

Mandom Demonstrates the Effectiveness of Training to Move Facial Muscles to Improve Facial Expressions in Upper-Middle-Age Men, Whose “Smile Is Not Actually Seen as a Smile”

—Characteristics of Facial Expressions of Men in their 60s and the Effects of Facial Muscle Training—

Mandom Corporation (Head office: Osaka City, President Executive Officer & Director: Ken Nishimura, hereinafter referred to as “Mandom”), pursues “creation of new value” as a human-oriented company to delight, excite, and bring joy to consumers. Through our research into skin impressions, we have verified in various ways the impressions that different skin conditions have on people, and have applied these findings to the development of skincare products.

In this research, we focused on the concerns that upper-middle-age men¹ have about facial expressions when communicating. The facial expressions of men in their 40s and 60s were quantitatively analyzed and compared using facial expression analysis software. The results showed that people in their 60s tended to give a more negative impression when they had a blank facial expression, and that the movements of the muscles to make a smiling facial expression were weakened. Furthermore, we confirmed that facial muscle training is an effective way to improve these tendencies.

The results of this research were presented at the 31st Annual Meeting of the Japan Society for Research on Emotions, held from Friday, May 26 to Sunday, May 28, 2023.

Research Background

According to recent reports, the proportion of male workers is high, at 83.9% for workers aged between 60 and 64 and 61.0% for workers aged between 65 and 69, and these percentages are increasing year after year.² In addition, it is believed that upper-middle-age men tend to have more opportunities for communication after retirement through activities such as participating in new communities. According to our survey on communication and facial expressions targeting upper-middle-age men, we heard many complaints about their not being able to express the facial expressions they intended, including “People seem to think I’m angry even though my facial expression is completely normal” or “When I smile, people don’t see it that way.” When communicating with others, visual information such as appearance, gestures, and gaze has a greater impact than auditory information,³ and facial expressions in particular, which express inner emotions, are the most important element in communication.

We started this research with the aim of identifying and addressing the concerns of upper-middle-age men related to making facial expressions, thereby contributing to smoother communication.



Research Content

A method called Facial Action Coding System (FACS)^{*4} is used for analyzing facial expressions. FACS records facial muscle movements divided into action units (AUs), thereby enabling detailed analysis of complex facial expressions and a precise understanding of muscle movements. FaceReader™, facial expression analysis software based on FACS theory, can also detect emotions such as “happiness” and “sadness” based on AUs. We used this software to investigate the facial expressions of upper-middle-age men, with the following results.

1. With a blank facial expression, upper-middle-age men in their 60s give a more negative impression than middle-age men in their 40s.

A comparison between men in their 40s and 60s revealed that when they had blank facial expressions, the men in their 60s felt a higher rate of negative emotions^{*5} (Figure 1). This probably reflected their experience of being seen to be angry even when their facial expressions were normal. On the other hand, there was no significant difference between age groups in the percentage of negative or positive emotions felt with a smiling facial expression (Figure 2). The reason for this could be the considerable individual differences in emotions felt when creating a smile, making it less susceptible to age differences.

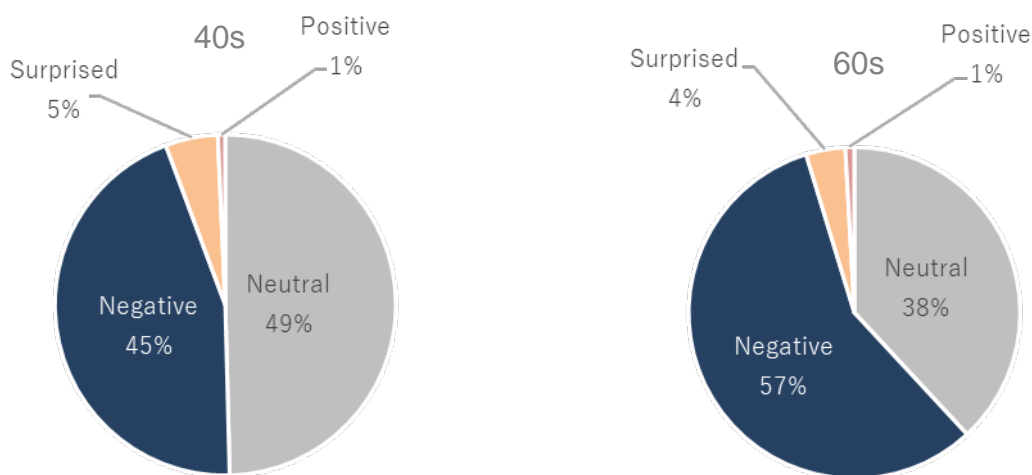


Figure 1. Percentage of emotions felt with blank facial expressions, comparison between age groups

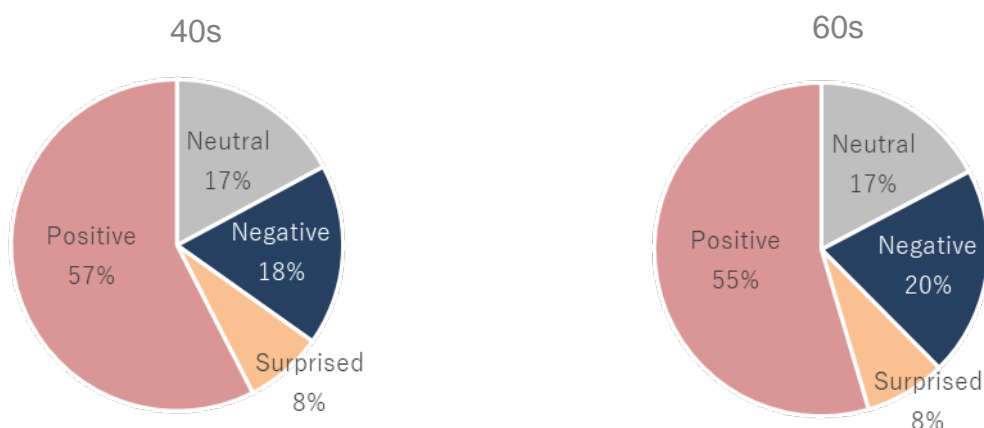


Figure 2. Percentage of emotions felt with smiling facial expressions, comparison between age groups

2. The muscles used in smiling tend to be weaker in upper-middle-age men in their 60s than in middle-aged men in their 40s.

We investigated whether there were any differences in the muscle movements used in smiling between people in their 40s and 60s. First, we selected subjects who were able to make smiling facial expressions⁶ and compared their AUs. As a result, the subjects in their 60s showed lower values than the subjects in their 40s for AU 06 (raising cheeks) and AU 12 (raising corners of the mouth), which are components of smiling facial expressions (Figure 3). This revealed that even when people in their 60s are perceived as smiling, their cheeks and corners of the mouth are less likely to lift, showing differences in muscle movement functionality by age group. Furthermore, when all subjects were given the task of “repeating the sequence of a blank facial expression and a smile,”⁷ it was found that the number of times smiles occurred was less among subjects in their 60s than among subjects in their 40s (Figure 4). These results indicate that men in their 60s tend to have more difficulty switching facial expressions.

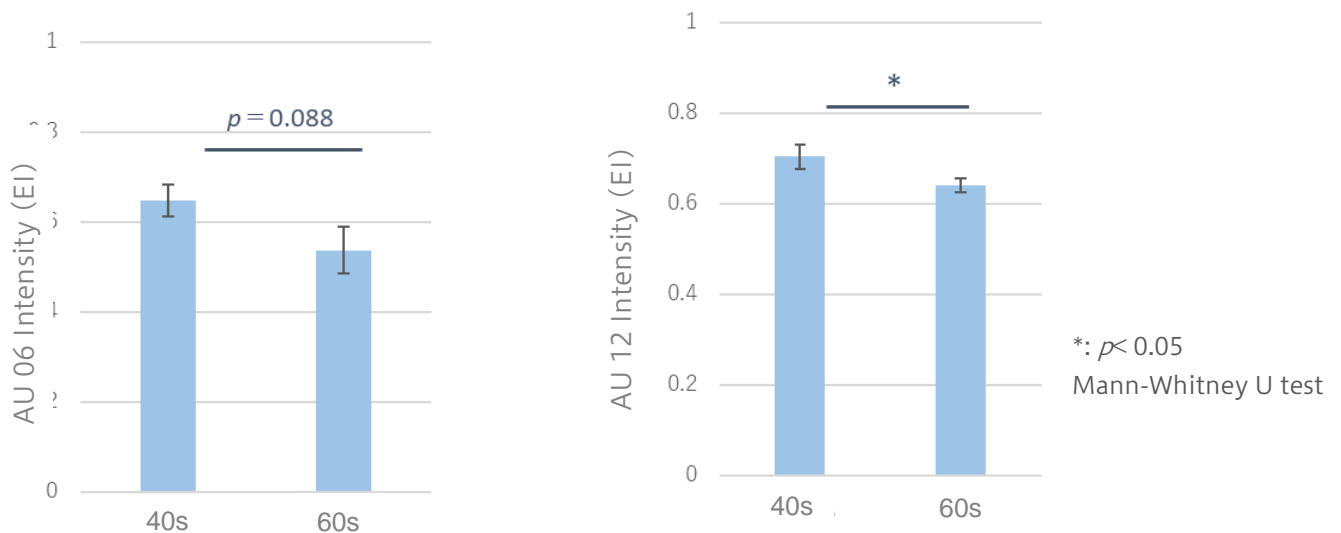


Figure 3. Comparison of AU 06 (left) and AU 12 (right) in smiling in subjects who are able to make smiling facial expressions

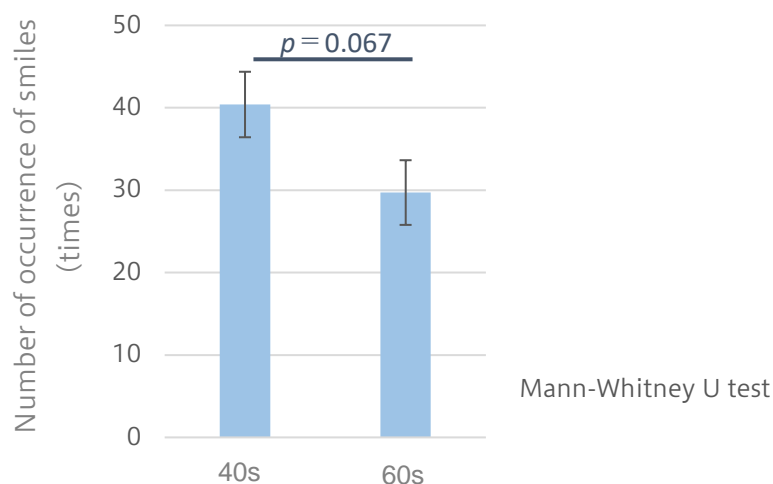


Figure 4. Number of times smiles occurred during the task of switching between a blank facial expression and a smile, comparison between age groups

3. Facial muscle training reduces the facial expression concerns of upper-middle-age men in their 60s

We verified the effectiveness of the facial muscle training method^{*8} based on the idea that training to improve the movement of facial muscles will improve the delivery of facial expressions. Thirty-six men in their 60s (average age 63.7 ± 2.4 years) were divided into two groups—a training group and a control group—to conduct a facial expression data acquisition study. Based on the facial expression analysis data from the initial period and a period four weeks later, the change in each parameter was calculated, and the following improvements were confirmed.

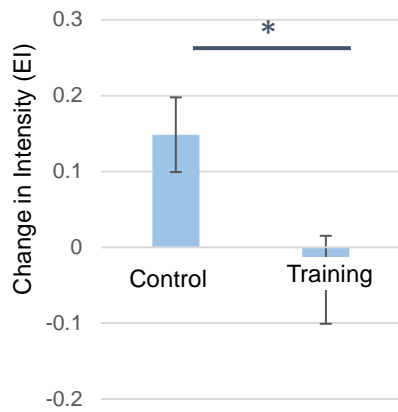
- The increase in negative emotions felt with blank facial expressions was suppressed (Figure 5, Graph a)
- Positive emotions increased with smiles (Figure 5, Graph b)
- AU 06 and AU 12 increased with smiles (Figure 5, Graphs c and d)

These results suggest that the facial muscle training method is expected to have the effects, among others, of giving a less gloomy impression with blank facial expressions, and of conveying to others more pleasant feelings with smiles. The above was also clearly demonstrated by the improvement in muscle movement to make smiling facial expressions.

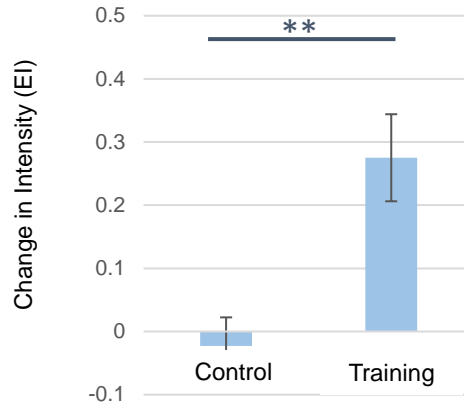
Furthermore, comments were received from the training group subjects such as, “My wife tells me my facial expressions have become brighter,” “Now I’m able to smile more naturally and my facial expressions are more vibrant than before,” “People tell me my smiles are lovely and that I look younger,” and “I have gained confidence in myself and can talk to people more freely,” indicating that the effects were felt in a variety of situations.

From the above, facial muscle training was demonstrated to be an effective way to address facial expression concerns in men in their 60s.

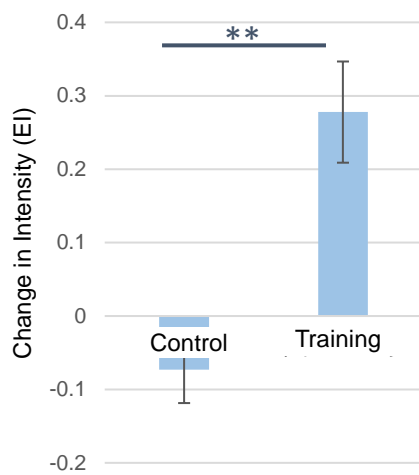
(a) Negative emotions felt with blank facial expressions



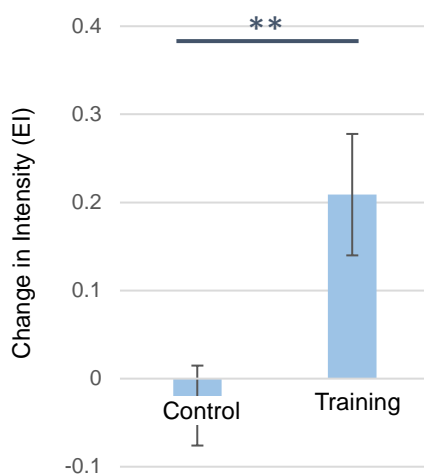
(b) Positive emotions felt with smiling facial expressions



(c) AU 06 with smiling facial expressions



(d) AU 12 with smiling facial expressions



T-test
 ** $p < 0.01$
 * $p < 0.05$

Figure 5. Changes in facial expression parameters after four weeks of training

We believe that the results obtained from this study will help resolve the concerns of upper-middle-age men about facial expressions in communication and will enhance smoother interactions.

As a people-oriented company, Mandom will continue to cherish connections between people and promote research activities with the aim of creating new value for a wide range of consumers, regardless of age.

Notes and Glossary

- *1 At Mandom, men aged between 55 and 74 are referred to as “upper-middle-age men.” For this release, the target subjects were upper-middle-age men age between 60 and 69, for whom various verifications were conducted.
- *2 See the Annual Report on the Ageing Society FY 2023 (Cabinet Office; Japanese only).
- *3 There is a rule called “Mehrabian’s rule,” which shows how three elements—linguistic information, auditory information, and visual information—influence communication. It is said that linguistic information (the meaning of the words themselves) accounts for 7%, auditory information (tone of voice and speaking style) accounts for 38%, and visual information (facial expressions and gestures) accounts for 55%.
- *4 Facial Action Coding System (FACS) is a method proposed by Ekman, P., et al., to quantitatively evaluate seven emotions by combining action units (AUs), the smallest anatomically independent and visually identifiable units of facial movement. Of the AUs, it is said that AU 06 and AU 12 contribute to smiling facial expressions.
- *5 Of the emotions detected by FACS, the sum of the parameters “sadness,” “fear,” “disgust,” “anger,” and “contempt” was defined as negative emotions, and the parameter “happiness” was defined as a positive emotion, and the percentage points of the total emotion parameters were shown.
- *6 Based on the evaluation by a specialist panel, subjects with positive emotion intensity of 0.45 or higher were defined as being able to smile.
- *7 In a task in which a blank facial expression and a smiling facial expression were switched repeatedly per second for two minutes, the number of times positive emotion intensity of 0.45 or higher was detected with a smiling facial expression was counted.
- *8 A facial muscle training method where a massage cream was used for 10 minutes twice a day.