

**The State Street Mile:
Age and Gender Differences in Competition-Aversion in the Field***

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Abstract: Gender differences in “competitiveness,” previously documented in laboratory experiments, are hypothesized to play a role in a wide array of economic outcomes. The current paper provides evidence of competition-aversion in a natural setting somewhere between the simplicity of a laboratory experiment and the full complexity and ambiguity of a labor market. The “State Street Mile” race offers both male and female participants a choice between two different levels of competition. Large, systematic age and gender differences are observed in the relationship between true ability and the decision to enter the more competitive race. Overall, qualified women and older runners are far less likely than qualified young men to enter a competitive race with cash prizes. However, the fastest young women unanimously enter the competitive race. Therefore, while we confirm age and gender differences in competitiveness in our field setting, the economic consequences to capable young women are rather small.

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Keywords: competition-aversion, age, gender

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Introduction

Gender differences in “competitiveness” are hypothesized to play a role in a wide array of economic outcomes, including the low representation of women among fortune 500 CEO’s (Bertrand and Hallock 2001, Niederle and Vesterlund 2007). While psychologists have a long history of documenting the reluctance of girls or women to enter competitions, economists have only recently begun to study this phenomenon. Psychologists have previously emphasized the tendency of women to underestimate their future performance on a number of different tasks (Deaux 1979, Pallier 2003).¹ Careful experimental studies by economists reveal that, in a laboratory setting, a number of different reasons underlie women’s lower inclination to compete. These reasons include not only women’s tendency to underestimate their own ability, but also greater aversion to risk, and uncertainty about their ability (Gupta, Poulsen, Villeval 2005, Niederle and Yestrumskas 2008, Eckel 2008, Eckel and Grossman 2008). Niederle and Vesterlund (2007) control for these and other factors in a carefully designed experiment that provides strong evidence of a distinct preference to avoid the act of competition.² The purpose of the current paper is to provide evidence of competition-aversion in a natural setting somewhere between the simplicity of a laboratory experiment and the full complexity and ambiguity of a labor market.

The “State Street Mile” race offers both male and female participants a choice between two different levels of competition. Those who believe they have superior ability, relative to participants of the same gender, are encouraged to enter a highly competitive, high-profile race with cash prizes. Other participants—those who believe they are slower runners and those who simply prefer a lower level of competition—pay the same entry fee and run the same course in age-group races with no cash prize. Systematic gender differences are observed in the relationship between true ability (as measured by actual time to run the mile, observed ex post) and the decision to enter the more competitive race. While fast young men are almost certain to enter the highly competitive race, a sizeable minority of the fast young women do not choose to do so.

Niederle and Vesterlund (2007) argue that reluctance to compete is particularly costly to high-ability women because this group has the most to gain from entering the competition. This

¹ The tendency to understate ability can be reduced if the question is answered privately, rather than announced in public (Heatherington et. al. 1993).

² Recent research by Gneezy, Leonard and List (2008) documents that the direction of the gendered preference for competition is culture-specific.

was true for the tournament they studied. However, we find that on this task the very fastest women are quite likely to enter the elite race. It is the middle range—above the qualifying standard but below the group most likely to win—where the largest gender differences in behavior are observed. Thus, while our results are consistent with experimental work on women avoiding competition, they also demonstrate why there might not be very much economic significance. In this context, the fastest women respond to financial incentives, and the economic consequences of the preference for competition aversion are therefore quite small.

In addition to the gender difference, this analysis identifies a reluctance to compete at the elite level among older qualified runners, despite the fact that winners are chosen based on age-graded times. This finding differs from recent experimental work by Charness and Villeval (2008) which shows that younger and older field subjects (employees under 30 years old and employees of the same firm over 50 years old) were equally willing to select a competitive payment option. In the State Street Mile, the propensity to compete in the highly competitive elite race among older men is similar to that observed for younger women, while older women are the least likely and young men are the most likely to enter a highly competitive elite race.

Data

There are four highly competitive races. Athletes are invited to sign up for the men's or women's "elite" race if they expect to run the mile faster than the qualifying standard (4:30 for men, 5:30 for women). An additional pair of highly competitive races is offered to athletes over 40. In the "elite masters" races, actual mile-times are converted to age-graded times to determine finishing place.³ This allows runners who are slowing down with age to engage in an adaptive competition. Cash prizes are awarded to the top three times in the elite races and the top three age-graded times in the elite masters races, and no cash prizes are offered to other participants.⁴

³ The age-graded time is computed using Jess Brewer's, "Masters Track & Field Age Graded Tables" <http://jick.net/~jess/track/mtf/agt2006.html>. The age-adjustment at age 40 is about 6 percent for men and 19 percent for women, and then increases gradually with each additional year of age after 40. For example, a 5:00 mile time for a 50 year old male converts to an age-graded mile time of 4:22. In the elite masters race, this runner would finish ahead of a 40 year old runner that ran 4:50, since the younger runner's time converts to a slower age-graded time of 4:34.

⁴ Cash prizes were \$500, \$250, and \$100 for both men and women in the elite races over the sample period. Cash prizes in the elite masters races were \$150, \$100 and \$50 in 2003, but were lowered to \$100, \$75 and \$50 in 2008. The top three runners in both the elite races and the less-competitive age-group races are given plaques that designate a first-, second-, or third-place finish in their respective race.

Data on the sex, age, and mile-time of each participant in the elite races and age-group races between 2002 and 2008 are available at www.sbmile.com. The “elite masters” category was not offered until 2003, so the analysis of older runners covers 2003-2008.

Published qualifying standards for the elite race are guidelines for participants and are not enforced by the race director.⁵ Participants choose freely whether or not to enter the elite races. We evaluate the entry decisions of runners by comparing their finishing times to the qualifying standards. For the elite masters races the time of a qualified runner depends upon age and gender. Since there are no published qualifying standards for the elite masters races we apply the same standards used in the elite races on an age-graded basis. In other words, runners in the elite masters races are deemed to have met the qualifying standard if their age-graded time is faster than 4:30 for men and 5:30 for women. This is consistent with advice given by the race director to prospective participants in the elite masters races.⁶

While it is possible for an individual over 40 to meet the qualifying standard for the elite race, only one runner over 40 ever chose the elite race over the elite masters race.⁷ We therefore model the choice set as a binary decision for both older and younger runners, conditioning on actual mile-time for younger runners and age-graded mile-time for older runners.

Sample Means

The probability of entering a highly competitive elite race is strongly correlated with mile-times relative to the qualifying standard. In each of the four groups (younger and older men and women), those below the qualifying standard are very unlikely to enter an elite race (Table 1, column 1). The main difference between groups is in the probability of entering an elite race conditional on running faster than the qualifying standard (Table 1, column 3). This probability ranges from 85 percent for the younger men to 28 percent for older women. Younger women are about two-thirds as likely as younger men to enter an elite race, conditional on an ex post mile-

⁵ However, a runner in the (under 40) elite race must beat the qualifying standard in order to be eligible for prize money. No top-three runner in the elite race has ever failed to meet the standard.

⁶ This was conveyed to us by personal communication. The most recent online entry offers guidelines for being competitive in the elite masters races: It states: “In past years, to be competitive in the Master's Elite mile, participants have run at the 85% and 80% levels for men and women, respectively.” This translates into age-graded mile times of 4:21 (men) or 5:13 (women). These times represent the average race times of past runners and are thus faster than the conventional minimum (qualifying) standard. More details are available at http://www.active.com/page/Event_Details.htm?event_id=1502508&assetId=06.

⁷ This man is coded as choosing to compete.

time faster than the qualifying standard. Older men are even less likely than young women to enter an elite race, despite the age-adjusted intensity of competition, and older women are the least likely to enter an elite race, conditional on meeting the qualifying standard.

	Below Qualifying Standard		At or above Qualifying Standard	
	(1)	(2)	(3)	(4)
	Proportion in Elite Race	Sample Size	Proportion in Elite Race	Sample Size
Men, Age 16-39	0.09	226	0.85	92
Women, Age 16-39	0.07	106	0.64	47
Men, Age 40+	0.04	268	0.44	105
Women, Age 40+	0.04	55	0.28	75

Table 1—Proportion Entering Elite Race, by Sex, Age Group, and Mile-Time Relative to Qualifying Standard

A set of regressions presented in Appendix Table A-1 dispels any doubt that the lower propensity of qualified women and older runners to enter the more competitive race is statistically significant and robust, but suggests that the behavior of younger women and older men might be similar. The question to be answered next is whether the observed between-group differences might be due to incorrect assessment of ability, competition aversion, or some other factor.

A Simple Model

Assume that runners get utility from winning a cash prize and disutility from the humiliation of entering an elite race, but running slower than the qualifying standard. Moreover, assume that some (competition-loving) runners gain additional utility from running in an elite race, while other (competition-averse) runners get disutility from running in an elite race. Each runner has the option to compete in an elite race, or to select a lower level of competition and enter their age-group race. Choosing to enter an elite race confers a (possibly negative) gain in expected payoff, which depends on the intrinsic enjoyment of competing as well as expectations about prizes or humiliation.

This model can be summarized by Equation 1, which shows the utility of runner i who chooses optimally between entering the elite and age-group race. Where C_i is an individual-

specific measure of the preference for competition, $E(w_i)$ is the expected utility associated with winning a cash prize in the elite race, and $E(h_i)$ is the expected humiliation associated with running below the qualifying standard in the elite race,

$$U_i = \max\{C_i + E(w_i) - E(h_i), 0\}. \quad (1)$$

The value of U_i is bounded below by zero, the (normalized) utility associated with entering the less competitive race. Aversion to entering the competition regardless of expected mile-time is captured by a negative value of C_i . $E(w_i)$ depends on the individual's expected distribution of possible mile-times, the expected times of other runners, and i 's preferences over cash prizes. $E(w_i)$ is a significant factor only among runners who both value winning and believe they have a good chance of winning. $E(h_i)$ depends on the individual's expected distribution of possible mile-times, the location of that distribution relative to the qualifying standard, and the individual's attitude toward humiliation. $E(h_i)$ is a significant factor only among those who are likely to run slower than the qualifying standard.

Clearly, the probability of entering the competitive race is increasing in the value of C_i — those who love competition are more likely to enter than otherwise similar runners who are competition-averse. However, the degree to which behavior reveals preferences for competition will vary by expected mile-times. Under this model, virtually all of the slowest runners are likely to avoid the elite race; they are certain to miss the qualifying standard, and all but extremely competition-loving runners choose not to be humiliated. For runners who believe they can meet the qualifying standard, incentives will differ according to their level of competition aversion. Among those who enjoy competition, incentives align so that everyone above the qualifying standard will choose to compete. However, competition-averse runners who expect to run faster than the qualifying standard have conflicting incentives. The fastest among the competition-averse runners might gain enough additional (expected) utility from their realistic chance of winning a cash prize so that they will be willing to compete in the elite race. However, those who dislike competition enough will avoid the elite race, despite the race director's suggestion.

Note that the set of runners with intermediate expected mile-times—those with a very small probability of either winning or falling below the qualifying standard—will reveal the most

about their preferences for competition. For this group $E(w_i)$ and $E(h_i)$ are each essentially zero and hence,

$$U_i = \max\{C_i, 0\}. \quad (2)$$

Among runners with expected mile-times in this range, those who are competition-averse ($C_i < 0$) will maximize utility by avoiding the competition, while those who love competition for its own sake ($C_i > 0$) will enter the elite race. The model therefore predicts that differences between groups in attitudes towards competition will result in large differences in observable behavior among those who are above the qualifying standard, but unlikely to win. In fact, in this range of expected mile times, the proportion of group members that chooses not to compete is an estimate of the prevalence of competition-aversion. Smaller differences in behavior might be observed among the very fastest runners, since the real possibility of winning a cash prize can offset aversion to the act of competition.

Empirical Results

As seen in Table 1 above, young men sort themselves almost perfectly according to their times relative to the qualifying standard, while other groups do not. One possible explanation is that perhaps the bulk of younger men are farther from the cutoff time, and are therefore able to more easily assess whether they are above the qualifying standard. The more sophisticated analysis described in Figures 1-4 reveals that this is not the case. For example, Figures 2 and 4 show that the peak of both the young women's and young men's distributions are just a bit slower than their respective qualifying standards (270 seconds and 330 seconds, respectively), so that this explanation doesn't seem to be pertinent.⁸ Another possible explanation is that a substantial proportion of young women underestimate their ability. If this were the case, though, we would expect lower participation by women than men both just above and just below the qualifying standard. Instead, the behavior of young women just below the qualifying standard (Figure 3) is virtually identical to that of young men just below the qualifying standard (Figure 1).

⁸ In fact, about 35 percent of both young women's and young men's mile-times are within 15 seconds of the qualifying standard.

Figures 1 and 3 show that entry to competition is very likely among both the fastest young men and the fastest young women.⁹ The largest difference in behavior is among those who meet the qualifying standard but are unlikely to win. In this range, young men are very likely to enter the competition, but young women are not. This finding suggests that young men expect to enjoy the competition for its own sake, while young women prefer not to compete unless they are likely to win.¹⁰ Table 2 slices the time intervals a different way and provides even stronger evidence that participation in the competitive race is nearly universal among young women likely to win. Among runners who have a greater than 50 percent chance of winning a prize (above the median 3rd place time) every single young woman and young man enters the competitive race. If competition aversion affects behavior only among those unlikely to win, it may not be costly to either women or men.

The comparable analysis for the older runners shows patterns of participation among older men that are very similar to those for younger women (Figures 5-8, and Table 3). Older women show the most competition aversion of all groups. Even many of the fastest (age-adjusted) older women can be seen avoiding the competitive race. Among those who have a greater than 50 percent chance of winning a prize (above the median 3rd place time) only 37 percent of older women enter the more competitive race. In fact, five of the eighteen cash prizes over six years went unclaimed because too few women entered the elite masters race for women over 40. It is impossible to determine whether this is an age or cohort effect; the younger women in our sample might remain more likely to engage in competition as they grow older. However, this field experiment provides strong evidence of a preference to avoid competition among women currently aged 40-75.

Independent of the differences between groups, one aspect of our results matches the theoretical framework for all four groups. In each case, those who are most likely to win are the most likely to enter the race, with the largest differences in competition-avoidance behaviors observed among those who meet the qualifying standard but are unlikely to win.

⁹ This analysis implicitly assumes that the choice of race does not affect mile-time. Previous research has found that random assignment of children to a competitive race tends to improve performance for boys, but not for girls (Gneezy and Rustichini 2004). In a paper and pencil task, random assignment to a competition improves performance for both men and women (Niederle and Vesterlund 2007). Therefore, reassigning more of the qualified women to the competitive race would either increase or not affect our assessment of their ability, and the estimates presented here represent a lower bound on women's aversion to competition conditional on ability.

¹⁰ Note that risk aversion cannot play a role here, since the only alternative to the small probability of winning is a certainty of not winning.

Discussion

Psychologists have long noted that differences in aspirations, conditional on ability, might contribute to lower vocational and socioeconomic attainment (Marini 1978, Marini and Greenberger 1978). To the extent that competition aversion might play a role in the formation of young women's aspirations, this analysis demonstrates that those young women who would pay the highest cost for competition-avoiding behavior unanimously respond to incentives by entering the highly competitive race. In this example, the tendency of young women to avoid competition is not too costly because the observed pattern of choices does not reduce expected payoffs very much. The observed differences in behavior appear to be a manifestation of revealed preferences rather than underestimation of ability.

Taking a broader view, evidence of competition aversion by young women has implications for the evolution of labor market institutions. For example, labor markets for occupations traditionally held by women may have evolved to include less competitive pay structures. In this case, the distribution of wages within a given occupation might convey less information about the distribution of productive characteristics and more information about the gender of incumbents than was previously understood.

Differences in competition-aversion between younger and older age groups are also revealed by this study. Runners under 40 are (regardless of gender) only half as likely to select into the competitive race, conditional on meeting the qualifying standard, as runners over 40. Since previous experimental work (Charness and Villeval, 2008) found no difference in competitive attitudes between young and old workers, this contrary finding suggests a promising avenue for further investigation.

Finally, the institutional features of this natural field experiment leave open the possibility that our results on competition-aversion are confounded by aversion to other aspects of the elite races. In addition to the possibility to compete for cash prizes, the elite races differ from the less competitive races because the audience is larger and because entry involves making a public declaration of high ability. The reluctance of women to publicly admit high opinions of themselves is well documented by psychologists (Heatherington et. al. 1993). Previous economic research has begun to study the impact of audience on competitive performance (Charness, Rigotti, and Rustichini 2007), but to our knowledge no one has yet tried to

disentangle the separate effects of aversion to the act of competition and (possibly distinct) aversion to acts of public competition. In fact, an observationally equivalent interpretation of our results is that some runners don't like to be public losers.¹¹ This explanation collapses the proposed tradeoff between utility from winning and disutility from competing into a single preference attribute, to make the same prediction as our model: runners who think that they can beat the qualifying standard, but don't think they can win (and prefer not to lose in public) will avoid the elite race.¹² Distinguishing the precise components of these complex relationships will require controlled laboratory experiments.

Summary and Conclusion

Competition aversion is believed to contribute to the low representation of women in high status occupations. Careful laboratory experiments have isolated gender differences in behavior that can only be explained by aversion to the act of competition (Niederle and Vesterlund 2007). Here, we provide an example of behavior in the field that seems to reveal competition aversion by women, but also by older men—the group with strong representation in high status occupations. Among participants in the State Street Mile, qualified young men are the most likely to enter a competitive race with cash prizes, while younger women, older men and (especially) older women show competition-avoiding behavior. However, among the fastest young runners, women unanimously enter the competitive race. The largest gender difference in behavior is among runners unlikely to win. Therefore, in this example, the economic consequences of the strongly revealed gender difference in preferences are quite small, and are virtually nonexistent in young cohorts.

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¹¹ The elite races are typically run in front of a larger crowd than the other races. They are run after all the age-group races, the dog mile and the family fun run are completed. Many finishers of these races stay to watch the elite races along with other spectators from the general public.

¹² We thank Ted Bergstrom for this insight.

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Appendix Table A-1

	(1)	(2)	(3)	(4)	(3)	(4)
Specification:	OLS	OLS, clustered SE	OLS, clustered SE, alternate QS described in footnote 6	Probit	Probit, clustered SE	Probit, clustered SE, alternate QS described in footnote 6
Women, Age 16-39	-0.210 (0.081)**	-0.210 (0.095)*	-0.210 (0.096)*	-0.263 (0.091)**	-0.263 (0.106)*	-0.262 (0.111)*
Men, Age 40+	-0.410 (0.064)**	-0.410 (0.075)**	-0.270 (0.084)**	-0.445 (0.067)**	-0.445 (0.078)**	-0.319 (0.095)**
Women, Age 40+	-0.568 (0.070)**	-0.568 (0.070)**	-0.525 (0.077)**	-0.563 (0.058)**	-0.563 (0.064)**	-0.542 (0.075)**
Constant	0.848 (0.047)**	0.848 (0.041)**	0.848 (0.041)**			
Observations	319	319	275	319	319	275
R-squared	0.19	0.19	0.16			

Standard errors in parentheses

* significant at 5%; ** significant at 1%

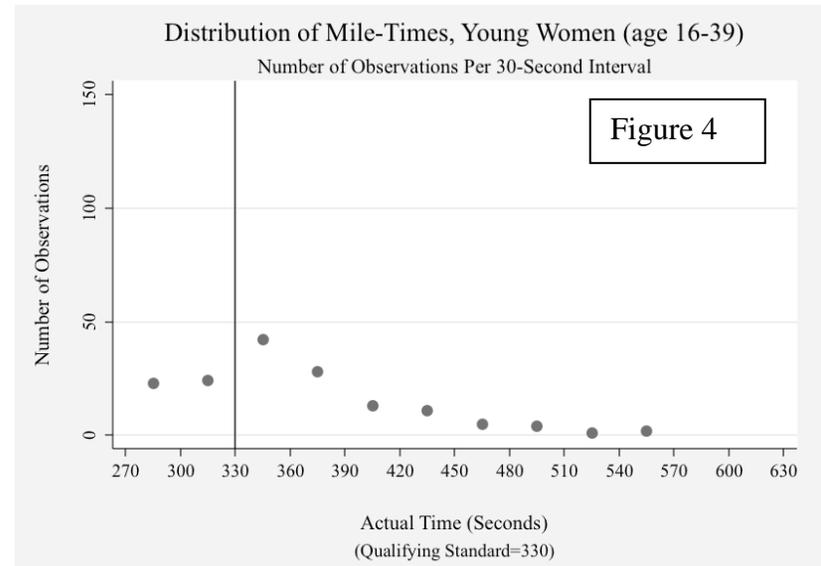
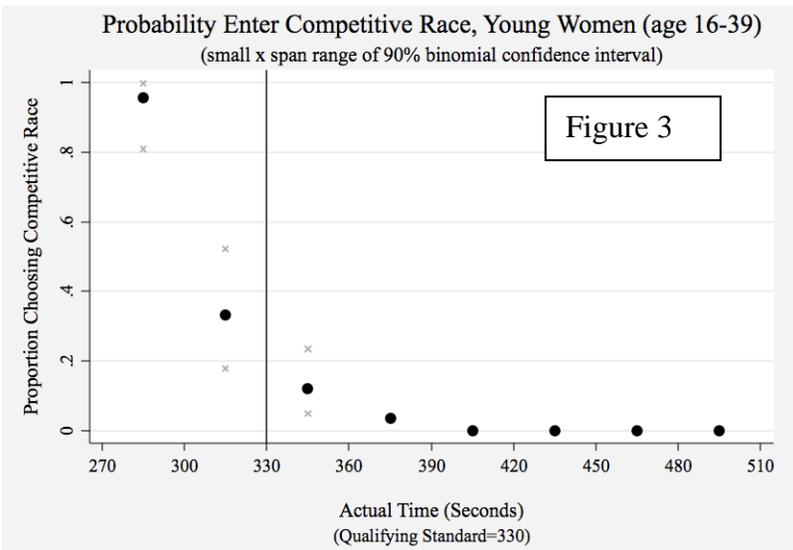
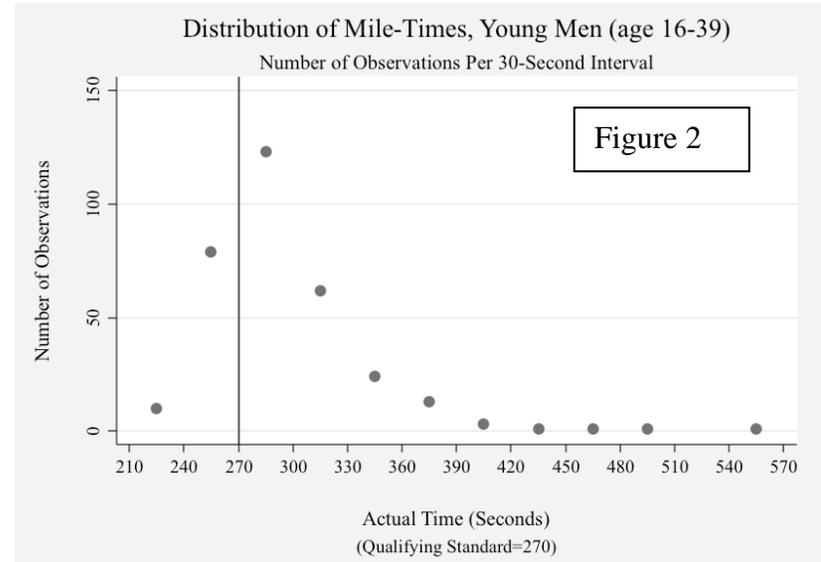
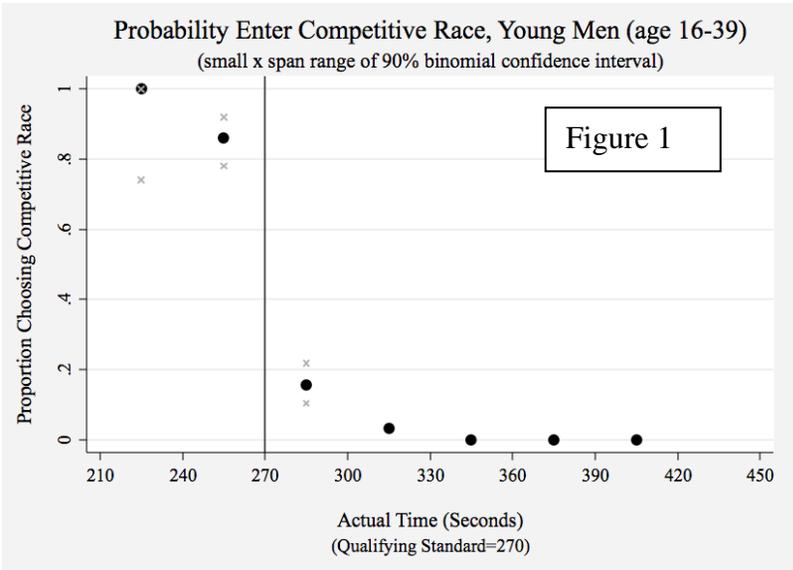
Dependent Variable: Indicator for selection into the more competitive race.

Sample: Age >=16 and mile time meets the qualifying standard.

Omitted Category: Men, Age 16-39

Columns 2, and 5 include clustered standard errors to account for the fact that the 319 observations are based on the choices of only 221 individual runners, in case runners observed in more than one year show year-to-year correlation in their choice of race.

Columns 4-6 report estimated differences in the probability of selection into the more competitive race, based on probit regressions. Columns 3 and 6 demonstrate that results are not very sensitive to assuming the qualifying standard for older runners is the slightly faster rating mentioned in footnote 6, again using clustered standard errors because the 275 observations are based on only 196 individuals.



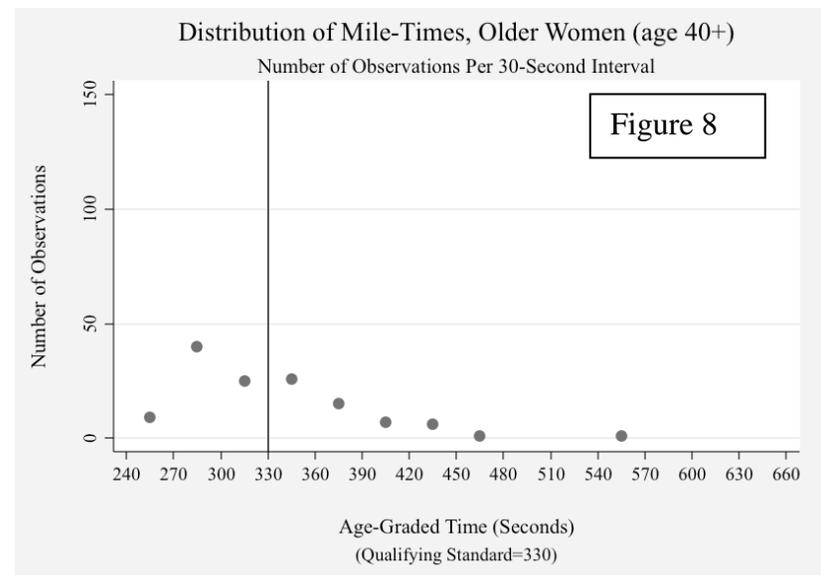
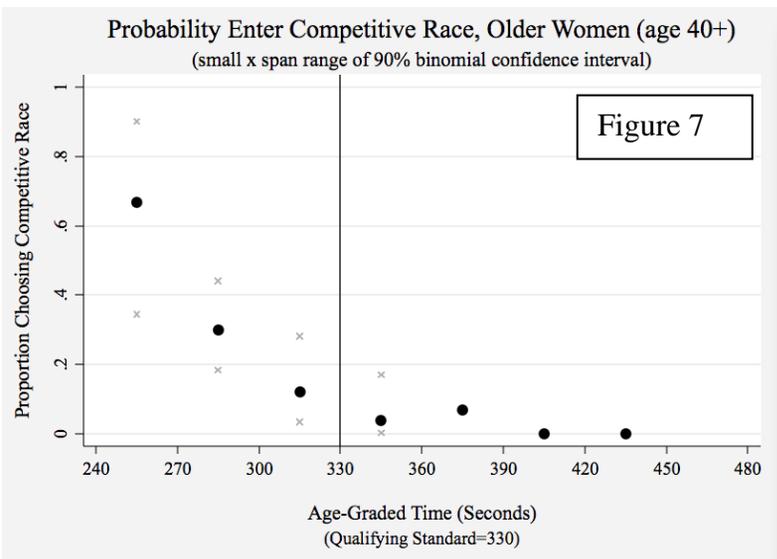
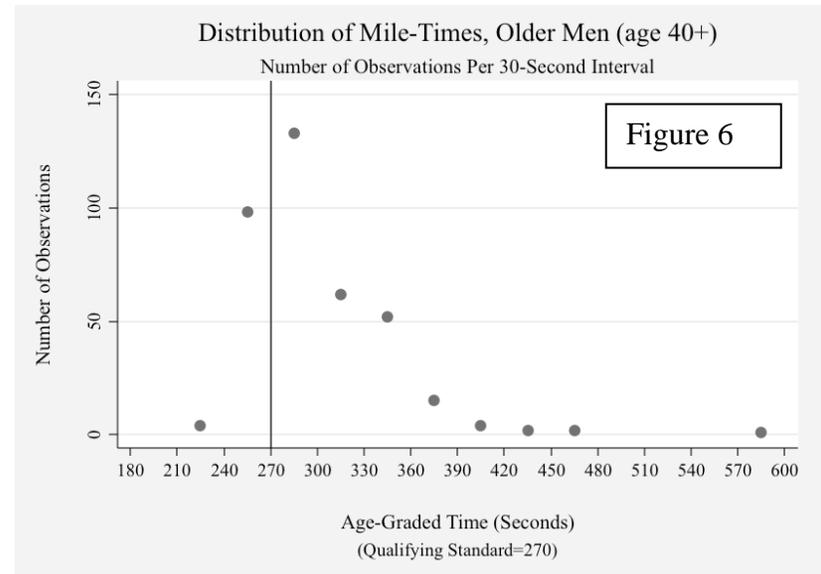
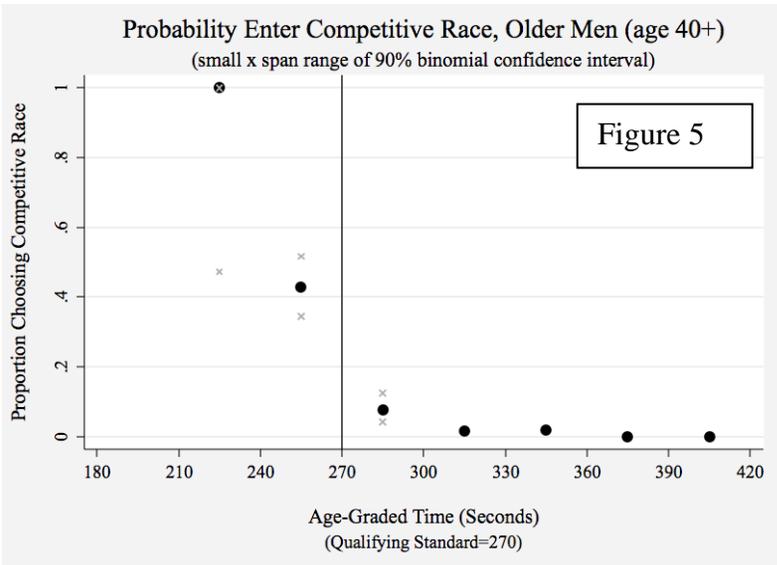


Table 2—Proportion Entering Competitive Race, by Sex and Mile-Time Relative to Qualifying Standard, Younger

	Men, Age 16-39			Women, Age 16-39		
	(1)	(2)	(3)	(4)	(5)	(6)
	Proportion in Competitive Race	Binomial 90 Percent Confidence Interval	Sample Size	Proportion in Competitive Race	Binomial 90 Percent Confidence Interval	Sample Size
Mile-Time Faster than Median 3 rd Place Winner's Time	1.00	[0.86,1]	20	1.00	[0.85,1]	19
Mile-Time between Median 3 rd Place Winner and QS minus 15 seconds	1.00	[0.89,1]	27	0.50	[0.25,0.75]	12
Mile-Time between QS minus 15 seconds and QS minus 5 seconds	0.84	[0.69,0.93]	31	0.40	[0.22,0.61]	20
Mile-Time between QS minus 5 seconds and QS plus 5 seconds	0.29	[0.16,0.45]	31	0.13	[0.02,0.36]	15
Mile-Time between QS plus 5 seconds and QS plus 15 seconds	0.18	[0.10,0.28]	57	0.11	[0.02,0.31]	18
Mile-Time Slower than QS plus 15 seconds	0.05	[0.02,0.08]	152	0.04	[0.01,0.10]	76
All with Mile-Time between Median 3 rd Place Winner and QS	0.84	[0.75,0.91]	69	0.39	[0.24,0.57]	28

QS= Qualifying Standard

Median 3rd Place Winner Times are 242 seconds for young men, 292 seconds for young women.

Table 3—Proportion Entering Competitive Race, by Sex and Mile-Time Relative to Qualifying Standard, Older

	Men, Age 40-81			Women, Age 40-75		
	(1)	(2)	(3)	(4)	(5)	(6)
	Proportion in Competitive Race	Binomial 90 Percent Confidence Interval	Sample Size	Proportion in Competitive Race	Binomial 90 Percent Confidence Interval	Sample Size
Mile-Time Faster than Median 3 rd Place Winner's Time	0.87	[0.70,0.96]	23	0.37	[0.25,0.50]	46
Mile-Time between Median 3 rd Place Winner and QS minus 15 seconds	0.56	[0.34,0.76]	18	0.21	[0.05,0.47]	14
Mile-Time between QS minus 15 seconds and QS minus 5 seconds	0.30	[0.18,0.43]	44	0.18	[0.05,0.40]	17
Mile-Time between QS minus 5 seconds and QS plus 5 seconds	0.16	[0.07,0.30]	37	0.00	[0.00,0.28]	9
Mile-Time between QS plus 5 seconds and QS plus 15 seconds	0.05	[0.01,0.13]	58	0.00	[0.00,0.26]	10
Mile-Time Slower than QS plus 15 seconds	0.03	[0.01,0.06]	193	0.05	[0.01,0.14]	43
All with Mile-Time between Median 3 rd Place Winner and QS	0.33	[0.24,0.43]	79	0.14	[0.05,0.30]	28

QS= Qualifying Standard

Median 3rd Place Winner Times are 249 (age-adjusted) seconds for men and 297 (age-adjusted) seconds for women.