

Aging Well

with your sense
of smell



a handbook for baby boomers

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Introduction

Much has been written about the aging of the Baby Boom Generation, 78 million strong, born between 1946 and 1964, who are now turning 50 years old. According to the U.S. Bureau of the Census, there were 63.5 million Americans age 50 and older in 1990. By the year 2010, it is projected there will be 96.4 million.

American Demographics magazine says that the baby boomers stoked the fitness and diet boom by their dedication to keeping young-looking, healthy and fit. They have also been in the forefront of the interest in holistic medicine. Instead of consulting a physician for a prescription, they are interested in exploring more

natural, self-help and alternative therapies for treating conditions such as stress.

Nearly 66% of boomers are married, and 75% of the women are in the work force. Both men and women feel daily tension and stress caused by pressures at the office and their family responsibilities. And, many boomers must not only take care of growing children, but also take responsibility for aging parents. As a group, they have less leisure time than other adults.¹

Today there are changes in all stages of the aging process. Twenty-five years ago, age 65 was considered to be old, a time for retirement and rocking chairs. Today, many people are starting second careers at 65. And, frequently the press reports on spry 70 and 80 year old marathoners. Reportedly, there are 30,000 to 50,000 people over 100 years old in the U.S. today. According to the Census Bureau, this group of centenarians will grow to 131,000 by 2010. So, what was "old" then is no longer considered to be as old now. Bernard

Baruch, the eminent financier who lived to be a venerable 95 years old, once said, "To me, old age is always fifteen years older than I am."

Regardless of your age, science now tells us aromas can enhance the journey through the aging process.

Most of us take our sense of smell for granted. No one thinks a lot about the sense of smell, but everyone knows that it adds to the enjoyment of everyday activities. The aroma of freshly baked bread, the sweet fragrance of lilacs in the spring, or the smell of freshly cut grass can give great pleasure. Fragrance can also affect our moods, ease stress, encourage relaxation and enhance alertness. Most of us are familiar with these beneficial effects through the historical practice of aromatherapy.

As we get older, questions arise as to what happens to our sense of smell? Does it diminish like our eye sight and hearing often do? Is it possible to sharpen our sense of smell to stave off the effects of aging? Can it be used to enhance

Aroma-ology[®] is a concept based on systematic, scientific data collected under controlled conditions. It was developed in 1982 under the leadership of the Olfactory Research Fund. Aroma-ology is dedicated to the study of the inter-relationship of psychology and the latest in fragrance technology to transmit through odor a variety of specific feelings (such as relaxation, exhilaration, sensuality, happiness and achievement) directly to the brain.



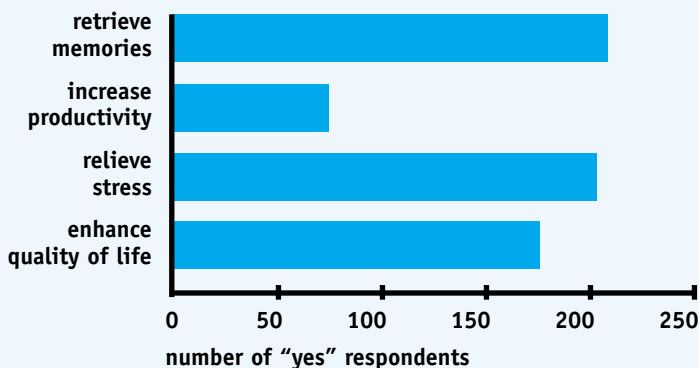
our homes, personal relationships, our sense of well-being? Many of these questions are now being investigated by research scientists, many of whom are supported by the Olfactory Research Fund, who are delving into the exciting new field of olfactory science, aroma-chology®.

The term “aroma-chology,” coined in 1982 by the Olfactory Research Fund’s President, Annette Green, is based on the scientific study of the

moods and emotions.

How does aroma-chology differ from aromatherapy? Though aromatherapy also deals with the effects of various aromas, it is based on folklore and anecdotal information rather than scientific studies. It is an ancient use of essential oils from plants, herbs and flowers to stimulate the olfactory sense and benefit the body physically, mentally, emotionally and spiritually. Aromatherapy claims

Do you believe aromas can help to ...



Source: Olfactory Research Fund National Sense of Smell Survey 1997

interrelationships between psychology and fragrance technology to elicit a variety of specific feelings and emotions such as relaxation, exhilaration, sensuality, happiness and well-being. Aroma-chology is a science in a rigorous sense with studies conducted in the world’s leading universities, hospitals and research centers. Aroma-chology is concerned only with the temporary effects of fragrances on human behavior, feelings of well-being,

to provide therapeutic benefits for treatment of various mental and physical disorders using essential oils. It is generally used in combination with body massage to heal, beautify and soothe the body and mind. Interestingly enough, many of the psychological claims made by aromatherapists over the years are now being substantiated by the work of the Olfactory Research Fund.

Once people used fragrance primarily

to attract the opposite sex. Now fragrances are used for a variety of purposes. In a survey conducted by the Olfactory Research Fund in 1997², respondents gave these reasons for using cologne, perfume or after-shave:

- I like the scent. - 83%
- It makes me feel better about myself. - 68%
- To enhance my well-being. - 56%
- To make myself more romantically attractive to others. - 51%
- To accessorize and make a fashion statement. - 46%

Now, let's explore how the sense of smell and aromas can enhance the quality of life and sense of well being as we age.



I feel good! The mood benefits of fragrance

Ongoing research shows aroma has a positive influence on moods and feelings of well being. In 1983, Dr. Craig Warren, who at the time was Vice President and Director of Fragrance Sciences at International Flavors and Fragrances, initiated a joint program with Dr. Gary E. Schwartz of Yale University to study the effects of fragrance on mood.³ The studies showed that eight major factors of mood are affected by fragrance. Fragrances can have a beneficial effect on irritation, stress, depression and apathy, and can further enhance the positive factors of happiness, sensuality, relaxation and stimulation.

Five fragrances had significantly measurable effects on mood states. It should be noted that complex fragrances can effect a variety of mood states as people react to the multiple notes in the scent, while simpler, single note fragrances usually effect a single mood state. Therefore, muguet, or lily of the valley, a complex

fragrance, makes people happy and increases both relaxation and stimulation. It also has the ability to lower depression, apathy and irritation. Douglas fir, on the other hand is a distinctly relaxing fragrance which is effective in lowering negative moods. (London's Heathrow Airport uses the scent of pine needles to put travellers at ease and reduce the stress of travel.)

Research has revealed that tuberose has a relaxing and sensuous profile with a significant increase in happiness. It is a perfect fragrance to use to enhance romantic moments. Tuberose also decreases depression. Osmanthus has stimulating and happy qualities that help to reduce apathy and depression. Hyacinth is a very complex fragrance which increases happiness, sensuality, relaxation and stimulation while decreasing all of the negative moods.

While all of these fragrances have been scientifically shown to increase positive feelings and reduce negative feelings, research has shown that your own favorite fragrance may also make you feel better simply because you take pleasure in the scent.

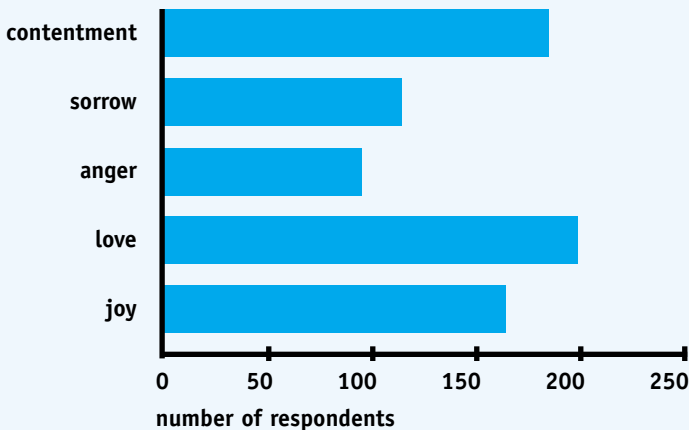
Physiological and psychological

changes occur in both women and men at mid-life that can interfere with a positive mood. In women, factors such as stages of family development, personal identity issues and societal expectations are very important. Males often experience inner turmoil, altered aspirations, career frustration, confrontation with one's mortality, family and role changes and concern with a decline in sexual potency. Dr. Susan S. Schiffman and Dr. Elizabeth A. Sattely-Miller of Duke University studied 56 women ranging in age from 45 to 60 years and 60 men between the ages of 40 and 55 years. They found that pleasant odors improved the moods of both men and women at mid-life.⁴ When the subjects used their choice of five popular colognes, they reported positive effects on their mood.

Fragrance can also be used to reduce anxiety during medical procedures. Dr. William Redd and Dr. Sharon Manne used fragrance to reduce patient anxiety and distress during MRI's (magnetic resonance imaging) in a study sponsored by the Olfactory Research Fund at Memorial Sloan-Kettering Cancer Center. When exposed to heliotropin, a sweet, vanilla-like scent, patients experi-

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Which moods and emotions do you believe are affected by the sense of smell?



Source: Olfactory Research Fund National Sense of Smell Survey 1997

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I feel good!
The mood
benefits of
fragrance

enced approximately 63% less overall anxiety than a control group of patients.⁵

In a study conducted in a large shopping mall, Dr. Robert A. Baron of Rensselaer Polytechnic Institute found that individuals exposed to pleasant odors were more likely to help a stranger than individuals not exposed to such odors. When asked to describe their current mood, those exposed to pleasant fragrances reported

that they felt happier and more positive than those not exposed to pleasant odors.⁶

Today, men and women are looking for fragrances that not only are pleasing, but have ingredients that have been scientifically proven to provide positive, beneficial psychological effects. These fragrances “plus” give people personal control over their feelings of well-being. And that sense of pleasure and control is important to all of us as we get older.





Aging and your sense of smell

Aging produces physical changes throughout the body. Hearing and eyesight often deteriorate. It is harder to read small print and glasses may be prescribed. We complain that we don't have the same level of energy as we once had. The sense of smell begins to diminish. We laugh ruefully with friends about being more forgetful.

According to The Longevity Strategy,⁷ the aging brain experiences both gains and losses. Aging produces a slight drop off in the ability to gather and use information, which can be overcome by breaking lengthy learning segments into shorter segments. On the other hand, knowledge shows no change with aging. We know more as we live longer. Memory for proper names decreases, but language skills including syntax, comprehension and grammar are not affected. Concentration and focus may diminish. Working for shorter periods with frequent breaks can help. And interestingly, problem solving actually improves with age. The Longevity Strategy

supports many of the behaviors already known to help healthy aging, including proper diet, exercise, an optimistic outlook, support of family and friends, a sense of humor and the need to “use or lose” both the brain and the body.

As adults, our sense of smell is most acute between the ages of 20 and 40, but over the course of our entire lifetime it helps to determine the flavor and palatability of foods, warns of danger such as fire, dangerous fumes and pollution, helps us make decisions about products, places and people and enhances our sense of well being.

The capacity to smell remains reasonably stable in most people until the age of 50 to 60.⁸ There is a slight decrease in the average performance across the sixth and seventh decades, and a marked decrease after the seventh.

In a study of 1,955 people conducted at the Clinical Smell & Taste Research Center at the University of Pennsylvania, more than 60% of the persons tested, aged between 65 and 80 years, evidenced major

olfactory impairment, with nearly a quarter totally lacking a sense of smell. On average, women outperformed men at all ages, and non-smokers outperformed smokers.⁹

In a Swedish study, 16 elderly people aged 77 to 87 years were compared for odor sensitivity to a group of 16 university students aged 20 to 25 years. The results showed almost identical odor sensitivity in the young adults as in the elderly people who had good mental and physical health.¹⁰

Although the loss of smell generally occurs gradually, happily there are ways of exercising your sense of smell to help maintain its acuity (see exercise table on opposite page).

Since our sense of smell can diminish as we age, some people tend to use too much fragrance because they cannot smell it as clearly as they once did. Remember that less is more in wearing scents, and even though we may not be aware of it ourselves, over-applying fragrances can be distracting to those around us.

It is encouraging that current research reveals that constant, creative use and increased awareness of all of our senses can help to keep them at peak performance well into old age, allowing our odor memory to remain substantially intact. Researchers continue to work diligently to increase our understanding in this area.

Although the loss of smell generally occurs gradually, happily there are ways of exercising your sense of smell to help maintain its acuity.

Exercise your sense of smell!

Train your mind, not your nose.

Most odors are perceived at an unconscious level. By thinking about the odors of familiar things, we bring about increased awareness. Musicians do not necessarily hear more music, but are more conscious of the content of what is heard. They train their minds, not their ears.

Smell often, but not a lot.

Because our noses fatigue easily, it is far better to smell in moderation, pause, then smell again. With different odors, you can smell alternately and this will increase the perception of the differences between odors. When you wish to refresh your nose, blow a small amount of air rapidly through your nose, back and forth for a few moments, and then return to smelling.

Create associations which make places and things – as well as odor – more memorable.

There are many opportunities to explore odors in addition to those at fragrance counters, and each should be taken. Every trip from home offers a rich palette of new smells. By creating conscious impressions of the odors wherever you go, you can bring back the whole sense of a visit 25 years past with one brief whiff.

Vary fragrance types.

Don't allow your sense of smell to become bored. If you start the day with a complex floral blend, perhaps a bright spicy or woody scent would provide the olfactory stimulation at the end of the day. Even the same fragrance, applied evenly over all of the skin, creates an entirely different impression than the concentrated essence emanating from a pulse point. The radiating aroma of a burning fragrance candle is vastly different from a few sprays of fragrance in the air.¹¹

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Aging
and your
sense of
smell





Work! Work! Work!

Fragrance can have a positive effect on the work environment, whether in a traditional office or a home office. Today, many more people are telecommuting and working at home. Often, retirees have a home office as well. At times, working at home can be lonely and isolating without regular interaction with fellow workers. Fragrances can be used to give a needed lift and maintain alertness. In the evening, a different fragrance can change the mood so that even though you haven't had to physically commute from the office, you feel the transition from work to relaxation.

Numerous studies have shown that odor stimuli can affect mood, anxiety and stress, performance in memorizing and memory retrieval tasks, sustained attention projects and problem solving.¹² All of these activities are present, to a greater or lesser degree, in most work situations. In studies conducted in both laboratories and real world scenarios, it has been found

that pleasant odors can encourage helpfulness, creativity, the ability to reason constructively and to come up with innovative solutions to problems.¹³

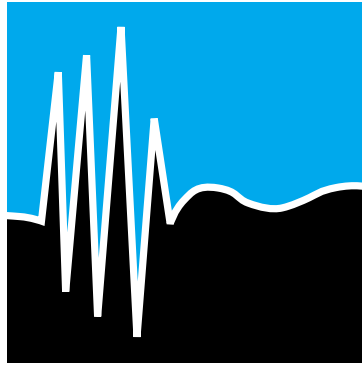
Fragrances are increasingly being used in the workplace to improve the performance and enhance the quality of life of workers. Some Japanese companies have used scent diffusers to release various odors at a low level of perception throughout the day. For instance, a lemony, woody fragrance might be used in the early morning for stimulation and a floral fragrance to aid concentration used later in the day.

So whether you work in an office in a skyscraper or in your den, fragrances can be used to improve your performance as well as make your environment more pleasant and productive.

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Fragrance in the workplace

- Lemon has been shown to help clerical workers to make fewer computer and word processing errors.
- Lavender helps a person perform mathematical calculations faster and with fewer errors.¹⁴
- Peppermint and muguet improve performance in sustained attention tasks.¹⁵
- Pleasant fragrances have been shown to improve workers' behavior in situations involving conflict and their ratings of people and objects. In addition, they also help to reduce stress.¹⁶
- Fragrances have also been used to promote well being in meeting rooms and hotel lobbies.



Stress busters

Almost everyone would answer a resounding **YES!** to the question, “Are you stressed out?” Stress can be caused by a variety of causes from office politics and pressures, children’s antics and activities, concern for aging parents, financial disappointments, retirement worries and health problems. For some, stressful situations are temporary; for others, stress is a chronic condition.

For women, the period from 40 to 49 years was found to be stressful, but the period after 50 was remarkably free of stress and conflict. Men, however, had a significant increase in stress beginning at age 50 caused by increased feeling of failure which intensified their efforts to reach their goals. However, those intensifying efforts ceased by age 60.¹⁷

Rather than taking medication to relieve stress, many baby boomers, as well as others, are seeking alternative medicines and therapies in the form of yoga, meditation,

herbs and health supplements, acupuncture and aromatherapy to maintain balance and good health. Scents are used to calm, relax, relieve stress and serve as a pick-me-up. With rising health costs, people are seeking alternative methods to promote well-being.

Researchers at Yale University have shown that the smell of spiced apples can ward off a panic attack in some people and reduce stress levels. Other fragrances known for their relaxing qualities are lavender, vanilla, rose, chamomile, neroli and ylang-ylang.

As we get older, some people experience difficulties in sleeping. Lavender has been found to aid the relaxation and sleep process. What nicer way to drift off to sleep than with your head resting on a lavender scented pillow, or having a lovely, lavender scented bath before bedtime. Candles, diffusers, room sprays, potpourri and sachets can all be used to good effect.

Knowing which fragrances help you to relax and unwind is the first step in controlling your stressful environment.

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There is no place like home

The term “cocooning” was coined in the late 1970’s by trend spotter Faith Popcorn to describe retreating into the privacy of one’s home during leisure time as a means of insulating oneself from what is perceived to be a harsh, unpredictable world. Today, people are staying at home more and more because they want to, not because they have to. Sales of home furnishings, gourmet cooking equipment and electronic entertainment centers have soared. Baby boomers, in particular, strive to establish a soothing, peaceful environment.

The home has become the focus for a total sensory experience which includes lighting, music and fragrance. Fragrance fountains provide a soothing sound, along with a refreshing, relaxing fragrance. Sales of scented candles have jumped dramatically. Potpourri, room sprays and scents for bed linens are popular. Famous fashion designers have introduced upscale products to enhance the home. The Olfactory Research Fund

conducted a study in June of 1997 of more than 350 people which showed that 80% of the participants used environmental fragrances.¹⁸ Home fragrances allow people to control their own environment and make it part of the signature ambiance of their homes. Scents can be used to set the mood for different occasions or seasons. For instance, an upbeat, mood elevating scent livens up a party, while a warm, sensual scent sets the tone for a romantic dinner. A soothing scent adds enjoyment to a relaxing weekend at home.

Home fragrances also can conjure up fond childhood memories. Can you remember racing home from school and smelling freshly baked chocolate chip cookies, or the soothing scent of the Christmas tree as you impatiently waited for Santa's arrival? In fact, these olfactory memories are so positive, realtors suggest that home sellers bake bread or have a spiced apple potpourri simmering on the stove when showing their homes to prospective buyers. Buyers are inclined to fall in love with the house simply because "it smells like home."

Just as you enjoy a variety of different types of music, or change lighting effects to fit the occasion, using different fragrances can completely alter your environment. As people spend more time at home, they focus on making it a place of welcome relaxation. Home fragrances are an inexpensive way to add a touch of luxury and pleasure to one's life.



Scents and sexuality

Sexual relationships need not diminish as we age, but can be enjoyed throughout one's healthy life cycle. Medical research has resulted in drugs that help to alleviate the problem of male impotence. With pressures of family, work and time constraints, it is important to set the stage for romance. Establishing an ambient environment conducive to intimacy can help enhance the sexual experience for older couples. Soft lights, sensual music and a pleasing fragrance provide a multi-sensory atmosphere that helps to shut out distractions and focus on each other.

In a 1995 survey conducted by *The New York Times* and the Olfactory Research Fund, 38% of the male respondents and 31% of the female respondents said that they use fragrance to make themselves more romantically attractive to others.

For the first time, scientific evidence has shown that

male fragrances enhance a woman's sexual arousal. In a study conducted by The Kinsey Institute and Indiana University under the auspices of the Olfactory Research Fund, women who smelled a popular male cologne while fantasizing about a pleasurable erotic experience reported themselves more sexually aroused than during exposure to either women's cologne or a neutral odor.¹⁹ Up until this time, all of the evidence was anecdotal rather than scientifically validated.

Certainly this breakthrough research will encourage further scientific studies.

Fragrances such as jasmine, tuberose, ylang-ylang, patchouli, sandalwood, rose, cardamon, cedarwood, cinnamon and clary sage are known for their aphrodisiac properties. A warm bubble bath, massage oil or candles scented with these fragrances help to heighten all of the senses and aid in increasing the enjoyment of the intimate experience.

In a 1995 survey conducted by *The New York Times* and the Olfactory Research Fund, 38% of the male respondents and 31% of the female respondents said that they use fragrance to make themselves more romantically attractive to others.



The taste and smell connection

Eating well is one of life's pleasures. A large part of the enjoyment of food flavors comes from smelling delicious aromas that accompany them. The human sense of smell largely determines the flavor and palatability of food and beverages. Imagine what roast turkey or popcorn or apple pie would taste like if you could not smell them cooking. In addition to flavor and aroma, the enjoyment of food is increased by its texture, or how it feels in the mouth, its temperature and its presentation.

The ability to discriminate among odors can be severely reduced by the aging process. Studies suggest that odors are half as intense for many elderly subjects as for young people.²⁰ This condition can result in diminished enjoyment of food, as well as inadequate nutrition for an older person. If you can't smell a delicious meal, interest in eating is reduced, which means that you don't get adequate amounts of needed vitamins, minerals and other nutrients. Mouth-watering

aromas increase saliva and stimulate the digestive tract which encourages the efficient metabolism of food.

Smelling food also helps to satiate you and contributes to feeling full, which can have an effect on weight gain or loss. Research by Dr. Susan Schiffman has shown that overweight people can be satisfied with less volume of food as long as they continue to receive the taste and odor they desire.²¹ Dieters should eat small amounts of a variety of foods for a maximum sensory experience. Bland foods without odor should be avoided. Enhanced food aromas can help to satisfy a person's hunger sooner. Someone who works in a bakery every day often has no appetite for the sweets produced, simply because the pervasive aroma satisfies his need to eat these foods.

Spices and herbs such as curry, ginger, crushed red pepper flakes, horseradish and fresh mint can be used to excite the taste buds. Condiments such as balsamic vinegar, Tabasco sauce and salsa can pep up flavor.

So what can you do to compensate for the decline in the sense of smell so that the enjoyment of food can be restored? Researchers are working on treatments for diminishing taste and smell due to aging and have found that by intensifying food aromas, appetites and the enjoyment of food can be improved. Increase food aromas with flavor enhancers such as bacon bits, butter or cheese flavoring, and extracts to improve the appetite. Use highly aromatic sauces. Simulated beef flavor, such as powdered beef bouillon, can be added to beef.²²

Spices and herbs such as curry, ginger, crushed red pepper flakes, horseradish and fresh mint can be used to excite the taste buds. Condiments such as balsamic vinegar, Tabasco sauce and salsa can pep up flavor.

The dining atmosphere also plays an important part in the enjoyment of food. Set the table with style. Arrange food attractively using different colors and textures. A meal of baked sole, mashed potatoes and cauliflower served on a white dinner plate won't excite anyone's taste buds, whereas baked sole, bright red tomatoes and fresh green peas on the same plate will. Dimming lights, lighting candles and listening to calming music can also enhance the dining experience.



The effects of fragrance on sports and leisure activities

Although baby boomers have less leisure time than other age groups, they are very committed to health and fitness activities. Older people are also exercising more than ever because they know the physical and mental benefits of being fit. While baby boomers enjoy a broad variety of sports and exercises, older people enjoy more low impact activities such as walking, cycling and water workouts.

With the evolution of more active life styles, doctors have seen more sports related injuries. As health costs rise, insurers are exploring alternative therapies and self help options as solutions to some health problems. There is a growing body of evidence, resulting in large part from research sponsored by the Olfactory Research Fund, that aroma can be used as an effective tool to help patients reduce stress and pain, as it promotes relaxation and enhances feelings of well being.

Fragrances can also help people adhere to exercise routines whether they are being done for basic health

and fitness benefits or as part of a physical therapy routine. Research is planned by the Fund to study the effects of aromachology techniques in the process of rehabilitation from sports injuries to:

- Reduce stress and promote relaxation.
- Encourage healing by reducing stress, which is known to suppress the immune system.
- Enhance performance during exercise by increasing perceived comfort level of exertion.
- Alleviate pain through visualization techniques utilizing aroma.
- Restore the feeling of control of one's life.²³

In addition to sports and exercise, there are many other enjoyable leisure time activities. For many, travel is a pleasurable priority, particularly for retired people who have the time, money and energy to do so. Remembering unique smells of travel destinations, such as the pungent spice markets of India or the lavender fields in the south of France or the briny smell of the ocean at high tide, can bring back wonderful memories of a particular trip. Conversely, some people believe that it is comforting to bring the smell of home along with them when they travel via a scented candle or pillow. Some airlines provide passengers with aromatherapy kits to ease the effects of travel and combat jet lag.

Today as we age, we enjoy a more active life style than our parents or grandparents enjoyed. These active life styles contribute to a greater enjoyment of all phases of our lives.



Conclusion

The five senses can play a pivotal role in keeping your body and mind at their peak as we age. The interrelationship of the senses helps in maintaining youthful attitudes and appearances. By stretching, exercising and enjoying all of our senses, we gain personal control over our feelings of well-being. The aging process can be a rich and rewarding experience and fulfill the prophecy of poet Robert Browning when he wrote, "Grow old along with me! The best is yet to be."





References

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1. Patricia Braus, "The Baby Boom at Mid-Decade". *American Demographics*, April 1995, p. 40.
 2. "Enthusiastic Response to Website Sense of Smell Survey", *The Aroma-Chology Review*, Vol. VI, No. 3.

Over 350 individuals participated in the survey conducted by the Olfactory Research Fund on its website and in a questionnaire to determine people's perception of their sense of smell and the role it plays in their daily lives. The majority of participants believe that aromas can have a positive effect in many aspects of daily life. 68% responded that they wear fragrance "to make me feel better about myself", and 56% use fragrance to enhance their well being. 80% use environmental fragrances.

3. Craig Warren, Stephen Warrenburg, "Mood Benefits of Fragrance", from a speech by Dr. Warren at the

November 12, 1991 symposium "Aroma-Chology: The Impact of Science on the Future of Fragrance" sponsored by the Olfactory Research Fund.

A mood profiling procedure was developed through this study which is a self-administered, quantitative method that measures subjective mood changes evoked by fragrance. Eight major factors of mood affected by fragrance were defined including happiness, sensuality, relaxation, stimulation, irritation, stress, depression and apathy.

4. Susan S. Schiffman, Elizabeth A. Sattely-Miller (1995), Pleasant Odors Improve Mood of Men As Well As Women at Mid-Life. In A. Gilbert (ed.), Compendium of Olfactory Research 1982-1994, 97-103, Dubuque, Iowa: Kendall/Hunt Publishing Company.

In two studies which measured the effect of fragrance on mood, 56 women ranging in age from 45 to 60 years and 60 males between the ages of 40 and 55 participated. The main finding of these studies were that the use of fragrance can improve mood in both women and men at mid-life.

5. William Redd, Sharon Manne (1995), Using Aroma to Reduce Distress During Magnetic Resonance Imaging. In A. Gilbert (ed.), Compendium of Olfactory Research 1982-1994, 47-52,

Dubuque, Iowa: Kendall/Hunt Publishing Company.

Eighty-five patients who were having an MRI scan participated in the trial at Memorial Sloan-Kettering Cancer Center. Patients who were exposed to a vanilla-like scent while undergoing MRI experienced approximately 63% less overall anxiety than a control group of patients who were not exposed to a fragrance.

6. Robert A. Baron, "Of Cookies, Coffee and Kindness: Pleasant Odors & the Tendency to Help Strangers in a Shopping Mall", *Aroma-Chology Review*, Vol. VI, No. 1, January 1997.

In this study conducted in a large shopping mall, persons exposed to pleasant smells rated their own moods as significantly more positive than those not exposed to smells. A significantly higher proportion of passersby were willing to help other people when a pleasant fragrance was present in the air than when it was not.

7. David J. Mahoney, Short Mahoney, The Longevity Strategy: How to Live to 100 Using the Brain-Body Connection, John Wiley & Sons, 1998.
8. Piet Vroon, Smell - The Secret Seducer, Farrar, Strauss & Giroux, 1994.
9. Richard L. Doty, Paul Shaman, Steven L. Applebaum, Ronita



Giberson, Lenore Siksorski and Lysa Rosenberg, "Smell Identification Ability: Changes with Age," *Science*, 12/21/84, Vol. 226, pp. 1441-1443.

Smell identification ability was measured in 1,955 persons ranging in age from 5 to 99 years. On the average, women outperformed men at all ages, and nonsmokers outperformed smokers. Peak performance occurred in the third through fifth decades and declined markedly after the seventh. More than half of those 65 to 80 years old evidenced major olfactory impairment. After 80 years, more than three-quarters evidenced major impairment.

10. Steven Nordin, Umea University, Ove Almkvist, Karolinska Institute, and Birgitta Berglund, Stockholm University, Sweden, "Odor Sensitivity and Successful Aging".

The results of this study showed almost identical odor sensibility in the successfully aged subjects as in the young adult subjects. Successfully aged was defined as arriving at age 77 to 87 with good mental and physical health. Sixteen people were studied in each group.

11. "Techniques to Improve Your Sense of Smell", The Fragrance Foundation, 1993.
12. J. Stephan Jellinek, "Aroma-Chology: A Status Report", *Perfume & Flavorist*, September/October 1994, Vol. 19.

13. Alice M. Isen, "The Sweet Smell of Success", *The Aroma-Chology Review*, Vol. VI, No. 3.

The pleasant odor of "cinnamon bun" released in ambient air by a standard vaporizer significantly increased creative problem solving ability as measured by the Remote Associates Test. There is further reason to believe that odor-induced positive effect may facilitate learning, reasoning and general (or "non-creative") logical problem solving.

14. Piet Vroon, Smell - The Secret Seducer, Farrar, Strauss & Giroux, 1994.
15. J.S. Warm, W.N. Dember & E. Parasuraman, "Effects of Olfactory Stimulation on Performance and Stress in a Visual Sustained Attention Task", *Journal of Soc Cosm. Chem* 42, 1992.

The effects of olfactory stimulation on performance and stress in a demanding and stressful visual attention task were studied in 36 subjects. Both peppermint and muguet were found to significantly improve performance in the test, with no difference in effectiveness between the two. Neither of the fragrances had a significant effect on subjective experience of stress or of work load.

16. See reference No. 6.
17. See reference No. 4.

18. See reference No. 2.
19. Cynthia A. Graham, Erick Janssen, Stephanie A. Sanders, "Sexual Fantasy, Women and Fragrance, *The Aroma-Chology Review*, Vol. VII No. 2.

In a study of 33 women between ages 19 and 45, researchers found that women who smelled a popular male cologne while fantasizing about a pleasant sexual experience reported themselves more sexually aroused than during exposure to either a women's cologne or a neutral scent.

20. Susan S. Schiffman, "Taste & Smell Losses with Age", *Contemporary Nutrition*, Vol. 16, No. 2, 1991.

Taste and smell losses occur with advancing age and these decrements in sensitivity can

contribute to inadequate nutritional status for the elderly. Flavor and texture enhancements can partially compensate for these losses.

21. Susan S. Schiffman, "The Use of Flavor to Enhance Efficacy of Reducing Diets", *Hospital Practice*, July 15, 1986.

Diets low in flavor variety and intensity fail in the long run because they do not satisfy the basic needs of overweight people. Flavor enhancers and changes in eating habits to increase the sensory impact of food can help.

22. See reference No. 20.
23. Olfactory Research Fund, Ltd., "Sports Rehab/Sensory Solutions", Concept Proposal, 1998.





The Olfactory Research Fund is the only tax-exempt, charitable organization in the world dedicated to the support of trail blazing research related to unraveling the mysteries and importance of the sense of smell and to identifying the psychological benefits of fragrance.

Olfactory Research Fund, Ltd.
145 East 32nd Street
New York, NY 10016
Tel. (212)725-2755
Fax (212)779-9058
Internet www.olfactory.org
Email info@olfactory.org