Psychological Science
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Psychological Science published online 10 November 2014
DOI: 10.1177/0956797614551371

Psychological Science OnlineFirst, published on November 10, 2014 as doi:10.1177/0956797614551371

Research Article

Psychological Science
1–16

DOI: 10.1177/0956797614551371
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Life Paths and Accomplishments of Mathematically Precocious Males and Females Four Decades Later

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Abstract

Two cohorts of intellectually talented 13-year-olds were identified in the 1970s (1972–1974 and 1976–1978) as being in the top 1% of mathematical reasoning ability (1,037 males, 613 females). About four decades later, data on their careers, accomplishments, psychological well-being, families, and life preferences and priorities were collected. Their accomplishments far exceeded base-rate expectations: Across the two cohorts, 4.1% had earned tenure at a major research university, 2.3% were top executives at "name brand" or Fortune 500 companies, and 2.4% were attorneys at major firms or organizations; participants had published 85 books and 7,572 refereed articles, secured 681 patents, and amassed $358 million in grants. For both males and females, mathematical precocity early in life predicts later creative contributions and leadership in critical occupational roles. On average, males had incomes much greater than their spouses', whereas females had incomes slightly lower than their spouses'. Salient sex differences that paralleled the differential career outcomes of the male and female participants were found in lifestyle preferences and priorities and in time allocation.

Keywords

intelligence, individual differences, creativity, giftedness

Received 6/24/14; Revision accepted 8/18/14

Fifty years after students were summoned out of their classrooms in September 1921 to populate arguably the most famous longitudinal study in psychology, Lewis Terman's Genetic Studies of Genius (Friedman & Martin, 2011; Holahan, Sears, & Cronbach, 1995; Terman, 1925), Julian C. Stanley launched the Study of Mathematically Precocious Youth (SMPY) in September 1971 (Keating & Stanley, 1972; Stanley, 1996). SMPY was designed in part to stand on the shoulders of Terman's contributions. Terman used time-intensive (individually administered) general-ability assessments to identify 1,528 high-IQ (top 1%) young adolescents and then tracked them for decades. He was interested in their accomplishments, educational needs, and personal well-being. SMPY had a similar agenda, but also a strong interventionist focus (Benbow & Stanley, 1996; Stanley, 2000). SMPY identified participants using more efficient (group-administered) and focused specific-ability assessments, administering college entrance exams to intellectually talented 13-year-olds to identify those in the top 1% in mathematical reasoning ability. The rationale was that for purposes of identifying scientific talent in particular and developing procedures to foster its growth (Bleske-Rechek, Lubinski, & Benbow, 2004; Park, Lubinski, & Benbow, 2013; Wai, Lubinski, Benbow, & Steiger, 2010), it might be more profitable to use tests of outstanding mathematical reasoning ability rather than assessments of more general ability (IQ).

This report details the occupational and creative accomplishments of 1,650 SMPY participants identified in the 1970s. Participants' psychological well-being, time allocation, orientation toward life, and partners also are examined. Our objective was to better understand their talent-development process. Looking beyond

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the abilities, interests, and opportunities that lead to outstanding accomplishments (Lubinski & Benbow, 2000, 2006), we wanted to investigate the lifestyle and psychological orientation required for developing a truly outstanding career and creative production. At this time, a reliable portrait of how participants' lives evolved has become discernible. Further, when SMPY was launched, many educational and occupational opportunities were just becoming open to women, so we paid particular attention to how mathematically precocious females, relative to males, have constructed their lives over the past 40 years. Given the contemporary attention devoted to developing and retaining talent in science, technology, engineering, and mathematics (STEM; Graham, Frederick, Byars-Winston, Hunter, & Handelsman, 2013; Kaminski & Geisler, 2012; Kell, Lubinski, Benbow, & Steiger, 2013; Moss-Racusin et al., 2014), and the inordinate potential of mathematically precocious youth for contributing professionally to STEM disciplines (Kell, Lubinski, & Benbow, 2013; Lubinski & Benbow, 2006; Park, Lubinski, & Benbow, 2007, 2008), this follow-up is well positioned to be especially informative.

Participants

For this midlife follow-up, the two oldest cohorts of SMPY (Lubinski & Benbow, 2006) were surveyed (to allow replication of findings) from January 2012 to February 2013. During this interval, members of Cohort 1, identified in 1972 through 1974 (707 males, 452 females), were 53 years old on average, and members of Cohort 2, identified in 1976 through 1978 (330 males, 161 females), were 48 years old on average. The average SAT mathematics score (SAT-M) by age 13 was 539 (SD = 77) for Cohort 1 males, 509 (SD = 62) for Cohort 1 females, 567 (SD = 65) for Cohort 2 males, and 521 (SD = 59) for Cohort 2 females.[1] Different methods for calculating the response rate yielded an average response rate of 72.3%.[2]

As an incentive, participants were offered a $20 Amazon.com gift card for completing the Web-based survey, which took most participants a bit over an hour to complete. They were also given the choice of accepting the gift card or donating the $20 to a scholarship program for students who are qualified to attend summer programs for intellectually talented youth but do not have the economic means to do so. Sixty-six percent (Cohort 1: 67% of males, 64% of females; Cohort 2: 67% of both males and females) chose to donate their incentive, which suggests that they felt that special programming for intellectually gifted youth is a worthwhile enterprise.

Education

Given that 30% of the U.S. population earn 4-year degrees (U.S. Census Bureau, 2012a) and just under 2% earn doctorates (U.S. Census Bureau, 2012b), participants' terminal educational credentials far exceeded base-rate expectations (and differed little by sex; see Tables S1 and S2 in the Supplemental Material available online): In Cohort 1, the terminal degree was a B.A. or B.S. for 27% of males and 32% of females, a master's for 30% of males and 35% of females, and a doctorate for 33% of males and 25% of females. In Cohort 2, the corresponding percentages were 25% and 29% for bachelor's degrees, 32% and 32% for master's degrees, and 40% and 38% for doctorates.

Occupations

Figure 1 shows the percentages of participants in various occupational categories, arrayed according to the difference between the percentage of men and the percentage of women represented. Men were more likely than women to be chief executives and to be employed in information technology and STEM positions, whereas women were more likely to be found in general business, elementary and secondary education, and health care (below the doctoral level), and were also more likely to be homemakers. Yet in some demanding fields—finance, medicine, and law—men and women were represented to about the same degree.

Creativity and occupational stature are not precisely reflected by the categories in Figure 1, but Tables 1 and 2 contain information that is relevant to the magnitude and originality of the cohorts' occupational accomplishments. The percentage of participants who had earned tenure at a top-50 university within the United States (1.8%) mirrors the base rate of doctorates in the United States, and 4.1% of participants were tenured at a major research university. Overall, 25% had published an article in a refereed outlet, 3% had published a book, 3% had secured a National Science Foundation or National Institutes of Health grant, and 8% had earned a patent. As of the follow-up, participants had published 85 books and 7,572 refereed articles, earned 681 patents, and received $358 million in grants (1 participant had received a MacArthur grant). Furthermore, an appreciable number of participants were organizational leaders entrusted with substantial economic and human resources for supporting organizational effectiveness and employee well-being. Protecting participants' identities precludes providing further details, but sufficient specificity is available here to document the impressive human capital found in samples of mathematically precocious youth (top 1%) identified by age 13.

Income

Compensation is an important index of organizational value, a measure of impact, and often an indicator of

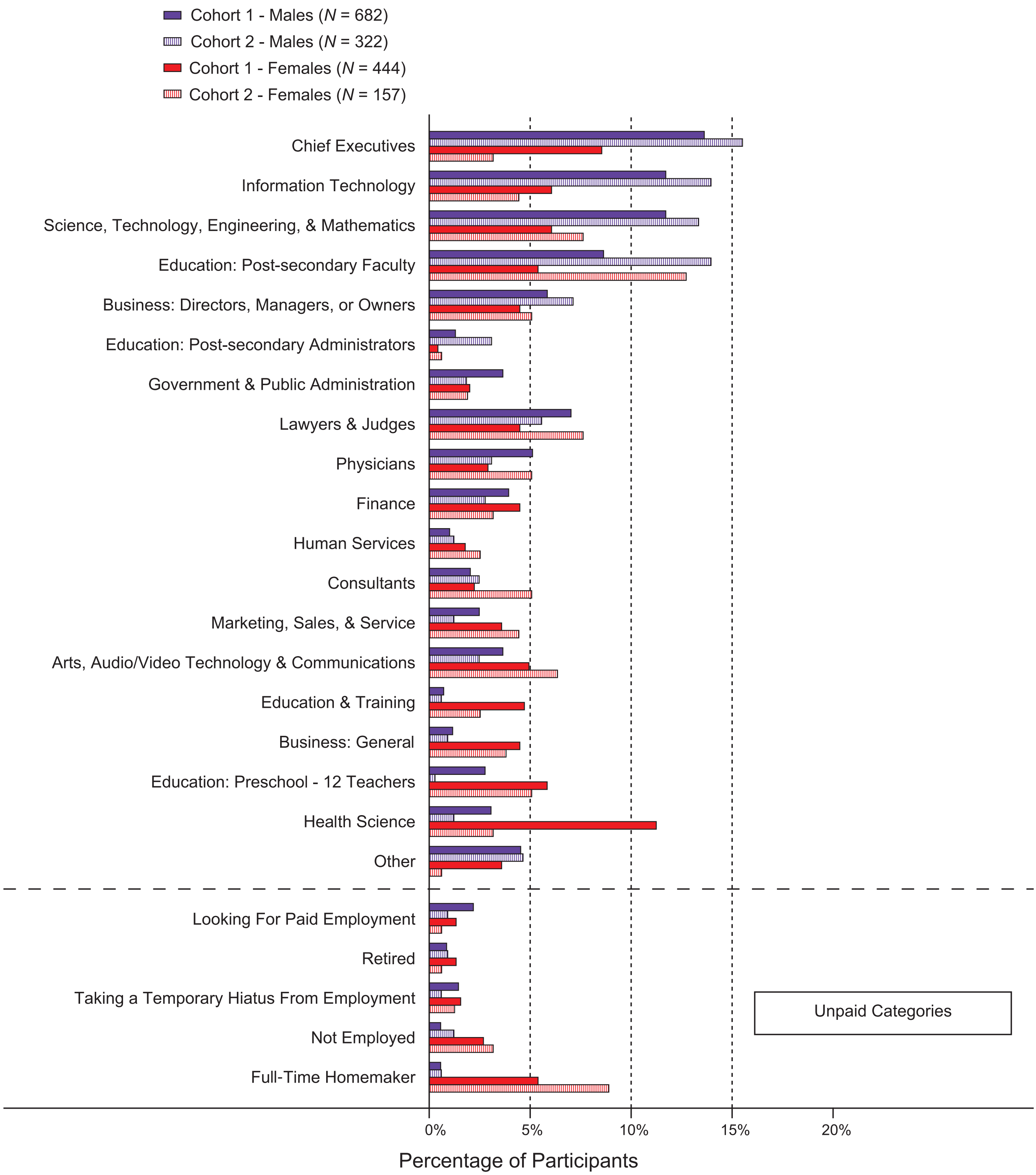

Fig. 1. Distribution of male and female participants in Cohorts 1 and 2 according to their occupational category at midlife. The categories (both paid and unpaid) are ordered by the magnitude of the sex difference in representation: For each category, the difference between the male and the female percentages was computed for each specific occupation, these differences were then averaged within each cohort, and finally the two cohort means were averaged. Categories that men were more likely than women to belong in are at the top, and categories that women were more likely than men to belong in are at the bottom.

Table 1. Participants' Occupational Stature by Cohort and Sex

	Cohort 1		Cohort 2		
Occupational achievement	Males	Females	Males	Females	Total
Tenured at major research university[a]	4.7%	1.5%	6.4%	3.7%	4.1%
Tenured at top-50 university	2.0%	1.1%	2.4%	1.2%	1.8%
Attorney at major firm, agency, or organization	3.0%	1.5%	2.7%	1.9%	2.4%
Top executive at "name brand" organization	2.1%	1.3%	2.7%	0.6%	1.9%
Top executive at Fortune 500 company	0.3%	0.4%	0.9%	0.0%	0.4%

[a]A chi-square test for this measure revealed a significant difference between males and females in Cohort 1, $p < .01$.

creativity. Overall, the median annual income of male participants was higher than that of female participants (Cohort 1: \$140,000 for males and \$80,000 for females; Cohort 2: \$138,000 for males and \$78,000 for females); the sex difference was statistically significant for both cohorts (Mann-Whitney U test, $zs \geq 8.30$, $ps < .001$; see Table S3a in the Supplemental Material). In both cohorts, however, there were pronounced and significant sex differences in the percentage of participants who were working full time (Cohort 1: 89% of males and 69% of females; Cohort 2: 90% of males and 59% of females), $\chi^2(1, N = 1{,}131) = 67.56$, $p < .001$, and $\chi^2(1, N = 481) = 68.55$, $p < .001$ (see Table S3b in the Supplemental Material). When contrasts in median annual income were restricted to participants who were working full time (Cohort 1: \$150,000 for males and \$101,000 for females; Cohort 2: \$142,000 for males and \$100,000 for females), sex differences lessened but remained significant (Mann-Whitney U test, $zs \geq 5.09$, $ps < .001$; see Table S3a).

However, an examination of subgroups is informative. Figure 2a displays median annual incomes and the cutoffs for the top quartile and top centile of annual incomes for married and unmarried men and women in each cohort. Among women, marital status and income did not covary appreciably; women earned about the same amount regardless of their marital status. In contrast, men who were married earned significantly more than those who were unmarried (Mann-Whitney U test, $zs \geq 4.17$, $ps < .001$; see Table S4 in the Supplemental Material).

Given that most participants were married (82% of males, 76% of females), we conducted an analysis that focused on the income of married participants and their spouses.[3] Figures 2b (Cohort 1) and 2c (Cohort 2) display median incomes of all married participants by sex, along with median incomes for the top quartile and top centile of the married participants; the graphs also show the corresponding median incomes of participants' spouses. In both cohorts, females tended to be married to males with

Table 2. Participants' Creative Accomplishments by Cohort and Sex

	Cohort 1		Cohort 2		
Accomplishment	Males	Females	Males	Females	Total
Any refereed publication[a]	23.6%	17.5%	33.3%	29.8%	24.5%
Organic-sciences publication[b]	9.1%	10.6%	9.1%	18.0%	10.4%
STEM publication[c]	10.9%	3.5%	17.9%	6.2%	9.8%
Book[a]	3.1%	1.1%	4.5%	5.0%	3.0%
National Institute of Health grant	3.1%	2.0%	3.3%	2.5%	2.8%
National Science Foundation grant[a]	3.3%	0.7%	4.8%	1.9%	2.7%
Patent[c]	6.8%	3.1%	16.7%	4.3%	7.5%

Note: In the United States, the base rate for securing a patent is approximately 1% (U.S. Patent and Trademark Office, 2011). The base rate for publishing a book is 0.87%. To estimate the latter base rate, we used data drawn from Bowker (2012), a bibliographic information provider that is associated with ProQuest and that gathers data on the total number of books published each year. We tallied the number of books published from 2002 (the earliest year data were available) to 2011 (the final year that complete data were available) and divided this sum (2,734,522) by the population of the United States on December 31, 2011 (312,799,495; U.S. Census Bureau, 2014b). STEM = science, technology, engineering, and mathematics.
[a]A chi-square test for this measure revealed a significant difference between males and females in Cohort 1, $p < .05$. [b]A chi-square test for this measure revealed a significant difference between males and females in Cohort 2, $p < .05$. [c]A chi-square test for this measure revealed a significant difference between males and females in both cohorts, $p < .05$.

incomes significantly higher than their own (*zs* ≥ 2.14, *ps* < .05), whereas males tended to be married to women earning markedly less than they themselves did (*zs* ≥ 12.27, *ps* < .001; see Table S5 in the Supplemental Material). Indeed, the spouses of male participants in Cohorts 1 and 2 earned median incomes of $26,000 and $20,000, respectively, whereas the corresponding medians for spouses of female participants were $100,000 and $110,000. Further, as the income of male participants increased, the income difference between them and their spouses became more pronounced. Similarly, to the extent that female participants earned more (i.e., top quartile and top centile), the likelihood that their spouses earned *less* than they did increased, and the income difference between them and their spouses became more pronounced as well; this difference achieved significance in Cohort 1, *zs* ≥ 3.83, *ps* < .001, but not in Cohort 2, because of small sample sizes for women, *z* = 1.39 (see Table S5).

These differences in spouses' incomes occurred even though the spouses of both male and female participants were highly educated (female participants' slightly more so; see Tables S6 and S7 in the Supplemental Material): Among the male participants in Cohorts 1 and 2, respectively, 38% and 41% were married to women whose terminal degree was a B.A. or B.S., 29% and 30% were married to women whose terminal degree was a master's, and 16% and 23% were married to women whose terminal degree was a doctorate; among the female participants in Cohorts 1 and 2, respectively, 32% and 28% were married to men whose terminal degree was a B.A. or B.S., 31% and 33% were married to men whose terminal degree was a master's, and 22% and 35% were married to men whose terminal degree was a doctorate. Thus, although these mathematically talented males and females were married to highly educated spouses, the spouses of the males were more frequently financially "underemployed." Nonetheless, male and female participants had similar median annual household incomes (i.e., participant plus spouse; Cohort 1: $198,000 for males and $190,000 for females; Cohort 2: $190,000 for males and $184,000 for females).

Retrospective, Prospective, and Ideal Time Allocation

Participants were asked to respond to items that were developed specifically for this study to assess allocation of time to work and career development and to family. Six items focused on how much time they had devoted to work during the past 15 years in 5-year segments and how much time they planned to devote to work in the future, again in three 5-year segments (Fig. 3a). Although precise point estimates cannot be gleaned from the retrospective responses, we are confident that comparisons across contiguous time periods are meaningful and reliable. Men reported devoting an average of 11 more hours per week to career development over the past 15 years than did women (51 vs. 40 hr per week across both cohorts), and prospective appraisals suggest that this statistically significant trend will continue. All six male-female contrasts (three retrospective and three prospective estimates) were significant for both Cohort 1, *ts*(840–957) ≥ 6.72, *ps* < .001, and Cohort 2, *ts*(359–423) ≥ 4.80, *ps* < .001. The prospective estimates covered approximately

Fig. 2. *(continued on next page)*

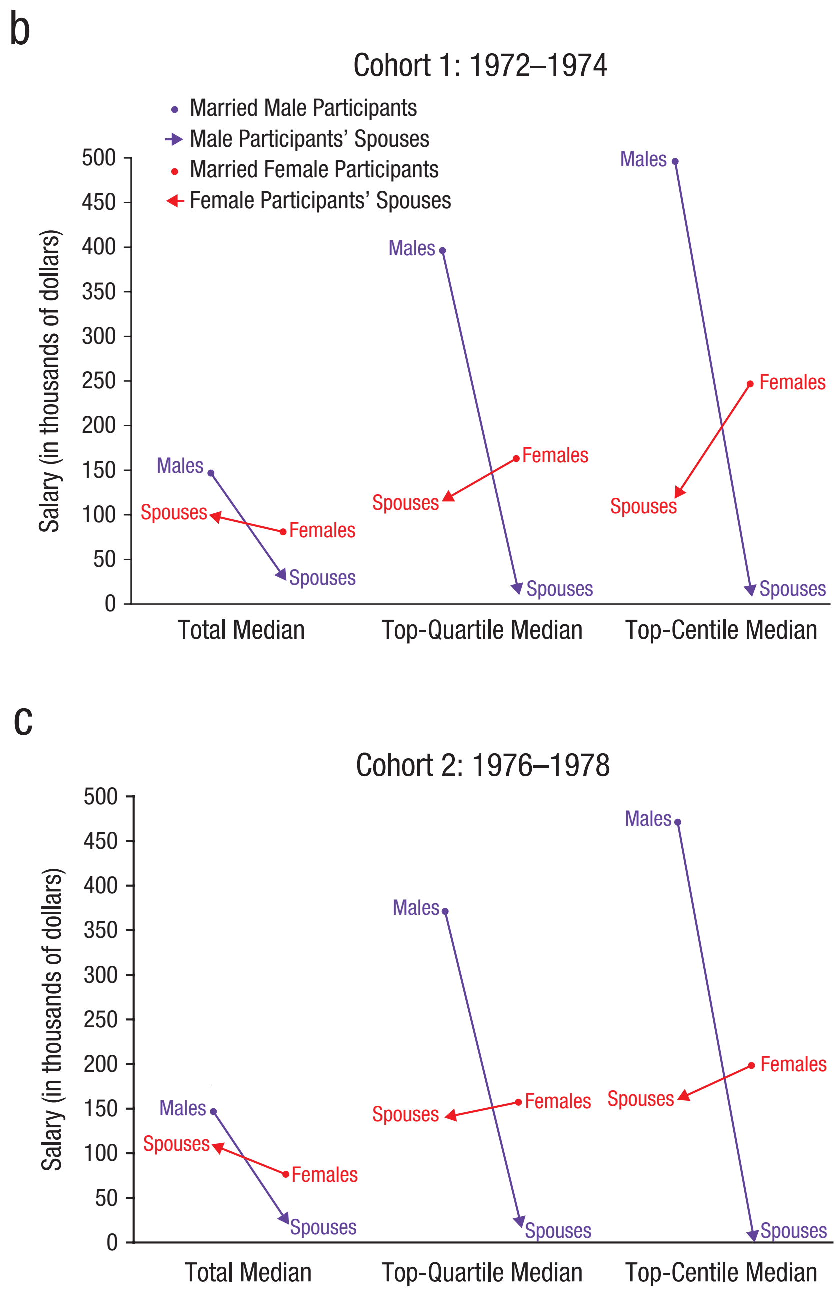

Fig. 2. Annual incomes of participants and their spouses. The graph in (a) shows median annual incomes and the cutoffs for the top quartile and top centile of annual incomes for married and unmarried male and female participants in Cohorts 1 and 2 (Cohort 1: *n*s = 521 married males, 318 married females, 114 unmarried males, and 105 unmarried females; Cohort 2: *n*s = 249 married males, 111 married females, 58 unmarried males, and 38 unmarried females). Note that in 2013, the median annual incomes of males and females (ages 45–54 years) in the United States were, respectively, $43,000 and $25,000 (U.S. Census Bureau, 2014a). The graphs in (b) and (c) present median, top-quartile median, and top-centile median incomes for married male and female participants in Cohorts 1 and 2 and their spouses (total *n*s: 517 males and 318 females in Cohort 1, 249 males and 111 females in Cohort 2).

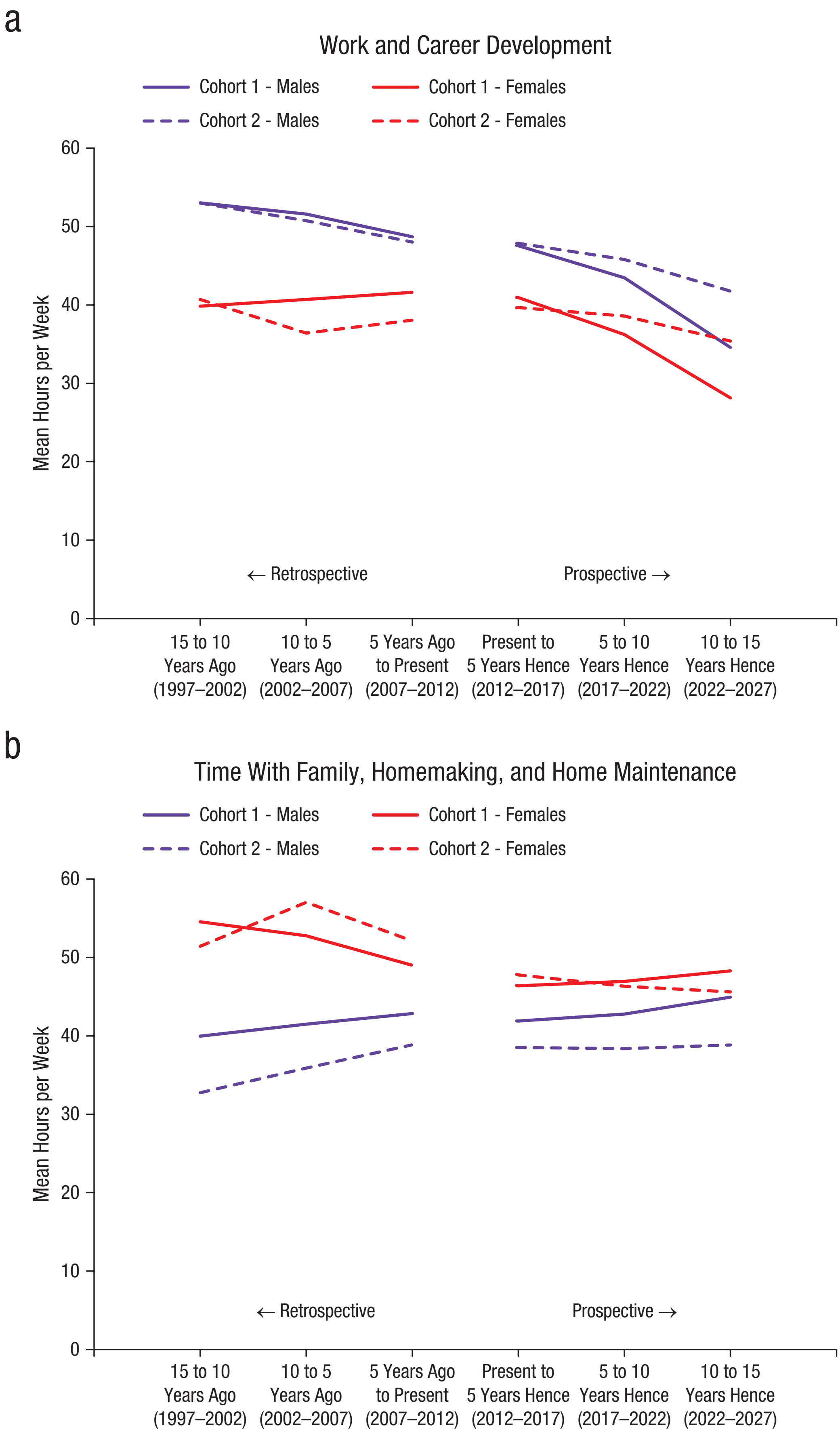

Fig. 3. *(continued on next page)*

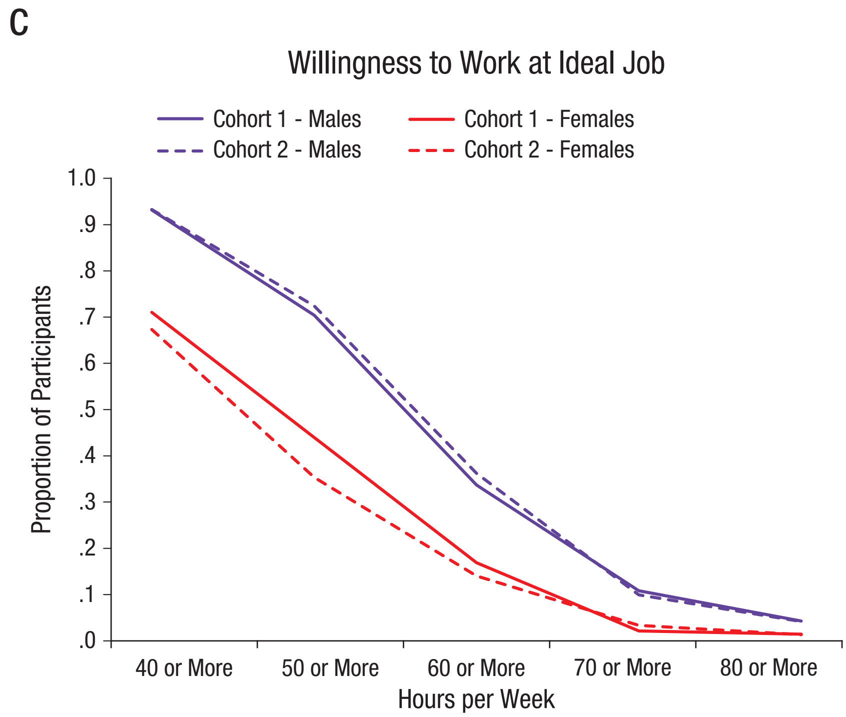

Fig. 3. Time devoted to work and family. The graph in (a) shows the mean number of hours per week that participants estimated they had spent on work and career development in three 5-year intervals prior to the follow-up and how many hours per week they planned to work in three 5-year intervals in the future (Cohort 1: *n*s ≥ 502 males and 340 females; Cohort 2: *n*s ≥ 251 males and 109 females). The graph in (b) shows corresponding means for time spent with family (including relatives) or engaged in homemaking and home maintenance (Cohort 1: *n*s ≥ 487 males and 337 females; Cohort 2: *n*s ≥ 247 males and 109 females). The graph in (c) shows the proportions of participants who were willing to work 40 to 49 hr, 50 to 59 hr, 60 to 69 hr, 70 to 79 hr, and 80 hr or more per week, if given their ideal job (Cohort 1: *n*s = 660 males and 422 females; Cohort 2: *n*s = 312 males and 150 females).

ages 53 to 68 for Cohort 1 and ages 48 to 63 for Cohort 2, so the more pronounced downward trend for the older cohort apparent in Figure 3a is understandable.

The time-allocation pattern for the sexes was inverted when participants were asked how many hours they had devoted to family, relatives, homemaking, and home maintenance over the past 15 years and how much time they planned to devote to family and home in the next 15 years (Fig. 3b; see note S1 in the Supplemental Material available online). Relative to men, women had devoted and planned to devote significantly more time to domestic pursuits and family—Cohort 1: ts(909–921) ≥ 3.84, ps < .001, for the retrospective estimates and ts(818–837) ≥ 2.07, ps < .05, for the prospective estimates; Cohort 2: ts(400–411) ≥ 5.52, ps < .001, for the retrospective estimates and ts(351–361) ≥ 2.73, ps < .01, for the prospective estimates.[4]

Finally, Figure 3c summarizes how much participants would be willing to work, at most, if they held their ideal job. We wanted to assess willingness to devote time to developing a truly outstanding career, which requires going well beyond a 40-hr workweek. Arguably the most widely agreed-on aspect of talent development is that people at the forefront of any discipline invest an extraordinary amount of their time to developing expertise and, ultimately, working in their career (Ericsson, 1996; Simonton, 1994, 2014). Excellence requires doing more than is required, and there are only so many hours in the day. In Cohort 1, significantly different proportions of men and women selected each response option for this question (ps < .01 for all options from “40 or more” to “70 or more” hours per week and $p < .05$ for “80 or more” hours per week). In Cohort 2, sex differences were significant for four of the response options ($p < .01$ for “40 or more” to “60 or more” and $p < .05$ for “70 or more”; for further details, see Table S8 in the Supplemental Material). That 30% of women but only 7% of men reported being unwilling to devote 40 or more hours per week to work in their ideal job is germane for understanding differential representation of men and women in high-level careers (Ceci, Ginther, Kahn, & Williams, in press; Ceci & Williams, 2007, 2011; Giles, 2011).

Work Preferences, Life Values, and Personal Views

Participants also rated items assessing work preferences (5-point scale from *not important* to *extremely important*), life values (5-point scale from *not important* to *extremely important*), and personal views (5-point scale from *strongly disagree* to *strongly agree*). Figures 4, 5, and 6 summarize results for these items. In each graph, the items are rank-ordered according to the effect size of the sex difference (male minus female) in Cohort 1's ratings of the items. Results for both cohorts are displayed in each figure, and the cross-cohort consistency of the effect-size magnitude is striking. Over all these items, the Pearson r and the Spearman ρ correlations between effect sizes in Cohorts 1 and 2 were between .86 and .95 (ps < .001). Thus, reliable sex differences were observed among these mathematically talented adults at midlife. Together, these sex differences tell a cohesive story of differing orientations toward life.

Men as a group valued full-time work, making an impact, and earning a high income, whereas women as a group valued part-time work more often, as well as community and family involvement and time for close relationships. The sexes did not differ significantly in responses to many items, including the personal importance they placed on living in an urban environment, developing their intellectual interests, and improving the human condition. However, there was a clear difference between the sexes in how much they valued distinguishing themselves at work as opposed to more evenly distributing their priorities across work, family, community, and non-work-related personal development. Men, on average, were more concerned with being successful in their work and feeling that society should invest in them because their ideas are better than most people's, whereas women felt more strongly that no one should be without life's necessities. Moreover, the same pattern of findings for the items in Figures 4, 5, and 6 has been observed in two younger SMPY cohorts: top STEM graduate students (SMPY Cohort 5; assessed at ages 25 and 35) and a profoundly gifted sample whose intellectual ability was in the top 1 in 10,000 (SMPY Cohort 3; assessed at age 33; Ferriman, Lubinski, & Benbow, 2009).

Collectively, men were more focused on their personal advancement and on advancing society through knowledge or the creation of concrete products, whereas women were more interested in keeping society vibrant and healthy. This finding mirrors previous work indicating that men tend to have an agentic orientation toward life and women tend to have a communal orientation (Wiggins, 1991). Although both abilities and interests are critical for understanding life-span development in education and the world of work (Deary, 2012; Deary, Whalley, & Starr, 2009; Geary, 2010; Judge, Klinger, & Simon, 2010; Lubinski & Benbow, 2000, 2006; Lubinski, Benbow, Shea, Eftekhari-Sanjani, & Halvorson, 2001; Su, Rounds, & Armstrong, 2009), they are not the only determinants (Ferriman et al., 2009; Goldin, 2014). It is important to also consider willingness to invest in having impact in the world of work (e.g., being creative, making money) as opposed to striving for balance between work and other aspects of life.

The sex differences in responses to the items in Figures 4 through 6 did not translate into sex differences in what participants felt they required for a meaningful life. Responses to three open-ended questions revealed that both men and women overwhelmingly considered their families to be more important than their work and careers to leading meaningful lives (for results of tests of sex differences, see Tables S9–S11 in the Supplemental Material). When asked what made their lives "worth living," 60% of men and 69% of women in Cohort 1 referred to family, but only 12% of men and 14% of women referred to work and career; this pattern was replicated in Cohort 2, with 60% of men and 66% of women referring to family and 20% of men and 18% of women referring to work and career. When describing what they had done in their lives that they were most proud of, members of Cohort 1 mentioned elements of their family (84% of men and 84% of women) more often than work and career (41% of men and 36% of women); this pattern, too, was replicated in Cohort 2 (family: 78% of men and 83% of women; work and career: 52% of men and 43% of women). Finally, when asked what was most important to them for achieving "fulfillment in life," members of Cohort 1 referred to family (33% of men and 37% of women) more often than work and career (10% of men and 11% of women), and, once again, this pattern was replicated in Cohort 2 (family: 46% of men and 42% of women; work and career: 18% of men and 17% of women).[5]

The sexes did differ, however, in whether they devoted time to the family tangibly (through resource acquisition) or emotionally (through "being there" in times of need for hands-on support; see Figs. 3, 4, and 5; cf. Wiggins, 1991). This conclusion is supported by another finding. In both cohorts, significant sex differences were observed in the number of days spent out of town each year because of work (analyses restricted to full-time workers)—Cohort 1: Ms = 23 for males and 12 for females, $t(899) = 4.73$, $p < .001$; Mdns = 10 for males and 4 for females, Mann-Whitney U test, $z = 7.06$, $p < .001$; Cohort 2: Ms = 23 for males and 15 for females, $t(201) = 2.05$, $p = .04$; Mdns = 10 for males and 6 for females, Mann-Whitney U test, $z = 3.02$, $p < .01$ (see Tables S12a and S12b in the Supplemental Material).

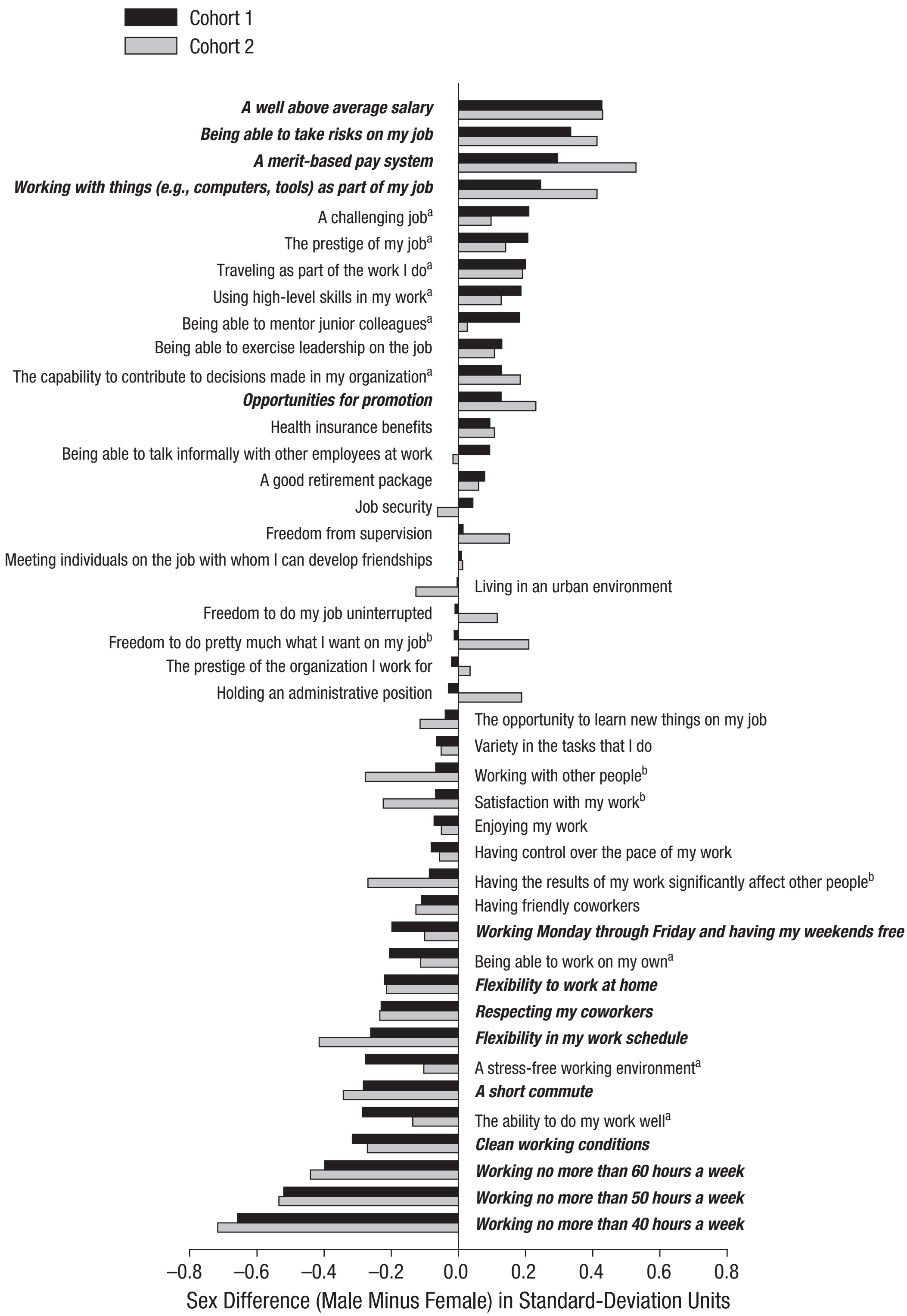

Fig. 4. Sex differences (male minus female) in work preferences in standard-deviation units. For each item, the bars show the magnitude of the sex difference separately for Cohort 1 ($ns \geq 632$ males and 424 females) and Cohort 2 ($ns \geq 305$ males and 148 females). These effect sizes were computed using the conventional pooled standard deviations of both samples. Boldface indicates that the sex difference was significant for both cohorts, $p < .05$. Superscripts indicate that the sex difference was significant for Cohort 1 only ([a]) or for Cohort 2 only ([b]), $p < .05$. The items are rank-ordered according to the effect size of the sex difference (male minus female) in Cohort 1's ratings.

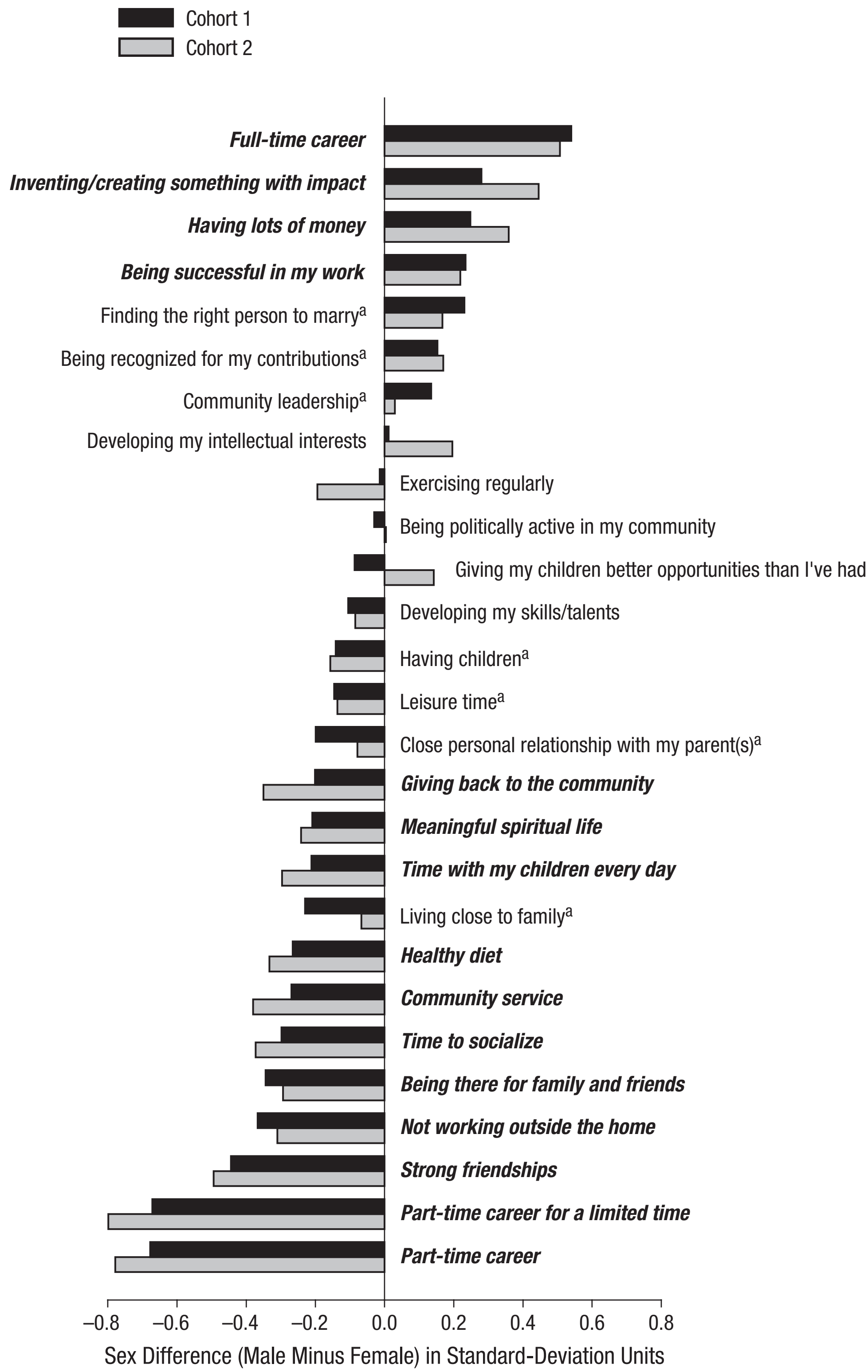

Fig. 5. Sex differences (male minus female) in life values in standard-deviation units. For each item, the bars show the magnitude of the sex difference separately for Cohort 1 (ns ≥ 467 males and 311 females) and Cohort 2 (ns ≥ 234 males and 108 females). These effect sizes were computed using the conventional pooled standard deviations of both samples. Boldface indicates that the sex difference was significant for both cohorts, $p < .05$. Superscripts indicate that the sex difference was significant for Cohort 1 only ([a]), $p < .05$. The items are rank-ordered according to the effect size of the sex difference (male minus female) in Cohort 1's ratings.

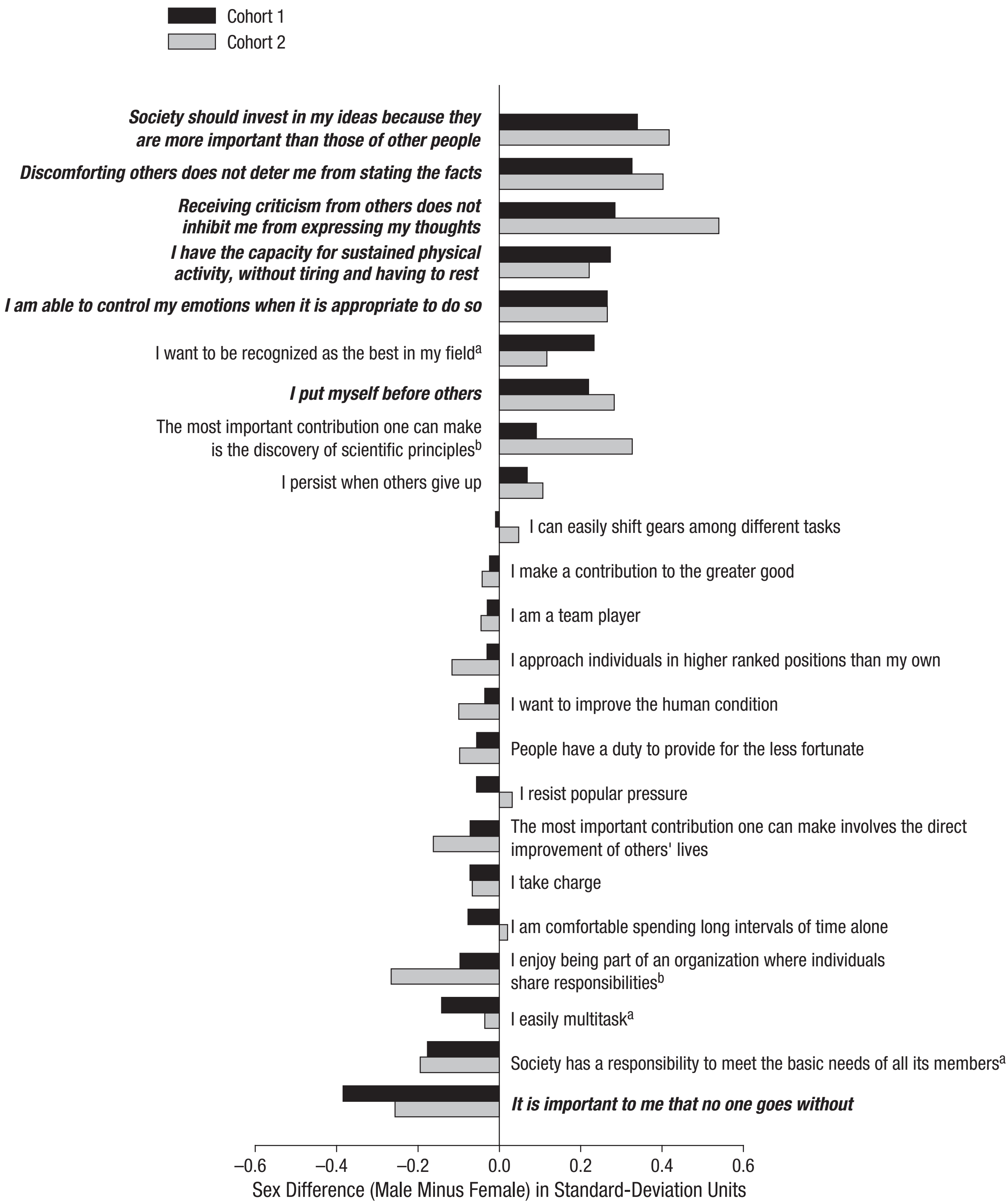

Fig. 6. Sex differences (male minus female) in personal views in standard-deviation units. For each item, the bars show the magnitude of the sex difference separately for Cohort 1 (*n*s ≥ 593 males and 413 females) and Cohort 2 (*n*s ≥ 294 males and 140 females). These effect sizes were computed using the conventional pooled standard deviations of both samples. Boldface indicates that the sex difference was significant for both cohorts, $p < .05$. Superscripts indicate that the sex difference was significant for Cohort 1 only ([a]) or for Cohort 2 only ([b]), $p < .05$. The items are rank-ordered according to the effect size of the sex difference (male minus female) in Cohort 1's ratings.

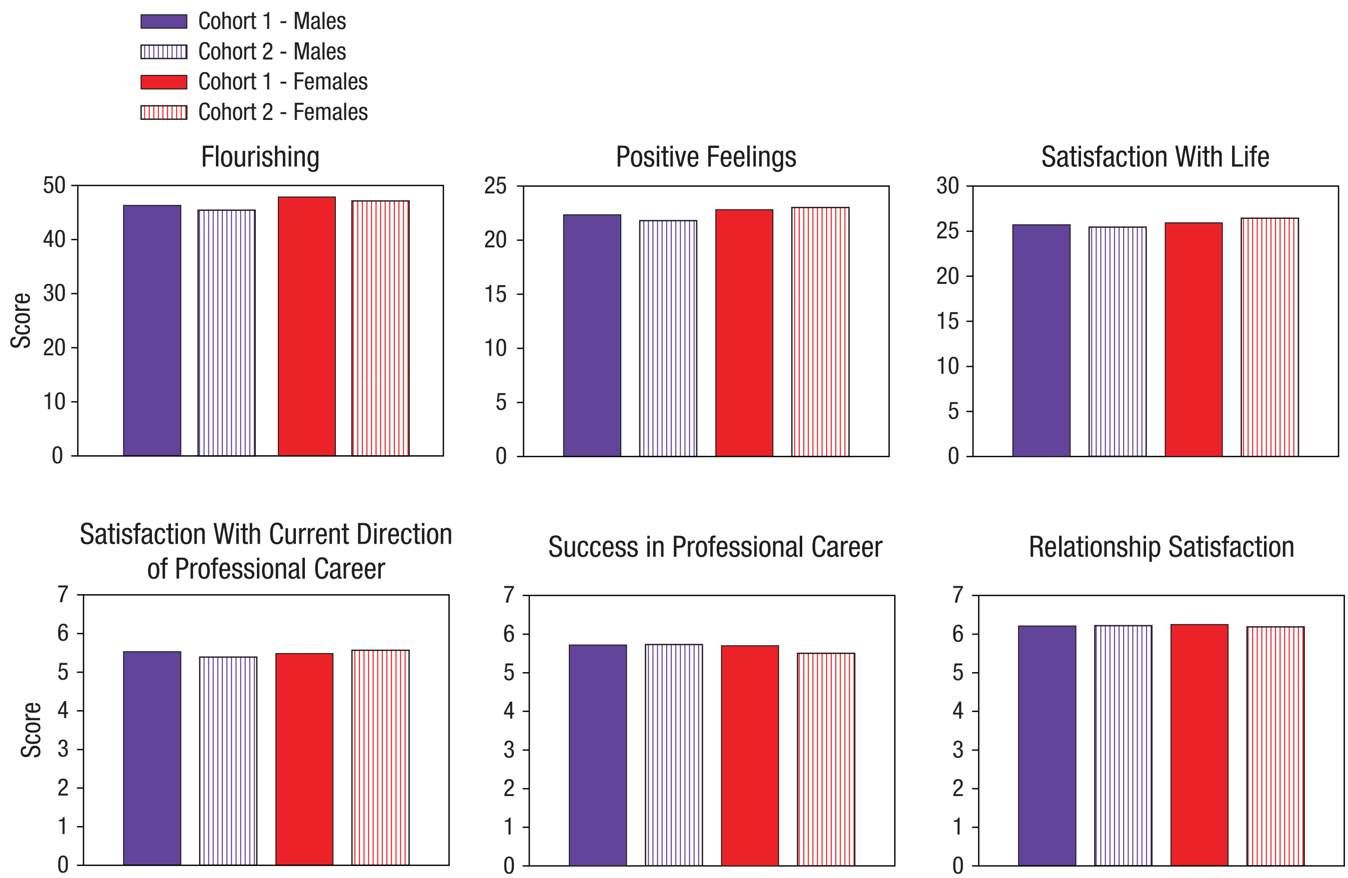

Fig. 7. Mean scores for subjective well-being and satisfaction among males and females in Cohorts 1 and 2. The top row presents results for items assessing psychological flourishing, positive feelings, and satisfaction with life (Cohort 1: *ns* ≥ 592 for males and 410 for females; Cohort 2: *ns* ≥ 294 for males and 140 for females). The bottom row presents results for items assessing participants' satisfaction with the current direction of their professional career, feelings of success in their professional career, and relationship satisfaction (Cohort 1: *ns* ≥ 612 for males and 367 for females; Cohort 2: *ns* ≥ 287 for males and 129 for females). Note that the highest value on the *y*-axis in each panel indicates the maximum possible score for the measure in question.

Well-Being and Satisfaction

Figure 7 reports data on subjective indicators of emotional well-being and psychological flourishing (Diener et al., 2010), satisfaction with career success and direction, and satisfaction with romantic relationships and life (Diener, Emmons, Larsen, & Griffin, 1985). Across these familiar indicators of adjustment and satisfaction, ratings of men and women were uniformly high and comparable (see also Tables S13 and S14 in the Supplemental Material). Scores on the Satisfaction With Life Scale (Diener et al., 1985) were comparable to those observed in two younger cohorts of SMPY participants (Lubinski, Benbow, Webb, & Bleske-Rechek, 2006) and higher than 94% of the normative values reported by Pavot and Diener (1993). In short, marked sex differences in how participants allocated their time and structured their lives were not accompanied by corresponding sex differences in how they viewed their career accomplishments and close relationships, or in their positive outlook on life. One interpretation of the lack of appreciable differences between the sexes across these indicators is that there are multiple ways to construct a meaningful, productive, and satisfying life.

Conclusion

This is the first study to document the career paths of mathematically talented males and females over four decades in which women had high-level career options. Although we found many similarities between men and women, their career paths did diverge. Also, on the whole, both men and women became the critical human capital needed for driving modern-day, conceptual economies. Early manifestations of exceptional mathematical talent did lead to outstanding creative accomplishment and professional leadership, but with notable sex differences. Life satisfaction was uniformly high for both sexes, as was psychological well-being. The mathematically talented were doing exceedingly well for both themselves and society.

Understanding remarkable adult accomplishments and creativity in high-potential populations requires looking beyond abilities, occupational preferences, and opportunity. The data suggest that all aspects of life competing for and structuring the use of time need to be assessed. Cutting-edge advances, high-powered careers, and important leadership roles demand substantial time commitment and intense engagement. And this is where the males and females in our samples diverged in aggregate. Compared with mathematically gifted women, mathematically gifted men expressed stronger preferences for developing high-impact careers and were willing to invest more time in their careers. Conversely, the women expressed stronger preferences for and devoted more time to advancing family and community, compared with the men. Both groups advanced society, though in varying ways, traveling different paths to their current highly productive and satisfying lives.

Author Contributions

The study concept was developed primarily by D. Lubinski and C. P. Benbow, with substantively significant contributions by H. J. Kell. Age-13 data collection for Cohort 2 was conducted by C. P. Benbow, and data collection for the midlife follow-up was conducted by H. J. Kell and D. Lubinski. All authors contributed to designing the particulars of the current study and writing the manuscript. The execution of the statistical analyses was conducted primarily by H. J. Kell.

Acknowledgments

Our Web-based survey profited immensely from feedback provided by the following colleagues: John Achter, Rosalind Arden, William Asher, Susan Assouline, Susan Athey, Simon Baron-Cohen, Fred H. Borgen, Thomas J. Bouchard, Jr., Tracy L. Branding, Linda Brody, Nathan Brody, Ashley Brown, David P. Campbell, Avshalom Caspi, Stephen Ceci, Lawrence Choo, Nicholas Colangelo, Lyn Corno, Rene V. Dawis, Donnatesa Dean, Douglas K. Detterman, William Dickens, Ed Diener, Angela Duckworth, Susan E. Embretson, Howard S. Friedman, Francoys Gagne, James Gallagher, Howard Gardner, David C. Geary, Lewis Goldberg, Claudia Goldin, Hill Goldsmith, Robert A. Gordon, Irving I. Gottesman, Linda S. Gottfredson, Miraca Gross, Catherine Hakim, Diane Halpern, Robert M. Hauser, Robert Hogan, Carole K. Holahan, Steve Hsu, Earl B. Hunt, James J. Jenkins, Arthur R. Jensen, Wendy Johnson, Timothy A. Judge, Nathan Kogan, Patrick Kyllonen, Randy Larsen, Barbara Lubinski, Thomas Ludwig, Michelle P. Martin, Kathleen McCartney, Terrie Moffitt, Michelle Muratori, David Myers, Helmuth Nyborg, Daniel Ozer, Abigail T. Panter, Gregory Park, Steven Pinker, Robert Plomin, Mark Runco, Joseph Renzulli, William Revelle, Steven E. Rhoads, Dan Robinson, Nancy Robinson, Joseph L. Rodgers, Gerard Saucier, Mark Savickas, K. Werner Schaie, Martin Seligman, Dean Keith Simonton, Stijn Smeets, Tamra Stambaugh, Rena Subotnik, Mary Ann Swiatek, Auke Tellegen, Sam Thiessen, Robert Thorndike, Eric Turkheimer, Christina Upchurch, Susana Urbina, Jonathan Wai, Howard Wainer, Niels G. Waller, Russell Warne, Rose Mary Webb, Richard Weinberg, Ellen Winner, Cathy Wendler, and Frank Worrell.

An earlier version of this manuscript benefited from comments by Frank Miele. Special thanks are reserved for Rachel Morgan, whose skill at finding participants and criterion information is truly extraordinary, and Kimberley Robertson, whose technical acumen, efficiency, and editorial talents contributed enormously to the development of our midlife survey.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

Support for this study was provided by a research and training grant from the Templeton Foundation and by National Institute of Child Health and Human Development Grant P30 HD 15051 to the Vanderbilt Kennedy Center for Research on Human Development.

Supplemental Material

Additional supporting information can be found at http://pss.sagepub.com/content/by/supplemental-data

Notes

1. Other research on the SMPY population showed that SAT-M score increases of around 160 points were required to double the odds ratios for a variety of low-base-rate accomplishments (e.g., earning a doctorate, publishing a refereed STEM article, securing a patent, or earning an income within the top 5%; Wai et al., 2010, p. 866). So although the sex differences in SAT-M scores in Cohort 1 (30 points) and Cohort 2 (46 points) are worth pointing out (and are inevitable no matter the cutoff score used, given greater male variability on mathematical reasoning measures), they are unlikely to appreciably account for the sex differences in the outcomes we analyzed.

2. In calculating the response rate, we used all combinations of three denominators and two numerators. The denominators were the number of participants in both cohorts who were not disabled, deceased, deployed in the military, or imprisoned (2,891); the number of people who participated in the age-33 follow-up (1,975; Benbow, Lubinski, Shea, & Eftekhari-Sanjani, 2000); and the number of people who agreed to participate in the midlife follow-up when initially contacted by phone, letter, or e-mail (1,979). The numerators were the number of participants who provided any data (e.g., updated contact information, sex) for the midlife follow-up (1,729) and the number of participants who provided substantive data (e.g., relationship status, time allocation) for this follow-up (1,650). The mean SAT-M scores for the groups used as possible numerators and denominators ranged from 523 to 527 for Cohort 1 and from 552 to 553 for Cohort 2. The mean SAT-M scores of SMPY members who did not participate in the follow-up were 533 for

males and 492 for females in Cohort 1 and 566 for males and 527 for females in Cohort 2.

3. In Cohort 1, 76% of men and 74% of women had biological children (mean number of children = 2.16 and 2.19, respectively); in Cohort 2, 72% of men and 74% of women had biological children (*M*s = 2.21 and 1.96, respectively; for additional details, see Tables S15a and S15b in the Supplemental Material).

4. These findings likely underestimate the magnitude of the sex difference because 11 women who were outliers were excluded (*ns* = 7 and 4 in Cohorts 1 and 2, respectively). Figure 3b combines responses to two items ("time with family including relatives" and "homemaking and home maintenance") with comparable patterns of results across both cohorts and sexes. The 11 participants were culled because they reported having spent or planning to spend more than 168 hr per week in at least one of the 5-year intervals. They may have viewed these two roles in a multitasking fashion, but in any event, their exclusion brings the male and female means closer together. Because the results were clear-cut without these participants (and all 11 were conspicuous outliers), it seemed best to simply remove them and inform readers about what we had done and why.

5. The full text of the three open-ended questions was as follows: "What makes your life worth living?" "What is most important for you in terms of achieving overall fulfillment in life?" and "What are the four things you have done in your life of which you are most proud?" For each of the first two questions, single text boxes were provided for typed-in responses. For the "most proud" question, separate text boxes were provided so that participants could discretely describe what they were first, second, third, and fourth most proud of in their lives. Nonetheless, participants often provided multiple or elaborate responses in a text box, making it difficult for us to determine which aspects of their lives they were more proud of than others. Hence, we considered responses in the first and second boxes to indicate what participants were most proud of. These responses were coded as referring to "family" if any aspect of family was given (e.g., happy marriage, maintaining a positive relationship with a child after divorce) and as referring to career if any aspect of career was given (e.g., achieving a positive reputation in the field, performing a job well). This procedure resulted in two response categories that were not mutually exclusive—30% of participants listed both family and career as what they were most proud of in life—but still provided a means of assessing the relative importance of career and family.

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