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The relationship between time perspective and financial risk tolerance in young adults

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Abstract

This study examines the relationship between time perspective (TP) and financial risk tolerance (FRT) in young adults. Prior research suggests young adults should invest in riskier portfolios to maximize wealth accumulation for retirement. Optimally, they will have a future TP and a high FRT. The results of this study indicate that TP accounts for a significant amount of variance in FRT. However, the relationship between TP and FRT is not optimal. Future oriented individuals exhibit lower FRT and present oriented individuals exhibit higher FRT. The paper concludes with discussion of the implications of these findings and suggestions for future research.

JEL classification: D8; D9; D14; G11

Keywords: Financial risk tolerance; Time perspective; Time orientation; Investment behavior; Wealth accumulation; Retirement portfolio

1. Introduction

It is a widely held belief among academics and finance professionals that young individuals with a long time horizon until retirement should maximize the size of their retirement nest egg by creating more risky retirement investment portfolios (Embrey and Fox, 1997; Hanna and Chen, 1997; Sung and Hanna, 1996). This is because more risky investment portfolios consisting primarily of stocks tend to outperform portfolios containing less risky

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investments such as bonds and certificates of deposit (Hanna and Chen, 1997; Siegel and Thaler, 1997).

In accordance with the theory of reasoned action (Fishbein and Ajzen, 1975), Yao, Sharpe, and Wang (2011) posit that an individual's financial risk attitudes affect their investment behavior and that behavior, in turn, affects wealth accumulation. The theory is supported by research that has shown investors with a higher risk tolerance are more likely to invest in equities over less risky investments, resulting in more significant wealth accumulation for retirement (e.g., Bailey and Kinerson, 2005; Bajtelsmit, Bernasek, and Jianakoplos, 1999; Hariharan, Chapman, and Domian, 2000; Keller and Siegrist, 2006; Yuh and DeVaney, 1996). However, it is not enough for a young individual to simply have a strong financial risk tolerance. They must also be thinking about their future (i.e., have a future time perspective). Thus, to build a successful retirement portfolio, a young person should possess both a strong financial risk tolerance and a future time perspective.

Financial risk tolerance and time perspective are two separate constructs that have received a fair amount of attention in the academic literature. While it seems logical that the two constructs both play an important role in investing behavior, there is a lack of research examining the relationship between them. The goal of the current study is to examine the impact of time perspective on financial risk tolerance in young adults after controlling for other commonly studied variables that have been found to affect financial risk tolerance.

2. Literature review and hypotheses

2.1. Financial risk tolerance

Financial risk tolerance (FRT) can be defined generally as an individual's willingness to accept uncertainty in financial settings where there is the possibility of a negative outcome (Grable, 2000; Grable, Lytton, and O'Neill, 2004; Grable and Roszkowski, 2007). In an investing context, FRT reflects an investor's comfort level with investment risk and market volatility (Faff, Mulino, and Chai, 2008; Grable and Lytton, 1998; Hallahan, Faff, and McKenzie, 2003). Thus, the higher one's FRT, the higher is the degree of uncertainty or investment volatility they are willing to bear. In contrast, financial risk aversion is a term used in the literature to represent the inverse of FRT and it reflects a person's unwillingness to take financial risk (Anbar and Eker, 2010; Hallahan et al., 2003). The higher one's risk aversion, the lower their comfort level with financial uncertainty and investment volatility.

Practitioners and scholars have long believed that FRT is an important factor in investment behavior and the accumulation of wealth. Investors with a higher FRT are more likely to construct a portfolio containing a larger percentage of risky investments (i.e., equities), while risk averse investors are more likely to hold less risky assets such as bonds and certificates of deposit (e.g., Bailey and Kinerson, 2005; Finke and Huston, 2003; Hariharan et al., 2000; Keller and Siegrist, 2006; Weber, Blais, and Betz, 2002). Since a portfolio containing more risky assets yields a higher return over the long run, investors with a higher

FRT will therefore accumulate more wealth upon retirement (e.g., Bernasek and Shwiff, 2001; Embrey and Fox, 1997; Hariharan et al., 2000; Jacobs-Lawson and Hershey, 2005; Jianakoplos and Bernasek, 1998; Yao et al., 2011).

A large body of literature on FRT and its determinants has accumulated over the years because of its importance in relation to individual investor behavior, retirement wealth accumulation, and personal financial planning. The discussion that follows focuses on only the three variables included in the current study—gender, income, and financial knowledge/experience. Note that while age and education level have also been found to affect FRT in previous studies, they are held constant in the current study because the participants are all college freshmen and are predominantly in the same age group.

2.1.1. Gender

The research on FRT has consistently found that females exhibit a lower FRT than males. It includes studies spanning a period of roughly two decades that incorporate a variety of measurement instruments and a number of different types of samples both inside and outside the United States. These samples include professional financial advisors (e.g., Hartog, Ferrer-i-Carbonell, and Jonker, 2002; Olsen and Cox, 2001), college faculty and staff (Gilliam and Chatterjee, 2011; Grable, 2000), college students (Anbar and Eker, 2010; Antonites and Wordsworth, 2009; Powell and Ansic, 1997; Ryack, 2011; Weber et al., 2002), adults nearing retirement age (Hariharan et al., 2000; Neelakantan, 2010), and the general public (e.g., Faff, Hallahan, and McKenzie, 2011; Gibson, Michayluk, and Van de Venter, 2013; Hallahan, Faff, and McKenzie, 2004; Larkin, Lucey, and Mulholland, 2013; Wong, 2011; Yao et al., 2011).

Two main theories have been advanced to explain why females are more risk averse. One theory is that biological and evolutionary differences between the genders have resulted in men naturally engaging in more risk taking behavior (Anbar and Eker, 2010; Olsen and Cox, 2001; Wong, 2011). The second theory suggests gender differences in risk taking behavior are related to cultural influences stemming from differences in the traditional societal roles of males and females (Anbar and Eker, 2010; Faff et al., 2011; Olsen and Cox, 2001; Wong, 2011).

2.1.2. Income

A popular theory advanced in the literature is that FRT will increase with higher levels of income because individuals with higher incomes are more able to absorb any potential losses that may result from more risky investments (Anbar and Eker, 2010; Grable and Lytton, 1998; Hallahan et al., 2004). This is supported by numerous studies that have found a positive relationship between income and FRT. As with gender, the finding is robust across various measurement instruments, countries, and populations that include samples of professional financial advisors (Hartog et al., 2002), college faculty and staff (Grable, 2000; Grable and Joo, 2004), college students (Anbar and Eker, 2010; Ryack, 2011), and the general public (e.g., Faff et al., 2011; Gibson et al., 2013; Grable and Lytton, 1998; Hallahan et al., 2004; Wong, 2011; Yao et al., 2011).

2.1.3. Financial knowledge and experience

The literature suggests that investors with increased financial knowledge and experience should have higher levels of FRT because such individuals have a better understanding of the uncertainties associated with taking financial risks, more confidence in their financial decisions, and better coping mechanisms to deal with financial uncertainties (Grable and Joo, 1997; Yao et al., 2011). Consistent with this theory, a number of studies find a significant positive relationship between FRT and self-reported financial knowledge (Antonites and Wordsworth, 2009; Gibson et al., 2013; Grable and Joo, 1997). Grable and Joo (2004) also find that higher financial knowledge scores from a 10-item objective measure are correlated with higher FRT. In addition, Ryack (2011) finds that college students who played a stock market game as part of a course in high school display higher levels of FRT.

2.2. Time perspective

A variable that has received very little attention in the FRT literature is *time perspective* (TP). Also referred to as *time orientation*, TP is believed to be the result of cognitive processes that divide our experiences into past, present, and future temporal frames of reference (D'Alessio, Guarino, De Pascalis, and Zimbardo, 2003; Nuttin, 1985; Zimbardo and Boyd, 1999). A bias toward one of these temporal frames of reference creates an individual differences variable that can affect a person's every day behavior and decision making. For example, a person primarily exhibiting a present TP will tend to focus on the immediate results of their actions and care little about future consequences (Strathman, Gleicher, Boninger, and Edwards, 1994; Zimbardo and Boyd, 1999). An individual who is primarily future oriented will instead concentrate on the achievement of future goals, focusing on how their current behavior affects future outcomes (Boniwell and Zimbardo, 2004; D'Alessio et al., 2003; Strathman et al., 1994; Zimbardo and Boyd, 1999). Present TP and future TP are separate constructs and research has found that measures of the two different constructs are not correlated (Boniwell and Zimbardo, 2004; Zimbardo and Boyd, 1999).

Similar to the FRT research, the TP literature has also explored the impact of a number of different demographic variables such as gender and income. For example, prior TP research has found a positive relationship between future TP and income level (e.g., Appleby et al., 2005; Gonzalez and Zimbardo, 1985; Holman and Silver, 2005). However, the results are mixed regarding gender. Some studies show that females are more future oriented than males (e.g., Gonzalez and Zimbardo, 1985; Keough, Zimbardo, and Boyd, 1999; Zimbardo, Keough, and Boyd, 1997) and others find no relationship between gender and TP (e.g., Epel, Bandura, and Zimbardo, 1999; Hamilton, Kives, Micevski, and Grace, 2003; Harber, Zimbardo, and Boyd, 2003).

There is an extensive body of literature examining the impact of TP on behavior across a variety of contexts. For example, researchers have found that more future (present) oriented individuals are less (more) likely to gamble (Hodgins and Engel, 2002; MacKillop, Anderson, Castelda, Mattson, and Donovick, 2006; Petry, 2001; Toplak, Liu, MacPherson, Toneatto, and Stanovich, 2007) and to consume high levels of alcohol, drugs, and cigarettes (Henson, Carey, Carey, and Maisto, 2006; Keough et al., 1999;

MacKillop, Mattson, MacKillop, Castelda, and Donovick, 2007; Petry, Bickel, and Arnett, 1998; Vuchinich and Simpson, 1998; Wills, Sandy, and Yaeger, 2001). Future (present) TP is also positively (negatively) linked with eating healthier, exercising, and participation in screening for HIV and cancer (Dorr, Krueckeberg, Strathman, and Wood, 1999; Henson et al., 2006; Levy, Micco, Putt, and Armstrong, 2006; Luszczynska, Gibbons, Piko, and Tekozel, 2004; Ouellette, Hessling, Gibbons, Reis-Bergan, and Gerrard, 2005; Shores and Scott, 2007).

With the exception of the gambling behavior studies, research examining the role of TP in financial settings has been limited. However, that research does suggest a positive link between future TP and fiscally responsible behavior. For example, Joireman, Sprott, and Spangenberg (2005) find business students with a stronger future orientation are more likely to use a financial windfall to pay down a credit card, contribute to savings, or cover college debt. In contrast, the more present oriented students prefer to purchase a sale item online or go on a trip with friends. Results from Webley and Nyhus (2006) further indicate that future TP in adults is associated with their "economic socialization" (i.e., having been encouraged to have a bank account, having earned or been given money as a teenager, and having discussed financial affairs with their parents). Hershey and Mowen (2000) also find that future TP is positively associated with perceived financial knowledge, retirement involvement, and perceived financial preparedness. There appears to be only one study that has examined both TP and FRT. Results from Jacobs-Lawson and Hershey (2005) suggest that higher levels of FRT and future TP are predictive of saving for retirement. However, that study does not examine present TP or the direct relationship between TP and FRT.

2.3. Hypotheses on the predicted relationship between FRT and TP

Despite its potential importance, research examining the relationship between TP and FRT is lacking. In general, the time perspective research indicates people who are present oriented tend to be more likely to engage in risky activities, while those who are future oriented tend to avoid such activities. Therefore, it seems plausible that future (present) TP will be associated with a lower (higher) FRT. This leads to the following hypotheses.

Hypothesis 1: Present oriented individuals are more likely to display higher levels of financial risk tolerance.

Hypothesis 2: Future oriented individuals are more likely to display lower levels of financial risk tolerance.

Hypothesis 3: Present time perspective will account for a large amount of variance in financial risk tolerance above and beyond other variables previously found to affect financial risk tolerance.

Hypothesis 4: Future time perspective will account for a large amount of variance in financial risk tolerance above and beyond other variables previously found to affect financial risk tolerance.

Table 1 Simple descriptive statistics

Variable	*n*	Mean	Median
FRT score	340	26.3968	26.6984
PTP	374	5.7678	5.8889
FTP	378	5.4637	5.6111
	SD	Minimum	Maximum
FRT score	4.4203	16.0000	40.0000
PTP	1.0065	2.2222	7.8889
FTP	1.0443	2.3333	8.0000
	n	%	Cumulative %
Gender			
Female	215	56.88%	56.88%
Male	163	43.12%	100.00%
Total	378	100.00%	
Income			
Less than $20,000	16	4.49%	4.49%
$20,000 to $39,999	35	9.83%	14.33%
$40,000 to $59,999	75	21.07%	35.39%
$60,000 to $79,999	80	22.47%	57.87%
$80,000 to $99,999	58	16.29%	74.16%
Over $100,000	92	25.84%	100.00%
Total	356	100.00%	
StkGame			
No, did not play the stock market game	272	72.15%	72.15%
Yes, played the stock market game	105	27.85%	100.00%
Total	377	100.00%	
Race			
White	328	88.65%	88.65%
Other	42	11.35%	100.00%
Total	370	100.00%	

Financial Risk Tolerance (FRT) Score is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course. *Race* is the self-reported race of the student.

3. Procedure

This study uses data previously collected by Ryack (2011, 2012). The sample consists of 378 new freshmen that completed a research instrument while attending summer orientation sessions at a public university. Descriptive statistics for the sample are presented in Table 1 and discussed in the Results section. The survey instrument includes various demographic questions as well as a number of items used to measure FRT, present TP, and future TP.

Responses to demographic questions about gender, estimated family income, and financial knowledge/experience are used as control variables since they have been found in previous research to have a strong impact on FRT. The dependent variable, *FRT Score*, is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale (see Appendix A). This scale has been utilized to measure FRT in a number of prior studies and it has been demonstrated to be both a reliable and valid measure of FRT when compared with other measures (Gilliam, Chatterjee, and Grable, 2010; Grable and Lytton, 1999, 2001, 2003; Kuzniak, Rabbani, Heo, Ruiz-Menjivar, and Grable, 2015).

The present and future TP independent variables are measured with eighteen items from the Zimbardo Time Perspective Inventory (ZTPI; Zimbardo and Boyd, 1999). The ZTPI consists of 56 items that make up five different TP scales: Past-Negative, Past-Positive, Present-Fatalistic, Present-Hedonistic, and Future. These scales resulted from extensive factor analyses with college student samples and each scale represents a distinct factor that measures a unique type of TP. It has been common for researchers to use only the scales relevant to their particular study, with the Future and Present-Hedonistic scales appearing most often in the research. Items in the Future scale reflect behavior associated with the planning for and achievement of future goals. The Present-Hedonistic scale items characterize an orientation toward present enjoyment and pleasure with a lack of consideration of future consequences. Given that our hypotheses focus on the impact of present TP and future TP on FRT, our instrument only includes items from the Present-Hedonistic and Future ZTPI scales.

Consistent with Ryack (2012, 2015), we measure present TP with a subset of nine items from the ZTPI Present-Hedonistic scale and we measure future TP with a subset of nine items from the ZTPI Future scale (see Appendix B). Six items contained in the original ZTPI Present-Hedonistic scale and four items contained in the original ZTPI Future scale are excluded in an effort to create more parsimonious scale measures. Most of the items excluded had a negative factor loading, a factor loading below 0.40, or were redundant with other scale items presented in the original study by Zimbardo and Boyd (1999). Ryack (2012) tests the modified nine item scales in confirmatory factor analyses with a college student sample and finds that the revisions do not significantly alter scale integrity. For each scale item, the participants rated how characteristic the statement was of him or her on an eight-point scale ranging from extremely typical to slightly typical on one end (i.e., rating of 1–4) and slightly atypical to extremely atypical on the other end (i.e., rating of 5–8). Before analyzing the data, these ratings were reverse scored so that a higher number indicates the statement is more characteristic of the participant. In other words, a rating of 1–4 now represents extremely atypical to slightly atypical and a rating of 5–8 represents slightly typical to extremely typical. This is done to make analysis of the impact of present TP and future TP (the independent variables) on FRT (the dependent variable) easier to interpret because a higher FRT score indicates the participant has a stronger financial risk tolerance. Each participant's TP score is calculated as the average of their ratings for the relevant scale. Thus, a higher average score for the present TP scale items indicates the participant has a stronger present orientation and a higher average score on the future TP scale items indicates a stronger future orientation.

4. Results

4.1. Descriptive statistics and t-tests

The descriptive statistics are presented in Table 1. As previously noted, *FRT Score* is measured using participant scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale (see Appendix A). The lowest possible score is 13 and the highest possible score is 47, with a higher score equating to a higher risk tolerance. The mean *FRT Score* for the sample is 26.3968 with a range from 16.000 to 40.000. Each participant's TP score is calculated as the average of their ratings of the nine scale items that make up each scale (see Appendix A). The lowest possible value for each scale is one and the highest possible value is eight, with a higher score indicating the participant has a stronger orientation toward the TP measured by the scale. The *Present Time Perspective* (*PTP*) scores range from 2.2222 to 7.8889, with a mean of 5.7678. The *Future Time Perspective (FTP*) scores range from 2.3333 to 8.0000, with a mean of 5.4637.

Gender is a [0,1] indicator variable with 0 coded as female and 1 coded as male. Of the 378 students in the sample, approximately 57% are females and 43% are males. In addition, roughly 89% of the students are White, with the remainder belonging to various ethnic groups. The *Income* variable reflects each student's estimate of the combined income of their parents from all sources, before taxes. The mean student estimate of their parents' combined income is in the range of $60,000 to $80,000, with approximately 26% estimating their parents' combined income to be above $100,000. While Ryack (2011) uses several variables to measure financial knowledge/experience among college students, he finds the most significant measure is completion of a stock market game as part of a high school course. Therefore, that variable is used as the sole measure of financial knowledge/experience in the current study. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a high school course in which a stock market game was played and 1 coded as having taken such a course. Roughly 72% of the students did not take a high school course in which a stock market game was played.

T-tests of the differences in *FRT Score*, *PTP*, and *FTP* by *Gender* and by *StkGame* are presented in Table 2. There is a significant difference in *FRT Score* between females and males, with a mean *FRT Score* for the females of 24.9764 as compared to 28.1905 for the males ($p < 0.0001$). This result is consistent with a large body of prior research that finds females tend to exhibit lower financial risk tolerance as compared to males. There is no significant difference in *PTP* between females and males. However, the mean female score on the *FTP* scale, 5.7564, is significantly higher than the mean male score on the *FTP* scale, 5.0644 ($p < 0.0001$). The mean *FRT Score* for those individuals who have played a stock market game as part of a high school course is significantly higher than those individuals who have not played a stock market game as part of a high school course (mean of 27.8925 vs. 25.8463, $p < 0.0001$). This is also consistent with prior research that finds a positive relationship between FRT and financial experience/knowledge. There is no significant difference in *PTP* or *FTP* between those who have played the stock market game and those who have not.

Table 2 Differences in *FRT Score*, *PTP*, and *FTP* By *Gender* and By *StkGame*

		FRT Score	*PTP*	*FTP*
Panel A: By *Gender*				
Female	Mean	24.9764	5.7341	5.7564
Male	Mean	28.1905	5.8114	5.0644
Difference		−3.2140	−0.0773	0.6920
t-statistic		−7.1073	−0.7316	6.7478
p-value		0.0000	0.4649	0.0000
Panel B: By *StkGame*				
Did not play stock market game	Mean	25.8463	5.7915	5.4737
Played stock market game	Mean	27.8925	5.6993	5.4291
Difference		−2.0461	0.0923	0.0446
t-statistic		−3.8680	0.7926	0.3699
p-value		0.0001	0.4285	0.7117

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic Scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course.

4.2. Correlation analysis

Pearson bivariate correlations of all the variables are presented in Table 3. As predicted by Hypotheses 1 and 2, there is a significant positive correlation between *FRT Score* and *PTP* ($r = 0.3519$, $p < 0.01$), and a significant negative correlation between *FRT Score* and FTP ($r = -0.3265$, $p < 0.01$). Consistent with prior research, the findings further show a significant correlation between *FRT Score* and the previously studied variables of gender, income, and financial knowledge/experience. However, there does not appear to be a significant correlation between *Race* and *FRT Score*. Thus, *Race* is excluded from the multivariate analyses conducted below. Males tend to display higher risk tolerance, *FRT Score* increases with estimated family income, and students that played a stock market game in high school exhibit a higher *FRT Score*. Additionally, females tend to be more future oriented than males ($r = -0.3294$, $p < 0.0001$) and there is a negative relationship between income and future TP ($r = -0.1675$, $p < 0.01$).

4.3. Ordinary least squares hierarchical regressions

Prior research has examined the impact of various demographic characteristics on FRT scale scores using Ordinary Least Squares (OLS) hierarchical regressions (Gibson et al., 2013; Hallahan et al., 2004; Ryack, 2011). Consistent with this methodology, we run OLS hierarchical regressions of the following form:

Step 1: *FRT Score = f(Gender, Income, StkGame)*
Step 2: *FRT Score = f(PTP, Gender, Income, StkGame)*
Step 3: *FRT Score = f(FTP, PTP, Gender, Income, StkGame)*

Table 3 Pearson bivariate correlations

	FRT Score	*PTP*	*FTP*	*Gender*	*Income*	*StkGame*	*Race*
FRT Score	1						
PTP	0.3519**	1					
	336	374					
FTP	−0.3265**	−0.0241	1				
	338	374	378				
Gender	0.3615**	0.038	−0.3294**	1			
	338	372	376	378			
Income	0.2356**	0.0913	−0.1675*	0.2011**	1		
	323	352	354	355	356		
StkGame	0.2068**	−0.0412	−0.0192	0.0884	0.0152	1	
	337	371	375	375	354	377	
Race	−0.0232	−0.0011	0.094	0.1032	−0.0919	0.0338	1
	332	364	368	369	350	367	370

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course. *Race* is the self-reported race of the student. *n*, the number of observations, is shown under the correlation.

* $p < 0.05$, two-tailed; ** $p < 0.01$, two-tailed.

where the dependent variable, *FRT Score*, is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. In the first step, we enter *Gender* as a [0,1] indicator variable with 0 coded as female and 1 coded as male, *Income* as the student estimate their parents' combined income from all sources before taxes, and *StkGame* as a proxy for financial knowledge/experience. *StkGame* is a [0,1] indicator variable where 0 indicates the participant did not complete a high school course where they played a stock market game, and 1 indicates they did complete such a course. The three independent variables entered in Step 1 have been examined in other studies and serve as control variables in the current study. The new independent variables of interest, *PTP* and *FTP*, are added in Step 2 and Step 3. *PTP* is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale, and is added as an independent variable in Step 2. *FTP* is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale, and is added as an independent variable in Step 3.

Table 4 presents the results of the OLS hierarchical regressions. We check the OLS regression assumptions for each of the Step 1, Step 2, and Step 3 regressions by running the *regcheck* command in Stata (Greene, 1997; Kennedy, 1998). Specifically, this command checks for the assumption of homoscedasticity of the errors using the Breusch-Pagan test (Gujarati, 2014), the assumption of no multicollinearity using Variance Inflation Factor (VIF) values (Studenmund, 2005), the assumption that the residuals are distributed normally using the Shapiro-Wilk test, the assumption that the model is correctly specified using the linktest (StataCorp LP, 2015), and the assumption of

Table 4 OLS hierarchical regressions (standardized beta coefficients)

	Step 1	Step 2	Step 3
	FRT Score	*FRT Score*	*FRT Score*
FTP			−0.251
p-value			0.000
PTP		0.335	0.341
p-value		0.000	0.000
Gender	0.295	0.286	0.202
p-value	0.000	0.000	0.000
Income	0.178	0.148	0.110
p-value	0.000	0.000	0.016
StkGame	0.181	0.188	0.197
p-value	0.000	0.000	0.000
n	320	317	317
R^2	0.179	0.287	0.340
Adjusted R^2	0.172	0.278	0.330
F-statistic	21.180	27.690	29.060
Prob > *F*-statistic	0.000	0.000	0.000

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course.

This table presents results of the following Ordinary Least Squared (OLS) Regressions:

Step 1: *FRT Score = f(Gender, Income, StkGame)*

Step 2: *FRT Score = f(PTP, Gender, Income, StkGame)*

Step 3: *FRT Score = f(FTP, PTP, Gender, Income, StkGame).*

appropriate functional form using Ramsey's regression specification error test (Wooldridge, 2008). It also checks for influential observations using Cook's D statistic (Pardoe, 2006). All regression assumptions are found to hold true for each of the Step 1, Step 2, and Step 3 regressions (untabulated results).

As predicted in Hypothesis 1, *PTP* is a significant predictor of *FRT Score* in that individuals with a stronger present orientation are more likely to have a higher level of FRT. Consistent with Hypothesis 3, the *PTP* variable accounts for a large amount of variance above and beyond the control variables as evidenced by an adjusted R^2 increase from 0.172 in Step 1 to 0.278 (an increase of 0.106 or 61.63%) in Step 2.

In support of Hypothesis 2, the OLS hierarchical regressions further demonstrate a significant negative relationship between *FTP* and *FRT Score*. In other words, individuals with a stronger future orientation are more likely to have a lower FRT. The addition of the *FTP* variable increases the adjusted R^2 from 0.278 in Step 2 to 0.330 in Step 3 (an increase of 0.052 or 18.71%), thus supporting Hypothesis 4. A comparison of Step 3 to Step 1 demonstrates that the *PTP* and *FTP* variables together result in an adjusted R^2 increase of 0.158 (an increase of 91.86%) over a model that only includes gender, income, and financial

knowledge/experience (*Gender*, *Income*, and *StkGame*). Thus, we find evidence in support of all four hypotheses.

4.4. Sensitivity analyses

We run a variety of sensitivity analyses to ensure that our inferences remain qualitatively unchanged if we run regressions separately for certain groups, or if we change the method of estimation.

4.4.1. OLS hierarchical regressions by group

We begin our sensitivity analyses by running OLS hierarchical regressions by *Gender* (results reported in Table 5) and by *StkGame* (results reported in Table 6). In Table 5, we run regressions of the following form by *Gender*:

Step 1: *FRT Score = f(Income, StkGame)*
Step 2: *FRT Score = f(PTP, Income, StkGame)*
Step 3: *FRT Score = f(FTP, PTP, Income, StkGame)*

where the dependent variable and independent variables are defined in the previous section. For both females and males, *PTP* is a significant predictor of *FRT Score*, supporting Hypothesis 1. Consistent with the full model previously discussed (where *Gender* is an independent variable), the *PTP* variable accounts for a large amount of variance above and beyond the control variables. This is evidenced by an adjusted R^2 increase from 0.095 in Step 1 to 0.204 in Step 2 for females and from 0.030 in Step 1 to 0.161 for males, thus providing support for Hypothesis 3. As found with the full regression models, the OLS hierarchical regressions by gender also demonstrate a significant negative relationship between *FTP* and *FRT Score*, supporting Hypothesis 2. The addition of the *FTP* variable increases the adjusted R^2 from 0.204 in Step 2 to 0.306 in Step 3 for females and from 0.161 in Step 2 to 0.182 in Step 3 for males, thus supporting Hypothesis 4. A comparison of Step 3 to Step 1 demonstrates that the *PTP* and *FTP* variables together result in an adjusted R^2 increase of 0.211 (an increase of 222.11%) for females and an increase of 0.152 (an increase of 506.67%) for males over a model that only includes only income and financial knowledge/experience (*Income*, *StkGame*). An interesting finding is that *Income* continues to be a significant explanatory variable for females but not for males. As in the full model, we find evidence to support all four hypotheses when we run hierarchical regressions separately by *Gender*.

We also run the OLS hierarchical regressions separately for participants that did not complete a high school course with a stock market game and for participants that did complete such a course. In Table 6, we run regressions of the following form by *StkGame*:

Step 1: *FRT Score = f(Gender, Income)*
Step 2: *FRT Score = f(PTP, Gender, Income)*
Step 3: *FRT Score = f(FTP, PTP, Gender, Income)*

Table 5 OLS hierarchical regressions by gender (standardized beta coefficients)

	Step 1	Step 2	Step 3
	FRT Score	*FRT Score*	*FRT Score*
Female			
Gender = 0			
FTP			−0.329
p-value			0.000
PTP		0.343	0.321
p-value		0.000	0.000
Income	0.253	0.205	0.165
p-value	0.000	0.003	0.011
StkGame	0.208	0.230	0.190
p-value	0.003	0.001	0.003
n	178	176	176
R^2	0.105	0.218	0.322
Adjusted R^2	0.095	0.204	0.306
F-statistic	10.290	15.930	20.310
Prob > *F*-statistic	0.000	0.000	0.000
Male			
Gender = 1			
FTP			−0.169
p-value			0.036
PTP		0.367	0.385
p-value		0.000	0.000
Income	0.102	0.092	0.059
p-value	0.223	0.237	0.453
StkGame	0.179	0.166	0.198
p-value	0.032	0.034	0.012
n	142	141	141
R^2	0.044	0.179	0.206
Adjusted R^2	0.030	0.161	0.182
F-statistic	3.200	9.980	8.800
Prob > *F*-statistic	0.044	0.000	0.000

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course.

This table presents results of the following Ordinary Least Squared (OLS) Regressions by *Gender*:

Step 1: *FRT Score = f(Income, StkGame)*

Step 2: *FRT Score = f(PTP, Income, StkGame)*

Step 3: *FRT Score = f(FTP, PTP, Income, StkGame).*

where the dependent variable and independent variables are as previously defined. For both individuals without financial knowledge/experience and individuals with financial knowledge and experience, *PTP* is a significant predictor of *FRT Score*, supporting Hypothesis 1. Consistent with the full model discussed earlier (where *StkGame* is an independent variable), the *PTP* variable accounts for a large amount of variance above and beyond the control variables. This is

Table 6 OLS hierarchical regressions by StkGame (standardized beta coefficients)

	Step 1	Step 2	Step 3
	FRT Score	*FRT Score*	*FRT Score*
Did not play			
StkGame = 0			
FTP			−0.224
p-value			0.001
PTP		0.337	0.324
p-value		0.000	0.000
Gender	0.304	0.309	0.214
p-value	0.000	0.000	0.001
Income	0.203	0.156	0.125
p-value	0.001	0.009	0.032
n	229	227	227
R^2	0.155	0.263	0.302
Adjusted R^2	0.148	0.253	0.289
F-statistic	18.460	25.750	24.740
Prob > *F*-statistic	0.000	0.000	0.000
Played			
StkGame = 1			
FTP			−0.341
p-value			0.000
PTP		0.357	0.428
p-value		0.000	0.000
Gender	0.294	0.251	0.207
p-value	0.005	0.011	0.025
Income	0.128	0.138	0.079
p-value	0.214	0.154	0.387
n	91	90	90
R^2	0.120	0.247	0.353
Adjusted R^2	0.100	0.221	0.322
F-statistic	5.660	5.510	7.400
Prob > *F*-statistic	0.005	0.002	0.000

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course.

This table presents results of the following Ordinary Least Squared (OLS) Regressions by *StkGame*:

Step 1: *FRT Score = f(Gender, Income)*

Step 2: *FRT Score = f(PTP, Gender, Income)*

Step 3: *FRT Score = f(FTP, PTP, Gender, Income).*

evidenced by an adjusted R^2 increase from 0.148 in Step 1 to 0.253 in Step 2 for individuals without financial knowledge/experience and from 0.100 in Step 1 to 0.221 for individuals with financial knowledge and experience, thus providing support for Hypothesis 3. As found with the full regression models, the hierarchical regressions by *StkGame* also demonstrate a significant negative relationship between *FTP* and *FRT Score*, supporting Hypothesis 2. The addition of the

Table 7 Hierarchical truncated regressions

	Step 1	Step 2	Step 3
	FRT Score	*FRT Score*	*FRT Score*
FTP			−1.065
p-value			0.000
PTP		1.450	1.498
p-value		0.000	0.000
Gender	2.578	2.507	1.779
p-value	0.000	0.000	0.000
Income	0.488	0.411	0.306
p-value	0.001	0.005	0.031
StkGame	1.824	1.867	1.952
p-value	0.000	0.000	0.000
n	317	314	314
Rough estimate of R^2	0.179	0.287	0.340
Wald χ^2	56.760	94.950	117.790
Prob $> \chi^2$	0.000	0.000	0.000

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course.

This table presents results of the following Truncated Regressions using Maximum Likelihood Estimation with robust standard errors:

Step 1: *FRT Score = f(Gender, Income, StkGame)*

Step 2: *FRT Score = f(PTP, Gender, Income, StkGame)*

Step 3: *FRT Score = f(FTP, PTP, Gender, Income, StkGame).*

FTP variable increases the adjusted R^2 from 0.253 in Step 2 to 0.289 in Step 3 for individuals without financial knowledge/experience and from 0.221 in Step 2 to 0.322 in Step 3 for individuals with financial knowledge and experience, thus supporting Hypothesis 4. A comparison of Step 3 to Step 1 demonstrates that the *PTP* and *FTP* variables together result in an adjusted R^2 increase of 0.141 (an increase of 95.27%) for individuals without financial knowledge/experience and an increase of 0.222 (an increase of 222.0%) for individuals with financial knowledge/experience over a model that only includes only gender and income (*Gender*, *Income*). An interesting find is that *Income* continues to be a significant explanatory variable for individuals without financial knowledge/experience but not for individuals with financial knowledge/experience. As in the full model, we find evidence to support all four hypotheses when we run hierarchical regressions separately by *StkGame*.

4.4.2. Hierarchical truncated regressions

Given that the dependent variable is a scale measure with a limited possible range of 13–47, it can be argued that a truncated regression model would be more appropriate than an OLS regression model (Davidson and MacKinnon, 1993; Maddala, 1983). In Table 7, we report the results of hierarchical truncated regressions using maximum likelihood estimation

with robust standard errors (the inferences are qualitatively unchanged if these regressions are run without robust standard errors). A rough estimate of the R^2 one would find in an OLS regression is computed by correlating *FRT Score* with the predicted value and squaring the result. We run hierarchical truncated regressions of the following form where the dependent variable and independent variables are as defined earlier:

Step 1: *FRT Score = f(Gender, Income, StkGame)*
Step 2: *FRT Score = f(PTP, Gender, Income, StkGame)*
Step 3: *FRT Score = f(FTP, PTP, Gender, Income, StkGame)*

Consistent with Hypothesis 1, *PTP* is a significant predictor of *FRT Score*. Consistent with Hypothesis 3, the *PTP* variable accounts for a large amount of variance above and beyond the control variables as evidenced by an increase in the rough estimate of R^2 from 0.179 in Step 1 to 0.287 in Step 2 (an increase of 0.108 or 60.34%). In support of Hypothesis 2, there is a significant negative relationship between *FTP* and *FRT Score*. The addition of the *FTP* variable increases the rough estimate of R^2 from 0.287 in Step 2 to 0.340 in Step 3 (an increase of 0.053 or 18.47%), thus supporting Hypothesis 4. A comparison of Step 3 to Step 1 demonstrates that the *PTP* and *FTP* variables together result in an increase in the rough estimate of R^2 of 0.161 (an increase of 89.94%) over a model that only includes gender, income and financial knowledge/experience (*Gender*, *Income*, and *StkGame*). Thus, we continue to find evidence in support of all four hypotheses when we run hierarchical truncated regressions that use maximum likelihood estimation.

4.4.3. Ordinal logistic regressions

It can also be argued that the nature of the dependent variable, *FRT Score*, is better captured by running an ordinal logistic regression model (Davidson and MacKinnon, 1993; Greene, 1997; Liu, 2016; Maddala, 1983). In Table 8, we report the results of hierarchical ordinal logistic regressions using maximum likelihood estimation with robust standard errors (the inferences are qualitatively unchanged if these regressions are run without robust standard errors). We run hierarchical ordinal logistic regressions of the following form where the dependent variable and independent variables are as defined earlier:

Step 1: *FRT Score = f(Gender, Income, StkGame)*
Step 2: *FRT Score = f(PTP, Gender, Income, StkGame)*
Step 3: *FRT Score = f(FTP, PTP, Gender, Income, StkGame)*

Consistent with Hypothesis 1, *PTP* is a significant predictor of *FRT Score*. Consistent with Hypothesis 3, the *PTP* variable accounts for a large amount of variance above and beyond the control variables as evidenced by an increase in the Pseudo R^2 from 0.032 in Step 1 to 0.054 in Step 2 (an increase of 0.022 or 68.75%). In support of Hypothesis 2, there is a significant negative relationship between *FTP* and *FRT Score*. The addition of the *FTP* variable increases the Pseudo R^2 from 0.054 in Step 2 to 0.068 in Step 3 (an increase of 0.014 or 25.93%), thus supporting Hypothesis 4. A comparison of Step 3 to Step 1 demonstrates that the *PTP* and *FTP* variables together result in an increase in the Pseudo R^2 of 0.036 (an increase of 112.50%) over a model that only includes gender,

Table 8 Hierarchical ordinal logistic regressions

	Step 1	Step 2	Step 3
	FRT Score	*FRT Score*	*FRT Score*
FTP			−0.561
p-value			0.000
PTP		0.698	0.742
p-value		0.000	0.000
Gender	1.108	1.156	0.836
p-value	0.000	0.000	0.000
Income	0.227	0.191	0.137
p-value	0.001	0.007	0.048
StkGame	0.768	0.817	0.918
p-value	0.000	0.000	0.000
n	320	317	317
Wald χ^2	49.660	84.710	94.650
Prob $> \chi^2$	0.000	0.000	0.000
Psuedo R^2	0.032	0.054	0.068

Financial Risk Tolerance (FRT) *Score* is measured using student scores on the Grable and Lytton (1999) 13-item financial risk tolerance scale. *Future Time Perspective* (FTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Future scale. *Present Time Perspective* (PTP) is measured using nine items from the Zimbardo Time Perspective Inventory (ZTPI) Present-Hedonistic scale. *Gender* is a [0,1] indicator variable with 0 coded as female and 1 coded as male. *Income* is estimate of parents' income is where students were asked to estimate the combined income of their parents from all sources, before taxes. *StkGame* is a [0,1] indicator variable with 0 coded as not having taken a course in high school in which a stock market game was played and 1 coded as having taken such a course.

This table presents results of the following Ordinal Logistic Regressions using Maximum Likelihood Estimation with robust standard errors:

Step 1: *FRT Score = f(Gender, Income, StkGame)*

Step 2: *FRT Score = f(PTP, Gender, Income, StkGame)*

Step 3: *FRT Score = f(FTP, PTP, Gender, Income, StkGame).*

income, and financial knowledge/experience (*Gender*, *Income*, and *StkGame*). Thus, we continue to find evidence in support of all four hypotheses when running hierarchical ordinal logistic models.

5. Discussion and conclusion

Prior research has found that FRT is impacted by a number of variables such as gender, income, and financial knowledge/experience. This study finds that TP accounts for a significant amount of the variance in FRT above and beyond the amount contributed by those previously studied variables. Young adults with a stronger present orientation tend to have higher FRT scores and those with a stronger future orientation tend to have lower FRT scores. However, prior research demonstrates that individuals with a long time horizon until retirement should be investing in portfolios of more risky securities (i.e., equities as opposed to bonds and money market funds) to maximize their long-term wealth accumulation. Thus, the results from this study indicate that young adults are not likely to engage in optimal investment behavior. Those that are thinking about their future (i.e., they exhibit a future

orientation) tend to be financially risk averse and less likely to create a portfolio that will maximize their wealth. Those that are more risk tolerant tend to be present oriented and are less likely to invest for their future. These findings point to a set of challenges for financial professionals, educators, and researchers:

1. How can we get the young adults with the higher FRT focused on investing for their future?
2. How can we increase the financial risk tolerance of the young adults that are future oriented?

Consistent with prior research, this study also finds that females are more financially risk averse than males. While results from previous studies examining the relationship between gender and TP are mixed, females in the current study tend to display a stronger future orientation than males. Contrary to prior research, the results show a negative relationship between income and future TP. This may be explained by the fact that the females in the sample tend to be more future oriented than the males, while at the same time they appear to provide lower estimates of their family income than the males do. Additionally, the results generally support prior findings of a significant positive relationship between FRT and both income and financial knowledge/experience. However, we find some interesting results for the income variable when we run regressions separately for each group (i.e., by gender or by financial knowledge/experience). When the OLS regressions are run separately for males and females, income is a significant explanatory variable for females, but not for males. The reason for this difference is not clear, but as previously noted, the females in our sample do appear to provide lower estimates of their family income than the males. Our separate regressions by group also show that the income variable is significant for participants that did not complete a stock market game in high school, but is not significant for those that did complete a stock market game. Again, the reason for this difference is not clear. It does raise a question as to whether or not certain types of financial experience and knowledge may possibly mitigate the importance of income as a determinant of FRT. However, these results may be an artifact of our particular income measure and further research is clearly needed before any conclusions can be made regarding the differences we find in the separate group regressions.

Future research should also address the two challenges noted above, exploring possible interventions that move present oriented individuals with a high FRT toward a stronger future orientation and increase the FRT of future oriented individuals that have a low FRT. Additionally, more research is needed to determine how generalizable the results are. The current sample is from a population of new college freshmen that are primarily White. Future research could examine the relationship between TP and FRT among samples of participants from different age groups, different race groups, and different education levels.

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Appendix: A Grable and Lytton (1999) 13-Item Financial Risk Tolerance Scale

1. In general, how would your best friend describe you as a risk taker?
   a) A real gambler
   b) Willing to take risks after completing adequate research
   c) Cautious
   d) A real risk avoider
2. You are on a TV game show and can choose one of the following. Which would you take?
   a) $1,000 in cash
   b) A 50% chance at winning $5,000
   c) A 25% chance at winning $10,000
   d) A 5% chance at winning $100,000
3. You have just finished saving for a "once-in-a-lifetime" vacation. Three weeks before you plan to leave, you lose your job. You would:
   a) Cancel the vacation
   b) Take a much more modest vacation
   c) Go as scheduled, reasoning that you need the time to prepare for a job search
   d) Extend your vacation, because this might be your last chance to go first-class
4. If you unexpectedly received $20,000 to *invest*, what would you do?
   a) Deposit it in a bank account, money market account, or an insured CD
   b) Invest it in safe high quality bonds or bond mutual funds
   c) Invest it in stocks or stock mutual funds
5. In terms of experience, how comfortable are you investing in stocks or stock mutual funds?
   a) Not at all comfortable
   b) Somewhat comfortable
   c) Very comfortable
6. When you think of the word "risk" which of the following words comes to mind first?
   a) Loss
   b) Uncertainty
   c) Opportunity
   d) Thrill
7. Some experts are predicting prices of hard assets such as gold, jewels, collectibles, and real estate to increase in value. Bond prices may fall, however, experts tend to agree that government bonds are relatively safe. Most of your investment assets are now in high interest government bonds. What would you do?
   a) Hold the bonds
   b) Sell the bonds, put half the proceeds into money market accounts, and the other half into hard assets
   c) Sell the bonds and put the total proceeds into hard assets
   d) Sell the bonds, put all the money into hard assets, and borrow additional money to buy more.
8. Given the best and worst case returns of the four investment choices below, which would you prefer?
   a) $200 gain best case; $0 gain/loss worst case
   b) $800 gain best case; $200 loss worst case
   c) $2,600 gain best case; $800 loss worst case
   d) $4,800 gain best case; $2,400 loss worst case
9. In addition to whatever you own, you have been given $1,000. You are now asked to choose between:
   a) A sure gain of $500
   b) A 50% chance to gain $1,000 and a 50% chance to gain nothing
10. In addition to whatever you own, you have been given $2,000. You are now asked to choose between:
   c) A sure loss of $500
   d) A 50% chance to lose $1,000 and a 50% chance to lose nothing
11. Suppose a relative left you an inheritance of $100,000, stipulating in the will that you invest ALL the money in ONE of the following choices. Which one would you select?
   a) A savings account or money market mutual fund
   b) A mutual fund that owns stocks and bonds

(continued on next page)

Appendix A *(continued)*

c) A portfolio of 15 common stocks
d) Commodities like gold, silver, and oil

12. If you had to invest $20,000, which of the following investment choices would you find most appealing?
a) 60% in low-risk investments, 30% in medium-risk investments, and 10% in high-risk investments
b) 30% in low-risk investments, 40% in medium-risk investments, and 30% in high-risk investments
c) 10% in low-risk investments, 40% in medium-risk investments, and 50% in high-risk investments

13. Your trusted friend and neighbor, an experienced geologist, is putting together a group of investors to fund an exploratory gold mining venture. The venture could pay back 50 to 100 times the investment if successful. If the mine is a bust, the entire investment is worthless. Your friend estimates the chance of success is only 20%. If you had the money, how much would you invest?
a) Nothing
b) One month's salary
c) Three month's salary
d) Six month's salary

Scoring:
1. a = 4; b = 3; c = 2; d = 1
2. a = 1; b = 2; c = 3; d = 4
3. a = 1; b = 2; c = 3; d = 4
4. a = 1; b = 2; c = 3
5. a = 1; b = 2; c = 3
6. a = 1; b = 2; c = 3; d = 4
7. a = 1; b = 2; c = 3; d = 4
8. a = 1; b = 2; c = 3; d = 4
9. a = 1; b = 3
10. a = 1; b = 3
11. a = 1; b = 2; c = 3; d = 4
12. a = 1; b = 2; c = 3
13. a = 1; b = 2; c = 3; d = 4

Source: Grable, J., & Lytton, R. H. (1999). Financial risk tolerance revisited: The development of a risk assessment instrument. *Financial Services Review, 8,* 163–181.

Appendix B: Zimbardo Time Perspective Inventory (ZTPI) scale items

ZTPI Present-Hedonistic Scale items:
I believe that getting together with one's friends to party is one of life's important pleasures.
I do things impulsively.
I try to live my life as fully as possible, one day at a time.
I make decisions on the spur of the moment.
It is important to put excitement in my life.
Taking risks keeps my life from becoming boring.
It is more important for me to enjoy life's journey than to focus only on the destination.
I find myself getting swept up in the excitement of the moment.
I prefer friends who are spontaneous rather than predictable.

ZTPI Future Scale items:
I believe a person's day should be planned ahead each morning.
When I want to achieve something, I set goals and consider specific means for reaching those goals.
Meeting tomorrow's deadlines and doing other necessary work comes before tonight's play.
It upsets me to be late for appointments.
I meet my obligations to friends and authorities on time.
I complete projects on time by making steady progress.
I make lists of things I must do.
I am able to resist temptations when I know there is work to be done.
I keep working at a difficult, uninteresting task if it will help me get ahead.

Consistent with Ryack (2012, 2015), the Present scale items used in this study include nine of the 15 items from the original ZTPI Present-Hedonistic scale and the Future scale items used include nine of the thirteen items from the original ZTPI Future scale (Zimbardo & Boyd, 1999). Ryack (2012) conducted confirmatory factor analyses on these scale items using a sample of college students and found the revisions did not significantly alter scale integrity.

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