> × Sin stock				0.15 † (0.09)				0.10 (0.07)
Female (0 = no, 1 = yes)	-0.08 (0.09)	-0.04 (0.09)	-0.09 (0.09)	-0.06 (0.09)	-0.19 * (0.08)	-0.17 * (0.08)	-0.17 * (0.08)	-0.19 * (0.08)
Risk tolerance	-0.00 (0.05)	0.00 (0.05)	-0.00 (0.05)	-0.01 (0.05)	-0.01 (0.04)	-0.01 (0.04)	0.00 (0.04)	-0.00 (0.04)
Objective inv. Knowledge	-0.08 (0.05)	-0.08 (0.05)	-0.07 (0.05)	-0.07 (0.05)	0.06 (0.04)	0.07 (0.04)	0.03 (0.04)	0.06 (0.04)
Subjective inv. Knowledge	0.07 (0.05)	0.07 (0.05)	0.07 (0.05)	0.06 (0.05)	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)	0.04 (0.04)
Age (logged)	-0.10 * (0.05)	-0.08 (0.05)	-0.10 * (0.05)	-0.09 (0.05)	-0.04 (0.04)	-0.02 (0.04)	-0.04 (0.04)	-0.03 (0.04)
<i>N</i>	644	644	644	644	644	644	644	644
<i>R</i> ²	0.159	0.182	0.162	0.171	0.101	0.116	0.113	0.105
<i>AIC</i>	-1521.350	-1526.908	-1518.598	-1522.055	-2737.177	-2741.957	-2741.055	-2735.167

Notes: This table reports beta regressions, computed using the *R* package *betareg* (Cribari-Neto and Zeileis 2010). All non-indicator variables are standardized. Robust standard errors are shown in parentheses. We controlled for socioeconomic status by using the logged mean of the income bracket and dummy variables for education level.

† $p = 0.075$, * $p < .05$, ** $p < .01$, *** $p < .001$

Results for baseline investment again showed a main effect of sin stocks: consistent with the sin stock aversion hypothesis and past work, people invested less in sin than conventional stocks at baseline. Consistent with Study 1, baseline aversion to sin stocks was significantly stronger among people high in deontological inclinations (specification BI 2), though not utilitarian inclinations (specification BI 3); baseline aversion to sin stocks was lower among people high in dark personality traits, albeit marginally (specification BI 4). In **Figure 4 Panel A**, we show the predicted baseline investment for sin and conventional stocks for different levels of deontological inclinations, utilitarian inclinations, and composite dark triad scores.

A. Baseline investment



B. AUC

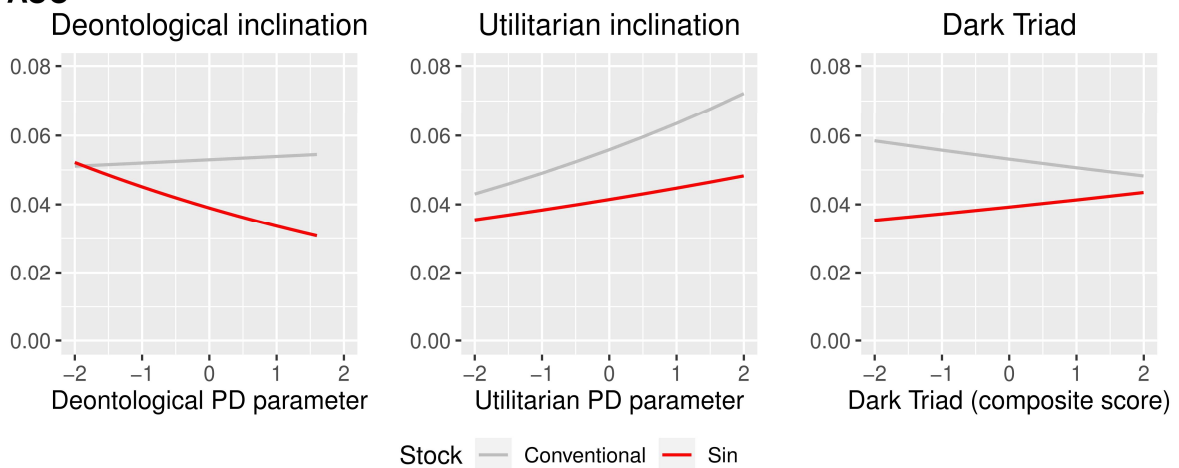


Figure 4. Predicted Baseline Investment and AUC for People High in Deontological and Utilitarian Inclinations and Dark Personality Traits

Notes: Baseline investment (BI) refers to the level of investment in the absence of a premium. AUC refers to an aggregate willingness to increase investment as premiums increase. DVs are transformed as suggested by Smithson and Verkuilen (2006).

Results for AUC also showed a main effect of sin stocks: AUC was significantly smaller for sin than conventional stocks, suggesting that overall, people were less sensitive to increased returns for sin stocks than for conventional stocks (specifications AUC 1-4). This pattern suggests the rejection of the sin deduction model and full resilience model in their pure form – instead, actual behaviors are, in aggregate, in between these two models.

Consistent with baseline aversion, AUC was especially smaller for sin than conventional stocks among people high in deontological inclinations (specification AUC 2), though not utilitarian inclinations (specification AUC 3). This pattern suggests that people higher in deontological inclinations were more resilient to the bribes offered by higher rates or returns from sin stocks. Conversely, people high in utilitarian inclinations showed a general tendency to invest more as returns increased across both sin and conventional stocks. This pattern aligns with findings suggesting greater mathematical acuity and investment prowess among people high in utilitarian inclinations (Byrd and Conway 2019; Niszczoła et al. 2022). Surprisingly, there was no significant difference for sin versus conventional AUC for people high in dark personality traits (specification AUC 4). Results showed that women were less sensitive than men to increasing returns in the selected stocks overall. **In Figure 4 Panel B** we show predicted AUCs

for sin and conventional stocks for different levels of deontological inclinations, utilitarian inclinations, and composite dark triad scores.

As a robustness check, we performed OLS regressions on the log of each dependent variable (plus a minuscule constant (10^{-6}) to make the argument positive) to align with the approach used in past research. Results point to the same conclusions as the beta regressions (see **Table A5**).

3.2.3. Predictors of (Non-)Investment and (Lack of) Decay

We conducted a complementary analysis on the decision to invest (at all), or to show (any) sensitivity to increasing premiums. To do so, we coded those with baseline investment of 0% as 0; those with baseline investment $> 0\%$ were coded 1. Likewise, for AUC we coded participants as 0 if they showed no decay—i.e., allocations were the same across all expected returns—and 1 otherwise.

Results are shown in

Table 3 Panel A. Key patterns observed in the beta regressions are replicated. First, participants investing in sin versus conventional stocks were 85% less likely to allocate to these stocks when there was no premium (specifications BI 1-4) and 88% less likely to exhibit sensitivity to higher returns (specifications AUC 1-4) than participants investing in conventional stocks. Second, participants with +1SD higher deontological inclination were 56% ($e^{-0.81} - 1$) less likely to invest in sin stocks at baseline, and 50% less likely to show sensitivity to sin stock return premiums—i.e., they were less likely to show a pattern of decay. Third, participants with +1SD higher composite dark personality score were 70% more likely to invest in sin stocks and were 95% more likely to show sensitivity to sin stock premiums—i.e., they were more likely to show a pattern of decay.

In

Table 3 Panel B we fit beta regressions on the subsample of participants with positive baseline investments (specifications BI 1-4), and positive AUCs (specifications AUC 1-4). For baseline investment, the main effect of sin stocks was still significant, suggesting that people who invested something continued to invest less in sin than conventional stocks. However, deontological inclinations and dark trait traits no longer reached statistical significance. For AUCs, the main effect of sin stock was no longer significant, suggesting that once an investment decision has been made, people show similar sensitivity to higher returns for sin and conventional stocks. In addition, deontological inclinations and dark trait traits no longer reached statistical significance. Notably, utilitarian inclinations continued to predict overall AUC across both stock types when people who decided to invest, suggesting this finding reflects analytical aspects of utilitarian thinking in terms of maximizing mathematical return rather than moral concern per se (Byrd and Conway 2019).

Table 3. Decomposition of Baseline Investment and AUC

Panel A. Predictors of Deciding to Invest and Sensitivity to Higher Returns

	Baseline investment > 0 =1 if Baseline investment is positive, =0 if Baseline investment is zero				AUC > 0 =1 if AUC is positive, =0 if AUC is zero			
	BI 1	BI 2	BI 3	BI 4	AUC 1	AUC 2	AUC 3	AUC 4
(Intercept)	3.70 ** (1.25)	3.83 ** (1.32)	3.77 ** (1.25)	3.76 ** (1.23)	2.45 ** (0.90)	2.41 ** (0.93)	2.52 ** (0.90)	2.50 ** (0.92)
Sin stock (0 = no, 1 = yes)	-1.88 *** (0.24)	-1.88 *** (0.25)	-1.92 *** (0.25)	-1.85 *** (0.24)	-2.08 *** (0.34)	-1.99 *** (0.34)	-2.08 *** (0.34)	-2.04 *** (0.35)
Deontological PD Parameter (D)		0.33 (0.25)				0.21 (0.27)		
D × Sin stock		-0.81 ** (0.28)				-0.69 * (0.33)		
Utilitarian PD Parameter (U)			-0.16 (0.22)				0.16 (0.32)	
U × Sin stock			0.24 (0.24)				0.07 (0.35)	
Dark personality score (Dark)				-0.11 (0.19)				-0.29 (0.28)
Dark × Sin stock				0.53 * (0.23)				0.67 * (0.34)
Female (0 = no, 1 = yes)	-0.12 (0.22)	0.00 (0.23)	-0.12 (0.22)	-0.08 (0.22)	-0.19 (0.28)	-0.06 (0.29)	-0.13 (0.30)	-0.16 (0.29)
Risk tolerance	0.07 (0.12)	0.08 (0.12)	0.07 (0.12)	0.02 (0.13)	0.03 (0.15)	0.03 (0.16)	0.03 (0.15)	-0.02 (0.15)
Objective inv. knowledge	-0.44 *** (0.13)	-0.45 *** (0.13)	-0.46 *** (0.14)	-0.41 ** (0.13)	-0.19 (0.15)	-0.19 (0.16)	-0.27 (0.16)	-0.14 (0.16)
Subjective inv. knowledge	0.10 (0.13)	0.08 (0.14)	0.11 (0.13)	0.04 (0.13)	0.06 (0.16)	0.03 (0.17)	0.07 (0.16)	-0.02 (0.17)
Age (logged)	-0.26 * (0.12)	-0.21 (0.12)	-0.26 * (0.12)	-0.19 (0.12)	-0.31 * (0.15)	-0.25 (0.16)	-0.31 * (0.15)	-0.25 (0.16)
N	644	644	644	644	644	644	644	644
R ² Tjur	0.177	0.207	0.178	0.196	0.132	0.158	0.136	0.146

Panel B. Predictors of Investment Level (if Baseline Investment > 0) and AUC (if AUC > 0)

	Baseline investment				AUC			
	BI 1	BI 2	BI 3	BI 4	AUC 1	AUC 2	AUC 3	AUC 4
(Intercept)	-1.14 *** (0.27)	-1.12 *** (0.27)	-1.18 *** (0.27)	-1.15 *** (0.27)	-2.52 *** (0.25)	-2.53 *** (0.25)	-2.51 *** (0.25)	-2.49 *** (0.25)
Sin stock (0 = no, 1 = yes)	-0.29 ** (0.09)	-0.31 ** (0.10)	-0.29 ** (0.09)	-0.28 ** (0.10)	-0.05 (0.08)	-0.05 (0.08)	-0.05 (0.08)	-0.04 (0.08)
Deontological PD Parameter (D)		-0.05 (0.06)				-0.00 (0.05)		
D × Sin stock		-0.01 (0.09)				-0.05 (0.08)		
Utilitarian PD Parameter (U)			-0.02 (0.06)				0.11 * (0.05)	
U × Sin stock			-0.14 (0.09)				-0.05 (0.07)	

	Baseline investment				AUC			
	BI 1	BI 2	BI 3	BI 4	AUC 1	AUC 2	AUC 3	AUC 4
Dark personality score (<i>Dark</i>)				0.00 (0.06)				-0.05 (0.05)
<i>Dark</i> × Sin stock				-0.04 (0.09)				-0.00 (0.08)
Female (0 = no, 1 = yes)	-0.16 (0.09)	-0.15 (0.09)	-0.18 (0.09)	-0.16 (0.09)	-0.23 ** (0.08)	-0.22 ** (0.08)	-0.20 * (0.08)	-0.24 ** (0.08)
Risk tolerance	-0.03 (0.05)	-0.04 (0.05)	-0.03 (0.05)	-0.03 (0.05)	0.00 (0.04)	0.00 (0.04)	0.01 (0.04)	0.01 (0.04)
Objective inv. knowledge	0.04 (0.05)	0.04 (0.05)	0.07 (0.05)	0.04 (0.05)	0.11 ** (0.04)	0.11 ** (0.04)	0.08 * (0.04)	0.10 * (0.04)
Subjective inv. knowledge	0.08 (0.05)	0.08 (0.05)	0.07 (0.05)	0.08 (0.05)	0.05 (0.04)	0.05 (0.04)	0.05 (0.04)	0.06 (0.04)
Age (logged)	-0.06 (0.05)	-0.05 (0.05)	-0.06 (0.05)	-0.06 (0.05)	0.01 (0.04)	0.01 (0.04)	0.01 (0.04)	0.00 (0.04)
<i>N</i>	487	487	487	487	565	565	565	565
<i>R</i> ²	0.052	0.055	0.067	0.053	0.090	0.091	0.100	0.093
<i>AIC</i>	-450.234	-447.690	-451.909	-446.429	- 2121.802	- 2118.731	- 2122.989	- 2119.240

Notes: Estimates in Panel A are log-odds ratios. All non-indicator variables are standardized. Robust standard errors are shown in parentheses. We controlled for socioeconomic status by using the logged mean of the income bracket and dummy variables for education level.

* $p < .05$ ** $p < .01$ *** $p < .001$

Hence, increased versus reduced moral concerns appear to predict whether a person will show full resilience or not—i.e., total avoidance of sin stocks and insensitivity to increasing sin stock returns—but once a person decides to invest in a sin stock, these moral concerns no longer play a crucial role. Once an investment decision has been made, then only rate of return appears impactful; moral considerations no longer appear consequential. Hence, this pattern suggests two independent elements to investment decisions in sin stocks with return premiums: participants must decide whether to invest anything at all, a decision impacted by moral concerns (or lack thereof). Once a decision has been made to invest, however, moral concerns no longer appear to play a role—now, only investment premiums appear to drive decisions.¹ In other words, if people decide to invest *something* in the selected stocks or to show *some* susceptibility to higher returns, moral inclinations and dark personality traits no longer play a role. Moral considerations appear to only drive a decision to be fully resilient to higher returns from sin stocks.

3.2.4. Additional Analyses

Finally, we examined how baseline sin stock investment and AUC reflects a) the interaction between deontological and utilitarian inclinations, b) and each dark trait individually. We replicated specifications BI 1 and AUC 1 in **Table 2** with interaction between deontological and utilitarian inclinations (see **Figure A2**) and each dark triad trait (see **Figure A3**). We also present full results in **Table A3**. In contrast to Study 1, there was no interaction between deontological and utilitarian inclinations, and thus no evidence for an attenuation of the effect when both inclinations are high (Niszczota et al. 2022). Only one of the three dark traits – psychopathy – predicted lower baseline aversion to

sin stocks, and none were individually significant predicting AUC. Taken together with the results from Study 1, our findings suggest a robust effect of psychopathy on the decision to allocate funds in sin stocks.

3.3. Discussion

On average, participants exhibited baseline aversion towards ‘sin stocks,’ i.e., they invested a smaller proportion of their money in a subset of stocks (offering no advantage on returns) if this set was morally controversial. This aversion was stronger in people high in deontological inclinations, and lower in people with dark personalities.

Critically, this study also tested how sin stock aversion changed as the expected returns increased, i.e., the moral decay hypothesis. Indeed, we observed moral decay: as returns increased, aversion to sin stocks reduced—i.e., the Area Under the Curve both sin and non-sin investments became larger. This suggests that increasing expected returns for sin stocks eats away at moral aversion to sin stocks. However, people invested more in non-sin than sin stocks at all levels of the curve, consistent with the sin deduction model, suggesting some resilience against “bribes” in the form of a premium for sin stock investment.

As predicted, susceptibility to moral decay was substantially lower among people high in deontological inclinations and substantially higher among people high in dark personality traits. A further analysis showed that the latter was primarily driven by psychopathy. Considering the plausible assumption that sin stocks trade at a discount relative to conventional stocks, this pattern contrasts with the findings of ten Brinke et al. (2018), who showed that hedge fund managers with high psychopathy scores—albeit, estimated via behaviors rather than a personality inventory—obtained lower investment returns.

4. General Discussion

Previous research examined baseline willingness to invest in ‘sin stocks’—morally controversial companies that cause societal damage as a byproduct of doing business—when doing so offered no return premium. However, a key feature of such investments is that they offer incentives in terms of greater returns (Hong and Kacperczyk 2009). This begs the question of moral decay: can people be ‘bribed’ to overcome their aversion toward sin stocks as premiums increase?

Indeed, the current work replicated and extended past work by demonstrating that a) on average, people are generally averse to investing in sin stocks at baseline, b) on average, people demonstrate moral decay, such that aversion to sin stocks reduces as investment premiums increase, and c) these patterns are moderated by individual differences. People higher in moral concerns (deontological and utilitarian inclinations in sacrificial dilemmas) show increased aversion to sin stocks at baseline and people higher in deontological inclinations show resistance to moral decay. Conversely, people higher in dark personality traits—particularly psychopathy—show reduced aversion to sin stocks at baseline and increased moral decay.

Regarding moral decay, we examined how responses compared to three models: full resilience, sin deduction, and full decay. Overall, responses perhaps best approximated the sin deduction model, where people penalize sin versus non-sin stocks at baseline, and then show similar rates of increased investment in sin and non-sin stocks as returns increase. However, a minority of people demonstrated a pattern of full resilience—steadfastly refusing to invest in sin stocks even as returns increased. Such people were likely to be high in moral concern (particularly scoring high in deontological inclinations). Conversely, people high in dark traits deviated in the direction of full decay, showing little differentiation between sin and non-sin stocks

especially at higher rates of return. Importantly, these findings held above and beyond a series of other relevant predictors, including age, gender, risk tolerance, and both objective and subjective investment knowledge. Therefore, these findings cannot be explained by, for example, a greater appetite for risk among people in dark traits.

4.1. Reconciliation with Prior Findings

Some theorists argue that morality is not qualitatively different from nonmoral cognition. For example, Rai and Holyoak (2010) showed that moral judgments follow predictions derived from economic psychology. Shenhav and Greene (2010) showed that moral considerations take into account both the magnitude of gains and their probability – suggesting that moral judgments are informed by general valuation processes. Even though deontological judgments appear to focus on the moral valence of an action rather than its outcomes, research nonetheless suggests that people who make deontological judgments intuitively process the outcomes of their decisions (Bago and De Neys 2018; Białek and De Neys 2016), and increasing the positive outcomes of a transgression slows them down and reduces their confidence even if they continue to reject the transgression (Białek and De Neys 2017). Hence, judgments appear to entail a combination of sensitivity to moral infractions and sensitivity to outcomes (see also Chen and Schonger 2022).

Our findings align with these findings: financial decisions to invest in sin stocks appear to reflect a combination of aversion to the transgression of funding morally questionable operations that cause societal damage, plus sensitivity to the outcomes that such investments bring—i.e., returns on the investment. Thus, many people who are averse to investing in sin stocks at baseline were eventually bribed by increasing returns from the investment to forgo their qualms and make the investment. However, not everyone was equally susceptible to such moral decay. People high in deontological inclinations, who tend to be sensitive to others' suffering and endorse absolute moral rules—demonstrated increased baseline aversion and reduced decay, suggesting particular emphasis on the moral implications of investing in sin stocks. Conversely, people high in dark traits demonstrated reduced aversion in increased decay, suggesting reduced emphasis on moral the moral implications of sin stocks.

By considering both moral concerns and sensitivity to outcomes, people may be able to pursue multiple somewhat conflicting goals: maximizing gains but preserving their moral self-image. Doing so may require considering each of these elements separately. Directly weighing these dimensions of their decision against one another may force people to admit they are trading morality for money, and such taboo tradeoffs are overwhelmingly aversive (Tetlock 2003), cueing outrage and the need for moral cleansing (Tetlock et al. 2000). People thus try to avoid making taboo tradeoffs, such as those between money and morality, salient. Instead, people in the current work appeared to both track the profitability of their investment, and also correct for its moral status, perhaps as somewhat separate processes. Because the deduction for sin stocks was fairly constant across increasing magnitude of returns, people may feel that a somewhat-flat correction for sin stocks means their moral image was not compromised. This way, people feel that they “punished” sinful companies by reducing the proportion of money invested in them, thus feeling they are moral, even as they increased investment with increasing returns. Future research might profitably investigate whether people afford similar perceptions to others: do they rate someone who invests heavily in high-return sin stocks equally moral as someone who invests less in low-return sin stocks, so long as both impose a flat penalty versus non-sin stocks?

Whereas the current work suggests that people manage to integrate moral concerns and concerns about outcomes when deciding on sin stock investments, other research suggests that

economic considerations are qualitatively different from moral considerations. For example, switching mindsets from social relationships to market pricing may affect how moral judgments are made, e.g., promote more utilitarian decision-making (Zaleskiewicz et al. 2020). It remains possible that such mindset effects also influence sin stock investments. For example, people may show different patterns depending on whether they are asked to make investment decisions about sin stocks (economic mindset) or moral judgments about sin stocks (moral mindset). It is possible that such judgments would be less affected by returns, and immoral investment would be seen as immoral regardless of how much money was earned through it – a relationship that we described as the full resilience model. Future research might profitably investigate this question.

4.2. Relevance

Our findings are becoming increasingly relevant given increasing awareness of morally relevant elements of investments in recent years. For example, there is a significant backlash against the fossil fuel industry for supplying dirty energy (Trinks et al. 2018) and against prominent technological companies for practices that hurt the psychological well-being of minors (Slotnik 2021). The invasion of Russia on Ukraine means that people are not only averse to using products and services from Russia but might also be averse to companies that rely on Russian goods or commodities instead of using alternative sources. Hence, perceptions of sin stocks remains an important topic for study.

4.3. Limitations

The main limitation of our work is that we employ hypothetical scenarios. While using hypothetical scenarios allowed us to test scenarios where the benefits of investing in a subset of sin and conventional stocks are extreme, the lack of incentives increases the possibility of a hypothetical bias (List and Gallet 2001), where the statements from hypothetical scenarios do not translate into real-life behavior. People often respond in socially desirable ways but may not necessarily “put their money where their mouth is”. This issue is perhaps especially salient for moral decision-making. However, we believe that there are several reasons that we can expect the findings to be robust. Firstly, our study points to a consistent bias. As Study 2 used a within-subjects design for rate of return, participants were cognizant of a tradeoff between cash and morality: heavier investment in sin stocks leads to higher expected returns. Yet, it is clear from several studies that people deem investment in many sin stocks to be morally inappropriate, and have the potential to cause discomfort to them (e.g., Niszczoła & Białek, 2021; Niszczoła & Kaszás, 2020). Even in the presence of moral objections, participants were willing to sacrifice these objections, if doing so lead to an improvement in returns. Crucially, people exhibited similar shifts in investments for sin and conventional stocks after introducing higher expected returns (rewards) from them.

5. Conclusions

Our research showed that when making investment decisions people do consider its moral dimension, and some people do it to a greater extent than others. We conclude that moral decay is a reliable phenomenon, and despite the baseline sin stock aversion, larger returns are luring people into investing more of their resources into sin stocks.

Notes

1. That said, this interpretation should be treated with caution, as the analysis has reduced power compared to the full sample.

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Appendix

Supplementary tables and figures

Table A1. Descriptive statistics and bivariate correlations in Study 1

	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Sin investment	29.00	26.88													
2. Deontological parameter	0.58	0.22	-.39**												
3. Utilitarian parameter	0.27	0.20	-.28**	.24**											
4. Dark personality	2.66	0.66	.36**	-.50**	-.27**										
5. Machiavellianism	3.03	0.84	.28**	-.43**	-.14*	.88**									
6. Narcissism	2.79	0.71	.27**	-.40**	-.27**	.80**	.55**								
7. Psychopathy	2.17	0.77	.38**	-.44**	-.30**	.86**	.66**	.52**							
8. Gender (0 = <i>m</i> , 1 = <i>f</i>)	0.34	0.48	-.07	.22**	.05	-.25**	-.14*	-.19**	-.32**						
9. Age	38.04	11.35	-.12	.20**	-.03	-.15*	-.16*	-.05	-.17*	.18**					
10. Risk tolerance	4.69	2.63	.22**	-.32**	-.25**	.51**	.34**	.55**	.43**	-.26**	-.10				
11. Objective inv. knowledge	4.59	1.22	-.39**	.18**	.28**	-.30**	-.21**	-.27**	-.30**	.01	.17*	-.10			
12. Subjective inv. knowledge	3.89	1.75	.20**	-.24**	-.26**	.41**	.30**	.48**	.27**	-.18**	.13*	.54**	-.02		
13. Harm acceptance (incongruent)	0.59	0.18	.24**	-.78**	.37**	.34**	.35**	.23**	.28**	-.17*	-.18**	.16*	-.05	.10	
14. Harm acceptance (congruent)	0.32	0.21	.47**	-.88**	-.63**	.54**	.42**	.45**	.51**	-.20**	-.12	.37**	-.30**	.32**	.49**

Notes: *M* and *SD* are used to represent mean and standard deviation, respectively.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A2. Descriptive statistics and bivariate correlations in Study 2

Panel A. Entire sample

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Baseline investment	0.15	0.18														
2. AUC	0.05	0.08	.07													
3. Deontological parameter	0.63	0.21	-.08*	-.05												
4. Utilitarian parameter	0.29	0.19	-.08*	.13**	-.02											
5. Dark personality	2.38	0.58	.05	-.00	-.35**	-.02										
6. Machiavellianism	2.83	0.80	.04	.01	-.32**	.06	.82**									
7. Narcissism	2.44	0.79	.02	-.02	-.21**	-.06	.75**	.35**								
8. Psychopathy	1.87	0.60	.09*	.00	-.30**	-.06	.80**	.58**	.39**							
9. Female (0 = no, 1 = yes)	0.45	0.50	-.06	-.17**	.13**	-.15**	-.18**	-.09*	-.13**	-.24**						
10. Age	44.25	12.88	-.10*	-.00	.14**	.07	-.18**	-.13**	-.10**	-.20**	.07					
11. Risk tolerance	3.85	2.49	.03	.04	-.14**	-.02	.36**	.16**	.38**	.34**	-.21**	-.08				
12. Objective inv. knowledge	5.01	1.03	-.05	.15**	.10*	.31**	-.07	-.06	-.08	-.04	-.13**	.16**	.09*			
13. Subjective inv. knowledge	3.90	1.58	.02	.16**	-.08*	.07	.18**	.07	.27**	.08*	-.26**	.11**	.33**	.28**		
14. Harm acceptance: incongruent	0.55	0.20	.01	.10*	-.77**	.62**	.25**	.28**	.13**	.19**	-.19**	-.05	.10*	.11**	.12**	
15. Harm acceptance: congruent	0.26	0.17	.11**	-.03	-.87**	-.41**	.32**	.26**	.22**	.28**	-.05	-.14**	.14**	-.22**	.06	.46**

Panel B. Sin stock (experimental) group

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Baseline investment	0.10	0.16														
2. AUC	0.05	0.09	.09													
3. Deontological parameter	0.62	0.22	-.17**	-.12*												
4. Utilitarian parameter	0.29	0.21	-.17**	.14*	-.03											
5. Dark personality	2.38	0.59	.09	.05	-.40**	.04										
6. Machiavellianism	2.81	0.81	.09	.05	-.37**	.08	.82**									
7. Narcissism	2.48	0.82	-.00	.03	-.24**	.02	.76**	.35**								
8. Psychopathy	1.84	0.60	.15**	.03	-.36**	-.03	.80**	.58**	.41**							
9. Female (0 = no, 1 = yes)	0.45	0.50	-.03	-.17**	.21**	-.15**	-.17**	-.07	-.13*	-.24**						
10. Age	45.01	13.34	-.12*	-.02	.21**	.06	-.27**	-.17**	-.21**	-.29**	.08					
11. Risk tolerance	3.75	2.50	.05	.12*	-.11*	.02	.32**	.12*	.36**	.31**	-.22**	-.11				
12. Objective inv. knowledge	4.96	1.05	-.23**	.16**	.06	.42**	-.09	-.06	-.09	-.08	-.09	.16**	.07			
13. Subjective inv. knowledge	3.96	1.55	-.07	.16**	-.12*	.09	.25**	.12*	.34**	.12*	-.28**	.05	.41**	.27**		
14. Harm acceptance: incongruent	0.56	0.21	.03	.16**	-.77**	.63**	.32**	.32**	.21**	.24**	-.25**	-.12*	.11*	.19**	.17**	
15. Harm acceptance: congruent	0.27	0.18	.23**	.02	-.87**	-.40**	.34**	.28**	.21**	.32**	-.13*	-.20**	.11*	-.25**	.09	.46**

Panel C. Conventional stock (control) group

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Baseline investment	0.19	0.19														
2. AUC	0.05	0.07	.05													
3. Deontological parameter	0.64	0.20	-.02	.05												
4. Utilitarian parameter	0.30	0.18	-.00	.11	-.01											
5. Dark personality	2.38	0.56	.02	-.07	-.29**	-.09										
6. Machiavellianism	2.85	0.79	-.02	-.05	-.27**	.03	.83**									
7. Narcissism	2.40	0.76	.06	-.08	-.18**	-.17**	.75**	.35**								
8. Psychopathy	1.90	0.59	.02	-.04	-.24**	-.09	.79**	.58**	.38**							
9. Female (0 = no, 1 = yes)	0.46	0.50	-.09	-.17**	.05	-.16**	-.19**	-.11*	-.14*	-.23**						
10. Age	43.51	12.40	-.06	.02	.07	.09	-.07	-.09	.01	-.11*	.06					
11. Risk tolerance	3.96	2.47	-.00	-.07	-.17**	-.06	.41**	.21**	.41**	.36**	-.20**	-.04				
12. Objective inv. knowledge	5.07	1.01	.08	.15**	.13*	.18**	-.05	-.06	-.06	-.01	-.16**	.16**	.10			
13. Subjective inv. knowledge	3.83	1.60	.10	.16**	-.03	.05	.12*	.02	.20**	.05	-.24**	.17**	.25**	.29**		
14. Harm acceptance: incongruent	0.55	0.18	.01	.01	-.77**	.61**	.17**	.23**	.04	.13*	-.13*	.02	.09	.01	.06	
15. Harm acceptance: congruent	0.25	0.16	.02	-.10	-.87**	-.43**	.30**	.23**	.23**	.25**	.03	-.08	.17**	-.19**	.02	.46**

Notes: *M* and *SD* are used to represent mean and standard deviation, respectively.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A3. Interaction between deontological and utilitarian inclinations, and individual dark personality traits

	Baseline investment				AUC			
	D × U	M	N	P	D × U	M	N	P
(Intercept)	-1.20 *** (0.28)	-1.13 *** (0.28)	-1.14 *** (0.28)	-1.13 *** (0.28)	-2.79 *** (0.24)	-2.77 *** (0.24)	-2.76 *** (0.24)	-2.78 *** (0.24)
Sin stock (0 = no, 1 = yes)	-0.71 *** (0.09)	-0.71 *** (0.09)	-0.72 *** (0.09)	-0.71 *** (0.09)	-0.32 *** (0.07)	-0.31 *** (0.07)	-0.31 *** (0.07)	-0.32 *** (0.07)
Deontological PD Parameter (<i>D</i>)	0.05 (0.06)	-0.06 (0.05)	-0.07 (0.04)	-0.06 (0.05)	0.03 (0.05)	-0.06 (0.04)	-0.07 (0.04)	-0.07 (0.04)
Utilitarian PD Parameter (<i>U</i>)	-0.02 (0.07)	-0.05 (0.05)	-0.05 (0.05)	-0.05 (0.05)	0.14 * (0.05)	0.11 ** (0.04)	0.11 ** (0.04)	0.10 ** (0.04)
Dark personality score (<i>Dark</i>)	0.04 (0.05)				-0.02 (0.04)			
<i>D</i> × Sin stock	-0.22 ** (0.09)				-0.18 * (0.07)			
<i>U</i> × Sin stock	-0.05 (0.09)				-0.04 (0.07)			
<i>D</i> × <i>U</i>	-0.06 (0.06)	-0.02 (0.04)	-0.02 (0.04)	-0.01 (0.04)	-0.01 (0.05)	-0.05 (0.03)	-0.05 (0.03)	-0.05 (0.03)
<i>D</i> × <i>U</i> × Sin stock	0.06 (0.08)				-0.08 (0.07)			
Machiavellianism (<i>M</i>)		-0.06 (0.06)				-0.05 (0.05)		
<i>M</i> × Sin stock		0.17 (0.08)				0.12 (0.07)		
Narcissism (<i>N</i>)			0.02 (0.07)				-0.05 (0.06)	
<i>N</i> × Sin stock			-0.01 (0.09)				0.02 (0.07)	
Psychopathy (<i>P</i>)				-0.06 (0.06)				-0.04 (0.05)
<i>P</i> × Sin stock				0.22 ** (0.09)				0.06 (0.07)
Female (0 = no, 1 = yes)	-0.04 (0.09)	-0.07 (0.09)	-0.07 (0.09)	-0.06 (0.09)	-0.15 (0.08)	-0.16 * (0.08)	-0.16 * (0.08)	-0.16 * (0.08)
Risk tolerance	-0.01 (0.05)	-0.01 (0.05)	-0.02 (0.05)	-0.02 (0.05)	0.01 (0.04)	-0.00 (0.04)	0.01 (0.04)	0.00 (0.04)
Objective inv. Knowledge	-0.06 (0.05)	-0.06 (0.05)	-0.06 (0.05)	-0.05 (0.05)	0.03 (0.04)	0.04 (0.04)	0.03 (0.04)	0.04 (0.04)
Subjective inv. Knowledge	0.07 (0.05)	0.07 (0.05)	0.07 (0.05)	0.07 (0.05)	0.05 (0.04)	0.04 (0.04)	0.05 (0.04)	0.04 (0.04)
Age (logged)	-0.08 (0.05)	-0.08 (0.05)	-0.09 (0.05)	-0.07 (0.05)	-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.04)	-0.03 (0.04)
<i>N</i>	644	644	644	644	644	644	644	644
<i>R</i> ²	0.187	0.179	0.170	0.186	0.135	0.125	0.122	0.123
<i>AIC</i>	-1519.588	-1519.596	-1515.587	-1522.909	-2743.975	-2742.903	-2740.914	-2740.726

Notes: This table reports beta regressions, computed using the *R* package *betareg* (Cribari-Neto and Zeileis 2010). We used logit as the link function, and thus estimates are log-odds ratios. All non-indicator variables are standardized. Robust standard errors are shown in parentheses. We controlled for socioeconomic status by using the logged mean of the income bracket and dummy variables for education level.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A4. Robustness analyses: more restrictive exclusions

	Baseline investment				AUC			
	BI 1	BI 2	BI 3	BI 4	AUC 1	AUC 2	AUC 3	AUC 4
(Intercept)	-1.39 *** (0.27)	-1.44 *** (0.27)	-1.40 *** (0.27)	-1.38 *** (0.27)	-2.75 *** (0.25)	-2.75 *** (0.25)	-2.71 *** (0.25)	-2.75 *** (0.25)
Sin stock (0 = no, 1 = yes)	-0.72 *** (0.09)	-0.73 *** (0.09)	-0.72 *** (0.09)	-0.72 *** (0.09)	-0.33 *** (0.08)	-0.34 *** (0.08)	-0.33 *** (0.08)	-0.34 *** (0.08)
Deontological PD Parameter (<i>D</i>)		0.10 (0.06)				0.01 (0.06)		
<i>D</i> × Sin stock		-0.30 *** (0.08)				-0.16 * (0.08)		
Utilitarian PD Parameter (<i>U</i>)			0.07 (0.06)				0.10 (0.06)	
<i>U</i> × Sin stock			-0.11 (0.08)				-0.04 (0.08)	
Dark personality score (<i>Dark</i>)				-0.03 (0.06)				-0.01 (0.06)
<i>Dark</i> × Sin stock				0.17 * (0.08)				0.05 (0.08)
Female (0 = no, 1 = yes)	-0.01 (0.09)	0.03 (0.09)	0.00 (0.09)	0.01 (0.09)	-0.22 ** (0.08)	-0.20 * (0.08)	-0.20 * (0.08)	-0.22 ** (0.08)
Risk tolerance	0.02 (0.05)	0.03 (0.05)	0.02 (0.05)	0.01 (0.05)	-0.00 (0.04)	-0.01 (0.04)	0.01 (0.04)	-0.00 (0.04)
Objective inv. Knowledge	-0.10 * (0.04)	-0.10 * (0.04)	-0.10 * (0.05)	-0.09 * (0.05)	0.05 (0.04)	0.06 (0.04)	0.03 (0.04)	0.05 (0.04)
Subjective inv. Knowledge	0.06 (0.05)	0.05 (0.05)	0.06 (0.05)	0.04 (0.05)	0.05 (0.04)	0.04 (0.04)	0.05 (0.04)	0.05 (0.04)
Age (logged)	-0.11 * (0.04)	-0.08 (0.04)	-0.11 * (0.04)	-0.09 * (0.04)	-0.06 (0.04)	-0.04 (0.04)	-0.06 (0.04)	-0.05 (0.04)
<i>N</i>	579	579	579	579	579	579	579	579
<i>R</i> ²	0.161	0.191	0.163	0.173	0.112	0.128	0.119	0.113

Notes: This table reports beta regressions, computed using the R package *betareg* (Cribari-Neto and Zeileis 2010). We used logit as the link function, and thus estimates are log-odds ratios. All non-indicator variables are standardized. Robust standard errors are shown in parentheses. We controlled for socioeconomic status by using the logged mean of the income bracket and dummy variables for education level.

* $p < .05$ ** $p < .01$ *** $p < .001$

Table A5. Robustness analysis using logged DVs and OLS as the modelling technique

	Log (Baseline investment + 10 ⁻⁶)				Log (AUC + 10 ⁻⁶)			
	BI 1	BI 2	BI 3	BI 4	AUC 1	AUC 2	AUC 3	AUC 4
(Intercept)	-1.70 *	-1.75 *	-1.72 *	-1.57 *	-4.65 ***	-4.65 ***	-4.52 ***	-4.56 ***
	(0.81)	(0.84)	(0.82)	(0.77)	(1.07)	(1.04)	(1.04)	(1.06)
Sin stock (0 = no, 1 = yes)	-3.72 ***	-3.76 ***	-3.72 ***	-3.73 ***	-1.92 ***	-1.95 ***	-1.92 ***	-1.93 ***
	(0.39)	(0.38)	(0.39)	(0.38)	(0.28)	(0.27)	(0.28)	(0.27)
Deontological PD Parameter (<i>D</i>)		0.36 (0.26)				0.12 (0.13)		
<i>D</i> × Sin stock		-1.60 *** (0.39)				-0.92 *** (0.27)		
Utilitarian PD Parameter (<i>U</i>)			0.01 (0.23)				0.32 * (0.14)	
<i>U</i> × Sin stock			-0.10 (0.36)				0.03 (0.27)	
Dark personality score (<i>Dark</i>)				-0.13 (0.21)				-0.16 (0.14)
<i>Dark</i> × Sin stock				1.22 *** (0.35)				0.71 ** (0.27)
Female (0 = no, 1 = yes)	-0.28 (0.39)	-0.06 (0.39)	-0.29 (0.40)	-0.22 (0.39)	-0.54 * (0.28)	-0.40 (0.28)	-0.45 (0.29)	-0.53 (0.28)
Risk tolerance	0.12 (0.20)	0.13 (0.20)	0.12 (0.20)	0.01 (0.21)	0.02 (0.15)	0.02 (0.15)	0.04 (0.15)	-0.01 (0.15)
Objective inv. knowledge	-0.72 *** (0.19)	-0.69 *** (0.19)	-0.70 *** (0.20)	-0.64 *** (0.19)	0.04 (0.14)	0.07 (0.14)	-0.06 (0.15)	0.08 (0.14)
Subjective inv. knowledge	0.26 (0.22)	0.20 (0.22)	0.26 (0.22)	0.14 (0.22)	0.11 (0.15)	0.07 (0.16)	0.12 (0.15)	0.05 (0.15)
Age (logged)	-0.50 * (0.21)	-0.38 (0.21)	-0.50 * (0.21)	-0.36 (0.21)	-0.31 * (0.14)	-0.23 (0.14)	-0.32 * (0.14)	-0.24 (0.15)
<i>N</i>	644	644	644	644	644	644	644	644
<i>R</i> ² adjusted	0.147	0.178	0.145	0.166	0.087	0.111	0.092	0.096

Notes: All non-indicator variables are standardized. Robust standard errors are shown in parentheses. We controlled for socioeconomic status by using the logged mean of the income bracket and dummy variables for education level.

* $p < .05$ ** $p < .01$ *** $p < .001$

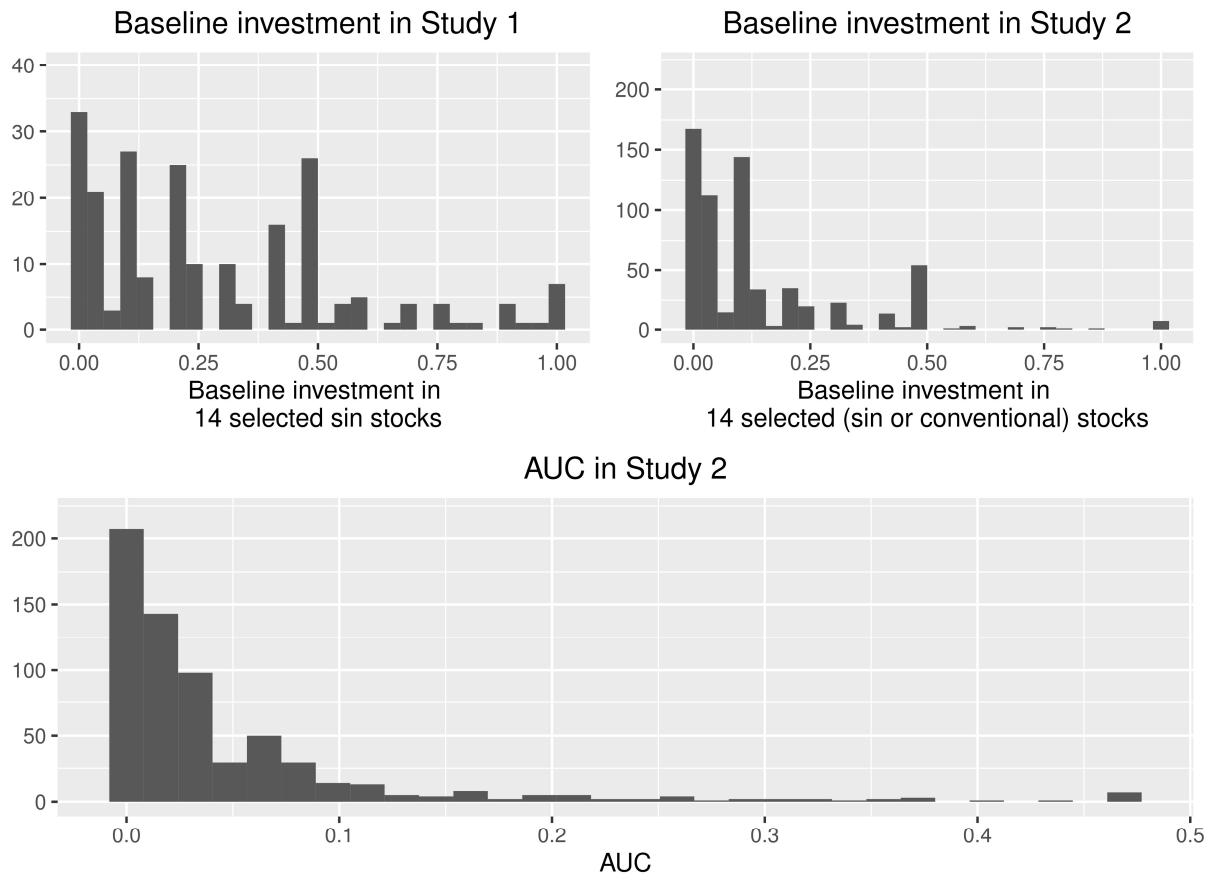


Figure A1. Histograms for proportion invested in selected stocks and AUC

Deontological vs utilitarian inclinations

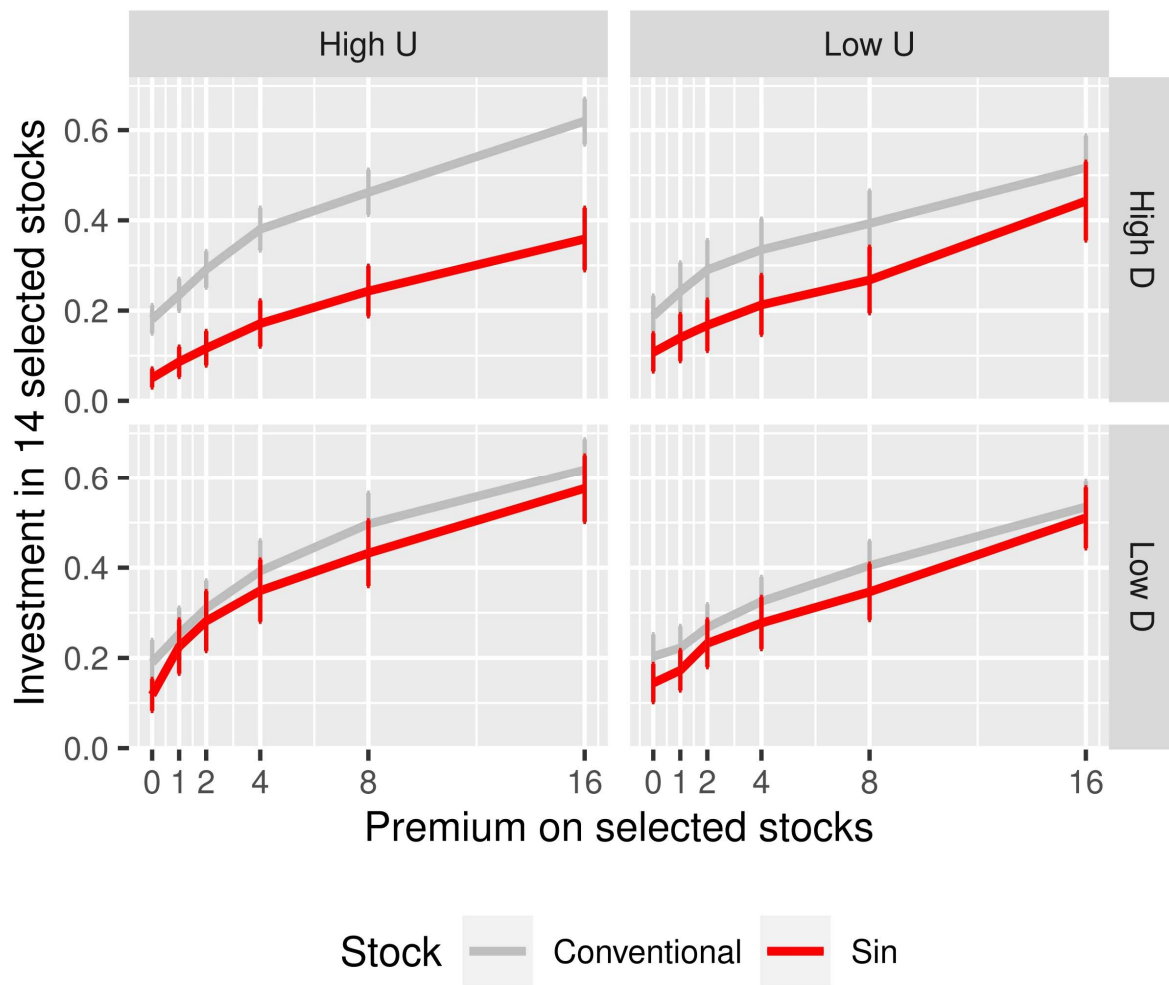


Figure A2. Baseline investment and AUC for People High and Low in Deontological and Utilitarian Inclinations

Note: Error bars show 95% CIs.

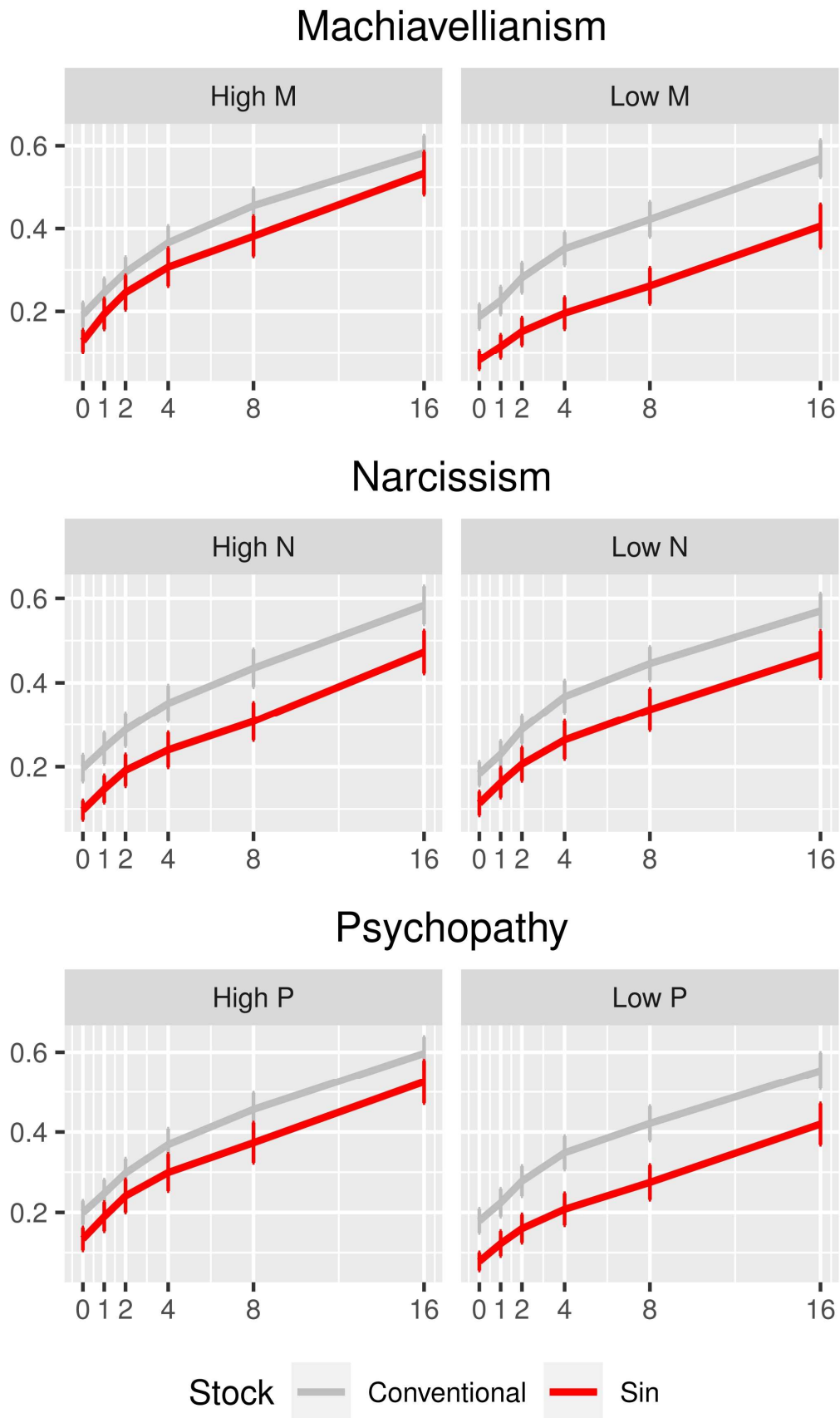


Figure A3. Baseline investment and AUC for People High vs Low in Each Dark Personality Trait
Note: Error bars show 95% CIs.

Materials used in studies

Study 1 (correlational study)

Imagine that your relative has left you \$30,000 in his will. As he wanted to interest you in the world of finance, in the will he stated that you cannot withdraw this money straight away. Instead, according to the will, you have to invest the money in stocks, and stocks only from the Standard & Poor's 500 index (i.e., the most prominent companies listed on the US stock market), and the money invested this way can be withdrawn no earlier than five years from now (if you decide to sell the stocks then).

Your task is to decide what percentage of your inheritance you would invest companies from these fourteen industries (listed in alphabetical order, with a short summary). Note that the market value of companies from the fourteen listed industries are roughly 12% of the total value of the 500 companies in this index.

1. **Abortion/Abortifacients.** Companies owning or operating facilities where abortions are performed, abortion providers, abortifacient manufacturers.
2. **Adult Entertainment.** Companies targeted at the production or distribution of sexually explicit products and services, i.e., X-rated films, online products, production studios, printed materials, TV or radio programs, and adult clubs or bars.
3. **Alcohol.** Companies that have as its business the production and/or distribution of alcoholic products, including breweries, wineries, alcoholic beverage stores, wholesalers, and drinking places.
4. **Animal Testing.** Companies that do research or perform tests on animals for medical and cosmetic reasons (to determine safety and efficacy of particular products).
5. **Contraceptives.** Companies involved in the manufacturing of contraceptives, e.g., birth control pills, IUDs, sterilization procedures providers, condom manufacturers, and so on.
6. **Controversial Weapons.** Companies involved in nuclear, biological, chemical weapons, cluster munitions, and antipersonnel mines.
7. **Fur industry.** Companies that manufacture, sell, or distribute fur products.
8. **Gambling.** Companies that manufacture, own, or operate gambling machines or equipment, casinos, lotteries and betting activities.
9. **Genetic Engineering.** Companies perform genetic engineering or modification techniques for medical or agricultural or other purposes.
10. **Meat.** Companies involved in slaughtering, fishing, and processing of meat products.
11. **Nuclear Power.** Companies operating, constructing, or owning nuclear power plants or utilities, as well as companies involved in uranium mining.
12. **Pork.** Companies involved in the production, procession or wholesale distribution of pork products.
13. **Stem Cells.** Companies involved in (research in) embryonic stem cells, as well as human cloning.
14. **Tobacco.** Companies involved in the production, processing and wholesale distribution of tobacco products.

The remainder of your inheritance will be invested in companies from other industries (e.g., engineering or water utilities companies or companies making household durables or semiconductors; note that this list is long, as it consists of every industry apart from the fourteen listed above). For example, if you decided to invest 12% in companies that are listed

above, it would mean that you would invest 88% (i.e., 100% minus 12%) in companies from the remainder of industries.

Please bear in my mind that the expected return and the riskiness of the companies from the industries listed above is - on average - the same as it is for other companies in the S&P 500 index.

Study 2 (experimental study)

Introduction [page 1]

In this survey, you will learn about a subset of companies (from S&P 500), and will be informed what part of S&P 500 they represent based on market capitalization. Next, you will be asked to imagine that you have some sum of money, but you have to invest it for at least five years. You will be asked to say how much of this sum you'd invest in the "special" subset of the S&P 500 companies, while the rest of the money would be proportionally invested in the remaining companies. You decide how to allocate your money. There are no right or wrong answers--just choose what seems best to you. However, remember that there is a known economic rule "to not put all eggs into one basket", thus you should not invest 100% of your money in one type of stocks.

Training task [page 2]

Below is a short training task, that will help you get familiar with the investment task. Please note that it is shorter than the actual task.

Imagine that your relative has left you \$30,000 in his will. As he wanted to interest you in the world of finance, in the will he stated that you cannot withdraw this money straight away. Instead, according to the will, you have to invest the money in stocks, and stocks only from the Standard & Poor's 500 index (i.e., the most prominent companies listed on the US stock market), and the money invested this way can be withdrawn no earlier than five years from now (if you decide to sell the stocks then).

Your task is to decide what percentage of your inheritance you would invest in companies whose name starts on the letters:

- E,
- S,
- T or
- W.

For simplicity, let's call them the "special" companies. Note that the market value of companies whose name starts on either of these letters is roughly 15% of the total value of the 500 companies in this index.

The remainder of your inheritance will be invested in companies from other industries (e.g., A or Z; note that this list is long, as it consists of every company whose name starts on a different letter than the four letters listed above). For example, if you decided to invest 15% in companies that are listed above, it would mean that you would invest 85% (i.e., 100% minus 15%) in companies whose name start on another letter than the four letters listed above.

Please note that if the expected return from investing in companies is higher, the more you should invest in these companies. In other words, the higher the hypothetical expected return of the "special" companies, the more you should invest in them. Thus, the numbers that you enter in the boxes should increase or stay the same, but should not decrease.

- If the stocks from the companies listed above had **the same expected return** as the remainder of companies from S&P 500 (e.g., it would be around 6%), then I would invest...

% in them.

- If the stocks from the companies listed above had a **1% (percentage points) higher expected return** than the remainder of companies from S&P 500 (e.g., 7% instead of 6%), then I would invest...

% in them.

- If the stocks from the companies listed above had a **2% (percentage points) higher expected return** than the remainder of companies from S&P 500 (e.g., 8% instead of 6%), then I would invest...

% in them.

Buffer page before task [page 3]

Thank you for completing the "training" task. On the next page you will see the actual task. Please read it carefully, as the "special" companies will now be different.

Task [page 4]

Imagine that your relative has left you \$30,000 in his will. As he wanted to interest you in the world of finance, in the will he stated that you cannot withdraw this money straight away. Instead, according to the will, you have to invest the money in stocks, and stocks only from the Standard & Poor's 500 index (i.e., the most prominent companies listed on the US stock market), and the money invested this way can be withdrawn no earlier than five years from now (if you decide to sell the stocks then).

Your task is to decide what percentage of your inheritance you would invest in companies that operate in either of the fourteen industries listed below. Write your answers in the boxes at the bottom of the page.

[Experimental condition]

1. Abortion/Abortifacients. Companies owning or operating facilities where abortions are performed, abortion providers, abortifacient manufacturers.

2. **Adult Entertainment.** Companies targeted at the production or distribution of sexually explicit products and services, i.e., X-rated films, online products, production studios, printed materials, TV or radio programs, and adult clubs or bars.
3. **Alcohol.** Companies that have as its business the production and/or distribution of alcoholic products, including breweries, wineries, alcoholic beverage stores, wholesalers, and drinking places.
4. **Animal Testing.** Companies that do research or perform tests on animals for medical and cosmetic reasons (to determine safety and efficacy of particular products).
5. **Contraceptives.** Companies involved in the manufacturing of contraceptives, e.g., birth control pills, IUDs, sterilization procedures providers, condom manufacturers, and so on.
6. **Controversial Weapons.** Companies involved in nuclear, biological, chemical weapons, cluster munitions, and antipersonnel mines.
7. **Fur industry.** Companies that manufacture, sell, or distribute fur products.
8. **Gambling.** Companies that manufacture, own, or operate gambling machines or equipment, casinos, lotteries and betting activities.
9. **Genetic Engineering.** Companies perform genetic engineering or modification techniques for medical or agricultural or other purposes.
10. **Meat.** Companies involved in slaughtering, fishing, and processing of meat products.
11. **Nuclear Power.** Companies operating, constructing, or owning nuclear power plants or utilities, as well as companies involved in uranium mining.
12. **Pork.** Companies involved in the production, procession or wholesale distribution of pork products.
13. **Stem Cells.** Companies involved in (research in) embryonic stem cells, as well as human cloning.
14. **Tobacco.** Companies involved in the production, processing and wholesale distribution of tobacco products.

[Control condition]

1. **Air Freight/Logistics.** Companies providing air freight transportation, air courier, and air logistics services.
2. **Cable & Satellite.** Providers of cable or satellite television services. Includes cable networks and program distribution.
3. **Communications Equipment.** Manufacturers of communication equipment and products, including LANs, WANs, routers, telephones, switchboards and exchanges.
4. **Construction/Engineering.** Companies engaged primarily in non-residential construction, as well as civil engineering companies.
5. **Health Care Equipment.** Manufacturers of health care equipment and devices. Includes medical instruments, drug delivery systems, cardiovascular & orthopedic devices, and diagnostic equipment.
6. **Household Durables.** Companies that manufacture consumer electronics, household appliances, houseware etc.
7. **Industrial Gases.** Manufacturers of industrial gases.
8. **IT Consulting & Other Services.** Providers of information technology and systems integration services. Includes information technology consulting and information management services.
9. **Leisure Products.** Manufacturers of leisure products and equipment including sports equipment, bicycles and toys.
10. **Marine.** Companies providing maritime transportation of passengers or goods.
11. **Paper Packaging.** Manufacturers of paper and cardboard containers and packaging.

12. Road/Rail. Companies providing railroad and trucking transportation of passengers or goods.
13. Semiconductors/Semiconductor Equipment. Companies that manufacture semiconductors or semiconductor equipment.
14. Water Utilities. Companies that distribute water to consumers, also by being involved in water treatment.

- If the stocks from the industries listed above had **the same expected return** as the remainder of industries from S&P 500 (e.g., it would be around 6%), then I would invest...

% in them.

- If the stocks from the industries listed above had a **1% (percentage points) higher expected return** than the remainder of industries from S&P 500 (e.g., 7% instead of 6%), then I would invest...

% in them.

- If the stocks from the industries listed above had a **2% (percentage points) higher expected return** than the remainder of industries from S&P 500 (e.g., 8% instead of 6%), then I would invest...

% in them.

- The stocks from the industries listed above had a **4% (percentage points) higher expected return** than the remainder of industries from S&P 500 (e.g., 10% instead of 6%), then I would invest...

% in them.

- The stocks from the industries listed above had a **8% (percentage points) higher expected return** than the remainder of industries from S&P 500 (e.g., 14% instead of 6%), then I would invest...

% in them.

- The stocks from the industries listed above had a **16% (percentage points) higher expected return** than the remainder of industries from S&P 500 (e.g., 22% instead of 6%), then I would invest...

% in them.

Note that the market value of companies from the fourteen listed industries are roughly 12% of the total value of the 500 companies in this index.

Short Dark Triad (Jones & Paulhus, 2014) [page 5]

Please indicate how much you agree with each of the following statements. where:

- 1 = Disagree strongly
- 2 = Disagree
- 3 = Neither agree nor disagree
- 4 = Agree
- 5 = Strongly Agree [10 items]

[27 items]

Moral inclinations (Conway & Gawronski, 2013) [pages 6-26]

On the following screens you will see a series of short stories. Please read them carefully. Even though some stories may seem similar, each story is different in important ways. Please note that some stories refer to things that may seem unpleasant to think about. This is because we are interested in people's thoughts about difficult, real-life issues.

After each story you will be asked to make a judgment about whether you find the action described appropriate or inappropriate. Click the option that best corresponds to your personal opinion. There is no right or wrong answer--just choose what seems best to you.

[20 dilemmas]

Attention check [page 27]

Which of these types of companies was not mentioned during the survey?

[4 options, 1 was correct]

Demographics [page 28]

What is your biological sex? [male/female]

What is your age (in years)?

What is your marital status? [single/married/divorced or widowed]

How many people are in your household?

What is the income in your household? [Less than \$10,000/\$10,000-\$14,999/\$15,000-\$24,999/\$25,000-\$39,999/\$40,000-\$59,999/\$60,000-\$74,999/\$75,000-\$100,000/More than \$100,000]

What is your highest achieved level of education? [Primary education/Secondary education/Bachelor or equivalent/Master or equivalent/Doctoral or equivalent]

What is your employment status? [Unemployed/Employee/Self-employed]

How do you see yourself: are you generally a person who is fully prepared to take risks or do you try to avoid taking risks? Choose the appropriate number on a scale of 0 to 10, where: 0 = not at all willing to take risks, 10 = very willing to take risks. (Dohmen et al., 2011)

To what extent do you disagree or agree with the following statement below? Please rate on a scale of 1 (*fully disagree*) to 7 (*fully agree*): My investment knowledge is good.

Objective investment knowledge [page 29]

Investment knowledge test items. Items 1-4 were originally used in van Rooij et al. (2011). Items 5-6 were originally used in Agnew and Szykman (2005). The items were presented in random order. The minimum score in the investment knowledge test was 0 and the maximum was 6.

1. Considering a long time period (e.g., 10 or 20 years), which asset normally gives the highest return: savings accounts, bonds or stocks?
2. Normally, which asset displays the highest fluctuations over time: savings accounts, bonds, or stocks?
3. Stocks are normally riskier than bonds - is this statement True or False?
4. When an investor spreads money among different unrelated assets, does the risk of losing money: increase, decrease or stay the same?
5. If you were to invest \$1000 in a stock fund, would it be possible to have less than \$1000 when you decide to withdraw or move it to another fund?
6. High yield bond funds are invested in bonds with strong credit ratings - is this statement True or False?

Comments [page 30]

If you have any comments, please put them in the box below: [box]