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The Influence of Age-Related Cues on Health and Longevity

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Abstract
Environmental cues that signal aging may directly and indirectly prime diminished capacity. Similarly, the absence of these cues may prime improved health. The authors investigated the effects of age cues on health and longevity in five very different settings. The findings include the following: First, women who think they look younger after having their hair colored/cut show a decrease in blood pressure and appear younger in photographs (in which their hair is cropped out) to independent raters. Second, clothing is an age-related cue. Uniforms eliminate these age-related cues: Those who wear work uniforms have lower morbidity than do those who earn the same amount of money and do not wear work uniforms. Third, baldness cues old age. Men who bald prematurely see an older self and therefore age faster: Prematurely bald men have an excess risk of getting prostate cancer and coronary heart disease than do men who do not prematurely bald. Fourth, women who bear children later in life are surrounded by younger age-related cues: Older mothers have a longer life expectancy than do women who bear children earlier in life. Last, large spousal age differences result in age-incongruent cues: Younger spouses live shorter lives and older spouses live longer lives than do controls.

Keywords
aging, age identity, social perception, health, longevity

Old age is commonly viewed as a period of inevitable cognitive and physical decline (Langer, 1982). Research suggests that negative perceptions of old age begin to develop around 6 years of age (Isaacs & Bearison, 1986) and persist into old age (Nosek, Banaji, & Greenwald, 2002).

The literature is replete with examples of negative stereotypes about mature adults (e.g., Isaacs & Bearison, 1986; Langer & Rodin, 1976; Levy, 1996; Nelson, 2002; Rodin & Langer, 1980). Because perceptions of old age are pervasive and resistant to change, it becomes difficult to disentangle the extent to which old age is necessarily a time of diminishing capacities and the extent to which it is a function of negative premature cognitive commitments or mindsets regarding age.

Research demonstrates that views of old age are automatic and unconscious and influence a variety of behaviors congruent with those views (e.g., Bargh, Chen, & Burrows, 1996; Levy, 1996; Levy, Hausdorff, Hencke, & Wei, 2000; Levy & Langer, 1994). Levy and Langer found that memory problems for older adults were related to the premature cognitive commitments people have about memory and aging. In Levy's study examining age perception and cognitive performance, individuals primed with negative stereotypes of old age (e.g., "senile," "dependent") performed worse on memory tasks than did those primed with positive stereotypes (e.g., "kind," "alert"). Age perception also influences behavior. In Bargh et al.'s study, individuals who had been primed with negative stereotypes of old age walked more slowly down a hallway when leaving the experiment than did control participants.

Although a number of studies illustrate how perceptions of old age can lead to decrements in cognitive functioning and physical behavior, research also shows priming positive perceptions of aging can lead to improvements in cognitive functioning and have far-reaching implications for one's health (Demakakos, Gjonca, & Nazroo, 2007; Knoll, Rieckmann, Scholz, & Schwarzer, 2004; Kuper & Marmot, 2003; Levy, Slade, Kunkel, & Kasl, 2002; Logan, Ward, & Spitze, 1992; Siegel, Bradley, & Kasl, 2003; Uotinen, Rantanen, & Suutama, 2005; Van Doorn & Kasl, 1998; Westerhof & Barrett, 2005;

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Westerhof, Barrett, & Steverink, 2003). Levy et al. discovered in a longitudinal analysis that individuals with more positive self-perceptions of aging measured up to 23 years earlier lived an average of 7.5 years longer than did individuals with less positive self-perceptions of aging, after adjusting for the effect of gender, socioeconomic status, loneliness, and functional health. The researchers believed that it was self-perceptions of aging that influenced physiological outcomes. In fact, Vaupel et al. (1998) believed that as much as 75% of variation in longevity may be attributed to nongenetic attributes, including psychological and behavioral factors. Although Levy et al. did not measure actual health, there is considerable evidence that shows self-rated health influences survival (Idler & Kasl, 1991; Idler, Russell, & Davis, 2000; Kaplan & Camacho, 1983). In a cohort study of 6,928 adults, perceived health was a better predictor of mortality than actual health (Kaplan & Camacho), and in another study, older adults who perceived their health as poor were six times more likely to die than those who perceived their health as excellent, regardless of their actual health status (Idler & Kasl).

Some of the individuals in Levy et al.'s (2002) study were fortunate enough to defy common conceptions of aging even though research on self-perception indicates that the majority of older adults in Western societies internalize negative attitudes about their own group; consider themselves as lower in status; and are less likeable, unhappier, more dependent, and less goal-oriented than younger adults (Nosek et al., 2002; Zebrowitz & Montepare, 2000). A positive view about aging appears to be important and adaptive for one's physical and mental health. We also believe, however, that there are "mindless" cues in the environment that can prime an older or younger self, and the body may age accordingly regardless of one's views. These cues may put individuals in potentially favorable or unfavorable positions, depending on the context.

The Importance of Contextual Cues

Context plays an important role in masking, muting, or magnifying age cues. We are constantly surrounded by age cues in the environment that include physical signs of aging (e.g., wrinkles, gray hair), the roles one occupies (e.g., grandmother), and the interests and activities one has and does (Hendricks, 1987). These age cues signal to ourselves and to others (a) what age demographic others most likely fall into and (b) certain assumptions that go along with those cues.

Contextual information has long been shown to be more influential than chronological age information in judgments of older adults (Kite & Wagner, 2002). For example, an older person's health status and performance are more important than their actual age in influencing people's judgments (Gekoski & Knox, 1990; Reno, 1979). Being put in a context where one is not expected to be, given her age (e.g., a woman in her 30s with a young child), or where physical signs of aging are concealed or muted (e.g., using Botox), may overturn or offset negative perceptions of aging, and in effect, change the way our bodies age.

How might this happen? Since the time of Descartes, as humans we have mindlessly accepted mind/body dualism. From this perspective the unanswered question has always been "How do we get from the nonmaterial mind to the material body?" Despite the absence of knowledge of the precise mechanisms involved, there is ample evidence that our thoughts have enormous influence over our bodily processes.

A series of studies by Langer and her colleagues illustrate this mind/body phenomenon (Alexander, Langer, Newman, Chandler, & Davies, 1989; Crum & Langer, 2007; Langer, 1989; Langer, Beck, Janoff-Bulman, & Timko, 1984; Langer et al., 1988; Langer, Djikic, Pirson, Madenci, & Donahue, in press; Langer & Rodin, 1976; Rodin & Langer, 1977). For example, Langer and Rodin (1976) and Rodin and Langer (1977) found that giving choice to elderly adults resulted in increased longevity. In a more recent study, Crum and Langer found that chambermaids who viewed their work as exercise showed a decrease in weight, blood pressure, body fat, waist-to-hip ratio, and body mass index. Measures were taken 4 weeks apart on diet, amount of exercise outside of work, and typical workload (how many hotel rooms were cleaned each day). At the end of 4 weeks, even though the actual workload did not increase and participants did not report getting any additional exercise outside of work or having a change in diet, they perceived themselves as getting significantly more exercise than before and showed improvements in various health measures.

In another series of recent studies, Langer et al. (in press) explored the effect of the mind on vision. The traditional eye chart shows letters getting progressively smaller as one reads down the chart, and thereby the eye chart creates the expectation that soon individuals will not be able to see. Most individuals expect this to occur about two thirds of the way down the chart. In one of the studies, the experimenters reversed the chart so that the letters got progressively larger, creating the expectation that soon individuals would be able to see. In another study, the experimenters started the chart with smaller letters that ordinarily would appear a third of the way down the chart. In both cases, people were able to see what they previously could not with the traditional eye charts because of a change in expectations.

These studies support the mind/body hypothesis that where the mind is, the body follows. We believe this phenomenon also applies to the aging process. If we put the mind in a younger place, surrounded by younger cues, physical measures may reveal a younger body. This was the hypothesis that guided the counterclockwise study.

In the counterclockwise study, Langer et al. (1988) brought a group of men between the ages of 75 and 80 to a 5-day retreat. The men were randomly assigned to one of two groups. The first group was instructed to imagine they were actually 55 years old and live for the week as if it was 20 years earlier. Thus, all conversation about the past was in the present tense. The second group was told to reflect on their lives 20 years before when they were 55 years old. For them, conversation was in the past tense.

Both groups were "experimental" in the sense that they were taken from the contexts of their everyday lives to a retreat where they were "brought back" to an earlier time. However, the second group was referred to as the control group in order to control for the experience of being at the retreat.

Pre- and post-measures were taken on physical strength, perception, cognition, hearing, and visual thresholds, as well as a self-report measure that assessed values and behavior. Before and after photographs were also taken of men in both groups. Between the first and last day of the retreat, experimenters tried to recreate an atmosphere that would remind participants of events and experiences from 20 years earlier. Although experimenters were instructed to recreate an atmosphere that mimicked a previous time, they were blind to the hypothesis of the study. The experimenters played popular music and showed popular television shows of the time. They discussed "current" events such as the launch of the first U.S. satellite, Explorer 1; the need for bomb shelters; and Castro's advance into Havana, Cuba. The men in both groups were asked not to discuss anything that happened after September 1959 with each other, but whereas the first group was asked to conduct all conversations and discussions in the present, the second group was asked to use the past tense. Experimenters also had participants write autobiographical sketches about their lives in 1959, with similar instructions to the first group and second group to use the present and past tense, respectively.

By the end of the week, both groups looked younger by about 3 years, as rated by independent judges who viewed before-and-after photographs. Hearing and memory generally improved for both groups. Both groups had some weight gain, increased bideltoid and tricep skinfolds, and improved hand strength. The fact that these changes were found in both groups illustrates the importance of how a change in perception, specifically a focus on being younger, can influence changes in physiological measures even in a short period of time. There were also significant differences between the two groups. Men in the experimental group had better joint flexibility, finger length (their arthritis diminished and they were able to straighten their fingers more), better posture, greater increases in tricep skinfold and bideltoid breadth, and improved vision, compared with men in the control group. On intelligence tests, 63% of the experimental group improved their scores after the retreat, compared with 44% of the control group. One might argue that motivational differences accounted for the differences found between both groups. However, potential motivational differences do not account for the fact that men in both groups appeared younger in photographs viewed by blind observers.

The counterclockwise study demonstrates that the decline in physical and mental health expected later in life may be a product of assumptions about how one is supposed to age. Supposedly irreversible signs of aging were altered as a result of this psychological intervention. It should be noted that the men in this study, particularly for men in the experimental group, had to exercise some degree of mindfulness in order to fully participate. They had to actively recontextualize their mindset. While being at a retreat, socializing with other men their age, and engaging in various activities might account for some of the changes observed for the comparison group, we believe the psychological change of mindset was at least partially responsible for the differences between the two groups. One group focused on being in the past while the second group reflected on the past.

Purpose

The following studies provide a conceptual replication of the mind/body hypothesis: If one's mindset is altered, one's body will change accordingly. Because this nondualist view is still at odds with much current thinking, we present these data as worthy of consideration in the spirit of possibility. Alternative explanations, which we outline for each study, are also plausible. Each of the studies that follow was based on a priori hypotheses: According to whether a younger or older self is primed, the body will age accordingly. In this article, we discuss five studies in which age markers are either muted or magnified (priming a younger or older self, respectively) and how this may influence health and longevity.

Field Study

If women change their appearance and think they look younger, will others agree? Will the perception of being younger translate into physical measures? In a recent investigation, we were curious of whether women who dye their hair to cover gray hair would feel younger than women around the same age who just have their hair cut but not dyed.

We sampled 47 women (28 hair dyed, 19 no hair dye) between the ages of 27 to 83 years of age ($M = 42.7$ years, $SD = 10.9$ years) at a local hair salon. Before each woman's hair appointment, we took photographs of just her face and obtained her blood pressure. In addition, participants filled out a brief questionnaire that asked the woman her age and what age she thought she looked. After the woman's hair appointment, the same procedures were followed except that in the postquestionnaire, in addition to asking what age the woman felt she looked, she was also asked how satisfied she was with the way she looked and how attractive she felt, rating her response on a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*completely*). To determine whether women who got their hair dyed appeared younger to independent raters, we cropped photographs of the women so that their hair was not showing. Independent raters (10 women, 8 men) ranging from 20 to 64 years of age ($M = 44.9$ years, $SD = 13.6$ years) viewed before-and-after photographs of each woman and were asked to identify the photo in which the woman appeared younger. The order of before-and-after photos were randomly switched to control for order effects.

Results indicate that there were no significant differences between women who had their hair dyed and women who did not; however, when women, regardless of their hair procedure, reported feeling younger after their hair appointment, other

changes followed. Women who perceived themselves as younger, regardless of whether they got their hair dyed, appeared younger to independent raters compared with women who felt the same age or older. Only 1 woman felt older after her hair appointment, $t(45) = -2.00$, $p < .05$. This was the case for both conditions despite the important fact that women did not feel significantly more attractive or satisfied with how their hair looked after their hair appointment. More important, women who perceived themselves as younger after their hair appointment showed a decrease in both systolic blood pressure ($\chi^2 = 4.41$, $p < .05$) and diastolic blood pressure ($\chi^2 = 5.07$, $p < .05$). This study showed that a change in self-perception of age was associated with physiological changes for the participant and were even apparent to others unaware of the change in mindset by participants. This study is unique because it examined the effect of antecedents of age perception on health as opposed to generally exploring how age perception affects health. The results of this exploratory study illustrate how a common external change, such as getting one's hair done, can alter age perception and manifest itself in both outward (face) and inward (blood pressure) physiological changes.

Archival Studies

The following studies present archival data. The researchers of the studies described below do not mention age cues as a possible reason for their outcomes. In fact, with respect to baldness, the medical researchers state that "the precise mechanisms leading to the development of Male Pattern Baldness (MPB) and prostate cancer are largely unknown" (Hawk, Breslow, & Graubard, 2000, p. 523). Although there may be alternative explanations, we believe that age-related cues and the mindsets that accompany them may at least partially account for the outcomes of all of these studies.

Uniforms and Morbidity

Clothing serves as an age-related cue (Twigg, 2007). It is unlikely for a 50-year-old person, for example, to wear the same outfits that are designed for a 25-year-old person. When people wear uniforms at work, they are deprived of this age-related cue. If one wears a uniform at a job from when he or she is 25 years old until he or she is 65 years old, there is one less cue suggesting that he or she is getting older. As such, it is predicted that people who wear work uniforms will have better health than those who do not wear work uniforms.

We examined morbidity data for 206 professions from the National Health Interview Survey—which was conducted between 1986 and 1994—to assess whether people in professions who wear uniforms have better health than those who do not wear uniforms. We used an adjusted morbidity ratio[1] as our outcome variable, which controlled for age, gender, race and ethnicity, and level of education (Lee et al., 2006). The morbidity ratio was a weighted average of seven odds ratios from logistic regressions predicting restricted activity days, restricted bed days, work loss days as a result of illness or injury, doctor visits, hospital stays, health status, and chronic health conditions (Lee et al.). In our analysis of whether uniform wearing significantly predicted morbidity, we also controlled for income, level of physical activity a job may demand, and level of happiness at one's job. We controlled for these factors because a higher income may afford more, and better, access to health care (Lynch, Smith, Kaplan, & House, 2000) and a healthier lifestyle. The physical demand of a job can be seen as a form of exercise (Crum & Langer, 2007). Some jobs are more physically demanding than others (e.g., construction work vs. secretarial work). A job that involves a fair amount of walking or lifting (e.g., farm work) can be considered healthier for the cardiovascular system compared with a sedentary desk job (e.g., receptionist). Last, happiness has been linked to longevity (Davenport, 2005; Deeg & van Zonneveld, 1989; Langer, 1989; Veenhoven, 2007), and thus seemed important to control for as well.

Information on median salary from 1994 (the last year of the National Health Interview Survey) was taken from the U.S. Department of Labor, Bureau of Labor Statistics Web site. Information on how happy people are in various professions was taken from the General Social Survey by the National Opinion Research Center at the University of Chicago (Smith, 2007). Independent raters coded whether people in each of the 206 professions typically wear uniforms ("yes" or "no"). They were told that some jobs require people to wear a uniform for identification or professionalism purposes (e.g., those worn by flight attendants) and/or as a safety regulation (e.g., a lab coat worn by chemists). They were asked to code the presence of uniform if people in that profession tend to wear a uniform the majority of the time (especially when interacting with clients or patients, as is the case with physicians). A dress code (e.g., shirt and tie) did not qualify as a uniform because the employee was able to purchase his or her own variation of the required attire. For example, for a business-casual dress code, someone could choose from a wide variety (e.g., color, style, brand) of shirts and pants. In contrast, a work uniform is usually provided by the company or organization for the employee to wear (e.g., an apron or skirt for a waitress).

Physical activity was coded on a scale from 1 (*light*), such as for a secretarial job, to 4 (*heavy*), such as for a construction job. Coders were told (a) that some jobs involve more physical activity than do others and (b) to make their best estimate on a scale from 1 to 4 for how physically demanding each job is (see Table 1 for list of professions and codes). If they were unsure, they were told they could leave the field blank. Interrater reliability was .89 for presence of uniforms and .75 for physical activity.

To determine whether wearing a work uniform is a significant predictor of morbidity, we conducted a multiple regression analysis, with the adjusted morbidity ratio as the outcome variable, and uniform and the selected control variables as the predictor variables. We also tested for the interaction between uniform and median income. Our reasoning was that clothing might serve as a greater age-related cue for people with more earning power. If wealthier people can afford to wear clothes

Table 1. Occupations by Rank, From Worst to Best Health

Occupation	Rank	Adjusted morbidity	Uniform	Median annual salary (in U.S. dollars)	Happiness Index	Physical activity level
Social workers	1	1.42	No	26468	38.7	3
Inspectors, testers, graders	2	1.39	Yes	30108	36.6	2
Postal clerks (except mail carriers)	3	1.32	Yes	32708	35	2
Psychologists	4	1.3	No	33332	37.2	1
Grinding/abrading/buffing/polishing machine operators	5	1.28	Yes	20436	31.4	3
Nursing aides/orderlies and attendants	6	1.28	Yes	14300	28.3	3
Specified mechanics and repairers	7	1.23	Yes	25324	.	3
Inspectors, compliance officers (except construction)	8	1.23	Yes	34684	22.3	3
Correctional institution officers	9	1.22	Yes	24908	26	3
Licensed practical nurses	10	1.22	Yes	23400	30.6	3
Punching and stamping press machine operators	11	1.21	Yes	20488	23.5	3
Mail carriers, postal service	12	1.21	Yes	33540	34.5	3
Actors and directors	13	1.2	No	28912	51	2
Guards and police, except public service	14	1.19	Yes	17628	23.8	3
Bill and account collectors	15	1.19	No	19656	.	1
Street and door-to-door sales workers	16	1.19	No	16796	25.2	3
Assemblers	17	1.18	Yes	17576	28.2	2
Purchasing managers	18	1.17	No	40144	.	1
Telephone operators	19	1.16	No	20384	25	1
Stationary engineers	20	1.16	No	30732	46.29	2
Dispatchers	21	1.16	No	21060	39	1
Personal service occupations, not elsewhere classified	22	1.16	Yes	15444	40	.
Administrators/officials, public administration	23	1.16	No	37076	36	2
Janitors and cleaners	24	1.16	Yes	15236	24.2	3
Teachers, special education	25	1.15	No	33436	52.6	3
Aerospace engineer	26	1.15	No	50232	46.29	1
Computer systems analysts and scientists	27	1.14	No	43992	38.7	1
Sheet metal workers	28	1.14	Yes	29172	.	3
Counselors, educational and vocational	29	1.14	No	35672	26.7	1
Messengers	30	1.14	Yes	17576	18.8	4
Health technologists and technicians	31	1.14	Yes	23972	.	3
Bus drivers	32	1.13	Yes	20384	34.29	1
Production inspectors, checkers, and examiners	33	1.12	Yes	20332	22.3	2
Machinists	34	1.12	Yes	26988	30.1	3
Computer programmers	35	1.12	No	38376	30.1	1
Police and detectives, public service	36	1.12	Yes	33956	44	3
Technicians	37	1.11	Yes	27820	.	3
Welders and cutters	38	1.11	Yes	23920	20.8	3
Molding and casting machine operators	39	1.11	Yes	18824	31.4	3
Order clerks	40	1.11		24128	37.6	1
Bus, truck, and stationary engine mechanics	41	1.11	Yes	25532	14.5	4
Construction trades, not elsewhere classified	42	1.1	No	21736	22.1	4
Heating, air conditioning, and refrigeration mechanics	43	1.1	Yes	25688	26.5	3
Management analysts	44	1.1	No	41340	.	1
Health aides, except nursing	45	1.1	Yes	15288	.	3
Miscellaneous material moving equipment operators	46	1.1	No	23296	.	3
Data entry keyers	47	1.1	No	18876	25.4	1
Aircraft engine mechanics	48	1.09	Yes	36868	.	4
Engineering technicians	49	1.09	No	29380	.	2

(continued)

Occupation	Rank	Adjusted morbidity	Uniform	Median annual salary (in U.S. dollars)	Happiness Index	Physical activity level
Buyers, wholesale/retail trade except farm product	50	1.09	No	26468	39.7	1
Stock and inventory clerks	51	1.09	No	20488	27.4	3
Mixing and blending machine operators	52	1.08	Yes	21476	31.4	3
Editors and reporters	53	1.08	No	31928	35.7	2
Clergy	54	1.08	Yes	27872	67.2	2
Taxicab drivers and chauffeurs	55	1.07	No	19448	32.39	1
Electrical and electronic equipment assemblers	56	1.07	Yes	17420	28.2	2
Supervisors, mechanics, and repairers	57	1.07	Yes	34996	.	1
Supervisors, cleaning and building service workers	58	1.07	No	18772	.	1
Drafting occupations	59	1.07	No	28548	29.2	1
Heavy equipment mechanics	60	1.06	Yes	28652	.	3
Teachers	61	1.06	No	32292	48.39	2
Not specified mechanics and repairers	62	1.06	Yes	24128	.	3
Designers	63	1.06	No	30576	31.4	2
Production coordinators	64	1.06	No	26416	24.7	.
Economists	65	1.05	No	46228	45.89	1
Industrial machinery repairers	66	1.05	Yes	27612	22.2	3
Advertising and related sales occupations	67	1.05	No	28808	42.29	1
Administrative support occupations	68	1.05	No	20384	27.5	1
Sheriffs/bailiffs/other law enforcement officers	69	1.05	Yes	26832	36.89	3
Records clerks	70	1.05	No	20696	28.2	1
Personnel/training/labor relations specialists	71	1.05	No	31772	.	2
Sales occupations, other business services	72	1.04	No	32864	.	2
Supervisors, general office	73	1.04	No	26520	.	1
Management-related occupations	74	1.04	No	31044	.	1
Laborers, except construction	75	1.04	No	16692	24.1	4
Miscellaneous machine operators	76	1.04	Yes	21216	31.4	3
Insurance adjusters, examiners, and investigators	77	1.04	No	23712	28.6	1
Interviewers	78	1.04	No	18772	37.29	2
Industrial truck and tractor equipment operators	79	1.03	Yes	21944	25.8	2
Managers, medicine and health	80	1.03	No	32396	42.5	1
Teachers, prekindergarten and kindergarten	81	1.03	No	19656	37.1	3
Billing clerks	82	1.03	No	19396	33.6	1
Postsecondary teachers, subject unspecified	83	1.03	No	43628	38.89	3
Computer operators	84	1.03	No	21268	36.5	1
Receptionists	85	1.03	No	16016	33.89	1
Administrators, education and related fields	86	1.03	No	39936	45.39	1
Registered nurses	87	1.02	Yes	35464	36.29	3
Legal assistants	88	1.02	No	25636	22.8	2
Managers, properties and real estate	89	1.02	No	22568	37.6	2
Attendants, amusement and recreational facilities	90	1.02	Yes	16900	15.7	3
Painters/sculptors/craft artists/artist printmaker	91	1.02	No	25532	31.7	2
File clerks	92	1.02	No	16172	.	1
Child care workers	93	1.02	No	13052	35.79	3
Typists	94	1.02	No	19240	29.4	1
Chemists, except biochemists	95	1.01	Yes	41236	26.4	1
Machine operators, not specified	96	1.01	Yes	20176	31.4	3
Bartenders	97	1.01	.	15548	19.6	3
Child care workers, private household	98	1.01	No	8216	33.39	3
Investigators and adjusters, except insurance	99	1.01	No	21320	42.89	1
Insurance sales occupations	100	1.01	No	31616	35.7	2
Truck drivers	101	1.01	No	24284	33.6	2

(continued)

Table 1 (continued)

Occupation	Rank	Adjusted morbidity	Uniform	Median annual salary (in U.S. dollars)	Happiness Index	Physical activity level
Freight, stock and material handlers, not elsewhere classified	102	1.00	No	19136	20.8	3
Personnel and labor relations managers	103	1.00	No	35152	37.7	1
Traffic, shipping, and receiving clerks	104	1.00	Yes	19916	29.3	3
Electricians	105	1.00	Yes	29848	30.2	3
Teachers, secondary school	106	0.99	No	35880	36.1	3
Graders and sorters, except agricultural	107	0.99	Yes	14612	.	3
Supervisors, food preparation and service occupations	108	0.99	Yes	16848	25.6	1
Mail clerks, except postal service	109	0.99	Yes	16744	37	2
Architects	110	0.99	No	36504	53.5	2
Automobile mechanics	111	0.99	Yes	22880	23.7	3
General office clerks	112	0.99	No	19344	32.89	1
Maids and housemen	113	0.99	Yes	12792	22.8	4
Payroll and timekeeping clerks	114	0.99	No	21268	21.9	1
Teachers, elementary school	115	0.98	No	32448	44.7	3
Electrical and electronic technicians	116	0.98	Yes	31252	36.7	3
Expediters	117	0.98	Yes	20124	24.3	1
Painting and paint-spraying machine operators	118	0.98	Yes	19240	30.7	3
Purchasing agents and buyers	119	0.98	No	31148	.	1
Librarians	120	0.98	No	31096	25.2	1
Plumbers, pipefitters, and steamfitters	121	0.97	Yes	27560	31	3
Photographers	122	0.97	No	25064	20.8	2
Teachers aides	123	0.97	No	13364	37	2
Managers/marketing/advertising/public relations	124	0.97	No	44252	40.89	1
Operations/systems researchers and analysts	125	0.97	No	40248	.	1
Miscellaneous food preparation occupations	126	0.96	Yes	11648	20.8	2
Cashiers	127	0.96	Yes	11856	24.5	2
Waiters and waitresses	128	0.96	Yes	13312	31.5	3
Library clerks	129	0.95	No	19136	.	2
Industrial	130	0.95	Yes	.	.	3
Accountants and auditors	131	0.95	No	32032	41.79	1
Musicians and composers	132	0.95	No	.	41.79	1
Supervisors, construction	133	0.95	No	32396	.	2
Laundering and dry cleaning machine operators	134	0.95	No	13156	21.8	3
Securities and financial services sales occupations	135	0.95	No	37336	39.6	1
Telephone installers and repairers	136	0.95	Yes	35308	37.89	3
Public relations specialists	137	0.94	No	29900	39.5	1
Sales workers, furniture and home furnishings	138	0.94	No	22204	25.7	2
Other financial officers	139	0.93	No	33124	33.89	1
Firefighting occupations	140	0.93	Yes	32708	57.2	3
Sales workers, motor vehicles and boats	141	0.93	No	27768	42.79	2
Managers and administrators	142	0.93	No	36556	.	1
Hand packers and packagers	143	0.93	No	14716	24.2	3
Operating engineers	144	0.93	Yes	27508	40.6	2
Cooks	145	0.93	Yes	13208	30.1	3
Clinical lab technologists and technicians	146	0.92	Yes	26988	33.2	2
Dressmakers	147	0.92	No	16588	28.7	2
Packaging and filling machine operators	148	0.92	No	15548	31.4	3
Butchers and meat cutters	149	0.92	Yes	17108	35.39	2
Groundskeepers and gardeners, except farm	150	0.92	No	14924	30.5	3
Carpenters	151	0.92	No	22048	33.6	4
Slicing and cutting machine operators	152	0.92	Yes	17212	13.6	3
Lawyers	153	0.92	No	58032	43	2
Private household cleaners and servants	154	0.91	No	10140	25.3	3

(continued)

Occupation	Rank	Adjusted morbidity	Uniform	Median annual salary (in U.S. dollars)	Happiness Index	Physical activity level
Bookkeepers, accounting, and auditing clerks	155	0.91	No	19448	38.95	1
Supervisors, production occupations	156	0.91	No	30368	.	1
Sales reps, mining/manufacturing/wholesale	157	0.91	No	.	.	2
Radiologic technicians	158	0.91	Yes	29432	34.6	2
Engineers	159	0.91	No	46644	46.29	2
Electrical and Electronic	160	0.91	Yes	.	.	3
Secretaries	161	0.91	No	19916	38.7	1
Food counter/fountain/related occupations	162	0.91	Yes	10608	.	3
Civil engineers	163	0.9	No	44720	40.89	2
Vehicle washers and equipment cleaners	164	0.9	Yes	14560	16.9	3
Sales workers, radio, TV, stereo, and appliances	165	0.9	Yes	20852	.	2
Timber cutting and logging occupations	166	0.9	No	.	.	4
Managers, farms, except horticultural	167	0.9	No	.	.	2
Pressing machine operators	168	0.89	No	14300	23.5	3
Hairdressers and cosmetologists	169	0.89	No	14820	32.2	2
Farmers, except horticultural	170	0.89	No	.	32.39	4
Real estate sales occupations	171	0.89	No	30836	45.29	2
Roofers	172	0.89	No	19292	14.2	4
Garage and service-station-related occupations	173	0.89	Yes	13312	13.2	3
Electronic repairers, communication/industrial equipment	174	0.88	No	28184	15.7	3
Sales workers, other commodities	175	0.88	No	15184	.	2
Printing press operators	176	0.88	No	22464	32.5	2
Stock handlers and baggers	177	0.88	Yes	13624	20.8	3
Supervisors, distribution, scheduling, and adjusting	178	0.88	No	29328	.	1
Supervisors, related agricultural occupations	179	0.87	No	21476	.	2
Mechanical	180	0.87	Yes	.	.	3
Brickmasons and stonemasons	181	0.87	No	25272	32.1	4
Bakers	182	0.87	Yes	17160	29.3	3
Transportation ticket and reservation agents	183	0.86		21164	56.5	1
Dental assistants	184	0.86	Yes	17108	36.6	2
Construction laborers	185	0.86	No	17576	18.8	4
Supervisors/proprietors, sales occupations	186	0.86	No	26052	.	1
Painters, construction and maintenance	187	0.85	Yes	19812	30.7	3
Waiters/waitresses assistances	188	0.85	Yes	11856	.	3
Financial managers	189	0.85	No	37336	41.29	1
Kitchen workers, food preparation	190	0.84	Yes	12064	20.8	3
Sales workers, building and hardware supplies	191	0.84	Yes	17316	55.89	2
Textile sewing machine operators	192	0.82	No	12324	32.29	2
Automobile body and related repairers	193	0.81	Yes	23660	16.4	3
Drywall installers	194	0.79	No	21788	.	4
Bank tellers	195	0.79	No	15340	33.29	2
Sales workers, parts	196	0.79	No	19656	.	2
Tool and die makers	197	0.78	Yes	34528	38.6	3
Sales counter clerks	198	0.77	Yes	13832	22.9	3
Sales workers, apparel	199	0.77	No	13780	29.1	3
Farm workers	200	0.75	No	13208	31.8	4
Driver-sales workers	201	0.74	Yes	23972	23	2
Dietitians	202	0.84	No	27924	.	1
Pharmacists	203	0.72	Yes	49608	24.7	2
Physicians	204	0.68	Yes	51792	43.89	2
Airplane pilots and navigators	205	0.61	Yes	52676	49.1	1
Dentists	206	0.53	Yes	49400	41.6	2

Note. From Lee et al. (2006).

Table 2. Correlations Between Predictors and Adjusted Morbidity

Variable	1	2	3	4	5
1. Adjusted morbidity	—	.0398	.0133	–.0091	–.0224
2. Uniform		—	–.1270†	–.2147**	–.3729***
3. Median salary			—	.4823***	–.2851***
4. Happiness Index				—	–.3118***
5. Physical activity					—

†$p \leq .10$.
*$p \leq .05$.
**$p \leq .01$.
***$p \leq .001$.

that are more varied and change their wardrobe more frequently, they should experience more age-related cues. Thus, the uniform effect should become more prominent at higher income levels.

The correlations among the predictor variables and adjusted morbidity are displayed in Table 2. People who wear work uniforms tend to be less happy at their jobs ($r = –0.21$, $p < .01$), and perhaps it is not surprising that people who earn more money at their job were happier at their jobs ($r = 0.48$, $p < .0001$). The results of the regression indicate that wearing a uniform is a significant predictor of morbidity ($t = 2.81$, $p < .01$; see Table 3). There were no main effects for happiness or physical activity levels in predicting morbidity. The results also show a significant interaction between uniform and median salary ($t = –3.05$, $p < .01$) such that people who earn less than $24,916 per year and who wear work uniforms (e.g., waiters, waitresses) tend to have poorer health (higher morbidity) than do people who earn less than $24,916 per year and who do not wear work uniforms (e.g., street and door-to-door sales workers). With an annual income of more than $24,916, the trend reversed. Individuals who earned more than $24,916 per year and who did not wear work uniforms (e.g., engineers) had poorer health than did their uniformed counterparts (e.g., chemists; see Fig. 1). This finding is consistent with our hypothesis regarding the lack of age-related cues a uniform provides. Dressing appropriately for one's age becomes somewhat irrelevant when wearing work uniforms. Not only is the age cue absent for workers who wear uniforms, but also it is absent for the people with whom they work.

We may see the effect of uniform for people in higher socioeconomic statuses because clothing is a status symbol. Apart from an age-related cue, having more money may mean having the purchasing power to keep up with constantly changing trends in fashion. A uniform at higher income levels may act as a buffer for being all too aware of one's age. In contrast, people in higher earning brackets who do not wear uniforms may continue to be aware of their age as they make daily decisions about what they will wear and their work wardrobes continually change over time.

The opposite effect of uniform for people with low earning potential may be due to job control. *Job control* refers to the amount of discretion and independence one has in determining how and when work needs to be done. People of low socioeconomic status usually have low job control (Bosma, Stansfeld, & Marmot, 1998). In addition, people on the lower end of the income spectrum tend to work high effort and low reward jobs (Siegrist, Peter, Junge, Cremer, & Seidel, 1990). The mismatch between a high workload and low control over occupational status (e.g., job insecurity, poor promotion prospects, status inconsistency) has been shown in several studies to be associated with a higher incidence of coronary heart disease, even after controlling for major confounding behavioral risk factors such as diet, exercise, cigarette smoking, and alcohol consumption (Bosma et al.; Peter et al., 2009; Siegrist et al.). In an analysis that isolated the effects of job control on coronary heart disease, psychological attributes such as hostility, negative affectivity, minor psychiatric disorder, and coping were also shown to have little effect on cardiovascular disease (Bosma et al.). The personal characteristics were not confounders, intermediate factors, or effect modifiers (Bosma et al.). People of low socioeconomic status who wear uniforms may experience less job control (as rated by the employee) than those who do not wear uniforms. Wearing a uniform may be seen as a way of being controlled, which may override any effect the age cue could or could not have. In contrast, uniforms worn by people with higher earning potential may be seen more as a status symbol (e.g., doctors) compared with uniforms worn by people with lower incomes (e.g., janitors).

One reason some people wear work uniforms is for safety regulations (e.g., machine operators); some professions are more risky than others. We were only able to identify incidence of injury statistics for 89 of the 206 occupations from the 1994 Survey of Occupational Injuries and Illnesses. Moreover, incidence of injury statistics was only available for private sector jobs. Information on public sector jobs (e.g., policemen, firefighters) was only available by state. Because we could not find incidence of injury statistics for the majority of the occupations, we ran a separate regression analysis with just the 89 professions, adding injury as another predictor variable. Injury did not have an effect. Nevertheless, one of the measures Lee et al. (2006) collected was lost days from work as a result of illness or injury, so injury seemed to be accounted for in the adjusted morbidity ratio.

Male Pattern Baldness and Disease

As men age, baldness increases. Thus, balding is a cue for older age. We hypothesized that premature balding would signal an older self and would thus result in other signs of premature aging.

Research on social perceptions of bald men shows that bald men are perceived as being older than their real age compared with men who are not bald (Henss, 2001; Muscarella & Cunningham, 1996). Men who are prematurely bald are likely to be perceived as older than their real age because they are not expected to bald until later in life. The most revealing signs of aging are physical. Gray hair, wrinkles, and balding are usually apparent indications that one is getting older. Because physical

Table 3. Parameter Estimates From the Regression of Morbidity on Uniform, Controlling for Selected Background Characteristics

Predictors	Model 1: Baseline	Model 2: Uniform	Model 3: Interaction
Intercept	1.0348***	1.0294***	0.9498***
Control variables			
Median income	–.0004	–.0006	.0022
Happiness Index	–.0000	.0004	.0005
Physical activity 2	–.0539†	–.0570†	–.0518†
Physical activity 3	–.0054	–.0077	–.0024
Physical activity 4	–.0601	–.0601	–.0484
Question predictors			
Uniform		.0017	.1667**
Interaction of uniform and median income			–.0067**
R^2	3.41	3.61	9.29
F	1.08	0.93	2.17*

Note. Median income was divided by $1,000.
†$p < .10$.
*$p < .05$.
**$p < .01$.
***$p < .001$.

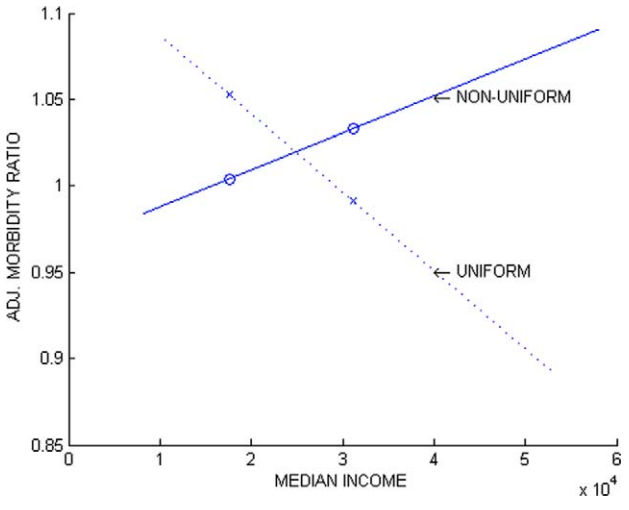

Fig. 1. Intersection of uniform and annual median salary at $24,916. Median income was divided by $1,000.

cues are the most salient to others, these cues are usually automatically associated with stereotypes of old age. Baldness may be a blatant reminder of one's perceived age and thus cues a physically older self. To test this premise, we sought information on premature balding and health. The only data available were on prostate cancer and coronary heart disease.

Balding and prostate cancer are more likely to occur in older men (Kwabi-Addo et al., 2007). A longitudinal study, however, that tracked 4,421 men between the ages of 25 and 75 years of age with no history of prostate cancer for up to 21 years, showed that prematurely bald men had a 50% excess risk of being diagnosed with prostate cancer than did men who were not bald (Hawk et al., 2000). Data were taken from the Epidemiologic Follow-up Study of the first National Health and Nutrition Examination Survey, a nationally representative cross-sectional survey. Incident cases of prostate cancer were identified by interviews, medical records, and death certificates. Age-standardized incidence rates and proportional hazards models were used to examine the association between male pattern baldness and clinical prostate cancer.

Male pattern baldness is a clearly observable trait that generally precedes the diagnosis of clinical prostate cancer by decades (Hawk et al., 2000). In the longitudinal study by Hawk et al., male pattern baldness was reported as early as 25 years of age. However, the rate of baldness was more than 50% for men between 45 and 55 years old and more than 70% for men by age 80. In comparison, the percentages of having male pattern baldness in the general population are 24.5% in one's 50s, 34.3% in one's 60s, and 46.9% in one's 70s. The percentage of men who have prostate cancer are 14% in one's 50s, 37% in one's 60s, and 41% in one's 70s. The percentages indicate a correlation between baldness and prostate cancer. At the beginning of 60 years of age, men who were prematurely bald had a consistently higher incidence of prostate cancer—a 50% excess risk compared with men who were not prematurely bald (see Fig. 2).

Prostate cancer is the most common cancer diagnosed among American men, and the likelihood of being diagnosed increases with age (Kwabi-Addo et al., 2007). Because the only visible difference between men with a higher rate of diagnosis and those with a lower rate is baldness, bald men may perceive themselves as older before contracting cancer or heart disease, and we believe this perception may at least partially account for how their body ages. Hawk et al. (2000) stated that balding and prostate cancer share epidemiological and biological risk factors, including aging, heritable genetic factors, and androgenic metabolism. However, they admitted that the precise mechanisms leading to the development of balding and prostate cancer are largely unknown.

In another study on baldness and disease, men with rapid hair loss had a greater risk of coronary heart disease than did

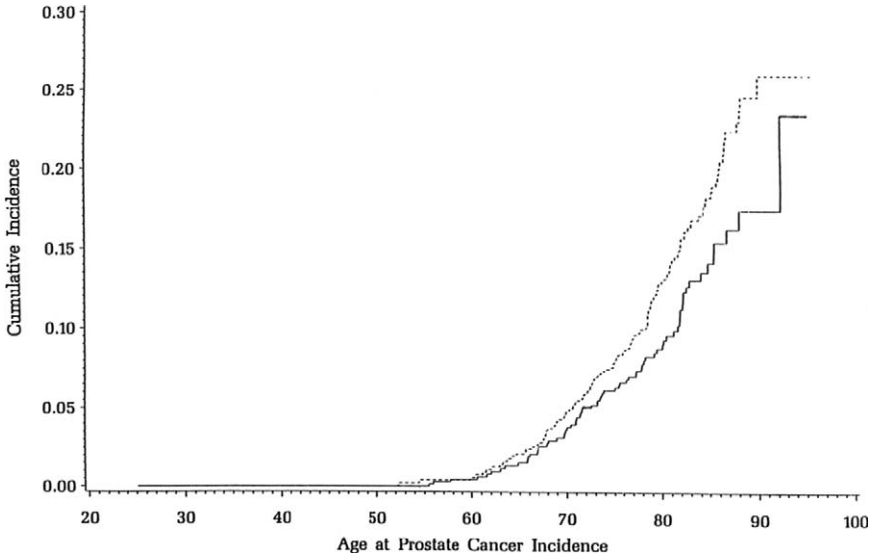

Fig. 2. Cumulative incidence of prostate cancer by baldness in the Epidemiologic Follow-up Study of the First National Health and Nutrition Examination Survey, 1971–1974 (baseline) through 1992. The darker line represents no baldness; the lighter line represents any baldness. From Hawk, Breslow, and Graubard (2000).

men with no to moderate progression of hair loss (Herrera, D'Agostino, Gerstmann, Bosco, & Belanger, 1995). Herrera et al. examined 2,017 men for degree of hair loss and grouped them into one of three groups: "mild or no progression," "moderate progression," or "rapid progression." Participants were biennially followed prospectively for up to 30 years for new occurrences of coronary heart disease, coronary heart disease death, cardiovascular disease, and death as a result of any cause. The researchers assessed the relations between the extent and progression of baldness and coronary heart disease using a Cox proportional hazards model, adjusting for age and other known cardiovascular disease risk factors. The results show that although the degree of baldness was not associated with examined heart disease, the amount of progression of baldness was associated with coronary heart occurrence (risk rate = 2.4), coronary heart disease mortality (risk = 3.8), and all-cause mortality (risk = 2.4).

Together, these findings provide support for the mind/body hypothesis: Prematurely bald men are likely to perceive themselves as older, and this self-perception may influence adverse health outcomes later in life. Studies show there is a link between perceived age and cardiovascular health. In Levy et al.'s (2000) study, individuals primed with negative stereotypes of old age had heightened cardiovascular responses, even though they rated tasks of the experiment (i.e., memory tasks, mathematical problems) as equally stressful as did individuals primed with positive age stereotypes. In another study that linked perceptions of age and health, the chronological age at which individuals perceived as the end of "middle age" was associated with a wide array of cardiovascular and functional health outcomes, including mortality from coronary heart disease in a 7-year follow-up (Kuper & Marmot, 2003). These studies demonstrate that there are visceral responses that accompany associations of old age, which may then have negative consequences for health over time. We believe a similar process is in effect for men who are prematurely bald. Over time, the cumulative effects turn into something larger and more visible (in this case, a disease); the internalized belief that one is older, and the negative associations that may result, become part of one's identity, and it may have important physiological consequences down the line.

Taken together, these findings indicate that baldness, and the rate of its progression, may serve as an early and visible risk factor for both prostate cancer and coronary heart disease. Although biological and genetic factors likely play a role in the higher incidence of prostate cancer and cardiovascular disease among prematurely bald men, we believe that the feelings associated with being older than one's chronological age account for some of these health outcomes.

Optimal Age for First-Time Mothers

Child rearing provides numerous age-related cues. One of the most salient of these is the age of other mothers one encounters in school meetings, in parks, on television, and in magazines. The median age of first-time mothers in the United States from 1989 to 1999 was 25 years (Ventura, Martin, Curtin, Mathews, & Park, 2000; Ventura, Martin, Curtin, Menacker, & Hamilton, 2001). The social world one experiences during this time of life is typically that of a woman in her mid-20s. If a woman has her first child later in life, she likely lives a life much like a younger mother does. On the basis of these premises, we predicted that women who have children later in life will live longer than those who have children at the more normative time.

A study by Mirowsky (2005) shows that women who bear their first child between the ages of 29 and 34 years have better

long-term health outcomes compared with women younger than 29 years of age and women older than 42 years of age. Mirowsky sampled 2,215 women from the 1986 U.S. Survey of Americans' Changing Lives, and its 8-year mortality follow-up of deaths recorded on the National Death Index (House, 2003). Women provided information on a health problem index that had seven subscales:

1. The respondent's rating of her own health on a 5-point Likert-type scale ranging from very healthy to very unhealthy.
2. The interviewer's rating of the respondent's health on a similar 5-point Likert-type scale, made at the end of the interview.
3. A count of six potentially fatal conditions the respondent reported having within the past 12 months, including lung disease, hypertension, heart disease, diabetes, cancer, and stroke.
4. A count of four nonfatal conditions in the past 12 months, including arthritis or rheumatism, foot problems (e.g., corns, calluses, poor circulation), broken or fractured bones, and urinary incontinence.
5. A two-item index of difficulty walking or using stairs (none, a little, some, a lot, cannot do).
6. A two-item index of difficulty seeing or hearing, even with glasses or a hearing aid (very well, quite well, somewhat well, not too well, or not at all well).
7. A four-item index of malaise in the past week (feeling that everything was an effort, feeling unable to get going, having restless sleep, and not feeling like eating—hardly ever, some of the time, most of the time).

These seven factors have been known to predict mortality risk independently, adjusting for age and socioeconomic status (Idler & Benyamini, 1997, as cited in Mirowsky, 2005).

Mirowsky's (2005) analysis, which controlled for race/ethnicity and level of education, shows that the longer women delayed first childbirth, the lower the relative hazard of death over the 8 years of follow-up. Examining other health factors that predict mortality, Mirowsky discovered that the optimal age at first birth for mothers' long-run health occurs about two decades after the median end of puberty, around the age of 34 years. Thirty-four years of age is about 13 years after the age at which pregnant women have the lowest risk of spontaneous abortion, ectopic pregnancy, stillbirth, and obstetric problems. In contrast, it is within a few years of mothers' age at birth associated with the minimum risk of infant mortality, and a decade short of the median end of fecundity (Mirowsky).

Perls, Alpert, and Fretts (1997) found similar effects to Mirowsky's (2005) study. Perls et al. examined two groups of women born in 1896: (a) those who lived to 100 years of age and (b) those who lived to 73 years of age. The women did not differ significantly with respect to race, religion, or level of education. Perls et al. found that women who lived to at least age 100 were four times more likely to have had children while in their 40s than women who survived only to age 73. His study did not differentiate which numbered child the women had in their 40s, but this study nevertheless supports Mirowsky's findings that having children later in life is linked to longevity.

One might think a woman having her fourth child in her 30s should benefit just the same as a woman having her first child in her 30s. A mother with multiple children, however, has already had a same-age cohort raising her older children. Having a first child versus a fourth child in one's 30s may be a very different experience. In this investigation, we first wanted to control for the number of children an older mother had as a basis of comparison between younger and older mothers. Second, the activities and lifestyle that the older mother experienced before having her first child were likely different from those of a mother having her fourth child later in life. Suddenly, the older, first-time mother is put into a world of young children and young mothers with whom she can now identify. In contrast, the older mother with her fourth child has already gone through rounds of changing diapers, taking her children to the park, and setting up play dates with other mothers. Although Perls et al. (1997) did not differentiate which numbered child women in his study had in their 40s, Mirowsky (2005) found a clear effect for women who had their first child later in life. Regardless of whether it was a first or fourth child, though, the findings of these two studies nevertheless show that having a child later in life is beneficial to a woman's long-term health.

The findings from Mirowsky's (2005) study have been explained by both biological and social factors that could have just as easily predicted the reverse finding. At a young age, a woman suffers the risk of complications during pregnancy and birth, such as prematurity and low birth weight (Mirowsky). Pregnancy puts strain on the body, which can also lead to poor health outcomes later in life. Childbirth in late life has its own set of physical risks. Young mothers, particularly under the age of 20 years, have also been linked to single motherhood, poverty, and low education, and they tend to seek prenatal care less often than do older mothers (Mirowsky). Sociologists (e.g., Stein & Susser, 2000) have argued that older women's social advantages allow them to care for themselves and their children more competently. Compared with younger women, older women tend to be more financially stable, having had more time to establish a career. This, Stein and Susser have argued, will allow older women to provide more resources for themselves and their children, such as better health care. Although these are all legitimate explanations (and considering that having a fourth child by the time a woman is in her 30s drains more resources over time), Mirowsky's study controlled for level of education. We acknowledge that the older mother has had more time to amass work experience and has probably saved up more money by the time she is in her 30s. Alternatively, biologically it is counterintuitive to expect older women who bear children to live longer; their bodies are already aging, and pregnancy puts more strain on the body. The older woman may not have the requisite energy needed for child rearing and may not feel like part of the in-group.

There are many plausible explanations for both predictions, some of which may account for the findings. However, we also

believe that perception of age influences one's health outcomes. Youthful cues signal a younger person. Suddenly the older mother's world is surrounded by younger cues, including younger mothers and their young children. The older mother will engage in the same kinds of activities as the other mothers will, which include playing with her young child. In addition, the older mother will interact with the other mothers (a) at parent–teacher association meetings, (b) at school events (e.g., plays, performances), (c) while dropping off and picking up her child from school, and (d) at play dates. The period of time the older mother raises a young child shifts her to an earlier age that is associated with younger mothers in their 20s. In the longer term, the older mother will invest more time in her child until the child turns 18 and she will become an empty nester later in life. This will also cue a younger self, given that her life transitions will occur later than most of her same-age peers.

One might argue that an older, first-time mother is just as likely to feel older and not part of the in-group as one could feel younger and part of the in-group. In response, there is research to suggest that individuals who interact with each other more over time perceive themselves as more similar to each other. In studies on interpersonal attraction, researchers have found that perceived similarity is greater than actual similarity in predicting interpersonal attraction (e.g., Morry, 2007). Although the age difference might initially be obvious, it could eventually become less prominent as time progresses and more pertinent similarities revolving around children emerge.

Women also talk with each other a great deal about their bodies (Paulson & Willig, 2008). The conversations an older mother may have about her body may be more similar to a younger mother who just had a child than with another woman her own age who is lamenting about her body "breaking down." Furthermore, the knowledge that the older mother was able to have a child at her age may reinforce the fact that she was healthy enough to do so, which may confirm the feeling that she is younger. Similar to Langer et al.'s (1988) study, which effectively put 75-year-old men in a younger mindset, having a child at an older age in effect "rewinds" a woman's age to reflect a younger woman's self. We believe that this change in self-perception, in part, contributes to a longer life.

Age Differences in Marriage and Longevity

As we age in early adulthood, we grow personally, professionally, and financially. Thus, being the older spouse in early adulthood typically means being the more dominant partner (Klinger-Vartabedian & Wispe, 1989). When there is a large age difference between spouses, the life lived is likely to mirror that of the older and more dominant partner. Thus, we predict that those who marry older people will live older lives sooner and consequently have shorter life spans. Conversely, older spouses will benefit from being more dominant and being around the younger spouse and thus are predicted to live longer.

Klinger-Vartabedian and Wispe (1989) examined age differences in marriage and female longevity for 437 women, and they found that women who marry men up to 14 years their senior have shorter life expectancies than do women who marry men roughly the same age and up to 14 years younger. This finding signifies that there is something about the social dynamic between an older spouse and a younger spouse that makes it more biologically advantageous for the older spouse and less advantageous for the younger spouse.

Klinger-Vartabedian and Wispe (1989) analyzed the 1968 portion of the National Mortality Followback Survey (U.S. National Center for Health Statistics, 1970) and the 1970 U.S. Census (U.S. Bureau of the Census, 1972), which contained all marriages in the United States by age difference of spouse. The National Morbidity Followback Survey provided individual records; however, the census data necessary to generate age-specific death rates were classified in 5-year intervals. Therefore, the researchers grouped the ages of all deceased wives and the age of all surviving husbands into cohorts containing 5-year intervals. The researchers acknowledge a more precise grading would have been desirable for the same age designation, but they explained that 5-year age groupings are commonly used in mortality estimates (Stockwell & Groat, 1984, as cited in Klinger-Vartabedian & Wispe).

Klinger-Vartabedian and Wispe (1989) used a standard mortality ratio (SMR) to make comparisons between couples with different age differentials. The SMR represents the ratio of the number of actual or observed deaths to the expected number in each specific cohort. Representing fluctuation from the base rate of 100, the SMR was only 84 for wives with husbands 4–14 years younger, whereas it was 125 for women married to older men up to 14 years their senior. Although SMRs were lowest for women married to men about 6 years younger, they rose above 100 for women married to men who were 10 or more years younger. This difference in the SMR for the age differential shows there is a limit to how young (or old) a spouse needs to be in order to see an effect. If a spouse is much too young, the older spouse will start to feel too old and vice versa. This effect may differ by gender, but the effect is in the same predicted direction (see Fig. 3).

Several reasons have been offered to account for the findings from this study. They include younger spouses having to take care of the older spouse in old age, which may, over time, be emotionally and physically taxing on the younger spouse. If and when the older spouse dies before the younger spouse, the younger spouse is left to grieve, and studies show that after a spouse dies, the other spouse dies soon after, a phenomenon referred to as *widowhood effect* (Lillard & Panis, 1996; Lillard & Waite, 1995).

The age that both spouses feel may be a reflection of the interests and activities of their spouse. In marriage, there is often an "exchange" and mutual participation of lifestyle activities and interests for both spouses over time (Kalmijn & Bernasco, 2001). Aside from one's perceived age, the other spouse may constantly be reminded of his or her partner's chronological age and internalize feelings when with him or her accordingly. For example, people who have younger partners sometimes say, "He or she makes me feel 'young' or 'alive' again." The opposite is not often heard: "He or she makes me

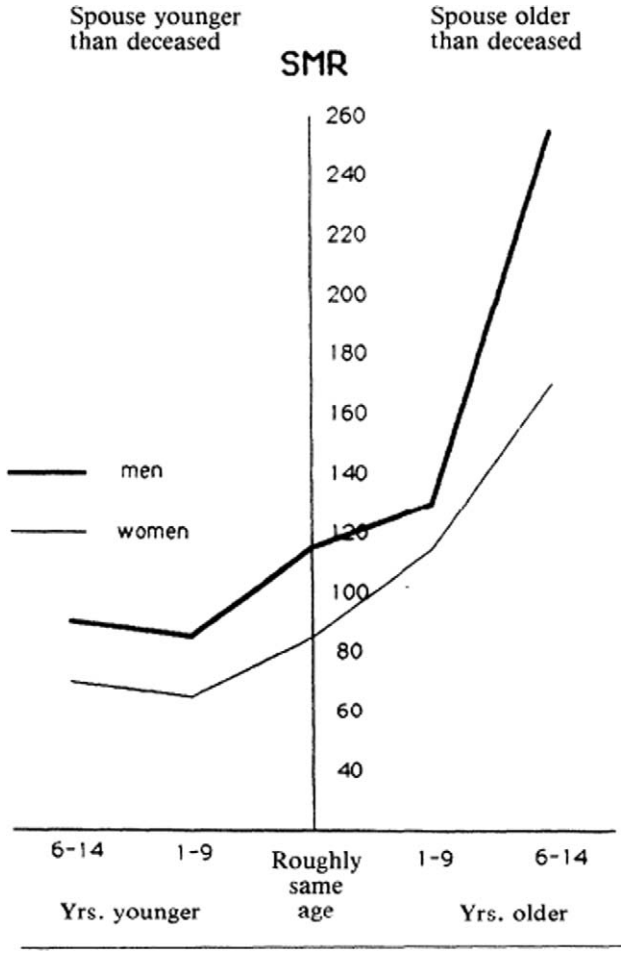

Fig. 3. Standard mortality ratios (SMRs) of women and men married to younger and older spouses. Numbers above 100 mean that more deaths occurred than expected, and numbers below 100 mean that fewer deaths occurred. From Klinger-Vartabedian and Wispe (1989).

feel mature," or worse, "morbid"! According to Greenberg, Schimel, and Mertens (2002), one reason that society harbors negative attitudes toward older adults is because older adults remind us of the prospects of diminishing beauty, health, sensation, and ultimately, death. On the one hand, the older spouse serves as an age prime for the younger spouse. On the other hand, the younger spouse remains something of a buffer to the older spouse because he or she constantly reminds the older spouse of youth. These experiences and mindsets can be translated into physiological changes as both spouses interact.

Zajonc, Adelmann, Murphy, and Niedenthal (1987) have examined physiological reactions in marital interaction over time. They discovered that spouses tend to look more alike with age. It is generally easier for spouses to look more alike when they are closer in age. Zajonc et al. also commented on the influence of shared emotions on facial expressions. They explained that emotional states are reflected nonverbally through smiles, frowns, grimaces, and other facial expressions, and that these outward expressions are mimicked by those intimate to us as they share our emotions. Thus, one product of a long-term relationship is that partners develop similar smile or frown lines, postures, and movements. Zajonc et al.'s research also suggested that facial expressions help produce emotions by altering blood flow to the brain, which, in turn, regulates the release of various mood-altering neurochemicals. It is thereby proposed that outward appearances and inward feelings are reciprocally influenced, and because people interact with their spouses frequently, their appearances will have a great effect on one another.

Age difference in marriage and longevity may be similarly intertwined, a phenomenon that Klinger-Vartabedian and Wispe (1989) referred to as the *mortality mean*. Neugarten (1968) suggested that as human beings, we are deeply influenced by "social clocks"—we gauge our lives by the implicit belief that there is a "right age" for certain behaviors or attitudes. Klinger-Vartabedian and Wispe proposed that it is possible that marital partners set their own social or biological clocks in accordance with their spouse's age, thus creating a mortality mean. In this hypothetical averaging of ages, the older person becomes "younger" and lives longer than expected, and the younger person becomes "older" and dies sooner than expected.

Conclusion

Evidence across five very different domains supports the general mind/body hypothesis that when a younger mind is primed, a younger body can accompany it. In the studies presented in this article, age was primed by a beauty treatment, clothing, premature baldness, late-in-life child bearing, and spousal age differences. In each case, health and longevity predictably followed the age-related cue. As with the retreat study described earlier (Langer et al., 1988), one could ask, "How did it *really* happen?" How did changing one's psychological state result in such unambiguous physical changes? Although we do not know the precise mechanisms involved, researchers in previous studies who have studied the relation between perceptions of aging and survival may offer some insights. For example, in the longitudinal study by Levy et al. (2002), they found that the "will to live"—defined as a judgment that the perceived benefits of one's life outweigh the perceived hardships—partially mediated perceptions about aging and survival. Levy et al. said—but did not test whether—other mediators are likely involved to account for the outcomes in their study. Another possible mechanism is a heightened cardiovascular response to stress about aging. As reported earlier, participants who were primed with negative stereotypes of old age had heightened cardiovascular responses, even though they rated tasks of an experiment as equally stressful as did individuals who were primed with positive age stereotypes (Levy et al., 2000). These studies demonstrate that individuals can have physiological responses to ideas about aging. It is thus conceivable that real-life situations such as being prematurely bald or marrying an older spouse can make one either unconsciously or consciously aware of old age and set in motion a series of physiological processes that can have real effects on short-term

and long-term health. Although many experienced ailments may be a natural part of aging, many may not be, and instead may be a function of one's mindsets about old age and the cues that signal diminishing capacity.

Many predictions follow from the mind/body hypothesis. For example, we would predict that childcare workers who take care of young children all day would have better health than senior care workers who look after older adults all day. As Greenberg et al. (2002) reasoned, older adults can remind us of the prospects of diminishing health. Therefore, individuals who are around older adults may be influenced by such thoughts that could affect their health over time. Another prediction is that people who teach students of the same age every year (i.e., students are not aging, per se) and who do not have children themselves should age better than people who teach students of the same age year after year, but who have children. A third prediction is that individuals who feel younger after a cosmetic procedure, such as Botox or a surgical face lift, should test younger.

Because wearing work uniforms, having male pattern baldness, being an older mother, and marrying a spouse who is older or younger than themselves are not uncommon phenomena, longitudinal studies should be conducted on these different phenomena that include measures of actual and subjective age, self-rated health, and actual health to see how much subjective age accounts for these health outcomes, as we believe they do. The major caution to researchers testing this hypothesis is that the belief has to be complete for it to work. As with placebos, many mindsets regarding disease and aging are strong and thus resistant to change.

The mind/body hypothesis as articulated and tested here need not relate only to aging. We know this from the vast literature on placebos and studies on emotion. For example, Cohen, Doyle, Turner, Alper, and Skoner (2003) have shown the effects of thoughts on prevention/cure from the common cold, and Rozin and his colleagues (Rozin & Fallon, 1987; Rozin, Haidt, & McCauley, 2000) show the effect of thoughts, such as drinking a drop of urine, on our disgust response. If we were to cue weight loss (e.g., Crum & Langer, 2007), improved vision (Langer et al., 1988; Langer et al., in press), or a host of other physical and psychological phenomena (e.g., competence), we may find that many of our presumed limits are self-limiting and self-fulfilling. It may be time to question our own mindsets and consider the possibility that psychology has even more to offer the medical world than we had previously believed.

In the last century, the average American's life span has increased by 27 years (Rogers, Hummer, & Nam, 2000). The extended life expectancy has led to prolonged periods of time spent in various work and family roles (Gee, 1987). People are getting married and having children later, and more adults are going into higher education (Arnett, 2000). Therefore, age norms are starting to change or are, at least, extending in accordance with societal trends. These changes may lead to changes in age-related cues, which may, in turn, affect health outcomes. Research should be ongoing in this area to monitor how self-perceptions of age change with societal trends.

Note

1. Lee et al. (2006) also provided an unadjusted morbidity ratio that did not control for age, race/ethnicity, and education for the 206 professions. We chose to use the adjusted morbidity ratio to control for these potentially confounding factors.

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

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