

Improvement of nonverbal behaviour in Japanese female perfume-wearers

Takahiro Higuchi

Tokyo Metropolitan University, Tokyo, Japan

Ken Shoji and Sumie Taguchi

Shiseido Product Development Center, Yokohama, Japan

Toshiteru Hatayama

Tohoku University, Sendai, Japan

The present study addressed the issue of whether people who use perfume improve their “visual” interpersonal impression. This expectation comes from the possibility that those who wear perfume may modify their nonverbal behaviour through positive mood changes generated by the pleasant odour of perfume or through an increase of public self-consciousness. Thirty-one Japanese females were assigned to either a perfume or a no-perfume group. A screening test held in advance confirmed that all the participants in the perfume group preferred the smell of the perfume used in this study. They participated in an interview and answered questions asked by a female confederate. In the middle of the interview, the interviewees in the perfume group put on the perfume. The improvement of their nonverbal behaviour in the latter half of the interview was evaluated by 18 neutral observers, who watched silent video clips of the interviews. The observers were not informed that some of the interviewees used perfume. The results of observer ratings showed that the interviewees in the perfume group showed significantly less nonsymbolic movement (touching their hair or nose, or shifting their posture such as rotating on a swivel chair) when wearing perfume. Analysis of the video clips showed that the interviewees in the perfume group decreased their nonsymbolic movement for about 6 s per minute after putting on the perfume. The female observers also rated the interviewees in the perfume group as more self-confident. These findings suggest that wearing perfume inhibits behaviours that project negative impressions. Analysis of the subjective mood showed that the inhibition of an interviewee’s nonsymbolic movement might have resulted from a wearer’s positive mood change. Although several methodological issues limit the conclusions drawn from these results, the present study showed that wearing perfume has the potential to cause changes in nonverbal behaviour and to improve visual impressions.

La présente étude examine comment les gens qui utilisent le parfum améliorent l’impression visuelle qu’ils produisent sur les autres. Cette prévision provient de la possibilité que ceux qui portent du parfum peuvent modifier leur comportement non verbal à partir des changements d’humeur positifs générés par l’odeur plaisante du parfum ou à partir l’augmentation de la conscience de soi publique. Trente et une femmes japonaises furent assignées soit à un groupe portant du parfum ou à un groupe ne portant pas de parfum. Un test de dépistage mené à l’avance a confirmé que toutes les participantes dans le groupe avec parfum préféraient l’odeur du parfum utilisé dans cette étude. Elles ont participé à une entrevue et ont répondu à des questions posées par une femme complice du chercheur. Au milieu de l’entrevue, les participantes interrogées du groupe avec parfum se sont appliquées du parfum. Dix-huit observateurs neutres ont visionné un enregistrement vidéo muet de la seconde moitié des entrevues afin d’évaluer l’augmentation des comportements non verbaux des participantes. Les observateurs ne furent pas informés que certaines femmes s’étaient appliquées du parfum. Les résultats des évaluations des observateurs ont indiqué que les participantes du groupe avec parfum ont montré significativement moins de mouvements non symboliques (toucher leur nez ou changer leur posture tel qu’en

Correspondence should be sent to Takahiro Higuchi, Department of Kinesiology, Graduate School of Science, Tokyo Metropolitan University, 1-1, Minami-Ohsawa, Hachioji, Tokyo, 192-0397, Japan (E-mail: higuchit@comp.metro-u.ac.jp).

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se tournant sur un fauteuil pivotant) lorsqu'elles portaient du parfum. L'analyse des enregistrements vidéos a indiqué que les participantes du groupe avec parfum ont réduit leurs mouvements non symboliques environ 6 secondes par minute après s'être mises du parfum. Les observatrices féminines ont également évalué les participantes parfumées comme ayant plus confiance en soi. Ces données suggèrent que le fait de porter du parfum inhibe les comportements projetant des impressions négatives. L'analyse de l'humeur subjective a montré que l'inhibition des mouvements non symboliques de la participante interrogée peut résulter du changement positif d'humeur de la personne qui porte un parfum. Quoique plusieurs considérations méthodologiques limitent les conclusions tirées de ces résultats, la présente étude a montré que le fait de porter du parfum a le potentiel de provoquer des changements dans le comportement non verbal et d'améliorer les impressions visuelles.

*E*l presente estudio investigó si la gente que usa perfume mejora la impresión "visual" que produce en otras personas. Esta expectativa proviene de la posibilidad de que aquéllos que usan perfume modifiquen su conducta no verbal por medio de cambios positivos en su estado de ánimo generados por el olor agradable del perfume o por medio de un aumento de su autoconsciencia pública. Treinta y un mujeres japonesas se asignaron a un grupo que se aplicara perfume o a un grupo sin perfume. Se condujo antes una prueba de filtro que confirmó que todas las participantes en el grupo con perfume preferían el olor del perfume empleado en el estudio. Participaron en una entrevista y respondieron preguntas a una mujer confederada. A la mitad de la entrevista, se aplicaban el perfume las entrevistadas del grupo con perfume. Diez y ocho observadores neutrales, quienes vieron las entrevistas en videograbaciones silenciosas, evaluaron qué tanto mejoraba su conducta no verbal durante la segunda mitad de la entrevista. No se informó a los observadores que algunas de las entrevistadas usaban perfume. Los resultados de las calificaciones asignadas por los observadores mostraron que las entrevistadas del grupo con perfume manifestaban, de manera significativa, menos movimientos no simbólicos (tocar su pelo o nariz, o cambiar de postura como voltearse en una silla giratoria) cuando se habían aplicado perfume. El análisis de las videograbaciones mostró que las entrevistadas del grupo con perfume disminuían sus movimientos no simbólicos a aproximadamente 6 segundos por minuto después de ponerse el perfume. Las mujeres observadoras también consideraron que las entrevistadas en el grupo con perfume mostraban más confianza en ellas mismas. Estos hallazgos sugieren que usar perfume inhibe la conducta que proyecta una impresión negativa. El análisis el estado de ánimo subjetivo sugiere que la inhibición del movimiento no simbólico de las entrevistadas podría ser el resultado de un cambio a un estado de ánimo positivo en las participantes que se aplicaron perfume. Aunque diversos sesgos metodológicos limitan las conclusiones derivadas de estos resultados, el presente estudio sugiere que usar perfume podría promover cambios en la conducta no verbal y mejorar la impresión visual que se produce en los demás.

Perfume is expected to improve the wearer's interpersonal impressions in social settings (Baron, 1981; Fiore, 1992). Although the reason for the contribution of olfactory impressions to positive impressions of a perfume-wearer is unclear, positive affective states generated by an exposure to a pleasant odour may play a role (e.g., Ehrlichman, Kuhl, Zhu, & Warrenburg, 1997; Schiffman, Suggs, & Sattely-Miller, 1995; Sugano, 1992). The olfactory areas in the brain make anatomically unique and direct connections with the neural substrates responsible for emotional information processing. This leads to the speculation that people who interact with those who wear perfume may experience relatively intense affective responses that result in a positive impression on the perfume-wearer.

Such positive reactions to perfume may be experienced by the perfume-wearer as well. If this is so, perfume may cause behavioural changes that result in the wearer's projecting a positive "visual" impression. For example, people in positive affective states tend to be benevolent toward

others (Baron, 1990; Carnevale & Isen, 1986). In such situations, people are more likely to smile or make eye contact with others, which projects a positive image (Cunningham, Barbee, & Pike, 1990; Mueser, Grau, Sussman, & Rosen, 1984). Modification in the wearer's nonverbal behaviour may also arise from a temporal increase of public self-consciousness (i.e., to see oneself in other people's eyes; Fenigstein, Scheier, & Buss, 1975). Because perfume attracts attention, those who wear perfume are likely to be conscious of the effect that perfume has on others. Perfume-wearers may, in turn, alter their behaviour to make themselves more attractive to others (Vrij, Edward, & Bull, 2001). It is therefore reasonable to assume that perfume-wearers may project positive visual and olfactory impressions.

To test this hypothesis, an experiment involving a simulated interview was conducted. Young females participated in the task as interviewees. One half of the participants put perfume on halfway through the interview, while the other half did not. Neutral observers who watched silent

video clips of the interviews evaluated improvements in nonverbal behaviour that occurred in the latter half of the interview. The observers were not informed that some of the interviewees were wearing perfume; therefore, they rated the interviewees on the basis of visual impressions alone. For this pilot study, females were selected as interviewees because females represent the majority of perfume-wearers and are more likely to use the possible benefit of wearing perfume than males.

Three types of nonverbal behaviour (smiling, making eye contact, and touching oneself as a type of nonsymbolic movement) that affect interpersonal impressions during an interview were measured. Smiling (Cunningham et al., 1990; Mueser et al., 1984) and making eye contact (Burgoon, Manusov, Mineo, & Hale, 1985; Cook & Smith, 1975; Kampe, Frith, Dolan, & Frith, 2001) create positive impressions on others. Nonsymbolic movement is a generic term used for self-touching (of the hair, nose, and arm, for example) or shifting posture (crossing the legs while talking, or rotating on a swivel chair). Nonsymbolic movement is assumed to represent self-denigrating posture, such as anxiety, tension, and embarrassment (Harrigan, 1988; LeCompte, 1981; however, see Rögels, Roelen, & Van Meel, 1990, for different interpretations). Frequent nonsymbolic movements may, therefore, project a negative impression on the observers of an interview.

METHODS

The interview task

Participants

Thirty-one Japanese female students (mean age=18.9 years) participated. They were novices to this kind of experiment. Informed consent was obtained from each participant before the experiment. The participants were assigned to one of two groups: a perfume group or a no-perfume group (16 in the perfume group). Selection was based on the results of the screening test, confirming that all the participants in the perfume group preferred, as well as were unfamiliar with, the smell of the perfume used in this experiment.

Interviewer

One of three Japanese female confederates (all 21 years old, i.e., similar age to and same gender as the participants) served as the interviewer for each interview. They put on a white gown and were

trained to behave consistently in each situation. For example, they were trained to respond to a participant's answer (i.e., nod and/or smile), to leave intervals between a participant's answer and the next question, and to discuss specific topics during the intervals.

Fragrance stimulus

The fragrance used was a commercial perfume named "Breath Garden-Tenderness Time" (Shiseido, Japan). In the middle of the interview, the experimenter sprayed the fragrance on the right wrist of the participants in the perfume group. The amount of the fragrance presented was equal to one spray from an atomizer (about 0.01 ml). The participants were instructed to rub one wrist on the other to spread the perfume.

Interview task

The experimental task was a simulated interview in which the interviewer asked four blocks of questions in front of a video camera. Each block of the interview consisted of 10 to 12 questions and lasted approximately 2 to 3 min. The questions related to daily life, individual interests, and the use of cosmetics, and they were all relatively easy to answer. A rest interval of a few minutes was scheduled between the blocks. The interview was held in what is referred to as a friendly environment (Liden, Martin, & Parsons, 1993), in which the interviewer asked questions with an occasional smile, maintained moderate eye contact, and nodded as the interviewee responded.

The participants also rated their subjective mood at the end of each block by using an adjective checklist. The items were selected from instruments titled the Multiple Affective States Generated by Dressing (MASGD; Saito, Nakagawa, & Fujiwara, 1995). The scale consisted of four subscales of positive mood (cheerfulness, fulfilment, dominance, and relaxation) and three subscales of negative mood (depression, shame, and tension), each of which contained five adjectives. Two adjectives were selected from each subscale. Thus, the participants rated $7 \times 2 = 14$ adjectives using a 7-point scale (from 0 to 6).

Procedure

The participants put on a gray sweatshirt and entered the experiment room. The layout of the experiment room is shown in Figure 1. The participants sat on a backless swivel chair. Before the interview began, the participants were given

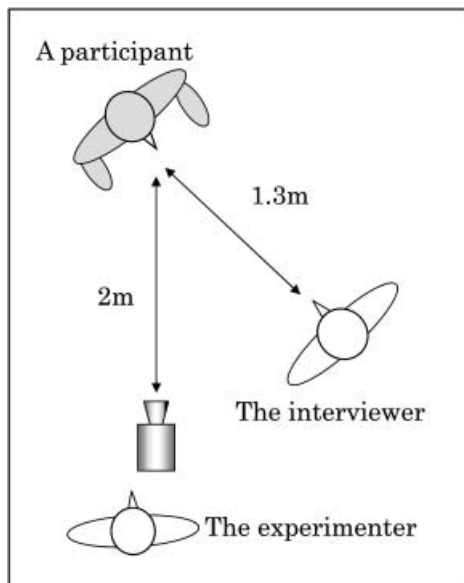


Figure 1. Experimental setup in the interview task.

instructions about the interview and were encouraged to remain relaxed during it.

During the interval between the second and third blocks, the interviewer presented the perfume to the participants in the perfume group. They were told that this was the perfume that they had rated in the advance investigation as pleasant and one they were willing to use. After presenting the perfume, the interviewer asked the participant about her impressions of the perfume until the beginning of the third block. The participants in the no-perfume group, on the other hand, did not use any olfactory stimulants during this interval and talked casually with the interviewer. Both groups performed the latter half of the interview in an identical manner.

Measurements

Personality. To test whether two experimental groups were homogeneous in terms of personality relating to nonverbal behaviour in social interactions, two personality traits (Free-Child scale in Egogram and Exhibitionism) were measured in the screening test. These measurements were necessary as a manipulation check because nonrandom assignment of the participants to the experimental group on the basis of the screening test was used in the present study.

The Free-Child (FC) scale includes items such as “If you experience some emotional feeling, such as happiness or sadness, do you usually express it in facial expressions or behaviour?” (Dusay, 1972, 1977). The FC scale could influence the translation

of one’s affective states into nonverbal behaviour. Exhibitionism is the action taken to become the constant centre of attention (Reber, 1995). The “clinical” meaning of exhibitionism (i.e., a mental problem that results in a person wanting to show his/her sexual organs in public places) was not considered. The degree of exhibitionism was determined by asking questions such as “Do you feel comfortable when your behaviour attracts attention from others?” (Buss, 1986). Six items of each personality trait were selected. The participants rated the items by using a 7-point scale (from 0 to 6).

Nonverbal behaviour. The interviewees’ nonverbal behaviour shown in the video was assessed as a basic measurement. Degree of smiling, eye contact, and nonsymbolic movement were expressed by the sum of the occurrence time. For example, if a participant smiled three times for 3 s, 2 s, and 1 s each, then the degree of the smiling in the video totaled 6 s. Nonsymbolic movement included self-touching (of the hair, nose, or arm, for example) and shifting posture (rotating on a swivel chair, crossing the legs while talking), or frequently shaking one leg. The degree of each nonverbal behaviour was normalized to express the occurrence time per minute. The within-interviewee differences of the normalized data between the second and third blocks were calculated.

Two additional analyses for nonverbal behaviour were performed as a manipulation check. First, the amount of nonverbal behaviour in the second (baseline) block was compared between the experimental groups. Because a nonrandom assignment of participants in the two groups was used, it should be necessary to confirm that there were no significant group differences in the nonverbal behaviours in the baseline block. Second, the effect of the interviewer on the within-interviewee changes from the second to third blocks in the nonverbal behaviour of the interviewees in the fragrance group was examined. It is possible that changes in the nonverbal behaviour of the interviewees were the result of changes in the nonverbal behaviour of the interviewer. To examine this possibility, the within-interviewee changes in nonverbal behaviour from the second to third blocks were compared among interviewees in the perfume group, each of whom communicated with a different interviewer. Given that changes in the nonverbal behaviour pattern of each of the three interviewers would not necessarily be the same, the pattern of changes in the nonverbal behaviour of each of the interviewees,

who communicated with a different interviewer, may have differed significantly.

Subjective mood states. The interviewees' subjective mood states during the interview were measured on the basis of the rating for the adjective checklist. Scores of each of the seven subscales in a block were expressed by the sum of ratings for two adjectives (i.e., 0 minimum, 12 maximum). For each subscale, subtraction of the score in the second block from that in the third block was calculated.

Observer rating of female interviewees

Observers

Eighteen Japanese undergraduates (nine female, nine male, mean age 20.6 years) participated. None was acquainted with the interviewees observed in the video stimuli.

Video stimuli

The stimuli consisted of 62 video clips (31 interviewees \times 2 scenes). Each of the video clips contained the first three consecutive questions and answers in either the second or third blocks (i.e., the blocks just before and after the perfume stimulation). The mean length of the video stimuli was 34.3 s ($SD=7.8$ s, no significant differences between the length of the videos in the second and third blocks). The videos presented a scene of the interviewee's upper body on the centre of the screen, and the interviewer was shown from behind on the right edge of the screen. No sound was used. The effect of the interviewee's clothing on the observer's rating was avoided because all the interviewees wore uniforms (gray sweatshirts).

The video stimuli were presented on a 25-inch colour television from a distance of 2 m. They were divided into two sets of scenes (i.e., a set of videos of the second and third blocks). In each set, the order of the video stimuli was pseudorandomized. Two versions of video series were made for each set.

Task and procedure

The observers visited the laboratory twice in the course of a week. A maximum of four observers participated in the experiment at the same time. They watched soundless videos of the second block (31 stimuli) on the first day and videos of the third block (31 stimuli) on the second day. After watching each video stimulus, they rated the

interviewee observed in the video stimulus with respect to five items, that is, smiling, eye contact with the interviewer, nonsymbolic movement, self-confidence, and attractiveness. Regarding the meaning of attractiveness, they were instructed to interpret this word as being pleasant to look at (i.e., nonsexual). They chose the appropriate score from 0 to 6 for each item. They were not informed that some of the interviewees put on perfume. A rest interval of a few minutes was scheduled after every eight video ratings.

Dependent measures

Dependent measures were "within-interviewee" differences of the ratings from the observers between the second and third blocks, calculated as follows. The observer's rating for each of the 31 interviewees was expressed by changes in the scores of the respective five items from the second to third blocks. This subtraction data of each question for each interviewee was then averaged in the female and male observers separately (nine data for each gender). From these calculations, averaged females' and males' ratings for each interviewee were obtained in the form of differences in the rating between the second and third blocks. These data, called "within-interviewee differences in the ratings from observers," were used as dependent measures. A two-way (fragrance, observer's gender) ANOVA with repeated measures on observer's gender was conducted for each of five dependent measures. The main effect of the observer's gender was treated as repeated measures because every interviewee had averaged data of both the female and male observers.

RESULTS

Basic measurements of interviewees

Personality

The participants of each experimental group were not significantly different in terms of either the FC score (30.2 and 27.8 points), $F(1, 28)=2.46$, n.s., or exhibitionism (17.4 and 17.3 points), $F(1, 28)=0.02$, n.s. These results confirmed that the two experimental groups were homogeneous in terms of personality relating to nonverbal behaviour in social interactions. It should be noted that students who showed relatively higher scores in exhibitionism were selected as the participants of the interview task. It was expected that the participants would not suffer terrible anxiety in the interview task and would behave freely.

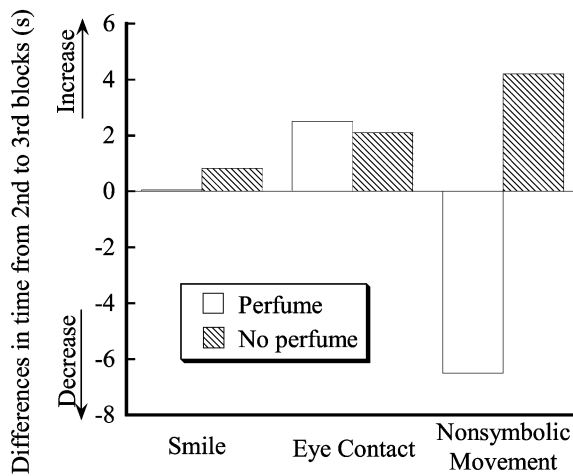


Figure 2. Mean within-interviewee changes in nonverbal behaviour from the second to the third blocks.

Nonverbal behaviour

The mean within-interviewee differences of each nonverbal behaviour are shown in Figure 2. A one-way ANOVA showed no effect of perfume for the smile and eye contact, $F(1, 29)=0.40$, $MSE=27.0$; $F(1, 29)=0.04$, $MSE=89.7$, respectively. The effect of perfume was significant for the nonsymbolic movement, $F(1, 29) = 8.30$, $MSE = 107.2$, $p < .01$. The interviewees in the perfume group had significantly less nonsymbolic movement in the third block than those in the no perfume group.

The degrees of nonverbal behaviour in the second (baseline) block for the two groups are shown in Table 1. A one-way ANOVA showed that there were no significant group differences in the time spent smiling, $F(1, 29) = 1.08$, $MSE=61.4$, making eye contact, $F(1, 29) = 0.48$, $MSE=45.0$, and performing nonsymbolic movements, $F(1, 29)=0.16$, $MSE=141.3$.

Mean within-interviewee changes in nonverbal behaviour of the interviewees in the perfume group for the three interviewers are shown in Table 2. A one-way ANOVA showed that there

TABLE 1
Mean normalized nonverbal behaviour in the second (baseline) block

Group	Nonverbal behaviour		
	Smiling	Eye contact	Nonsymbolic movement
Perfume			
Mean	14.0	18.8	10.0
SD	7.0	6.4	11.1
No perfume			
Mean	11.1	20.5	6.9
SD	8.2	6.6	8.3

TABLE 2

Effect of the interviewers on the within-interviewee changes in the nonverbal behaviour of the interviewees in the perfume group from the second to third blocks

	Interviewer		
	A	B	C
Number of interviews	5	3	8
Nonverbal behaviour			
Smiling			
Mean	0.6	-5.3	-0.4
SD	8.0	5.4	5.5
Eye contact			
Mean	0.0	1.7	5.0
SD	11.8	4.8	8.8
Nonsymbolic movement			
Mean	-4.4	-6.9	-7.7
SD	10.7	9.8	10.0

was no significant main effect of the interviewer on the changes in smiling, $F(2, 13)=0.72$, $MSE=49.6$, eye contact, $F(2, 13) = 0.38$, $MSE = 107.1$, and nonsymbolic movements, $F(2, 13) = 0.13$, $MSE=127.9$. These results showed little, if any, impact of the interviewer's nonverbal behaviour on the interviewee's nonverbal behaviour.

Subjective mood states

Mean within-subject differences of the seven subscales of subjective mood between the second and third blocks are shown in Table 3. A one-way ANOVA showed that the main effect of perfume was significant for the subscales of "dominance" and "relaxation," $F(1, 29) = 5.53$, $MSE = 0.74$, $p < .05$; $F(1, 29) = 4.84$, $MSE = 2.70$, $p < .05$, respectively. The interviewees in the perfume group enhanced their affective states of dominance and relaxation in the third block.

Observer rating

Mean within-interviewee differences between the second and third blocks in the observer's ratings for the five items are shown in Figure 3. For the smile factor, no effects of perfume and observer's gender, $F(1, 29)=1.26$, $MSE=1.3$; $F(1, 29)=0.36$, $MSE=1.0$, and no interaction, $F(1, 29)=0.38$, $MSE=1.0$, were found. For the eye contact factor, neither main effects nor interaction were found, $F(1, 29)=0.77$, $MSE=1.6$; $F(1, 29)=3.67$, $MSE=0.4$; $F(1, 29)=0.15$, $MSE=0.4$, respectively. For the nonsymbolic movement factor, the effect of perfume was significant, $F(1, 29)=9.20$, $MSE=3.1$, $p < .01$. The within-interviewee difference was significantly smaller in the perfume group, suggesting that the interviewees in the

TABLE 3
Mean within-interviewee differences of subjective mood between the second and third blocks

Group	Affective states						
	Cheerfulness	Fulfillment	Dominance*	Relaxation*	Depression	Shame	Tension
Perfume	0.56	-1.00	0.13	1.50	-0.63	-0.50	-1.18
No perfume	-0.20	-0.73	-0.60	0.20	-0.13	-1.33	-1.00

* $p < .05$.

perfume group decreased their nonsymbolic movement after putting on the perfume. The effect of the observer's gender was significant, $F(1, 29) = 4.50$, $MSE = 0.3$, $p < .05$. The female observers noted a larger decrease in nonsymbolic movement from the second to the third blocks than the male observers. No interaction of the two effects was found, $F(1, 29) = 2.88$, $MSE = 0.3$.

For the self-confidence factor, the effect of the observer's gender was significant, $F(1, 29) = 5.97$, $MSE = 1.1$, $p < .05$. The female observers noted a larger increase in the interviewee's self-confidence in the third block than the male observers did. The effect of perfume was not significant, $F(1, 29) = 0.67$, $MSE = 0.2$. There was a significant interaction, $F(1, 29) = 4.69$, $MSE = 0.2$, $p < .05$. The difference score of the female observers for the interviewees in the perfume group was significantly larger than for those in the no-perfume group. This means that the female observers, but not the male observers, thought that the interviewees in the perfume group looked more self-confident when they put on the perfume. For the attractiveness factor, a main effect of perfume failed to reach a significant level, $F(1, 29) = 2.91$, $MSE = 1.1$. The main effect of observer's gender was significant, $F(1, 29) = 09$, $MSE = 0.2$, $p < .05$. The female observers recognized a larger increase in the interviewee's attractiveness from the second to third blocks. The interaction was not significant, $F(1, 29) = 0.32$, $MSE = 0.2$.

DISCUSSION

The results of the observer rating showed that the interviewees in the perfume group used less nonsymbolic movement when wearing perfume. Analysis of the video clips showed that they decreased their nonsymbolic movement for about 6 s in the third block. The degree of smiling and eye contact remained the same. These results suggest that individuals who wear perfume have the potential to improve their visual impression by using less movement that produces negative impressions.

Several types of nonsymbolic movement were observed: About 33% was categorized as self-touching. Body parts touched differed from participant to participant, and included the nose, arms, legs, back, and hair. About 55% was categorized as a postural shift and every case except one involved rotating on a swivel chair. Because the chair had no back support, it appears that the participants had difficulty maintaining the same posture and, therefore, frequently rotated the chair to relieve discomfort.

Nonsymbolic movement is thought to occur in response to negative states such as stress, anxiety, or embarrassment (Harrigan, 1988; LeCompte, 1981). Analysis of the subjective mood showed that wearing perfume increased an interviewee's sense of "relaxation" and "dominance." The inhibition of an interviewee's nonsymbolic movement may, therefore, have arisen from the positive affective changes generated by their exposure to the pleasant smell of perfume. Several other factors, such as public self-consciousness or the cultural backgrounds of individuals wearing perfume, may also mediate the observed outcome. With regard to cultural background, Asians usually exhibit less emotional expression than Europeans and Americans in social settings (Tsai, Chentsova-Dutton, Freire-Bebeau, & Przymus, 2002). The selection of Japanese participants may have affected the present results in that wearers inhibited their nonsymbolic movement instead of expressing active communicative behaviour such as smiling or making eye contact.

The results of observer ratings also showed that the female observers, but not the male observers, rated the interviewees who wore perfume as more self-confident. This suggests that, from a female point of view, the inhibition of the nonsymbolic movement in an interview enhances the wearer's visual demeanour and makes them appear more self-confident. Previous studies have shown that females are more sensitive to emotional responses in other people's facial expressions or nonverbal behaviour (Connellan, Baron-Cohen, Wheelwright, Batki, & Ahluwalia, 2000; LaFrance, Henley, Hall, & Halberstadt, 1997).

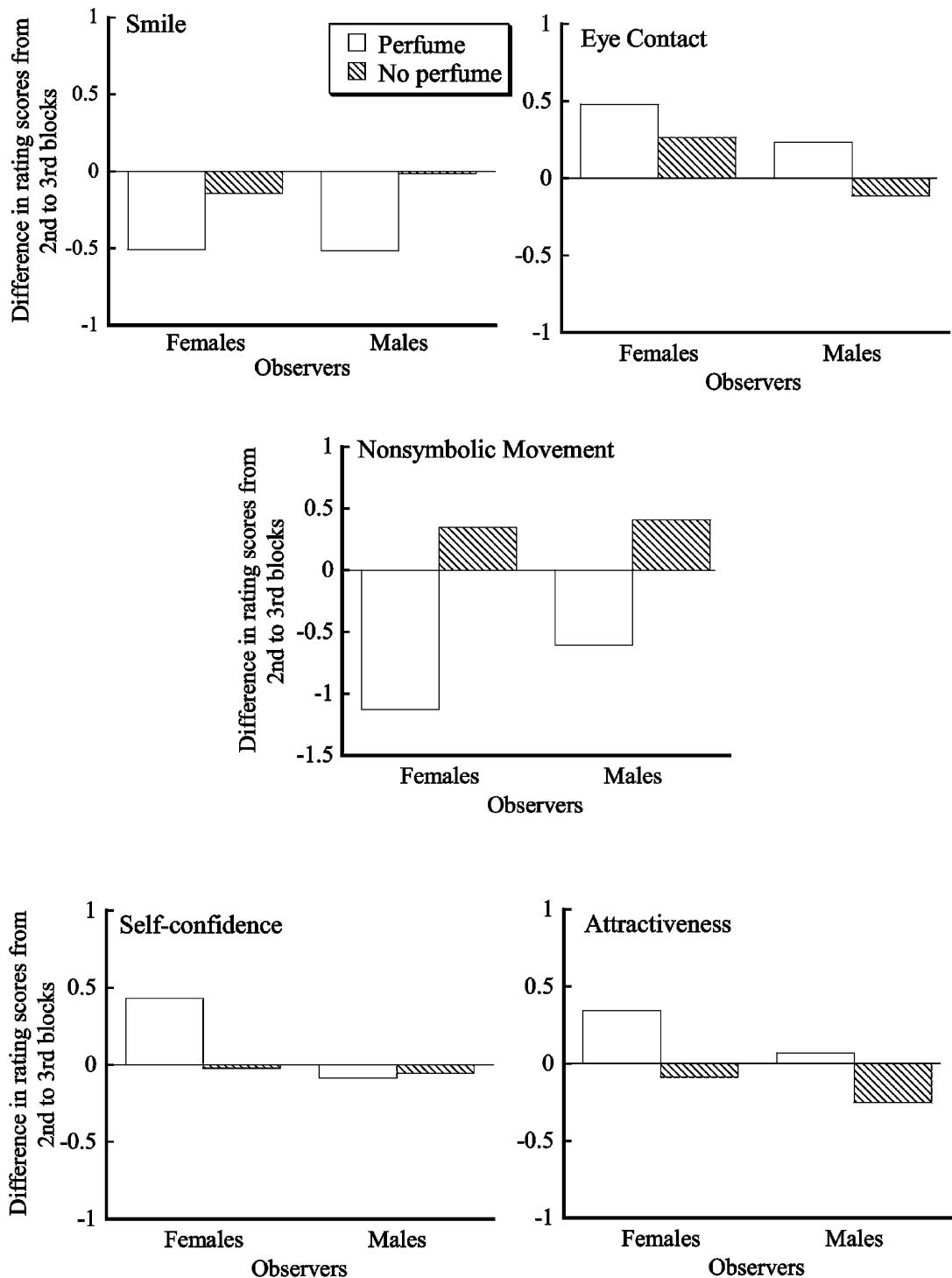


Figure 3. Mean within-interviewee differences between the second and third blocks in the observer's ratings for the five items.

The gender difference in the present study can therefore be interpreted to mean that the male observers could not “decode” the nonverbal messages of nonsymbolic movement. Alternatively, because all the interviewees were females, the agreement or disagreement between the observer's

gender and interviewee's gender may have mediated the observed gender differences (Hazlett & Hoehn-Saric, 2000; Mathes & Edwards, 1978).

There was another gender difference that was difficult to interpret. The female observers rated the interviewees in the third block higher in

nonsymbolic movement, self-confidence, and attractiveness. Because all the observers watched videos of the second block first, these results may reflect “mere exposure effect,” which proposes that a repeated exposure to a visual stimulus increases one’s preference for the stimulus (e.g., Harmon-Jones & Allen, 2001; Lee, 2001). So far, there is no plausible explanation for the gender differences that were observed in these ratings.

There are several methodological issues that limit the conclusions to be drawn from this study. First, the interviewees in the perfume group may have known the purpose of the present study from the experimental procedure (e.g., the content of the screening test and the peculiarity of putting on perfume in the course of an interview). Unfortunately, the present experimental design did not include a post-study debriefing in which the participants guessed the purpose of the experiment. Second, during the interval between the second and third blocks, during which the participants in the perfume group put on perfume, the participants in the no-perfume group did not participate in any experimental manipulation. This means that there was no control for the experimenter’s “gift-giving.” This asymmetry in the groups could have produced the present results. Finally, there was some concern that a nonrandom assignment of the participants to the experimental groups (i.e., all the participants in the perfume group absolutely preferred, as well as were unfamiliar with, the perfume stimuli) would produce unexpected side effects to critical differences in nonverbal behaviour between the two groups. In the present study, the primary issue was to examine whether a “pleasant” perfume could lead to improvements in the nonverbal behaviour of the wearers. For this purpose, arbitrarily assigning a perfume would be insufficient because there are large individual differences in preference for olfactory stimuli (Engen, 1982; Milinski & Wedekind, 2001). Although there were no significant group differences in the two personality tests relating the nonverbal behaviour in social interactions, the nonrandom assignment of the participants may have produced several unmeasured differences between the groups and have biased the present results.

In conclusion, the present study showed the possibility that wearing perfume can improve the wearer’s visual impressions, although several methodological issues limit the conclusions that can be drawn from the observed results. This implies that perfume-wearers do not just emit a pleasant odour to others but enjoy the smell of

perfume themselves, resulting in an improvement in their attractiveness.

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