



0361-9230(94)00134-0

Effect of Pleasant Odors on Mood of Males at Midlife: Comparison of African-American and European-American Men

SUSAN S. SCHIFFMAN,¹ MARK S. SUGGS AND ELIZABETH A. SATTELY-MILLER*Department of Psychiatry, Duke University Medical Center, Durham, NC 27710*

[Received 9 May 1994; Accepted 27 June 1994]

ABSTRACT: The purpose of this study was to determine if daily use of colognes could elevate mood in middle-aged men. Sixty men ranging in age from 40 to 55 years participated in the study. Half were European-American and half were African-American. Mood ratings were obtained twice daily for 12 days using the Profile of Mood States questionnaire (POMS). The first 2 days of the experiment were used as baseline information to establish each man's mood prior to the administration of the colognes. The following 10 days of the study consisted of two conditions of 5 days each, the fragrance condition and the placebo condition. Main effects of condition (baseline, fragrance, placebo) were found for all POMS factors including tension, depression, anger, vigor, fatigue, and confusion, as well as for the Total Mood Disturbance score (TMD). The scores for the fragrance condition were significantly better than those for the baseline condition for tension, depression, anger, fatigue, and confusion factors, as well as for the TMD. Also, the scores for the fragrance condition were significantly better than those for the placebo condition for all factors and the TMD. There was a main effect for race, with European-American subjects having significantly worse scores for tension and fatigue and significantly better scores for depression than African-American subjects. An interaction was present between race and condition for the depression, vigor, and confusion factors. The main conclusion of this study was that use of pleasant odors improved the mood of males at midlife.

KEY WORDS: Odor, Midlife, Mood, Profile of mood states, Male.

INTRODUCTION

The concept of a male climacteric comparable to and parallel with the female climacteric has been discussed in the scientific literature for many years [10]. The male climacteric is a life transition characterized by both biological and psychological aspects [29,39], although the interrelationship between the biology and psychology is not well understood. Biological changes that have been documented in some males during midlife include diminished testosterone secretion from the testes with subsequent reductions in serum testosterone [13,17,37], reductions in morning increase in testosterone characteristic of young men [35], increased levels of the carrier protein sex hormone-binding glob-

ulin (SHBG) which results in less androgen supply [37], enhanced serum luteinizing hormone (LH) levels [35,37], decreased spermiogenic activity of the testes [17,28], and degenerative changes of the penis [28]. Biological changes in males at midlife tend to be gradual, unlike the relatively abrupt diminution in gonadal function in women over a 1–2-year span [28]. Androgen replacement therapy has been reported to improve libido [13,16] with concomitant psychological benefits, including reductions in fatigue, depression, and headaches [13].

Common psychological symptoms that can occur at midlife include inner turmoil, altered aspirations, career frustration, confrontation with death, family/role changes, and concern with a decline in sexual potency [2,12,30,36]. The need for reassurance of masculinity can result in exhibitionism with projection of sexual inadequacies on the female partner [12]. Men at this age may desire to be adolescent again and to begin life anew [36]. Endocrine changes have not been found to be consistent predictors of either psychological symptoms of midlife or changes in sexual activity [24,25,34,41].

There has been little research on methods for dealing with the psychological aspects of the male climacteric. Mayer [23] suggested that midlife crises can be productive and can be used to change beliefs, goals, work, and way of life. Exercise has been promoted as a method for improving mood [22,38] in males at midlife. Recent experiments have shown that pleasant odors can improve mood of females at midlife [33] as well as in their teens and twenties [8].

The purpose of the present study was to determine experimentally if odor of colognes can improve the mood of males at midlife. The POMS (Profile of Mood States) questionnaire [26,27], which was used previously to assess the effect of fragrance on mood states in women at midlife [33], was employed here with males. The POMS questionnaire has been extensively tested and validated in many populations [4–7,11,14,18,21,32,42]. In the present study, the effect of pleasant odors on mood was compared in African-American and European-American subjects. Both races were tested because it was hypothesized that the moods of African-Americans may be compromised by their higher relative risk of mortality from diabetes and cardiovascular disease than for European-Amer-

¹ Requests for reprints should be addressed to Dr. Susan S. Schiffman, c/o Department of Psychology: Experimental, Box 90086, Duke University, Durham, NC 27708-0086.

TABLE 1
RESULTS OF ANALYSIS OF VARIANCE

| Effects | Dependent Variables | | | | | | Total Mood Disturbance Score |
|----------------------------|---------------------|------------|-------|-------|---------|-----------|------------------------------|
| | Tension | Depression | Anger | Vigor | Fatigue | Confusion | |
| Race | * | * | | | * | | |
| Subject nested within race | * | * | * | * | * | * | * |
| Condition | * | * | * | * | * | * | * |
| Race × Condition | | * | | * | | * | |

* Significant at $\alpha = 0.05$ level.

icans in this age group [3]. African-Americans have also been reported to be exposed to a greater number of chronic social stressors than European-Americans [1].

METHOD

Subjects

Sixty men were recruited from the Durham area to participate in the study. These men, who were between the ages of 40 and 55, were divided into two groups: 30 African-American males and 30 European-American males. The subjects in the two groups were matched according to age and years of education. The mean age was 44.7 ± 4.52 years. The mean years of education was 13.8 ± 3.06 . No males were taking hormonal supplements. Subjects were paid for their participation at the successful completion of the study. Subjects were also allowed to keep all colognes used during the study.

Materials

In the fragrance condition, five colognes currently on the market were tested. They were presented in glass containers and labeled A through E. In the placebo condition, a solvent without fragrance was used. It resembled the colognes in appearance, and was labeled F. Subjects read and signed a consent form before participating in the study. Background information that included personal and medical information was obtained from each subject through an initial questionnaire.

Mood ratings were determined twice daily using the Profile of Mood States questionnaire (POMS). The POMS [26,27] was used to measure the impact of fragrance on mood because it has been shown to be sensitive to transient mood shifts. The POMS contains 65 adjectives, most of which may be divided into six factors: tension–anxiety, depression–dejection, anger–hostility, vigor–activity, fatigue–inertia, and confusion–bewilderment. The score for each factor was derived, according to the POMS manual, by adding together a specific set of adjectives to get a total score for that factor. Each adjective applies to only one of the POMS factors and, thus, is only used once in the calculation for that factor. The factors were added together, with the vigor–activity factor weighted negatively, to obtain a total mood disturbance score (TMD). Preference for each fragrance and the placebo was also determined each time a POMS was completed. Subjects indicated their preference on a 10-point line scale ranging from 0 (dislike a lot) to 10 (like a lot). At the completion of the study, each subject filled out a final questionnaire, which asked how the cologne(s) smelled on them, if they noticed any changes in how cologne(s) smelled on them over the years, if they noticed any changes in the amount of cologne they use or in the frequency with which they use them over the years, and any final comments about the study.

Procedure

Subjects were initially given a consent form to sign and then an initial questionnaire to complete. A starting date was determined for each subject at their convenience. A personalized folder was given to each subject that contained a calendar outlining the testing days and times for all 12 days of the study. The first 2 days of the study provided the baseline information for each individual subject. Subjects did not use cologne during the baseline days. For both the baseline and the rest of the study, the POMS was completed twice each day. This occurred once at midmorning, around 1000 h, and once in the afternoon, around 1500 h. After the baseline was completed, the forms were picked up, and the subjects were given the materials for the next condition. During the next 10 days of the study, the subjects participated in two conditions: fragrance and placebo. Each condition lasted 5 days. The subjects were instructed not to use cologne on any day during the study unless it was given to them by the experimenter. Half of each group of subjects participated in the fragrance condition first, and half participated in the placebo condition first. During the fragrance condition, subjects used as many or as few of the five colognes as they wanted. They were instructed to only use one cologne during a morning or afternoon session, and to only use cologne(s) that they preferred. During the placebo condition, subjects only used the placebo, labeled F. The cologne or placebo was applied by each subject and, immediately afterward, the subject would fill out the POMS and a preference scale. At completion of the 5 days of the first condition (either fragrance or placebo), the forms were picked up by the experimenter, and new forms and cologne(s) were given to the subject. On the last day of the second condition, subjects completed the final questionnaire, and all forms were picked up by the experimenter.

TABLE 2
LEAST SQUARE MEANS FOR RACE

| Dependent Variable | Race (1s Mean) | | African-American vs. European-American |
|--------------------|------------------|-------------------|--|
| | African-American | European-American | |
| Tension | 4.76 | 5.78 | * |
| Depression | 4.48 | 3.79 | * |
| Anger | 3.54 | 3.80 | |
| Vigor | 16.90 | 17.35 | |
| Fatigue | 4.01 | 4.66 | * |
| Confusion | 3.72 | 3.75 | |
| TMD | 3.60 | 4.50 | |

TABLE 3
LEAST SQUARE MEANS FOR CONDITION

| Dependent Variable | Condition (ls mean) | | | Differences Between Conditions | | |
|------------------------------|---------------------|---------|-----------|--------------------------------|------------------------|-----------------------|
| | Baseline | Placebo | Fragrance | Baseline vs. Placebo | Baseline vs. Fragrance | Placebo vs. Fragrance |
| Tension | 6.01 | 5.24 | 4.56 | * | * | * |
| Depression | 5.23 | 3.99 | 3.17 | * | * | * |
| Anger | 4.40 | 3.63 | 2.98 | * | * | * |
| Vigor | 17.07 | 16.65 | 17.66 | | | |
| Fatigue | 5.37 | 4.12 | 3.52 | * | * | * |
| Confusion | 4.05 | 3.78 | 3.38 | | * | * |
| Total mood disturbance Score | 8.02 | 4.09 | 0.05 | * | * | * |

* Significant at $\alpha = 0.05$ level.

RESULTS

An analysis of variance was performed to determine if there were any significant main effects or interactions between the two races and the conditions (baseline, fragrance, placebo) for each POMS factor and the TMD. Subjects were nested within each of the two races. Table 1 summarizes the results of the analysis of variance. A main effect of race was found for the tension, depression, and fatigue factors. A main effect of condition was found for all POMS factors, tension, depression, anger, vigor, fatigue, and confusion, and the TMD. An interaction between race and condition was found for depression, vigor, and confusion factors.

Table 2 gives the least square means for the two races for each factor and the TMD. For the effect of race, European-American subjects had significantly higher scores for tension and fatigue than African-American subjects. However, African-American subjects had significantly higher scores for depression.

Table 3 gives the least square means for the three conditions (baseline, placebo, fragrance) for all factors and the TMD. For the tension, depression, anger, and fatigue factors, and the TMD, all three conditions were significantly different from each other. For these four factors and the TMD, the scores for the baseline condition were significantly higher (worse) than those for the fragrance and placebo conditions. In addition, the scores for the placebo condition were significantly higher than those for the fragrance condition. For the vigor factor, the fragrance condition had significantly higher (better) scores than the placebo condition, but neither fragrance nor placebo conditions differed sig-

nificantly from baseline. For the confusion factor, the scores for the fragrance condition were significantly lower (better) than those for the baseline and placebo conditions, but there was no significant difference between baseline and placebo conditions.

Table 4 indicates the significant interactions found between race and condition for depression, vigor, and confusion factors. For the depression factor, all three conditions were significantly different from each other for African-American subjects, with the highest (worst) score being for the baseline condition and the lowest (best) score being for the fragrance condition. For European-American subjects, the fragrance condition was significantly lower than the baseline and placebo conditions. There was no significant difference between baseline and placebo conditions. For the vigor factor, the placebo condition was significantly lower (worse) than the baseline and the fragrance conditions for African-Americans; however, there was no significant difference between the fragrance condition and baseline. The fragrance condition was significantly higher (better) than the baseline and the placebo conditions for European-American subjects, but there was no difference between the placebo condition and baseline. For the confusion factor, all three conditions were significantly different from each other for African-American subjects, with the baseline condition having the highest (worst) score and the fragrance condition having the lowest (best) scores. There were no significant differences between conditions for European-Americans.

Finally, an analysis of variance was performed comparing the data from this study of the effect of fragrance on the mood of men at midlife to the data from a comparable study of the effect of fragrance on the mood of women at midlife [33]. Subjects

TABLE 4
INTERACTIONS BETWEEN RACE AND CONDITION

| Dependent Variable | Race | Condition (ls mean) | | | Differences Between Conditions | | |
|--------------------|-------------------|---------------------|---------|-----------|--------------------------------|------------------------|-----------------------|
| | | Baseline | Placebo | Fragrance | Baseline vs. Placebo | Baseline vs. Fragrance | Placebo vs. Fragrance |
| Depression | African-American | 6.05 | 4.18 | 3.20 | * | * | * |
| | European-American | 4.41 | 3.80 | 3.15 | | * | * |
| Vigor | African-American | 17.39 | 16.19 | 17.10 | * | | * |
| | European-American | 16.74 | 17.10 | 18.21 | | * | * |
| Confusion | African-American | 4.30 | 3.70 | 3.17 | * | * | * |
| | European-American | 3.81 | 3.86 | 3.59 | | | |

* Significant at $\alpha = 0.05$ level.

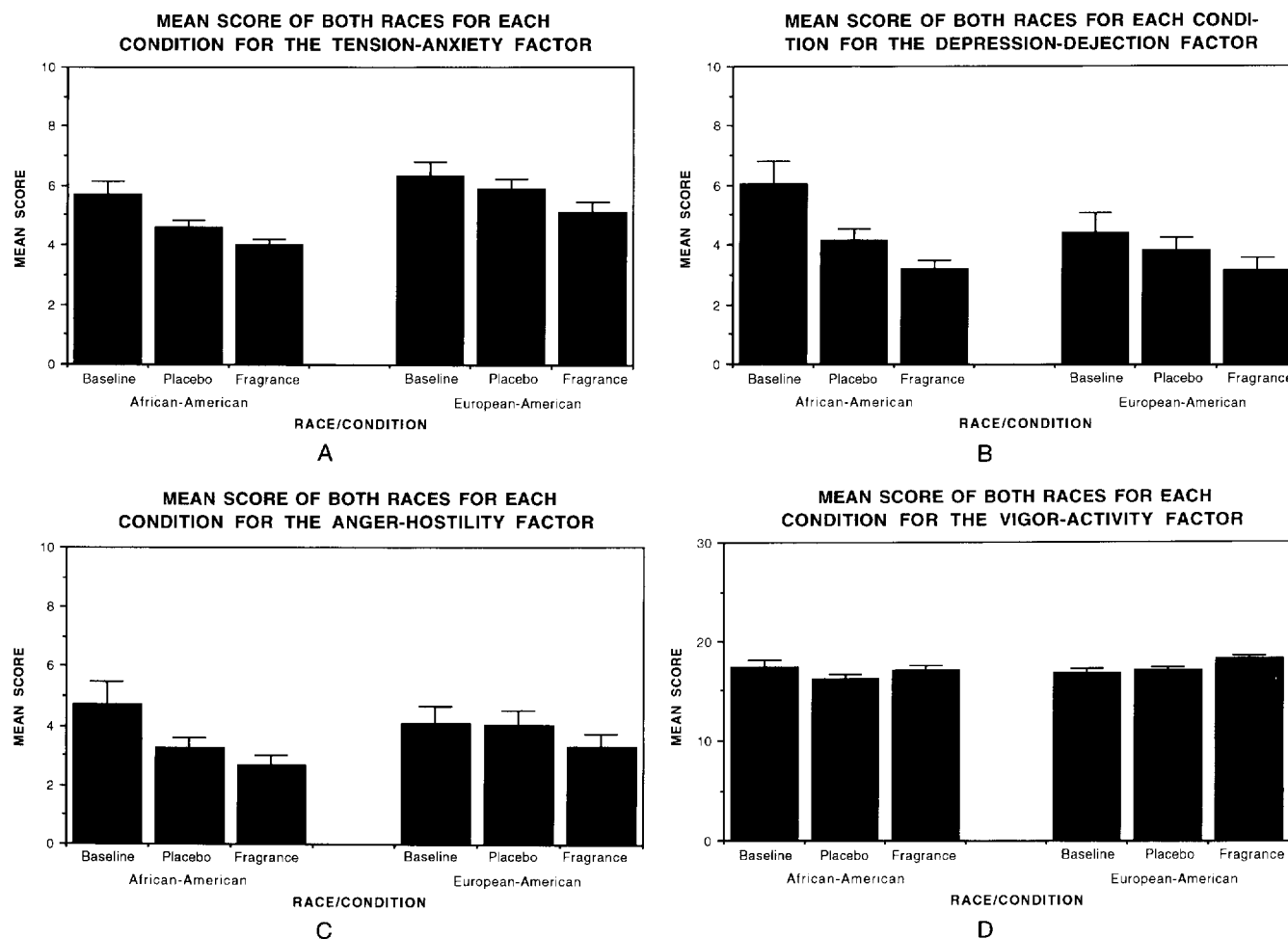


FIG. 1. (A–G) The mean scores of both races in each condition (baseline, placebo, and fragrance) for each POMS factor: A: tension–anxiety; B: depression–dejection; C: anger–hostility; D: vigor–activity; E: fatigue–inertia; F: confusion–bewilderment; and G: Total Mood Disturbance Score.

were nested within gender. The results of the analysis, which are presented in Table 5, revealed a significant effect of gender for all POMS factors and the TMD, but no gender \times condition interaction. Males had higher (worse) POMS scores than females for tension, depression, anger, fatigue, and confusion factors, as well as the TMD; males had higher (better) scores than females for the vigor factor. An additional analysis, also presented in Table 5, was performed that compared mood scores for males with scores for women taking hormone replacement therapy (either estrogen alone or estrogen with progesterone) [33]. Again, subjects were nested within gender. Women taking hormone replacement therapy had significantly better scores than men for all POMS factors and the TMD. However, when scores for males were compared with scores for women who were no longer menstruating and taking no hormone replacement therapy [33], there were no significant differences in the scores for tension, fatigue, and confusion factors, as well as the TMD. Middle-aged females taking no hormonal supplements, however, had significantly lower (better) scores for the depression and anger factors and significantly lower (worse) scores for the vigor factor than males at midlife.

Figure 1A–G gives the mean scores of both races for males in each condition (baseline, placebo, and fragrance) for each POMS factor and the TMD. The scores for the African-American

are on the left, and the scores for the European-Americans are on the right.

The mean preference scores for the fragrance and placebo conditions were significantly different. The mean preference score for the fragrance condition was 6.50, while the mean preference score for the placebo condition was 2.05. Preference scores for African-American and European-American subjects also differed significantly. The mean preference score for European-Americans was 4.43, and the mean score for African-Americans was 4.12. There was a significant interaction for preference scores between race and condition. African-American subjects had significantly higher preference scores for colognes in the fragrance condition (6.82) than European-American subjects (6.18). African-American subjects also had significantly lower preference scores in the placebo condition (1.41) than did European-American subjects (2.69). Thus African-American subjects liked the fragrances and disliked the placebo more than European-Americans.

DISCUSSION

Use of colognes significantly improved mood in men at midlife (total mood scores as well as all individual factors of tension, depression, anger, vigor, fatigue, and confusion). The improve-

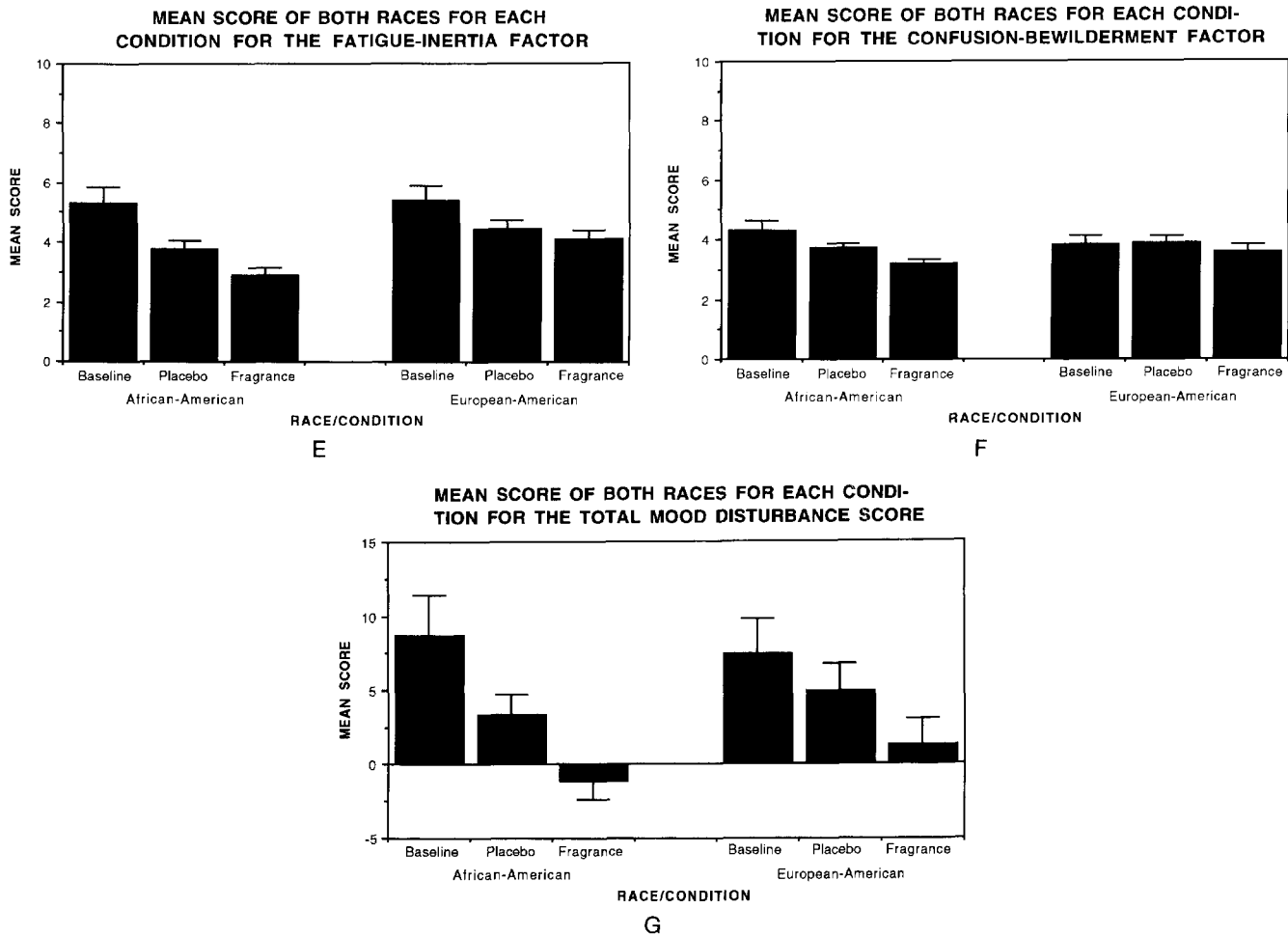


FIG. 1. Continued

ment in mood after exposure to pleasant odors was comparable for African-Americans and European-Americans for tension, anger, and fatigue factors, as well as for the TMD.

The finding here that pleasant odors can improve mood in males is not surprising, because the part of the brain that processes olfactory information, the so-called limbic system, is also the emotional area of the brain. The improved mood suggests a method for dealing with some aspects of male midlife crisis. Males often use colognes in social situations that involve interaction with women. This may reduce sexual anxiety or dissatisfaction with sex life because mood is improved. Odors are strongly associated with sexuality in the animal kingdom [19] so that the use of colognes may have a biological impact as well.

The finding that European-Americans were more tense and fatigued than African-Americans was surprising, because African-Americans have been reported to be exposed to more chronic social stressors than European-American populations [1]. African-Americans were more depressed, however, than European-Americans, which suggests that these two populations may respond differently to chronic social stressors at midlife.

The finding here that females at midlife (aged 45–60 years) have better total mood scores than males at midlife (aged 40–55 years) is consistent with the findings of Lehr [20], who studied the problems and conflicts that occur during the fifth and sixth decades in 326 males and females. For women, the period from

40–49 years was stressful, but the period after 50 was remarkably free of conflict and stress. Males, however, had a significant increase in stress beginning at age 50 years. Perez-Milian [31] evaluated 156 males on a male climacteric questionnaire designed to measure nine factors associated with midlife. He found that males in their 50s had increased feelings of failure and intensified their efforts to reach their goals. However, by age 60, these intensifying efforts ceased.

Although the moods for women were better as a group than moods for the males, the differences were largely due to the women taking hormonal supplements. Women taking either supplements of estrogen alone or estrogen with progesterone had better scores for tension, depression, anger, fatigue, and confusion factors, as well as the for the TMD. When postmenopausal women who were not taking estrogen (hormonal supplements) were compared to males, there were fewer differences. That is, male and female subjects had comparable scores for tension, fatigue, and confusion factors. Postmenopausal women not taking hormonal supplements, however, still had better scores on depression, anger, and vigor factors, as well as the TMD. Because no males in the study were taking hormonal supplements, these data suggest that women have slightly better moods at midlife. Further studies need to be done to compare men and women who are both taking hormonal replacements.

TABLE 5
RESULTS OF THE ANALYSES OF VARIANCE (WITH THE 1s MEANS) COMPARING THIS STUDY WITH A COMPARABLE STUDY [33]

| | Tension | Depression | Anger | Vigor | Fatigue | Confusion | TMD |
|---|---------|------------|-------|-------|---------|-----------|-------|
| Gender | * | * | * | * | * | * | * |
| Female | 4.73 | 2.04 | 1.50 | 16.51 | 3.46 | 3.40 | -1.38 |
| Male | 5.27 | 4.13 | 3.67 | 17.12 | 4.33 | 3.75 | 4.05 |
| Males vs. female hormone replacement group | * | * | * | * | * | * | * |
| Males | 5.27 | 4.13 | 3.67 | 17.12 | 4.33 | 3.74 | 4.05 |
| Female hormone Replacement group | 4.15 | 1.59 | 1.00 | 17.64 | 2.95 | 3.02 | -4.93 |
| Males vs. female nonmenstrating nonhormonal group | | * | * | * | | | |
| Males | 5.27 | 4.13 | 3.67 | 17.12 | 4.33 | 3.74 | 4.05 |
| Female nonmenstrating, nonhormonal group | 5.03 | 2.96 | 2.26 | 15.81 | 4.38 | 3.73 | 2.54 |

* Significant at $\alpha = 0.05$ level.

The finding that odors can alter mood in men and women at midlife is consistent with previous experiments that have found pleasant odors improve mood in young women. Ehrlichman and Bastone [8] exposed 45 college women to one of three experimental odor conditions (pleasant, unpleasant, and no odor) for approximately 20 min via a surgical mask. The women rated their current moods on the Differential Emotions Scale [15]. Statistical analysis indicated that the pleasant and unpleasant odor groups differed significantly on ratings of good and bad mood. Although pleasant odors appeared to improve mood, subjects in the unpleasant odor group rated themselves as significantly more disgusted on the Differential Emotions Scale. In a study by Bastone and Ehrlichman (see 8), subjects in a pleasant odor group rated themselves as significantly less tense, annoyed, and disgusted than those in an unpleasant odor group. Ehrlichman and Halpern [9] found that pleasant odors yielded happier memories than unpleasant odors in college-age female subjects.

In conclusion, the present study indicates that the use of pleasant odors can improve mood in men at midlife. The improved mood experienced by men with use of odors has the potential to produce additional cognitive and behavioral changes that may further enhance a feeling of well being. Comparison of mood ratings of males at midlife with mood ratings of females at midlife suggests that females tend to have better moods. Additional studies must be performed in males taking hormonal supplements. Further testing with a broader range of odors would also be helpful to determine if individual odors have measurable unique and distinctive effects on mood as suggested in a recent study [40] of a different population.

ACKNOWLEDGEMENTS

This study was supported by The Olfactory Research Fund and the National Institute on Aging AG00443.

REFERENCES

- Anderson, N. B.; McNeilly, M.; Myers, H. Autonomic reactivity and hypertension in blacks: A review and proposed model. *Ethnic. Dis.* 1:154-170; 1991.
- Brim, O. G. Theories of the male mid-life crisis. *Counsel. Psychol.* 6:2-9; 1976
- Calhoun, D. A. Hypertension in blacks: Socioeconomic stress and sympathetic nervous system activity. *Am. J. Med. Sci.* 394:306-311; 1992.
- Calil, H. M.; Zwicker, A. P.; Klepacz, S. The effects of lithium carbonate on healthy volunteers: Mood stabilization. *Biol. Psychiatry* 27:711-722; 1990.
- Cockerill, I. M.; Nevill, A. M.; Lyons, N. Modeling mood states in athletic performance. *J. Sports Sci.* 9:205-212; 1991.
- Cole, J. O.; Pope, H. G., Jr; LaBrie, R.; Ionescu-Pioggia, M. Assessing the subjective effect of stimulants in casual users. *Clin. Pharmacol. Ther.* 24:243-252; 1978.
- Der, D. F.; Lewington, P. Rational self-directed hypnotherapy: A treatment for panic attacks. *Am. J. Clin. Hypnosis* 32:160-167; 1990.
- Ehrlichman, H.; Bastone, L. The use of odour in the study of emotion. In: van Toller, S. Dodd, G. H., eds. *Fragrance. The psychology and biology of perfume.* London: Elsevier Applied Science; 1992:143-159.
- Ehrlichman, H.; Halpern, J. N. Affect and memory: Effects of pleasant and unpleasant odors on retrieval of happy and unhappy memories. *J. Pers. Soc. Psychol.* 55:769-779; 1988.
- Featherstone, M.; Hepworth, M. The history of the male menopause 1848-1936. *Maturitas* 7:249-257; 1985.
- File, S. E.; Bond, A. J.; Lister, R. G. Interaction between effects of caffeine and lorazepam in performance tests and self-ratings. *J. Clin. Psychopharmacol.* 2:102-106; 1982.
- Goppert, H. The sexual problem of aging. *J. Psychol. Psychother. Med. Anthropol.* 14(2-4):261-267; 1966.
- Greenblatt, R. B.; Nezhad, C.; Roesel, R. A.; Natrajan, P. K. Update on the male and female climacteric. *J. Am. Geriatr. Soc.* 27:481-490; 1979.
- Horswill, C. A.; Hickner, R. C.; Scott, J. R.; Costill, D. L.; Gould, D. Weight loss, dietary carbohydrate modifications, and high intensity, physical performance. *Med. Sci. Sports Exerc.* 22:470-476; 1990.
- Izard, C. E. *Patterns of emotions: A new analysis of anxiety and depression.* New York: Academic Press; 1972.
- Jacobelli, A. The male climacteric. Endocrinologic profile and therapeutic perspectives. *Clin. Ther.* 112:155-161; 1985.
- Janczewski, A.; Bablok, L.; Czaplicki, M. Premature male climacteric. *Polish Endocrinol.* 18(1-2):33-39; 1967.
- Kraemer, R. R.; Dziewaltowski, D. A.; Blair, M. S.; Rinehardt, K. F.; Castracane, V. D. Mood alteration from treadmill running and its relationship to beta-endorphin, corticotropin, and growth hormone. *J. Sports Med. Phys. Fit.* 30:241-246; 1990.
- Labows, J. N.; Preti, G. Human semiochemicals. In: van Toller, S.; Dodd, G. H., eds. *Fragrance. The psychology and biology of perfume.* London: Elsevier Applied Science; 1992:69-90.
- Lehr, U. Problems and conflicts of middle age. *Probl. Ergebn. Psychol.* 16:41-45; 1966.
- Lieberman, H. R.; Corkin, S.; Spring, B. J.; Growdon, J. H.; Wurtman, R. J. Mood, performance, and pain sensitivity: Changes induced by food constituents. *J. Psychiatr. Res.* 17:135-145; 1982/83.
- Lobstein, D. D.; Rasmussen, C. L.; Dunphy, G. E.; Dunphy, M. J. Beta-endorphin and components of depression as powerful discrim-

- inators between joggers and sedentary middle-aged men. *J. Psychosomat. Res.* 33:293–305; 1989.
23. Mayer, N. *The male mid-life crisis: Fresh starts after forty*. Garden City, NY: Doubleday; 1979.
 24. McKinlay, J. B. Is there an epidemiologic basis for a male climacteric syndrome? The Massachusetts male aging study. *Prog. Clin. Biol. Res.* 320:163–192; 1989.
 25. McKinlay, J. B.; Longcope, C.; Gray, A. The questionable physiologic and epidemiologic basis for a male climacteric syndrome: Preliminary results from the Massachusetts Male Aging Study. *Maturitas* 11:103–115; 1989.
 26. McNair, D. M.; Lorr, M. An analysis of mood in neurotics. *J. Abnorm. Soc. Psychol.* 69:620–627; 1964.
 27. McNair, D. M.; Lorr, M.; Droppleman, L. F. *Manual: Profile of mood states*. Revised 1992. San Diego: Education and Industrial Testing Service; 1992.
 28. Nankin, H. R. Fertility in aging men. *Maturitas* 7:259–265; 1985.
 29. Parlee, M. B. Psychological aspects of the climacteric in women. *Psychiatr. Opin.* 15:36–40; 1978.
 30. Pauleikhoff, B. Crisis virilis in the sixth decade of life. *Zeit. Klin. Psychol. Psychopathol. Psychother.* 32:112–116; 1984.
 31. Perez–Milian, R. Males' sexual and life transitions, awareness, and climacteric. MA Thesis. University of West Florida; 1991.
 32. Rausch, J. L.; Nicholson, B.; Lamke, C.; Matloff, J. Influence of negative affect on smoking cessation treatment outcome: A pilot study. *Br. J. Addict.* 85:929–933; 1990.
 33. Schiffman, S. S.; Sattely-Miller, E. A.; Suggs, M. S.; Graham, B. G. The effect of pleasant odors and hormone status on mood of women at mid-life. *Brain Res. Bull.* 36:19–29; 1995.
 34. Solstad, K.; Garde, K. Middle-aged Danish men's ideas of a male climacteric and of the female climacteric. *Maturitas* 15:7–16; 1992.
 35. Soules, M. R.; Bremner, W. J. The menopause and climacteric: Endocrinologic basis and associated symptomatology. *J. Am. Geriatr. Soc.* 30:547–561; 1982.
 36. Strickler, M. Crisis intervention and the climacteric man. *Soc. Casework* 56:85–89; 1975.
 37. Szarvas, F. Male climacteric from a practical point of view. *Wien. Med. Wochenschrift.* 142:100–103; 1992.
 38. Twillman, R. K. Relationships between moods and cardiovascular measures in naturalistic situations. Dissertation. Los Angeles: University of California; 1990.
 39. Vartapetov, B. A.; Demchenko, A. N. The climacteric in men. *Kiev USSR: Zdorov'ya*; 1965:244.
 40. Warren, C.; Warrenburg, S. Mood benefits of fragrance. *Perfum. Flavor.* 18:9–16; 1993.
 41. Wignor, R. M. The psychophysiological aspects of sexuality in later life. Paper presented at the Southwestern Sociological Association Meeting; 1977.
 42. Williams, T. J.; Krahenbuhl, G. S.; Morgan, D. W. Mood state and running economy in moderately trained male runners. *Med. Sci. Sports Exerc.* 23:727–731; 1991.