

The relationship between psychopathy and financial risk and time preferences

Psychopathy
and financial
risk

Corey A. Shank

Dalton State College School of Business, Dalton, Georgia, USA

Brice Dupoyet

*College of Business Administration, Florida International University,
Miami, Florida, USA*

Robert Durand

School of Economics, Finance and Property, Curtin University, Perth, Australia, and

Fernando Patterson

School of Business, North Carolina Central University, Durham, North Carolina, USA

Received 5 November 2019
Revised 6 March 2020
1 May 2020
8 May 2020
Accepted 11 May 2020

Abstract

Purpose – The purpose of this paper is to examine the relationship between psychopathy and its underlying traits and financial risk and time preferences.

Design/methodology/approach – The authors measure risk and time preferences using both the cumulative prospect theory and quasi-hyperbolic time discounting in a sample of business majors. The Psychopathic Personality Inventory – Revised test is then used to measure the global psychopathy and eight primary and two secondary traits of the sample of business majors. The measures of psychopathy are used as explanatory variables to model variation in subjects' time and risk preferences.

Findings – The authors find that the overall score on the continuum of psychopathy is positively related to the linearity of the cumulative prospective utility function. A breakdown of psychopathy into its secondary and primary traits shows a more complex relation. For example, the secondary trait of self-centered impulsivity is statistically significant in models of financial risk preference determinants under the cumulative prospect theory. The authors find that the primary traits of self-centered impulsivity and stress immunity are related to a higher time preference discount rate under quasi-hyperbolic time preferences.

Originality/value – This paper adds to the literature on personality and financial decisions and highlights the importance of psychopathy in finance.

Keywords Loss aversion, Time preferences, Risk preferences, Financial psychopath, Present bias

Paper type Research paper

1. Introduction

Psychopaths make up about 1% of the general population (Hare, 1991). However, up to 4% of finance and economics professionals are clinically diagnosed psychopaths (Babiak and Hare,

JEL classification – A12, D03, G02, G11

A previous version of this paper was circulated under the title “Psychopathic Traits and Financial Risk Preferences.” We thank Danika Wright, Ayesha Scott, seminar attendees at Curtin University, University of Wisconsin Eau Claire, University of North Carolina A&T, attendees at the Academy of Behavioral Finance and Economics 2016 conference and the New Zealand Finance Meeting 2018, the anonymous reviewers, and the editor Niklas Wagner for their helpful comments.



2006). Christopher Bayer, a notable psychologist who specializes in Wall Street professionals, argues that the number of psychopaths working on Wall Street is closer to 10% (DeCovny, 2012). Robert Hare, a leading researcher in psychopathy, states that: “If [he] wasn’t studying psychopaths in prison, [he’d] do it at the stock exchange” (Babiak and Hare, 2006). Additional *prima facie* evidence of the high prevalence of psychopathy in the finance/economics professions comes from criminology and legal studies of ponzi schemes, embezzlement, insider trading and other white-collar crimes. For example, research shows that white-collar criminals score significantly higher on psychopathy tests than non-white-collar criminals (Ragatz *et al.*, 2012) [1].

The term “corporate/financial psychopath” has been used to describe individuals working in business or finance who have a questionable conscience, and are willing to lie, manipulate others and be ruthless to gain a financial advantage. For example, Boddy (2015) claims that many senior employees of Enron, including its CEO, exhibited traits of the stereotypical psychopath, which is consistent with the rampant white-collar criminality that led to the collapse of the corporation. Previously, Boddy *et al.* (2010) showed that corporate psychopaths have a significantly negative influence on the value of corporations. Additionally, Babiak *et al.* (2010) show that while financial psychopaths can rate well in creativity, strategic thinking and communication skills, they tend to rate poorly in cooperation, management skills and overall accomplishments.

The findings in this paper show that the psychopathy trait plays an important role in financial decision-making. Our results add to the growing literature that personality traits (in our case, abnormal traits) drive many investment choices (Chitra and Sreedevi, 2011; Conlin *et al.*, 2015), stock market performance (Durand *et al.*, 2008), the disposition effect (Durand *et al.*, 2013a), overconfidence (Durand *et al.*, 2013b), risk aversion (Filbeck *et al.*, 2005), loss aversion (Durand *et al.*, 2019), trading behavior (Durand *et al.*, 2008; Durand *et al.*, 2013a; Tauni *et al.*, 2017; Oehler *et al.*, 2018; Oehler *et al.*, 2019), risk tolerance (Wong and Carducci, 2016) and financial delinquency (Parise and Peijnenburg, 2017). In focusing only on psychopathic traits in the current analysis, we leave the question of how other psychological models might relate to the variables modeled in this paper for future research.

Given the high prevalence of clinical psychopaths in the financial industry, it is imperative to examine the association between psychopathic traits and financial decision-making. Psychopathy has been implicated in a wide range of *social* risk reward decisions. However, its role in *financial* decisions is poorly understood [2]. This paper demonstrates that psychopathic personality factors have a significant influence on financial decisions. Specifically, we measure the financial risk and time preferences of 118 subjects using two prominent behavioral models of investor preferences: cumulative prospect theory (CPT) and quasi-hyperbolic time discounting (QTD). We then use data on the psychopathy trait and its primary and secondary traits measured for our subjects to examine if these behavioral features are associated with their preferences. We find that financial risk and time preferences have statistically significant associations with overall (global) psychopathy trait and its primary and secondary traits. We also find that higher levels of the psychopathy trait, self-centered impulsivity and rebellious nonconformity are associated with more rational risk preferences in the form of more linear utility functions and lower levels of risk aversion. Furthermore, self-centered impulsivity and carefree nonplanfulness are negatively related to rational decision-making in a discounting rate time preference sense, as individuals with high scores on self-centered impulsivity have significant difficulties delaying gratification, and higher scores of carefree nonplanfulness are associated with the present bias.

Our study is, to our knowledge, one of the first to examine the role of psychopathy on financial choices in greater depth than previously done, by examining the role of its various components. Generally, however, studies examining the role of psychopathy in social decision making and behavior use the umbrella (global) psychopathy trait and a sample of incarcerated

individuals. The use of an incarcerated sample creates severe limitations in this line of research, including cohesion and survivorship bias. We avoid these drawbacks by using a sample of business students, which is potentially more representative of the population of finance professionals.

The rest of this paper is organized as follows. Section 2 reviews the literature on psychopathy and decision-making. Section 3 describes the design of the study. The results are reported in Section 4, and Section 5 concludes the study.

2. Overview of the literature

2.1 Portrait of the “financial psychopath” in the literature

Research examining the behavior of financial economists versus non-financial economists in financial decision-making shows that financial economists often engage in greater antisocial behaviors than their counterparts [3]. For example, financial economists are more likely than non-financial economists to free ride and not contribute toward the public good (Marwell and Ames, 1981), to give less to charity (Frank *et al.*, 1993), to care less about fairness (Carter and Irons, 1991), to engage in greedy behavior (Long *et al.*, 2011) and to be more willing to bribe an official for personal gain (Frank and Schulze, 2000). Gandal *et al.* (2005) explain this antisocial behavior by finding that individuals who are exposed to the self-interest model place more value on achievement and less value on the welfare of others compared to individuals who have not been exposed to the self-interest model [4].

“In mainstream psychology, antisocial personality disorder has been referred to as psychopathy” (DSM-5, p. 659). Shank (2018) finds that business majors are more psychopathic than non-business majors. Similarly, Kowalski *et al.* (2017) find that narcissism and psychopathy are traits related to individuals pursuing business careers, while Vedel and Thomsen (2017) find that business students have higher scores of narcissism, Machiavellianism and psychopathy compared to psychology, law and political science students. This paper expands the related literature by examining whether finance majors score significantly differently on the various psychopathy sub-traits than other majors.

Schneider and Prasso (2002) show that top business schools deteriorate the morals of their MBA students. As students progress through their program, students change their views of what the priority of a company should be. At the start of the program, students emphasize satisfying customers; in the end, they focus more on maximizing shareholder value. Richards *et al.* (2002) suggest that the business curriculum may cause unethical behavior. Others argue that the social environment of the business school may shape individuals’ values and behavior differently for students with different majors (Sims and Keon, 1999, 2000). In fact, Cohn *et al.* (2014) argue that the culture in the financial industry could cause psychopathic behavior.

2.2 Psychopathy and financial risk preferences

Research shows that psychopaths display greater risk-taking behavior than non-psychopaths in an economic setting using the Iowa gambling task (Blair *et al.*, 2001; Mitchell *et al.*, 2002). Additionally, Jones (2014) finds that the gambling behavior of psychopaths is more likely to incorporate biases that are associated with detrimental outcomes. Incarcerated psychopaths also display significantly lower levels of loss aversion in a lottery type of task, even to their detriment (Newman *et al.*, 1987). Gambling tasks (such as the Iowa gambling task), however, may only focus on one specific area of behavioral finance, such as lottery-seeking. It may not allow for conclusions to be drawn about more general aspects of behaviorally driven decision-making, such as the prospect theory (a focus of the subsequent analyses) where the asymmetry between expected gains and losses has a much more

general application to financial decision-making. Additionally, the results using an incarcerated sample may not be applicable to finance professionals in general. We contribute to the literature in two ways. First, we use arguably better measures of financial risk-taking (discussed in Section 3.2) to understand decision-making than lottery tasks or the Iowa gambling task. Lottery tasks fail to examine loss aversion or time preferences, and the Iowa gambling task is a learning task designed to investigate the function of the orbitofrontal cortex. Second, we consider the sub-traits that make up the umbrella term of psychopathy (discussed in Section 3.3).

Rebellious nonconformity, Machiavellian egocentricity and stress immunity are among the best understood primary traits of psychopathy. In general, the literature indicates that rebellious nonconformity has a positive relationship with social risk-taking. For example, [Edens et al. \(2008\)](#), among others, find that rebellious nonconformity is positively related to the number of infractions committed by inmates. Alternatively, research shows that stress immunity has a negative relation with risk-taking. That is, individuals who are less stressed exhibit lower levels of loss aversion ([Kandasamy et al., 2014](#); [Schulkin et al., 1994](#); [Nofsinger et al., 2018](#)) and exhibit fewer investment biases ([Nofsinger et al., 2020](#)). [Shank \(2018\)](#) finds that Machiavellian egocentricity, rebellious nonconformity, stress immunity as well as second-order traits of self-centered impulsivity, fearless dominance and overall psychopathy levels are related to deceiving others for financial gain [5].

Moreover, research shows that narcissism, which is related to Machiavellian egocentricity, makes individuals more overconfident, regardless of whether they turn out to be right or wrong ([Campbell et al., 2004](#)). Narcissism also increases gambling frequency and monetary expenditures ([Lakey et al., 2008](#)) and increases risk-taking in the Iowa gambling task ([Brunell and Buelow, 2017](#)). Finally, self-centered impulsivity (SCI) is linked to sensation-seeking and social risk-taking ([Edens et al., 2008](#); [Uzieblo et al., 2007](#)). However, most of these studies look at social risk-taking rather than financial risk-taking. Therefore, we examine the impact of psychopathic sub-traits (see Subsection 3.3 for a more detailed explanation) in a financial setting and expect many psychopathic underlying traits to be related to loss aversion, diminishing curvature and distortion of probability [6].

Medical research shows that clinically diagnosed psychopaths have unique neurological differences. Notably, psychopaths have structural (i.e. anatomical) and functional (i.e. physiological) differences in the amygdala and prefrontal cortex – areas responsible for regulating emotions, financial decision-making, fear, stress resilience, pleasure, monetary reward-seeking behavior and higher cognitive functions ([Kiehl et al., 2001](#); [Blair, 2007](#); [Blair, 2008](#); [Glenn et al., 2009](#); [Yang et al., 2009](#)). Furthermore, amygdala hypoactivity results in a reduction of loss aversion during financial tasks ([Bechara et al., 1999](#); [De Martino et al., 2010](#); [Sokol-Hessner et al., 2012](#); [Weber et al., 2007](#)) [7]. Overall, these studies provide a biological explanation for the unique decisions made by psychopaths and a foundation for our hypothesis that psychopathic traits are related to financial decision-making.

2.3 Psychopathy and financial time preferences

[Edens and McDermott \(2010\)](#) use the Barratt Impulsivity Scale and find that inmates with high overall psychopathy and high SCI scores (consisting of carefree nonplanfulness, impulsive nonconformity, Machiavellian egocentricity and blame externalization) exhibit higher levels of impulsivity than the average inmate population. Additionally, [Newman et al. \(1992\)](#) find that inmates with clinically high psychopathy scores are less likely to delay gratification [8]. Additionally, [Jones and Paulhus \(2011\)](#) find that overall psychopathy is linked to dysfunctional impulsivity, which suggests that psychopaths' impulsivity stems from poor self-regulation. Moreover, [Lapierre et al. \(1995\)](#) find that psychopaths have a

structural deficit in the orbitofrontal-ventromedial, which may explain their impulsive behavior. From these studies, we expect psychopathic traits to be significantly related to financial time preferences consistent with being impatient and impulsive.

3. Method

3.1 Participants

To create a sample of individuals who have been exposed to the self-interest model of economics, we recruit subjects from upper-level undergraduate finance and economics courses required for all business majors. With Institutional Review Board (IRB) and instructor approval, a total of 135 individuals were recruited and took part in the study. The participants were offered a small amount of bonus points toward their course grade as an incentive to participate in this study. [Luccasen and Thomas \(2014\)](#) find that no significant difference in outcomes can be detected in experiments using class credit versus monetary incentives.

To receive credit, the participants had to complete three questionnaires. First, the Psychopathic Personality Inventory – Revised (PPI-R) test is used to measure eight primary psychopathic traits, two secondary psychopathic traits and a global psychopathy trait ([Lilienfeld et al., 2005](#)) [9]. The PPI-R is equipped with two validity scales that detect whether subjects display defensiveness, malingering, careless or random responding. Second, we use the dynamic experiments for estimating preferences (DEEP) methodology ([Toubia et al., 2013](#)) to measure three types of financial risk preferences and two types of financial time preferences [10]. DEEP has been used in previous experimental research, such as [Nofsinger and Shank \(2018\)](#) and [Patterson and Shank \(2020\)](#). At the beginning of the DEEP risk and time surveys, the subjects are given instructions about the tasks and are asked to answer a few simple questions to ensure that they understand the various aspects of the study and topics such as probabilities and the time value of money. Third, the participants completed a demographic survey. Overall, seven participants were disqualified due to invalid responses in the PPI-R survey, and ten participants were disqualified for failing to fill out the required demographics questionnaire (third questionnaire).

[Table 1](#) summarizes the characteristics of the sample. The sample is composed of 118 subjects, with 51 males (43%) and 67 females (57%). The median age of all participants is 22.7 years, with a standard deviation of 5.2 years. Additionally, 32 of the 118 (27%) subjects are finance majors, with 16 being male and 16 being female.

The sample size of 118 subjects is consistent with previous papers in the experimental finance literature. By way of comparison, other papers examining the impact of personality traits on financial decisions, [Durand et al. \(2008\)](#) use 18 subjects, [Durand et al. \(2013a, 2013b\)](#) use 115 subjects, [Durand et al. \(2013a, 2013b\)](#) use 61 subjects, [Durand et al. \(2019\)](#) use 128

Total	Male	Female			
118	51	67			
Mean	Age				
	24.6				
Median	22.7				
Accounting	Finance	Information systems	Management	Marketing	
28	32	9	39	10	

Table 1.
Subject sample
statistics

Note: This table reports the subjects' sample statistics of gender, age and academic major

subjects and [Filbeck et al. \(2005\)](#) use 68 subjects. As such, we view that our sample of 118 subjects provides us with a reasonable sample size to examine our research question of how psychopathic personality traits relate to financial decision-making. We accept, however, that as with any experiment, it would always have been helpful to work with an even larger sample.

3.2 Measuring financial risk and time preferences

Economics often uses mathematical functions to represent people's preferences. DEEP captures risk and time preferences by dynamically adjusting the series of questions presented to each subject while using data about the distribution of the parameters. Preferences are elicited by finding the convergence on the simulations of two influential models of people's financial choices: CPT and QTD models.

CPT has the following main features: a value function defined on gains and losses explaining how sensitive individuals are to changes in wealth (instead of total wealth), a loss-aversion feature reflecting how sensitive individuals are to losses and gains of the same amount and probability weightings considering how individuals tend to weigh probabilities in a nonlinear fashion, largely near certainty. These parameters are captured by giving the subject a series of pairs of gambles, defined by $\{x, p; y\}$ where the outcome of the gamble is equal to x with a probability p and equal to y with a probability $1-p$. These parameters extract the distortion of probabilities (α), the curvature of the value function (σ) and the degree of loss aversion (λ). A truncated normal distribution is used to ensure that the parameters stay within an acceptable range. We, thus, impose $\alpha \in [0.05, 2]$, $\sigma \in [0.05, 2]$ and $\lambda \in [0, 10]$ following [Toubia et al. \(2013\)](#). The utility or value of a gamble can, therefore, be denoted by $U(x, p, y, \alpha, \sigma, \lambda)$ and is equal to:

$$U(x, p, y, \alpha, \sigma, \lambda) = \begin{cases} v(y, \sigma) + \pi(p, \alpha)(v(x, \sigma) - v(y, \sigma)) & \text{if } x > y > 0 \text{ or if } x < y < 0 \\ \pi(p, \alpha)v(x, \sigma) + \pi(1-p, \alpha)v(y, \sigma) & \text{if } x < 0 < y \end{cases}$$

where

$$v(x, \sigma) = \begin{cases} x^\sigma & \text{for } x > 0 \\ -\lambda(-x)^\sigma & \text{for } x < 0 \end{cases}$$

and where $\pi(p, \alpha) = \exp[-(-\ln p)^\alpha]$

When x and y have the same sign, $v(y, \sigma)$ acts as the value reference point, $\pi(p, \alpha)$ is how much the individual weights the probability p and $v(x, \sigma) - v(y, \sigma)$ is the utility of the gamble. When $x < 0 < y$, the term $\pi(p, \alpha)v(x, \sigma) + \pi(1-p, \alpha)v(y, \sigma)$ represents the perceived weighted average of the loss and the gain. The parameters are elicited by asking subjects a series of choices between pairs of gamble where the decisions are indexed by i ($i = 1, \dots, J$), whereby w_i denotes the vector of decisions for subject i : $w_i = [\alpha_i, \sigma_i, \lambda_i]$. Questions are indexed by j ($j = 1, \dots, J$), where question j for subject i entails choosing between gamble $X_{ij}^A = \{x_{ij}^A, p_{ij}^A, y_{ij}^A\}$ and gamble $X_{ij}^B = \{x_{ij}^B, p_{ij}^B, y_{ij}^B\}$. A value of α that is lower (higher) than 1 reduces (increases) the weight of the probability p . When α is exactly equal to 1, the probability p remains unchanged. Additionally, a σ value of 1 yields a linear utility function, while values greater than 1 imply more curvature in the value function and values less than 1, and vice versa. Finally, higher values of λ capture higher levels of loss aversion.

In the time preference survey, the subjects are presented with two situations where they must choose between a smaller but nearer reward and a larger reward at a later date. The decision task is written as $\{x, t\}$ where the reward x is received in t periods (i.e. days). The model can then be written as $U(x, t) = v(x)d(t)$, where v is the utility gained from reward x , and d is the discount function. The time preference model used is a quasi-hyperbolic discount function (Phelps and Pollak, 1968; Laibson, 1997; Angeletos *et al.*, 2001; Frederick *et al.*, 2002; Benhabib *et al.*, 2010).

The quasi-hyperbolic time discount model used follows Benhabib *et al.* (2010), Laibson (1997) and Phelps and Pollak (1968):

$$U(x, t, \beta, r) = xd(t, \beta, r)$$

where

$$d(t, \beta, r) = \begin{cases} 1 & \text{for } t = 0 \\ \beta \exp(-rt) & \text{for } t > 0 \end{cases}$$

The discount function using r as a discount rate shows a discontinuous drop at $t = 1$ when $\beta < 1$. This shows an overweighted value at time $t = 0$ compared to a future time $t > 0$. This phenomenon is called the present bias (O'Donoghue and Rabin, 1999). The parameters of the quasi-hyperbolic time discount model are $w_i = [\beta_i, r_i]$ where subject i must make decisions for a series of choices between a pair of delayed payments and where the delay of immediate payment is zero. Question j for respondent i involves a decision between $X_{ij}^A = \{x_{ij}^A, t_{ij}^A\}$ and $X_{ij}^B = \{x_{ij}^B, t_{ij}^B\}$. A lower β value demonstrates a stronger present bias, while a higher r value reveals a higher daily discounting rate. As in CPT, we follow Toubia *et al.* (2013) and use a truncated normal distribution to keep parameters within an acceptable range for QTD: we impose $\beta \in [0, 2]$ and $r \in [0, 0.05]$.

3.3 Measuring psychopathic traits

The PPI-R test is one of the most widely used instruments to break down the umbrella psychopathic personality profile into eight distinct primary subcategories and two distinct secondary subcategories (Lilienfeld *et al.*, 2005). For example, the personality trait of psychopathy can be characterized by more than just one item (i.e. the eight primary traits). As such, a true psychopath will exhibit high tendencies to behave according to all of the descriptions of the primary traits. Furthermore, principal component analysis finds that seven of the eight primary traits (excluding cold-heartedness) can be factored into two secondary traits after orthogonalizing the data. Some people are more likely to behave following the four traits that factor on the SCI, while others may be more likely to exhibit the three traits that factor into fearless dominance.

Table 2 provides a detailed description of the various PPI-R traits and the test validity measures. Raw test scores are standardized to account for differences in age and gender following the PPI-R guidelines. In the general population, every factor has a mean score of 50 and a standard deviation of 10. Standard scores of 65 or above are significantly above the mean and are classified as “clinically high” [11].

4. Results

Table 3 presents the summary statistics for the psychopathic traits and DEEP measures. Panel A shows that our sample is near the average of 50 for the overall psychopathy trait.

Scale	Construct descriptions
<i>Panel A: psychopathy (global)</i>	
P Psychopathy (SCI + FD + C)	The greater the probability that the respondent matches the features of the prototypical psychopathic individual, such as guiltlessness, callousness, dishonesty, manipulativeness, superficial charm, egocentricity, risk-taking and poor impulsive control
<i>Panel B: secondary traits</i>	
SCI Self-centered impulsivity (ME + RN + BE + CN)	Tendency toward self-centeredness, ruthless use of others, brazen flouting of traditional values, propensity to attribute blame to others for one's mistakes and reckless impulsivity
FD Fearless dominance (SOI + F + STI)	Lack of anticipatory social and physical anxiety, low levels of tension and worry, low harm avoidance and high levels of interpersonal dominance
<i>Panel C: primary traits</i>	
ME Machiavellian egocentricity	Narcissistic and ruthless attitudes in interpersonal functioning
RN Rebellious nonconformity	Reckless lack of concern regarding social norms
BE Blame externalization	Tendency to blame others for one's problems and to rationalize one's misbehavior
CN Carefree nonplanfulness	Attitude of indifference in planning one's actions
SOI Social influence	Perceived ability to influence and manipulate others
F Fearlessness	Absence of anticipatory anxiety concerning harm and willingness to participate in risky activities
STI Stress immunity	Absence of marked reactions to anxiety-provoking events
C Cold-heartedness	Propensity toward callousness, guiltlessness and lack of sentimentality
<i>Panel D: validity scales</i>	
VR Virtuous responding	Positive impression management
DR Deviant responding	Tendency to admit bizarre symptoms not indicative of known psychopathy
Note: This table displays the descriptions of the psychopathic dimensions described in the PPI-R (Lilienfeld <i>et al.</i> , 2005)	

Table 2.
Description of
psychopathy
measures

However, the sample scores lower than the population mean on SCI and higher on fearless dominance, demonstrating that merely looking at the umbrella trait of global psychopathy does not paint the entire picture. Additionally, the minimum and maximum show a large variance within our sample. The final column shows an about normal number of subjects scoring in the clinical range for all traits, except for carefree nonplanfulness.

The sample size of clinical subjects is small (less than 10% of the overall sample), making it difficult to validly examine if psychopaths make different financial decisions than individuals with normal psychopathic trait scores. Furthermore, this type of examination also may not produce accurate results as a subject with standardized scores of 60–64 are just shy of being classified as clinical but may behave much more similarly to subjects who score in the clinical category compared to subjects with standardized scores near 40. Therefore, we view using the continuum of each trait as the best way to answer the research question of how psychopathic traits relate to financial decision-making. Thus, our research question is looking more at how psychopathic traits relate to financial decision-making and less at the difference between financial decisions between psychopaths versus non-psychopaths.

	Mean	SD	Min	Max	Clinical subjects	Psychopathy and financial risk
<i>Panel A: summary statistics of psychopathic traits</i>						
Psychopathy	50.01	9.04	23	79	7	<hr/>
SCI	47.69	9.16	24	69	4	
Fearless dominance	52.10	9.88	28	80	10	
Machiavellian egocentricity	49.24	10.01	29	78	10	
Rebellious nonconformity	51.61	9.28	30	75	10	
Blame externalization	49.74	10.13	30	84	9	
Carefree nonplanfulness	42.06	8.47	26	65	1	
Social influence	51.51	10.41	25	72	14	
Fearlessness	49.83	8.98	31	70	8	
Stress immunity	53.68	10.19	29	78	17	
Cold-heartedness	52.74	11.14	31	85	20	
<i>Panel B: summary statistics of DEEP measures</i>						
Lack of probability distortion (α)	0.635	0.223	0.122	1.083		
Diminishing curvature (σ)	0.556	0.204	0.196	1.182		
Loss aversion (λ)	0.903	0.432	0.109	1.771		
Discount function (β)	0.885	0.333	0.0226	1.568		
Discounting rate (r)	0.011	0.007	0.001	0.024		

Notes: This table displays the mean, standard deviation (SD), minimum (MIN) and maximum (MAX) of the psychopathic traits (Panel A) and DEEP measures (Panel B). Additionally, Panel A displays the number of subjects who are clinically high for each trait (standardized score ≥ 65)

Table 3.
Summary statistics
of variables

However, we do believe that our results can be used to draw possible conclusions about psychopaths vs non psychopaths. To use an analogy to the five factors, all people can be summarized using the metric of *conscientiousness*, but a relatively smaller proportion of people could be accurately described as being conscientious. In our study, as the trait increases (decreases), the phenomena with which they have a significant correlation also change. Our findings allow us to predict how people with different scores, including those in the clinical range, will behave. Finally, Panel B displays the DEEP measures and shows similar mean and standard deviation as compared to [Toubia et al. \(2013\)](#) and shows a large variance from our measures.

[Table 4](#) presents the correlation matrix of the psychopathy variables used in the analysis. These correlations are consistent with those of the original instrument, and thereby the population. [Durand et al. \(2013a, p. 121, endnote 15\)](#) discuss the correlations of the traits they examine and use this to justify their use of a stepwise methodology; we will discuss and develop this issue below.

[Table 5](#) presents the relationship between psychopathic traits and financial risk preferences obtained using ordinary least squares (OLS) regressions. Each column of [Table 5](#) shows a regression analyzing a parameter of CPT (α , σ , λ) or QTD (β , r), and each row presents estimated coefficients for the global psychopathy trait, its primary or its secondary traits (with the associated *t*-statistics in brackets beneath). Global psychopathy is a linear combination of the secondary traits and cold-heartedness, and the secondary traits are linear combinations of the seven primary traits (cold-heartedness does not factor into either).

We include the variables of age and gender as the literature shows that they can have an impact on financial decision-making ([Barber and Odean, 2001](#); [Byrnes et al., 1999](#); [Dwyer et al., 2002](#); [Van den Bos et al., 2009](#); [Charness and Gneezy, 2012](#)). We also include

SEF

	ME	RN	BE	CN	SOI	F	STI	C	SCI	FD
RN	0.38									
BE	0.27	0.35								
CN	0.34	0.11	0.29							
SOI	0.14	0.02	-0.35	-0.28						
F	0.26	0.46	0.15	0.00	0.16					
STI	-0.12	-0.20	-0.51	-0.31	0.49	0.11				
C	0.35	0.19	-0.02	0.26	0.09	0.22	0.27			
SCI	0.76	0.68	0.70	0.59	-0.15	0.33	-0.41	0.28		
FD	0.14	0.12	-0.34	-0.28	0.81	0.57	0.73	0.26	-0.11	
P	0.70	0.58	0.28	0.30	0.41	0.63	0.23	0.58	0.70	0.60

Notes: This table shows the correlation coefficients between the eight primary, two secondary and global psychopathy dimensions for the sample ($N = 118$). The psychopathic dimensions are Machiavellian egocentricity (ME), rebellious nonconformity (RN), blame externalization (BE), carefree nonplanfulness (CN), social influence (SOI), fearlessness (F), stress immunity (STI), cold-heartedness (C), self-centered impulsivity (SCI), fearless dominance (FD) and global psychopathy (P). Table 2 provides descriptions of these factors

Table 4.
Correlation of
psychopathy
variables

a dummy variable identifying whether the subject is a finance major, as a greater knowledge of finance may make the subject gravitate toward different financial decisions. Following Durand *et al.* (2008, 2013a, 2013b, 2019), we focus on analyses derived from backward stepwise regressions to examine the impact of psychopathic traits and financial decision-making [12]. Durand *et al.* (2013a, p. 121, endnote 15) argue that a stepwise procedure is optimal because of the correlation of the traits in the sample they study as certain “packages” are more prevalent in the group. A point that Durand *et al.* (2008, 2013a, 2013b, 2019) perhaps should have highlighted is that sample sizes available to researchers where financial decisions are modeled using personality traits (such as the facets of psychopathy used in this paper) are much lower than those available to researchers modeling such decisions using archival data. Accordingly, the signal-to-noise ratio in these studies represents a considerable hurdle. The stepwise procedure is, therefore, a potentially useful tool that allows researchers to understand the phenomena of interest.

Table 5 shows that the global trait of psychopathy is significantly related to having a more linear cumulative prospective utility function with a coefficient of 0.0042 at the 5% level, implying that psychopaths need to take less risk to gain the same level of utility as normal scoring individuals.

The secondary trait of SCI is statistically significant in two of the three models of financial risk preferences presented in Table 5. SCI is negatively related to α , showing that individuals high in this trait do not overweigh high probabilities. As found for the global trait of psychopathy, SCI is positively related to diminishing curvature (σ), showing that the finding for the global trait is driven by the subjects’ scores on this secondary trait.

Consideration of the primary traits of psychopathy helps us gain a deeper understanding of why the global psychopathy trait and the second trait of SCI are associated with the diminishing curvature (σ), as well as why SCI is associated with probability distortion (α). The primary trait of rebellious nonconformity, a component of the secondary trait of SCI – and through this, the global psychopathy trait, is positively related to having a more linear utility function with a coefficient of 0.0046 at the 1% level while being inversely related to loss aversion with a coefficient of -0.01 at the 5% level. As Shiv *et al.* (2005) show that

	Lack of probability distortion (α)	Diminishing curvature (σ)	Loss aversion (λ)	Discount function (β)	Discounting rate (r)
Psychopathy					
SCI	-0.0043* (-1.925)	0.0042** (2.046)			0.0001* (1.691)
Rebellious nonconformity		0.0042** (2.213)	-0.0100** (-2.548)		
Blame externalization	-0.0041** (-2.065)		0.0046*** (2.609)		
Carefree nonplianthood				-0.0081** (-2.142)	
Male	0.031	0.035	0.046	0.042	0.0025** (2.059)
R^2	0.023	0.027	0.038	0.034	0.047
Adjusted R^2					0.031

Notes: This table reports the regression results where the dependent variable is one of the financial risk or time preferences and the independent variables are the psychopathic measures using the entire sample ($n = 118$). The natural log of all psychopathic traits has been taken to account for nonlinearity of the data. A description of these traits is presented in [Table 2](#). Male is a variable taking the value of 1 if the subject is male, and 0 if the subject is female. T -statistics are listed in parentheses with significance shown at the 10% (*), 5% (**), 1% (***) levels

Table 5.
Psychopathic traits
and financial risk
and time preferences

individuals who are more averse to loss earn less money than individuals who are not, our results suggest that investors with higher scores of SCI and rebellious nonconformity may earn higher returns. Therefore, our results show that higher scores on some psychopathic traits are beneficial in financial decision-making.

Furthermore, the final two columns of Table 5 report regression results where the dependent variables capture one of the two financial time preference parameters: the discount function (β) and the discounting rate (r). We find that carefree nonplanfulness has a negative and statistically significant relationship with the discount function at the 5% level. That is, higher scores on this trait are associated with a stronger present bias. The ability to control or suppress the present bias, as is the ability to manage other investment biases, is related to making rational financial decisions (Moffitt *et al.*, 2011; Hampton *et al.*, 2018). Therefore, individuals who score lower on carefree nonplanfulness, which most of the sample does, exhibit a natural advantage for rational economic behavior and the resulting financial performance. Finally, our results show that SCI has a positive relationship with the discount function, indicating that narcissistic and impulsive individuals are less likely to delay gratification.

5. Conclusion

To the best of our knowledge, this paper is the first to show that psychopathic traits are related to financial decisions. We obtain data on 118 subjects' scores on metrics capturing a global psychopathy trait as well as primary and secondary traits. We then use this data to model subjects' subjects' cumulative prospective utility functions and quasi-hyperbolic discount functions. The results show that psychopathic traits are associated with the financial risk and time preferences captured in subjects' cumulative prospective utility functions and quasi-hyperbolic discount functions.

The findings in this paper point to psychopathic traits being associated with attitudes to risk that are associated with success in finance. Less fear of risk and being less loss averse results in higher returns in the finance industry (Shiv *et al.*, 2005; Fellner and Sutter, 2009). These results are primarily because of higher scores in the secondary trait of SCI and the primary trait of rebellious nonconformity. Additionally, the trait of rebellious nonconformity is related to being less averse to losses. However, we also find that SCI has a positive association with the discounting rate when we analyze QTD; we argue that this relationship is consistent impulsive behavior which, we presume, may not be associated with success in finance.

Employers and regulators are on the horns of a dilemma. We highlighted the association of psychopathy and white-collar crimes and suggested that ponzi schemes, embezzlement and insider trading are *prima facie* examples of the presence of higher levels of psychopathy among market professionals. Yet, financial institutions are at the heart and soul of a mature and healthy economy (Shiller, 2012). Given the importance of finance to our well-being, should we be at peace with a finance profession that seemingly attracts, and then offers opportunities for success to, professionals with higher psychopathic tendencies? In light of the importance of this question, the findings in this paper are relevant and important not only for regulators but for the wider community.

As with any experiment, there are always limitations, and recognizing these can guide the way for future research. The sample of college students could be expanded to include professional business individuals. For example, a sample of financial advisors could confirm the generalizability of the results presented in this paper. Furthermore, our paper is one of few that draws its subjects from a non-incarcerated sample. This, we believe, allows better generalizability to the general population. However, this leaves us with a small sample of clinical psychopaths. As such, future research could study incarcerated criminals convicted

of white-collar crimes again to consider the generalizability of the results presented in this paper.

Notes

1. [Gregory \(2012\)](#) highlights an interesting and well-known case by making use of a speech given by Diane Henriques at the University of New England in 2012. “. . .The media have highlighted many financial professionals since 2007 for fraud and mismanagement of money. One high-profile case was Bernard Madoff, accused of running a Ponzi scheme that defrauded investors of billions of dollars over decades. Diane Henriques spent hours interviewing Madoff in prison and concluded he was psychopathic. She found him to be charming and not the least remorseful for what he had done. Without formal clinical training, Henriques had followed the guidelines in the DSM-5 and formulated a diagnosis” ([Gregory, 2012](#), p. 162).
2. The psychopathic personality trait (which we also call global psychopathy in this paper) can be decomposed into several underlying primary and secondary factors ([Cleckley, 1955](#); [Hare, 1991](#)). We describe these primary and secondary traits in Section 3.3, where we discuss the measurement of psychopathic traits.
3. The term “economist” is usually understood and described by the related literature as any individual with knowledge of the rational choice theory (i.e. the rational/self-interest model of economics). For example, individuals who have taken economics or finance courses in college fit this description.
4. For further explanation of the self-interest model, see Federal Reserve Bank of St. [Louis \(2012\)](#).
5. A second-order trait is a combination of primary traits obtained using principal component analysis, while overall psychopathy is the combination of all primary traits.
6. Psychopathy encompasses a range of specific features, its primary and second traits. By considering these more granular dimensions of psychopathy, we are able to examine which, if any, of these features drive any influence of psychopathy *per se* on the behaviors studied in this paper. This might provide a deeper understanding of the topic under consideration. Alternatively, psychopathy might be too broad a construct to find a relationship with the behaviors we examine. Using the sub-traits may allow for a cleaner examination of the behaviors.
7. For a greater explanation about the physiology of financial decisions and neurofinance in general, see [Nofsinger and Shank \(2020\)](#) and [Sahi \(2012\)](#).
8. Clinically high denotes a diagnosis of psychopathy.
9. The PPI-R test contains 154 questions.
10. The risk preference survey contains 16 questions and the time preference survey 20 questions.
11. As the psychology literature typically deals with an individual being a psychopath or not, there is no low group.
12. Additionally, we do not include models where no variables show significance to save space. Analyses including all variables may be obtained from the corresponding author upon request.

References

- Angeletos, G., Laibson, D., Repetto, A., Tobacman, J. and Weinberg, S. (2001), “The hyperbolic consumption model: calibration, simulation, and empirical evaluation”, *Journal of Economic Perspectives*, Vol. 15 No. 3, pp. 47-68.
- Babiak, P. and Hare, R. (2006), *Snakes in Suits: When Psychopaths Go to Work*, Regan Books, New York, NY.

-
- Babiak, P., Neumann, C. and Hare, R. (2010), "Corporate psychopathy: talking the walk", *Behavioral Sciences and the Law*, Vol. 28 No. 2, pp. 174-193.
- Barber, B. and Odean, T. (2001), "Boys will be boys: gender, overconfidence, and common stock investment", *The Quarterly Journal of Economics*, Vol. 116 No. 1, pp. 261-292.
- Bechara, A., Damasio, H., Damasio, A. and Lee, G. (1999), "Different contributions of the human amygdala and ventromedial prefrontal cortex to decision-making", *The Journal of Neuroscience*, Vol. 19 No. 13, pp. 5473-5481.
- Benhabib, J., Bisin, A. and Schotter, A. (2010), "Present-bias, quasi-hyperbolic discounting, and fixed costs", *Games and Economic Behavior*, Vol. 69 No. 2, pp. 205-223.
- Blair, R. (2007), "The amygdala and ventromedial prefrontal cortex in morality and psychopathy", *Trends in Cognitive Sciences*, Vol. 11 No. 9, pp. 387-392.
- Blair, R. (2008), "The cognitive neuroscience of psychopathy and implications for judgments of responsibility", *Neuroethics*, Vol. 1 No. 3, pp. 149-157.
- Blair, R., Colledge, E. and Mitchell, D. (2001), "Somatic markers and response reversal: is there orbitofrontal cortex dysfunction in boys with psychopathic tendencies?", *Journal of Abnormal Child Psychology*, Vol. 29 No. 6, pp. 499-511.
- Boddy, C. (2015), "Unethical 20th century businesses and their leaders: were Enron and its CEO corporate psychopaths?", *The Value of Pluralism in Advancing Management Research, Education and Practice: Leadership and Leadership Development Track*, British Academy of Management, Portsmouth University.
- Boddy, C., Ladyshevsky, R. and Galvin, P. (2010), "The influence of corporate psychopaths on corporate social responsibility and organizational commitment to employees", *Journal of Business Ethics*, Vol. 97 No. 1, pp. 1-19.
- Brunell, A. and Buelow, M. (2017), "Narcissism and performance on behavioral decision-making tasks", *Journal of Behavioral Decision Making*, Vol. 30 No. 1, pp. 3-14.
- Byrnes, J., Miller, D. and Schafer, W. (1999), "Gender differences in risk taking: a meta-analysis", *Psychological Bulletin*, Vol. 125 No. 3, p. 367.
- Campbell, W., Goodie, A. and Foster, J. (2004), "Narcissism, confidence, and risk attitude", *Journal of Behavioral Decision Making*, Vol. 17 No. 4, pp. 297-311.
- Carter, J. and Irons, M. (1991), "Are economists different, and if so, why?", *Journal of Economic Perspectives*, Vol. 5 No. 2, pp. 171-177.
- Charness, G. and Gneezy, U. (2012), "Strong evidence for gender differences in risk taking", *Journal of Economic Behavior and Organization*, Vol. 83 No. 1, pp. 50-58.
- Chitra, K. and Sreedevi, V. (2011), "Does personality traits influence the choice of investment?", *IUP Journal of Behavioral Finance*, Vol. 8 No. 2, pp. 47-57.
- Cohn, A., Fehr, E. and Maréchal, M. (2014), "Business culture and dishonesty in the banking industry", *Nature*, Vol. 516 No. 7529, pp. 86-89.
- Conlin, A., Kyröläinen, P., Kaakinen, M., Järvelin, M., Perttunen, J. and Svento, R. (2015), "Personality traits and stock market participation", *Journal of Empirical Finance*, Vol. 33, pp. 34-50.
- De Martino, B., Camerer, C. and Adolphs, R. (2010), "Amygdala damage eliminates monetary loss aversion", *Proceedings of the National Academy of Sciences*, Vol. 107 No. 8, pp. 3788-3792.
- DeCovny, S. (2012), "The financial psychopath next door", *CFA Institute Magazine*, Vol. 23 No. 2, pp. 34-35.
- Durand, R., Fung, L. and Limkriangkrai, M. (2019), "Myopic loss aversion, personality, and gender", *Journal of Behavioral Finance*, Vol. 20 No. 3.
- Durand, R., Newby, R. and Sanghani, J. (2008), "An intimate portrait of the individual investor", *Journal of Behavioral Finance*, Vol. 9 No. 4, pp. 193-208.

-
- Durand, R., Newby, R., Peggs, L. and Siekierka, M. (2013a), *Journal of Behavioral Finance*, Vol. 14 No. 2, pp. 116-133.
- Durand, R., Newby, R., Tant, K. and Trepongkaruna, S. (2013b), "Overconfidence, overreaction and personality", *Review of Behavioural Finance*, Vol. 5 No. 2, pp. 104-133.
- Dwyer, P., Gilkeson, J. and List, J. (2002), "Gender differences in revealed risk taking: evidence from mutual fund investors", *Economics Letters*, Vol. 76 No. 2, pp. 151-158.
- Edens, J. and McDermott, B. (2010), "Examining the construct validity of the psychopathic personality inventory—revised: preferential correlates of fearless dominance and self-centered impulsivity", *Psychological Assessment*, Vol. 22 No. 1, p. 32.
- Edens, J., Poythress, N., Lilienfeld, S., Patrick, C. and Test, A. (2008), "Further evidence of the divergent correlates of the psychopathic personality inventory factors: prediction of institutional misconduct among male prisoners", *Psychological Assessment*, Vol. 20 No. 1, p. 86.
- Federal Reserve Bank of St. Louis (2012), "The role of Self-Interest and competition in a market economy - the economic lowdown podcast series [audio podcast]", available at: www.stlouisfed.org/education/economic-lowdown-podcast-series/episode-3-the-role-of-self-interest-and-competition-in-a-market-economy (accessed 30 April 2017).
- Fellner, G. and Sutter, M. (2009), "Causes, consequences, and cures of myopic loss aversion: an experimental investigation", *The Economic Journal*, Vol. 119 No. 537, pp. 900-916.
- Filbeck, G., Hatfield, P. and Horvath, P. (2005), "Risk aversion and personality type", *Journal of Behavioral Finance*, Vol. 6 No. 4, pp. 170-180.
- Frank, B. and Schulze, G. (2000), "Does economics make citizens corrupt?", *Journal of Economic Behavior and Organization*, Vol. 43 No. 1, pp. 101-113.
- Frank, R., Gilovich, T. and Regan, D. (1993), "Does studying economics inhibit cooperation?", *Journal of Economic Perspectives*, Vol. 7 No. 2, pp. 159-171.
- Frederick, S., Loewenstein, G. and O'donoghue, T. (2002), "Time discounting and time preference: a critical review", *Journal of Economic Literature*, Vol. 40 No. 2, pp. 351-401.
- Gandal, N., Roccas, S., Sagiv, L. and Wrzesniewski, A. (2005), "Personal value priorities of economists", *Human Relations*, Vol. 58 No. 10, pp. 1227-1252.
- Glenn, A., Raine, A. and Schug, R. (2009), "The neural correlates of moral decision-making in psychopathy", *Molecular Psychiatry*, Vol. 14 No. 1, pp. 5-6.
- Hampton, W.H., Asadi, N. and Olson, I.R. (2018), "Good things for those who wait: predictive modeling highlights importance of discounting for income attainment", *Frontiers of Psychology*, Vol. 9, p. 1545.
- Hare, R. (1991), *The Hare Psychopathy Checklist-Revised: Manual*, Multi-Health Systems, Incorporated.
- Jones, D.N. (2014), "Risk in the face of retribution: psychopathic individuals persist in financial misbehavior among the dark triad", *Personality and Individual Differences*, Vol. 67, pp. 109-113.
- Jones, D. and Paulhus, D. (2011), "The role of impulsivity in the dark triad of personality", *Personality and Individual Differences*, Vol. 51 No. 5, pp. 679-682.
- Kandasamy, N., Hardy, B., Page, L., Schaffner, M., Graggaber, J., Powlson, A., Fletcher, P., Gurnell, M. and Coates, J. (2014), "Cortisol shifts financial risk preferences", *Proceedings of the National Academy of Sciences*, Vol. 111 No. 9, pp. 3608-3613.
- Kiehl, K., Smith, A., Hare, R., Mendrek, A., Forster, B., Brink, J. and Liddle, P. (2001), "Limbic abnormalities in affective processing by criminal psychopaths as revealed by functional magnetic resonance imaging", *Biological Psychiatry*, Vol. 50 No. 9, pp. 677-684.
- Kowalski, C., Vernon, P. and Schermer, J. (2017), "Vocational interests and dark personality: are there dark career choices?", *Personality and Individual Differences*, Vol. 104, pp. 43-47.
- Laibson, D. (1997), "Golden eggs and hyperbolic discounting", *The Quarterly Journal of Economics*, Vol. 112 No. 2, pp. 443-478.
-

-
- Lakey, C., Rose, P., Campbell, W. and Goodie, A. (2008), "Probing the link between narcissism and gambling: the mediating role of judgment and decision-making biases", *Journal of Behavioral Decision Making*, Vol. 21 No. 2, pp. 113-137.
- Lapierre, D., Braun, C. and Hodgins, S. (1995), "Ventral frontal deficits in psychopathy: neuropsychological test findings", *Neuropsychologia*, Vol. 33 No. 2, pp. 139-151.
- Lilienfeld, S., Widows, M. and Staff, P.A.R. (2005), "Psychopathic personality Inventory™-Revised", *Social Influence*, Vol. 61 No. 65, p. 97.
- Long, W., Malhotra, D. and Murnighan, J. (2011), "Economics education and greed", *Academy of Management Learning and Education*, Vol. 10 No. 4, pp. 643-660.
- Luccasen, R. and Thomas, M. (2014), "Monetary incentives versus class credit: evidence from a large classroom trust experiment", *Economics Letters*, Vol. 123 No. 2, pp. 232-235.
- Marwell, G. and Ames, R. (1981), "Economists free ride, does anyone else? Experiments on the provision of public goods, IV", *Journal of Public Economics*, Vol. 15 No. 3, pp. 295-310.
- Mitchell, D., Colledge, E., Leonard, A. and Blair, R. (2002), "Risky decisions and response reversal: is there evidence of orbitofrontal cortex dysfunction in psychopathic individuals?", *Neuropsychologia*, Vol. 40 No. 12, pp. 2013-2022.
- Moffitt, T.E., Arseneault, L., Belsky, D.W., Dickson, N., Hancox, R.J., Harrington, H.L., Houts, R., Poulton, R., Roberts, B.W., Ross, S., Sears, M.R., Thomson, W.M. and Caspi, A. (2011), "A gradient of childhood self-control predicts health, wealth, and public safety, PNAS", *Proceedings of the National Academy of Sciences of Sciences*, Vol. 108 No. 7, pp. 2693-2698.
- Newman, J., Kosson, D. and Patterson, C. (1992), "Delay of gratification in psychopathic and nonpsychopathic offenders", *Journal of Abnormal Psychology*, Vol. 101 No. 4, pp. 630-636.
- Newman, J., Patterson, C. and Kosson, D. (1987), "Response perseveration in psychopaths", *Journal of Abnormal Psychology*, Vol. 96 No. 2, pp. 145-148.
- Nofsinger, J. and Shank, C. (2018), "DEEP sleep: the impact of sleep on financial risk taking", *Review of Financial Economics*.
- Nofsinger, J., Patterson, F. and Shank, C. (2018), "Decision making, financial risk aversion, and behavioral biases: the role of testosterone and stress", *Journal of Economics and Human Biology*, Vol. 29, pp. 1-16.
- Nofsinger, J. and Shank, C. (2019), *The Biology of Investing: Nature, Nurture, Physiology, and Cognition*, 1st ed., Routledge, New York, NY.
- Nofsinger, J., Patterson, F. and Shank, C. (2020), "On the physiology of investment biases: the role of cortisol and testosterone", *Journal of Behavioral Finance*, Forthcoming.
- O'Donoghue, T. and Rabin, M. (1999), "Doing it now or later", *American Economic Review*, Vol. 89 No. 1, pp. 103-124.
- Oehler, A., Wendt, S., Wedlich, F. and Horn, M. (2018), "Investors' personality influences investment decisions: experimental evidence on extraversion and neuroticism", *Journal of Behavioral Finance*, Vol. 19 No. 1, pp. 30-48.
- Oehler, A., Wedlich, F., Wendt, S. and Horn, M. (2019), "Does personality drive price bubbles?", *Studies in Economics and Finance*.
- Parise, G. and Peijnenburg, K. (2017), "Understanding the determinants of financial outcomes and choices: the role of noncognitive abilities", Working Paper.
- Patterson, F. and Shank, C. (2020), "Health habits and behavioral biases", Working Paper.
- Phelps, E. and Pollak, R. (1968), "On second-best national saving and game-equilibrium growth", *The Review of Economic Studies*, Vol. 35 No. 2, pp. 185-199.

-
- Ragatz, L., Fremouw, W. and Baker, E. (2012), "The psychological profile of white-collar offenders: demographics, criminal thinking, psychopathic traits, and psychopathology", *Criminal Justice and Behavior*, Vol. 39 No. 7, pp. 978-997.
- Richards, C., Gilbert, J. and Harris, J. (2002), "Assessing ethics education needs in the MBA program", *Teaching Business Ethics*, Vol. 6 No. 4, pp. 447-476.
- Sahi, S.K. (2012), "Neurofinance and investment behavior", *Studies in Economics and Finance*, Vol. 29 No. 4, pp. 246-267.
- Schneider, M. and Prasso, S. (2002), "How an MBA can bend your mind", *Business Week*, Vol. 12.
- Schulkin, J., McEwen, B. and Gold, P. (1994), "Allostasis, amygdala, and anticipatory angst", *Neuroscience and Biobehavioral Reviews*, Vol. 18 No. 3, pp. 385-396.
- Shank, C. (2018), "Deconstructing the corporate psychopath: an examination of deceptive behavior", *Review of Behavioral Finance*, Vol. 10 No. 2, pp. 163-182.
- Shiller, R.J. (2012), *Finance and the Good Society*, Princeton University Press, Princeton, NJ.
- Shiv, B., Loewenstein, G., Bechara, A., Damasio, H. and Damasio, A. (2005), "Investment behavior and the negative side of emotion", *Psychological Science*, Vol. 16 No. 6, pp. 435-439.
- Sims, R. and Keon, T. (1999), "Determinants of ethical decision making: the relationship of the perceived organizational environment", *Journal of Business Ethics*, Vol. 19 No. 4, pp. 393-401.
- Sims, R. and Keon, T. (2000), "The influence of organizational expectations on ethical decision making conflict", *Journal of Business Ethics*, Vol. 23 No. 2, pp. 219-228.
- Sokol-Hessner, P., Camerer, C. and Phelps, E. (2012), "Emotion regulation reduces loss aversion and decreases amygdala responses to losses", *Social Cognitive and Affective Neuroscience*, Vol. 8 No. 3, pp. 341-350.
- Tauni, M., Rao, Z., Fang, H. and Gao, M. (2017), "Does investor personality moderate the relationship between information sources and trading behavior? Evidence from Chinese stock market", *Managerial Finance*, Vol. 43 No. 5, pp. 545-566.
- Toubia, O., Johnson, E., Evgeniou, T. and Delquié, P. (2013), "Dynamic experiments for estimating preferences: an adaptive method of eliciting time and risk parameters", *Management Science*, Vol. 59 No. 3, pp. 613-640.
- Uzieblo, K., Verschuere, B. and Crombez, G. (2007), "The psychopathic personality inventory: construct validity of the two-factor structure", *Personality and Individual Differences*, Vol. 43 No. 4, pp. 657-667.
- Van den Bos, R., den Heijer, E., Vlaar, S. and Houx, B. (2009), "Exploring gender differences in decision-making using the IA gambling task", *Encyclopedia of Psychology of Decision Making*, Nova Science Publishers, New York, NY, pp. 1115-1134.
- Vedel, A. and Thomsen, D. (2017), "The dark triad across academic majors", *Personality and Individual Differences*, Vol. 116, pp. 86-91.
- Weber, B., Aholt, A., Neuhaus, C., Trautner, P., Elger, C. and Teichert, T. (2007), "Neural evidence for reference-dependence in real-market-transactions", *NeuroImage*, Vol. 35 No. 1, pp. 441-447.
- Wong, A. and Carducci, B. (2016), "Do sensation seeking, control orientation, ambiguity, and dishonesty traits affect financial risk tolerance?", *Managerial Finance*, Vol. 42 No. 1, pp. 34-41.
- Yang, Y., Raine, A., Narr, K., Colletti, P. and Toga, A. (2009), "Localization of deformations within the amygdala in individuals with psychopathy", *Archives of General Psychiatry*, Vol. 66 No. 9, pp. 986-994.

Further reading

- American Psychiatric Association (2013), *Diagnostic and Statistical Manual of Mental Disorders. DSM-5*, 5th ed., American Psychiatric Publishing, Washington, DC.
- Cleckley, H. (1955), *The Mask of Sanity: An Attempt to Clarify Some Issues about the so-Called Psychopathic Personality*, Ravenio Books.
- Crespi-Cladera, R. and Pascual-Fuster, B. (2014), "Does the independence of independent directors matter?", *Journal of Corporate Finance*, Vol. 28, pp. 116-134.
- Durack, N., Durand, R.B. and Maller, R.A. (2004), "A best choice among asset pricing models? The conditional capital asset pricing model in Australia", *Accounting and Finance*, Vol. 44 No. 2, pp. 139-162.
- Gregory, D.W. (2012), "Deconstructing financial psychopaths: Culture, evolution, or opportunity", In The 2012 annual meeting of the academy of behavioral finance and economics, p. 42.
- Gregory, D.W. (2017), "Financial psychopaths", in Baker, H.K., Filbeck, G. and Ricciardi, V. (Eds), *Financial Behavior. Players, Services, Products, and Markets*, Oxford University Press, New York, NY, pp. 153-169.
- Keef, S. and Roush, M. (2005), "Influence of weather on New Zealand financial securities", *Accounting and Finance*, Vol. 45 No. 3, pp. 415-437.
- Kuhnen, C.M. and Melzer, B.T. (2018), "Nongognitive abilities and financial delinquency: the role of self-efficacy in avoiding financial distress", *The Journal of Finance*, Vol. 73 No. 6, pp. 2837-2869.
- Lilienfeld, S., Fowler, K. and Patrick, C. (2006), "The self-report assessment of psychopathy", *Assessment*, Vol. 13 No. 4, pp. 107-132.
- Lo, A. and Repin, D. (2002), "The psychophysiology of real-time financial risk processing", *Journal of Cognitive Neuroscience*, Vol. 14 No. 3, pp. 323-339.
- Lykken, D. (1995), *The Antisocial Personalities*, Lawrence Erlbaum Associates, Hillsdale, NJ.
- Mooney, C.Z., Duval, R.D. and Duvall, R. (1993), *Bootstrapping: A Nonparametric Approach to Statistical Inference*, Vols 94/95, Sage.
- Newman, J. and Kosson, D. (1986), "Passive avoidance learning in psychopathic and nonpsychopathic offenders", *Journal of Abnormal Psychology*, Vol. 95 No. 3, p. 252.
- Nofsinger, J., Patterson, F. and Shank, C. (2018), "Decision-making, financial risk aversion, and behavioral biases: the role of testosterone and stress", *Economics and Human Biology*, Vol. 29, pp. 1-16.

Corresponding author

Corey A. Shank can be contacted at: cshank@daltonstate.edu