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Does perfectionism influence individual financial risk tolerance and financial well-being? Evidence from an online survey data from the US

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Abstract

Perfectionism influences various aspects of our lives, such as academic study, music, athletics, and work. Perfectionism has two essential facets: striving and evaluative concerns. The effect of perfectionism on financial domain was rarely examined. This study aims to investigate whether perfectionism influence tolerance for financial risk, wealth accumulation and gambling behavior. We implement a cross-sectional study with an online survey sample of 661 US residents. We conduct OLS, quantile and ordered logistic regressions as well as mediation tests to examine the relationships between the variables of interest. The results suggest three findings. First, perfectionistic striving is positively associated with financial risk tolerance, but perfectionistic concerns have no impact on financial risk tolerance. Second, perfectionistic striving (concerns) positively (negatively) predicts liquid wealth mediated by investment knowledge. Third, perfectionistic concerns inhibit gambling expenditure. This study contributes to theory by documenting that perfectionism can influence financial satisfaction or well-being. The conclusions also have important implication from a policy perspective.

Keywords Perfectionism · Risk tolerance · Wealth · Gamble

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Introduction

Empirically, individuals characterized by perfectionistic striving exhibit higher academic, musical, and athletic performance (Stoeber et al. 2008) with positive affect and endurance. Such individuals are inspired to fight for what they want, to set higher standards than others', and to exert their best efforts to achieve their goals. In contrast, individuals characterized by evaluative concerns are associated with negative emotions, low self-esteem and low self-efficacy (Dunkley et al. 2003), leading to goal orientation avoidance and self-defeatism (Sagar and Stoeber 2009).

Although the effects of perfectionism on multiple domains of life (e.g., academic study, music, athletics, work) have been widely studied (Sotardi and Dubien 2019; Spagnoli et al. 2021a, b), there is a lack of evidence to support the contention that perfectionism influences individual decision-making on investments or personal financial well-being. In recent studies, personality traits have been found to play a role in financial well-being. For example, Rai et al. (2021) report that agreeableness, conscientiousness and openness among the Big Five personality traits are associated with financial risk tolerance. Conscientiousness favors sound household financial decisions, which in turn influences wealth accumulation (Xu and Yao 2022). However, little is known regarding whether and how perfectionism influences individual risk tolerance and wealth accumulation. Financial risk tolerance is the extent of financial risk a person is willing to accept (Van de Venter et al. 2012); financial risk tolerance is important because it can predict a broad range of essential economic outcomes (Guiso and Paiella 2006). At the same time, wealth drives individual well-being (Headey and Wooden 2004). Therefore, it appears worthwhile to investigate the potential effects of perfectionism on financial risk tolerance and wealth accumulation.

Recent studies have examined gambling as a form of risk-taking, especially when there is a high chance of losing and a lower chance of winning (Mishra et al. 2010). Personality traits and risk-taking have both been associated with gambling involvement. By participating in gambling, people expose their money to a potentially adverse outcome and to uncertainty (Mishra et al. 2010). Brand and Altstötter-Gleich (2008) emphasize that perfectionism can affect decision-making in risky situations when the rewards and punishments are stipulated (e.g., gambling), while other personality traits only mildly predict the variance in decisions under ambiguous conditions when there are multiple possible outcomes. However, the results of these studies are derived from neuropsychological decision-making tasks, which do not reflect daily life. More recently, personality traits have been described as vital predictors of gambling affinity (Grable et al. 2021); hence, they provide us with an excellent means to study the potential correlation between perfectionism and gambling behavior.

The purpose of this research is to examine financial risk tolerance and financial well-being. We conduct a cross-sectional analysis using OLS regression and quantile regression to investigate the relationships between the variables of interest. We use an online survey to collect information from 661 respondents

randomly selected from the US general population. More specifically, the first objective is to examine whether perfectionism is associated with financial risk tolerance and, if so, how. The second objective is to assess whether perfectionism can influence wealth accumulation through a single channel or not, such as investment knowledge. The third objective is to determine whether perfectionism plays a role in gambling expenditure.

We obtain three general findings. First, financial risk tolerance increases with the extent of perfectionistic striving, whereas evaluative concerns are not directly associated with financial risk tolerance. Second, striving (evaluative concerns) is associated with increased (decreased) investment knowledge, which is in turn associated with increased (decreased) liquid wealth. Third, perfectionistic concerns inhibit gambling expenditure.

This preliminary study has significant theoretical and empirical implications for behavioral finance. First, it reinforces the view that perfectionism has both active and negative aspects that contribute to positive or adverse consequences, respectively, for instance, increased and decreased wealth accumulation, or increased and reduced risk tolerance. Second, in regard to empirical implications, it is valuable to study the relationship between perfectionism and wealth accumulation. Concerning policy implications, related findings are useful to developing deliberate interventions to support individuals with poor financial well-being, and life satisfaction and who experience a high level of negative affect. These interventions could involve professional financial courses, adaptive perfectionism-oriented psychological counseling, or general education. Such interventions can not only teach investment knowledge but also enhance internalized standards for achievement while decreasing the propensity to fear mistakes and evaluation by others.

Literature review

Perfectionism

Frost et al. (1990) and Hewitt and Flett (1991) verified that perfectionism encompasses multiple dimensions and proposed a multiscale measurement for perfectionism. Refining all facets of the definition of perfectionism, Frost et al. (1993) suggest two core dimensions: positive strivings and negative evaluation concerns. The same authors show that evaluative concerns are associated with negative characteristics, whereas the strivings dimension is associated with positive characteristics, thus providing the first empirical evidence that there is a positive dimension of perfectionism. Other reports present evidence regarding the association between positive strivings and positive life outcomes. For example, perfectionistic striving is positively associated with positive affect, effort, academic achievement, performance and self-efficacy (Stoeber et al. 2008). Teenagers high in perfectionistic striving are subject to higher perceived responsiveness from their parents. In contrast, adolescents high in perfectionistic concerns feel low perceived responsiveness from their parents (Damian et al. 2021).

Stoeber and Otto (2006) systematically review papers that report empirical evidence of positive strivings and negative evaluation concerns, concluding that perfectionistic striving in fact occur. They also propose a conceptual framework combining striving and evaluative concerns as well as variety of perfectionists (e.g., healthy perfectionists, non-healthy perfectionists, and non-perfectionists). They challenge the widely accepted conception that perfectionism is only destructive. Because perfectionism is prevalent in society, a better understanding of its effects on individual well-being in multiple domains is necessary (Sassaroli et al. 2008).

Tools to measure multidimensional perfectionism vary. The two main measures are the Frost Multidimensional Perfectionism Scale (F-MPS) proposed by Frost et al. (1990) and the Hewitt Multidimensional Perfectionism Scale (H-MPS) introduced by Hewitt and Flett (1991). Because subsequent papers have empirically shown that active striving and negative evaluation concerns are the most common central dimensions of perfectionism, Burgess et al. (2016) recently proposed a short version of the F-MPS, known as the F-MPS-Brief, which effectively captures these two dimensions. More recently, Bento et al. (2020) developed a short form of the perfectionism scale for child and adolescents. In the present study, we use F-MPS-Brief to measure perfectionism.

Investment knowledge

In personal finance, investment knowledge is a cognitive skill similar to a language. There is no system of direct instruction to help individuals develop investment knowledge (Forbes and Kara 2010). In fact, most people lack sufficient competence in such knowledge.

The literature reveals the effect of financial knowledge on economic outcomes. First, investment knowledge is positively associated with stock ownership (Van Rooij et al. 2011). Those with high financial knowledge are more likely to engage in retirement planning, resulting in wealth accumulation (Lusardi and Mitchell 2008). Second, Stango and Zinman (2009) find that those who cannot correctly calculate interest rates tend to borrow more money and accumulate less wealth. Third, self-reported and objective financial knowledge have been shown to influence credit card behavior throughout life (Allgood and Walstad 2013). Financial knowledge is more specialized than general knowledge (education) and contributes to financial decision-making (Lusardi and Mitchell 2011). An example that explains the relationship between financial knowledge and financial decision-making is the effect of tax literacy on tax compliance. Individuals high in tax literacy are more likely to comply voluntarily (Batrancea et al. 2012, 2013; Nichita and Batrancea 2012; Batrancea and Nichita 2015; Nichita et al. 2019; Batrancea 2021).

There are three valid and reliable ways to measure financial knowledge. The first comprises three independent questions and was proposed by Lusardi and Mitchell (2011), who construct their measure using four principles: simplicity, relevance, brevity, and capacity to differentiate. The sum score of the three questions yields an individual's financial literacy. The second measure is a 13-item scale proposed by Fernandes et al. (2014). In a meta-analysis, these same authors refine their measure

with 26 items used in previous studies and report that the measure possesses high psychometric properties. A respondent's answers to the scale's items determine the respondent's financial literacy. The third measure consists of one self-reported question, as proposed by Cooper et al. (2014). A recent version of this measure uses four questions with respect to interest rates, interest compounding, inflation, and risk diversification, as suggested by Klapper and Lusardi (2020). We use the third measure, which is concise and straightforward.

Financial risk tolerance (FRT)

Van de Venter et al. (2012) define financial risk tolerance as the amount of financial risk an individual is willing to accept. Traditionally, economists have considered financial risk tolerance an objective function of real personal financial behaviors, including the risk to which the assets held by a person are exposed. Cesarini et al. (2010) confirm this argument by providing evidence that nearly 20% of the observed variance in an individual's willingness to tolerate financial risk might be due to genetic differences. Van de Venter et al. (2012) consolidate this view by presenting financial risk tolerance as a time-invariant personality trait that is unlikely to change extensively throughout an individual's life.

There are three main approaches to measuring personal financial risk tolerance. The first is a multidimensional risk measure (the GL-RTS), a 13-item index that involves the constructs of investment risk, risk comfort and experience, and speculative risk (Grable and Lytton 1999). Grable and Lytton (2003) verified this measure's validity by comparing a summary score of its 13-item scale with asset allocation choice. The second approach is a single-item measure from the Survey of Consumer Finances (SCF), a measure used in many surveys. Gilliam et al. (2010) report that both the GL-RTS and the single-item measure from the SCF are valid but that the GL-RTS has higher explanatory power than the single-item measure. The third approach is a 25-item measure developed by an Australian company (FinaMetrica Pty., Limited), and the Applied Psychology Unit of the University of New South Wales School of Psychology. Van de Venter et al. (2012) use this measure to support their findings. After balancing the explanatory power and the number of items, we chose to use the GL-RTS because long, complicated questions might lead to comprehension problems and mental fatigue among respondents.

Gambling behavior

Early research reported the association between personality and risky behavior. Gambling is a risky behavior (Soane et al. 2010) that is spreading fast and has been increasingly normalized through advertising and newly developed platforms (Abarbanel et al. 2017). However, excessive gambling has the potential to negatively influence one's financial situation, relationships, health, and employment (Browne et al. 2016). These negative outcomes can result in social inequality (Castrén et al. 2018). Thus, it is crucial to develop economic models that produce a detailed description of gambling. From a psychological perspective, personality traits can predict gambling

behavior (Soane et al. 2010). Tabri et al. (2021) state that persons with higher (relative to lower) perfectionism scores are inclined to concentrate on a particular field (e.g., appearance, financial success), which may lead to risky behaviors (e.g., weight-control, gambling) to reach a high standard of success in that field. However, Brand and Altstötter-Gleich (2008) do not find empirical correlations between the common Big Five personalities and gambling but, rather, between perfectionism and gambling. In particular, individuals with high evaluative concerns increase the number of safe choices in laboratory gambling. In addition, Karami Isheqlou et al. (2022) document that perfectionism influences our decisions in monetary gambling tasks. Hence, we expect that perfectionism may predict gambling expenditure.

Hypothesis development

Perfectionism and financial risk tolerance (H1)

We hypothesize that perfectionism influences financial risk tolerance. On the one hand, perfectionistic striving is positively correlated with positive psychological features, processes, and outcomes, such as endurance, positive affect, athletic performance, musical performance, educational performance, expectations, and hopes regarding success (Stoeber et al. 2008). Such research mainly concentrates on the work and academic areas; subsequently, Hu et al. (2021) proposed financial self-efficacy, a finance-specific self-efficacy construct, and found that it can influence general life satisfaction via investment satisfaction and sequentially via the tendency to high standards and investment satisfaction. Their paper contributed to the literature by documenting that self-efficacy can positively influence financial well-being.

In other words, general self-efficacy leads to a tendency to have high standards tendency (Rim et al. 2011). If we consider the motivational facet of financial self-efficacy, those high in financial self-efficacy tend to have confidence in their ability to reach financial goals. This belief could stimulate them to preserve and raise their standards and make further progress toward their financial goals (Lown 2011). Therefore, financial self-efficacy contributes to a tendency to hold high standards in finance (Hu et al. 2021).

In contrast, According to Giacopelli et al. (2013) suggest a positive relationship between the high standards tendency and domain-specific satisfaction. In addition, financial risk tolerance improves financial satisfaction (Joo and Grable 2004; Firli et al. 2021). Furthermore, financial self-efficacy is positively related to risk-taking (Montford and Goldsmith 2016). Therefore, we hypothesize that perfectionism affects financial risk tolerance.

Second, perfectionistic striving is positively linked with self-efficacy and aspiration level (Stoeber et al. 2008). Self-efficacy is a personal resource that involves the positive self-belief in an individual's capabilities to exercise control over a variety of challenging tasks and to address negative Schwarzer events (Schwarzer and Jerusalem 1995). Consequently, self-efficacy is positively associated with risk-taking (Krueger and Dickson 1994). Pinjisakikool (2018) reports that household financial

behavior is affected by personal traits via financial risk tolerance. Therefore, we hypothesize as follows:

H1a Perfectionistic striving is positively associated with financial risk tolerance.

In contrast, perfectionistic concerns are typically associated with negative emotions, low self-esteem, low self-efficacy, and fear of failure (Dunkley et al. 2003; Stoeber and Otto 2006). Second, perfectionistic concerns are negatively associated with self-efficacy and aspiration level (Stoeber et al. 2008). In addition, Brand and Altstötter-Gleich (2008) argue that individuals with severe perfectionistic concerns may tend to make non-risky choices to avoid mistakes. Hence, we anticipate the following:

H1b Perfectionistic concerns are negatively associated with financial risk tolerance.

Perfectionism is a personality trait that typically compels individuals to strive for higher standards and leads to critical self-evaluations; perfectionism is sustainable and relatively stable (Rice and Aldea 2006). Financial risk tolerance is also a stable trait that is less likely to change as time passes.

Mediating role of investment knowledge (H2)

We hypothesize that investment knowledge mediates the relationship between perfectionism and the accumulation of liquid wealth. The rationale behind this hypothesis is that personality type is generally associated with knowledge, and knowledge predicts performance. In this paper, perfectionism is a type of personality trait, and investment knowledge is specific knowledge in the finance domain that affects an individual's ability to plan and implement a regular investment program (Van Rooij et al. 2011). Wealth accumulation is performance that directly influences financial well-being. What is the justification for creating a link between perfectionism and investment knowledge? First, perfectionism is internally motivated (Stoeber and Stoeber 2009). Second, acquiring new knowledge entails dutiful deference to self-interests and personal goals, such as acquiring capital income by investment and subsequently achieving financial freedom, or maintaining good financial well-being. More specifically, perfectionistic striving is positively associated with self-efficacy and aspiration level (Stoeber et al. 2008), whereas self-efficacy is positively related to mental effort and achievement (Schunk 1991). Self-efficacy is also positively associated with learning (Martocchio and Judge 1997). Common sense suggests that learning is positively associated with knowledge acquisition. Hence, we anticipate that perfectionistic striving is positively associated with investment knowledge. Moreover, financial knowledge is positively associated with wealth accumulation (Van Rooij et al. 2012). Therefore, we propose the following hypothesis:

H2a Investment knowledge mediates the relationship between perfectionistic striving and liquid wealth.

On the other hand, perfectionistic concerns are negatively associated with self-efficacy and aspiration level (Stoeber et al. 2008), whereas self-efficacy is positively associated with mental effort and achievement (Schunk 1991). In addition, self-efficacy is positively associated with learning (Martocchio and Judge 1997). Common sense suggests that learning is positively associated with knowledge acquisition. Therefore, we anticipate that perfectionistic concerns are negatively associated with investment knowledge. Moreover, financial knowledge is positively associated with wealth accumulation (Van Rooij et al. 2012). Therefore, we offer the following hypothesis:

H2b Investment knowledge mediates the relationship between perfectionistic concerns and liquid wealth.

Perfectionism and monthly gambling expenditure (H3)

Decision-making under risk appears to be differentially linked to distinct facets of perfectionism (Brand and Altstötter-Gleich 2008). We hypothesize that individuals with high personal standards (high striving) may tend to spend more money on gambling if they have been participating in gambling because they can offset the financial risk by the prospect of obtaining more money from gambling. We also hypothesize that individuals with intensive concerns about mistakes or doubts regarding outcomes (high evaluative concerns) are more likely to spend less money on gambling if they have been participating in gambling because they may prefer to optimize the consequences of their financial decisions and to dodge mistakes and subsequently avoid negative feedback (Brand and Altstötter-Gleich 2008). Based on this discussion, we hypothesize as follows:

H3a Evaluative concerns are negatively associated with monthly gambling expenditure.

H3b Striving is positively associated with monthly gambling expenditure.

Data description

Sampling

We used a web survey after sending email invitations to potential respondents. The email contained basic information about the research content and the incentives for the respondents as well as a link to the online survey. More specifically, we used a sampling service purchased from an online panel vendor, Qualtrics, whose panel

team supports survey construction by providing an assistant to develop complicated electronic questionnaires, distribute the survey to an established panel group and record the results.

We designed a questionnaire that included questions eliciting demographic information (12 questions), and questions about perfectionism (8 questions), investment knowledge (5 questions), financial risk tolerance (11 questions) and financial behaviors (5 questions). We administered the survey twice. In the first round, we collected data from a population of individuals ranging in age between 18 and 54 years (group A). In the second round, we collected data from a population of individuals older than 55 years (group B). For group A, we distributed 524 questionnaires and received 365 completed surveys. Therefore, the response rate for group A was 69.6%. The remaining 159 questionnaires were marked as nonresponses, primarily for four reasons: not eligible (82), screened out by attention filters (37), unwilling to participate (38) and excessive time duration (2). Subsequently, we further excluded 64 answers because of outliers, straight-liners or unreasonable responses (e.g., an answer unrelated to an open question). Therefore, for group A, there were 301 valid questionnaires. There were no missing values because we set "force response" (i.e., respondents must answer all questions) for the entire survey, and we compensated respondents financially after the survey. For group B, we distributed 461 questionnaires and received 378 completed responses. Hence, the response rate for group B was 82.0%. There were 83 questionnaires marked as nonresponses, generally because of unwillingness to participate (71) and attention (12). Moreover, we excluded an additional 18 responses due to outliers. Hence, we had 360 valid questionnaires for group B, which did not involve missing data because here too we set "force response". We provided the respondents with a financial incentive to complete the questionnaire. In total, we obtained data from 661 individuals across different age subpopulations who were US citizens and could access the internet. Thus, the final response rate was 75.4%.

Data validity

Web surveys are much faster than traditional face-to-face or postal surveys, which saves researchers time. In our case, the Qualtrics panel teams distributed our survey to reliable and targeted groups in the panel with an email invitation. Qualtrics provides multiple digital platforms for participants to access web surveys without geographic or time restrictions. Furthermore, web surveys typically have fewer unanswered questions than traditional paper-and-pencil surveys (de Rada and Domínguez-Álvarez 2014).

However, certain risks are associated with the disadvantages of web surveys and the solutions used to overcome them. First, there can be problems with the response rate. In our case, we addressed this issue by offering the respondents financial incentives. As previously mentioned, the final response rate was 75.4%, which was higher than the minimum criterion (60%) and within the target interval (70–85%) recommended by Singleton et al. (2010). The second problem pertains to coverage. Ideally, when internet penetration is 100%, web surveys will fully cover the general

population. In reality, Internet penetration in the US is currently 87.9%, which is close to full coverage, indicating limited under-coverage bias. The third potential problem is self-selection bias, which is the main limitation of web survey research. To diminish self-selection bias, Qualtrics sends potential respondents one email invitation containing the internet link to the survey and basic information (Aftha-norhan et al. 2021; Al Halbusi et al. 2021a, b), such as the research purpose of the survey, how much time the survey will take and the incentives being offered. No specific survey question is disclosed in the email invitation. In addition, Qualtrics proportionally selects a sample from the general population and randomizes it before sending the survey link. The next drawback concerns fraudulent respondents. The Qualtrics panel team confirms respondent identity using TrueSample, Verity, Smart-Sample, USPS verification, and digital fingerprinting. Furthermore, the panel team authenticates the addresses, demographic details, and email addresses of respondents, and ensures that each valid response has a unique IP address.

We collected our data based on simple random sampling. This approach is vital to ensuring that when a large number of samples are drawn, the mean of the sample represents the general population. However, applying this approach does not mean that one specific sample perfectly represents the general population. Rather, simple random sampling enables us to generalize and make externally valid conclusions regarding the general population based on our sample. Our data are from a geographically dispersed population, which is an advantage of a web-based survey. Consequently, to detect potential geographical bias, we visualized the distribution of participants on a flat map of the US (prepared in Excel 2016) showing the population density of the US in 2010 according to the US Census Bureau. On the map, each blue solid point represents the location of one participant. From the perspective of geography, our respondents were located across the US. They were clustered heavily on the east coast, modestly on the south-west coast, and mildly in the middle part of the country. Figure 1 shows that the US Census data and our sample share similar geographic features with regard to population density. Therefore, we believe
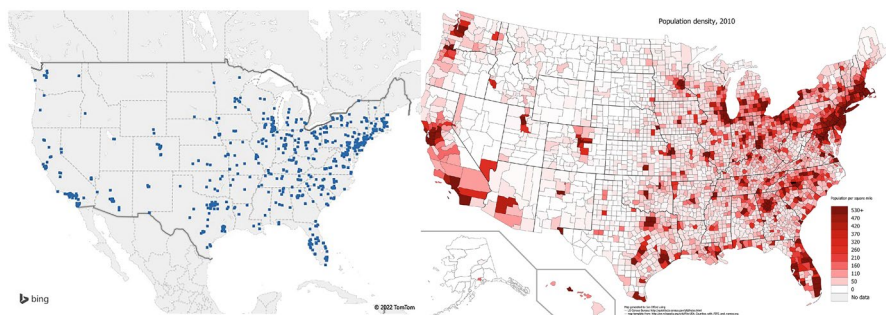
Fig. 1 depicts the locations of the respondents from the US in our sample (left) and the population density of the US in 2010 according to the US Census Bureau (right). Each blue solid point represents the location of one participant. From the perspective of geography, our sample is distributed randomly across the US. The right diagram displays the population density of the US in 2010 (map source: http://backs tory.us/; data source: the US Census Bureau http://quickfacts.censuss.gov/qfd/index.html

Table 1 Demographic information of the survey respondents

Household income	Obs	%	Age	Obs	%
< $50,000	321	48.56	< 30	2	0.30
$50,000–$99,999	266	40.24	30–39	137	20.73
$100,000–$149,999	43	6.5	40–49	105	15.89
$150,000 or more	31	4.7	50–59	164	24.81
			60–69	176	26.63
Education			70–79	69	10.44
Less than high school	7	1.06	80–90	8	1.2
High school	132	20.00			
Some college	163	25.66	Liquid assets		
Associate degree	109	16.49	< 10,000	288	43.57
Bachelor degree	165	24.96	10,000–49,999	99	14.98
Master degree	74	11.19	50,000–100,000	101	15.43
Doctorate	11	0.64	> 100,000	172	26.02

that our survey data are sufficiently representative of the general population of the US and of good quality for further empirical analysis. Table 1 provides the demographic information of the survey respondents.

As shown in Table 1, the majority of survey respondents range from 30 to 69 years of age (88.06%). A total of 250 of the 661 respondents had a bachelor or a higher. Nearly half of respondents had a household income less than $50,000 per year. In addition, 288 (43.57%) respondents had liquid assets less than $10,000.

Data measurement and description

We include the perfectionism measures, financial risk tolerance, investment knowledge, and demographic variables in the statistical model. In the following, we introduce the measurements of the variables and their corresponding abbreviations. Tables 2 and 3 report the number of observations, means, standard errors, minimums, maximums, skewness and kurtosis of the variables. Table 4 presents Kendall's correlation matrix of the variables of interest, which provides initial insights into the relationships between them. More specifically, striving (average) is significantly correlated with FRT ($r = 0.2016$; $p < 0.001$), at a moderate level. Striving (average) is also significantly associated with investment knowledge ($r = 0.1597$; $p < 0.001$) and liquid wealth ($r = 0.0980$; $p < 0.001$), at a moderate level and a weak level, respectively. Furthermore, investment knowledge is significantly correlated with liquid wealth ($r = 0.3432$; $p < 0.001$), at a moderate level.

First, we use the mean indicator from the eight-item perfectionism scale (F-MPS-Brief) proposed by Burgess et al. (2016) to measure the two facets of perfectionism: perfectionistic striving and perfectionistic concerns. Each item uses a 5-point Likert-type indicator, ranging from 1 = strongly disagree to 5 = strongly agree. The brief version of the F-MPS represents a concise tool for measuring perfectionism and has been shown to be valid and reliable in terms of internal consistency, measurement

Table 2 Summary statistics of the entire sample

Variables	Entire sample (1)					
	Mean	SD	Min	Max	Skewness	Kurtosis
Main variables						
Perfectionism (striving)						
PS1	3.527	1.076	1	5		
PS2	3.313	1.152	1	5		
PS3	3.288	1.013	1	5		
PS4	3.641	0.986	1	5		
Perfectionism (evaluative concern)						
PEC1	2.121	1.188	1	5		
PEC2	1.904	1.016	1	5		
PEC3	2.180	1.112	1	5		
PEC4	2.998	1.383	1	5		
Striving (average)	3.443	0.861	1	5	− 0.487	3.083
Evaluative concern (average)	2.306	0.778	1	5	0.387	2.899
FRT	24.588	5.111	14	39	0.179	2.540
FL	8.726	2.481	2	13	− 0.222	2.256
Log_monthly_gambling	1.344	2.109	0	10.13	1.373	3.920
Investment knowledge	2.370	1.120	1	5	0.471	2.425
Control variables						
Age	5.372	1.364	0.5	8.8	− 0.152	2.162
Log_Annual_hincome	10.685	1.109	0	18.42	− 2.936	30.193
Education	3.845	1.402	1	7	1.137	1.980
Male	0.334		0	1	0.702	1.493
Marital_status	0.644		0	1		
No_dep	1.099	1.358	0	10	1.707	8.006
Religion	0.717		0	1	− 0.963	1.929
White_race	0.873		0	1	− 2.239	6.014
Log_liq_asset	8.572	4.390	0	20.72	− 0.962	2.852
Employment	0.641		0	1	− 0.589	1.347
Number of observations	661					

We measure striving with an average indicator *Striving (Average)* based on four 5-scale items. We measure evaluative concern with an average indicator *Evaluative concern (Average)* based on 5-scale items. Financial risk tolerance is denoted *FRT*. Financial literacy is denoted *FL*. The logarithm of liquid assets is denoted *Log_Liq_asset*. *Investment knowledge* is the knowledge possessed by individuals who capable of making investment decisions, managing their portfolios, and tracking financial markets. The control variables include age/10 (*Age*), annual household income (Log_*Annual_hincome*), educational attainment (*Education*), gender (*Male*), whether married or living with a partner (*Marital status*), whether the individual is Caucasian (*White_race*), the number of dependent children (*No_dep*), and whether the respondent has religious beliefs (*Religion*). *Log_Monthly_gambling* denotes the logarithm of monthly expenditure on gambling

Table 3 Summary statistics of gambling sample

Variables	Gambling group (2)					
	Mean	SD	Min	Max	Skewness	Kurtosis
Main variables						
Perfectionism (striving)						
PS1	3.604	0.995	1	5		
PS2	3.511	1.023	1	5		
PS3	3.337	0.964	1	5		
PS4	3.760	0.889	1	5		
Perfectionism (evaluative concern)						
PEC1	2.275	1.226	1	5		
PEC2	1.937	1.006	1	5		
PEC3	2.137	1.087	1	5		
PEC4	3.022	1.170	1	5		
Striving (average)	3.553	0.745	1	5	− 0.701	3.952
Evaluative concern (average)	2.343	0.779	1	4.75	0.265	2.537
FRT	26.24	4.948	15	39	0.076	2.626
FL	8.666	2.591	4	13	− 0.079	1.919
Log_monthly_gambling	3.949	1.665	0.690	10.13	0.702	3.791
Investment knowledge	2.600	1.110	1	5	0.208	2.265
Control variables						
Age	5.267	1.381	0.5	8.1	− 0.176	2.429
Log_Annual_hincome	10.780	1.218	0	13.53	− 5.256	42.171
Education	3.911	1.333	2	7	0.185	2.020
Male	0.426		0	1	0.296	1.088
Marital_status	0.724		0	1	− 1.005	2.009
No_dep	1.386	1.537	0	10	1.884	9.295
Religion	0.733		0	1	− 1.055	2.113
White_race	0.866		0	1	− 2.157	5.653
Log_liq_asset	9.229	3.800	0	18.42	− 1.298	4.178
Employment	0.657		0	1	− 0.749	1.562
Number of observations	225					

We measure striving with an average indicator *Striving (Average)* based on four 5-scale items. We measure evaluative concern with an average indicator *Evaluative concern (Average)* based on 5-scale items. Financial risk tolerance is denoted *FRT*. Financial literacy is denoted *FL*. The logarithm of liquid assets is denoted *Log_Liq_asset*. *Investment knowledge* is the knowledge possessed by individuals who capable of making investment decisions, managing their portfolios, and tracking financial markets. The control variables include age/10 (*Age*), annual household income (Log_*Annual_hincome*), educational attainment (*Education*), gender (*Male*), whether married or living with a partner (*Marital status*), whether the individual is Caucasian (*White_race*), the number of dependent children (*No_dep*), and whether respondent has religious beliefs (*Religion*). *Log_Monthly_gambling* denotes the logarithm of monthly expenditures on gambling

Table 4 Kendall's correlation matrix

	Evaluative concern (Average)	FRT	Investment knowledge	Log_liq_asset	Log_monthly_gambling
(1) Striving (average)	0.0589 (0.5649)	0.2016*** (0.0000)	0.1597*** (0.0000)	0.0980*** (0.0059)	0.0779 (0.1653)
(2) Evaluative concern (average)		0.0453 (1.0000)	− 0.0357 (1.0000)	− 0.0155 (1.0000)	0.0182 (1.0000)
(3) FRT			0.2647*** (0.0000)	0.1839*** (0.0000)	0.2006*** (0.0000)
(4) Investment knowledge				0.3432*** (0.0000)	0.1395*** (0.0001)
(5) Log_liq_asset					0.0772 (0.1500)

, and * indicate significance at the 5% level (2-sided) and 1% level, respectively. P values are in parentheses. The number of observations is 661

equivalence across ethnicities and concurrency, as well as convergence (Burgess et al. 2016). Specifically, we denote PS1, PS2, PS3 and PS4 as the items with which to construct striving, and we select PEC1, PEC2, PEC3 and PEC4 to construct evaluation concerns. The higher the score of each PS (PEC) is, the more likely that the respondent is an adaptive (maladaptive) perfectionist.

We use an average indicator to measure striving and evaluative concerns. We tested the reliability of this measure with Cronbach's alpha. Hinton et al. (2014) proposed four interval-based categories to assess the reliability of the summative scale (Likert 1932): excellent reliability (0.90 and above), high reliability (0.70–0.90), moderate reliability (0.50–0.70), and low reliability (0.50 and below). In particular, we calculate the arithmetic mean value of PS1, PS2, PS3, and PS4 to construct *Striving (average)*. Its Cronbach's alpha=0.829, indicating that it is highly reliable (Hinton et al. 2014). Similarly, we calculate the arithmetic mean value of PEC1, PEC2, PEC3, and PEC4 to construct *Evaluative concerns (average)*. Its Cronbach's alpha=0.641, which is moderately reliable (Hinton et al. 2014).

Second, financial risk tolerance is a latent term that indicates the extent of financial risk that an individual can tolerate in making financial decisions (Grable and Lytton 1999). We employ a 13-item instrument (for details, see Supplementary A) to construct a sum-index, in which a higher score indicates a greater level of risk tolerance, as proposed by Grable and Lytton (1999). We use this index to measure financial risk tolerance (*FRT*), which ranges from 13 to 47.

Third, investment knowledge is possessed by individuals who capable of making investment decisions, managing their portfolios, and tracking financial markets. We use a self-reported five-scale variable, proposed by Cooper et al. (2014), to measure investment knowledge. A higher score indicates a higher level of investment knowledge. We define this variable as *Investment knowledge*.

We subsequently perform log transformations of liquid assets (e.g., money in savings and checking accounts, stocks, and bonds) because log transformation can help normalize continuous data. These variables are nonnegative and continuous and defined as *Log_Liq_asset* in the subsequent analysis.

We adopt gender, age, marital status, income, education (Al Halbusi et al. 2021a, b), race, number of dependents, employment status, and religion as control variables. *Age* measures the quotient of the age of an individual divided by 10. *Education* measures the highest educational attainment of a person, ranging from 1 (less than high school) to 7 (doctorate). *Male* is a dichotomous variable coded 1 for male and 0 otherwise. *Marital_status* is a binary variable coded 1 for living with a partner and 0 otherwise. *Religion* is a binary variable coded 1 for an individual who believes he or she belongs to a religion and 0 otherwise. *White_race* is a dichotomous variable coded 1 if an individual is Caucasian and 0 otherwise. *No_dep* defines the number of dependent children in the respondent's household, which is nonnegative and discrete. *Log_Annual_hincome* is the logarithmic form of the annual income of a household before taxes. *Employment* is a binary variable that takes the value of 1 if an individual has a job or is self-employed, and 0 otherwise. The original survey questions for these variables are provided in Supplementary A.

Methods

Econometric model for testing the link between perfectionism and risk tolerance (H1)

The first objective of this paper is to investigate the effect of perfectionism on financial risk tolerance. We use OLS regression and quantile regression, as the benchmark techniques. We use ordered logistic regression as robustness check. In particular, the OLS technique verifies the relationship between one or more independent variables and the conditional mean of the dependent variable. Quantile regressions can characterize the entire conditional distribution of a dependent variable given a number of regressors. The quantile regression's objective function is a weighted sum of absolute deviations, which provides a robust measure of location. Thus, the estimated coefficient vector is not sensitive to outlier observations of the dependent variable. We use the 10th, 25th, 50th, 75th, and 90th quantile regressions and examine the significance of the estimators by applying bootstrapped standard errors based on 1000 replications.

The OLS model is specified as follows:

$$FRT_i = Striving_i\beta + Evaluative_i\varphi + X_i\gamma + \alpha_i \tag{1}$$

FRT_i is individual i's level of financial risk tolerance. $Striving_i$ denotes the level of the positive aspect of perfectionism of individual i. $Evaluative_i$ represents the level of the negative aspect of perfectionism of individual i. X_i is a vector of the control variables, which include gender, age, employment status, educational attainment, race, religion, annual income of the household, number of dependent children, marital status, liquid wealth, and self-reported investment knowledge. α_i is the error term. Note that it is important to assess both perfectionistic striving and perfectionistic concerns simultaneously when investigating the empirical correlation between perfectionism and other variables of interest because perfectionistic concerns can overpower the relationship between perfectionistic striving and positive life outcomes (Hill et al. 2010).

We fit the following quantile model:

$$FRT_i(\tau) = Striving_i\beta(\tau) + Evaluative_i\varphi(\tau) + X_i\gamma(\tau) + \alpha_i(\tau) \tag{2}$$

$FRT_i(\tau)$ is the τth conditional quantile of the degree of individual i's financial risk tolerance. $\beta(\tau)$ $(\varphi(\tau))$ is the corresponding coefficient of the level of positive (negative) aspect of perfectionism of individual i at the τth conditional quantile. $\gamma(\tau)$ is a vector of the coefficients of the control variables at the τth conditional quantile. Furthermore, $\alpha_i(\tau)$ indicates the τth conditional quantile of the error terms.

Ordered logistic model is used to check robustness of results.

We apply OLS and quantile regressions as well as ordered logistic model successively to examine whether there is a significant relationship between perfectionism and financial risk tolerance in the entire sample.

Investment knowledge as a mediator between perfectionism and liquid wealth (H2)

The second objective of this paper is to examine whether investment knowledge mediates the effect of perfectionism on liquid wealth. The direct and indirect effects of perfectionism are obtained from the results of two linear models. To test H2a, the relationship between striving, liquid wealth, and investment knowledge is estimated from perfectionism:

$$Invest\_know_i = a_{21}Striving_i + Evaluative_i\varphi + X_i\gamma + \alpha_i \tag{3}$$

Subsequently, liquid wealth is estimated from both striving and investment knowledge:

$$Liq\_assest_i = c'_{21}Striving_i + b_{21}Invest\_know_i + Evaluative_i\varphi' + X_i\gamma' + \alpha'_i \tag{4}$$

The direct effect of perfectionistic striving on liquid wealth is estimated with c'_{21} in Eq. (4). This parameter measures how much two cases that differ in striving by one unit are estimated to differ in liquid wealth independent of the effect of investment knowledge on liquid wealth. The indirect effect of striving on liquid wealth through investment knowledge is estimated by $a_{21} \times b_{21}$, which represents the product of the effect of striving on investment knowledge (a_{21} in Eq. 3) and the effect of investment knowledge on liquid wealth while controlling for striving (b_{21} in Eq. 4).

Similarly, to test H2b, i.e., the relationship between evaluative concern and liquid wealth, one estimates investment knowledge from perfectionism:

$$Invest\_know_i = a_{22}Evaluative_i + Striving_i\varphi + X_i\gamma + \alpha_i \tag{5}$$

Liquid wealth is then estimated from both evaluative concern and investment knowledge:

$$Liq\_assest_i = c'_{22}Evaluative_i + b_{22}Invest\_know_i + Striving_i\varphi' + X_i\gamma' + \alpha'_i \tag{6}$$

The direct effect of evaluative concerns on liquid wealth is estimated with c'_{22} in Eq. (6). This parameter measures how much two cases differing in evaluative concerns by one unit are estimated to differ in liquid wealth independent of the effect of investment knowledge on liquid wealth. The indirect effect of evaluative concerns on liquid wealth through investment knowledge is estimated by $a_{22} \times b_{22}$, which represents the product of the effect of evaluative concerns on investment knowledge (a_{22} in Eq. 5) and the effect of investment knowledge on liquid wealth while controlling for striving (b_{22} in Eq. 6).

We determine whether there is a mediation effect by following the decision tree proposed by Zhao et al. (2010). We explain five terms in the boxes, developed by Zhao et al. (2010), which include three types of mediation analysis and two types of non-mediation. Complementary mediation refers to when an indirect effect ($a \times b$) and a direct effect (c') both exist and have the same sign. Competitive mediation refers to when an indirect effect ($a \times b$) and a direct effect (c') both exist but have opposite signs. Indirect-only mediation (full mediation) refers to

the existence of an indirect effect ($a \times b$) but without a direct effect (c'). Direct-only non-mediation refers to the existence of a direct effect (c') but without an indirect effect.

Therefore, if we detect a mediation effect, we proceed to the bootstrap test, as proposed by Preacher and Hayes (2004, 2008), to verify the significance of the indirect effect ($a \times b$). In contrast to the Sobel test (1982), this test does not require a sampling distribution of the indirect effect to be normal, and it is more powerful (Williams and MacKinnon 2008). We perform the bootstrap tests in SPSS Process.

Link between perfectionism and monthly gambling behavior (H3)

The final objective of this paper is to examine, in the gambling subsample, whether perfectionism affects monthly expenditure on gambling. We use OLS regression and quantile regression, as the benchmark techniques. The OLS technique verifies the relationship between one or more independent variables and the conditional mean of the dependent variable. Quantile regressions develop the regression model to estimate the conditional quantiles of the dependent variable. This method is prefer-able when there is heteroscedasticity in the dataset. Quantile regressions are also a useful means to increase the robustness of the results. They are independent of the assumptions of the normal distribution of the error term and are robust when there are outliers in the dependent variable. We use the 10th, 25th, 50th, 75th, and 90th quantile regressions, and we examine the significance of the estimators by applying bootstrapped standard errors based on 1000 replications.

The OLS model is specified as follows:

$$Monthly\ Gambling_i = Striving_i\beta + Evaluative_i\varphi + X_i\gamma + \alpha_i \tag{7}$$

where $Monthly\_Gambling_i$ denotes the logarithm of the monthly expenditure on gambling of individual i. $Striving_i$ denotes the level of the positive aspect of perfectionism of individual i. $Evaluative_i$ represents the level of the negative aspect of perfectionism of individual i. X_i is a vector of the control variables, which include gender, age, employment status, educational attainment, race, religion, annual household income, number of dependent children, marital status, liquid wealth, self-reported investment knowledge, financial risk tolerance and financial literacy. α_i indicates the error term.

We fit the following quantile model:

$$Monthly\ Gambling_i(\tau) = Striving_i\beta(\tau) + Evaluative_i\varphi(\tau) + X_i\gamma(\tau) + \alpha_i(\tau) \tag{8}$$

where $Month\_Gambling_i(\tau)$ is the τth conditional quantile of the logarithm of indi-vidual i's monthly expenditure on gambling. $\beta(\tau)$ ($\varphi(\tau)$) is the corresponding coef-ficient of the level of the positive (negative) aspect of perfectionism of individual i at the τth conditional quantile. $\gamma(\tau)$ is a vector of the coefficients of the control variables at the τth conditional quantile. $\alpha_i(\tau)$ indicates the τth conditional quantile of the error terms.

Table 5 Quantile regression and OLS regression as well as ordered logistic regression results for the effect of perfectionism on financial risk tolerance in the entire sample

	Quantile regressions					OLS	OLOGIT
	10%	25%	50%	75%	90%		
Main effect							
Striving (average)	0.877** (0.315)	0.685** (0.282)	0.809*** (0.280)	0.943*** (0.333)	1.488*** (0.394)	0.938*** (0.200)	0.364*** (0.084)
Evaluative concerns (average)	−0.076 (0.385)	−0.077 (0.250)	−0.199 (0.365)	−0.196 (0.408)	0.203 (0.504)	−0.113 (0.231)	−0.050 (0.098)
Control effect							
Male	1.182 (0.628)	1.371*** (0.502)	2.122*** (0.523)	2.081*** (0.620)	2.002*** (0.700)	1.721*** (0.371)	0.736*** (0.156)
Age	−0.618** (0.289)	−0.712*** (0.274)	−0.880*** (0.222)	−0.949*** (0.264)	−1.129*** (0.349)	−0.886*** (0.178)	−0.346*** (0.074)
Employment	1.450 (0.853)	1.842*** (0.683)	1.852*** (0.619)	1.691(0.755)	0.663 (0.954)	1.364*** (0.471)	0.624*** (0.197)
Education	0.304 (0.201)	0.289 (0.181)	0.254 (0.166)	0.275 (0.220)	0.092 (0.276)	0.222** (0.136)	0.101 (0.058)
White_race	−0.060 (1.005)	−0.963*** (0.897)	−1.008 (0.606)	0.462 (0.680)	0.372 (1.016)	−0.376 (0.498)	−0.208 (0.206)
Religion	−0.518 (0.603)	−0.658 (0.525)	−0.435 (0.503)	−0.042 (0.660)	−0.278 (0.719)	−0.360 (0.378)	−0.162 (0.153)
Log_Annual_hin-come	0.104 (0.289)	0.007 (0.286)	0.306 (0.273)	−0.182 (0.458)	−0.522 (0.356)	0.004 (0.210)	0.031 (0.092)
No_dep	0.148 (0.190)	0.103 (0.190)	−0.029 (0.217)	0.039 (0.236)	0.362 (0.320)	0.086 (0.142)	0.017 (0.060)
Marital_status	0.314 (0.636)	−0.347 (0.543)	−0.660 (0.492)	0.232 (0.607)	0.535 (0.824)	−0.171 (0.382)	−0.137 (0.162)
Log_Liq_asset	0.176** (0.075)	0.166*** (0.056)	0.096 (0.064)	0.038 (0.096)	0.170 (0.010)	0.129*** (0.048)	0.052** (0.020)
Investment knowl-edge	0.304 (0.362)	0.683*** (0.242)	1.101*** (0.224)	0.934*** (0.283)	0.616 (0.337)	0.741*** (0.170)	0.317*** (0.071)
Pseudo R2 (R2 in OLS)	0.181	0.197	0.196	0.170	0.181	0.297	0.063
Number of observations	661	661	661	661	661	661	661

The dependent variable is financial risk tolerance (FRT). This table reports the coefficients of the quantile regression and OLS regression as well as ordered logistic regression regarding the effect of striving and evaluative concerns on FRT. For the quantile regression, bootstrapped standard errors are in parentheses for 1,000 bootstrap replications. For the OLS regression and ordered logistic regression, the robust standard errors are in parentheses. **, and *** indicate significance at the 5% level (2-sided) and 1% level, respectively. No multicollinearity was detected after implementing the VIF test

Ethical approval

This study was approved by the Ethical Committee of the University of Southampton (Submission ID: 20738). The ethical principles of the University of Southampton were followed. All respondents signed informed consent forms before participating in the survey.

Results

Perfectionism as a predictor of individual financial risk (H1)

Table 5 reports the coefficients in the OLS and quantile regressions as well as ordered logistic regression. We find that the coefficients before (after) quantile regression are smaller (greater) than the coefficient of the OLS regression. In addition, the estimators of evaluative concerns are not significant in the quantile regressions or OLS regression or ordered logistic regression. Several control variables predict financial risk tolerance. For instance, compared with females, males tend to have a higher level of financial risk tolerance. Older people tend to tolerate less financial risk than younger people do. Moreover, financial literacy and employment are both positive predictors of financial risk tolerance.

Investment knowledge as a mediator between perfectionism and liquid wealth (H2)

OLS regression analyses were conducted to investigate the mediation effect of investment knowledge on the relationship between striving (average) and the accumulation of liquid assets. The overall regression model was statistically significant ($R^2 = 0.179$, $F[648] = 11.702$, $p < 0.001$). First, striving (average) is positively associated with investment knowledge (path a: coefficient is 0.208, SE $= 0.048$, and $p < 0.001$).

Second, investment knowledge is positively associated with the relationship between striving and liquid assets (path b: coefficient is 1.035, SE $= 0.140$, $p < 0.001$). The significance of path a and path b implies that there is a mediation effect. To further test the significance of this mediation effect (indirect effect $a*b$), we use the bootstrapping method with bias-corrected confidence estimates. The 95% confidence interval of the indirect effect is taken with 5000 bootstrap resamples (Preacher and Hayes 2008). If the confidence intervals of estimators do not contain 0, the indirect effect is significantly different from zero. The results of the bootstrap test suggest that investment knowledge mediates the link between striving and liquid wealth (indirect effect $= a*b = 0.208*1.035 = 0.216$, SE $= 0.057$, CI $=$ from 0.119 to 0.343). In addition, the total effect (path $c = 0.443$, SE $= 0.182$, $p = 0.015$) is significant, while the direct effect (path $c' = 0.216$, SE $= 0.177$, $p = 0.199$) is
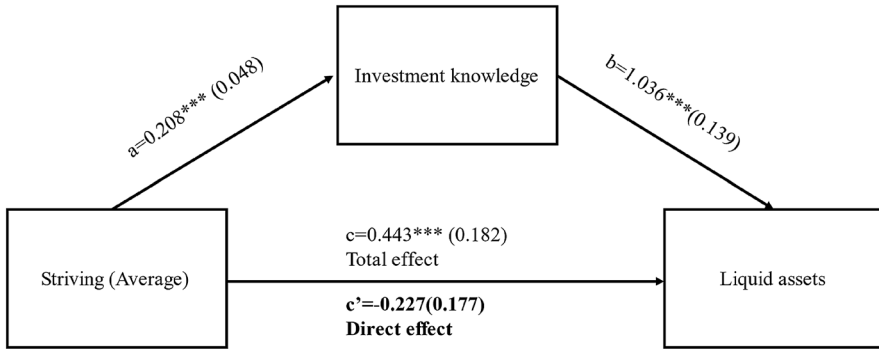
Fig. 2 The indirect effect of striving on liquid assets through investment knowledge is statistically significant ($a*b = 0.215$, SE $= 0.057$, 95% CI $= [0.119, 0.343]$). The bootstrapped resampling is 5000. $**p < 0.05$, $***p < 0.01$

non-significant, indicating a full mediation effect. Therefore, we can conclude that investment knowledge fully mediates the relationship between striving and liquid wealth. Figure 2 displays the corresponding results.

Similarly, OLS regression was conducted to investigate the mediation effect of investment knowledge on the relationship between evaluative concerns (average) and the accumulation of liquid wealth. The overall regression model is statistically significant ($R^2 = 0.357$, $F[647] = 30.153$, $p < 0.001$). First, evaluative concerns (average) are negatively associated with investment knowledge (path a: the coefficient is -0.108, SE $= 0.054$, and $p < 0.001$). Second, investment knowledge is positively associated with liquid asset (path b: the coefficient is 1.036, SE $= 0.140$, $p < 0.001$). Because path a and path b are significant, there is a mediation effect. We use the bootstrapping method with percentile confidence estimates. The 95% confidence interval of the indirect effect is analyzed with 10,000 bootstrap resamples (Preacher and Hayes 2008). The results of the bootstrap test suggest that investment knowledge
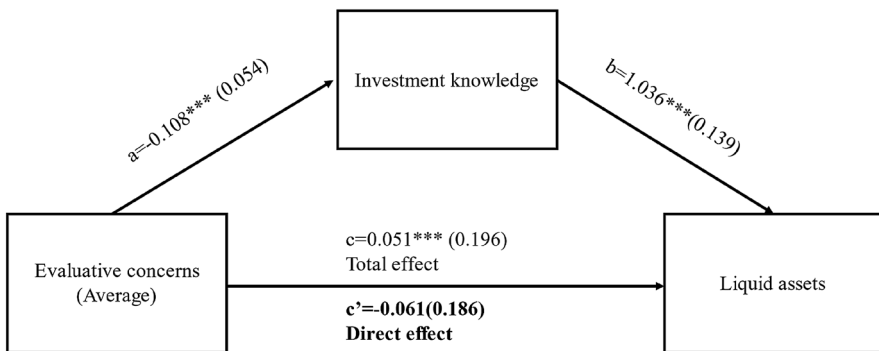
Fig. 3 The indirect effect of striving on liquid assets through investment knowledge is statistically significant ($a*b = 0.112$, SE $= 0.057$, 95% CI $= [-0.231, -0.004]$). The bootstrapped resampling is 5000. $**p < 0.05$, $***p < 0.01$

mediates the link between evaluative concerns and liquid assets (indirect effect $= a*$ $b = -0.108*1.035 = -0.112$, SE$=0.057$, CI$=$from -0.231 to -0.004). In addition, the total effect (path $c = -0.051$, SE$=0.196$, $p=0.793$) and the direct effect (path $c' = 0.061$, SE$=0.177$, $p=0.743$) are non-significant, indicating a full mediation effect. Therefore, we can conclude that investment knowledge fully mediates the relationship between evaluative concerns and liquid wealth. Figure 3 displays the corresponding results.

In summary, the indirect effect (0.215) between striving and liquid assets via investment knowledge is positive and significant, which supports H2a. This finding means that the log of liquid assets is expected to increase by 0.215 units for every one-unit increase in striving (average) (1–5 scale). Meanwhile, the indirect effect (-0.112) between evaluative concerns and liquid assets via investment knowledge is negative and significant, which supports H2b. This finding indicates that the log of liquid assets is expected to decrease by 0.112 units for every one-unit increase in evaluative concerns (average) (1–5 scale). We conclude that the indirect effect of perfectionistic striving on liquid wealth is higher than the indirect effect of perfectionistic evaluative concerns on liquid wealth.

Perfectionism as a predictor of monthly gambling expenditures (H3)

Table 6 reports the estimates of the OLS regression regarding the relationship between perfectionism and monthly expenditure on gambling as well as estimates for quantiles $\tau \in \{0.10, 0.35, 0.50, 0.70, 0.90\}$ to assess Hypothesis 3 for the gambling group ($N=225$). Throughout this subsection, the dependent variable is the logarithm of monthly income spent on gambling. The independent variables are striving (average) and evaluative concerns (average), which represent the positive facet and the adverse facet of perfectionism, respectively. The average marginal effects of evaluative concerns (average) are negatively significant in all quantiles and OLS regressions. The average magnitude of these coefficients is approximately 0.35, which means that log-transformed monthly expenditure on gambling is reduced by approximately 35% for a one-unit increase in evaluative concerns (average) (5-point scale) when all other variables are held constant. However, we do not find that striving (average) can predict the variance in log-transformed monthly expenditure on gambling because nearly no corresponding coefficient is statistically significant. Therefore, the results support Hypothesis 3a but do not support Hypothesis 3b.

Discussion

Perfectionism and financial risk tolerance

Our results support H1a, which states that, among the general population, perfectionistic striving is positively associated with financial risk tolerance. This finding remain valid in different demographic subgroups, including males, females, aging people (age ≥ 55), nonelderly people, the employed, and the un-employed. However,

Table 6 Reports the average marginal effects of perfectionism on the logarithm of monthly expenditure on gambling among individuals who have participated in gambling

Dependent variables: Log (Monthly expenditure on gambling)	Quantile regressions					OLS
	10%	35%	50%	70%	90%	
Main effect						
Evaluative concern (average)	− 0.141 (0.073)	− 0.291** (0.139)	− 0.318** (0.131)	− 0.484*** (0.183)	− 0.585 (0.320)	− 0.339** (0.144)
Striving (average)	− 0.032 (0.087)	− 0.023 (0.174)	− 0.304** (0.149)	− 0.152 (0.142)	0.172 (0.303)	− 0.033 (0.164)
Control effect						
Age	0.069 (0.073)	− 0.201 (0.134)	− 0.182 (0.102)	− 0.113 (0.169)	− 0.054 (0.288)	− 0.102 (0.132)
Male	0.197 (0.153)	0.144 (0.237)	0.279 (0.213)	0.282 (0.302)	0.570 (0.533)	0.239 (0.249)
Marital status	0.053 (0.152)	− 0.341 (0.260)	− 0.227 (0.277)	− 0.046 (0.289)	0.701 (0.815)	− 0.130 (0.240)
Education	− 0.235*** (0.055)	− 0.053 (0.096)	− 0.074 (0.083)	− 0.106 (0.081)	− 0.167 (0.258)	− 0.072 (0.098)
Employment	0.020 (0.224)	− 0.484 (0.326)	− 0.405 (0.340)	− 0.342 (0.358)	− 0.071 (0.679)	− 0.225 (0.296)
White_race	− 0.191 (0.239)	− 0.451 (0.394)	− 0.618** (0.252)	− 0.535 (0.301)	− 0.219 (0.732)	− 0.274 (0.339)
Religion	− 0.110 (0.155)	− 0.314 (0.273)	− 0.212 (0.216)	− 0.245 (0.269)	0.955* (0.532)	0.061 (0.235)
No_dep	0.059 (0.058)	0.191 (0.109)	0.153*** (0.053)	0.024 (0.094)	− 0.068 (0.249)	0.053 (0.080)
Log_Annual_hincome	0.038 (0.068)	0.122 (0.183)	− 0.112 (0.140)	0.069 (0.115)	0.022 (0.516)	0.053 (0.114)
Log_liq_asset	0.049 (0.035)	0.086*** (0.026)	0.967*** (0.037)	0.070 (0.046)	0.042 (0.094)	0.071** (0.030)
Investment knowledge	0.265*** (0.064)	0.078 (0.110)	0.024 (0.093)	0.055 (0.141)	0.031 (0.228)	0.010 (0.117)
FRT	0.076*** (0.015)	0.069*** (0.027)	− 0.062*** (0.022)	− 0.036*** (0.032)	0.143** (0.060)	0.078*** (0.027)
FL	− 0.148*** (0.034)	− 0.168*** (0.047)	− 0.148*** (0.045)	− 0.102 (0.065)	− 0.171 (0.124)	− 0.144*** (0.052)
Pseudo R2 (R2 in OLS)	0.149	0.104	0.114	0.108	0.143	0.174
Number of observations	225	225	225	225	225	225

The dependent variable is the log transformation of monthly expenditure on gambling. This table reports the coefficients of the quantile regression and OLS regression regarding the effects of striving and evaluative concerns on monthly expenditure on gambling. The sample is the group of individuals who participate in gambling monthly. Robust standard errors are in parentheses, for both the quantile regression and OLS regression. **, and *** indicate significance at the 5% level (2-sided), and 1% level, respectively. No multicollinearity was detected after implementing the VIF test

the results do not indicate that perfectionistic concerns (negative reactions to imperfection) influence financial risk tolerance.

Among the few researchers who have examined that documents the relationship between perfectionism and risk attitude. Weller and Thulin (2012) report that a higher score on perfectionism is associated with less risk-taking to achieve gains. However, Weller and Thulin (2012) do not investigate the effect of the positive aspect of perfectionism on individual risk attitudes; we fill this gap by demonstrating that perfectionistic striving drives financial risk tolerance. Therefore, how might we account for this relationship between striving and financial risk tolerance? By definition, perfectionism is a personality disposition described as striving for flawlessness and establishing high standards for performance, accompanied by a propensity for excessively critical evaluation of one's actions. Therefore, it appears that the positive association between perfectionistic striving and financial risk tolerance may be due to the aim of achieving financial well-being, which is a key determinant of general life happiness (Kruger 2011). Previous research has reported that adaptive forms of perfectionism are associated with higher levels of self-efficacy (Frost et al. 1990; Stoeber et al. 2008), whereas financial self-efficacy is positively associated with increased investment risk-taking (Montford and Goldsmith 2016). Therefore, self-efficacy may be one channel through which striving drives financial risk tolerance. By definition, self-efficacy concerns individuals' beliefs regarding their ability to organize and execute courses of action to achieve a goal. Self-efficacy appears to be an internal motivation and is one of the best predictors of successful performance across many areas. Self-efficacy increases individuals' confidence in their capacity to execute certain behaviors, and in particular, financial self-efficacy is positively associated with investment knowledge (Forbes and Kara 2010). Thus, people with confidence and investment knowledge tend to have a willingness to tolerate financial risk. Although allocating more savings to "risky" investments such as stocks and less to "safer" fixed income vehicles increases financial risk, it increases individual savings over the long run (Chatterjee et al. 2011) because risky assets provide more long-term growth in portfolio value. Due to the fact that long-term portfolio growth results in positive capital income, we believe that such growth can solidify an individual's financial situation. Hence, self-oriented perfectionism seeks financial well-being.

Other channels may involve individual characteristics. In particular, striving is associated with more pride after success, and consequently, greater pride is associated with a higher level of confidence, which in turn may drive tolerance of financial risk when individuals make financial decisions. Stoeber et al. (2008) reveal that perfectionistic striving positively predicts the level of aspiration; hence, increased aspiration causes higher risk tolerance. Moreover, Stoeber and Otto (2006) review the argument from the literature that striving is positively associated with extraversion, which is in turn associated with risk tolerance. Finally, striving shows a positive relationship with endurance (Stoeber and Otto 2006), and prime-age males have developed a greater risk-preference position.

Why are perfectionistic concerns unable to predict the variability in financial risk tolerance? By definition, perfectionistic concerns are associated with critical self-evaluation, feelings of divergence between anticipations and outcomes, excessive

concern about mistakes, and worrying about acceptance by others (Stoeber et al. 2008). Therefore, perfectionistic concerns are supposed to be negatively associated with financial risk tolerance because such concerns are related to mistakes (Stoeber et al. 2008). However, the two facets of perfectionism do interact in concert (Brand and Altstötter-Gleich 2008), and the positive facet may play the dominant role in increasing risk tolerance.

We interpret this main finding regarding the relationship between perfectionistic striving and financial risk tolerance based only on theoretical justification and inferences from the literature.

Perfectionism, investment knowledge, and liquid wealth

The second finding is that striving (evaluative concerns) is associated with increased (decreased) investment knowledge, which is then associated with increased (decreased) liquid wealth. That is, both striving and evaluative concerns indirectly affect liquid wealth through the channel of investment knowledge. We propose the following mechanism for the indirect relationship between perfectionism and liquid wealth. First, those with greater liquid wealth tend to have a more positive awareness of their financial well-being, which in turn drives life satisfaction (Ruberton et al. 2016). Second, common sense dictates that perfectionists seek to be perfect in all aspects of their lives, including investing and purchasing, which are found to be correlated with self-oriented perfectionism (striving) (Stoeber and Stoeber 2009). Nevertheless, Stoeber and Stoeber (2009) do not find that investing and purchasing are correlated with socially prescribed perfectionism (evaluative concerns). Our finding is partially consistent with their finding, but provides enhanced evidence in support of the relationship between perfectionism (both striving and evaluative concerns) and liquid wealth. First, they use the Spearman's correlation to inspect this relationship, whereas we use regression models. Correlation is not a causal analysis, but regression is a casual inference tool. Second, their results do not suggest that there is a negative correlation between perfectionistic concern and the investment domain, whereas we find that perfectionistic concerns lead to decreased investment knowledge, which further causes decreased liquid wealth.

Next, we explain a mechanism by which investment knowledge could mediate the relationship between perfectionism and liquid wealth. On the one hand, our results indicate that striving is positively associated with investment knowledge, whereas evaluative concerns are negatively related to investment knowledge. By definition, studying involves the acquisition of knowledge through reading, investigation, or practice. Therefore, it appears that striving (evaluative concerns) can facilitate (impede) the ability to study, which in turn enhances (weakens) the acquisition of knowledge. In the investment context, this finding is in line with previous research showing that perfectionistic striving is positively associated with studying. For example, Stoeber and Stoeber (2009) report that striving has a positive correlation with studying. Therefore, striving appears to enhance the acquisition of investment knowledge.

However, perfectionistic concerns are negatively associated with studying, acquiring knowledge or other negative outcomes. For instance, first, students ranging from 15 to 21 years old who have high levels of evaluative concerns tend to experience test anxiety (Abdollahi et al. 2018). Second, perfectionistic concerns are positively associated with burnout (Spagnoli et al. 2021a, b) and burnout and learning engagement have a negative relationship with one another (Cazan 2015). Third, perfectionistic concerns are maladaptive for successful learning (Osenk et al. 2020). These arguments contribute to the view that evaluative concerns tend to obstruct the acquisition of investment knowledge.

In contrast, Van Rooij et al. (2012) ascertain that financial knowledge accelerates wealth accumulation through two channels. The first is stock market participation. A high level of financial knowledge reduces the cost of collecting and dealing with information and decreases obstacles to investment in the stock market. Knowledgeable retail investors benefit from their equity premium. The second channel is retirement planning behavior. Individuals with a high level of financial knowledge tend to plan for retirement and stick to their plans in terms of saving for their retirement needs, collecting information, and endeavoring to realize their plans (Lusardi and Mitchell 2011).

The third finding is that the absolute magnitude of the indirect effect of striving on liquid wealth is greater than that of evaluative concerns on liquid wealth when the other variables remain stable. This finding provides evidence that the benefits of the adaptive facet of perfectionism can overpower the disadvantages derived from the maladaptive facet of perfectionism.

Taken together, these findings identify one channel through which perfectionism can influence the accumulation of liquid wealth, thus bridging perfectionism and financial well-being.

Perfectionism and gambling behaviors

According to a recent study, risky financial tolerance involves two particular domains: investment decisions and gambling (Sekścińska et al. 2021). Both influence wealth accumulation, which is why we further test the relationship between perfectionism and gambling behaviors.

The gambling environment changes quickly. Gambling is widely advertised and increasingly accessible, and newly developed means to engage in gambling appear constantly. In addition, gambling expenditure is gradually increasing (Statista 2020). Thompson et al. (2021) propose that the five-factor personality model influences general lottery gambling. Smith et al. (2019) report that there is an important link between perfectionism and personality traits included in the five-factor model (FFM). Therefore, we assume that perfectionism will influence gambling expenditure.

The final finding is that perfectionistic concerns are a significant factor in predicting monthly gambling expenditure. Those who exhibit intense concerns about mistakes tend to spend less money on gambling than those with low concerns about mistakes. This finding is consistent with the conclusion of Brand and

Altstötter-Gleich (2008), who report that participants with perfectionistic concerns tend to select safe choices in behavior experiments under risk conditions. This result implies that future research examining the relationship between personality traits and behaviors related to gambling should incorporate perfectionism into the list of personality measures (Mishra et al. 2010).

Conclusion

Our main finding is that perfectionistic striving is positively associated with the level of financial risk tolerance, whereas our results do not indicate that evaluative concerns are directly associated with financial risk tolerance. Second, striving (evaluative concerns) is associated with increased (decreased) investment knowledge, which is in turn associated with increased (decreased) liquid wealth. Third, our results indicate that perfectionistic concerns inhibit monthly gambling expenditures. This finding remain consistently stable when we measure monthly gambling in both absolute and relative form. These empirical results provide evidence that can help to achieve research objectives which are investigating the relationship between perfectionism, financial risk tolerance, wealth accumulation, and gambling expenditure.

In reporting these relationships, this preliminary study has several important implications for theoretical and empirical research in behavioral finance. First, previous studies have largely focused on the effect of perfectionism in work, sport and academic domains (Hill et al. 2018; Madigan 2019; Ocampo et al. 2020), the finance domain has been less frequently investigated. Therefore, this research contributes theoretically to the literature by documenting that perfectionism plays a role in the financial domain. Second, with respect to the study's empirical implications, perfectionistic concerns do not necessarily lead to negative outcomes. With respect to policy implications, our findings may aid the development of deliberate interventions for financial managers, psychological practitioners, social workers or policy makers seeking to support individuals who report poor financial well-being or poor life satisfaction. Such interventions might include professional financial courses, psychological counseling, and general education, which can not only improve investment knowledge but also foster internalized standards for achievement while reducing the propensity to fear mistakes and evaluation by others.

This study has several limitations. First, because of its pilot nature, this paper reports only one channel (investment knowledge) through which perfectionism influences wealth accumulation. Second, the paper does not explain why striving motivates an increase in risk tolerance whereas evaluative concerns do not. Third, the findings are based on a single-country sample and a cross-sectional analysis, which may limit the generalizability of the analysis results to other countries and cannot hinder causal inferences.

Future researchers can consider improving on this study in the following ways. First, to substantiate the causal inferences, longitudinal analysis is warranted. Second, it may be profitable to investigate the effect of perfectionism on the heterogeneity of other preferences, such as time discounting and uncertainty aversion. Third,

it is of use to detect whether perfectionism is a dominant personality predictor to financial risk tolerance when controlling for Big Five personality factors.

Declarations

Conflict of interest The authors have no conflicts of interest to declare that are relevant to the content of this article.

Ethical approval The questionnaire and methodology for this study were approved by the Ethics Committee of the University of Southampton (Ethics approval number: 20738).

Consent to participate Informed consent was obtained from all individual participants included in the study.

Consent to publish The participants have consented to the article being published in an academic journal.

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