*Article*

# Gender and Health Control Beliefs Among Middle-Aged and Older Adults

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## Abstract

**Objective:** Internal health locus of control (HLOC) reflects individuals' beliefs that their own behavior influences their health. This study explores the gender difference in internal HLOC among middle-aged and older adults. **Method:** Using data from two waves of the National Survey of Midlife Development in the United States (MIDUS; *N* = 1,748), I estimate two-level random-intercept models predicting internal HLOC. **Results:** Women report higher levels of health control beliefs than men, especially in older cohorts born in the 1920s and 1930s. Adjustment for health, socioeconomic status, generalized control, and masculinity *increases* this gender gap, whereas adjustment for femininity and religiosity significantly *reduces* this difference. Women's higher religiosity and more feminine traits, such as warmth, nurturance, and care, partly explain their higher internal HLOC relative to men. **Discussion:** Because femininity and religiosity are positively associated with other-orientation, interventions to increase communal orientation may enhance beliefs in proactive responsibility for one's health among older adults.

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Internal health locus of control (HLOC) is the extent to which individuals believe that their own behavior influences their health status (Wallston, Wallston, & DeVellis, 1978). Extensive research documents the beneficial role of internal HLOC for positive health behaviors that become particularly important in later life, such as management of chronic diseases and adherence to a healthy lifestyle (Armitage, 2003; Markey, Markey, Schneider, & Brownlee, 2005; Robison-Whelen & Bodenheimer, 2004). Specifically, proactive health beliefs are positively related to healthy lifestyle, including abstaining from smoking (Reitzel et al., 2013; Seeman & Seeman, 1983), engaging in higher levels of physical activity (Armitage, 2003; Grotz, Hapke, Lampert, & Baumeister, 2011), and maintaining a healthier nutritional status in older age (Chen, Acton, & Shao, 2010). Moreover, internal HLOC enhances mental health in later life by reducing depressive symptoms (van Dijk, Dijkshoorn, van Dijk, Crèmer, & Agyemang, 2013), contributing to effective coping with health-related stressors (Robison-Whelen & Bodenheimer, 2004; Wallston et al., 1978), and facilitating psychological adjustment to chronic disease (Cvengros, Christensen, & Lawton, 2005). Importantly, internal health control beliefs increase adherence to treatment regimens for diabetes and cancer (Barlow, Macey, & Struthers, 1993; O'Hea et al., 2005), and even improve survival after a diagnosis of a chronic illness (Burker, Evon, Galanko, & Egan, 2005).

Existing research has overwhelmingly focused on the implications of health control beliefs for health outcomes and health behaviors. Yet, surprisingly little is known about the social distribution of the internal HLOC. Participation in health maintenance behaviors becomes particularly important in later life as the burden of health risks and chronic diseases increases. Understanding population differences in health control beliefs as well as the processes underlying these population differences is an important step toward improving older adults' active role in health care and adherence to increasingly complex treatment regimens. Moreover, knowledge of the social distribution of health control beliefs will help identify population subgroups that are potentially at risk of under-utilizing health care services and neglecting their health. Gender is a particularly salient social dimension in this respect because men are less likely than women to adopt behaviors that promote health and longevity (Courtenay, 2000; Gorman & Read, 2006).

Research conducted by psychologists and clinicians has focused on intra-individual processes rather than macrosocial contexts. In contrast, sociologists

studied extensively the social antecedents of generalized control (Mirowsky & Ross, 2007; Pearlin, 1999), while paying little attention to the domain-specific control over one's health. Using two waves of the National Survey of Midlife Development in the United States (MIDUS), this study integrates psychological and sociological perspectives to explore the gender difference in the internal HLOC and to identify potential mechanisms explaining this difference.

Although, to my knowledge, no study has directly explored population-wide gender differences in health control beliefs, previous research has accumulated indirect evidence that makes it plausible to expect that gender systematically affects internal HLOC through a variety of psychosocial mechanisms. To be considered as a potential mediator in this study, each mechanism should (a) systematically and consistently differ by gender, and (b) be a significant predictor of health control beliefs. Of the mechanisms that satisfy these two conditions, some predict that women have *lower* levels of proactive health control beliefs than men, whereas others predict that women have *higher* levels of proactive health control beliefs than men.

## Mechanisms Predicting Women's Lower Internal Health Control Beliefs

Women may have *lower* internal HLOC than men because of women's lower levels of physical health, generalized personal control, and socioeconomic status (SES)—resources that are positively related to proactive health control beliefs. With respect to *health*, women report worse self-rated health, have more hospitalization episodes, and rely more on health care services than men even after adjustment for women-specific health care visits (Case & Paxson, 2005; Gorman & Read, 2006; Idler, 2003). Women accumulate more time over the life course in institutional medical settings where compliance and deference to the medical authority is expected (Riska, 2003). Moreover, women are more likely than men to have functional limitations or disabilities and to suffer from debilitating chronic conditions, such as arthritis (Case & Paxson, 2005). These experiences may undermine women's perceptions of being in charge of their health.

*Generalized personal control* reflects individuals' beliefs in their ability to influence their life chances and direct their lives (Pearlin, 1999). Men exhibit higher levels of perceived control over their life chances than women (Gecas, 1989), and the gender gap in personal control is greater in older than younger age groups (Ross & Mirowsky, 2002). In turn, generalized control is positively related to proactive health control beliefs, and the two constructs are theoretically and empirically distinct (Wallston, Wallston, Kaplan, & Maides, 1976; Wu, Tang, & Kwok, 2004).

SES is associated with higher self-responsibility for health. Compared with persons with higher levels of income and education, low-SES individuals are more likely to exhibit a passive orientation toward health maintenance and invest responsibility for their health in professional health services (Cockerham, Kunz, Leuschen, & Spaeth, 1986). Moreover, persons with low income express a stronger agreement that people should not be held responsible for their illnesses (Wolinsky & Wolinsky, 1981). As SES increases, however, individuals are more likely to manifest self-control over health and personal responsibility for their health care (Cockerham et al., 1986). In turn, men have more socioeconomic resources than women (Ross & Mirowsky, 2002).

**Hypothesis 1:** Women exhibit lower internal HLOC than men, and this gender difference is explained by women's lower levels of physical health, generalized personal control, and socioeconomic resources.

## Mechanisms Predicting Women's Higher Internal Health Control Beliefs

Women may have *higher* internal HLOC than men because of women's lower levels of masculinity and higher levels of femininity and religiosity. Masculinity is an orientation toward the self with an emphasis on achievement, self-assertion, and self-direction, whereas femininity refers to an orientation toward others with an emphasis on attachment, nurturance, and empathy (Helgeson, 1994; Moore, 2007). Current cohorts of older adults have experienced traditional gender-typed norms and the gendered demarcation of public and private spheres over the life course (Carr, 2004). Men were primary providers and focused on the achievement in the public sphere, whereas women were nurturers and caregivers who focused on childrearing and family responsibilities (Carr, 2004; Pudrovska, 2010). In older cohorts, men and women express beliefs consistent with the cultural norms of masculinity and femininity, respectively (Carr, 2004; Pudrovska, 2010). Researchers have drawn a consistent link between men's risky health behaviors and hegemonic masculinity ideals that emphasize male stoicism, the denial of weakness and vulnerability, and the appearance of being strong and invincible (Courtenay, 2000; Mahalik, Burns, & Syzdek, 2007; Pudrovska, 2010). By neglecting their health, men legitimize themselves as the "stronger sex" in opposition to healthy practices of women (Courtenay, 2000; Oliffe, 2009). In contrast, the cultural ideals of femininity and other-orientation embrace competence in health-related matters, attention to own and others' health, and efficient use of health-enhancing resources (Courtenay, 2000; Reczek & Umberson, 2012).

Similar to femininity, *religiosity* can be positively related to internal HLOC. The relationship between religious beliefs and personal mastery can potentially reflect two mechanisms: *relinquished control* and *personal empowerment* (Schieman, Pudrovska, & Milkie, 2005). From the relinquished control perspective, religious individuals may rely on God to protect their health rather than taking actions themselves (Spilka & Schmidt, 1983; Wallston et al., 1999). Yet, research has been more consistent with the personal empowerment mechanism (Schieman et al., 2005). The belief in divine control is related positively to internal feelings of mastery, especially among women (Schieman et al., 2005). Religious beliefs may enhance personal control over health because most religions promote respect and care for the body as "the temple of the soul" and emphasize gratitude for good health and the gift of living (George, Ellison, & Larson, 2002). Individuals feel empowered by God to assume personal responsibility for health maintenance (Wallston et al., 1999). Gender differences in religiosity may create gender differences in health control beliefs. Individuals with higher levels of religious commitment and subjective religiosity experience a stronger positive relationship between divine control and personal control (Furnham, 1982), and women are more religious than men on almost all indicators of religious involvement (Roth & Kroll, 2007). Moreover, women are more likely than men to create a link between religious beliefs and health (Sointu & Woodhead, 2008).

**Hypothesis 2:** Women have *higher* levels of internal HLOC than men, and this gender difference is explained by women's lower levels of masculinity and higher levels of femininity and religiosity.

## Potential Cohort Differences

The gender gap in health control beliefs may differ across cohorts. Older generations of men and women were characterized by the traditional division of paid and unpaid work, where men were the primary breadwinners and women were homemakers and caregivers (Casper & Bianchi, 2002). The last 40 years have witnessed remarkable changes in women's work and family experiences, and opportunities available to women have expanded considerably (Schnittker, 2007). Compared with women in older cohorts, women in younger generations have higher levels of education, experience a smaller gender gap in earnings, and suffer less inequality in the division of unpaid family labor (Casper & Bianchi, 2002; Schnittker, 2007). Given women's increased education and labor market participation and men's greater tendency to share domestic responsibilities, men and women of younger cohorts are expected to be both accomplished workers and involved parents (Casper

& Bianchi, 2002). Because family and work domains of men and women have become more similar in recent decades, I hypothesize that gender differences in health control beliefs are larger in older cohorts and smaller in younger cohorts.

## Data

The data for this analysis come from two waves of the National Survey of MIDUS. The first wave was conducted in 1994 to 1995. The sample included 4,242 noninstitutionalized English-speaking adults aged 25 to 74 years in the coterminous United States. The data were collected both via phone interviews and self-administered questionnaires (SAQs). The response rate for the MIDUS I telephone interview was 70%. Among the telephone participants, 86.3% completed SAQs. A longitudinal follow-up was conducted in 2004 to 2006, with the retention rate of 70%. The sample in MIDUS II contained 2,257 participants, of which 1,805 (80%) completed SAQs. The analytic sample is this study is based on 1,748 individuals (791 men and 957 women) who participated in two waves and completed both phone interviews and SAQs because the health control items were included in the self-administered part of the survey whereas the information about most predictor variables was collected by phone.

### *Sample Attrition*

Attrition related to unobserved residual changes in the response variable may produce biased estimates. If internal HLOC increases the probability of attrition, the coefficients in my analysis may be biased. To address this possibility, I conducted logistic regression analysis to examine the effect of HLOC at baseline on the probability of participating in the follow-up. Although there is no evidence of outcome-dependent attrition bias, I use the Heckman two-step procedure to create a selection instrument adjust for the hazard of attrition in all models as an additional precaution.

### *Measures*

To assess *internal HLOC*, participants were asked about the extent of their agreement with the following statements: (a) "Keeping healthy depends on things that I can do"; (b) "I work hard at trying to stay healthy"; (c) "There are certain things I can do for myself to reduce the risk of a heart attack"; (d) "There are certain things I can do for myself to reduce the risk of cancer." The response categories range from (1) "strongly disagree" to (7) "strongly agree." Because

two health control items explicitly ask about preventing heart attack and cancer, we exclude participants who have ever been diagnosed with a non-skin cancer or had a heart attack. A sensitivity analysis shows that results from models with and without these participants are very similar (available on request). Factor analysis shows that the four items load on one factor (eigenvalue = 2.37) with factor loadings equal .82, .65, .84, and .75 for Items a, b, c, and d, respectively. The items were averaged to create a scale (Cronbach's $\alpha = .72$).

*Sociodemographic characteristics.* *Gender* is coded 1 for women and 0 for men. *Age* is coded in years. Participants were aged 25 to 74 years at Wave 1 and 35 to 84 at Wave 2, with a median age of 55 years. *Race* is categorized as White (reference category), Black, and other race.

*Physical health characteristics.* *Self-rated health* is represented with five categories ranging from (1) "poor" to (5) "excellent." *Problems with activities of daily living* (ADLs) reflect whether participants' health limited everyday activities, such as carrying groceries or climbing stairs. An indicator of *physical activity limited because of health* (1 = "not limited at all," 2 = "limited a little," and 3 = "limited a lot") and the *number of chronic illnesses* other than cancer or heart problems are also included. Finally, *pain* is coded 1 if a participant reported chronic pain.

*Generalized control* was measured as the extent of agreement with 12 statements, such as "What happens in my life is often beyond my control" and "What happens to me in the future mostly depends on me." Response categories range from (1) "strongly agree" to (7) "strongly disagree." Positively worded items were reverse-coded so that higher scores reflect higher levels of control. All items were averaged to create a scale ($\alpha = .84$). *Sociodemographic characteristics.* The categories of *education* include less than high school, high school, or GED (reference category), some college, bachelor's degree, and graduate or professional degree. The measure of *income* is a natural log of the total household income. *Employment* is coded 1 if a participant was working for pay at the time of the interview and 0 otherwise. *Occupational status* is reflected with the total-based 1990 occupational socioeconomic index (SEI). Because the effect of occupational SEI pertains only to employed persons, we include this variable not as an independent term but as an internal moderator of employment (McFarland, Pudrovska, Schieman, Ellison, & Bierman, 2013). *Marital status* is represented with a dummy variable coded 1 for those married at the time of the interview.

*Masculine* and *feminine orientations* are represented with two scales. The *masculinity* scale is based on the following traits participants used to describe themselves: self-confident, forceful, assertive, active, and dominant.

Participants indicated how well each item described them: (1) "a lot," (2) "some," (3) "a little," and (4) "not at all." All items were reverse-coded and averaged to create a scale (α = .76). Similarly, the *femininity* scale was obtained by averaging responses to the following items: caring, softhearted, sympathetic, and warm (α = .79).

*Religiosity* is assessed with four items. Participants were asked how religious they were and indicated the degree of their religiosity on a scale from (1) "very" to (4) "not at all." Participants also indicated the frequency with which they seek comfort through religious or spiritual means and rely on their religious beliefs to make decision. Response categories for both items range from (1) "often" to (4) "never." Finally, participants reported the degree to which they look to God for strength, support, and guidance, with response choices from (1) "a great deal" to (4) "none." All items were reverse-coded and averaged to create a scale (α = .86)

*Cohort.* Participants were categorized into five 10-year birth cohorts: born in the 1920s, 1930s, 1940s, 1950s, and 1960s. *Cohort* is included as an ordinal variable with five categories (0 = *the oldest cohort* and 4 = *the youngest cohort*).

All variables had 2% missing values on average. Missing values were imputed using the *mi* module for multiple imputation in Stata 12.1.

## Analytic Plan

First, I summarize all variables and test significant gender differences for means or proportions. Second, to examine the effect of gender on health control beliefs, a two-level random-intercept model is estimated with Level 1 units (measurements for an individual at 2 time points) nested within Level 2 units (individuals). This model can be represented by the following reduced-form equation (Rabe-Hesketh & Skrondal, 2008):

$$Y_{ij} = \left(\beta_{0j} + \zeta_{0j}\right) + \left(\beta_1 + \zeta_{1j}\right) Gender_{ij} + \sum_{k=1}^{q} \beta_k X_{kij} + \epsilon_{ij} \quad (1)$$

where $Y_{ij}$ is internal HLOC measured at occasion $i$ for individual $j$. The *fixed part* of the model contains the intercept $\beta_0$, the slope for the main effect of gender $\beta_1$, and coefficients $\beta_k$ for individual-specific explanatory variables. The *random part* of the model is represented with random effects $\varsigma_{0j} \sim N(0, \psi_{11})$ and $\varepsilon_{ijv} \sim N(0, \theta_{ij})$. The variances $\psi_{11}$ and $\theta_{ij}$ are estimated in the model. The two-level random-intercept model is used instead of a cross-sectional model because a longitudinal approach takes into account within- and between-individual variability and adjusts for unobserved heterogeneity by

incorporating the individual-specific error component $\varsigma_{0j}$. In addition, the model in Equation (1) can be extended to explore how gender differences in health control beliefs vary by age and across cohorts. Using age as a time-varying covariate and cohort and as a time-invariant covariate, I estimate the fixed-effects of age and cohort (Models 1-8 of Table 2) as well as the three-way interaction among gender, age, and cohort (Model 9 of Table 2). In a sensitivity analysis (available on request), I estimated a fixed-effects model, and the findings were very similar to the random-effects specification. Therefore, I present results from the random-effects model because it is more efficient and unbiased, as indicated by the Hausman test. Finally, although there is no evidence of outcome-dependent attrition bias, all models adjust for the hazard of attrition as an additional precaution.

## Results

Table 1 shows that women report higher levels of internal health control beliefs than men ($p < .001$). Furthermore, compared with men, women exhibit significantly worse self-rated health and more chronic illnesses, problems with ADLs, physical activity limitations, and pain. Similarly, women are disadvantaged compared with men in terms of socioeconomic resources. As expected, more men (78%) than women (67%) are married. Finally, men exhibit higher levels of global control and masculinity, whereas women report higher levels of femininity and religiosity.

Model 1 in Table 2 indicates that adjusting for age, cohort, and race, women report significantly higher levels of internal HLOC than men ($b = .279$, $SE = .033$, $p < .001$). This difference, although not large in magnitude, is not trivial because it comprises one third of the standard deviation. Moreover, the gender gap in health control beliefs *increases* even further after adjustment for some characteristics, as discussed below. Model 2 indicates that better self-rated health is associated positively with health control beliefs, whereas the number of chronic illnesses and limited physical activity have a negative effect. The coefficient for gender increases from .279 in Model 1 to .363 in Model 2, or by 30%. This increase occurs because physical health characteristics *suppress* the gender difference in health control beliefs. Compared with men, women report poorer self-rated health, more chronic conditions, and more functional limitations—all factors associated negatively with health control beliefs. Were it not for their worse health characteristics, women would have reported even higher levels of internal health control compared with men.

Model 3, adjusting for socioeconomic characteristics, reveals that persons with at least some college education report stronger health control beliefs than those with a high school degree or less. Moreover, higher occupational SEI is

**Table 1.** Summary Statistics for the Study Variables by Gender: MIDUS, 1994-2005 (*N* = 1,748).

| | Men | Women |
|---|---|---|
| Variable | (*n* = 791) | (*n* = 957) |
| Internal Health Locus of Control Scale | 5.95 | 6.12*** |
| | (0.90) | (0.84) |
| Age | 55.63 | 55.94 |
| | (12.94) | (13.26) |
| White | 0.95 | 0.93*** |
| Physical health | | |
| Cancer ever | 0.12 | 0.15** |
| Heart problems ever | 0.21 | 0.16*** |
| Self-rated health | 3.84 | 3.68* |
| | (0.96) | (0.97) |
| Number of chronic illnesses | 2.59 | 3.04*** |
| | (2.25) | (2.59) |
| Problems with ADLs | 1.81 | 2.12** |
| | (0.84) | (0.96) |
| Limited physical activity | 2.27 | 2.51*** |
| | (1.12) | (1.17) |
| Pain | 0.27 | 0.31** |
| Socioeconomic resources | | |
| Education | | |
| Less than high school | 0.06 | 0.07** |
| High school | 0.25 | 0.31*** |
| Some college | 0.27 | 0.31*** |
| College graduate | 0.23 | 0.16*** |
| Post-graduate education | 0.20 | 0.15*** |
| Currently employed | 0.61 | 0.56*** |
| Occupational socioeconomic index (SEI) | 42.33 | 38.34*** |
| | (13.83) | (14.33) |
| Total household income (ln) | 10.96 | 10.65*** |
| | (.94) | (1.34) |
| Married | 0.78 | 0.67*** |
| Generalized personal control | 5.70 | 5.53*** |
| | (0.98) | (1.06) |
| Masculinity | 2.85 | 2.68*** |
| | (0.58) | (0.60) |
| Femininity | 3.29 | 3.61*** |
| | (0.57) | (0.46) |
| Religiosity | 2.63 | 3.02*** |
| | (0.93) | (0.84) |

*Note.* Means and standard deviations (in parentheses) are reported. MIDUS = Midlife Development in the United States; ADLs = activities of daily living.
Asterisks denote significant differences between women and men: *$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed).

**Table 2.** Two-Level Random-Intercept Models Predicting Internal Health Locus of Control: MIDUS, 1994-2005 ($N$ = 1,748).

| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Fixed part | | | | | | | | | |
| Gender (women = 1) | .279*** (.033) | .363*** (.035) | .318*** (.035) | .289*** (.035) | .324*** (.031) | .356*** (.032) | .152*** (.034) | .217*** (.034) | .155*** (.034) |
| Age | −.009*** (.002) | −.007*** (.002) | −.009*** (.002) | −.009*** (.002) | −.008*** (.002) | −.008*** (.002) | −.008*** (.002) | −.009*** (.002) | −.001 (.002) |
| Cohort | −.120*** (.025) | −.139*** (.025) | −.124*** (.025) | −.120*** (.025) | −.115*** (.025) | −.103*** (.025) | −.105*** (.025) | −.111*** (.025) | −.104*** (.025) |
| Gender × Age | | | | | | | | | .008 (.006) |
| Gender × Cohort | | | | | | | | | .029 (.049) |
| Age × Cohort | | | | | | | | | −.002* (.001) |
| Gender × Age × Cohort | | | | | | | | | −.0002* (.0001) |
| Physical health | | | | | | | | | |
| Self-rated health | | .235*** (.018) | | | | | | | |
| Number of chronic illnesses | | −.020** (.008) | | | | | | | |
| Problems with ADLs | | .009 (.031) | | | | | | | |
| Limited physical activity | | −.142*** (.017) | | | | | | | |
| Pain | | −.047 (.039) | | | | | | | |
| Socioeconomic | | | | | | | | | |
| High school | | | ref | | | | | | |
| Less than high school | | | .012 (.073) | | | | | | |
| Some college | | | .091* (.044) | | | | | | |
| College graduate | | | .146** (.056) | | | | | | |
| Post-graduate education | | | .142* (.062) | | | | | | |
| Currently employed | | | .026 (.054) | | | | | | |
| Employed × Occupational SEI | | | .044† (.025) | | | | | | |
| Total household income (ln) | | | −.008 (.013) | | | | | | |

*(continued)*

**Table 2. (continued)**

| Variable | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
|---|---|---|---|---|---|---|---|---|---|
| Married | | | | .057† (.034) | | | | | |
| Generalized personal control | | | | | .284*** (.015) | | | | |
| Masculinity | | | | | | .441*** (.025) | | | |
| Femininity | | | | | | | .377*** (.029) | | |
| Religiosity | | | | | | | | .187*** (.018) | |
| Constant | 6.036 | 5.677 | 6.018 | 6.058 | 4.982 | 5.286 | 5.328 | 5.809 | 5.505 |
| Random part | | | | | | | | | |
| Level 2 random intercept variance $\psi_{11}$ | .206 (.018) | .183 (.017) | .205 (.018) | .207 (.018) | .160 (.017) | .183 (.017) | .192 (.018) | .201 (.017) | .244 (.019) |
| Level 1 variance $\theta_{ij}$ | .468 (.017) | .459 (.016) | .467 (.017) | .467 (.017) | .471 (.017) | .459 (.017) | .469 (.017) | .464 (.017) | .433 (.016) |
| Log likelihood | −3,825 | −3,758 | −3,819 | −3,825 | −3,744 | −3,734 | −3,783 | −3,791 | −3,821 |

*Note*. All models adjust for race and the hazard of attrition. MIDUS = Midlife Development in the United States; ADLs = activities of daily living; SEI = socioeconomic index.
†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$ (two-tailed).

marginally related to higher internal locus of control ($p < .10$). The coefficient for gender increases from .279 in Model 1 to .318 in Model 3, or by 14%, which suggests that education and occupational prestige also suppress the effect of gender. Women, on average, have lower levels of education and occupational SEI than men. Were it not for their lower socioeconomic attainment, women would have reported even stronger health control beliefs than men. Model 4 shows that marital status is marginally related to health control beliefs ($p < .10$), with the married reporting somewhat higher levels of health control than the unmarried. Yet, marital status neither explains nor suppresses the focal gender difference. Model 5 includes the generalized sense of control that is related positively to health control ($b = .284$, $SE = .015$, $p < .001$). The coefficient for gender increases from .279 in Model 1 to .324 in Model 5, or by 16%. Women, on average, have lower levels of generalized personal control than men, and this difference suppresses the gender gap in health control beliefs. If women had the same level of the general sense of control as men, women would have been even more likely than men to believe in controlling their health.

Models 6 and 7 adjust for masculinity and femininity, respectively. Masculinity is associated positively with health control beliefs ($b = .441$, $SE = .025$, $p < .001$). Yet, the gender gap in perceived control over health increases by 28% after adjustment for masculinity because men have higher masculinity than women. If women had the levels of masculinity as high as men's, women would have expressed even stronger health control beliefs. Femininity, just like masculinity, is related positively to health control beliefs ($b = .377$, $SE = .029$, $p < .001$). In contrast to masculinity, however, the gender gap *decreases* by 44% after adjustment for feminine orientation. The mediating effect of femininity is significant at the .001 level, as indicated by the Sobel–Goodman mediation test. Thus, femininity explains the gender difference in health control beliefs more than any other variable. Individuals who are caring, softhearted, sympathetic, and warm are more likely to believe in internal HLOC. Women's higher levels of femininity-related traits explain almost half of the gender gap in health control beliefs.

As shown in Model 8, after adjustment for religiosity, the effect of gender declines from .279 in Model 1 to .217 in Model 8, or by 22%. The Sobel–Goodman test indicates that this decline is significant at the .01 level. Religiosity is associated positively with internal HLOC, and women, on average, have higher religiosity than men. Religiosity is the only other variable in this study that partially explains the effect of gender.

Finally, the analysis explored age and cohort effects on the gender gap in health control beliefs. Model 9 in Table 2 shows a significant three-way interaction among gender, age, and cohort ($b = -.0002$, $SE = .0001$, $p < .05$). As hypothesized, I found cohort differences in the effect of gender on internal

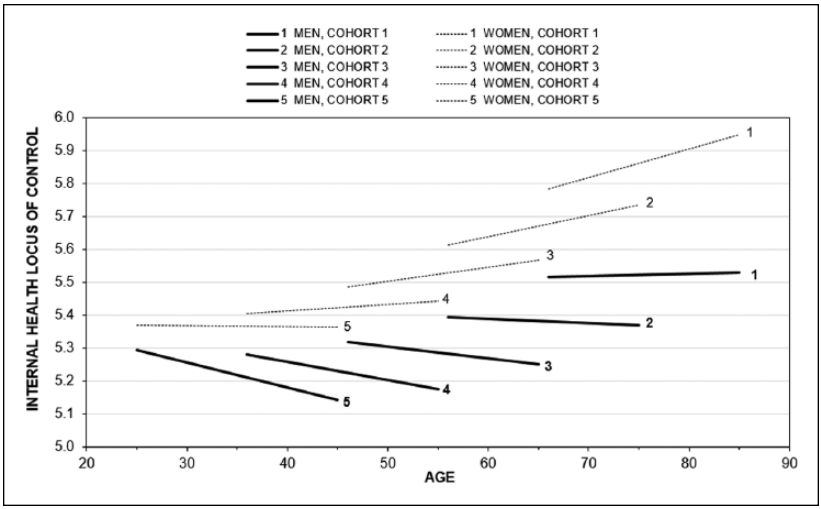


**Figure 1.** Internal health locus of control among men and women in five birth cohorts: MIDUS, 1994-2005 (*N* = 1,748).
*Note*. Figure 1 is based on Model 9 in Table 2. MIDUS = Midlife Development in the United States.

health control illustrated in Figure 1. Internal HLOC increases with age, especially for women. Although women have higher levels of internal health control than men in each cohort, men and women in younger cohorts are more similar in terms of health control beliefs than men and women in older cohorts. The gender gap is particularly pronounced among persons born in the 1920s and decreases for each successive birth cohort.

## Discussion

Using data from the National Survey of MIDUS, I examined gender differences in the internal HLOC among middle-aged and older adults. The findings reveal that compared with men, women express a significantly higher level of internal HLOC. Although I could not explain this gender gap completely, I found two characteristics that reduce it substantially: femininity and religiosity.

### *Femininity*

As hypothesized, individuals with more femininity traits reflecting other-orientation, warmth, and nurturance exhibit higher levels of internal health

control. Because women self-attribute higher average levels of femininity qualities than men, women express stronger beliefs in personal control over health. Indeed, femininity explains 44% of the gender gap in health control beliefs. Interestingly, I find that masculinity is also related *positively* to proactive health beliefs. Yet, masculinity does not explain the gender difference in internal HLOC but makes it more pronounced because women self-attribute fewer masculinity traits than men. If women were similar to men in terms of masculinity, women would have reported even stronger beliefs in personal control over health.

This study suggests that traits associated with masculinity are not detrimental to health control beliefs. It appears that a risk for poor health maintenance and health neglect may stem from the lack of communion and other-orientation rather than simply from "masculine" orientation and focus on personal achievement. Previous research has shown how adherence to the ideals of hegemonic masculinity increases unhealthy behaviors and decreases commitment to caring for one's health (Courtenay, 2000; Oliffe, 2009). Hegemonic masculinity may be detrimental to health because it is unbalanced by "feminine" traits of communion and other-orientation. Women report higher levels of personal responsibility for health *because of* their higher femininity and *despite* their lower masculinity. Because both masculinity and femininity can have adverse health consequences when they are taken to their extremes (Helgeson, 1994), their balance is important for optimal health (Hunt, Lewars, Emslie, & Batty, 2007; Lefkowitz & Zeldow, 2006; Moore, 2007).

## *Religiosity*

Consistent with the personal empowerment hypothesis, religiosity is associated positively with internal HLOC. Because women have higher levels of religiosity than men, the effect of gender on health control beliefs declines by 22% after adjustment for religiosity. It is interesting that religiosity and femininity are similar in terms of their relationship to health control beliefs and the explanation of gender differences. Religiosity is closely related to femininity traits reflecting other-orientation. Religiosity and spirituality are associated positively with altruism and caring for others (Thompson & Remmes, 2002) as well as with prosocial tendencies, including agreeableness and benevolence (Saroglou & Munoz-Garcia, 2008). Wink and Dillon (2003) point to a direct link between other-orientation and religiosity by suggesting that "religiousness is more closely related to a communal mode of functioning characterized by a focus on participation in a mutual, interpersonal reality" (p. 922). In this way, femininity and

religiosity can be integrated in a coherent framework that underscores the idea that communal disposition and other-orientation may enhance beliefs of personal care and responsibility for own health. Nurturance, warmth, and caring may increase self-regulation and impetus to work on one's health because of the sense that a person's good health matters for the well-being of other people (Umberson, 1987). Commitment to one's health is bolstered by the prosocial motivation to be a source of support rather than burden for others (Pudrovska, 2010).

## *Other Potential Explanations*

This study indicates that physical health, SES, and global personal control are associated positively with health control beliefs, and women have lower levels of these resources than men. Yet, after adjustment for these variables, the gender gap in health control beliefs *increases*. Women express stronger beliefs in personal control over health than men *despite* women's worse health and lower SES and self-efficacy. If women were comparable with men in terms of these resources, women's internal HLOC would be even higher. Thus, gender inequality in the distribution of resources suppresses the gender gap in internal HLOC.

## *Cohort Effects*

Although women report higher levels of health control beliefs than men in every cohort, this gender difference is significantly greater in older cohorts than younger cohorts. Men's internal HLOC relative to women's is the lowest in the 1920s birth cohort and the highest among people born in 1960s. The cultural norms of masculinity and femininity may be gradually changing because of macrosocial processes that encourage egalitarian gender relations. This study suggests that the strongest explanation for the gender gap in health control reflects women's higher levels of communal traits associated with femininity. Because men's and women's social roles become increasingly similar for each successive birth cohort (Casper & Bianchi, 2002), it is likely that men of younger cohorts also approach their female peers in terms of communal orientation and health control beliefs. It is a balanced combination of masculinity and femininity, rather than each of them taken to an extreme, that is associated with positive physical and mental health outcomes (Helgeson, 1994). Thus, increasing overlap and permeability of boundaries between masculinity and femininity may have beneficial consequences for health behaviors and health outcomes of future cohorts of older adults.

### *Limitations and Future Research*

About half of the gender gap in personal control over health remains unexplained by all variables in this study. In addition to individual characteristics, macrosocial and cultural factors can further contribute to gender differences in health control beliefs. For example, women may be more likely than men to feel personal responsibility for health because the public discourse of breast cancer that has become very powerful and pervading since the 1970s encourages women to take charge of their health and get personally involved in the prevention and treatment of breast cancer (Clarke & Everest, 2006). Future research should examine how macrosocial influences on women's and men's health beliefs may create the gender gap in internal HLOC. Furthermore, the present study uses measures of psychological traits associated with masculinity and femininity. Given that masculinity and femininity are multi-dimensional constructs involving not only personality traits, but also gender attitudes, behaviors, and preferences (Helgeson, 1994; Lefkowitz & Zeldow, 2006; Pudrovska, 2010), an important direction for future research will be to create measures reflecting multiple dimensions of masculine and feminine orientations. Finally, 90% of the MIDUS sample is White. Although race is included in all models, the number of non-White participants is not sufficient to examine how gender patterns and explanations for these patterns differ by race. Future research should be based on samples that allow a detailed exploration of the interaction between gender and race.

## Conclusion

The present study based on a national longitudinal data set is an important step in documenting the social distribution of internal HLOC and elucidating mechanisms linking gender to health control beliefs. These findings also have clinical implications by suggesting that interventions aimed at developing and increasing other-orientation, communal outlook, and nurturance may cultivate proactive health beliefs and, ultimately, improve healthy behaviors and self-care among men. Older men who were socialized to adhere to more traditional masculine self-schemas may particularly benefits from such interventions.

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