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The abnormal psychology of investment performance ☆

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ABSTRACT

We examine a range of mental health characteristics (e.g. depression, paranoia, and schizophrenia) in subjects engaged in simulated investment trading, showing that certain abnormal personality characteristics have a statistically significant association with the degree of investment diversification, the return achieved, the degree of risk undertaken, and the resultant risk-adjusted performance. These financially educated individuals are more paranoid and psychopathically deviant than the average person, with high scores on these characteristics associated with greater risk-taking. Finally, male and female investors possess different mental health strengths and weaknesses in relation to their financial performance.

1. Introduction

For decades popular investment folklore has linked personality traits to both investing decisions and the ability to choose winners and losers. However, issues such as the link between personality and investment performance are largely unexplored areas in academic literature. In this paper we examine how *abnormal* personality traits are associated with investment performance. We derive our motivation to study abnormal personality traits from anecdotal reports of extreme behavior with institutional traders, e.g. substance abuse and sleep deprivation, which raises the question of whether abnormal behavior in general can be related to successful (or unsuccessful) investors. Unlike normal personality traits (such as extroversion), abnormal traits (such as depression) better describe the mental health characteristics of an individual. Therefore, this study directly examines the question of whether and how mental health characteristics are related to investment financial outcomes.[2]

The association between underlying pathological developments in personality and harmful social behaviors is well documented, such as pathological gambling (Roy, Custer, Lorenz, & Linnoila, 1989) and substance abuse (Tarter, 1988). However, whether abnormal personality traits are associated with beneficial or harmful *investment* decisions has not been studied. As such, this study uses Durand, Newby, and Sanghani (2008) and Durand, Newby, Peggs, and Siekierka (2010) as foundations, in that they study the link between Norman's Big Five dimensions of personality (i.e., negative emotions, extroversion, openness to experience, agreeableness and conscientiousness) and investor financial choices and investment performance. Unlike those studies, we explore individual traits and not an entire dimension of personality, where the latter is composed of many traits. We also focus exclusively on the abnormal dimension of personality, which encompasses the disruptive patterns of behavior that can negatively affect investment decisions. Our empirical investigation is also loosely related to the concepts elucidated by Gregory (2012), who descriptively examines the characteristics of "financial psychopaths" and how they can ruin lives by scamming individuals of their financial assets.

We first determine whether individuals who pursue a formal education in finance possess different mental health characteristics than the typical college student. Such an analysis can provide hints as to the personality and social behaviors of individuals who ultimately become professional investors or other finance oriented professionals. Second, we examine whether mental health characteristics are related to investment performance metrics, such as the degree of investment diversification, the investment return, the amount of realized risk, and the associated risk-adjusted return. As such, we examine both the importance of mental health and how mental pathology (or the lack thereof) relates to investment performance. Finally, we determine whether women and men differ significantly in terms of their respective mental health characteristics relative to their financial performance.

We find that individuals who pursue a formal education in *finance* possess a different abnormal personality profile than the average

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[2] When referring to personality characteristics, the terms "traits" and "factors" are used interchangeably. Similarly, the terms "abnormal personality" and "mental health" are commonly substituted for each other.

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college student. In particular, their levels of paranoia and psychopathic deviation are significantly above the college population mean levels. Additionally, we find that several abnormal personality factors are associated with the degree of portfolio diversification, as well as to the return, risk, and risk-adjusted return realized by these same individuals in their investment decisions. Consequently, our results show that mental health characteristics are related to both investment choices and financial performance.

Our results also show that the relation between mental pathology and investment performance is not uniform across all abnormal personality factors. In other words, mental pathology in most factors does not typically hinder investment performance. In fact, investors who exhibit mental pathology in several abnormal personality factors (i.e. factor scores above 8 on the personality test taken) significantly *outperform* investors with low or average levels of mental pathology in the overall risk-adjusted performance. We also find that men and women who are in our finance sample differ significantly from each other on certain aspects of abnormal personality, including psychopathic deviation and brooding discontent—areas in which men score significantly higher than women. Furthermore, we find that men and women exhibit both differences and similarities in the manner in which their mental health is related to their investment performance. Such differences reflect gender specific mental strengths and weaknesses. In other words, certain mental pathologies that affect male investor performance do not affect female investor performance, and vice versa. As such, our results substantiate that benefits exist to diversifying investment professionals across gender.

We add to the developing behavioral finance literature by being the first to demonstrate that mental health characteristics (i.e. abnormal personality traits) possess a statistically significant association with investment performance. Overall, our findings encourage the use of mental health assessment for personal introspection regarding finance professionals' performance. Given the negative impact of irrational investment decisions on financial markets and institutions, such information can be of particular interest to regulators and employers looking to promote more rational decision-making.

2. Portrayal of investor psychobiology in the literature

Investor decision-making and their ensuing financial performance is influenced by many psychological factors, including intelligence, the ability to make rational decisions, and personality traits. In particular, the ability to act rationally has received substantial coverage in the literature, mainly because rationality is a central assumption of even the most basic theoretical models in economics and finance. The extent that such models fail to describe market behavior is attributed by behavioral finance to a failure of investors to act rationally due to the expression of psychological biases that affect financial decision-making. In particular, investment biases are "affect heuristics" that result from human emotions, which are often at odds with human rationality. Among the most commonly described biases are overconfidence (Odean, 1999), self-attribution (Daniel, Hirshleifer, & Subrahmanyam, 1998), and the house-money effect (Thaler & Johnson, 1990). Shefrin (2000) notes that such investment biases are highly pervasive and systematic. Furthermore, such biases typically result in detrimental financial outcomes because they promote irrational financial choices such as too much trading and taking unnecessary risks (see Baker & Nofsinger, 2002 for a review of the literature on investment biases).

Alternatively, the errors in judgment associated with psychological biases should not be confused with personality traits, which are *habitual* patterns of behavior, thought and emotion. However, as with investment biases, personality traits are related to financial decision-making. Durand et al. (2008) show that several *normal* personality factors (such as extraversion, conscientiousness, and masculinity), are related to trading frequency and the proportion of shares invested in the market portfolio.[3] Additionally, Durand et al. (2008) show that investor personality is related to investment outcomes, including return, realized risk, and risk-adjusted return. One explanation for their results is that personality factors help to shape financial preferences, and thereby influence the ensuing investment performance. In a related paper, Durand et al. (2010) show that personality factors are related to two investment biases, namely the availability heuristic and the disposition effect. Consequently, these results suggest that investment biases are related to personality characteristics. Therefore, it is possible that personality factors influence investment performance by predisposing investors to committing financial judgment errors.

In addition to psychological factors, such as investment biases and personality traits, investor decision-making has biological underpinnings, including hormonal, genetic and neural correlates. For example, Coates and Herbert (2008) show that morning levels of the male sex hormone (testosterone) are predictive of daily profitability in male traders, whereas morning levels of the stress hormone (cortisol) are predictive of their afternoon return volatility. Similarly, Lo and Repin (2002) document significant changes in physiological variables, such as skin voltage and blood pressure, in traders during periods of heightened market volatility. Additional evidence of the role of investor biology in financial performance is provided by studies showing that medications and substance abuse alter financial risk-taking decisions. For example, Rogers, Lancaster, Wakeley, and Bhagwagar (2004) show that beta-blockers, which are commonly prescribed to treat high blood pressure, distort the perception of financial risk by decreasing the subjects' ability to discriminate between large and small financial losses during a gambling task. On the other hand, drugs of abuse, such as marijuana and alcohol, are associated with a persistent preference for risky financial choices (Lane, Tcheremissine, Lieving, Nouvion, & Cherek, 2005).

The latest developments in brain imaging and genetic sequencing have further enhanced our understanding of the biological antecedents of financial decision-making. For example, Kuhnen and Knutson (2005) show that the brain's limbic system, which is responsible for the regulation of reward, punishment and emotions, is differentially activated prior to pursuing risk-seeking and risk-averse financial choices. Additionally, this brain region is activated during impending irrational choices. Their findings demonstrate that risk preferences and irrational financial decision-making have neural antecedents. Similarly, Kuhnen and Chiao (2009) show that individuals with a certain genetic marker take greater financial risk in an investment task and have a greater susceptibility to the "framing investment bias" than do individuals without this genetic marker. Thus, their results show that financial risk-taking and investment biases also possess a genetic antecedent.

Overall, investor decision-making and the ensuing investment performance is the result of the combined influence of psychological and biological factors. In fact, advances in behavioral neuroscience demonstrate that such factors are interrelated. For example, Cohen, Young, Baek, Kessler, and Ranganath (2005) show that the personality factor of extroversion has a genetic marker, and that extroversion scores are associated with activation of the brain's limbic system, which regulates emotions. Similarly, the personality factor of neuroticism, which is characterized by risk-aversion, is associated with a chronic activation of the loss-avoidance component of the limbic system (Flory, Manuck, Matthews, & Muldoon, 2004), and has a genetic marker (Arnold, Zai, & Richter, 2004). On the other hand, acute activation of the loss-avoidance system leads to experiencing anxiety (Bechara, Damasio, & Damasio, 2000), fears of disappointment and regret (De Martino, Kumaran, Holt, & Dolan, 2009), and disgust, pain and loss (Wright, He, Shapira, Goodman, & Liu, 2004). These findings are consistent with

[3] There are two major dimensions of personality: a normal dimension and an abnormal dimension. The normal dimension of personality describes human temperament and characteristics that are unrelated to mental health, such as extroversion, agreeableness, etc. The abnormal dimension of personality describes human traits that are related to mental disorders, such as paranoia, schizophrenia, etc.