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Perceived Work Environment and Cognitive Functioning

Cindy M. de Frias & K. Warner Schaie

The Pennsylvania State University

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The Pennsylvania State University, Department of Human Development and Family Studies, 115 Henderson Building South, University Park, PA 16802.

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Given the current demographic trends, the workforce is becoming increasingly older with fewer workers available at entry positions. Of interest perhaps now more than before is how characteristics of the workplace influence cognitive performance throughout the working life span. Research has shown that individual differences in cognitive performance can be attributed to demographic and personal attributes (Schaie, 1989). For example, factors shown to reduce the likelihood of decline in cognitive abilities include: engagement in an intellectually stimulating and complex environment; and maintaining flexible personality attributes at midlife (Schaie, 1996). Further research is needed to delineate particular job characteristics that moderate the relationship between cognitive functioning and age (Avolio & Waldman, 1990). Additional knowledge of individual differences in cognitive performance will be gained by exploring dynamics of the work environment.

A prominent project investigating intellectual functioning and work characteristics includes the work of Kohn and Schooler (1983). These researchers have studied the direction of the causal effects between occupational self-direction, defined as initiative, thought, and independent judgement concerning work which may be supported by some job conditions and hindered by others, and psychological functioning. That is, whether occupational self-direction affects or reflects psychological characteristics or merely job molding and selective recruitment. They believe that there exists a continuous exchange throughout an individual's career. Kohn and Schooler (1983) looked at the reciprocal relationship between one dimension of occupational self-direction (i.e., substantive complexity of work) and one dimension of psychological functioning (i.e., intellectual flexibility). Causal models were assessed to look at both contemporaneous and lagged reciprocal effects. Their study consisted of men tested in 1964 and again in 1974. A

contemporaneous effect was found for substantive complexity on ideational flexibility, whereas, a lagged effect was found between ideational flexibility to substantive complexity. The effect of substantive complexity on ideational flexibility is immediate indicating that requirements of one's present job influences one's present thinking patterns (Kohn & Schooler, 1983). Job conditions may not be structured to allow variations in substantive complexity to meet the needs of workers, but overtime workers may be more able to modify job conditions or switch to jobs more compatible with their intellectual functioning. These findings lend support to the view of a reciprocal relationship between job conditions and psychological functioning overtime (Kohn & Schooler, 1983). Schooler (1987) claims that complex environments supporting initiative and independent judgement increased men's intellectual flexibility and a self-directed orientation, whereas, jobs that do not foster occupational self-direction will decrease men's intellectual flexibility and lead to a conformist orientation. Exposure to simple environments for lengthy periods may be detrimental to cognitive performance especially, intellectual flexibility (Schooler, 1987). The effect of occupational self-direction on psychological functioning was also found with women. Women in substantively complex and nonroutine work showed more ideational flexibility and were more receptive to innovation and change (Kohn & Schooler, 1983). Cross-cultural similarities were also found in Poland (Miller, Slomczynski, & Kohn, 1985), and Japan (Naoi & Schooler, 1985).

The negative relationship between age and basic cognitive processes has implications for aging and work performance (Salthouse, 1994). Salthouse (1994) suggests reasons for not finding expected decline in work performance with increasing age. These include selective attrition where only the most competent workers remain in their job until later adulthood; and given that with increasing age comes increased experience, experience is beneficial in work

settings, but not necessarily in cognitive ability tests (lending to occupation-specific knowledge). Indeed, Avolio and Waldman (1994) found that education was a significant predictor of cognitive performance beyond age, race, and sex.

Avolio, Waldman, and McDaniel (1990) looked at the influence of experience and five occupation types on work performance. They found that across occupations job experience was a better predictor of work performance than age. There was a moderating effect for occupational type where both age and experience predicted performance more successfully for complex jobs. Performance declined among older workers in less complex jobs. Implications for these findings are that experience is salient in highly complex jobs, but becomes less useful in less complex jobs. Performance in routine, less complex jobs may accelerate decline, especially if workers become bored with their tasks (Avolio et al., 1990). Cognitive development may be enhanced across the life span by providing incentives for workers to become involved in intellectually challenging tasks (Avolio & Waldman, 1990).

Rebok, Offermann, Wirtz, and Montaglione (1986) hypothesized that social environmental variables associated with complexity of the work environment (e.g., substantive nature of job demands, and organizational level) would be a better indicator of managerial processing than age. They looked at the cognitive processing style (e.g., use of delegation or time management strategies) of mid-level managers. Findings suggest that managers using time management strategies indicated higher feelings of competence and less decline in their managerial processing abilities. Time management is a technique that facilitates processing which allows for enhanced feelings of competence. Organizational characteristics (e.g., supervisory experience and level) and age were not related to use of time management techniques. This finding contradicts Birren's (1969) finding of older experienced professionals reporting the use of time management strategies.

Avolio and Waldman (1990) examined whether job complexity and occupational type moderates the relationship between age and cognitive performance. That is, how cognitive demands in a job relate to differences in cognitive performance in young and old workers. They proposed that cognitive abilities will be continuously used in complex jobs, thereby reducing age differences. Results indicate that job complexity was not a significant moderator, but a weak occupation by age interaction was found that predicted cognitive test scores. Job complexity accounted for the greatest amount of variance in test performance compared to age and experience. Longitudinal research is needed to investigate whether more competent individuals are recruited into particular jobs or whether job experiences result in age-related declines in cognitive abilities. Preferences regarding level of job complexity may illuminate how individuals with similar abilities will overtime exhibit different rates of change in abilities (Avolio & Waldman, 1990).

With the increase in the aged workforce considering the relationships among aging, cognition, and work performance is important (Park, 1994). Compensatory mechanisms (e.g., collaboration and external aids, see Dixon, 1992, 1995) may be implemented in work situations to help maintain performance levels. Birren (1969) found that middle-aged career individuals dealt with time management, and conserved cognitive resources by using colleagues for advice and assistance. Equal opportunities need to be provided for adult workers of any age who hold the same competence levels (Sterns, Barrett, Czaja, & Barr, 1994).

Job complexity has also been linked to work satisfaction. For example, Gould (1979) examined the influence of career stages on the relationship between job complexity and work satisfaction. Job complexity was defined as the degree that the job lacks repetition and

routinization, fosters independent judgement, and demands creativity and originality. Results suggest a strong positive relationship between perceived job complexity and work satisfaction during the trial career stage (under 30 years of age). A significant negative relationship was not found between job complexity and work satisfaction for the older career group (maintenance stage, ages 45 years and over). A reason for this finding is that workers at this stage have gained experience and tenure, thus the perception of complexity is not as threatening (Gould, 1979). Repetti and Cosmas (1991) found a moderate relationship between quality of the social environment at work and job satisfaction among nonmanagerial bank employees. Spector (1986) reported that perceptions of control at work was positively related to job satisfaction, in addition to motivation, commitment, performance, and involvement.

Wooten, Barner, and Silver (1994) investigated the influence of cognitive style (to assess field independence) on preferences in the work environment among undergraduates. Findings suggest an association between cognitive style and perceptions of an ideal work environment. Field-independent participants preferred a work environment fostering involvement, innovation, and autonomy. Bunce and West (1995) investigated the effect of personality and perceived group climate on innovation. Findings suggest that although both are important predictors of innovation at work, personality variables (especially propensity to innovate) explained a greater amount of the variance for changes in innovation.

Although research exists concerning the relationship between job complexity and cognitive abilities, more information is needed regarding how other work conditions influence cognitive abilities. The focus of the present study is to expand our knowledge of the relationship between perceived work environment and cognitive performance. The dimensions of interest for characterizing the work environment include Moos's (1986) dimensions of Autonomy, Control,

and Innovation. The hypotheses investigated include: (1) Perceptions of the work environment will vary according to age and gender; (2) Occupational type will moderate the age and gender relationship on perceived work environment; and (3) Perceived work environment will predict cognitive style after controlling for demographic variables.

Method

Participants

The present sample consisted of participants who were drawn from the Seattle Longitudinal Study (SLS), an on-going longitudinal-sequential study of adult cognitive development. Participants were volunteers recruited at random, stratified by age and gender, from the membership of a Health Maintenance Organization (Group Health Cooperative of Puget Sound). Participants were drawn from two samples: The Family Study (offspring and siblings of the longitudinal sample), tested in 1989; and the Longitudinal Study, tested in 1991. The present sample comprised of 2,710 participants (1,170 men and 1,540 women) who ranged in age from 21 to 93 years (M = 54.1 years, SD = 16.8). The sample had a mean education level of 15.1 years (SD = 2.7, range = 6-21 years) and a mean income bracket of $26,000 to $27,999. The participants worked in a number of occupations (ranging from blue collar (5) to professional (9), M = 7.1, SD = 1.4). The sample was disaggregated into nine age groups (see Table 1).

Measures

All participants were given the Work Environment Scale (WES) (Moos, 1981). This test measures participant's perceptions of their existing work environment. Participants who were retired at the time of testing were asked to answer the questions based on their last major job. This test was reduced to five items and measured on a five-point Likert scale. Three of the original ten WES subscales were included in this study. These subscales include:

Autonomy. - This scale measures the extent to which employees are encouraged to both make independent decisions and to be self-sufficient.

Control. - This scale measures the extent to which rules and pressures are used by management to control their employees.

Innovation. - This scale measures the degree to which variety, change, and novel approaches are emphasized.

The Test of Behavioral Rigidity (TBR). The TBR contains three subtests that reflect measures of cognitive style (Schaie & Parham, 1975). Three factor scores representing latent dimensions were derived from the TBR. Motor-Cognitive Flexibility (MCF) measures the individual's ability to shift between tasks and to adjust to change in demands. Attitudinal Flexibility (AF) measures the individual's ability to perceive and respond to new or unfamiliar patterns in cognitively induced situations. Psychomotor Speed (PS) measures the individual's rate in responding to familiar tasks.

Analyses

For all the analyses reported, alpha levels of $p < .05$ were utilized to indicate statistical significance. The analyses conducted are as follows: 1) A 2 (gender) x 9 (age group) Multivariate Analysis of Variance (MANOVA) was performed on the three Moos subscales; 2) A 2 (gender) x 9 (age group) x 5 (occupation type) MANOVA was performed on the three Moos subscales. Post-hoc comparisons of means was performed with Tukey's Honest Significance Difference (HSD) test for unequal cell sizes; and 3) Hierarchical regression was used to determine whether perceived work environment predicted cognitive style after controlling for demographic variables.

Results

Gender and Age Group Differences in Perceived Work Environment

A 2 (gender) x 9 (age group) MANOVA was conducted to examine the mean level differences between gender and age group on measures of perceived work environment: Autonomy, Control, and Innovation. The combined perceived work environment scores were significantly affected by gender, (Rao's $R[3, 2,690] = 13.02$, $p < .001$), and age group, (Rao's $R[24, 7,802] = 12.46$, $p < .001$), but not significantly affected by the gender by age group interaction, (Rao's $R[24, 7,802] = 1.51$, $p > .05$). Univariate F-tests revealed a significant effect for gender on Control and Innovation (see Table 2 for summary statistics). Post hoc univariate analyses revealed that women ($M = 17.22$) reported higher scores on the Control measure than men ($M = 16.73$), whereas, men ($M = 17.45$) reported higher Innovation scores than women ($M = 16.80$) (refer to Figure 1 for a plot of gender effects). Univariate F-tests revealed significant main effects for age group on all three measures of perceived work environment: Autonomy, Control, and Innovation (refer back to Table 2 for summary statistics and see Table 3 for associated means). As shown in Figure 2, a curvilinear shape exists for perceived work environment scores across age groups. Thus, scores are relatively low both at the start and at the end of one's work life, but remain relatively high during the active working years. On the Autonomy measure, the oldest age group (1) did not differ from the second oldest age group (2) or the youngest age group (9), but scored lower than all other age groups (3-8). On the Control measure, the two older age groups (1 and 2) did not differ from each other or from the youngest age group (9), but scored lower than all other younger age groups (3-8). The age group (4) approaching the end of the work life and the age group (9) at the start of the work life scored lower than the age groups (5-6 and 5-7, respectively) distal from retirement. On the Innovation measure, the oldest age group did not differ from the second oldest age group, but scored lower

than all other age groups (3-9). The second oldest age group scored lower than the age groups (5-8) distal from retirement. The age groups (3 and 4) either approaching or at the end of their work life scored lower than the age groups (6 and 7) distal from retirement.

Differences in Perceived Work Environment Based on OccupationType

A second MANOVA was performed to investigate whether occupation type moderated the relationship between gender and age group on measures of perceived work environment. A 2 (gender) x 9 (age group) x 5 (occupation type) MANOVA was performed on the same three dependent variables: Autonomy, Control, and Innovation. Reported here will be the significant effects for occupation type as the age group and gender effects were discussed in the previous section. The combined dependent measures were significantly affected by occupation type (Rao's $R[12, 5{,}561] = 12.15$, $p < .001$). The only significant interaction occurred between gender and occupation type (Rao's $R[12, 5{,}561] = 3.98$, $p < .001$). The age group by occupation type interaction was not significant indicating that age relations are similar across the five occupation categories. Univariate F-tests revealed significant main effects for occupation type and the gender by occupation type interaction on all three measures of perceived work environment: Autonomy, Control, and Innovation (refer back to Table 2 for summary statistics and Table 4 for associated means). Post hoc univariate analyses for the occupation main effect revealed that workers in blue collar jobs scored lower on the Autonomy measure than workers in managerial, semi- and professional occupations, while clerical/sales workers scored lower than workers in managerial and professional jobs. On the Control measure, blue collar workers scored lower than all other workers. Clerical/sales workers scored lower than managerial and professional workers. Managerial workers scored higher than semi-professional workers. On the Innovation measure, blue collar and clerical/sales workers scored lower than managerial, semi- and professional

workers. Semi-professionals scored lower than professionals (see Figure 3).

For the gender by occupation type interaction, on the Autonomy measure, men and women in their respective occupation categories did not differ from each other. Blue collar men scored lower than men and women in most occupational categories. Women in clerical/sales jobs scored lower than men and women in managerial jobs, and men in semi- and professional jobs. Women in blue collar jobs scored lower than men in managerial and professional jobs. Men in managerial jobs scored higher than women in semi- and professional jobs. Men in professional jobs scored higher than women in semi-professional jobs. On the Control measure, blue collar men had the lowest score. Men and women in clerical/sales, managerial, and semi-professional jobs did not differ in their respective occupation categories. However, for professional jobs men scored higher than women, while in blue collar jobs women scored higher than men. Women in clerical sales scored lower than men and women in managerial jobs, and men in professional jobs. Women in blue-collar jobs scored lower than men and women in managerial jobs, and men in professional jobs. Men in managerial jobs scored higher than women in professional jobs. On the Innovation measure, men and women did not differ from each other in their respective jobs. Overall, women in clerical/sales jobs scored lower than men and women in managerial, semi- and professional jobs. Blue collar men scored lower than men in clerical/sales jobs, and men and women in managerial, semi- and professional jobs. Men in managerial jobs scored higher than women in semi-professional jobs. Women in blue collar jobs scored lower than men and women in managerial and professional jobs, and men in semi-professional jobs (see Figure 4).

Perceived Work Environment and Cognitive Style

Hierarchical regression analyses were used to examine the concurrent relationship between perceived work environment and cognitive style while controlling for demographic variables.

Since variables such as gender, education, and occupation type will account for a significant portion of the variance in cognitive performance, the test of a significant amount of additional variance explained by work variables will be more conservative. The first model entered included gender, education, and occupation type to determine the effects of demographic variables on cognitive functioning. The second model entered included the demographic variables, followed by the work variables to determine the effects of work after controlling for demographic characteristics. The third model entered included the demographic and work variables, followed by age to determine the variance that remains related with age after individual differences in perceived work environment were controlled.

The results of the analyses are reported in Table 5, and indicate that perceived work environment was predictive of cognitive style after controlling for gender, education, and occupation type. Perceived work environment accounted for an additional 4% to 6% of the variance in Attitudinal Flexibility, Motor-Cognitive Flexibility, and Psychomotor Speed. Age accounted for an additional 4% to 20% of the variance in the three measures of cognitive style.

Discussion

The present study focused on differences in perceived work environment, and the relation between perceived work environment and cognitive functioning. The results of this study provide further support for Kohn and Schooler's (1983) research on occupational conditions and intellectual functioning. Indeed, findings from the hierarchical regression analyses indicate that work conditions are predictive of cognitive functioning. In addition, age accounted for substantial amount of variance indicating that systematic differences by age exist and remain to be explained.

Though the effects were small, the curvilinear shape in the age differences in perceived work environment suggests that the oldest and youngest age groups did not differ from each

other, but scored lower than individuals in the middle- to young-old age groups. Thus, individuals at the start and end of their work life perceive their work climate as characteristic of less autonomy, control, and innovation. Possible explanations for age differences include the likely event that young adult workers may not have gained the experience required to be given responsibilities requiring control, innovation and independent judgement. Whereas, older adult workers may have reached burnout or disengagement. Indeed, disengagement has been related to higher declines in cognitive ability, whereas, high engagement in the environment leads to higher ability performance (Gribbin, Schaie, & Parham, 1980). By allowing older adult workers to make their own decisions, emphasizing variety and change, and minimizing rules may enable the worker to become more engaged in his or her work environment, thereby, reducing the risk of cognitive decrement throughout the working life span. Another possible explanation for the age differences that cannot be ruled out is that age group may be confounded, such that more jobs now are characteristic of autonomy, control, and innovation. The shifts in job characteristics and changes in the opportunities in the work life may have resulted in the age differences.

Not surprising, the current study indicates that workers in relatively less complex jobs reported less perceived autonomy, control, and innovation in the workplace. In addition, gender has been shown to influence the relationship between occupation type and perceived work environment. Implications of this finding are that new job tactics need to be introduced in the work setting to support occupational self-direction as described by Kohn and Schooler (1983) and intellectual stimulation which may enhance job performance. Schooler (1987) claims that factors needed to foster the development or maintenance of high levels of cognitive abilities and self-directedness (e.g., awards and incentives) may not be characteristic of simple environments. Thus, we need to learn and seek out how environments that lend themselves to suitable levels of

cognitive functioning can be supported (Schooler, 1987). Appropriate feedback may reinforce workers to seek out intellectually demanding tasks, thereby, benefiting cognitive performance (Avolio & Waldman, 1990). Learning how and which contextual factors lead to the maintenance and decrement in cognitive performance is crucial given the recent changes in the age distribution.

Future Research

The present study does not provide longitudinal data, thus directionality of effects cannot be determined. Future longitudinal research is necessary to test whether competent individuals are selected into jobs or whether job conditions and experiences influence cognitive abilities (Avolio & Waldman, 1990). Of interest would be how the WES relates to nonwork activities. The learning-generalization model mentioned by Kohn and Schooler (1983) indicates that knowledge gained in the work environment can be transferred to other realms.

Studies have shown that cognitive abilities can be improved through training (Schaie & Willis, 1986; Willis & Nesselroade, 1990). The introduction of complex tasks, innovation, autonomy, and control in the work setting may be a natural tactic for enhancing cognitive functioning. These job conditions may be supportive of plasticity and the developmental course of the aging adult (Baltes, 1987). Since job conditions have been linked to cognitive functioning, the development and maintenance of an intellectually stimulating work climate should be supported. The development of interventions to alter job settings can lead to a more competent workforce which may be especially important at advanced ages (Avolio & Waldman, 1990).

References

Avolio, B. J., & Waldman, D. A. (1990). An examination of age and cognitive test performance across job complexity and occupational types. Journal of Applied Psychology, 75, 43-50.

Avolio, B. J., & Waldman, D. A. (1994). Variations in cognitive, perceptual, and psychomotor abilities across the working life span: Examining the effects of race, sex, experience, education, and occupational type. Psychology and Aging, 9, 430-442.

Avolio, B. J., Waldman, D. A., & McDaniel, M. A. (1990). Age and work performance in nonmanagerial jobs: The effects of experience and occupational type. Academy of Management Journal, 33, 407-422.

Baltes, P. B. (1987). Theoretical propositions of life-span developmental psychology: On the dynamics between growth and decline. Developmental Psychology, 23, 611-626.

Birren, J. E. (1969). Age and decision strategies. Interdisciplinary Topics in Gerontology, 4, 23-36.

Bunce, D., & West, M. A. (1995). Self perceptions and perceptions of group climate as predictors of individual innovation at work. Applied Psychology: An International Review, 44, 199-215.

Dixon, R. A. (1992). Contextual approaches to adult intellectual development. In R. J. Sternberg & C. A. Berg (Eds.), Intellectual development (pp. 350-380). New York: Cambridge University Press.

Dixon, R. A. (1995). Promoting competence through compensation. In L. A. Bond, S. J. Cutler, & A. Grams (Eds.), Promoting successful and productive aging (pp. 220-238). Thousand Oaks, CA: Sage.

Gould, S. (1979). Age, job complexity, satisfaction, and performance. Journal of Vocational Behavior, 14, 209-223.

Gribbin, K., Schaie, K. W., & Parham, I. A. (1980). Complexity of life style and maintenance of intellectual abilities. Journal of Social Issues, 36, 47-61.

Kohn, M. L., & Schooler, C. (1983). In collaboration with J. Miller, K. A. Miller, C. Schoenbach, & R. Schoenberg. Work and personality: An inquiry into the impact of social stratification. Norwood, NJ: Ablex.

Miller, J., Slomczynski, K. M., & Kohn, M. L. (1985). Continuity of learning-generalization: The effect of job on men's intellective process in the United States and Poland. American Journal of Sociology, 91, 593-615.

Moos, R. H. (1986). Work Environment Scale manual. Palo Alto, CA: Consulting Psychologists Press.

Naoi, A., & Schooler, C. (1985). Occupational conditions and psychological functioning in Japan. American Journal of Sociology, 90, 729-752.

Park, D. C. (1994). Aging, cognition, and work. Human Performance, 7, 181-205.

Rebok, G. W., Offermann, L. R., Wirtz, P. W., & Montaglione, C. J. (1986). Work and intellectual aging: The psychological concomitants of social-organizational conditions. Educational Gerontology, 12, 359-374.

Repetti, R. L., & Cosmas, K. A. (1991). The quality of the social environment at work and job satisfaction. Journal of Applied Social Psychology, 21, 840-854.

Salthouse, T. A. (1994). Age-related differences in basic cognitive processes: Implications for work. Experimental Aging Research, 20, 249-255.

Schaie, K. W. (1989). The hazards of cognitive aging. Gerontologist, 29, 484-493.

Schaie, K. W. (1996). Intellectual development in adulthood. Cambridge: Cambridge University Press.

Schaie, K. W., & Parham, I. A. (1975). Manual for the test of behavioral rigidity. Palo Alto, CA: Consulting Psychologists Press.

Schaie, K. W., & Willis, S. L. (1986). Can decline in adult intellectual functioning be reversed? Developmental Psychology, 22, 223-232.

Schooler, C. (1987). Psychological effects of complex environments during the life span: A review and theory. In C. Schooler & K. W. Schaie (Eds.), Cognitive functioning and social structure over the life course (pp. 24-49). Norwood, NJ: Ablex.

Spector, P. E. (1986). Perceived control by employees: A meta-analysis of studies concerning autonomy and participation at work. Human Relations, 39, 1005-1016.

Sterns, H. L., Barrett, G. V., Czaja, S. J., & Barr, J. K. (1994). Issues in work and aging. The Journal of Applied Gerontology, 13, 7-19.

Willis, S. L., & Nesselroade, C. S. (1990). Long-term effects of fluid ability training in old-old age. Developmental Psychology, 26, 905-910.

Wooten, K. C., Barner, B. O., & Silver, N. C. (1994). The influence of cognitive style upon work environment preferences. Perceptual and Motor Skills, 79, 307-314.

Table 1

Age Distribution of the Sample

Age Group	Mean Age	Range in Years	Sample Size
1	82	78-93	237
2	74	71-77	327
3	67	64-70	363
4	60	57-63	309
5	53	50-56	314
6	46	43-49	344
7	39	36-42	338
8	32	29-35	331
9	26	21-28	147

Table 2

Multivariate Analysis of Variance for Perceived Work Environment

		F		
Source	df	Autonomy	Control	Innovation
[a]Age Group (A)	8	5.10***	20.74***	19.12***
Gender (G)	1	2.69	6.06*	16.49***
A x G	8	1.92	1.14	1.80
error	2692	(14.99)	(24.33)	(15.65)
[b]Occupation (O)	4	15.07***	23.66***	24.17***
O x G	4	6.98***	6.59***	4.06**
O x A	32	1.11	1.28	1.06
O x A x G	32	1.09	1.44	1.12
error	2104	(14.24)	(21.53)	(14.75)

Note. [a]Analyses conducted were 2 (gender) x 9 (age group) MANOVA (n = 2710). [b]Analyses conducted were 2 (gender) x 9 (age group) x 5 (occupation type) MANOVA (n = 2403).

Values enclosed in parentheses represent mean square errors. *p < .05. **p < .01.

***p < .001.

Table 3

Mean Scores by Age Group on Measures of Perceived Work Environment

Variable	Age Group 1	2	3	4	5	6	7	8	9
Autonomy	19.63	20.61	21.07	20.95	21.22	21.25	20.95	20.77	19.90
Control	14.43	15.51	17.19	16.94	18.21	18.33	18.12	17.85	16.16
Innovation	15.03	16.12	16.91	17.02	17.74	18.30	18.09	17.80	17.09

Table 4

Mean Scores by Occupation Type on Measures of Perceived Work Environment

Dependent Variable	Blue Collar	Clerical/Sales	Managerial	Semi-Professional	Professional
Autonomy					
T	19.50	20.21	21.53	20.90	21.06
M	18.87	20.87	21.89	21.29	21.66
F	20.14	19.54	21.17	20.50	20.47
Control					
T	14.85	16.39	18.06	16.97	17.37
M	13.91	16.59	18.12	17.14	18.14
F	15.79	16.18	18.00	16.79	16.60
Innovation					
T	15.97	16.52	18.15	17.54	18.29
M	15.64	17.32	18.61	17.62	18.36
F	16.30	15.72	17.70	17.46	18.22

Note. T = total sample. M = males. F = females.

Table 5
Hierarchical Regression Analysis Predicting Cognitive Style

Predictors	Attitudinal Flexibility			Motor-Cognitive Flexibility			Psychomotor Speed		
	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
Model 1									
Gender	-.05**			.05*			-.26***		
Education	.27***			.25***			.42***		
Occupation type	.04			-.03			.01		
		.06***	----		.06***	----		.23***	----
Model 2									
Gender	-.05*			.05**			-.25***		
Education	.21***			.20***			.36***		
Occupation Type	-.05*			-.04			-.01		
Autonomy	-.15***			-.07**			-.11***		
Control	.22***			.19***			.25***		
Innovation	.15***			.09**			.12***		
		.11***	.05**		.10***	.04**		.29***	.06**
Model 3									
Gender	-.03			.09***			-.21***		
Education	.17***			.12***			.28***		
Occupation Type	-.03			.01			.05**		
Autonomy	-.11***			.01			-.03		
Control	.18***			.11***			.17***		
Innovation	.12***			.02			.05**		
Age	-.20***			-.46***			-.44***		
		.15***	.04**		.29***	.20**		.46***	.18**

Note. *$p < .05$. **$p < .01$. ***$p < .001$.

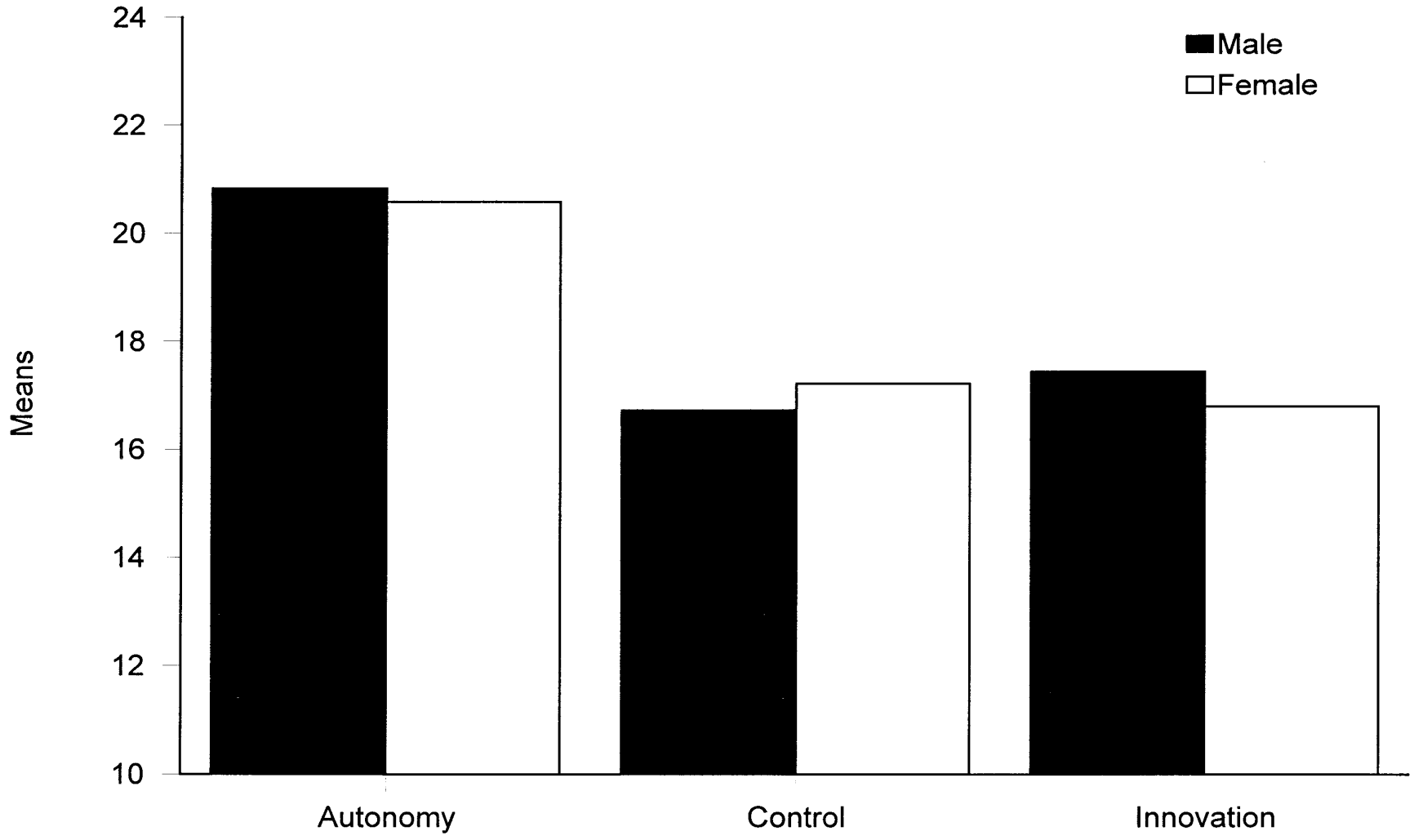

Figure 1. Gender mean differences in perceived work environment.

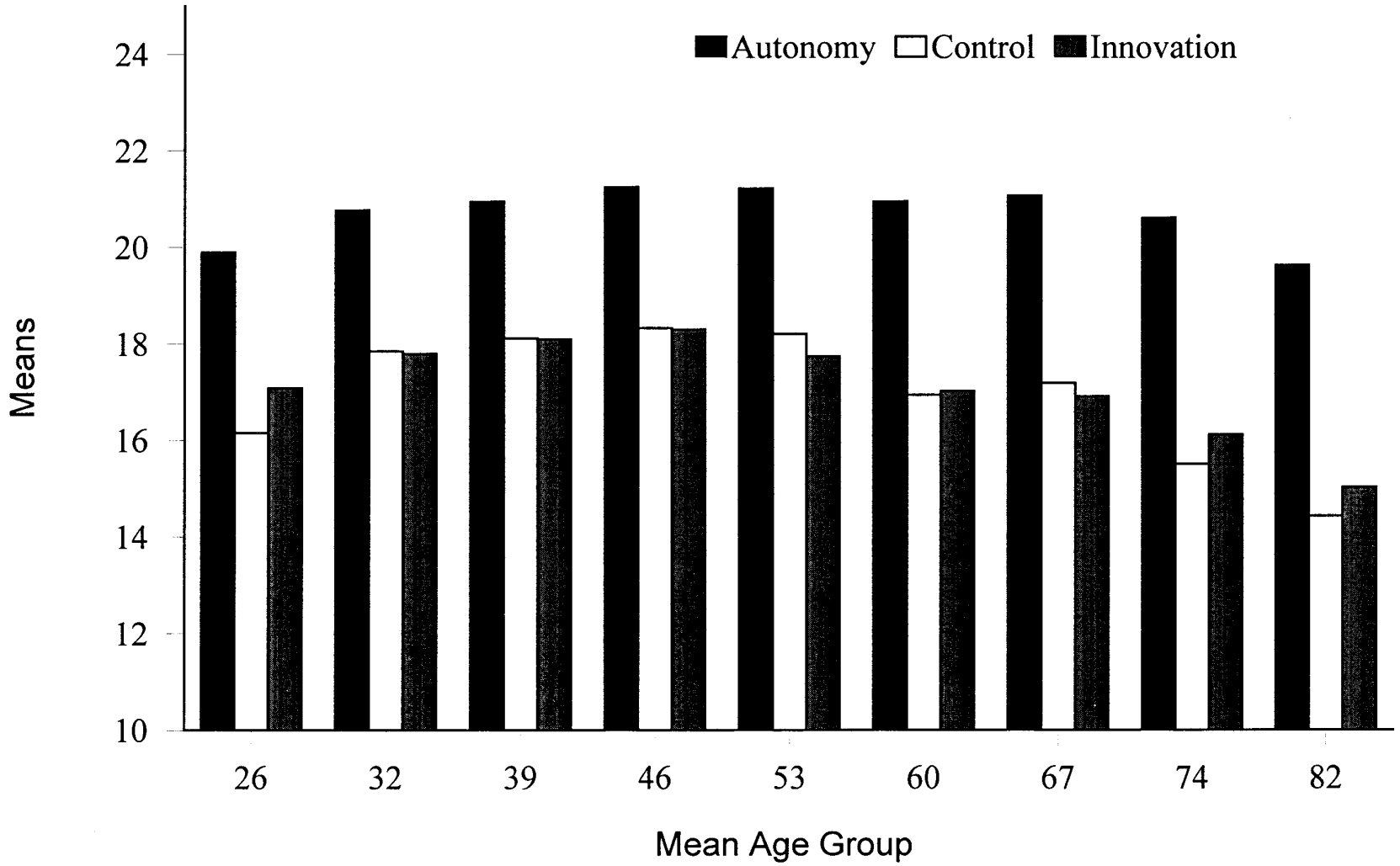

Figure 2. Mean differences across age groups in perceived work environment.

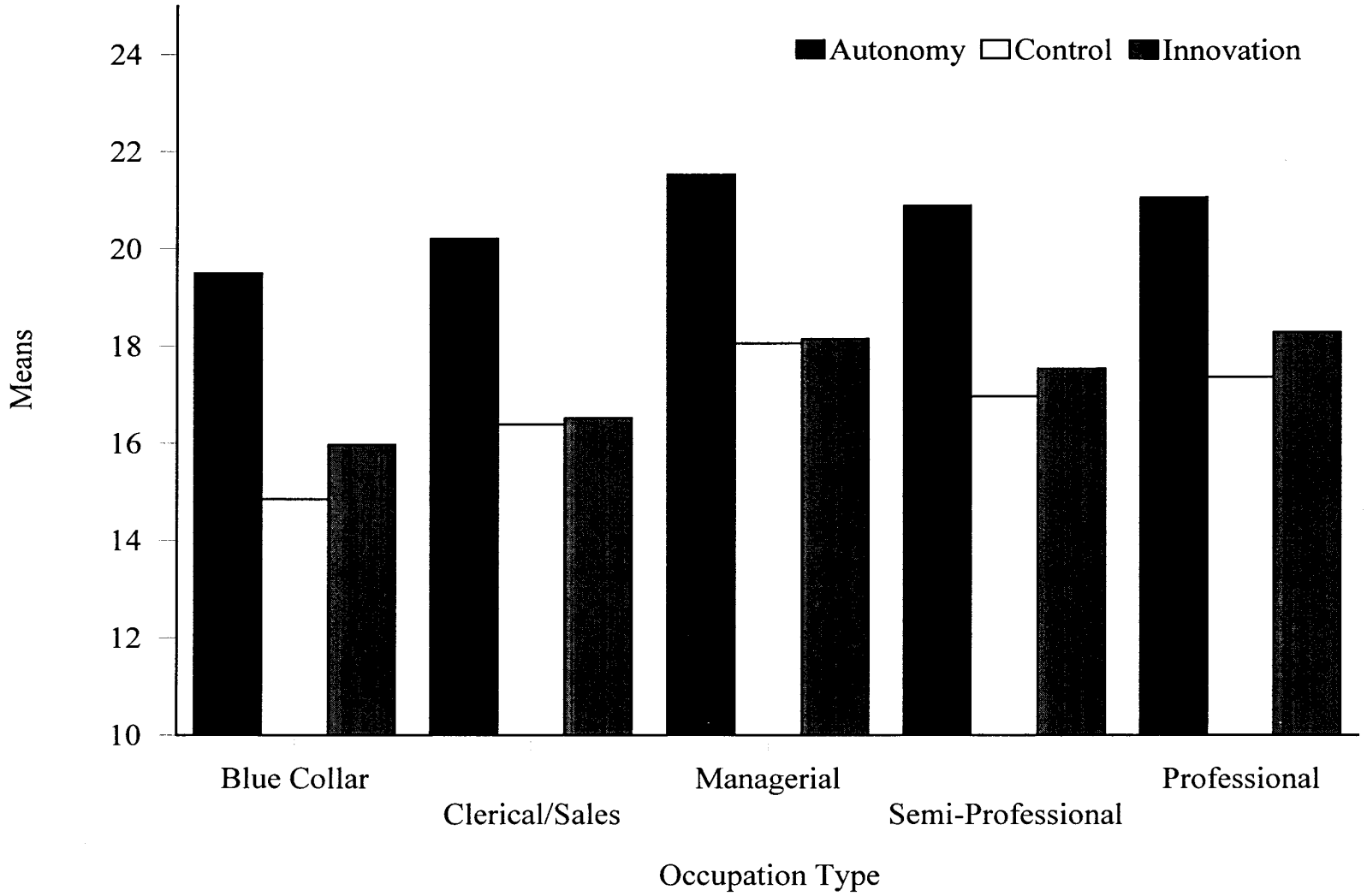

Figure 3. Mean differences in perceived work environment by occupation type.

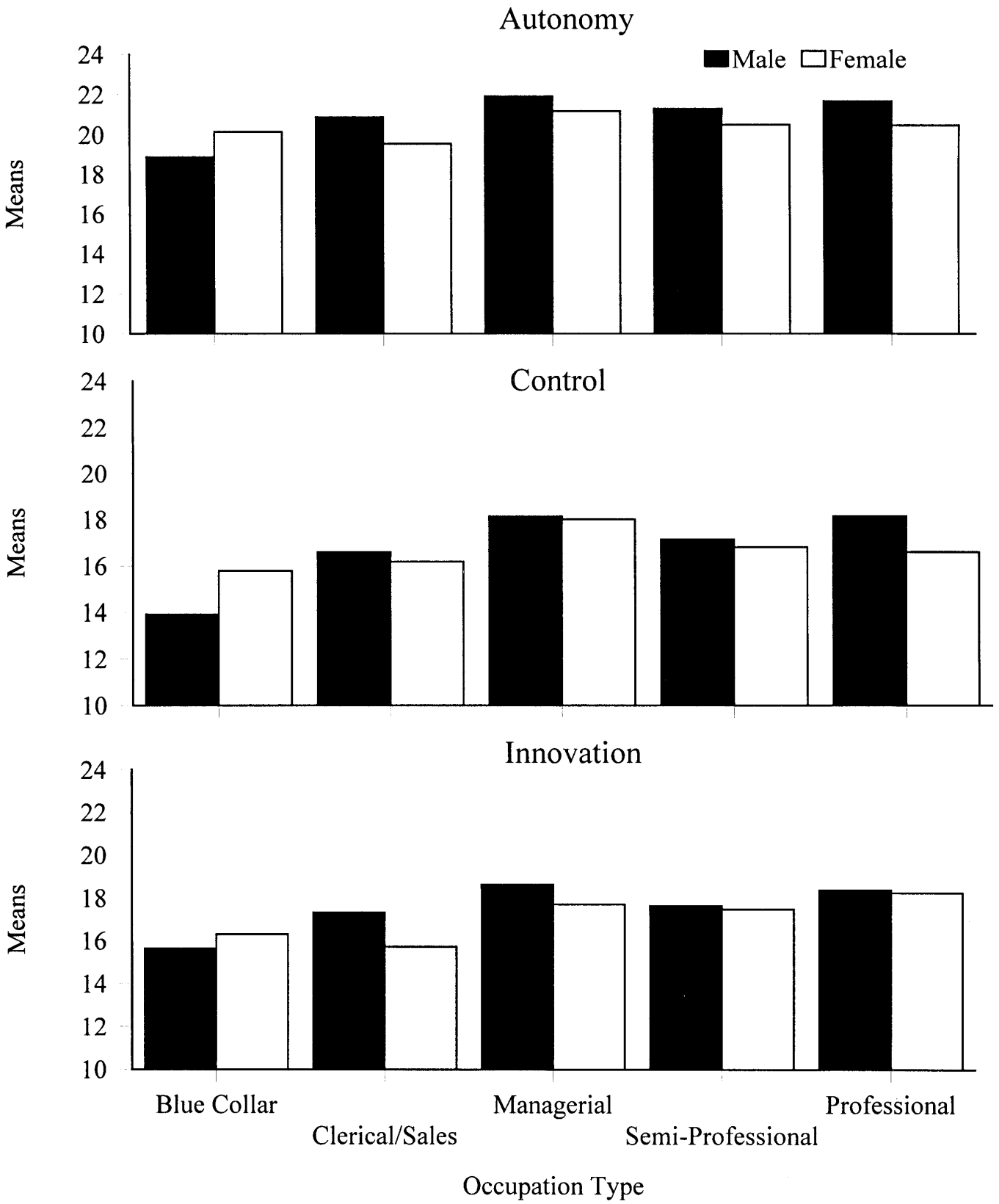

Figure 4. Mean differences in perceived work environment by occupation type and gender.