What a difference a (birth) month makes: The relative age effect and fund manager performance

JFE2019.04

主讲人：王光耀

Author： John (Jianqiu) Bai

- Assistant Professor of Finance; Gary Gregg Faculty Research Fellow; Joseph G. Riesman Research Professor
- **Education**
- Ph.D., Finance, University of Southern California
- M.S., Finance, Queen's University
- B.Comm., Finance, University of British Columbia
- **Research & Teaching Interests**
- Professor Bai's research and teaching interests are in empirical corporate finance with a focus on labor finance and using machine learning and textual analysis to study asset price movements and interactions between firms and markets.
- **Selected Publications**
- "The Impact of Bank Credit on Labor Reallocation and Aggregate Industry Productivity", 2018, with Daniel Carvalho and Gordon Phillips, Journal of Finance, 73(6), 2787-2836
- What a Difference a (Birth) Month Makes: the Relative Age Effect and Fund Manager Performance, 2019, with Linlin Ma, Kevin Mullally, and David H. Solomon, Journal of Financial Economics, 123(1), 200-221
- "Employment Protection, Investment, and Firm Growth", 2019, with DJ Fairhurst and Matthew Serfling, Review of Financial Studies, 33(2), 644-688
- "Organizational Form and Trade Liberalization: Plant-level Evidence", 2020, Management Science, Forthcoming

Author:马琳琳

- **教育经历**
- 哲学博士（金融专业），佐治亚州立大学，美国亚特兰大，2013年
- 理学硕士（金融专业），杜伦大学，英国杜伦，2007年
- 经济学学士（金融专业），对外经济贸易大学，中国北京，2005年
- **工作经历**
- 北京大学汇丰商学院 金融学助理教授 2018年7月至今
- 东北大学（美国波士顿）达莫尔麦金商学院 金融学助理教授 2013年8月至2018年6月
- **研究领域**
- 共同基金和对冲基金，股东维权，行为金融学
- **发表论文：**
- “Portfolio Manager Compensation in the U.S. Mutual Fund Industry” (with Yuehua Tang and Juan-Pedro Gómez), 2019, Journal of Finance 74, 587-638.
- “What a Difference a (Birth) Month Makes: The Relative Age Effect and Fund Manager Performance” (with Jianqiu Bai, Kevin Mullally, and David Solomon), 2019, Journal of Financial Economics 132, 200-221.
- “Portfolio Manager Ownership and Mutual Fund Risk Taking” (with Yuehua Tang), 2019, Management Science 65 (12): 5518-5534.

Author:Kevin Mullally

- **EDUCATION**
- Ph.D. in Finance, Georgia State University, Atlanta, GA, May 2016
- M.S. Finance, Georgia State University, Atlanta, GA, 2010
- B.S. Mathematics Education, University of Central Florida, Orlando, FL, 2005
- **AREAS OF INTEREST**
- Institutional Investors, Mutual Funds and Hedge Funds, Financial Markets
- **PUBLICATIONS**
- 1. “What a Difference a (Birth) Month Makes: The Relative Age Effect and Fund Manager Performance” with John (Jiangiu) Bai, Linlin Ma, and David Solomon, Journal of Financial Economics, 2019, 132, 200-221.
- 2. “Mandatory Portfolio Disclosure, Stock Liquidity, and Mutual Fund Performance” (with Vikas Agarwal, Yuehua Tang, and Baozhong Yang), Journal of Finance, 2015, vol. 70 (6), 2733-2776.
- 3. “The Economics and Finance of Hedge Funds: A Review of the Academic Literature” (with Vikas Agarwal and Narayan Naik), Foundations and Trends in Finance, 2015, vol. 10 (1), 1- 111.

Author:DAVID H. SOLOMON

- **EDUCATION**
- Doctor of Philosophy, Finance. 2009
- Masters of Business Administration. 2009
- University of Chicago Booth School of Business, Chicago, USA
- Bachelor of Commerce (Honors), Quantitative Finance Major. 2003
- University of Western Australia, Perth, Australia
- **RESEARCH INTERESTS**
- Behavioral Finance, Asset Pricing, Media, Mutual Funds, Dividends, Investor Psychology
- **PUBLICATIONS**
- 'The Dividend Disconnect' with Samuel M. Hartzmark Journal of Finance, Forthcoming
- 'Recurring Firm Events and Predictable Returns: The Within-Firm Time-Series' with Samuel M. Hartzmark Annual Review of Financial Economics, Forthcoming
- What a Difference a (Birth) Month Makes: The Relative Age Effect and Fund Manager Performance With John Bai, Linlin Ma, and Kevin Mullally Journal of Financial Economics, Forthcoming

Abstract

- Many US states have a single cutoff date for school entry, meaning that some children are older than others when they begin kindergarten. We show that this variation in birth months is associated with differences in adult labor market outcomes in the mutual fund industry. Relatively older managers (i.e., those born just after the cutoff) make better stock selections, and their funds outperform their younger peers' funds by 0.48% per annum. This difference is linked to increased confidence. Survey respondents judge relatively older managers as appearing more confident in photographs, and these managers display more confident behavior: making larger bets, window dressing their holdings less, and securing more fund flows conditional on performance.

- Introduction
- Data and sample selection
- Relative age and fund performance
- Relative age and confidence
- Alternative causes of return differences
- Conclusion

Part 1 Introduction

Introduction(background)

- Why some firms succeed and others fail?
- Characteristics of managers
- Overconfidence
- Confidence
- Underconfidence

Introduction(Main question)

- How early childhood experiences relating to the month of birth affect the confidence and performance of mutual fund managers?
- Childhood – from kindergarten
- Cut off day for school eligibility
- Physically bigger and more cognitively developed.
- Display better performance on tasks at a young age.
- Persist into adulthood

Introduction(relative age and fund performance)

- Relative older mutual fund managers performance display better fund performance.
- Funds run by managers in the top quartile of relative age outperform those in the lowest quartile by 0.477% annually in their Carhart (1997) four-factor alpha, and stocks disproportionately held by older managers outperform those held by younger man- agers by 1.62–1.76% per year.
- Considering that the average mutual fund in our sample has an annual four-factor al- pha of − 0.489%, this effect is considerable.

Introduction(relative age and confidence)

- Why might relatively older managers outperform their peers?
- Whether this relative age effect is linked to managerial confidence, whereby the experience of being older as a child has personality-forming effects that are evident in adulthood.
- Confidence can initially seem surprising as a potential driver of performance, perhaps because of its pop culture association with vague, feel-good advice like “believing in the power of your dreams.”

Introduction(relative age and confidence)

- we explore two quite concrete ways confidence may improve fund returns.
- The first is that a more confident fund manager can have better interpersonal skills that help him lead and inspire his team of colleagues and employees and thus obtain better performance from the group as a whole. ways confi- dence may improve fund returns.
- The second is that a more confident fund manager can make larger bets on stocks where he is more informed and thus obtain higher portfolio returns on average as a result.
- While neither of these explanations maps cleanly to conventional ideas of fund manager skill, such as stock-picking ability, the leadership channel would be a direct positive input into the fund's production func- tion, whereas the larger betting channel would be a com- plement to an existing stock-picking skill set.

Introduction(relative age and confidence)

•While a link between relative age and confidence has been conjectured in prior literature, we establish direct evidence that relatively older fund managers are perceived as more confident based on their physical appearance and body language.

•We manually download the profile pictures of a sample of relatively older and relatively younger managers from LinkedIn. We create 2000 randomly drawn pairings of one photo of a relatively older manager and one photo of a relatively younger manager.

•They choose the relatively older manager in 54.75% of cases, with an associated p-value of 0.000023. This result is striking given respondents have no other information than a small, posed photo and are still able to perceive differences in the confidence of relatively older and younger managers.

•By contrast, survey respondents do not perceive relatively older managers to be more reliable or more physically attractive, suggesting that confidence is not simply measuring a wide range of personality differences.

Introduction(alternative causes of return differences)

- Differences in educational attainment
- Team-managed funds
- Parental planning
- Month of the year

Part 2 Data and sources

Data and sample selection(data sources)

- Fund level characteristics:
- Sources: Morningstar Direct Mutual Fund database & Thomson Reuters Mutual Fund Holdings database.
- Fund names, manager names, returns, expense ratios, turnover ratios.
- Restrict sample to funds that are primarily invested in US equities.
- Sample period is 1980-2015.
- Initial sample contains 4359 funds and 6618 unique managers.

- Managers' information:
- Sources: LexisNexis Public Records (LNPR) database.
- Birth month, year, first five digits of their ssn(assume that the state in which the manager received his ssn is also the state in which he attended his kindergarten)
- Education background.

Data and sample selection (construction of relative age variables)

- Relative age is defined as the number of months between the manager's birth month and the cutoff month for school entry in the state the manager attended kindergarten.
- Throughout the paper, "relatively older/younger" refers only to the birth month relative to this school entry cutoff (and thus the age of the child when he started kindergarten).
- relative age is primarily about the effect of early childhood experiences, because it is by construction an age gap that is proportionally large in childhood but very small in adulthood.

$$RelativeAge = \begin{Bmatrix} CutoffMonth - BirthMonth, \\ BirthMonth < CutoffMonth \\ 12 - (BirthMonth - CutoffMonth), \\ BirthMonth \geq CutoffMonth \end{Bmatrix}. \quad (1)$$

Data and sample selection(summary statistics and correlation matrix)

Table 1
Sample distribution by relative age.
The table reports the distribution of fund managers' relative ages and birth months in our sample. Our sample contains 2228 domestic equity funds and 4081 distinct managers and the sample period is from 1980 to 2015. *Relative age* is defined as the number of months before the school year cutoff that the manager in question was born, with larger numbers corresponding to being relatively older on entering kindergarten. We obtain cutoff month for each individual state from Bedard and Dhuey (2012).

Panel A. Relative age distribution

Relative age	# of managers	% of sample
1	334	8.18
2	378	9.26
3	340	8.33
4	374	9.16
5	371	9.09
6	340	8.33
7	346	8.48
8	321	7.87
9	339	8.31
10	286	7.01
11	319	7.82
12	333	8.16
Total	4,081	100

Panel B. Birth month distribution

	Mutual fund managers		United States births, 2015	
Birth month	# of managers	% of sample	# births	% of population
January	332	8.14	325,955	8.19
February	267	6.54	298,058	7.49
March	334	8.18	328,923	8.27
April	332	8.14	320,832	8.06
May	354	8.67	327,917	8.24
June	340	8.33	330,541	8.31
July	370	9.07	353,415	8.88
August	347	8.5	351,791	8.84
September	374	9.16	347,516	8.73
October	384	9.41	339,007	8.52
November	345	8.45	318,820	8.01
December	302	7.4	335,722	8.44
Total	4081	100	3,978,497	100

Table 2 Summary statistics and Correlation matrix

Panel A:				
Variable	Mean	Median	Std. dev	*N*
Manager characteristics				
Relative age (in months)	6.40	6.33	2.74	22,330
Manager age (in years)	46.32	45.74	7.73	22,330
Manager tenure (in years)	5.50	4.17	4.57	22,330
Top MBA (0/1)	0.33	0.20	0.38	22,330
Average undergraduate SAT	1294.65	1300.00	127.29	21,954
Performance & skill measures				
Net 4-factor alpha (% per year)	−0.489	−0.724	7.316	19,981
Net 5-factor alpha (% per year)	−0.640	−0.761	7.963	19,981
Gross 4-factor alpha (% per year)	0.834	0.506	7.166	18,834
Gross 5-factor alpha (% per year)	0.713	0.490	7.769	18,834
BVB value-added ($ mill)	−0.516	−0.597	2.900	22,256
Return gap (%)	−0.013	−0.015	0.677	15,040
Active share (%)	0.819	0.866	0.156	15,040
$1 - R2$ (%)	9.005	6.788	8.168	17,977
Window dressing measures				
Rank gap	0.00	−0.01	0.08	7620
Backward holding return gap (*BHRG*)	0.01	0.00	0.03	7872
Fund characteristics				
# stocks	120.07	73.75	182.04	19,654
Average ($ mill)	11.32	2.26	26.344	19,638
Fund size ($ mill)	1298.20	207.34	5521.04	20,179
Family size ($ bill)	70.05	11.80	197.15	20,263
Fund flows (%)	1.42	−0.16	6.88	16,887
Expense ratio (%)	1.32	1.28	0.87	21,616
Turnover (%)	80.47	60.47	70.28	20,435
Fund age (in years)	13.18	9.58	12.78	22,330

Panel B: Correlations

	Relative age	Mgr. age	Mgr. tenure	Top MBA	Avg. SAT	Return gap	Active share	$(1-R2)$	Fund size	Family size	Expense ratio	Turnover
Relative age	1.000											
Mgr. age	0.040	1.000										
Mgr. tenure	0.017	0.393	1.000									
Top MBA	−0.046	0.008	0.029	1.000								
Avg. SAT	0.058	0.030	0.080	0.285	1.000							
Return gap	0.001	−0.059	−0.054	0.021	0.013	1.000						
Active share	0.044	0.021	0.099	−0.069	0.034	0.028	1.000					
$(1-R2)$	−0.009	0.055	0.037	−0.021	0.007	−0.003	0.381	1.000				
Fund size	0.027	0.041	0.143	0.125	0.123	−0.018	−0.148	−0.066	1.000			
Family size	−0.020	−0.040	−0.017	0.159	0.137	0.020	−0.172	−0.099	0.403	1.000		
Expense ratio	−0.006	0.002	−0.072	−0.105	−0.073	0.043	0.247	0.174	−0.163	−0.252	1.000	
Turnover	−0.046	−0.158	−0.193	−0.072	−0.034	0.092	0.119	0.117	−0.094	−0.014	0.192	1.000

Part3 Relative age and fund performance

Relative age and fund performance(Portfolio sorts)

- By funds
- By stocks

Multivariate regressions

- OLS:

$$Performance_{i,t} = \alpha + \beta(RelAge_{i,t-1}) + \gamma'(FundChars_{i,t-1}) + \varphi'(MgrChars_{i,t-1}) + \varepsilon_{i,t}, \quad (2)$$

- Four-factor alpha:

$$R_{i,t} - R_{f,t} = \alpha_i + \sum_{j=1}^{4} \beta_{i,j} F_{j,t} + \varepsilon_{i,t}, \quad (3)$$

- Flow:

$$Flow_{i,t} = \frac{AUM_t - AUM_{t-1} \times (1 + Return_t)}{AUM_{t-1}}. \quad (4)$$

Table 3

The effect of relative age: portfolio returns.

The table contains the average raw returns, alphas, and DGTW measures for calendar time portfolios sorted on managers' relative age. *Relative age* is defined as the number of months before the school year cutoff that the manager in question was born, with larger numbers corresponding to being relatively older on entering kindergarten. At the beginning of every month, funds are sorted into four portfolios based on the relative ages of their managers. Panel A contains the results when the portfolio returns are calculated using the monthly fund returns, while Panel B contains the results when the portfolio returns are calculated based on stocks disproportionately held by relatively older managers versus those held by relatively younger managers. Portfolios are rebalanced monthly in Panel A and quarterly in Panel B when funds reveal new portfolio holdings. Q4–Q1 is the long-short portfolio constructed by purchasing the portfolio of funds (or stocks) with the highest relative ages and short selling the portfolio of funds (or stocks) with the lowest relative age. Returns are presented in annual percent, and *t*-statistics are presented in parentheses below the coefficient estimates. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Portfolios of funds

	Q1 (low)	Q2	Q3	Q4	Q4 – Q1
Raw return	7.72%	7.93%	7.90%	8.14%	0.42%**
	(2.52)	(2.59)	(2.65)	(2.68)	(1.98)
Alpha	−0.94%	−0.66%	−0.59%	−0.47%	0.48%**
	(− 2.30)	(− 1.42)	(− 1.33)	(− 1.15)	(2.02)

Panel B. Portfolios of stocks

	Q1 (low)	Q2	Q3	Q4	Q4 – Q1
Raw return	13.56%	14.44%	14.64%	15.30%	1.76%**
	(4.41)	(4.84)	(5.07)	(5.03)	(2.15)
Alpha	0.87%	1.88%	2.34%	2.51%	1.64%**
	(1.29)	(3.30)	(4.30)	(3.40)	(2.06)
3-month DGTW	−0.43%	0.54%	1.17%	1.19%	1.62%***
	(− 1.13)	(1.69)	(3.53)	(2.86)	(2.83)

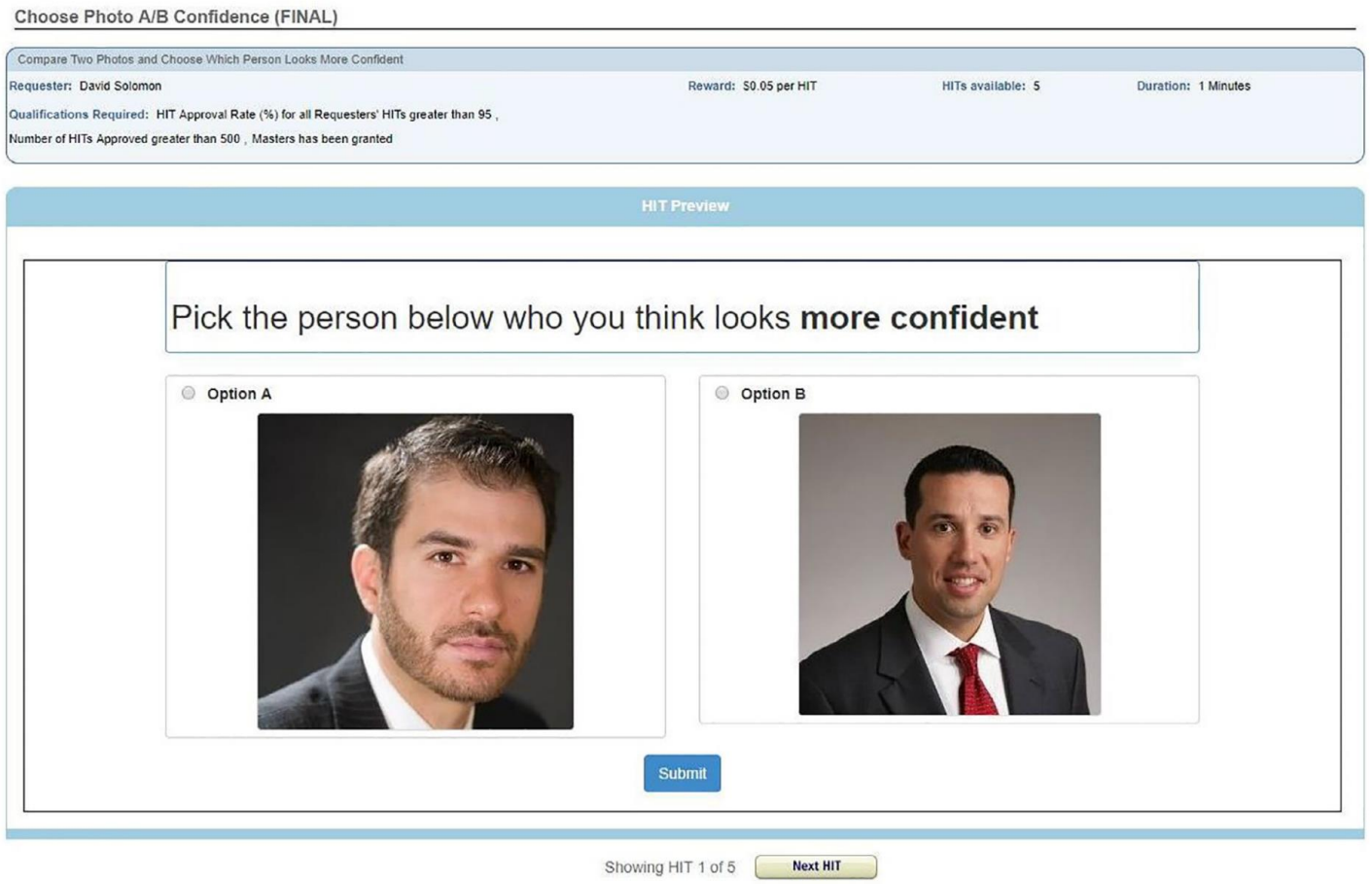
Table 4 The effect of relative age on fund performance

Dependent variable	Four-factor alpha					
	[1]	[2]	[3]	[4]	[5]	[6]
High relative age$_{t-1}$	0.413**		0.403**		0.419**	
	(2.41)		(2.27)		(2.54)	
Relative age$_{t-1}$		0.055**		0.058**		0.056**
		(1.97)		(2.00)		(2.07)
Fund size$_{t-1}$	−0.166**	−0.163**	−0.080	−0.077	−0.172*	−0.169*
	(−1.98)	(−1.96)	(−1.31)	(−1.28)	(−1.90)	(−1.88)
Fund family size$_{t-1}$	0.134***	0.131***	0.120***	0.117***	0.123**	0.121**
	(3.58)	(3.50)	(3.35)	(3.27)	(2.36)	(2.31)
Expense ratio$_{t-1}$	−0.428***	−0.429***	−0.415***	−0.415***	−0.432***	−0.433***
	(−3.88)	(−3.88)	(−3.50)	(−3.51)	(−3.94)	(−3.95)
Turnover$_{t-1}$	−3.106***	−3.108***	−2.833***	−2.835***	−3.110***	−3.114***
	(−7.20)	(−7.19)	(−7.59)	(−7.57)	(−6.92)	(−6.92)
Manager age$_{t-1}$	−2.488***	−2.468***	−2.551***	−2.533***	−2.436***	−2.413***
	(−4.08)	(−4.05)	(−3.99)	(−3.97)	(−3.98)	(−3.95)
Fund age$_{t-1}$	0.143	0.141	0.094	0.092	0.143	0.139
	(1.12)	(1.11)	(0.82)	(0.81)	(1.06)	(1.04)
Manager tenure$_{t-1}$	0.101***	0.102***	0.123***	0.123***	0.173*	0.173*
	(4.90)	(4.93)	(6.70)	(6.73)	(1.69)	(1.69)
Fund flow$_{t-1}$	0.207**	0.209**	0.200**	0.202**	0.102***	0.103***
	(1.98)	(1.99)	(2.02)	(2.03)	(4.92)	(4.94)
Style FE	Yes	Yes	No	No	Yes	Yes
Year FE	Yes	Yes	No	No	Yes	Yes
Family FE	No	No	No	No	Yes	Yes
Style x Year FE	No	No	Yes	Yes	No	No
Observations	14,092	14,092	14,092	14,092	14,092	14,092
R-squared	0.134	0.133	0.276	0.275	0.138	0.147

Part 4 Relative age and confidence

- One possibility is relatively older managers have greater confidence than relatively younger managers.
- Although confidence and achievement are likely to be endogenous, the notion that confidence arising from differences in relative age could be driving our performance result is at least a plausible hypothesis, as previously outlined.
- To the extent that this is understudied in finance, we examine this possibility in two steps:
- we first use a survey approach to investigate whether the relatively older managers in our sample are perceived as more confident.
- We then study whether fund managers' actual behavior is consistent with being more confident.

4.1 Amazon Mechanical Turk Survey



- We begin by constructing survey measures of how people judge the confidence of managers from their physical appearance.
- We seek to evaluate whether the general public perceives relatively older managers as more confident based on their physical appearance.

Data sources of this survey

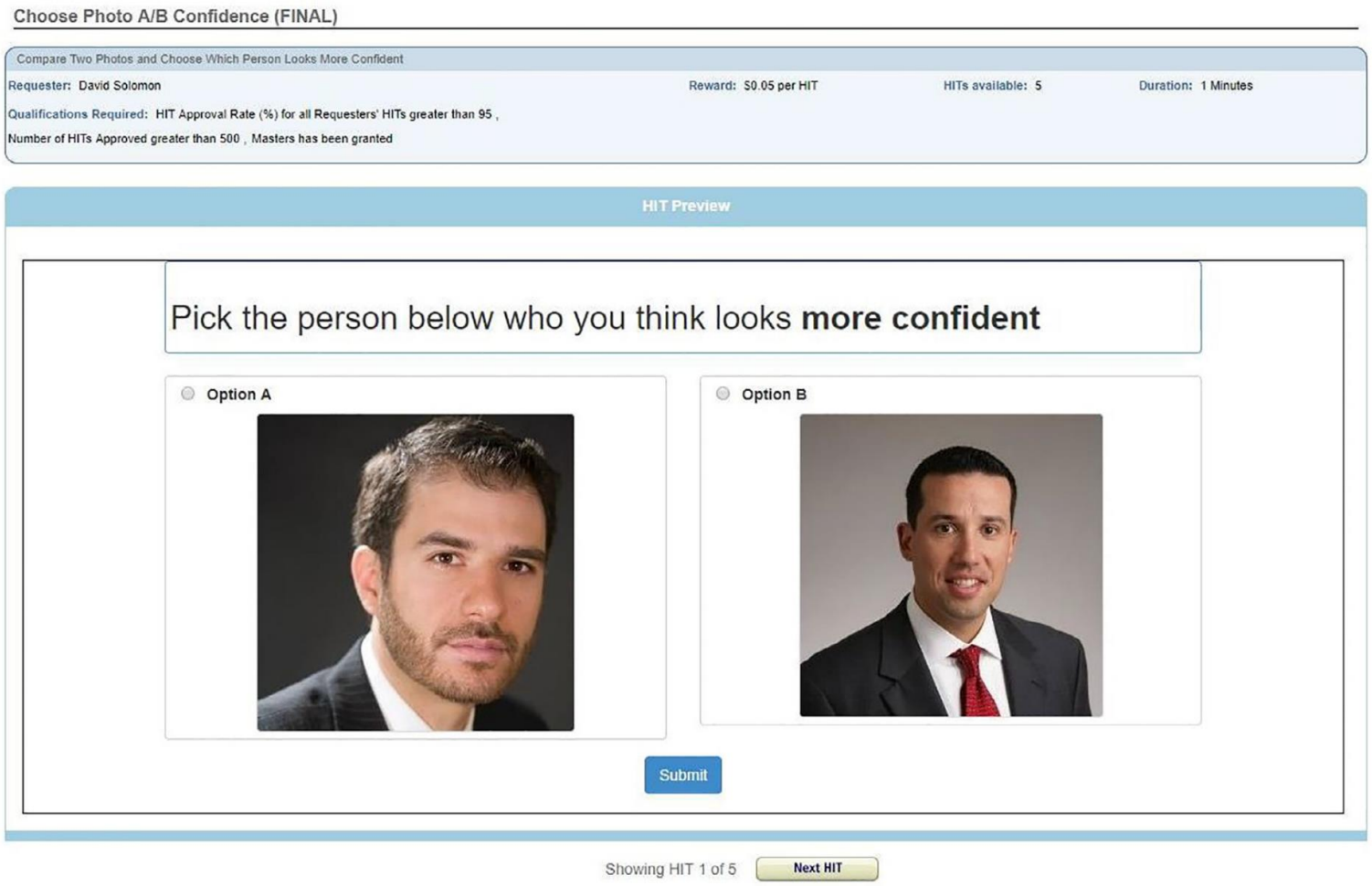
- We identify the profiles of a random sample from LinkedIn:
- relatively older (relative ages of 11 or 12)
- relatively younger managers (relative ages of 1 or 2)

- We download the profile pictures of the managers in question, either the full size picture if available or the thumbnail.
- Intotal, we download pictures for 119 relatively older managers and 136 relatively younger managers.

Process of the survey

- Because evaluating confidence through appearance and body language seems to involve a significant component of “gut feel,” we evaluate the perception of differences in confidence between two managers instead of asking respondents to assign numerical values or verbal descriptions to individual managers.
- Specifically, we take the two sets of photos and generate 2000 pairings of one randomly chosen relatively older manager and one relatively younger manager (with pairwise matchups drawn without replacement, so each one was different).
- No other information is given.

Screen Shot of Amazon Mechanical Turk Survey



We run the survey using respondents on Amazon's Mechanical Turk platform. Thirty-four respondents evaluate the 2000 pairings and are paid $0.05 per evaluation, leading to an average hourly wage of $10.60. It is worth noting that the respondents take an average of 17 seconds per evaluation. This is not equivalent to respondents spending 17 seconds explicitly pondering the choice, as this time pe riod also includes time spent with the evaluation screen open when not working. It does, however, provide some reassurance that respondents are putting some thought into the decision

- Most importantly, the test design is robust to any concerns about the quality of the sample pool, the incentives of participants to care about the answer, etc.
- All of these concerns should lead people to pick at random.
- As a result, if these problems are present, they simply strengthen the null hypothesis – that relative age will not be associated with confidence, and so respondents should have no tendency to systematically pick the relatively older manager as more confident (given they have no information on which one the relatively older manager is).
- Thus, the null hypothesis is the straightforward prediction that respondents should choose the relatively older manager as being more confident 50% of the time.

Table 5 The effect of relative age on manager confidence: survey results.

Panel A. Which manager is more confident?			
	Relatively old manager		Relatively young manager
# of unique managers	120		137
# of 2-manager comparisons	2000		2000
Responses more confident	1095		905
Percentage more confident	54.75%		45.25%
P-value for difference		0.00002	
Panel B. Which manager is more reliable?			
	Relatively old manager		Relatively young manager
# of unique managers	120		137
# of 2-manager comparisons	2000		2000
Responses more reliable	978		1022
Percentage more reliable	48.90%		51.20%
P-value for difference		0.336	
Panel C. Which manager is more attractive to the opposite sex?			
	Relatively old manager		Relatively young manager
# of unique managers	120		137
# of 2-manager comparisons	2000		2000
Responses more attractive	997		1003
Percentage more attractive	49.85%		50.15%
P-value for difference		0.911	

Result of the experiment

- These results show direct evidence that people perceive relatively older fund managers as more confident, even if they have no knowledge of the person's relative age.
- One potential concern with these tests is that the confidence in the managers' photos can be a result of their high returns, not the cause.
- More complicated versions are also possible, whereby managers only update their photo when they have good returns, but relatively older managers somehow take photos at higher levels of returns.

4.2 Confidence versus other personality traits

- One of the potential concerns with the above result is that the differences in perceived confidence can be part of a general difference in personality that shows up along many dimensions.
- Of particular concern are other related traits that might also influence fund performance but through channels only indirectly related to confidence.
- First, we ask survey respondents which manager appears more reliable.
- Second, respondents are asked which manager is likely to appear more attractive to a member of the opposite sex.

Table 5 The effect of relative age on manager confidence: survey results.

Panel A. Which manager is more confident?			
	Relatively old manager		Relatively young manager
# of unique managers	120		137
# of 2-manager comparisons	2000		2000
Responses more confident	1095		905
Percentage more confident	54.75%		45.25%
P-value for difference		0.00002	
Panel B. Which manager is more reliable?			
	Relatively old manager		Relatively young manager
# of unique managers	120		137
# of 2-manager comparisons	2000		2000
Responses more reliable	978		1022
Percentage more reliable	48.90%		51.20%
P-value for difference		0.336	
Panel C. Which manager is more attractive to the opposite sex?			
	Relatively old manager		Relatively young manager
# of unique managers	120		137
# of 2-manager comparisons	2000		2000
Responses more attractive	997		1003
Percentage more attractive	49.85%		50.15%
P-value for difference		0.911	

Table 6

The effect of relative age on managers' social connections.

The table reports the results from OLS regressions of a fund manager's number of LinkedIn connections on the fund managers' relative age. The dependent variable is the number of social media connections the manager has on their LinkedIn profile. High relative age dummy is an indicator variable that equals one if a manager's relative age is greater than or equal to seven. Relative age is defined as the number of months before the school year cutoff that the manager in question was born, with larger numbers corresponding to being relatively older on entering kindergarten. Definitions of all other variables and sample description are in Table 2.

Dependent variable	# Connections					
	[1]	[2]	[3]	[4]	[5]	[6]
High relative age	−5.496	3.212	−6.445			
	(−0.35)	(0.20)	(−0.40)			
Relative age				−1.343	−0.761	−1.488
				(−0.59)	(−0.33)	(−0.65)
Female (0/1)	−12.181		−14.705	−12.431		−14.925
	(−0.50)		(−0.59)	(−0.51)		(−0.60)
Age	−5.953***		−6.136***	−5.955***		−6.138***
	(−6.14)		(−6.21)	(−6.15)		(−6.21)
Top MBA (0/1)	7.591		13.184	7.487		13.084
	(0.43)		(0.73)	(0.42)		(0.72)
Avg. SAT score	0.170***		0.186***	0.170***		0.185***
	(3.20)		(3.42)	(3.20)		(3.42)
Avg. fund size		−17.229***	−17.383***		−17.191***	−17.348***
		(−2.99)	(−3.00)		(−2.98)	(−3.00)
Avg. family size		3.182	0.420		3.187	0.400
		(0.80)	(0.10)		(0.80)	(0.10)
Observations	2309	2341	2252	2309	2341	2252
R-squared	0.022	0.005	0.028	0.022	0.005	0.028

4.3 Managerial behaviors associated with confidence

- While our survey results provide strong evidence that relative age is associated with differences in perceived confidence, it is important to test whether this is reflected in managers' actual trading – do relatively older managers act in ways consistent with greater confidence? To this end,we investigate whether relatively older managers deviate more from their benchmark indices.
- To test whether relative older managers make more aggressive bets, we first use the Active share variable from Cremers and Petajisto (2009) that is constructed as the difference between a fund's actual holdings and that of their benchmark index.

$$BetSize_{i,t} = \alpha + \beta(RelAge_{i,t-1}) + \gamma'(FundChars_{i,t-1}) + \varphi'(MgrChars_{i,t-1}) + \varepsilon_{i,t} \quad (5)$$

Table 7 The effect of relative age on the aggressiveness of fund holdings

Panel A: Without fund family fixed effects						
Dependent variable	Active share [1]	# stocks [2]	Avg. pos. size [3]	Active share [4]	# stocks [5]	Avg. pos. size [6]
High relative age$_{t-1}$	0.011**	−27.252***	1.821*			
	(2.42)	(−3.52)	(1.80)			
Relative age$_{t-1}$				0.003**	−6.447***	0.422**
				(2.52)	(−3.39)	(2.19)
Fund size$_{t-1}$	−0.005**	16.328***	10.343***	−0.005**	16.120***	10.357***
	(−2.37)	(5.24)	(11.51)	(−2.33)	(5.27)	(11.55)
Fund family size$_{t-1}$	−0.007***	6.563***	−1.102***	−0.007***	6.778***	−1.116***
	(−5.32)	(4.10)	(−4.17)	(−5.41)	(4.27)	(−4.23)
Expense ratio $_{t-1}$	0.006	−11.338	1.160***	0.006	−11.457	1.167***
	(1.50)	(−1.41)	(4.00)	(1.51)	(−1.43)	(4.03)
Turnover$_{t-1}$	0.030***	−41.889**	−2.607*	0.030***	−41.790**	−2.615*
	(2.95)	(−2.44)	(−1.78)	(2.96)	(−2.44)	(−1.78)
Manager age$_{t-1}$	0.037*	−29.221	6.702*	0.037*	−29.371	6.718**
	(1.94)	(−1.06)	(1.96)	(1.95)	(−1.06)	(1.97)
Fund age$_{t-1}$	0.007*	−28.958***	0.091	0.007*	−28.970***	0.091
	(1.89)	(−4.50)	(0.10)	(1.88)	(−4.52)	(0.10)
Fund flow$_{t-1}$	0.000	0.217	0.557***	0.000	0.197	0.558***
	(0.73)	(0.73)	(8.48)	(0.77)	(0.65)	(8.57)
Manager tenure$_{t-1}$	0.016***	−16.573***	2.262***	0.016***	−16.622***	2.265***
	(5.77)	(−2.71)	(4.31)	(5.74)	(−2.71)	(4.33)
Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,621	13,008	12,997	11,621	13,008	12,997
R-squared	0.527	0.141	0.446	0.528	0.145	0.446

Specifically, relatively older managers have 1.1% higher *Active share*, hold approximately 27 fewer stocks, and invest $1.8 million more in each stock in their portfolios when compared to their relatively younger counterparts.

Panel B: With fund family fixed effects

Dependent variable	Active share [1]	# stocks [2]	Avg. pos. size [3]	Active share [4]	# stocks [5]	Avg. pos. size [6]
High relative age dummy	0.009**	−9.672*	1.591*			
	(2.00)	(−1.65)	(1.83)			
Relative age (continuous)				0.002**	−2.779*	0.423**
				(1.99)	(−1.92)	(2.38)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Family FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,618	13,005	12,994	11,618	13,005	12,994
R-squared	0.582	0.473	0.536	0.583	0.474	0.537

4.4 Window dressing

$$WindowDress_{i,t} = \alpha + \beta(RelAge_{i,t-1}) + \gamma'(FundChars_{i,t-1}) + \varphi'(MgrChars_{i,t-1}) + \varepsilon_{i,t}, \quad (6)$$

Table 8 The effece of relative age on funds' window dressing activities

Dependent variable	BHRG [1]	Rank gap [2]	BHRG [3]	Rank gap [4]
High relative age$_{t-1}$	−0.004***	−0.008***		
	(−3.46)	(−2.88)		
Relative age$_{t-1}$			−0.001***	−0.001***
			(−2.69)	(−2.86)
Four-factor alpha$_{t-1}$	−0.005*	−0.014***	−0.005*	−0.014***
	(−1.93)	(−3.35)	(−1.95)	(−3.37)
Active share$_{t-1}$	−0.013**	−0.052**	−0.014**	−0.052**
	(−2.40)	(−2.48)	(−2.45)	(−2.53)
Fund size$_{t-1}$	0.001*	0.001	0.001	0.001
	(1.66)	(1.30)	(1.53)	(1.18)
Fund family size$_{t-1}$	−0.000*	−0.002***	−0.000*	−0.002***
	(−1.79)	(−3.83)	(−1.69)	(−3.69)
Expense ratio$_{t-1}$	−0.001	0.005	−0.001	0.005
	(−0.63)	(1.63)	(−0.68)	(1.57)
Turnover$_{t-1}$	0.035***	0.066***	0.035***	0.066***
	(9.56)	(8.38)	(9.50)	(8.35)
Manager age$_{t-1}$	0.016***	0.034***	0.016***	0.034***
	(4.23)	(2.67)	(4.24)	(2.71)
Fund age$_{t-1}$	−0.001	−0.001	−0.001	−0.001
	(−0.73)	(−0.52)	(−0.74)	(−0.54)
Fund flow$_{t-1}$	0.000**	−0.000	0.000**	−0.000
	(2.37)	(−1.06)	(2.33)	(−1.10)
Manager tenure$_{t-1}$	0.001**	−0.001	0.001**	−0.001
	(2.35)	(−0.63)	(2.39)	(−0.60)
Style FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	5615	5444	5615	5444
R-squared	0.324	0.218	0.323	0.217

4.5 Ability to attract fund flows

$$FundFlows_{i,t} = \alpha + \beta(RelAge_{i,t-1}) + \delta Performance_{i,t-1}\ \gamma'(FundChars_{i,t-1}) + \varphi'(MgrChars_{i,t-1}) + \varepsilon_{i,t}, \quad (7)$$

Table 9 The effect of relative age on fund flow

Dependent variable:	Fund flows					
	[1]	[2]	[3]	[4]	[5]	[6]
High relative age$_{t-1}$	0.042**	0.040**	0.040**			
	(2.40)	(2.35)	(2.33)			
Relative age$_{t-1}$				0.006**	0.006**	0.006**
				(2.11)	(2.02)	(1.99)
Return$_{t-1}$	0.011***			0.011***		
	(3.39)			(3.39)		
Return squared$_{t-1}$	0.000**			0.000**		
	(2.05)			(2.04)		
Return quintile 1 (low)$_{t-1}$		0.702***			0.698***	
		(3.77)			(3.74)	
Return quintile 2$_{t-1}$		0.289*			0.291*	
		(1.90)			(1.91)	
Return quintile 3$_{t-1}$		0.284**			0.284**	
		(1.97)			(1.97)	
Return quintile 4$_{t-1}$		0.435***			0.435***	
		(2.96)			(2.94)	
Return quintile 5 (high)$_{t-1}$		2.363***			2.362***	
		(5.87)			(5.87)	
Return rank$_{t-1}$			0.006***			0.006***
			(11.25)			(11.26)
Volatility$_{t-1}$	−0.006	−0.000	0.004	−0.006	−0.000	0.004
	(−0.35)	(−0.03)	(0.32)	(−0.35)	(−0.03)	(0.32)
Fund size$_{t-1}$	−0.127***	−0.124***	−0.124***	−0.127***	−0.124***	−0.124***
	(−6.95)	(−6.92)	(−6.86)	(−6.95)	(−6.92)	(−6.85)
Fund family size$_{t-1}$	0.049***	0.048***	0.046***	0.049***	0.048***	0.046***
	(5.13)	(5.16)	(4.95)	(5.12)	(5.15)	(4.94)
Expense ratio$_{t-1}$	−0.003	−0.003	−0.002	−0.003	−0.003	−0.002
	(−0.42)	(−0.41)	(−0.21)	(−0.41)	(−0.40)	(−0.20)
Turnover$_{t-1}$	−0.030**	−0.025**	−0.022*	−0.031**	−0.025**	−0.022*
	(−2.49)	(−1.98)	(−1.74)	(−2.51)	(−1.99)	(−1.75)
Manager age$_{t-1}$	−0.092*	−0.077	−0.073	−0.091*	−0.076	−0.072
	(−1.76)	(−1.46)	(−1.39)	(−1.74)	(−1.45)	(−1.37)
Fund age$_{t-1}$	−0.138***	−0.132***	−0.136***	−0.138***	−0.132***	−0.136***
	(−8.58)	(−8.35)	(−8.47)	(−8.57)	(−8.34)	(−8.46)
Fund flow$_{t-1}$	0.042***	0.036***	0.037***	0.042***	0.036***	0.037***
	(3.96)	(3.84)	(4.01)	(3.98)	(3.87)	(4.04)
Style FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	18,340	18,340	18,340	18,340	18,340	18,340
R-squared	0.129	0.141	0.134	0.129	0.141	0.134

- Overall, the results in Section 4 provide strong evidence consistent with confidence being an important channel for relatively older managers' outperformance.
- We next turn to the question of whether other mechanisms may also be driving the relative age effect.

Part5 Alternative causes

- Differences in educational attainment
- Team-managed funds
- Parental planning
- Month of the year

Table 10 Relative age,educational attainment,skill,and fund performance

Panel A: Controlling for manager education			
Dependent variable	Four-factor alpha		
	[1]	[2]	[3]
High relative age $_{t-1}$	0.432**	0.398**	0.421**
	(2.49)	(2.32)	(2.41)
Top MBA $_{t-1}$	0.662**		0.561**
	(2.51)		(2.18)
Average SAT score $_{t-1}$		0.136**	0.092
		(2.11)	(1.56)
Controls	Yes	Yes	Yes
Style FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Observations	14,092	13,953	13,953
R-squared	0.135	0.133	0.134

Panel B: Controlling for manager skill measures

Dependent variable		
	Control for return gap [1]	Control for R^2 [2]
High relative age $_{t-1}$	0.551***	0.385**
	(3.28)	(2.26)
Return gap$_{t-1}$	0.786*	
	(1.82)	
R-squared$_{t-1}$		0.053
		(1.60)
Controls	Yes	Yes
Style FE	Yes	Yes
Year FE	Yes	Yes
Observations	10,458	13,946
R-squared	0.150	0.136

Panel C: Manager univariate comparisons

	High relative age	Low relative age	Difference	*t*-stat (difference)
Age (at first manager job)	38.72	38.87	−0.15	−0.55
Family size (first manager job)	54,190	48,220	5970	1.19
Fund size (first manager job)	402.91	401.65	1.26	0.02
Year of birth	1960.6	1960.9	−0.30	−0.69
Top MBA (0/1)	0.297	0.282	0.015	1.10
Average undergraduate SAT	1292.30	1280.00	12.30**	2.50

Table 11 The effect of relative age on fund performance: robustness

Panel A: Subsample analyses & alternative specification

Dependent variable	Four-factor alpha		
	Solo managed portfolios only [1]	Managers born in June–Sep. [2]	Manager birth month FE [3]
High relative age$_{t-1}$	0.470**	0.417**	0.312**
	(2.08)	(2.35)	(2.08)
Controls	Yes	Yes	Yes
Style FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Birth month FE	No	No	Yes
Observations	4988	7805	14,092
R-squared	0.138	0.134	0.136

Panel B: Different performance measures

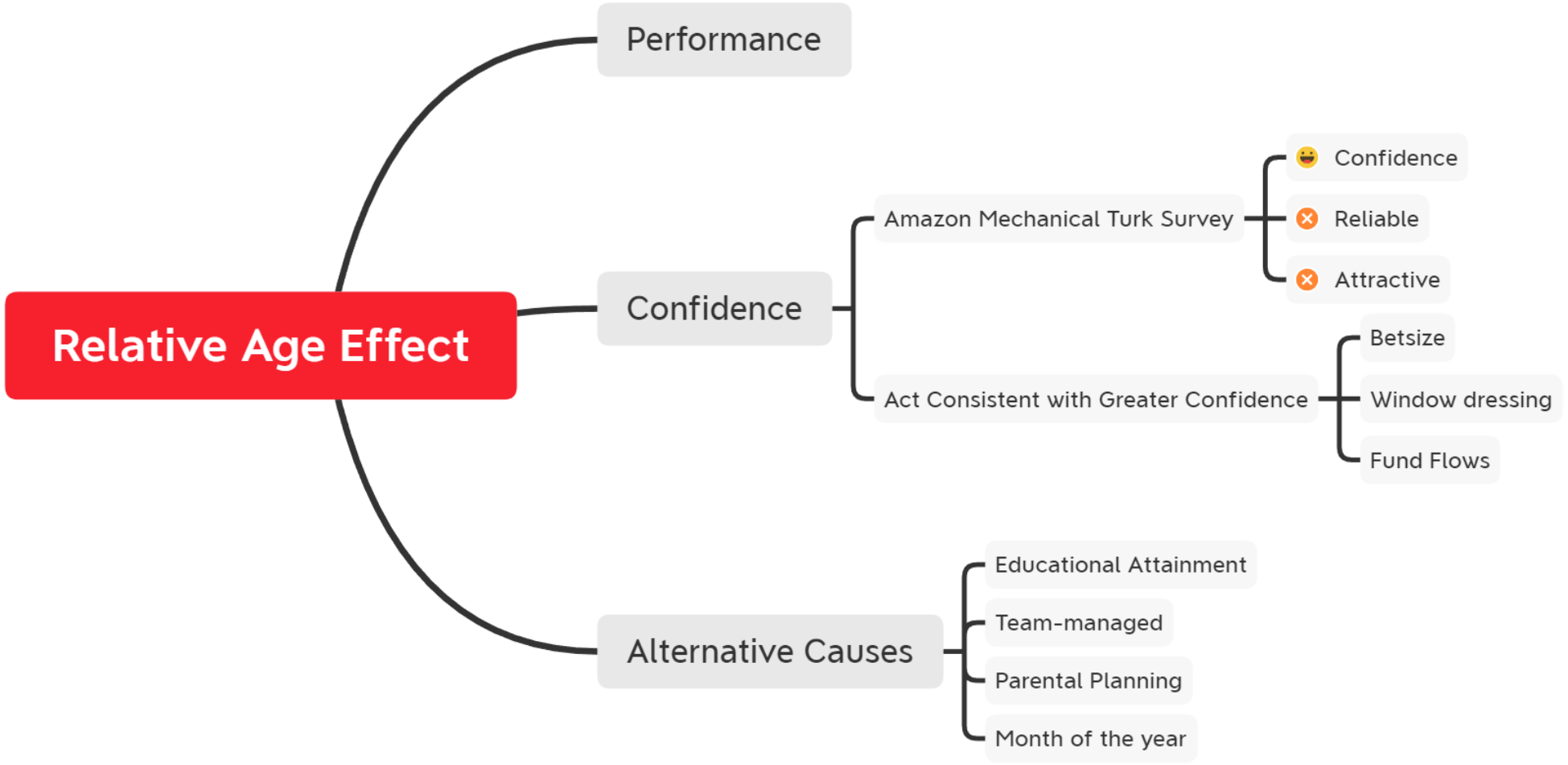
Dependent variable	Five-factor alpha [1]	Gross four-factor alpha [2]	Gross five-factor alpha [3]	Value-added [4]
High rel. age$_{t-1}$	0.470**	0.418**	0.477**	0.594*
	(2.32)	(2.44)	(2.32)	(1.84)
Controls	Yes	Yes	Yes	Yes
Style FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Observations	14,092	13,876	13,876	12,205
R-squared	0.144	0.129	0.140	0.090

Interpretation of the relative age effect

Part 6 Conclcusion

- In this paper, we show a new and surprising fact about mutual fund performance – fund managers who were born relatively earlier in the school year and thus were older at the time they began kindergarten, significantly outperform their relatively younger peers in terms of fund returns and stock picks.
- Our results point to the importance of confidence as a driver of success in organizations. This stands in contrast to the considerable literature on overconfidence being linked to bad managerial outcomes.
- Our results also speak to the relative importance of genetic versus environmental factors in explaining success.
- Finally, our survey results highlight the surprising importance of physical cues such as appearance and body language.

Review of this paper


Relative Age Effect
Performance
Confidence
Amazon Mechanical Turk Survey
Confidence
Reliable
Attractive
Act Consistent with Greater Confidence
Betsize
Window dressing
Fund Flows
Alternative Causes
Educational Attainment
Team-managed
Parental Planning
Month of the year