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Competitiveness across the Life Span: The Feisty Fifties

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Abstract

Existing theories on life-span changes in confidence or motivation suggest that individuals' preferences to enter competitive situations should gradually decline with age. We examined competitive preferences in a field experiment using real financial stakes in 25 to 75 year olds (*N*=543). The critical dependent variable was whether participants chose to perform a simple mental arithmetic task either under a piece-rate payment schedule (i.e., $.25 per solved item) or a competitive payment schedule ($.50 per solved item if the overall score is better than that of a randomly selected opponent, $0 otherwise). Results revealed that competitive preferences *increased* across the life span until they peaked around age 50, and dropped thereafter. We also found that throughout, men had a substantially larger preference for competing than women—extending previous findings on college-aged participants. The age/gender differences in preferences were neither accounted for by actual differences in performance nor individuals' subjective confidence. This first systematic attempt to characterize age differences in competitive behavior suggests that a simple decline conception of competitiveness needs to be reconsidered.

Access to resources in society is often regulated through competitions. Job interviews, college entry exams, grant submissions, or a run for public office, are all situations where willingness to enter a competition (competitive preference) and performance in a competitive situation (competitive performance) serve as gate keepers to important resources and opportunities.

Ideally, competitions sort individuals by competence, promoting fair and efficient allocation of limited resources. This assumes that both competitive choices and performances are an accurate reflection of the competencies in question. It is therefore critical to understand the factors that influence competitive preferences and performance and the degree to which such factors may be independent of competence. In the current paper we focus specifically on how competitiveness changes with adult age/cohort—a question that so far has received very little research attention. Our main focus will be on individuals' preferences for competing in the intellectual domain. However we will also examine how these preferences are related to differences in how well individuals perform in competitive situations.

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Life-Span Changes in Competitive Preferences?

Why should the willingness to enter competitive situations change across the life span? Observable competitive preferences are likely to reflect a number of more basic-level constructs, such as confidence in one's abilities, motivational orientation, and even endocrinological processes. Age-related changes in any one of these aspects could be responsible for changes in how individuals approach competitive situations.

Confidence

Basic cognitive functions show a gradual decline, starting in young adulthood (e.g., Salthouse, 1996) and also people's self efficacy (Berry & West, 1993) and beliefs about age-related changes in intellectual functioning are dominated by a negative outlook (e.g., Heckhausen, Dixon, & Baltes, 1989; Kite & Johnson, 1988; Lineweaver & Hertzog, 1998). Given that confidence in one's own ability affects individuals' goal setting and task persistence (e.g., West & Yassuda, 2004) it is plausible to assume that it also influences one's interest in seeking opportunities to compete in the affected domains. However, there are also domains that exhibit either a growth or an inverted U-shaped trajectory across the life span (Agarwal, Driscoll, Gabaix, & Laibson, 2008; see also Baltes, 1987; Simonton, 1988). This makes it difficult to directly relate assumed changes in confidence or beliefs to possible changes in competitive decisions. Therefore, in the current study we assessed participants' beliefs about their own ability level relative to that of others specifically for the target ability and after initial experience with that task. Also, we selected a task domain that typically shows little age-related decline, namely simple mental arithmetic (e.g., Verhaeghen, Kliegl, & Mayr, 1997).

Motivation and Goals

Competitive behavior is often thought to reflect more general motivational orientations. For example, with regard to the domain of achievement motivation Dweck (1986) has established a distinction between performance motivation and mastery motivation. Individuals driven by performance motivation focus mainly on outperforming others and therefore can be expected to seek out opportunities to compete. In contrast, mastery oriented individuals use an internal frame of reference, focusing on improving or maintaining their level of skill. There is some initial evidence that whereas performance motivation declines with age, mastery motivation remains stable (e.g., Steinberg, Grieve, and Glass, 2001). This fits with evidence indicating shifts in goal orientations across the life span. For example, older individuals become more focused on maintaining a once-established skill level and compensating for possible losses (e.g., Ebner, Freund, & Baltes, 2006; Freund, 2006). This type of goal orientation entails an internal frame of reference, thus implying that older adults should be more interested in comparing themselves with their past levels of performance rather than in going head-to-head with others.

Competitive behavior occurs in a social context and therefore social motivational orientations are also relevant. Conceptually, competitive behavior is centered on the individual rather than on the rewards from meaningful social exchanges. Theoretical models suggest that pro-social rather than ego-centered behavior should increase across the life span (e.g., E.H. Erikson, 1963). Empirically, there is some evidence that aspects such as self-reported generativity or agreeableness show positive life-span trajectories (McAdams, de St. Aubin, & Logan, 1993; Roberts, Robins, Trzesniewski, and Caspi, 2003) and that older adults engage in more charitable giving than young adults (e.g., Andreoni, 2006, Midlarksy & Hannah, 1989). To our knowledge, the presumed reciprocal relationship between pro-social and competitive motivational orientation awaits rigorous empirical validation.

Assuming it exists the here-mentioned findings of increases in pro-social tendencies with age suggest a parallel decline in competitive preferences.

Endocrinological Changes

There is increasing evidence that competitive behavior is affected by base levels and within-individual fluctuations in steroid hormones. For example, base levels of testosterone are positively correlated with competitive choices for men and in women (Mehta & Josephs 2006) and day-to-day fluctuations in testosterone are related to performance in competitive situations (Coates, 2008). This is relevant here, because levels of steroid hormones undergo substantial live-span changes, including a gradual drop in testosterone in both men and women (Burger, Dudley, Robertson, & Dennerstein, 2002). Thus, hormonal changes across the life span are another potential candidate factor behind an age-related reduction in the competitiveness.

Summary

Differences in competitive behavior across the adult life span could result from changes in confidence, a shift from an orientation towards social comparisons (i.e., performance motivation) towards an internal reference frame (i.e., mastery orientation), a shift from an ego-centered towards a pro-social orientation, or from changes in steroid hormone levels. Importantly, each of these possible explanations leads to the prediction that competitive preferences exhibit a monotonic decline with increasing age.

Behavioral Economics Research on Gender Differences in Competitiveness

While so far little is known about how competitive preferences are affected by age, much recent research attention, in particular in behavioral economics, has been directed towards another demographic variable, namely gender. For example, Niederle and Vesterlund (2007) had male and female students perform simple mental arithmetic tasks (adding sets of 2-digit numbers) in groups of four participants. In the here most critical condition, participants could choose whether or not they wanted to be paid using a piece-rate compensation schema (i.e., $.50 per solved problem) or a winner-take-all scheme (i.e., $2.00 for the best of the four participants and nothing for the rest). Women were much less likely than men to choose the competition (35% vs. 73%). A conclusion from this and other related work (for a recent review, see Croson & Gneezy, 2009) is that there are significant gender differences in competitive preferences and that these cannot be explained by competitive performance or factors such as confidence, sensitivity to relative feedback, or risk aversion.

While the study by Niederle and Vesterlund revealed no gender differences in performance in competitive situations, an earlier study by Gneezy, Niederle and Rustichini (2003) has shown that when men and women perform complex visual-spatial puzzles under both piece-rate and winner-take all conditions, marked improvements in the relative performance of men appeared in the winner-take all condition compared to the piece-rate situation. While it remains an open question why some situations may be more prone to revealing gender differences in competitive performance than others, this study does indicate that it is important to consider performance differences before generalizing about differences in preferences. After all, for individuals who perform worse in competitive than in non-competitive situations avoiding competitions would be the rational choice.

So far, evidence regarding gender differences in competitive preferences and performance is not available beyond college-age samples. Therefore, one important goal of the current work is to examine how these aspects change across the life span.

The Current Study

We assessed competitive preferences in a field experiment conducted in a local shopping mall. While this allowed us to collect data on a large and heterogeneous sample, it also came with certain limitations regarding the total amount of testing that was possible for each individual subject. We therefore focused our assessment on the basic question of age-related changes in competitive preferences, using the same types of procedures that have proven useful for assessing gender differences in competitiveness (e.g., Croson & Gneezy, 2009). However, our design did also allow us to track possible objective age differences in competitive performance and subjective confidence. Our main research questions were: Is there an age-related, monotonic decline in competitive preferences as can be expected based on life-span changes in aspects such as motivational orientation or levels of steroid hormones? Does the previously documented gender difference in competitive preferences extend across the entire life span? Are life-span and gender differences in competitiveness independent of performance and confidence?

Methods

Subject Recruitment and Sample Description

The participants in our study were 543 adults between ages 25 and 75, which were part of larger sample of participants recruited at an indoor shopping mall in Eugene, OR. For recruitment and testing a mall kiosk was used. Mall visitors were approached by experimenters and asked if they would participate in a 5–10 minute experiment in exchange possible earnings between $2–$15, depending on their decisions and performance. Potential recruits were not given specific details about the task or the purpose of the study before agreeing to participate.

Table 1 presents important characteristics of the sample as a function of 10-year age brackets and gender. The numbers of men and women were relatively well balanced across age brackets and there were expected differences in education and employment status across age and gender.

Task and Procedure

The experiment was conducted on computers, at a kiosk with partitions to ensure the participants' privacy. Up to five participants could be tested simultaneously. The basic task involved verifying simple equations of the kind 7+2+3−6=5, presented in font size 60 in black on a white computer screen. Equations were constructed randomly with the constraint that individual terms in the equations had to be between 1 and 9, Half of the equations were shown with correct, and half with incorrect answers. Participants had to press the right arrow key for correct and the left arrow key for incorrect solutions. Immediately after a choice the next equation was presented. Each round of equations lasted 30 seconds and one point was awarded for each correct answer and one point subtracted for each incorrect answer, to discourage guessing.

Participants were given full and accurate instructions of the task, with no deception. They were informed that one experimental round would be chosen at random to count for their actual payoff. They first performed one practice round with the arithmetic task. The first two experimental rounds were implemented as either competition or piece-rate in a counterbalanced order. For the piece-rate round, participants were informed that they could earn $.25 for each point. For the competition round, participants were informed that they would perform against the results of an earlier subject chosen at random from the existing data base of all individuals who had participated in this experiment in the mall (for the very first set of participants, the data-base was pre-populated with results from a pilot study).

Further, they were informed that they would see the same sequence of equations as the comparison participant saw in a competition round and would compete directly against that participant's score. If the participant answered more equations than the earlier subject, new equations were randomly generated. If the participant had a higher score than the "opponent", he/she would earn $0.50 per point, otherwise he/she would earn $0.00 per point. These initial piece-rate and competition rounds served the dual purpose of familiarizing participants with a competitive and a non-competitive condition, and they provided relevant performance data. Participants did not receive feedback about their performance after these rounds.

Upon completion of the second scored round, participants were asked to estimate their performance relative to other participants. They were told that if they correctly guessed their rank they would receive an additional $2.00 at the end of the experiment. The participant's score from the previous round was used to calculate which decile he/she was in, relative to the average scores of previous participants who had used the same computer. They were presented with a screen asking "Out of 9 random participants, how many would your score from last round have beaten?", with the numbers zero through 9 shown across the screen. Each number key corresponded to one decile (i.e., "0" = 0%–9%, "1" = 90%–99%, etc.). Again, participants received no feedback about the accuracy of their guess until after the experiment.

The third round allowed participants to choose between the piece rate and competition payment schemes. Both options were presented on the screen side by side (positions on the screen counterbalanced), each within a square frame labeled either as "Compete" or "Piece rate". Participants could indicate their choice using the left and right arrow keys after which they performed the round under the chosen regime.

The fourth and final round involved providing participants with relative performance information, or the opportunity to buy such information. These results are discussed in a separate paper. After this final round, participants completed a short demographic survey on age, gender, employment status/occupation, and years of education. They were also informed about their overall earnings and paid in cash.

Results and Discussion

We begin by testing for possible age/gender differences in performance, which would need to be taken into consideration when interpreting potential differences in competitive choices. Second, we present participants' choices of either piece-rate or competitive payment schedules as a reflection of competitive preferences and we examine effects of potential moderating variables, including actual performance. Third, we test to what degree participants' confidence explains their competitive choices. Finally, in an initial attempt to shed light on the measurement quality and construct validity of the relevant constructs, we will report intercorrelations among core variables.

Non-competitive and Competitive Performance

We ask here if there were age or gender differences in the basic task performance in a non-competitive situation. Table 2 shows the number of points earned (i.e., correct equations minus incorrect equations) across age brackets and gender. To analyze these data, we performed regression analyses with earned score as dependent variable and continuous age (centered around the sample mean), gender (male=0, female=1), and the interaction between age and gender. There was a slight tendency for young women to perform better than men and for older women to perform worse than men. However, neither this age × gender interaction, b=−.025, SE= .016, p=.11, nor any direct age or gender effect was reliable. This

pattern did not change when we added an age squared term and a gender by age-squared interaction, to account for possible quadratic effects. The lack of general age effects in simple mental arithmetic tasks replicates previous results (e.g., Verhaeghen et al., 1997).

Next, we examined how performance is affected in a competitive situation. Here, we used a multilevel model with points earned as dependent variable, age and gender as subject-level predictors, and piece-rate versus competition as within-subject predictor along with the relevant interactions. The only reliable effect here was a gender by piece-rate versus competition interaction. Whereas men and women showed almost identical performance under piece-rate conditions (men=4.00, women=4.05, $t(541)=.28$, $p>.7$), women, but not men exhibited a slight, but reliable drop in performance in the competitive situation (men=4.09, women=3.55, $t(541)=2.4$, $p<.02$). This result is broadly consistent with previous findings indicating a competitive disadvantage for women (e.g., Gneezey et al., 2003) and this gender difference will have to be taken into account when looking at gender differences in competitive choice. Neither the overall piece-rate versus competition difference nor how this difference was affected by gender was modulated through age in a systematic manner. Here and in all further analyses, we also included age-squared and its interaction with gender in the analysis. Unless, explicitly stated, these analyses produced no significant effects. Also, inclusion of control variables such as education or employment status had no effects.

Competitive Preferences

Figure 1 shows choices for competitive over piece-rate payments, across gender and age brackets. Two aspects stand out. First, there was a substantial gender difference that is stable across age levels. Overall, 56% of men and only 36% of women chose to compete and the difference was relatively stable across age. Second, across the life-span the willingness to compete followed an inverted U-shaped function. For both genders it increased up to age 50 and declined thereafter.

We used a probit regression that modeled probability of choosing competition as a function of gender, age and age-squared. As shown in Table 3 (Model 1), both gender and age-squared were highly reliable, whereas no overall linear age trend was apparent. Next, we added the gender by age and the gender by age-squared interactions (Model 2), which produced no reliable effects. We also performed separate probit analyses, one for ages 25 to 54, the other ages 45 to 74. These revealed that both the increase in competitive choice towards the peak around 50 ($b=.006$, $SE=.003$, $p<.05$) and the decline thereafter were reliable ($b=-.011$, $SE=.004$, $p<.01$).[1] As apparent from Model 3 (Table 3), the Model 1 results remain basically unchanged when adding demographic control variables such as education or employment status.

We documented above small but reliable gender differences in competitive performance. Therefore, in Model 4 we added to Model 1 individuals' piece-rate and competition scores. The results showed that tendency to compete was positively and highly significantly related to performance in the previous no-choice competition situation, and it was negatively, though not significantly so, related to the no-choice piece-rate score. This pattern implies that it is not performance per se that affects competitive choices, but how much better one performs under a competitive relative to the piece-rate situation. Again however, after including these predictors the coefficients for both the gender (and also the age-related effects) remained virtually unchanged. Thus, even though there was a slight gender

[1]Inspection of Figure 1 indicates somewhat larger gender differences in the first age bracket (25-34 year olds) than thereafter. To test the statistical significance of this pattern, we added a cubic age trend and its interaction with gender to the analysis. However this produced no hint of a reliable effect in either Model 1 or 2.

difference in competitive performance, this could not account for the gender difference in competitive preferences.

Confidence

One reason why people may choose not to enter a competition is because of a low subjective confidence in one's own competitive performance. We had asked participants to guess their likely rank (in 10% steps) relative to all other possible participants, after experiencing both the piece-rate and the competition situation, but prior to choosing whether or not to compete. Table 2 presents the estimated rankings. As apparent from this table, the overall pattern of subjective rankings did not correspond to the inverted U-shaped, age-related function we found for competitive choices. Accordingly, the Model 5 coefficients for age-squared were not affected by adding confidence as predictor; also the interactions between confidence and age or age-squared were far from reliable, both *p*s >.5. Thus, subjective confidence, at least as assessed here, was not the critical factor behind the age-trajectory in competitive preferences.

In a regression analysis with age, age-squared, and gender as predictors of guessed rank, only gender proved reliable (b=−.63, SE=.17, p<.001), suggesting that women overall were less confident of their performance than men. Inspection of Table 2 indicates that the gender difference was largest during early and late adulthood, and smallest around age 50. Correspondingly, the addition of the age by gender (b=.02, SE=.013, p=.138) and the age-squared by gender interactions (b=−.002, SE=.001, p=.06) produced an almost reliable increase in R-square.

Can the gender difference in confidence explain the gender difference in competitive choice? To test this, we added the subjective ranking to the Model 1 predictors of choices (Model 5, Table 3). Despite a highly reliable coefficient for this variable, the coefficients for the other predictors remained virtually unaffected. In additional analyses we found an interesting, highly reliable interaction between gender and subjective ranking (see Model 6), indicating that for women the relationship between subjective ranking and choice was about three times as strong as for men. This result suggests that men and women use different information to decide whether or not to compete: Men do so without much regard for their actual probability of winning, whereas women in this case take this aspect into regard—as would be expected from a rational decision maker. However, the main conclusion from these analyses is that while confidence in one's ability to perform well in a competitive situation may be an important variable, it cannot explain the pattern of gender or age differences in competitive preferences.

Intercorrelations

Table 4 shows relationships between our core variables. Performance in the piece-rate and the competition situation was correlated. Interestingly, performance under competition, confidence, and competitive choice were all modestly related, but competitive choice was not related to performance in the piece-rate condition. The fact that competitive preferences and competitive performance were correlated is important, as it shows, to our knowledge for the first time, that these two different manifestations of "competitiveness" may reflect at least to some degree a common, underlying construct. We also need to note the overall modest level of correlations, an aspect we will return to when we discuss limitations of this work.

General Discussion

Mid-life Peak in "Taste for Competition"

As outlined in the introduction, possible reasons for negative life-span changes in competitive preferences include a change in subjective confidence (perhaps tracking the gradual decline in basic cognitive capacity), life-span changes in motivational orientation, or levels of steroid hormones. Therefore, it is surprising that we found a gradual increase in competitive preferences until age fifty, only then followed by a decline. It is further important to note that these age trends are not reflection of similar trends in either objective task performance or subjective confidence in winning the competition.

We do not believe that the current results necessarily rule out the contributions of lifespan changes in factors such as confidence in one's ability or motivational orientation. However, the type of U-shaped pattern we found typically calls for explanations based on at least two different underlying developmental forces that counteract each other. What then could be responsible for the pre-50 growth in competitive preferences? One interesting possibility is suggested by the results of a recent meta-analysis (Roberts, Walton, & Viechtbauer, 2006). These authors reported that the personality trait of social dominance shows the strongest positive age trends from early adulthood to the fifties, of all the traits assessed (1 SD change). Successfully engaging in competitions is critical for establishing social dominance and therefore it is plausible to assume that with such an increased interest in social dominance comes an increased "taste for competition". Interestingly, Steverink, Lindenberg, and Ormel (1998; see also Steverink & Lindenberg, 2006) have proposed that individuals will pursue goals for which the ratio between resources and constraints is beneficial. For status-oriented goals, which can be realized mainly in the occupational domain, this should be primarily the case during middle/late adulthood, which is broadly consistent with our finding that competitive preferences peak around 50.

The above-mentioned meta-analytic database did not allow strong claims about post-50 development of social dominance, but there was no evidence for a decline. However, the post-50 changes could easily reflect the fact that in this life phase, competitive preferences become gradually dominated by the kinds of changes in motivation, goal orientation, or hormonal levels we had discussed in the Introduction. Obviously, these theoretical speculations about counteracting developmental forces need to be followed up with work in which potentially relevant factors are assessed alongside with behavioral assays of competitive preferences.

Gender Differences in Competitive Preferences

We replicated the now well-established finding that women are less likely to enter a competition than men using a similar protocol as in previous studies (Niederle & Vesterlund, 2007), but a more heterogeneous sample. We also replicate that this effect cannot be explained by differences in actual performance or subjective confidence. Most important, we show for the first time that these gender differences extend across the adult life span, remaining virtually unchanged between 25 and 75. This is particularly surprising given that it does not reflect actual differences in performance (at least not in the task assessed here). In other words, it seems to reflect a surprisingly stubborn bias that appears unaffected by a lifetime of experience with one's own actual competence. Assuming this bias extends beyond experimental tasks, it could very well be at least partially responsibility for life-long gender-related differences in access to resources or opportunities to contribute to society.

Limitations

The current study allowed us to characterize age/cohort changes in competitiveness, but not how these correspond to other important theoretical constructs, such as motivation or endocrinological status. Future, multivariate studies will be necessary to establish these relationships. One additional construct that could explain differences in competitive preferences, but that we were not able to control within our design individuals' degree of risk aversion. Risk aversion is usually assessed through a choice between a sure gain (or loss) and a risky gain (or loss) with identical expected values, a choice that is structurally very similar to the one between piece-rate and competitive payments. There is some evidence of greater risk aversion in older adults (Aitken, Robbins, & Sahaikian, 2004; Weller, Levin, Denburg, 2010), however such a monotonic decline could not by itself explain the inverted-U trajectory we found for competitive preferences. Moreover, recent results suggest that increased risk aversion is limited to choice situations where outcomes are framed in terms of losses (Mikels & Reed, 2009). Thus, we believe it is unlikely that age differences in risk aversion are behind the pattern of competitive choices we observed. Nevertheless, in future work this should be addressed directly by comparing age trends in decisions between risky and sure payouts with decisions between competitive and non-competitive payments.

While our sample was relatively large up to age 55, the size of the final age bracket was smaller (see Table 1). Thus, the downward trajectory of competitive preferences is less well-established than the pre-50 increase and requires replication. However, we also contend that the final data points continued trends that were visible at age 60 in an orderly manner. Also, the fact that trends were very similar for men and women adds credibility to these results.

Another important limitation of the present work becomes apparent when inspecting the correlations between critical variables presented in Table 4. While most of these correlations were highly reliable, their size was modest—the highest correlation observed with the choice variable was .23. As in existing work on gender differences in competitive preferences from the behavioral economics tradition, also in the current study the assessment of such preferences was based on a single binary decision per participant. Therefore, the modest correlations probably reflect the relatively low-reliability assessment of the critical constructs. This practice is defensible when the main goal is to characterize mean trends/differences. However, in future work it will be important to take a more comprehensive, multivariate approach in order to establish how competitive preferences relate to other important constructs, such as motivational orientation. For this purpose it will be critical to marry the behavioral economics approach and its emphasis on real-stakes decisions with the psychological tradition and its focus on reliable measurement and construct validity.

As in all cross-sectional work, the age differences we report could be either due to developmental processes (i.e., tied to ontogenetic age) or result from cohort-specific experiences, or a combination of these two factors. It may be tempting to speculate about secular trends that might influence individuals' competitive preferences. For example, the experience of growing up as one of many baby boomers (roughly the 50 to 60-year-olds in our sample) may have resulted in a greater competitiveness compared to those who were born later and in smaller numbers. However, a-priori one might have also expected that the prolonged economic downturn that has shaped the 30-year-olds upbringing might have increased their competitive tendencies. It will require multivariate, cross-sectional work that allows detailed assessment of potentially critical factors, or even better, longitudinal studies to distinguish the role of such secular trends from ontogenetic processes.

Conclusion

Competitive choices and performance are important as they can act as a "filter" that stands between individuals' true competence and how this competence is translated into contributions that benefit the individual and/or society. As the current results show, there is some reason for concern that this filter exerts unwanted biases. Irrespective of their actual competence (at least as assessed in our experiment), women were less likely to compete than men throughout the life span, and the difference in the willingness to compete between 50-year olds' on the one hand and either 30 or 70-year olds' on the other was at least as large as that between men and women. Extrapolating from existing results regarding life-span changes in confidence, motivational orientation, or steroid hormones one might have a expected monotonic decline in competitive preferences with age. Instead, the present finding of a non-monotonic trajectory suggests that opposing developmental forces are at work: Some promote a decrease in competitive preferences, but other factors—with status orientation being an interesting candidate here—promote a pre-50 increase in willingness to enter competitive situations.

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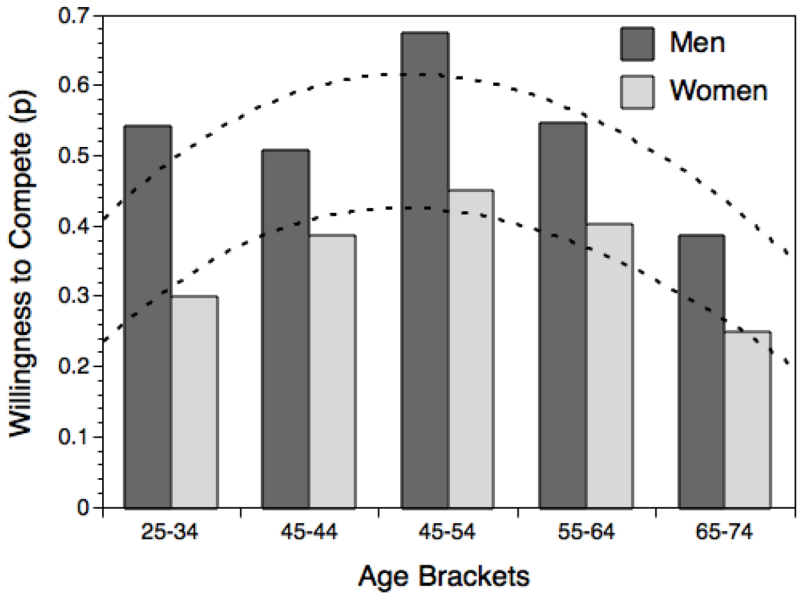

Figure 1.
Competitive preferences of men and women across the life span. Dashed lines show the predicted age trajectories derived from Model 2.

Table 1

Sample Characteristics as a Function of Age and Gender

Age	Gender	N	Education	Student	Unemployed	Retired
25–34	Male	81	14.8	.20	.21	.05
	Female	60	15.3	.13	.17	.03
35–44	Male	55	14.7	.07	.18	.0
	Female	62	15.5	.06	.11	.06
45–54	Male	65	15.1	.05	.23	.05
	Female	73	15.8	.04	.11	.12
55–64	Male	62	16.3	.0	.10	.24
	Female	47	15.0	.0	.09	.36
66–74	Male	18	16.4	.0	.06	.83
	Female	20	14.1	.0	.0	.90

Table 2

Average points earned (SD) for piece rate and competition rounds, and subjective rank as a function of age bracket and gender.

Age	Gender	Piece Rate	Competition	Subjective Rank
25–34	Male	3.93 (2.41)	4.27 (2.92)	5.21 (2.08)
	Female	4.38 (2.46)	3.83 (2.72)	4.00 (1.93)
35–44	Male	3.76 (2.74)	3.71 (2.76)	4.95 (2.06)
	Female	4.34 (1.93)	3.32 (2.67)	4.39 (2.00)
45–54	Male	4.18 (2.24)	3.86 (2.96)	5.00 (2.04)
	Female	3.84 (2.48)	3.78 (2.33)	4.95 (1.85)
55–64	Male	4.10 (2.23)	4.35 (2.28)	5.37 (1.94)
	Female	4.00 (2.18)	3.28 (2.68)	4.87 (2.01)
65–74	Male	4.00 (2.09)	4.33 (1.68)	5.11 (1.90)
	Female	3.1 (2.85)	3.15 (2.28)	4.15 (2.21)

Table 3

Results of probit models with probability of choosing competition as dependent variable.

	Model 1		**Model 2**		**Model 3**		**Model 4**		**Model 5**		**Model 6**	
Predictors	**b**	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**	**b**	**SE**
Constant	**.306**	**.096**	**.334**	**.113**	−.102	.300	.170	.144	**.275**	**.098**	**.280**	**.097**
Gender	**−.479**	**.110**	**−.534**	**.156**	**−.495**	**.111**	**−.446**	**.111**	**−.413**	**.112**	**−.420**	**.113**
Age,	.002	.004	.002	.006	.001	.005	.003	.004	.001	.004	.000	.004
Age^2	**−.0009**	**.0003**	**−.001**	**.0005**	**−.0009**	**.0004**	**−.001**	**.0003**	**−.001**	**.0003**	**.001**	**.0003**
Gen. × Age			.001	.009								
Gen. × Age^2			.0003	.001								
Education					.029	.018						
Student					.075	.222						
Unempl.					−.185	.162						
Retired					.028	.184						
Piece-rate							−.037	.025				
Compete							**.074**	**.023**				
Confidence									**.140**	**.028**		
Confidence											.073	.037
Gen. × Conf.											**.160**	**.059**

Note. Coefficients in bold were significant.

Table 4

Correlations between performance under piece-rate and competition conditions, confidence about performance in the competition condition, and competitive choice.

	Competition	Confidence	Choice
Piece-rate	.355***	.279***	−.013
Competition		.282***	.133**
Confidence			.232***

Note.

*** p<.001,

** p<.01.