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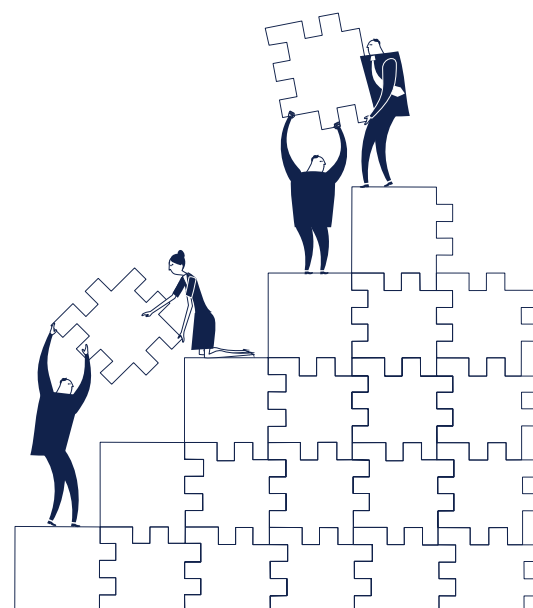## Research Papers

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Naked Aggression: Personality and Portfolio Manager Performance

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Abstract

Why do portfolio managers actively manage their stock portfolios? The finance literature suggests the importance of financial incentives, effort, information and career concerns. We suggest that personality can also be a factor. We perform an experiment with industry experts. The experiment documents that, in a group decision setting, subjects with high aggression, measured by a standard psychology test, were much more likely to deviate from market tracking. In an individual decision setting, these same subject's behavior was not significantly affected by aggressiveness. This result suggests that, in group settings, personality, rather than cognitive biases, might be the most important source of behavioral deviations from the rational choice paradigm.

1   Introduction

Rational-choice economics and cognitive psychology have a great deal to say about the incentives and biases that affect the decision-making of institutional portfolio managers. In this paper, we investigate the unexplored question of whether social psychology can also provide significant insights. We perform a laboratory experiment in which seasoned financial professionals make portfolio allocation decisions. We find that in a group setting, a key social psychology variable, personality, and in particular aggressiveness, dominates all other determinants of portfolio choice. In contrast, in an individual decision-making context, we find that managers' choices are not affected by aggressiveness. This result suggests that research into the determinants of institutional investor behavior needs to account for the influence of personality.

The literature in financial economics on active portfolio management can broadly be divided into two streams. A theoretical literature that investigates reason how effort, information, and career concerns can distort affect the incentives for active management and an empirical literature that considers the effect of active management on the returns to mutual funds and investors in mutual funds. Broadly speaking, the consensus of the theoretical literature is that controlling the behavior of portfolio managers through incentive contracts is more difficult than controlling agent behavior in standard principal–agent models and that incentive problems associated with delegated investment management lead to sub-optimally high levels of active management. [1]

In contrast to the theoretical literature, empirical research has not reached a consensus on the overall value effect of active management. Fama and French (2010) present evidence which suggests that, on average, active management reduces returns to mutual fund investors. In contrast Cremers and Petajisto (2009) argue that the fraction of a mutual fund's portfolio under active management is positively associated with investor returns. Berk and Green (2004) argue that, assuming rational asset pricing, decreasing returns to scale, and perfect competition between fund investors, the gains from active management should be captured by fund man-

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[1]See Admati and Pfleiderer (1997), Rajan and Srivastava (2000), Ross (2004), Carpenter (2000), and Dow and Gorton (1997).

agers. One, albeit fairly obvious conclusion concerning the value of active management that can be drawn from theory and evidence on delegated portfolio management is that the value creation effect of active management is reduced by incentive distortions.

In this paper we consider another potential source of distortion, one that has not been considered by the finance literature—aggression. More specifically we focus on the personality trait aggression, which is stable in adult life, and not the state aggression which we all sometimes experience. The trait approach assume that personality traits differ across individuals, but are stable within an individual (during adulthood) and over time (McCrae and Costa, 2003), and that these traits shape the persons behavior.[2]

In recent years a number of economics models have shown that incorporating personality traits into economic models can significantly increase their predictability (Rustichini, DeYoung, Anderson, and Burks (2012), Battigalli and Dufwenberg (2009), Rustichini, DeYoung, Anderson, and Burks (2012), Kugler, Neeman, and Vulkan (2014), Dupuy and Galichon (2014)). We focus on aggression because we believe it is prevalent in the finance industry in general and with portfolio managers in particular. Furthermore, the industry seeks and rewards aggressive behavior.[3] A quick glance at recruitment materials for money management jobs reveals many quotes such as "we are seeking individuals that are intelligent and aggressive." Popular books describing the money management business are full of references to culture of aggressive behavior and how quickly it spread in Wall Street and London in the 80s and 90s (e.g., pp. 106-7 in Endlich (2000)). Personality matters most when we interact with others. This is why it is particularly relevant to many economic situations. Fund managers either work in teams or must regularly report their decisions to risk managers, investment committees, managers and even shareholders. To test all this we present conduct an experiment involving experienced finance practitioners. We present them with a choice between passive index tracking and investing in a share that can return more or less than the index. The setup is such that they should largely be skeptical about investing in this share. We find that when our experts are in a group

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[2]Examples can be found in Barrick, Mount, and Judge (2001), Hurtz and Donovan (2000), Hogan and Holland (2003), Hogan and Holland (2003), Poropat (2009), and Roberts, Kuncel, Shiner, Caspi, and Goldberg (2007); but see Morgeson, Campion, Dipboye, Hollenbeck, Murphy, and Schmitt (2007), for a different perspective.

[3]In fact, among practitioners the terms aggressive and active portfolio management are often interchangeable.

situation personality "takes over"—aggressive managers are far more likely to opt for active management than passively track the index. As a control, when the same subjects face a mathematically equivalent decision problem individually (not in a group) then personality has no impact on their decision and they behave as predicted by standard finance theory.

The rest of the paper is organized in the following way: Section 2 presents the precise details of the decisions we use and the theoretical analysis of these; section 3 describes our design and procedure; section 4 sets out our findings. We discuss our finding and conclude in section 5.

2   The decision problem

Each subject must choose between passively tracking the index and investing in stock A. The stock can either earn the index return plus 20% or the index return less 30%. The index returns 20%. Each subject is part of a group of 5. Each subject receives an independent signal about stock A. The signal is either "good" or "bad." Subjects are informed that the probability of receiving a good signal given that the stock will return the index plus 20% is greater than 50% and the probability of receiving a bad signal given that the stock will return the index less 20% is also greater than 50%. Each subject sees all signals (hers and, in the group experiment, the other four signals) before making her decision. The control individual experiment is identical to the group experiment except that subjects are on their own—not part of any group. In the experiments, we focus on the case where (1) in the control case subjects receive a bad signal, and (2) in the group experiment there are 2 "good" and 3 bad signals, and the subject receives a good signal.

2.1   Optimal investing strategies for Bayes rational agents

In this section, we consider the Bayes rational solution to the participants decision problem and belief-based deviations from Bayes rationality that might explain investment choices. We focus on the group experiment because it is central to testing our hypotheses regarding the effect of

aggression on portfolio manager behavior. Because the decision problem is very simple, the the analysis of the problem produces no surprising results. For this reason, to avoid taxing the readers patience, we will simply state some fairly obvious properties of the subject's inference problem and defer detailed derivations of these properties to Appendix A. To facilitate the discussion of these results, we will say that signal quality is symmetric if (a) the signal is equally precise when conditioned on a high or low return on the stock, and (b) all subjects receive signals of equal quality.

Our first observation is that if a subject believes that signal quality is symmetric, and the subject is weakly risk averse, investing in the index is the optimal decision. This follows because, under the symmetry assumption, posterior beliefs conditioned on the signals depend only on the difference between the number of good and bad signals. In both the baseline group experiment and the individual control experiment, the number of bad signal exceeds the number of good signal by one signal. Thus, given symmetric signal quality, the probability that the stock will beat the index is less than 50%. Given that the upside gain when the stock beats the index is less than the downside loss, this implies that the expected return on the stock is less than the expected return on the index. Moreover, the variation in return, measured by second-order stochastic dominance, is greater for the stock. Thus, a risk neutral or risk averse investor who believes that signal quality is symmetric will track rather than invest in the stock. The size of the loss from investing in the stock is increasing in the subject's assessment of signal quality and in the subject's risk aversion. However, even if the subject believes that the signal is uninformative and the subject is risk neutral, investing in the stock is strictly suboptimal.

Thus, rationalizing subject's choice of investing in the stock requires relaxing at least one of the two symmetry conditions. In the appendix we show that relaxing the assumption that signal quality is independent of the return on the stock can rationalize investing in the stock. Investing in the stock is only rationalized if the subject believes that the signal is much more precise when the return on the stock is low. In this case, if the realized return is low, the subject expects almost all the signals to be be bad while, if the return is high, the subject expects the signals will be more or less random. Since, in the the experiment, the number of

good signals is close to the number of bad signals, and thus fairly "random," such a subject would infer from the high degree of variation in the signals that the return will be high based on their belief that signal variance is much higher when the realized payoff on the stock is high. As we show in Appendix A, the degree of asymmetry required to support investing is extreme. Moreover, asymmetry is not motivated by the experiment's instructions and the line of reasoning connecting this sort of signal asymmetry to posterior assessments is complex. Thus, we doubt that this sort of asymmetric assessment of signal quality played an important role in subject decision making.

A more plausible rationalization of investing in the stock is produced by relaxing the assumption that that subject believe that all subjects receive signals of equal quality. Define an "arrogant" subject as a subject who believes that her own signal is very precise and all other subjects signals are nearly uninformative. An arrogant subject both overweights her own signal relative to the signals of others and places a high absolute value on the quality of her signal. A sufficiently arrogant subject, with fairly low risk aversion, who receives a positive signal, will choose to invest in the stock. In our baseline experiment, the group experiment, subjects received positive signals. Thus, a high degree of arrogance rationalizes stock investing in the group experiment. However, in the individual experiment, since the subject received a negative signal, an arrogant subject would experience larger losses from investing in the stock than a subject who believed that signal quality was symmetric.

Thus, the most plausible hypotheses for subject behavior, under the assumption of Bayesian rationality and weak subject risk aversion, is that (a) in the group experiment, subjects will invest in the stock in the stock only if they are arrogant, i.e. attribute high quality to their own signal and low quality to the signals received by others and (b) in the control experiment, all investors will track.

Experimental researchers have discovered that, when Bayesian/Nash predictions of subject behavior are difficult to confirm in an experimental setting, frequently quantile response models based on Bayesian best replies nevertheless closely fit subject behavior (Goeree, Holt, and Palfrey, 2002). In quantile response models, subjects play strategies with a probability that is

proportional to the payoff from the strategy. The strategy that yield the higher payoff under the agents utility function, is not played with probability 1. However odds that the agent will play a given strategy versus another strategy is increasing in the difference in the payoffs produced by the two strategies. Under the hypothesis that subjects exhibit quantile response behavior, and that the payoffs they obtain from the two investment alternatives are based on Bayesian evaluation of the expected utility of wealth that the strategies generate, we predict that (a)in the group treatment, arrogant and/or low risk aversion subjects will be more likely to invest in the stock (b) in the individual experiment low risk aversion subjects will be more likely to invest in the stock and arrogant subjects will be less likely to invest.

2.2   The affect of aggressiveness on subject behavior

So far we looked at what should a fully rational decision maker do in the decision problem faced by our subjects. Our alternative explanation is that personality, and aggression in particular, matters. Lauriola and Levin (2001) show individuals with high scores engage in less risky decisions in the gains domain, but more risk taking in the domain of losses. In our setting this would mean that aggression should be positively correlated with investment. Personality matters more in a social context and therefore we would expect that this correlation to be significantly stronger in the group setting than in our control, individual decision problem.

The exact mechanism by which personality enters into into agents' subjective decision calculus is indeed problematic. One obvious possibility is that it affects subjects' subjective probability distributions in a fairly context-independent fashion. In our setting, high aggressiveness could simply make subjects more arrogant. Under this hypothesis, based on the analysis in the previous section, we would expect high-aggression to bias subjects toward investing in the group treatments and against investing in the individual treatments. A second possibility is that aggression affects decision making of agents who are endowed with state-dependent utility by affecting their decisions only in states where the decision is made in a group context. High-aggression decision makers might have an "individual-decision self" and a "group-decision self." The individual decision self could be risk avoiding and cautious while the group de-

cision self might be risk-taking and relatively unconcerned with downside risk.[4] Alternatively, a third possibility is that, in group contexts, high-aggression individuals simply act impulsively and make non-maximizing decisions, with impulsive, aggressive, responses displacing rational calculated responses.

Our individual control treatment is designed to provide some evidence on the plausibility of the first alternative. Our design does not permit us to distinguish between the second and third alternatives. However, the problem of determining the mechanism through which personality affects decisions is a general problem in the literature on personality and decision making (Borghans, Duckworth, Heckman, and Ter Weel, 2008). If personality factors are of first-order importance in investor decision making then realistic models of investor behavior need to incorporate these factors despite their rather awkward fit with utility-based approaches to modeling agent choice.

3   Design of experiment

3.1   Design approach

Following Bossaerts (2009) we adopt the general principles of "ecological design" in studying financial decision making. Ecological design stresses (a) the importance of using subjects who are familiar with decision problems similar to the decision problem being investigated in the experiment and (b) and designing and framing the problem to so that it resembles problems these subjects typically encounter rather than resembling a maths quiz.

We address the first point by using only experienced finance practitioners as subjects in our experiment. Our subjects have an average of just over 11 years of making investment decisions. Using experienced subjects mitigate the confounding effects that cognitive biases might have on our investigation of the effect of personality on decision making.[5] Thus, any systematic

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[4]For more discussion of dynamically rational decision making when decision makers preferences are time or context dependent, see Strotz (1955) and Peleg and Yaari (1973).

[5]The literature on behavioral finance is rich in examples of such biases, e.g., holding on to "losers" and selling "winners." However, behavioral finance researchers have show that many biases diminish, or even disappear, with experience. For example Barber et al 2009 which shows that in Taiwan virtually all day traders lose money while

deviation from rationality we find with our expert investors is likely to correspond to a real and persistent bias that does not diminish with experience.

In fact, in our experiment, subjects were remarkably rational individually choosing between risky prospects. The rationality of individual subject decision making under uncertainty is amply illustrated by their responses to the Holt and Laury risk questionnaire. H&L is a standard method of estimating risk attitude and is widely used in economics and finance experiments. In the H&L risk questionnaire, subjects face 10 consecutive decisions between lottery A and B, where B remains the same while A becomes progressively riskier. A rational decision maker will switch exactly once from choosing A to B, or will stick with the same option for all 10 decisions. For typical subject pools, many subjects switch more than once, resulting in between 30% and 40% of observation having to be discarded (and sometimes, all other decisions made by these subjects also need to be also ignored).

In our experiment *all* subjects behaved exactly as predicted by expected utility theory— witching between the to alternatives only once. In our experience this is extremely rare— certainly not something either of us or any of our other co-authors ever seen before. These responses provide strong support for our subjects indeed being experts in financial decision making.

The second aspect of ecological design is presenting subjects with a decision problem seems like real financial decisions and not a maths quiz. Our design makes every effort to look and feel as real as possible through our choice of language and the user interface. We believe that these attempts to look and feel real are particularly noticeable in the group decision scenario, which is at the heart of our study: Here subjects are in groups of 5 and each receives her/his own signal. The five signals appear on the screen one of the after the other, giving the impression of information being received by the group in real time even though in reality each group received the exact same signals in the same order. Subjects were allowed to send messages to the other members of the group before making the final decision. Once again, this gave our subjects the impression of a real group and real time decisions even though messages did not actually go

institutional investors get gain by taking advantage of the cognitive biases of the day traders.

anywhere in real time. This may seem a little "lose" but we made sure that we never at any point deceived our subjects in any way. We believe that on balance our design our effective in making subjects feel like they are part of a group that gets real time information and has to come up with a decision in respond to this information.

At the same time, we aimed to provide only the minimal contextual information required to make the problem appear to to be a real investment problem. For example, we never specified the index tracked by the tracking portfolio or the industry which the the alternative stock operates. By specifying that the information signals on concern the alternative individual stock investment, we minimized the effect of agent optimism or pessimism regarding overall economic and/or stock market performance. Finally, or minimalist formulation of the group decision problem controlled for the contaminating effects of that personality factors that effect subjects ability to influence other subjects might have on the results of our experiments, which was designed to test the effect of personality in a group setting on subject choices between risky prospects rather than the effect of personality on the ability of subjects to influence groups to adopt their their preferred outcome. If we had measured subject choices after actual interactions with other subjects, personality variables such as extroversion, which have been shown to facilitate dominance in group decision making, [NIR CITE PLEASE]would have played a key role in the subject choices. If such variables were correlated with aggressiveness these influence effects would have confounded our results.

Finally, our treatment which featured individual decision making was optimized to identify the effect cognitive biases, such as overconfidence, in the group experiment. For this reason the design specified that, in the group treatment subject received a positive signal regarding the alternative investment while in the individual treatment they received a negative signal. Under this design, if subject aggressiveness acted as a simply proxy for overconfidence, then aggressiveness would reduce the likelihood of investing in the alternative investment in the individual setting by roughly the same amount as it increased the likelihood of investing in the alternative in the group setting. Thus, this design produces a sharp test for the hypothesis that the effect of aggressiveness results simply from a confounding correlation between aggressiveness and

overconfidence.

3.2 Specific protocols

The experiment took place on January 17th 2014. Fifty two people participated in the online experiment. Participants were recruited through the Diploma in Financial Strategy course at the Said Business School, University of Oxford (http://www.sbs.ox.ac.uk/programmes/degrees/dfs). The gender split was 80% male and 20% female. The experiment lasted about 30 minutes. The distribution of subjects in the subject pool is as follow: about 40% are aged 20-30, 27% aged 30-40, 25% aged 40-50 and 8% aged 50-60. The participants come from diverse ethnic backgrounds. Subjects had on average just over 11 years of experience in making investments decisions.

3.2.1 Design

Half the participants completed the individual decision problem before the group and the other half in the opposite order. After completing the investment decision problems subjects completed a standard Holt and Laury risk assessment task, followed by a 74 questionnaire including gender, age, experience, the Big 5 and the Buss and Perry aggression questionnaire. At the end of the experiment, 4 subjects were selected at random and were paid depending on their choices and performance: Consistent with the instructions below they received £20 if they chose to track the index. If they chose to invest in the new stock their pay was determined by a random to be either £24 or £14 (see the instructions below for more details).

3.2.2 Software

The software used was an online experimental platform which the subjects accessed through their web browsers. The software randomly selected for each participant, whether they should see the individual or the group task first. The software recorded all inputs from the participants into a single database.

4 Results of experiment

4.1 Data description

Summary statistics for the variables used in the study are presented in Table 1. As one might expect given that the the experiment recruited financial professionals. The mean age of subjects in fairly high (35) and right skewed. Mean experience has the same characteristics. In contrast to these demographic variables, the instruments used to measure personality factors, except for Rotter scale, exhibited little skewness and less L-kurtosis than a Normal distribution (L-Kurtosis of the normal ≈ 0.1226). This is not surprising given that the design of these instruments was to some extent shaped by a desire for producing "regular distributions." In contrast, the one subject characteristic not measured with a personality instrument, risk aversion, exhibited more significant divergence from the Normal distribution: it was somewhat skewed (L-skew = 0.08) and quite kurtotic relative to the normal distribution (L-kurtosis = 0.20).

	AGG	AGREE	ROTT	NEURO	OPEN	CONS	EXTRA	RISK	EXP	AGE
Mean	26.60	33.10	2.61	20.80	37.90	34.90	28.50	5.36	11.20	35.50
Median	25.50	33.00	3.00	20.00	38.00	35.00	29.00	5.00	9.00	35.00
Std. Dev.	7.87	4.61	1.19	5.72	4.09	5.22	5.28	1.66	7.36	10.30
Mean Dev.	8.88	5.20	1.21	6.57	4.69	6.02	6.05	1.80	7.95	11.40
L-CV	0.17	0.08	0.23	0.16	0.06	0.09	0.11	0.17	0.35	0.16
L-Skewness	0.14	-0.03	-0.15	0.07	0.00	0.01	-0.04	0.08	0.25	0.16
L-Kurtosis	0.12	0.15	0.17	0.09	0.11	0.11	0.12	0.20	0.17	-0.08

Table 1: *Summary statistics*

Figure 2 presents the sample correlations between the variables measured in the experiment. Except for the obvious positive correlation between age and experience, none of the correlations exceed 0.50. The non personality variable, risk aversion, correlation with the personality variables was very weak, with the exception of a strong positive correlation with conscientiousness and the risk aversion measure ($r = 0.31$. Aggression exhibited a strong negative correlation with agreeableness ($r = -0.46$), and, as predicted by psychological theory, it exhibited a fairly strong positive correlation with neuroticism ($r = 0.27$). Aggression scores were only weakly correlated with risk aversion and perhaps surprisingly, the correlation was positive $r = 0.17$,

i.e. aggressive subjects were more risk averse on average. This pattern of correlation makes if difficult to argue that aggression is a proxy for risk tolerance. Table 2 also shows that male subjects on scored higher on aggressiveness and lower on conscientiousness and risk aversion.

	AGG	AGREE	ROTT	NEURO	OPEN	CONS	EXTRA	RISK	GENDER	EXP	AGE
AGG	1.00	-0.46	-0.15	0.27	-0.04	-0.15	-0.25	0.17	0.35	-0.15	-0.21
AGREE	–	1.00	-0.00	-0.29	-0.19	0.07	0.16	-0.30	-0.23	-0.20	-0.20
ROTT	–	–	1.00	-0.35	-0.06	0.42	0.46	0.01	-0.16	-0.05	-0.14
NEURO	–	–	–	1.00	0.17	-0.23	-0.34	-0.13	0.08	0.19	0.16
OPEN	–	–	–	–	1.00	0.10	0.26	0.14	-0.14	0.28	0.32
CONS	–	–	–	–	–	1.00	0.30	0.31	-0.32	0.10	-0.03
EXTRA	–	–	–	–	–	–	1.00	0.09	-0.24	-0.15	-0.22
RISK	–	–	–	–	–	–	–	1.00	-0.11	-0.09	-0.06
GENDER	–	–	–	–	–	–	–	–	1.00	0.03	0.14
EXP	–	–	–	–	–	–	–	–	–	1.00	0.74
AGE	–	–	–	–	–	–	–	–	–	–	1.00

Table 2: *Correlation Matrix*

4.2 Results: Group Decisions

The key question we are investigating is the effect of aggression on portfolio choice behavior in a group setting. Tables 3 and 4 present univariate tests for the effect of aggression on portfolio behavior. Table 3 presents non-parametric Mann-Whitney test of the null hypothesis the median aggression score of tracking subjects is the same as the median aggression score of investing subjects. The test decisively rejects the null hypothesis ($p = 0.007$). Table 4 presents the results of univariate logit regression of the probability of investing on aggression. The null hypothesis that the coefficient associated with the aggression score is zero is decisively rejected $p = 0.017$. Both of these tests point to a significant positive relation between aggression and deviations from the market portfolio.

	μ-Invest	μ-Track	Mann-Whitney Test	
			U	P-Value
AGG	32.3	24.9	265	0.007
#Obs.	10	34	–	–

Table 3: *Group Decisions:* Univariate Nonparametric Analysis

	Estimate	Standard Error	z-Statistic	P-Value
Intercept	-4.770	1.600	-2.980	0.003
AGG	0.125	0.052	2.390	0.017

Table 4: *Group Decisions:* Univariate Logit Analysis

In order to investigate possibility of confounding effects, we performed a multivariate logit analysis, including as controls the other personality variables, the risk aversion measure, and demographic variables. The results of these regression estimates are provided in Table 5. Once again the coefficient associated with aggression is very significant ($p = 0.032$). Moreover, the coefficient for aggression is the only coefficient that even approaches significance at conventional levels. In fact, in results not reported, we performed univariate parametric as well as non-parametric test of the significance for all of the other variables. None of these tests produced significant median differences between the tracking and investing subjects or significant coefficients in the logit specification.

	Estimate	Std. Error	z-Statistic	P-Value
Intercept	-3.870	8.400	-0.461	0.645
AGG	0.162	0.076	2.150	0.032
AGREE	0.027	0.112	0.237	0.813
ROTTER	0.249	0.459	0.543	0.587
NEURO	-0.009	0.089	-0.099	0.922
OPEN	-0.038	0.141	-0.269	0.788
CONS	-0.062	0.107	-0.580	0.562
EXTRA	-0.021	0.099	-0.216	0.829
RISK	-0.090	0.315	-0.286	0.775
GENDER	-0.577	1.430	-0.404	0.686
EXP	-0.030	0.090	-0.335	0.737
AGE	0.060	0.076	0.799	0.424

Table 5: *Group Decisions:* Multivariate Analysis

Thus, in our experiment aggression is the only significant predictor for deviations from the market portfolio in a group setting. Granting that aggression is a significant predictor of deviations from market tracking, naturally raises the question of the magnitude of the aggression effect. To answer this question we compared the estimated probability of investing of an in-

vestor with a mean level of measured aggressiveness, μ with the probability of investing for and investor with measured aggressiveness one standard deviation above the mean, $\mu + \sigma$ using both the univariate and multivariate logit models. Or results show that the magnitude of the aggression effect is quite large. In the univariate model, a one standard deviation increase in measured aggressiveness increased the probability of investing from 0.191 to 0.387. Under the multivariate specification, a one standard deviation increase increased the probability from 0.172 to 0.427. In both cases, the increase in the probability of investing *exceeded* a mean subjects probability of investing.

	$P(\mu + \sigma_{\text{AGG}})$	$P(\mu)$	ΔP
Univariate	0.387	0.191	0.196
Multivariate	0.427	0.172	0.255

Table 6: *Group Decisions:* Economic Significance of Aggressiveness

4.3 Individual Decisions

The group experiments test the core hypothesis of the paper—that, in social decision making environments, aggression affects portfolio manager behavior. These tests showed that, even after controlling for risk attitudes, demographics, and other personality factors, aggression, as measured by our instrument, had a significant positive relation with deviations from the tracking portfolio. The question remains as to whether our instrument captures subject aggressiveness or some other uncontrolled preference and/or personality factor. We investigated this issue by means of the control experiment in which subjects made choices as individuals outside the group context, between investing and tracking. This experiment is useful because the social psychology emphasizes the effect of personality factors on behavior in social group contexts rather than their effect on decision making. If in fact, our instrument has captures personality effects, we expect that the effect of measured aggressiveness on individual decision will be much more modest than its effect on group decision. In contrast, if aggression captures an uncontrolled aspect agent beliefs and/or preferences regarding the investment choices themselves, then, the captured characteristic should effect decisions in both the individual and group

settings.

Assuming that our instrument for measuring risk is effective in controlling for risk aversion, the captured characteristic would relate to subject beliefs about about the information structure. As discussed in Section 2, the most plausible belief-based explanation for subjects deviating from the market portfolio and investing in the group context is based on subject assessments of the quality of their signal relative to the signals received by other group members. In that section we showed that choosing investing over tracking required that a subject exhibit a great deal of both absolute and relative signal confidence, i.e., the subject must assign a high degree of precision to her own signal and believe that the quality of other subjects' signals is much lower. If our instrument for aggression simply captures signal confidence, then the measure should also affect individual decisions. Although, in the individual decisions relative signal confidence is not relevant, absolute signal confidence is still important in determining the payoff from investing versus tracking. Rejecting tracking requires a high degree of confidence in own signals. In the individual experiments, all subjects received a bad signal. Since confidence sufficient to motivate investing in the group context requires that subjects have a high degree of confidence in their own signal, confident subjects would be *less* likely to invest in the individual context. Thus, if measured aggression simply captured subject confidence, then one would expect that measured aggression would be positively correlated with tracking in the individual experiment. Thus, the individual decision experiment provides a number of testable predictions that will aid in identifying the the basis for the effect of measured aggression on subject behavior in the group experiment:

- If measured aggression reflects subject beliefs regarding the signal quality, then aggression will be negatively associated with investing.

- If measured aggression reflects personality differences, then the effect of aggression in the individual experiments should be less than in the group experiments.

- In general, personality factors should explain less of the variation in subject behavior in the individual experiments.

We first consider the effect of scores on the aggression instrument on behavior in the individual experiments. Tables 7 and 8 present univariate tests for the effect of aggression on portfolio behavior. Table 3 presents non-parametric Mann-Whitney test of the null hypothesis the median aggression score of tracking subjects is the same as the median aggression score of the investing subjects. The result of the test is that it is not possible to reject the null hypothesis that the median aggression score level in investing and tracking investors is the same at conventional levels ($p = 0.747$). Table 4 presents the results of univariate logit regression of the probability of investing (as opposed to tracking the market). The null hypothesis, that the coefficient associated with the aggression score is zero, cannot be rejected at conventional significance levels $p = 0.417$. Both of these tests fail to identify a significant effect of the aggression score on portfolio choice in the individual experiments. Moreover, the the coefficient for aggression in the logit test is positive, albeit insignificant. This is the opposite of one would expect if measured aggression simply captured signal confidence.

	μ-Invest	μ-Track	Mann-Whitney Test	
			U	P-Value
AGG	26.8	26.5	214.0	0.747
#Obs.	13	31	–	–

Table 7: *Individual Decisions:* Univariate Nonparametric Analysis

	Estimate	Standard Error	z-Statistic	P-Value
Intercept	0.593	1.815	0.327	0.744
AGG	-0.0519	0.064	-0.811	0.417

Table 8: *Individual Decisions:* Univariate Logit Analysis

Next, we consider the overall determinants of the invest vs. track decision using a multivariate logit specification that includes all of the variables. The results are presented in Table 9. The results show not only that personality variables had a muted effect in the individual experiments, but even that none of the personality variables had any significant effect at conventional levels. The only significant determinant of the invest vs. track decision identified by the regression was the risk aversion measure, RISK. The coefficient associated with risk aversion was

highly significant ($p = 0.03$) and negative. As discussed in Section 2, increasing risk aversion makes investing less attractive relative to tracking and thus the sign of the coefficient is in the predicted direction.

	Estimate	Std. Error	z-Statistic	P-Value
Intercept	-3.910	8.450	-0.463	0.643
AGG	0.065	0.070	0.923	0.356
AGREE	-0.012	0.115	-0.106	0.916
ROTTER	0.412	0.463	0.890	0.374
NEURO	-0.025	0.092	-0.276	0.783
OPEN	0.175	0.126	1.390	0.166
CONS	0.079	0.096	0.818	0.413
EXTRA	-0.172	0.116	-1.480	0.138
RISK	-0.784	0.361	-2.170	0.030
GENDER	-1.100	1.130	-0.973	0.331
EXP	-0.074	0.083	-0.897	0.370
AGE	0.064	0.069	0.926	0.354

Table 9: *Individual Decisions:* Multivariate Analysis

Univariate analysis of the individual experiment data confirms the predictive power of risk aversion in the individual experiments. Table 10 presents non-parametric Mann-Whitney test while Table 11 presents the results of univariate logit regressions. Risk is identified as a highly significant factor in the individual decisions by both tests. Moreover, as Table 12 shows the economic significance of risk a version is quite large, a one standard deviation increase in risk aversion reduces the predicted probability of of investing by substantially, with the reduction in the investing probability caused by the upward shift in risk aversion being approximately equal to half of the estimated probability of investing at the mean level of risk aversion.

	μ-Invest	μ-Track	Mann-Whitney Test	
			U	P-Value
RISK	4.69	5.65	127.000	0.050
#Obs.	10	34	–	–

Table 10: *Individual Decisions:* Univariate Nonparametric Analysis

	Estimate	Standard Error	z-Statistic	P-Value
Intercept	1.220	1.250	0.977	0.329
RISK	-0.405	0.241	-1.680	0.093

Table 11: *Individual Decisions:* Univariate Analysis

	$P(\mu + \sigma_{\text{RISK}})$	$P(\mu)$	ΔP
Univariate	0.165	0.278	-0.114
Multivariate	0.073	0.225	-0.152

Table 12: *Individual Decisions:* Economic Significance of Risk Aversion

Overall, these results provide no support for the hypothesis that measured aggression is acting as proxy for preference or belief characteristics of the subjects. First, the effect of measured aggression on individual decisions is insignificant and in the opposite direction to the one that would be expected under the most plausible belief-based hypothesis, signal confidence, for the aggression/investing relation documented in the group experiment. Second, consistent with the notion that personality variations matter most in group decision situations, individual decisions were not significantly effected by the personality variables. Third, measured risk aversions large and predicted effect on individual decisions, suggests that our measure of risk aversion effectively captures subject risk preferences. In which case, the very low and positive correlation between risk aversion and aggressiveness documented in Table 2 casts doubt on the hypothesis that aggression is a proxy for risk tolerance.

5   Conclusions

This paper considered the effect of aggressiveness on professional manager's portfolio allocations. Although references to aggressiveness are ubiquitous in the practitioner literature, to our knowledge, the effects of aggression on group investment decisions have been largely ignored in the academic literature on delegated portfolio management. We found that this personality factor had a very significant effect on behavior—in a group context, a one standard deviation increase in aggressiveness above the sample average shifted the probability of deviating from

the market portfolio from approximately 20% to approximately 40%, suggesting that aggressiveness has first-order importance for explaining institutional investor behavior.

We think that this paper points to a hitherto ignored "elephant in the room"— the power of personality in group economic decision making. It tests whether a *prima facie* important trait, one that financial firms routinely screen for in hiring, aggressiveness, effects the behavior of financial professionals. The tests suggest a strong effect. Admittedly, this paper is a first not a last step in parsing the effect of aggression, and personality in general, on the actions of institutional investors. Although we point to the elephant, we do not provide an explanation of how the elephant got into the room. More theoretical research is required to develop a plausible model of how personality is mediated by preferences, information, and incentives to produce decisions. More empirical research is required to validate the results of this experiment in the field and explore how other personality factors, such as extroversion, affect the ability of aggressive agents to bend group decisions in their preferred direction. Admittedly, this research will be difficult. The link between personality factors and the economic model of choice is probably even more "awkward" than the link between the economic model and cognitive biases. However, as with elephants, the fact that a factor is awkward does not imply that it is not powerful or that it can be safely ignored.

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Appendix

A   Bayes rational decision problem

Let S represent the proposition that three bad signals and two good signals about the investment have been received. Let H represent the proposition that investing will generate the high payoff of £24; Let L represent the proposition that investing will generate the low payoff of £14. Let q represent the investors prior assessment that the high payoff will be realized. Let γ represent the probability that the signal is good given that the high payoff will be realized; Let β represent the probability that the signal is bad given that the low payoff will be realized. The only information given to the subjects regarding q, γ, and β was that the the prior proability that the

investment would yield a high payoff equals 1/2 and that good signals are more likely when the investment will yield a high payoff and bad signals are more likely when the investment yields a low payoff, i.e.,

$$q = 1/2, \quad 1/2 \leq \gamma \leq 1, \quad 1/2 \leq \beta \leq 1. \tag{A-1}$$

First consider the optimal decision absent information from the signals. The decision to track produces a nonstochastic cash flow while the decision to invest produces a stochastic cash flow. Thus, if the expected cash flow from investing is less than the expected cash flow from tracking, risk averse investors will prefer tracking. Given that $q = 1/2$ the expected payoff from investing is less than the expected payoff from tracking. Thus, based on prior information, all risk neutral or risk averse investors will prefer to track. In the individual decision experiment, subjects received only one signal, a negative signal, thus their posterior assessment should be even lower than their prior assessment and hence, a fortiori, all risk averse or risk neutral subjects should prefer tracking in the individual decision experiment.

Now consider the optimal decision conditioned on the signals in the group decision experiment. Our benchmark is the optimal decision of a Bayesian risk-neutral investor. The utility of a risk-neutral investor if she invests equals the expected payoff from the investment conditioned on S, while The utility of a risk-neutral investor if she tracks is £20. Thus, investing will produce a weakly higher expected payoff than tracking if and only if

$$24 \, \mathscr{P}[H|S] + 14 \, \mathscr{P}[L|S] \geq 20. \tag{A-2}$$

Because there are only two possible payoffs from investing, high and low, and the payoff from tracking is riskless, the optimality of investing versus tracking is entirely determined by the relative odds of a high payoff versus a low payoff. Investing is an optimal strategy if and only if

$$\text{odds} = \frac{\mathbb{P}[H|S]}{\mathbb{P}[L|S]} = \frac{\mathbb{P}[H\&S]}{\mathbb{P}[L\&S]} \geq \frac{3}{2}. \tag{A-3}$$

where the equality

$$\frac{\mathbb{P}[H|S]}{\mathbb{P}[L|S]} = \frac{\mathbb{P}[H\&S]}{\mathbb{P}[L\&S]}$$

follows from Bayes rule. Thus, a necessary condition for a risk averse investor to invest rather than track is that the relative odds of a high payoff versus a low payoff at least equal $3:2$

A.1 Decision of a risk-neutral Bayesian subject

Now consider the decision problem of a risk-neutral Bayesian subject whose beliefs are based only on the information provided in the experiment's instructions. The subjects's information is given by equation (A-1). Since this subject has no reason to believe that any value of the parameters γ, and β) within the specified ranges is more likely than any other, she will assign a uniform probability distribution over the specified ranges to these parameters. Thus, subject beliefs about these parameters will be represented by a uniform distribution over the range of specified values, i.e.,

$$\tilde{\gamma} \overset{\text{dist.}}{=} \text{Unif}[1/2, 1], \quad \tilde{\beta} \overset{\text{dist.}}{=} \text{Unif}[1/2, 1].$$

Because, no information has been provided regarding the relation between these parameters, the subject beliefs about the value of any one parameter will be independent of her beliefs about the others.[6] Thus, the joint probabilities of H and S, to a Bayesian subject who relies only on the information provided by the instruction sheet, are represented by $H\&S$ and L and S, represented by $L\&S$, and are given as follows:

$$\mathbb{P}[H\&S] = \mathbb{E}\left[1/2 \binom{5}{2} \tilde{\gamma}^2 (1 - \tilde{\gamma})^3\right] = \frac{11}{384}, \tag{A-4}$$

$$\mathbb{P}[L\&S] = \mathbb{E}\left[1/2 \binom{5}{2} \tilde{\beta}^3 (1 - \tilde{\beta})^2\right] = \frac{7}{128}. \tag{A-5}$$

---

[6]See Jaynes (2003) for a discussion why these probability assignments optimally mirror the subject's information.

Therefore, combining equations (A-4) and (A-5) we find that an objective Bayesian subject would assign odds of

$$\text{odds} = \frac{\mathbb{P}[H\&S]}{\mathbb{P}[L\&S]} = \frac{11}{21}.$$

Since the subject's odds are $11:21$ and the required odds for investing are $3:2$, the subject would decisively reject investment in favor of tracking.

A.2 Asymmetric beliefs about quality of good and bad signals

Now suppose that a subject's beliefs about the parameters of the model deviate from the objective Bayesian assignments. How large of a deviation is required to induce this subject to invest rather than track? First consider a subjet who assigns the same signal quality to her signals and the other subjects signals but has arbitrary beliefs the quality of the two signals measured by β and γ. The odds for this subject are given by

$$\text{odds} = \frac{1/2 \binom{5}{2} \gamma^2 (1-\gamma)^3}{1/2 \binom{5}{2} \beta^3 (1-\beta)^2} = \frac{q \gamma^2 (1-\gamma)^3}{(1-q)(1-\beta)^2 \beta^3} \quad \gamma \in [0.50, 1], \ \beta \in [0.50, 1], \ q \in [0, 1].$$

In order the subject to invest, it must be the case that the subject's beliefs generate odds at least equal to $3:2$. The set of parameters supporting investing and tracking under these assumptions are illustrated in Figure 1.

From Figure 1 we see that any subject belief under which $\gamma = \beta$, i.e., any belief under which the estimated precision of the signal is independent of the future realized cash flow, will lead the subject to track rather than invest. Investing is only supported by the belief that the signal is much more precise when the realized cash flow is low. In this case, if the realized cash flow is low, the subject expects almost all the signals to be be bad while if the cash flow is high, the signals will be more or less random. Since, the the experiment, the number of good signals is close to the number of bad signals, and thus fairly "random," such a subject would infer from the high degree of variation in the signals that the return will be high based on their belief that signal variance is much higher when the realized payoff is high. As Figure 1 shows, such posterior assessments are only supported by rather extreme beliefs regarding the asymmetry
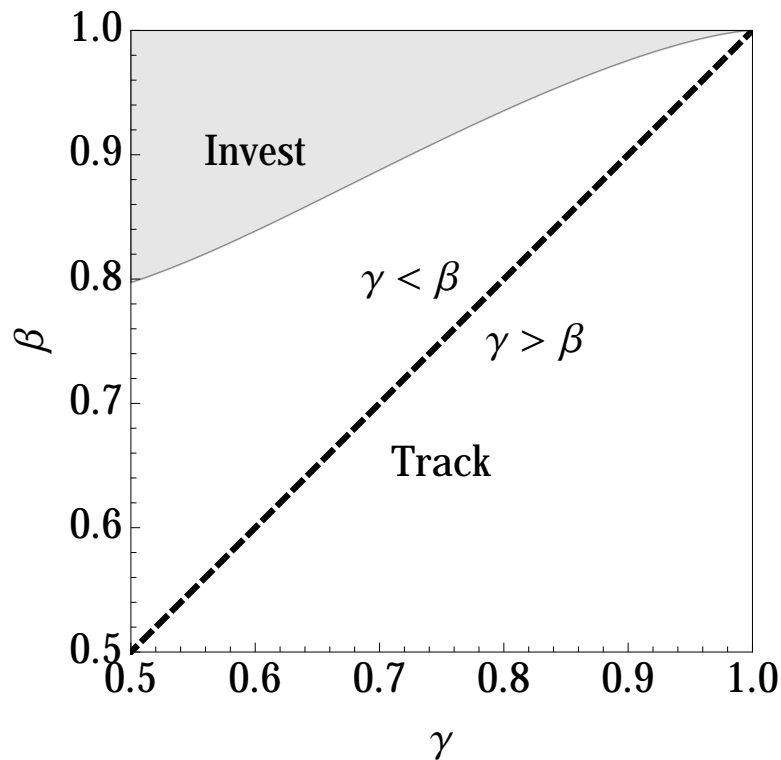
Figure 1: *Asymmetric beliefs about signal quality.* The horizontal axis represents γ, the probability that an individual signal is good given that the payoff from investing is high. The vertical axis represents β, the probability that an individual signal is bad given that the payoff from investing is low. The Investors prior probability equals $1/2$.

of signal quality between good and bad signals. Moreover, note that the the graph in Figure 1 only depicts deviations from tracking under the assumption of subject risk neutrality. Because deviation also increases risk, risk aversion will further reduce the region over which the subject will choose to deviate from the tracking. Thus, subjects with a moderate degree of risk aversion will only deviate to investing under even more extreme beliefs about signal quality asymmetry. Given that the degree of asymmetry required to support investing is extreme, asymmetry is not motivated by the experiment's instructions, and the line of reasoning from these beliefs about signal asymmetry to posterior assessments is complex, we doubt that subjective assignments of asymmetric signal quality to good and bad signals is plausible explanation for subject behavior in the experiments.

A.3 Overweighting of own signal

Now consider a subject who believes that his own signal is more informative than the signals received by other agents, i.e., the subject "overweights" his own signal. To abstract from the issue of asymmetric quality of good and bad signals suppose that under the subject's subjective beliefs are that good and bad signals have the same quality, i.e., $\beta = \gamma$. Assume that the subject assess is own signal quality as equal to o and the quality of the other subjects signal quality is equal to $\beta = k\,1/2 + (1-k)\,o, k \in [0,1]$. Thus, overweighting equal to 1 corresponds to the belief that the other subjects have completely worthless signals, $\beta = 1/2$, while overweighting of 0 corresponds to the belief that the quality of other subject signals is the same as the subject own signal. When making the decision, an overweighting subject will consider his own signal—good, and the four signals received by the other agents in the group—three of which are bad and one of which is good. Thus, the subject's odds ratio equals

$$\frac{o\,\beta\,(1-\beta)^3}{(1-o)\,(1-\beta)\,\beta^3} = \frac{o\left(1 - \frac{k}{2} - (1-k)\,o\right)^2}{(1-o)\left(\frac{k}{2} + (1-k)\,o\right)^2}$$

As shown above for a risk neutral investor to invest rather than track the market, the odds ratio must at least equal 3:2. If the investor exhibits a high, but reasonable given experimental evidence, level of risk aversion, say the investor has constant proportional risk aversion with a coefficient of 3, the probability that investing will produce the high return must at least equal 0.773 implying an odds ratio of approximatly 17:5. Figure A.3 depicts levels of overweighting k and perceived own signal quality o under which the investor will invest and track. From the Figure we see that overweighting as well as a significant degree of confidence in own signal and that the degree of overweighting and confidence required increases with subject risk aversion.

A.4 Economic significance of losses from investing rather than tracking

Finally, suppose that the subject has Bayesian objective posterior beliefs. In this case, tracking is always optimal. However, a natural question to ask is whether the losses from investing relative to tracking are economically significant. To address this question we plot the percentage
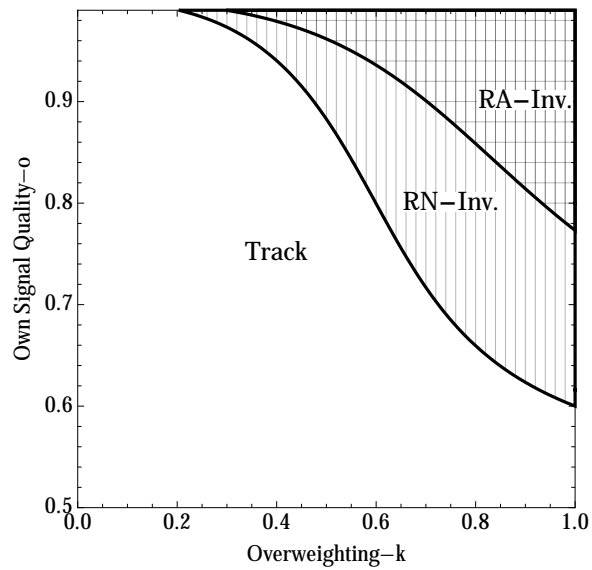
Figure 2: *The effect of overweighting of own signal.* In the figure, the horizontal axes represents the degree to which a subject attributes excess precision to her own signal relative to the signals of the other subjects. The vertical axis represents the subject attribution of precision to her own signal. The vertically hatched region labeled "RN-Inv" represents the set of parameter value under which the subject will invest if the subject is risk neutral. The horizontally hatched region labeled "RA-Inv" represents the set of parameters under which the subject will invest if the subject is risk averse with CPRA utility (coefficient of risk aversion equals 3).

loss from investing relative to tracking of certainty equivalent wealth for a range of possible risk aversion levels. We assume that the investors utility is specified by a constant proportional risk aversion (CPRA) utility of wealth function with risk aversion coefficient a. To check the robustness of our conclusions, we also graph the percentage certainty equivalent loss assuming that the investor beliefs that the signals are worthless, i.e, $\beta = \gamma = 1/2$. The case were the the signals are worthless represents a lower bound on the losses to subjects who believe that the signals are conditionally independent and signal quality is symmetric. As one can see from Figure A.4, for an objective Bayesian subject, the loss from investing relative to tracking in percentage terms, ranges from 12% to 20%. Even under the assumption that the signals are worthless, loss from investing is at least 5%. Thus, the decision to invest rather than track will have a significant effect on certainty equivalent wealth for Bayesian agents.
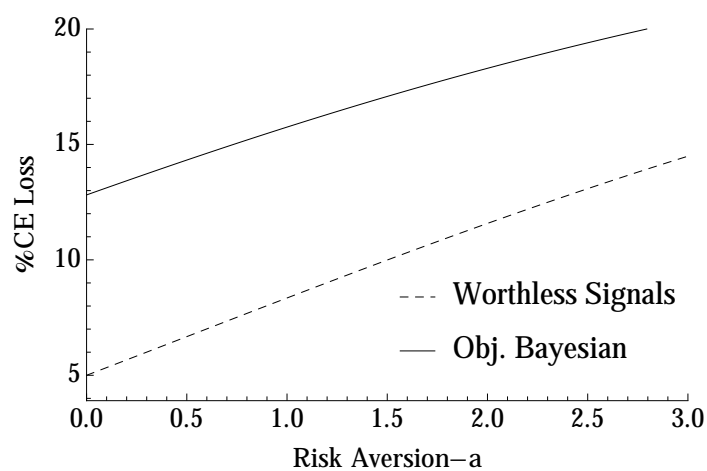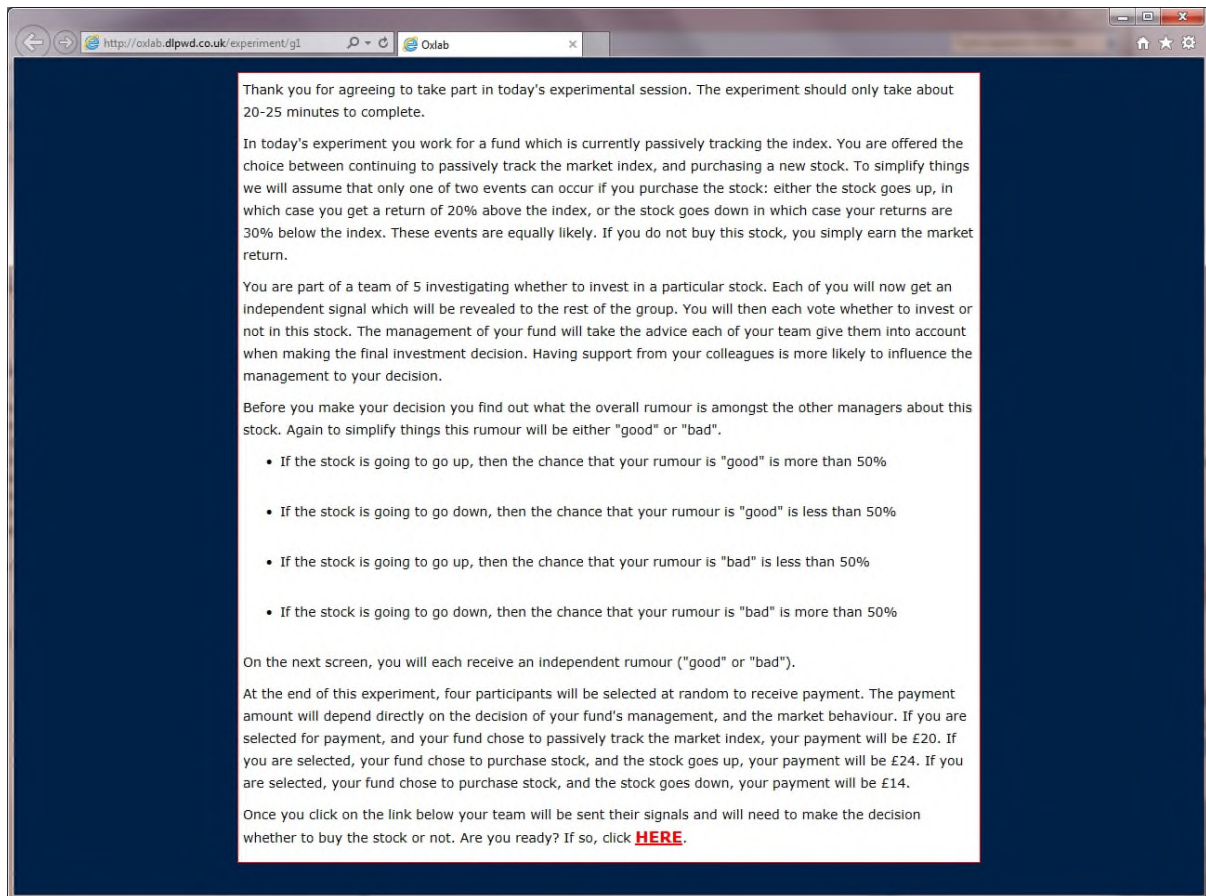
Figure 3: *Certainty equivalent loss from tracking*. In the figure the horizontal axis represent the CPRA risk aversion coefficient of the agent. The vertical axis represents the certainty equivalent loss from investing relative to tracking. The "Objective Bayesian" line represents the loss to an agent who forms posterior assessment based on the updating procedure outlined in Section A.1; The "Objective Bayesian" line represents the loss to an agent who forms posterior assessment based on the belief that both good and bad signals are uninformative.

B. Instructions and Questionnaire

Thank you for agreeing to take part in today's experimental session. The experiment should only take about 20-25 minutes to complete.

In today's experiment you work for a fund which is currently passively tracking the index. You are offered the choice between continuing to passively track the market index, and purchasing a new stock. To simplify things we will assume that only one of two events can occur if you purchase the stock: either the stock goes up, in which case you get a return of 20% above the index, or the stock goes down in which case your returns are 30% below the index. These events are equally likely. If you do not buy this stock, you simply earn the market return.

You are part of a team of 5 investigating whether to invest in a particular stock. Each of you will now get an independent signal which will be revealed to the rest of the group. You will then each vote whether to invest or not in this stock. The management of your fund will take the advice each of your team give them into account when making the final investment decision. Having support from your colleagues is more likely to influence the management to your decision.

Before you make your decision you find out what the overall rumour is amongst the other managers about this stock. Again to simplify things this rumour will be either "good" or "bad".

- If the stock is going to go up, then the chance that your rumour is "good" is more than 50%

- If the stock is going to go down, then the chance that your rumour is "good" is less than 50%

- If the stock is going to go up, then the chance that your rumour is "bad" is less than 50%

- If the stock is going to go down, then the chance that your rumour is "bad" is more than 50%

On the next screen, you will each receive an independent rumour ("good" or "bad").

At the end of this experiment, four participants will be selected at random to receive payment. The payment amount will depend directly on the decision of your fund's management, and the market behaviour. If you are selected for payment, and your fund chose to passively track the market index, your payment will be £20. If you are selected, your fund chose to purchase stock, and the stock goes up, your payment will be £24. If you are selected, your fund chose to purchase stock, and the stock goes down, your payment will be £14.

Once you click on the link below your team will be sent their signals and will need to make the decision whether to buy the stock or not. Are you ready? If so, click **HERE**.

Your rumour about the stock is **GOOD**. The rumours from your colleagues are shown below.

Your Rumour	Good
Colleague 1	**Bad**
Colleague 2	**Good**
Colleague 3	**Bad**
Colleague 4	**Bad**

If you would like to send a message to your counterparts to influence their decision, enter it here, otherwise, leave this box blank and just press submit:
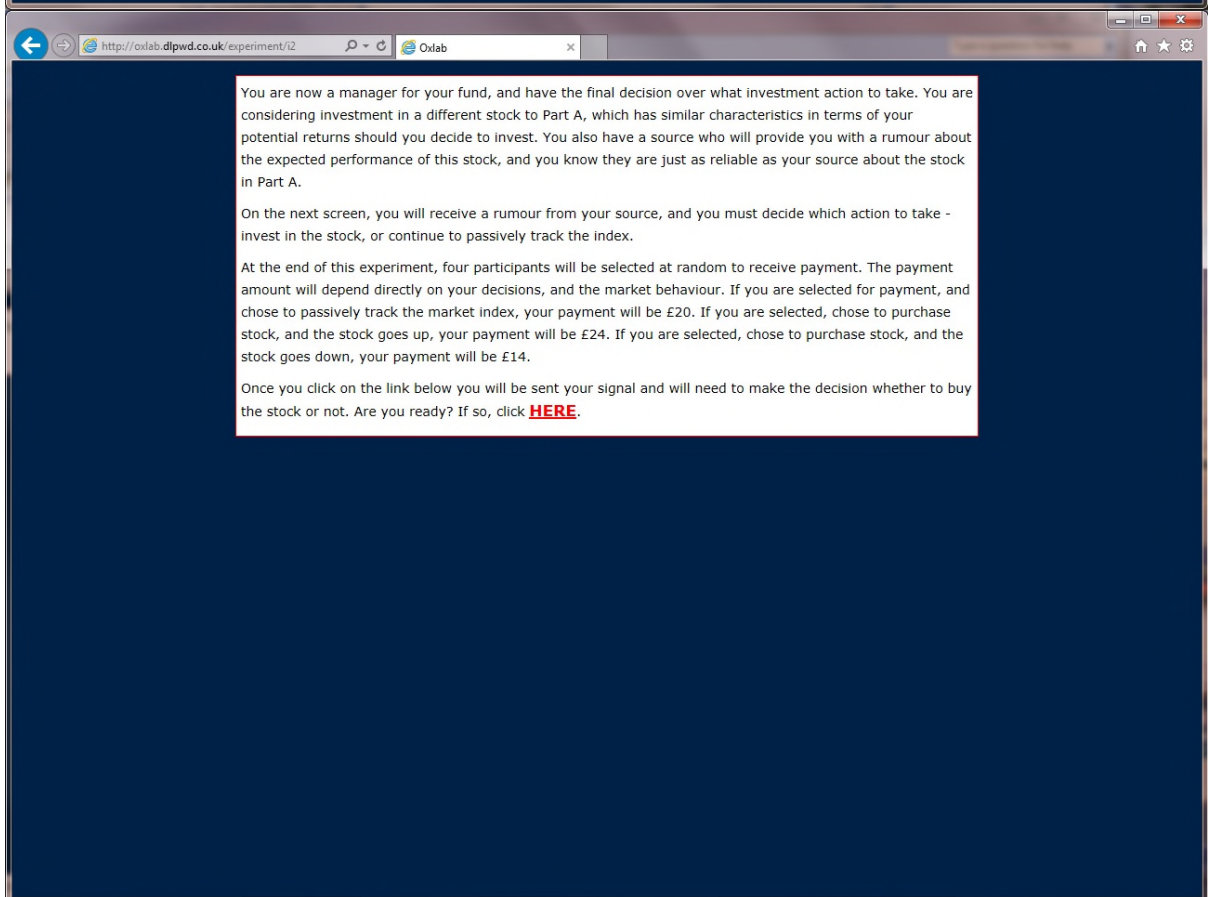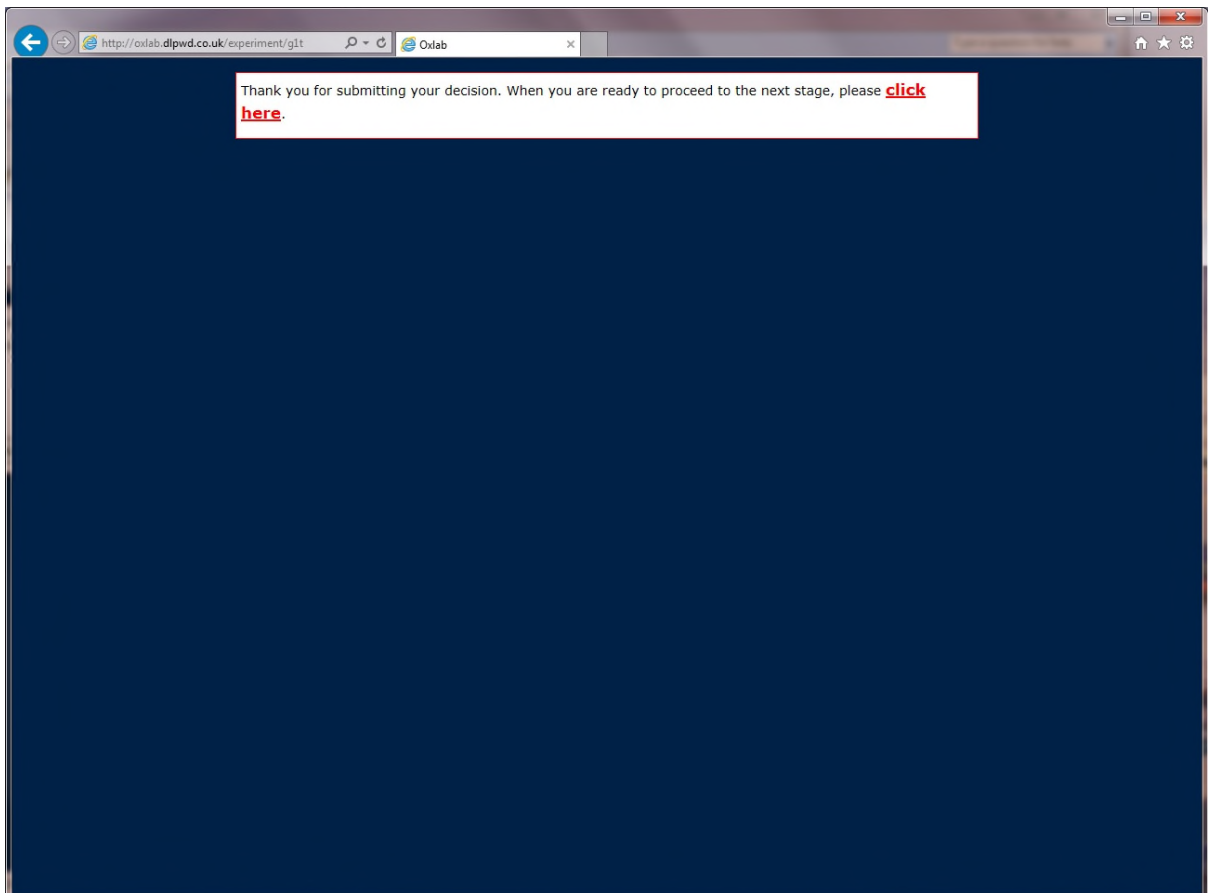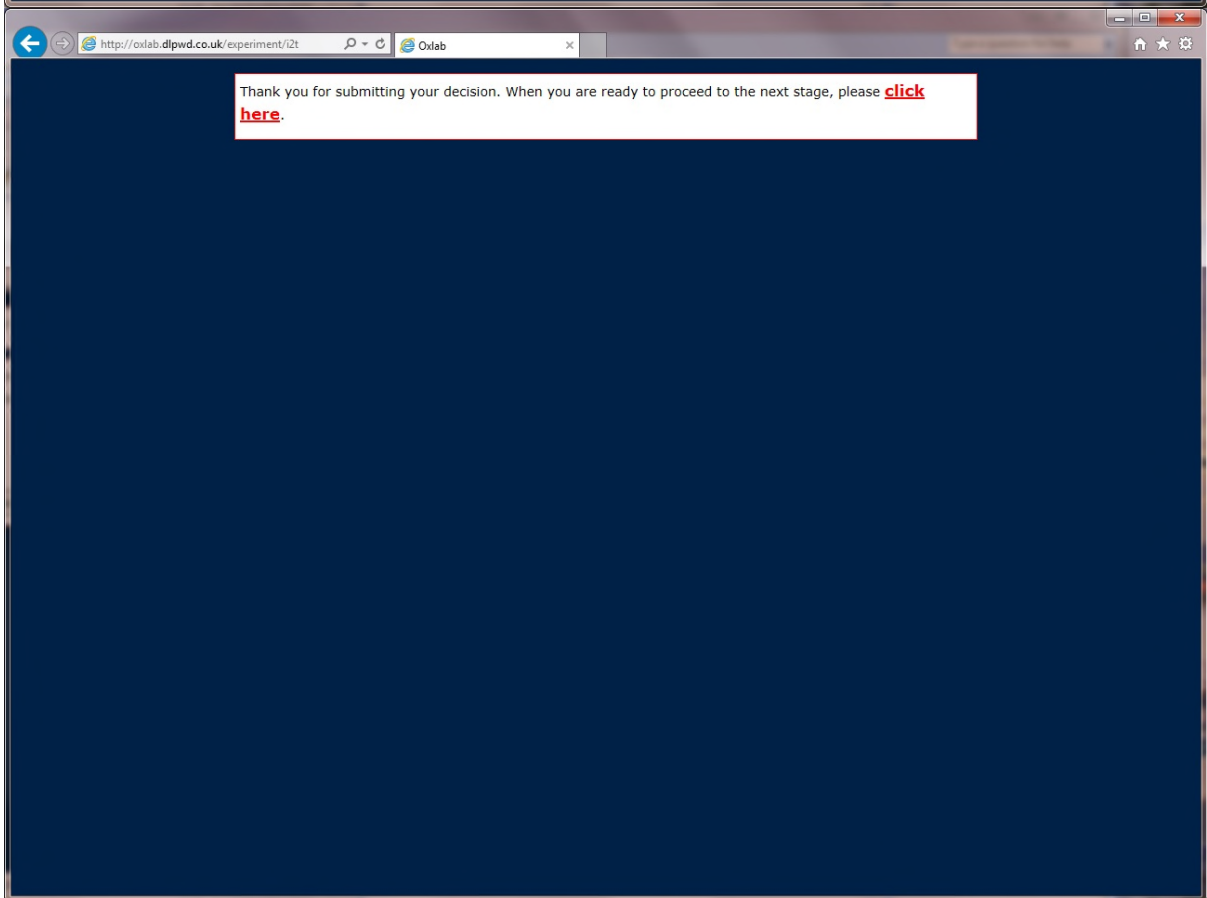
Submit Message

Your decision. Please click to select. If you wish to change your mind, click again to de-select, before clicking your new decision.

Purchase new stock	Continue passively tracking

Submit Decision

Thank you for submitting your decision. When you are ready to proceed to the next stage, please **click here**.

You are now a manager for your fund, and have the final decision over what investment action to take. You are considering investment in a different stock to Part A, which has similar characteristics in terms of your potential returns should you decide to invest. You also have a source who will provide you with a rumour about the expected performance of this stock, and you know they are just as reliable as your source about the stock in Part A.

On the next screen, you will receive a rumour from your source, and you must decide which action to take - invest in the stock, or continue to passively track the index.

At the end of this experiment, four participants will be selected at random to receive payment. The payment amount will depend directly on your decisions, and the market behaviour. If you are selected for payment, and chose to passively track the market index, your payment will be £20. If you are selected, chose to purchase stock, and the stock goes up, your payment will be £24. If you are selected, chose to purchase stock, and the stock goes down, your payment will be £14.

Once you click on the link below you will be sent your signal and will need to make the decision whether to buy the stock or not. Are you ready? If so, click **HERE**.

Your rumour about the stock is **BAD**.
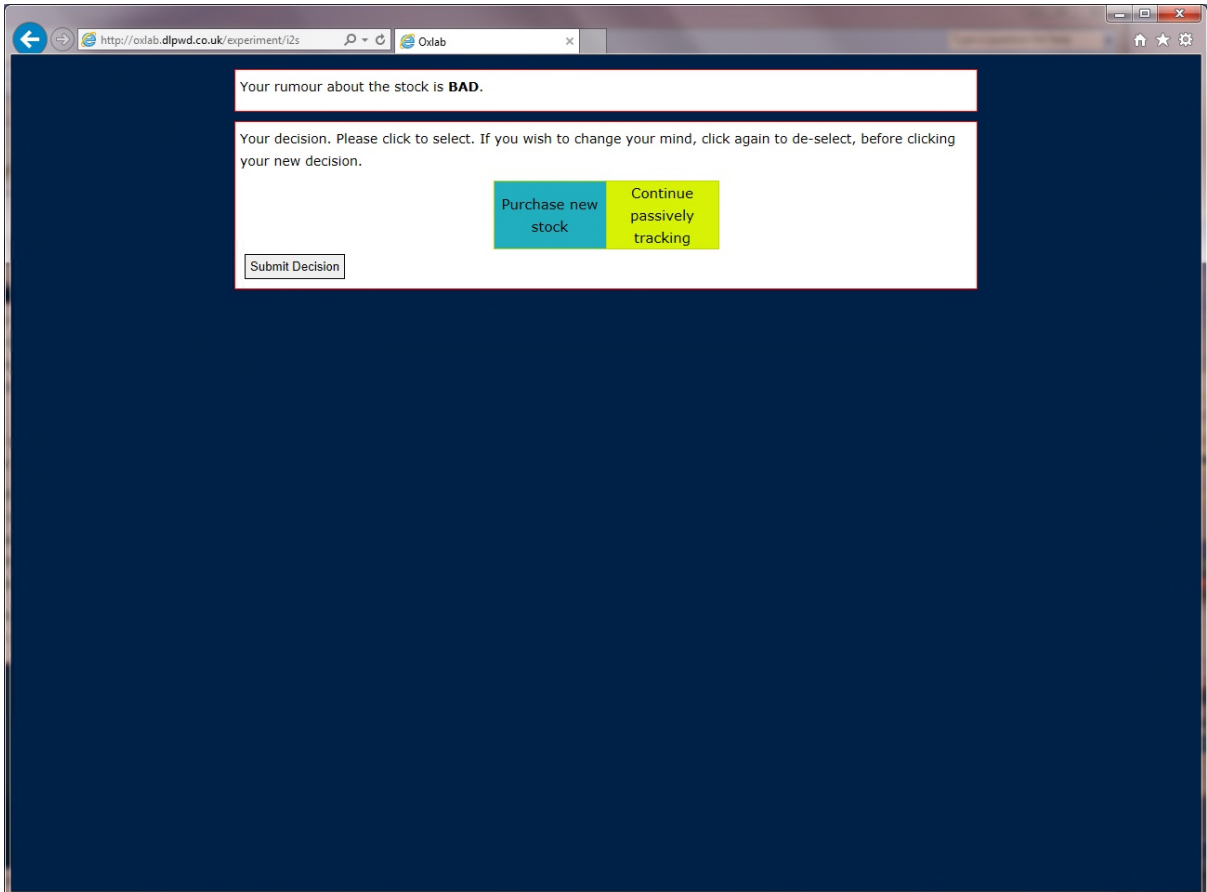
Your decision. Please click to select. If you wish to change your mind, click again to de-select, before clicking your new decision.

| Purchase new stock | Continue passively tracking |

Submit Decision

Thank you for submitting your decision. When you are ready to proceed to the next stage, please **click here**.

In this phase, you are given 10 different pairs of lotteries. For each pair, you must select which lottery to play. If you are selected to receive payment, then you will receive additional pay based on the choices you made. For example, in the first case, if you select lottery A, you have a 10% chance of being paid £2, and a 90% chance of being paid £1.60. You may wish to look at all the pairs before you start.

Lottery A: 10% £2.00 - 90% £1.60 **Lottery B:** 10% £3.85 - 90% £0.10

Play Lottery A   Play Lottery B

Lottery A: 20% £2.00 - 80% £1.60 **Lottery B:** 20% £3.85 - 80% £0.10

Play Lottery A   Play Lottery B

Lottery A: 30% £2.00 - 70% £1.60 **Lottery B:** 30% £3.85 - 70% £0.10

Play Lottery A   Play Lottery B

Lottery A: 40% £2.00 - 60% £1.60 **Lottery B:** 40% £3.85 - 60% £0.10

Play Lottery A   Play Lottery B

Lottery A: 50% £2.00 - 50% £1.60 **Lottery B:** 50% £3.85 - 50% £0.10

Play Lottery A   Play Lottery B

Lottery A: 60% £2.00 - 40% £1.60 **Lottery B:** 60% £3.85 - 40% £0.10

Play Lottery A   Play Lottery B

Lottery A: 50% £2.00 - 50% £1.60 **Lottery B:** 50% £3.85 - 50% £0.10

Play Lottery A   Play Lottery B

Lottery A: 60% £2.00 - 40% £1.60 **Lottery B:** 60% £3.85 - 40% £0.10

Play Lottery A   Play Lottery B

Lottery A: 70% £2.00 - 30% £1.60 **Lottery B:** 70% £3.85 - 30% £0.10

Play Lottery A   Play Lottery B

Lottery A: 80% £2.00 - 20% £1.60 **Lottery B:** 80% £3.85 - 20% £0.10

Play Lottery A   Play Lottery B

Lottery A: 90% £2.00 - 10% £1.60 **Lottery B:** 90% £3.85 - 10% £0.10

Play Lottery A   Play Lottery B

Lottery A: 100% £2.00 - 0% £1.60 **Lottery B:** 100% £3.85 - 0% £0.10

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Personality Questionnaire

Please answer the following questions.

The following statements concern your perception about yourself in a variety of situations. Your task is to indicate the strength of your agreement with each statement, utilizing a scale in which 1 denotes strong disagreement, 5 denotes strong agreement, and 2, 3, and 4 represent intermediate judgments. In the boxes after each statement, click a number from 1 to 5 from the following scale:

1. Strongly disagree

2. Disagree

3. Neither disagree nor agree

4. Agree

5. Strongly agree

There are no "right" or "wrong" answers, so select the number that most closely reflects you on each statement. Take your time and consider each statement carefully. You must respond to each question asked in order to proceed.

I see myself as someone who...

[- ▾]	1. ...Is talkative
[- ▾]	2. ...Tends to find fault with others
[- ▾]	3. ...Does a thorough job
[- ▾]	4. ...Is depressed, blue
[- ▾]	5. ...Is original, comes up with new ideas
[- ▾]	6. ...Is reserved
[- ▾]	7. ...Is helpful and unselfish with others
[- ▾]	8. ...Can be somewhat careless
[- ▾]	9. ...Is relaxed, handles stress well
[- ▾]	10. ...Is curious about many different things
[- ▾]	11. ...Is full of energy
[- ▾]	12. ...Starts quarrels with others
[- ▾]	13. ...Is a reliable worker
[- ▾]	14. ...Can be tense
[- ▾]	15. ...Is ingenious, a deep thinker
[- ▾]	16. ...Generates a lot of enthusiasm
[- ▾]	17. ...Has a forgiving nature
[- ▾]	18. ...Tends to be disorganized
[- ▾]	19. ...Worries a lot
[- ▾]	20. ...Has an active imagination
[- ▾]	21. ...Tends to be quiet
[- ▾]	22. ...Is generally trusting
[- ▾]	23. ...Tends to be lazy
[- ▾]	24. ...Is emotionally stable, not easily upset
[- ▾]	25. ...Is inventive
[- ▾]	26. ...Has an assertive personality
[- ▾]	27. ...Can be cold and aloof
[- ▾]	28. ...Perseveres until the task is finished
[- ▾]	29. ...Can be moody
[- ▾]	30. ...Values artistic, aesthetic experiences
[- ▾]	31. ...Is sometimes shy, inhibited
[- ▾]	32. ...Is considerate and kind to almost everyone
[- ▾]	33. ...Does things efficiently
[- ▾]	34. ...Remains calm in tense situations
[- ▾]	35. ...Prefers work that is routine
[- ▾]	36. ...Is outgoing, sociable
[- ▾]	37. ...Is sometimes rude to others
[- ▾]	38. ...Makes plans and follows through with them

- | 38. ...Makes plans and follows through with them
- | 39. ...Gets nervous easily
- | 40. ...Likes to reflect, play with ideas
- | 41. ...Has few artistic interests
- | 42. ...Likes to cooperate with others
- | 43. ...Is easily distracted
- | 44. ...Is sophisticated in art, music, or literature
- | 45. ...Is politically liberal

For each of the following questions, please select whether you agree or disagree with the statement (please you five point scale as above)

- | 46. I believe my success depends on ability rather than luck
- | 47. I dislike taking responsibility for making decisions
- | 48. I make decisions and move on
- | 49. I believe that unfortunate evens occur because of bad luck
- | 50. I like to take responsibility for making decisions
- | 51. I tend to take responsibility for making decisions
- | 52. I am always prepared
- | 53. I leave my belongings lying around
- | 54. I like order
- | 55. I shirk my duties
- | 56. I pay attention to details
- | 57. I am exacting in my work
- | 58. I like to follow a schedule
- | 59. I make a mess of things
- | 60. I often forget to put things in their proper place
- | 61. I get my chores done right away
- | 62. I have threatened people I know

- | 63. I sometimes feel like a powder keg ready to explode
- | 64. Once in a while, I can't control the urge to strike another person
- | 65. There are people that pushed me so far that we came to blows
- | 66. I often find myself myself disagreeing with people
- | 67. When people annoy me, I may tell them what I think of them
- | 68. I am sometimes eaten up with jealousy
- | 69. If I have to resort to violence to protect my rights, I will
- | 70. Given enough provocation, I may hit another person
- | 71. Other people always seem to get the breaks
- | 72. I can't help getting in to arguments when other people disagree with me
- | 73. I sometimes feel that people are laughing at me behind my back

- | 74. How would you define yourself?

[ ] 75. What do you think the 2014 percentage returns (positive or negative) will be for the Dow Jones

[ ] 76. What do you think the 2014 percentage returns (positive or negative) will be for the FTSE

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