Management international
International Management
Gestiòn Internacional

In search of sustainable successful traders in times of crisis
En quête des traders responsables à succès en temps de crise
En busca de traders sostenibles y exitosos en tiempos de crisis

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Volume 28, Number 5, 2024

Responsabilité et management international
Responsibility and international management
Responsabilidad y gestión internacional

URI: https://id.erudit.org/iderudit/1114627ar
DOI: https://doi.org/10.59876/a-2vz3-7b8n

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Publisher(s)

HEC Montréal
Université Paris Dauphine

ISSN

1206-1697 (print)
1918-9222 (digital)

Explore this journal

Cite this article

Kleinlogel, E. P., Schmid Mast, M., Frauendorfer, K., Gutsche, R. & Rif, A. (2024). In search of sustainable successful traders in times of crisis. *Management international / International Management / Gestiòn Internacional*, *28*(5), 149–160. https://doi.org/10.59876/a-2vz3-7b8n

Article abstract

In recent decades, recurring global crises have stemmed from management shortcomings in various organizations, particularly within the financial sector (e.g., the 2000 stock market crash, 2011 UBS rogue trader scandal). Excessive risk-taking attitudes by traders and investment and risk managers are tied to these crises. Identifying high *performance* individuals who are also *responsible* from a societal stance is a challenge. In this paper, we tackle this issue by investigating the personality traits that characterize responsible and successful traders to improve personnel selection procedures with cross-cultural applicability. Our findings reveal that being conscientious and intelligent while at the same time being inclined to take financial risks, are significantly associated with responsible trading performance.

In search of sustainable successful traders in times of crisis

En quête des traders responsables à succès en temps de crise

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ABSTRACT

In recent decades, recurring global crises have stemmed from management shortcomings in various organizations, particularly within the financial sector (e.g., the 2000 stock market crash, 2011 UBS rogue trader scandal). Excessive risk-taking attitudes by traders and investment and risk managers are tied to these crises. Identifying high *performance* individuals who are also *responsible* from a societal stance is a challenge. In this paper, we tackle this issue by investigating the personality traits that characterize responsible and successful traders to improve personnel selection procedures with cross-cultural applicability. Our findings reveal that being conscientious and intelligent while at the same time being inclined to take financial risks, are significantly associated with responsible trading performance.

Keywords: traders, responsible trading, performance, personality traits, risk management

Résumé

Ces dernières décennies ont été le spectacle de crises globales récurrentes découlant d'un management préoccupant observé dans diverses entreprises, et en particulier dans le secteur financier (ex : krach boursier de 2000, fraude chez UBS en 2011). La prise de risque excessive des traders, investisseurs et risk managers est liée à ces crises. Identifier les preneurs de décision à la fois hautement *performants* et *responsables* d'un point de vue sociétal constitue un réel défi. Ce papier aborde cette problématique via une perspective cross-culturelle en examinant les traits de personnalité caractérisant les traders dans le but d'améliorer les procédures de recrutement. Les résultats ont démontré qu'être consciencieux, intelligent et avoir un appétit pour le risque sont associés à une performance responsable.

Mots-Clés : traders, opération boursière responsable, performance, traits de personnalité, gestion des risques

Resumen

En las últimas décadas, las crisis mundiales recurrentes han tenido su origen en deficiencias de gestión en diversas organizaciones, en particular en el sector financiero (por ejemplo, el desplome bursátil de 2000, el escándalo de los "rogue traders" de UBS en 2011). Las actitudes excesivamente arriesgadas de los traders y gestores de inversiones y riesgos están relacionadas con estas crisis. Identificar a personas de alto *rendimiento* que también sean *responsables* desde el punto de vista social es un reto. En este artículo abordamos esta cuestión investigando los rasgos de personalidad que caracterizan a los traders sostenibles exitosos para mejorar los procedimientos de selección de personal con aplicabilidad transcultural. Nuestros resultados revelan que ser concienzudo e inteligente y, al mismo tiempo, estar inclinado a asumir riesgos financieros, están significativamente asociados con el rendimiento comercial responsable.

Palabras Clave: traders, trading sostenible, rendimiento, rasgos de personalidad, gestión del riesgo

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Funding: No fund, grant, or other support was received.

Availability of data and material: The dataset generated and analyzed during the current study as well as the data dictionary are available in the OSF repository, https://osf.io/ykg3c.

Ethical approval statement: This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Committee on Ethics in Research, HEC Lausanne.

Acknowledgements: We wish to thank the editors and the reviewers for their invaluable feedback, which has greatly improved our work. In addition, we would like to thank Dr. Laetitia A. Renier for her helpful comments.

Pour citer cet article : Kleinlogel, E.P. Schmid Mast, M. Frauendorfer, K. Gutsche, R. & Rif, A. (2024). In search of sustainable successful traders in times of crisis. *Management international*, *28*(5), 149-160.

DOI: https://doi.org/10.59876/a-2vz3-7b8n

From a human resource management lens, hiring the most talented applicants is essential. Companies count on them to boost return on investment, generate profit, and provide a competitive advantage over rivals. This quest involves implementing performant personnel selection procedures designed to select the *right* applicant. However, how can firms define the attributes of the *right* applicant? International management scholars face the challenge of identifying best practices to provide recommendations to practitioners while taking into account issues related to organizations operating across national borders (e.g., global staffing) and in an international business environment that is continually evolving (Collings & Scullion, 2012; Tarique & Schuler, 2008). Research showed that focusing on a set of job-related target skills and cognitive ability is not sufficient when screening applicants (Schmidt & Hunter, 1998). Hiring applicants with specific personality traits can be essential to performing well at work (e.g., Judge & Bono, 2000).

In the present research, we address the topic of selecting the *right* applicant in the field of investment and risk management. We make the case of traders. Throughout the past decades, excessive risk-taking by financial market actors has caused significant turmoil. As a response, regulatory authorities have implemented a plethora of rules and regulations (Gilligan, 2011; Land *et al.*, 2014). For instance, organizations can use algorithms designed to promote and ensure responsible investment management practices by monitoring trading activities and signaling the risky behavior of traders (Johnson, 2010). From a managerial standpoint, financial institutions can potentially mitigate excessive risk-taking through more elaborate hiring procedures. In this paper, we investigate the personality traits that allow screening for responsible and successful traders. We define these traders as those who are risk policy adhering, as well as risk-aware, while showing financial performance. Can a trader, in essence a short-term investment manager, be a risk-taker and make responsible decisions at the same time? What is the right mixture of personality traits to be a responsible and highly profitable trader? Investigating these questions has become vital due to the risk exposure that traders face because of the increasing number of exogenous events that are weakening the financial market stability.

Research widely investigated the extent to which the personality traits of traders and financial managers are associated with their risk-related attitudes (e.g., Nicholson *et al.*, 2005; Pan & Statman, 2013). What has not gained much research attention, however, is the relationship between the personality profile of traders and their performance. We address this gap by calling on the fields of finance and personality psychology. We investigate successful – risk adhering – trading using a risk-adjusted performance metric (i.e., capturing the extent to which traders are able to generate higher returns per unit of employed risk capital).

Our work aims to contribute to the literature on international management by investigating the characteristics shared by traders in their trading decisions, through their personality profile. Focusing on personality traits presents several advantages. First, research extensively investigated the structure of personality and demonstrated that each individual has a specific personality profile constructed around a set of well-defined personality traits (e.g., Goldberg, 1990), hence making the personality structure a concept that is scientifically sound and well-understood. Second, research showed that personality traits represent key factors in predicting a wide range of behaviors including (un)ethical decision making and performance at work (e.g., Pletzer *et al.*, 2019; Zell & Lesik, 2022), suggesting that personality traits might also play a role in predicting responsible trading performance. Last but not least, from an international standpoint, research revealed the validity of cross-cultural comparisons of personality profiles across a wide range of countries, languages, and hence cultures (e.g., García *et al.*, 2022; Ion *et al.*, 2017). Accordingly, our work aims to identify the personality traits allowing to select the *right* applicants to improve the personnel selection procedures of organizations playing on domestic as well as on global markets. Going further, our research falls within a global approach of corporate social responsibility (Pestre, 2014), through the identification of a standardized recruitment method with cross-cultural applicability.

We also contribute to the literature by addressing this topic in the context of a highly global unstable market, the energy market and its recent disruptions in 2021 and 2022. Commodity markets exhibit higher volatility levels, implying that such markets carry large risk exposure, and warrant increased risk management activities by market participants. Throughout recent years, energy companies, and in particular utility companies, have been increasingly engaging in commodity trading activities. However, if this practice goes beyond risk-mitigating hedging activities, hence implying that these companies effectively engage in prop trading, it could pose risks to societal energy security as well as go against shareholder and stakeholder interests. Whilst lax accounting standards fail to properly identify and disclose such activities – de facto allowing for significant leeway in the classification of commodity trading activities – the screening of personality traits becomes of central relevance across countries in selecting responsible traders.

Management and Personality Traits

Models of personality structure

Personality traits can be defined as individual differences that are stable over time and across situations (Funder, 2001; McCrae & Costa Jr., 1989). They are at the root of individuals' affective, behavioral, and cognitive styles. Research revealed that each individual has a specific personality profile constructed around a set of five personality traits: agreeableness, extraversion, conscientiousness, emotionality (also known as neuroticism, which is the opposite of emotional stability), and openness to experience (Costa Jr. & McCrae, 1988, 1992; Digman, 1989; Goldberg, 1990). This personality structure model is known as the Big Five or the Five-Factor Model. Individuals with a high agreeableness score tend

to be forgiving, tolerant, and willing to compromise and cooperate with others. Individuals with a high extraversion score enjoy social interactions and tend to feel confident and optimistic. Individuals with a high conscientiousness score are organized, self-disciplined, and make decisions based on reflection. Individuals with a high emotionality score tend to be anxious, avoid danger, and feel a need for emotional support from others. Individuals with a high openness to experience score tend to be curious, like to try novel approaches, and are open to unconventional ideas.

After decades of research focusing on this five-factor personality structure, research revealed that a sixth personality trait was missing from existing models: honesty-humility (Ashton *et al.*, 2000; Lee & Ashton 2004). Honesty-humility captures a moral conscience dimension of personality that is absent in the other traits (Ashton *et al.*, 2004; Ashton *et al.*, 2000). Individuals with a high honesty-humility score tend to be sincere, fair, and modest. This six-factor model is called HEXACO, representing the acronym of the six personality traits.

Several measurement instruments were developed to capture an individual's personality structure (e.g., Ashton & Lee, 2009; Costa & McCrae, 1992; John & Srivastava, 1999). These instruments are questionnaires that are either self-reported or other-reported. Sample items are: "People often call me a perfectionist" and "I tend to be lenient in judging other people" (Ashton & Lee, 2009).Research demonstrated the psychometric properties of these personality measurement instruments (e.g., Ashton & Lee, 2009; Connelly & Ones, 2010; Lee & Ashton, 2004;) as well as their cross-cultural applicability (e.g., García *et al.*, 2022; Ion *et al.*, 2017; McCrae *et al.*, 2004; Schmitt *et al.*, 2007; Thielmann *et al.*, 2020a). It is noteworthy that studies demonstrated low correlations among these personality traits meaning that a high score on one of these traits does not imply a low or a high score on one or several of the other traits (e.g., Lee & Ashton, 2004).

Organizational outcomes and personality traits

Research revealed that these personality traits predict a wide range of behaviors and organizational outcomes, such as altruism and prosocial behaviors (Hilbig *et al.*, 2014; Oda *et al.*, 2014), voice and creativity (Zare & Flinchbaugh, 2019), leadership emergence and effectiveness (Blake *et al.*, 2022), ethical leadership (Kalshoven *et al.*, 2011), and job satisfaction (Judge *et al.*, 2002) to only cite a few. International management scholars also identified personality traits as playing a crucial role when investigating organizational members' behaviors and outcomes, such as expatriate adjustment, effectiveness, and selection (Bhatti *et al.*, 2014; Caligiuri, 2000; Harari *et al.*, 2018; Mol *et al.*, 2005; Shaffer *et al.*, 2006), effectiveness of cross-cultural training (Lievens *et al.*, 2003), and global leadership activities (Caligiuri & Tarique, 2009).

With regards to job performance, a set of meta-analyses consistently revealed conscientiousness to be of particular importance (Barrick & Mount, 1991; Schmidt & Hunter, 1998; Wilmot & Ones, 2019; Zell & Lesik, 2022). For instance, conscientiousness is related to entrepreneurial performance (Zhao *et al.*, 2010), team performance (Peeters *et al.*, 2006), and overall job performance (Zell & Lesik, 2022). Findings from international management scholars supported these results by for instance showing a positive association between conscientiousness and expatriate job performance (Bhatti *et al.*, 2014; Caligiuri, 2000).

Responsible behaviors and personality traits

Apart from looking for applicants with a high level of conscientiousness, organizations might also be willing to identify the *right* applicants beyond their performance potential per se. Broadly speaking, organizations, willing to respond to the institutional call to develop corporate social responsibility strategies (Pestre, 2014; Persais, 2010), might in part decide to improve their personnel selection procedures by identifying applicants who are more likely to behave in a responsible manner, through a pre-screening phase.

Drawing on the literature on corporate social responsibility (e.g., Campbell, 2007; Carroll, 1979; Pereira, 2014; Persais, 2010), we conceptualize responsible behaviors as a set of practices adhering to rules and norms established by organizations and by society in general. This set of practices includes economic and legal dimensions such that individuals should perform well (i.e., make a profit) while complying with the law. It also includes an ethical dimension such that individuals should adhere to social norms to avoid the harmful consequences that can be inflicted on other individuals or society as a whole. The concept of responsible behavior hence involves duties of self-discipline, self-regulation, and moral conduct (Bear *et al.*, 2003) such that responsible individuals make decisions and engage in behaviors that are perceived as legitimate by all affected parties.

Literature, including several meta-analyses, consistently revealed that honesty-humility and conscientiousness are related to both (1) unethical behaviors such as academic dishonesty (Giluk & Postlethwaite, 2015; Lee *et al.*, 2020), workplace delinquency and deviance (de Vries & van Gelder, 2015; Pletzer *et al.*, 2019), and counterproductive behavior (Lee *et al.*, 2019; Marcus *et al.*, 2007, 2013), and (2) ethical outcomes such as work investment (Lodi-Smith & Roberts, 2007), prosocial behavior (Thielmann *et al.*, 2020b), and integrity (Lee *et al.*, 2005).

These findings demonstrate the crucial role played by personality traits in the field of (un)ethical behaviors across contexts and hence across culture. For instance, the meta-analysis conducted by Giluk and Postlethwaite (2015) included studies from a number of different countries (e.g., Canada, Pakistan, Spain, USA), and Lee *et al.* (2005) conducted their study in three different countries (i.e., Australia, Canada, and the Netherlands). Applied to an international personnel selection context, this literature suggests that measuring applicant level of conscientiousness and honesty-humility can help recruiters screen for applicants that are more likely to perform well and be responsible at work.

Personality Traits and Responsible Behavior among Traders

Personality traits and risk-taking attitudes

Research in finance extensively studied the role played by personality traits (mainly through a five-factor structure) in the context of portfolio management as well as on financial risk-taking attitudes (e.g., Akhtar & Batool, 2012; Durand *et al.*, 2013; Nicholson *et al.*, 2005; Pak & Mahmood, 2015; Renu & Christie, 2017; see Furnham, 2020 for a review). For instance, research consistently showed that extraversion is related to the trading behavior bias of overconfidence, whereas mixed results were found for the other personality traits (e.g., Cecchini *et al.*, 2019; Oehler *et al.*, 2018; Pan & Statman, 2013; Zaidi & Tauni, 2012). These findings suggest the personality trait of extraversion to be related to irresponsible behavior.

Personality traits and trading performance

The literature investigating the role played by personality traits to explain financial outcome is scarce (Camgoz *et al.*, 2011). Furthermore, past research used different metrics to capture trading performance (e.g., amount of realized gains/losses, risk-adjusted returns), hence preventing the comparability of findings. When findings can be compared, we observe diverging results, making the association between personality traits and trading performance an ongoing question. To illustrate, extraversion was found to be both positively (Cecchini *et al.*, 2019) and negatively (Durand *et al.*, 2013) related to the proportion of realized gains, and conscientiousness to be both positively (Cecchini *et al.*, 2019) and negatively (Durand *et al.*, 2013) related to the proportion of realized losses. Furthermore, in one study, findings revealed that conscientiousness and openness were negatively related to the proportion of realized gains (Cecchini *et al.*, 2019), whereas these effects were not observed in another study (Durand *et al.*, 2013).

To our knowledge, only three studies (i.e., Camgoz *et al.*, 2011; Durand *et al.*, 2008, 2013) investigated the role of personality traits on responsible trading performance. These studies assessed the extent to which the Big Five are related to trader portfolio performance, including a risk-adjusted performance metric (i.e., captured through the Sharpe ratios). Both studies from Durand and colleagues used an exploratory lens, meaning that they did not formulate hypotheses, whereas Camgoz *et al.* (2011) expected extraversion, openness to experience, and conscientiousness to be positively related to risk-adjusted performance, and neuroticism and agreeableness to be negatively related to risk-adjusted performance. Both Durand *et al.* (2008) and Camgoz *et al.* (2011) found a positive effect of extraversion on risk-adjusted performance, however they found opposite results with regards to conscientiousness. Finally, Durand *et al.* (2013) did not find any significant effect.

Interestingly from an international management lens, despite the fact that both studies from Durand and colleagues were conducted in the same location (Australia), the researchers found divergent results, hence discarding participant culture as a potential explanatory factor. Other factors might explain these divergent findings such as the professional status of the participants (professionals vs. students) and the procedure used to collect the data (see the next section for further details).

The Present Study

Aims of the study

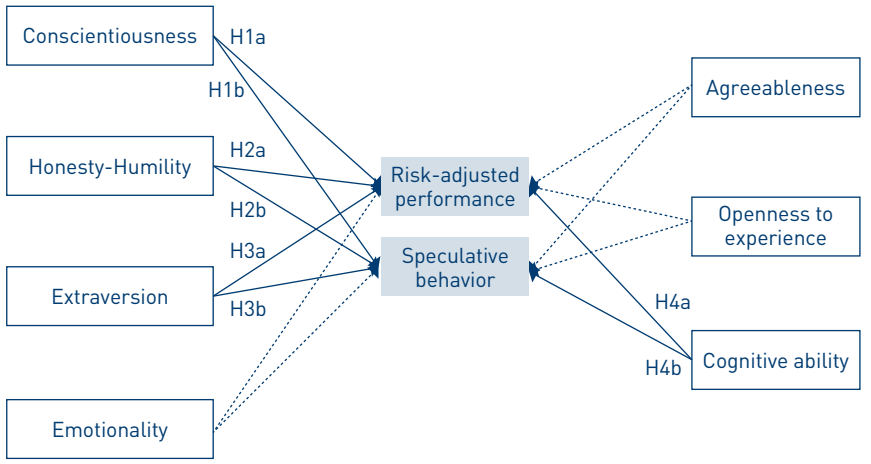
Our study aims to provide a better understanding of the role played by personality traits on trading behavior using a risk-adjusted performance metric. Specifically, we build on past studies from Camgoz *et al.* (2011) and Durand *et al.* (2008, 2013). Nonetheless, our work differs from these past studies in four main ways. First, we collect our data in a controlled environment (i.e., a mock trading room) using a trading simulation software. Past studies mainly collected data by asking investors (either professionals or student investors who were provided with a notional sum to invest) to self-report relevant metrics over a specific period of time. Through this controlled setting, we standardize the market-related information by presenting exactly the same information to participants during the trading session, allowing us to compare their trading performance.

Second, drawing on past research, we investigate the role played by the personality trait of honesty-humility, in addition to the five other personality traits addressed by previous studies, and cognitive ability, while controlling for a set of relevant finance-related individual, namely risk-attitudes, mental accounting, and uncertainty avoidance (e.g., Dohmen *et al.*, 2011; Fellner & Maciejovsky, 2007; Jung & Kellaris, 2004; Seiler *et al.*, 2012). We aim to assess whether the six personality traits and cognitive ability are significantly associated to trading outcomes above and beyond these relevant factors. Finally, our work differs from past studies by collecting data in a different cultural context (Switzerland).

Model and hypotheses

Drawing on past findings, we propose a model on the association between personality traits and responsible trading performance (see Figure 1) and formulate a set of hypotheses. We also investigate speculative behavior to assess the extent to which results differ between these two outcomes that are conceptually opposite.

FIGURE 1
Proposed model and Hypotheses



First, research showed conscientiousness to be positively related to performance (Zell & Lesik, 2022) and negatively related to unethical behavior (Marcus *et al.*, 2013) and financial risk-related attitudes (Pan & Statman, 2013), suggesting that individuals with a high score on conscientiousness are more likely to be able to gauge whether their decisions are exceedingly risky, while still achieving high levels of performance. Accordingly, we hypothesize conscientiousness to be positively related to risk-adjusted performance (H1a) and negatively related to speculative behavior (H1b).

Second, research demonstrated honesty-humility to be negatively related to unethical behavior (de Vries & van Gelder, 2015; Lee *et al.*, 2015). Given that individuals with a high score on this trait tend to follow established rules and norms and pay attention to the consequences that their decisions might have on others, in the present study we expect them to take the right amount of risk that is needed to perform according to what is defined as acceptable in this field. Furthermore, given that the financial market has a tendency to encourage risky attitudes by granting higher risk premia (Muir, 2017), it is plausible to expect that those with lower scores are more likely to engage in greedy behavior by taking a high amount of risk that would exceed established rules and policy designed to avoid colossal loss. Accordingly, we hypothesize honesty-humility to be positively associated with risk-adjusted performance (H2a) and negatively associated with speculative behavior (H2b).

Third, research showed extraversion to be positively related to risky attitudes and bias of overconfidence (Cecchini *et al.*, 2019; Pan & Statman, 2013), hence suggesting extraverted individuals to take an excessive amount of risk, thinking that they will offset the risk with profit. Accordingly, we hypothesize extraversion to be negatively associated with risk-adjusted performance (H3a) and positively associated with speculative behavior (H3b).

Finally, past studies revealed cognitive ability to be positively related to performance (Mammadov, 2022) and negatively related to risk-aversion (Lillehold, 2019) and that the bubbles and crashes observed in experimental asset markets were driven by low levels of participant cognitive sophistication (Bosch-Rosa *et al.*, 2017). Drawing on this literature, we hypothesize cognitive ability to be positively associated with risk-adjusted performance (H4a) and negatively associated with speculative behavior (H4b).

FIGURE 2
Trading room of the university

Method

Sample and procedure

A sample of 271 undergraduate students from a Swiss university participated in the study on a voluntary basis (21% women; M_{age} = 21.61, *SD* = 1.62). We drew participants from an asset-based commodity trading course over three semesters (Fall 2017 - Fall 2018). The course covered the interdependency of spot and forward markets for consumption commodities (e.g., oil, gas). In contrast to prices of pure financial assets, the prices of consumption assets are driven by transportation and storage costs as well as convenience yield. The students were taught how to hedge energy delivery contracts with forward instruments, which are not perfectly dependent on the corresponding underlying in the spot market. They experienced the impact of basis risks as well as volume and price risks. All data were collected in class. Participants did not receive any monetary compensation for their participation. To thank students for their participation, we gave them individual feedback on their personality profile. We received ethics approval to conduct the study and all participants signed a consent form before their participation.

The study was composed of two parts, namely an online questionnaire and about two weeks later a trading session which was part of the course exam[1]. In the shoes of traders, participants were invited into a mock trading room (see Figure 2). Each student had access to two computer screens displaying a set of information (e.g., prices and volatilities in the energy available risk capital on each student portfolio, market news and trends). The students also received information on the risk policy they were required to adhere to (i.e., the available risk capital based on the value-at-risk metric). Both the revealing market information as well as the risk exposure are highly dynamic, as they depend on the dynamics of the energy markets and on the student trading decisions. Over the period of the trading session, key performance indicators are revealed, which at the end of the trading session allows for an assessment of the risk-adjusted performance and other related outcomes of each student's trading activities.

The Financial Trading System (FTS) software was used to generate market simulations (OS Financial Trading System, 2014). Taking advantage of the software's features, which stretch across virtually all asset classes and cover a wide spectrum of financial products, the co-authors developed and implemented proprietary, didactically oriented trading cases, ranging from fundamental equity trading to the replication of advanced options portfolios.

Measures

We mainly collected data through the online questionnaire, except the trading-related data which were collected during the trading session. Tables 1 and 2 report the internal reliability coefficients, means, standard deviations, and correlations among the variables included in the study.

1. Before the trading session, participants were randomly assigned to one of the two conditions in which we manipulated the presence of accountability. In the treatment condition (presence of accountability), participants were told that they would have to justify their decisions in a small written report at the end of the trading session. In the control condition (absence of accountability), participants were not told to justify their decisions. We did not find any effect of this manipulation on our metrics and thus decided to not report these results.

Personality traits

We measured the six personality traits (honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience) using the short version of the HEXACO measurement instrument (Ashton & Lee, 2009). This instrument is composed of 60 items, 10 for each trait. Items are scored on 5-point Likert-type scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We averaged items to create a single score for each trait.

TABLE 1

Internal Reliability Coefficients, Means, Standard Deviations, and Correlations between the four dependent variables (1-4), finance-related measures (5-8), and cognitive ability (9)

		α	M	SD	1		2		3		4		5		6		7	8	9
1.	RAROC		0.02	0.02	-														
2.	Profit		148630.40	136336.40	.90	***	-												
3.	Time		0.98	0.02	.02		-.10	†	-										
4.	Risk propensity		0.52	0.19	.34	***	.61	***	-.40	***	-								
5.	Risk in general		6.12	1.88	.12	*	.14	*	-.04		.12	*	-						
6.	Risk in finance		5.52	2.09	.24	***	.23	***	-.03		.16	**	.51	***	-				
7.	Mental accounting		0.35	0.96	-.02		-.04		.07		-.08		.02		-.01		-		
8.	Uncertainty avoidance	.72	3.00	0.58	-.08		-.11	†	.06		-.10		-.42	***	-.29	***	-.04	-	
9.	Cognitive ability		40.17	5.79	.19	**	.19	**	.15	*	.12	*	.03		.03		-.02	.00	-

Note: RAROC: Risk-Adjusted Return of Capital; † $p < .10$, * $p < .05$, ** $p < .01$, $p < .001$.

TABLE 2

Internal Reliability Coefficients, Means, Standard Deviations, and Correlations between the four dependent variables (1-4) and the six personality traits (5-10)

		α	M	SD	1		2		3		4		5		6		7		8	9	10
1.	RAROC		0.02	0.02	-																
2.	Profit		136336.40	148630.40	.90	***	-														
3.	Time		0.02	0.98	.02		-.10	†	-												
4.	Risk propensity		0.19	0.52	.34	***	.61	***	-.40	***	-										
5.	Honesty-humility	.75	3.05	0.64	.02		-.01		-.12	*	.03		-								
6.	Emotionality	.77	2.78	0.64	-.16	**	-.14	*	.02		-.04		.07		-						
7.	Extraversion	.76	3.68	0.55	.05		.04		-.01		-.06		.01		-.20	***	-				
8.	Agreeableness	.72	2.99	0.55	.05		.08		-.07		.10	†	.35	***	-.06		.01		-		
9.	Conscientiousness	.79	3.68	0.59	.11	†	.06		.07		-.02		.04		.04		.11	†	-.09	-	
10.	Openness	.71	3.47	0.59	-.06		-.03		-.15	*	.05		.14	*	.06		.17	**	.00	-.02	-

Note: RAROC: Risk-Adjusted Return of Capital; † $p < .10$, * $p < .05$, ** $p < .01$, $p < .001$.

Cognitive ability

We assessed participant cognitive ability using the Cattell test (Cattell *et al.* 1973). This test is a 12-minute test composed of 4 subtests. For instance, a subtest was composed of 15 series of 5 figures and participant task was to indicate which figure differs from the others. The higher the score is on this test, the higher the cognitive ability.

Risk attitudes

We measured participant risk attitudes using these two questions: "In general, are you a person who is fully prepared to take risks or do you try to avoid taking risks?" and "In financial matters, are you a person who is fully prepared to take risks or do you try to avoid taking risks?" inspired by Dohmen *et al.* (2011). Items are scored on 10-point Likert-type scales ranging from 0 (*not at all willing to take risks*) to 10 (*very willing to take risks*).

Mental accounting

We assessed participant mental accounting using the measure developed by Seiler *et al.* (2012). Mental accounting refers to the "inconsistent viewing of the value of money depending on where the money originated" (p. 19). This measure is composed of two sets of 5 scenarios on investment property and the task for participants was to indicate to what extent they would sell a home on a scale ranging from 1 (*definitely would not sell the home*) to 9 (*definitely would sell the home*) for each scenario. A mental accounting score was computed for each participant by subtracting their averaged decisions for each of the two sets of scenarios. The higher the score, the more participants possess mental accounting, meaning the greater their tendency to invest if the funds come from a larger pool than when it comes from a smaller pool.

Uncertainty avoidance

We assessed participant uncertainty avoidance using an 8-item measure (Jung, 2002). Items are scored on 5-point Likert-type scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). We averaged the items to create a single score of uncertainty avoidance.

Responsible trading performance

We captured trading performance using Risk Adjusted Return on Capital (RAROC) score inspired by McNeil *et al.*, (2015). RAROC was computed as the average cash in USD generated by each participant per trading second divided by the average risk capital used per trading second. The average risk capital, also called Value at Risk (VaR), is a standard measure of risk that is commonly used in the financial industry. VaR is an indicator of a maximum loss that a trader could incur within a specified time frame, with a certain confidence level. The higher the ratio, the better the trader was in terms of using the risk capital more effectively. In other words, a higher RAROC indicates that the trader is able to generate higher returns per unit of employed risk capital.

Speculative behavior

We measured speculative behavior, through the factor time, by dividing the number of trading seconds during which the trader was within the (predefined) risk limits by the total number of trading seconds. A higher value indicates that a trader adhered to the risk capital limits, meaning that she/he tends to show an adequate risk appetite, whereas a lower value indicates that the trader tendentially exceeded the imposed risk constraints and therefore exhibited riskier behavior.

Additional trading metrics

We also collected data on profit and risk propensity. Profit captures the trader average cash in USD generated per trading second and risk propensity captures the trader average use of the allocated risk capital expressed as a share of the trader total allocated risk capital. The variable is calculated by taking the average of the trader's own employed risk capital over time scaled by the maximum allocated risk capital. A higher value in the risk propensity variable indicates a higher risk appetite.

Results

To test our hypotheses, we performed OLS regressions with robust standard errors (Cohen *et al.*, 2003). We also report associated reduced models (marked with *) obtained using a stepwise methodology of eliminating the least significant variable, as applied in Durand *et al.* (2008, 2013). Table 3 and Table 4 report these results. It is noteworthy that we replicated these analyses while adding participant age and gender as control variables in our models and we found similar results. We did not report these analyses for parsimonious reasons.

Results of Model 1 revealed three statistically significant effects with regards to risk-adjusted trading performance (RAROC). First, results showed a positive effect of financial risk attitude ($b = 0.0026$, $p < .001$), such that the more participants were prone to take risks in financial matters, the higher their RAROC. Results also showed a positive effect of conscientiousness ($b = 0.0044$, $p = .035$) and cognitive ability ($b = 0.0006$, $p = .008$), supporting H1a and H4a. These results are confirmed when applying Model 1* (see Table 3). We did not find any other significant results, not supporting H2a and H3a. We replicated these findings using a risk-free measure (profit), with the exception that we did not find any effect of conscientiousness (see Models 2 and 2* in Table 3).

Results related to speculative behavior (factor time) revealed a statistically significant negative effect of honesty-humility ($b = -0.0042$, $p = .029$), such that high levels were related to riskier behavior identified by a tendance to exceed the imposed risk constraints (see Models 3 and 3*). We did not find any other significant results. These findings do not support H1b-H4b. Results related to risk propensity only revealed a statistically significant positive effect of risk attitude in finance ($b = 0.0145$, $p = .009$) when using the reduced model approach (see Models 4 and 4* in Table 4).

TABLE 3

Results of regression analyses testing the relationship between the two performance metrics (RAROC, profit), finance-related measures, personality traits, and cognitive ability

	RAROC				Profit			
	(1)		(1*)		(2)		(2*)	
	b	*p-value*	*b*	*p-value*	*b*	*p-value*	*b*	*p-value*
Constant	-0.0236	0.282	-0.0325	0.008	-132865.20	0.347	-105275.50	0.065
Risk in general	-0.0003	0.726			-140.25	0.978		
Risk in finance	***0.0026***	***0.000***	***0.0025***	***0.000***	***14407.01***	***0.001***	***14949.82***	***0.000***
Mental accounting	-0.0005	0.703			-6575.29	0.375		
Uncertainty avoidance	0.0003	0.911			-7747.04	0.609		
Honesty-humility	0.0022	0.303			2465.62	0.857		
Emotionality	-0.0035	0.104			-15146.31	0.269		
Extraversion	0.0009	0.725			-733.43	0.962		
Agreeableness	0.0010	0.675			19145.67	0.246		
Conscientiousness	***0.0044***	***0.035***	***0.0046***	***0.025***	21471.31	0.106		
Openness	-0.0022	0.343			-6615.74	0.657		
Cognitive ability	***0.0006***	***0.008***	***0.0007***	***0.002***	***3800.16***	***0.006***	***4271.38***	***0.001***
F	3.73	0.000	11.18	0.000	3.23	0.000	13.01	0.000
df	11, 258		3, 266		11, 258		2, 267	
R^2	0.1252		0.1061		0.1107		0.0874	

Note: Model (1) reports the results of regression analyses testing the relationship between risk-adjusted trading performance (RAROC) and all the independent variables. Model (1*) reports what we consider to be the associated reduced model using a stepwise methodology, of stepwise eliminating the least significant variable from Model (1). Model (2) reports the results of regression analyses testing the relationship between risk-free trading performance and all the independent variables. Model (2*) reports what we consider to be the best model using a stepwise methodology, of stepwise eliminating the least significant variable each time from Model (3). Reported standard errors are robust. Significance at the 5% level is in italics and in bold.

TABLE 4

Results of regression analyses testing the relationship between the two risk-related metrics (time, risk propensity), finance-related measures, personality traits, and cognitive ability

	Time				Risk propensity			
	(3)		(3*)		(4)		(4*)	
	b	*p-value*	*b*	*p-value*	*b*	*p-value*	*b*	*p-value*
Constant	0.9709	0.000	0.9922	0.000	0.2561	0.236	0.4383	0.000
Risk in general	0.0000	0.985			0.0045	0.543		
Risk in finance	-0.0005	0.391			0.0113	0.081	***0.0145***	***0.009***
Mental accounting	0.0015	0.213			-0.0159	0.162		
Uncertainty avoidance	0.0003	0.884			-0.0198	0.364		
Honesty-humility	***-0.0042***	***0.029***	***-0.0046***	***0.015***	0.0037	0.850		
Emotionality	0.0022	0.329			0.0035	0.866		
Extraversion	0.0006	0.793			-0.0353	0.134		
Agreeableness	-0.0016	0.399			0.0324	0.147		
Conscientiousness	0.0024	0.481			0.0078	0.689		
Openness	-0.0052	0.173			0.0197	0.342		
Cognitive ability	0.0007	0.135			0.0038	0.069		
F	1.40	0.172	6.00	0.015	1.99	0.030	6.98	0.009
df	11, 258		1, 269		11, 258		1, 269	
R^2	0.0689		0.0149		0.0686		0.0247	

Note: Model (3) reports the results of regression analyses testing the relationship between the factor time and all the independent variables. Model (3*) reports what we consider to be the associated reduced model using a stepwise methodology, of stepwise eliminating the least significant variable from Model (3). Model (4) reports the results of regression analyses testing the relationship between risk propensity and all the independent variables. Model (4*) reports what we consider to be the associated reduced model using a stepwise methodology, of stepwise eliminating the least significant variable from Model (4). Reported standard errors are robust. Significance at the 5% level is in italics and in bold.

Discussion

The core objective of the present study was to identify which personality traits characterized responsible trading performance. Findings show that responsible traders need to be equipped with a sound appetite for financial risk, which is kept in check by both a conscientious mindset as well as cognitive ability.

Methodological, empirical, and practical contributions

From a methodological point of view, we contribute to past research through the experimental setting we used. We collected trading data in a mock trading room setting in which students, in the shoes of traders, make trading decisions using a self-developed trading simulation software mimicking real-life trading systems. One of the main advantages of this setting is the ability for researchers to test relationships in a rigorous way by controlling the environment and avoiding unexpected external stimuli that might affect the internal validity of the research (Shadish *et al.*, 2002).

From an empirical standpoint, our work contributes to the literature on international human resource management in several ways. First, given the stability and the cross-cultural validity of the personality structure, identifying those traits allowing to select the *right* applicant in terms of responsible and successful trading is crucial to be able to give clear recommendations to practitioners not only acting on a specific domestic market but also acting on the global market. International organizations willing to develop corporate social responsibility strategies can include these criteria as part of their global human resource management practices (see Pestre, 2014).

Second, we add to the work of Durand *et al.* (2008, 2013) and Camgoz *et al.* (2011) by conducting our study in Switzerland whereas they conducted their studies in Australia and in Turkey, respectively. Comparing these contexts is crucial to better understand the effects found in these studies. To do so, we rely on the work of Hofstede (2001; see also Hofstede *et al.*, 2010) who developed a framework allowing to compare countries based on six cultural dimensions. This comparison highlighted that the three countries are culturally different. Nonetheless, Australia tends to be closer to Switzerland as compared to Turkey (see Hofstede Insights, 2018). As an example, both countries score low on the power distance dimension (vs. high in Turkey), meaning that organizational members tend to be independent and the power is decentralized (vs. centralized). Both countries are also high on the individualism dimension (vs. low in Turkey), meaning that individuals look after themselves and their immediate families and personal achievement is important (vs. importance of social groups and collective good). Hence, we might expect similar findings between these two countries (vs. Turkey). Supporting this statement, for instance, Wang *et al.* (2017) found similarities between the two cultural dimensions of power distance and individualism in terms of finance-related decisions (i.e., loss aversion).

Nonetheless, our work supports findings from Camgoz *et al.* (2011) who also found a positive effect of conscientiousness on risk-adjusted performance and contrasts those of Durand *et al.* (2008, 2013) who did not find any effect of conscientiousness. Our results also contrast these three studies given that we did not find any effect of extraversion. These findings suggest that cultural differences might not play a key role in predicting risk-adjusted performance.

As a third empirical contribution, it is noteworthy that honesty-humility is the only personality trait found to be related to speculative behavior, suggesting that speculative behavior and risk propensity are distinct phenomena. These results contradict past research on unethical behavior (e.g., Lee *et al.*, 2005) by showing a positive association between this trait and speculative behavior. Nonetheless, we noticed that all participants showed a strong tendency to stay within the risk limit most of the time given that the factor time varied between .70 and 1 (M = .98, SD = .02). These results should thus be interpreted with caution.

As a main practical contribution, the present study aims to sensitize recruiters about the importance of assessing personality traits in a pre-screening step. Institutions looking for high-performance traders might be willing to assess applicant risk attitude in finance and cognitive ability, whereas financial institutions looking for *responsible and* high-performance traders might be willing to also assess applicant level of conscientiousness. Furthermore, these personality traits can be easily assessed through an online questionnaire using for instance the HEXACO inventory that is available online in open access in more than 40 different languages (see Hexaco, 2009). Supporting the present practical contribution, research revealed that personality tests as part of a personnel selection procedure tend to be perceived positively (Anderson & Witvliet, 2008; Anderson *et al.*, 2010) and similarly across countries such as in terms of process favorability (e.g., fairness of the selection method; Anderson & Witvliet, 2008).

Limitations and future research directions

The use of a convenience sample threatens the external validity and hence the generalizability of the findings (Shadish *et al.*, 2002). Recruiting samples of traders and collecting field data constitutes a real challenge in reaching an acceptable sample size as highlighted by Durand *et al.* (2013). In our study, we draw on their insight and recruited students enrolled in a finance training program. Supporting the use of this sample, Liyanarachchi and Milne (2005) investigated investment decisions and found similar patterns of results when comparing decisions from accounting students and practitioners. Nonetheless, we call for future research to replicate our study using samples of traders both in laboratory settings and through field studies.

Further, we collected trading data in a mock trading room through a simulation software. The use of experimental procedures, including simulations and scenarios, is often criticized as being too artificial, hence threatening the external validity of the studies (Dobbins *et al.*, 1988). Nonetheless, this setting allowed having the full control of the environment and the information presented to the participants. Furthermore, to mimic real-life trading activities (in which traders' compensation depends on their investment decisions), we draw on past research (e.g., Cecchini *et al.*, 2019; Durand *et al.*, 2013) and included strong incentives to perform, such that students' success in their studies depended in part on their performance during this simulation.

It is noteworthy that during their training, these students were sensitized to risk exposure. As an idea for future research, it would be interesting to compare responsible performance between a sample that is sensitized to the topic of responsible trading and a sample that is not sensitized to this topic. Findings showing that the former are more likely to engage in responsible trading activities would have consequences in terms of training within universities, but also in terms of training within financial institutions to educate traders to the evolution of the markets and how to adapt to this change.

Finally, further research is needed to be able to give clear recommendations to practitioners. Specifically, replicating the present study in different countries would provide more evidence on the cross-cultural applicability of personality traits as an important criteria to select the *right* applicants. Furthermore, the energy market setting of our study does not allow us to generalize our recommendations to other markets. Nonetheless, studying highly unstable markets is crucial given the recurring crises weakening the global financial market stability. We suggest replicating the present study in other markets involving different degrees of stability to assess the extent to which the three main factors also apply to other markets.

Conclusion

The present research suggests that a responsible trader is a careful risk-taker, meaning that her/his performance is driven by a willingness to take financial risks, intelligently, and conscientiously. Despite the fact that further evidence is needed, our work contributes to a better understanding of the personality traits characterizing responsible successful traders. Identifying those responsible traders can be easily done during the recruitment process and can be applied across cultures. Such process would help to protect the equity capital from being misused as risk capital for covering unnecessary risk exposures and for keeping the balance sustainably among all business units of economic relevance. The latter is seen as a basis for the management of incumbent companies becoming capable to contribute to the stable growth of the economy on the global market.

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