

Relations between emotions, display rules, social motives, and facial behaviour

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We report research on the relations between emotions, display rules, social motives, and facial behaviour. In Study 1 we used a questionnaire methodology to examine how respondents would react to a funny or a not funny joke told to them by a close friend or a stranger. We assessed display rules and motivations for smiling and/or laughing. Display rules and social motives (partly) mediated the relationship between the experimental manipulations and self-reported facial behaviour. Study 2 was a laboratory experiment in which funny or not funny jokes were told to participants by a male or female stranger. Consistent with hypotheses, hearing a funny joke evoked a stronger motivation to share positive affect by showing longer Duchenne smiling. Contrary to hypotheses, a not funny joke did not elicit greater prosocial motivation by showing longer “polite” smiling, although such a smiling pattern did occur. Rated funniness of the joke and the motivation to share positive affect mediated the relationship between the joke manipulation and facial behaviour. Path analysis was used to explore this mediating process in greater detail.

It is now established that facial behaviour during emotional stimulation is affected by the social context in which such stimulation occurs (Fridlund, 1991, 1994; Hess, Banse, & Kappas, 1995; Jakobs, Manstead, & Fischer, 1999a, 1999b; Zeman & Garber, 1996). For example, compared to an “alone” con-

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An earlier version of Study 1 was presented at the 10th Conference of the International Society for Research on Emotions (ISRE), held in Würzburg, Germany, 1998. An earlier version of Study 2 was presented at the 8th European Conference on “Facial Expression, Measurement and Meaning”, held in Saarbrücken, Germany, 1999.

dition the presence (explicit *and* implicit) of other persons engaging in the same task influences participants' facial behaviour during emotional stimulation (Fridlund, 1991, 1994). Other context effects reported in the emotion literature are related to the type of audience (Zeman & Garber, 1996), and the identity and power of one's interaction partner (Deutsch, 1990; Hecht & LaFrance, 1998; Jakobs et al., 1999b; Underwood, Coie, & Herbsman, 1992; Wagner & Smith, 1991). However, relatively little is known about *why* such influences occur.

A widely assumed explanation argues that we have learned, through a process of socialisation, to exercise control over our facial behaviour (Garner, 1996; Saarni, 1984; Zeman & Garber, 1996). Sometimes, the social context in which interaction between individuals takes place carries with it a prescription that we should control our facial behaviour. For example, imagine that you receive a disappointing birthday present from an aunt, and that you open it in her presence. It is likely that you would hide your disappointment and instead show an expression of pleasure. This and other comparable changes in facial behaviour are assumed to be the result of a set of rules that at their core involve minimising expressions of negative emotions like disappointment and replacing them by an expression of pleasure (after Saarni, 1979, 1984; based on Goffman, 1967). Ekman and Friesen (1969) were the first investigators to provide a clear definition of such display rules. In a subsequent publication they wrote: "We have coined the phrase *display rules* to describe what people learn, probably quite early in their lives, about the need to manage the appearance of particular emotions in particular situations" (Ekman & Friesen, 1975, p. 137). More recently, Reissland and Harris (1991) have provided a description of the prerequisites for using display rules (based on Snyder, 1974): "Display rules require the motivation and ability to control one's behaviour in accordance with one's knowledge of the appropriateness of a particular emotional expression in a particular context" (p. 431). The use of display rules thus seems to imply the *more or less* conscious control of one's facial behaviour. This is not to deny that, under certain circumstances, the application of display rules can occur automatically and outside of awareness. However, even in the case of automatic facial behaviour, we can still distinguish between facial behaviour that is shaped by display rules and unmodified facial behaviour. Moreover, different neural pathways may underlie automatic facial behaviour that is shaped by display rules compared to unmodified facial displays (see Matsumoto & Lee, 1993).

Controlling one's face does not only entail inhibiting one's expressions. There is empirical evidence that display rules can also result in the facilitation of responses. For example, Zeman and Garber (1996) showed the *expectation* of social support to be an important reason for expressing sadness and anger in young children. We believe that certain social contexts in which individuals expect or desire social support may well have a *facilitating* effect on our wish to *share* emotions and thus to show (i.e., more intensely or with longer duration) what one is really feeling, especially in the case of negative emotions (see

Chapman, 1973, 1975, and Chapman & Chapman, 1974, for facilitation effects with regard to smiling and laughing).

How the application of display rules affects our facial behaviour has been described by Ekman and Friesen (1969, 1975). They distinguished six possible ways in which display rules can affect facial behaviour. First, people can *facilitate* (intensify) or *inhibit* (deintensify)¹ their facial behaviour. Second, extreme inhibition is termed *neutralisation*. Third, not showing a felt emotion but instead replacing it with an unfelt emotion is called *masking*. Fourth, responding with one's face despite the fact that no emotion is felt is called *simulation*. Fifth, adding an expression as a comment on an emotion you just have shown is called *qualifying*.

In short, individuals can when required adapt their facial behaviour in different ways. The question that remains is how such a regulatory process can best be described. According to the Reissland and Harris (1991) description of display rules cited earlier, three prerequisites for display rule use can be distinguished. First, people must have *knowledge* of which facial behaviour is appropriate in a specific context. Second, they must have the *willingness* to control their facial behaviour. Third, they must have the *ability* to show appropriate facial behaviour. The value of this differentiation between three components (knowledge, motivation, and behaviour) of the regulatory process can be illustrated by returning to the example of the disappointing birthday present. Instead of showing what you really feel (i.e., expressing your disappointment), it is common to mask your disappointment (e.g., by smiling) in order to protect your aunt from feeling hurt. However, one could imagine a young child masking his/her disappointment in order to avoid punishment as a possible consequence of being impolite. This child is not prosocially motivated, but rather seems to be motivated to act in such a way in order to protect him- or herself. The two situations are similar with regard to the masking of negative affect, but different with respect to the underlying motive to implement such a display rule. This idea that display rules and the motives to use such rules are related is also recognised by Gnepp and Hess (1986; see also Ekman & Friesen, 1975). They distinguished between two categories of display rules: *Cultural* display rules should motivate people to act *prosocially* (i.e., to protect the feelings of others), whereas other display rules are used for *personal gain* (Garner, 1996; Saarni, 1984).

In the present paper we distinguish between display rules and social motives. We regard display rules as embodying knowledge about "how to act appropriately". Social motives, on the other hand, explain *why* we adapt our facial

¹ Ekman and Friesen (1975) include "facilitation" and "inhibition" under the more general term "modulation". What varies during modulation is not only the intensity of action units, but also the duration of the expression, and the number of facial areas involved (see Ekman & Friesen, 1975, p. 141).

behaviour in the light of display rules. In other words, display rules reflect knowledge about how to regulate one's facial behaviour when needed, whereas social motives lead to the implementation of such a regulatory process (i.e., facial behaviour).

The influence of social context (e.g., the identity of one's interaction partner) on facial expression during emotional stimulation can be explained by the working of display rules and social motives. For example, watching a sad video clip in the presence of a complete stranger may lead to *inhibition* of a sadness response for *personal gain* (e.g., looking cool). By contrast, the presence of a close friend may lead to *facilitation* of the facial response of sad affect because *social support* is desired. It is important to note that we do not hypothesise a one-to-one relationship between display rules and social motives. Different motives may underlie the implementation of a single display rule. Returning once again to the example of the disappointing birthday present, the masking of negative affect as an appropriate response could be related either to prosociality or to the motivation to hide negative emotions in order to avoid negative consequences of one's own actions. Our idea is that the social context in which an emotional stimulus is presented influences the elicitation of (different types of) display rules, but also the strength and the type of motivation to adapt our facial behaviour. Surprisingly, there is no *direct* evidence that social context effects are mediated by components of the regulatory process held to be responsible for such an effect, that is display rules and/or social motives (see Kappas, 1996).

The main objectives of the present research are: (a) to construct measurement scales for display rules and social motives; and (b) to provide evidence for their mediating effects on facial behaviour. We report two studies. In Study 1, vignettes were used to investigate how respondents thought they would react to a funny or not funny joke told to them by a close friend or a stranger. We used analysis of covariance to provide evidence for a mediating process in terms of display rules and social motives. Research on these sorts of issues has to date made relatively little use of field studies or real-life settings (for exceptions, see Fernández-Dols & Ruiz-Belda, 1995; Goldenthal, Johnston, & Kraut, 1981; Kraut & Johnston, 1979; Lockard, Fahrenbruch, Smith, & Morgan, 1977), but rather has typically made use of film clips or slides shown in lab settings as the emotion-eliciting stimuli (e.g., Ekman, Davidson, & Friesen, 1990; Jakobs et al., 1999a, 1999b). However, if facial displays partly reflect social motives that are influenced by a social context, it seems preferable, in principle, to study facial behaviour in the course of naturalistic social interaction. Therefore, Study 2 was a laboratory study in which funny or not funny jokes were actually told to participants by a confederate. Drawing on the results of Study 1, we predicted stronger positive emotions and greater motivation to share such affect when the joke was funny. We expected a "facilitation" display rule to be judged to be more appropriate in the funny joke condition. We also predicted stronger

negative emotions and greater motivation to act prosocially when the joke was not funny. We expected a “masking” display rule to be judged to be more appropriate in the not funny joke condition.

STUDY 1

Method

Design and respondents. In this vignette study we employed a 2×2 (Joke Type \times Other’s Identity) factorial design. Respondents were 160 students (79 male and 81 female) at the University of Utrecht, who participated on a voluntary basis. Ages ranged from 18 to 29 for men ($M = 22.0$, $SD = 2.4$) and 18 to 27 for women ($M = 21.4$, $SD = 2.0$). Respondents were randomly assigned to one of the four conditions.

Procedure. Respondents first received the following general instruction:

This research investigates how people behave in specific situations. Do your best to project yourself into the situation described below. Imagine how you would behave. Give honest answers to the questions. There are no right or wrong answers. What matters is how *you* would behave.

Respondents were then presented with the following situation description:

You are alone and have been waiting quite a long time for a bus to arrive. A *stranger* arrives and stands next to you. Nobody else is present. After some time this person starts telling a joke about buses and laughs aloud. You *like* the joke too.

In the not funny joke condition they were told that they *disliked* the joke. In the friend condition the joke teller was a *close friend*.

Dependent variables. After the respondents had read this scenario they answered the following questions: “To what extent would you smile in this situation?” and “To what extent would you laugh in this situation?” Both 5-point scales ranged from 1 (*not at all*) to 5 (*in full*). They then received the following instruction: “Imagine that you *were to* smile/laugh in this situation. Indicate *how likely* it is that you would smile/laugh in this situation for any of the following reasons.” There then followed the stem: “*In this situation I would smile/laugh, ...*”, followed by 18 items measuring social motives. Each was answered on a 5-point scale ranging from 1 (*very unlikely*) to 5 (*very likely*). A distinction was made between prosocial items and items related to personal gain (Garner, 1996; Gnepp & Hess, 1986; Saarni, 1984). The seven prosocial items were: “out of politeness”, “not to offend the other”, “to reassure the other”, “to take the other person’s feelings into account”, “because it is expected”,

“to please the other”, and “not to be disloyal towards the other”. The five items related to personal gain were: “to hide my uncertainty”, “to hide being embarrassed”, “to hide my discomfort”, “to avoid trouble”, and “because I would feel better”. Another six items were assumed to measure motivations associated with sharing positive affect: “because I want to show that I feel a bond with the other”, “to show the other I enjoy the joke”, “because I feel relaxed”, “to show the other I am cheerful”, “because I like the joke”, and “to show the other I like him/her”.

The next section of the questionnaire consisted of nine further items assessing display rules. Respondents read the following instruction: “Below you will find several possible reactions to this event. Indicate to what extent each reaction is appropriate in this situation.” Scales ranged from 1 (*very inappropriate*) to 5 (*very appropriate*). There then followed nine items, eight of which were based on the six possible ways in which facial expressions may be modified by using display rules described by Ekman and Friesen (1969, 1975). The nine items were: “Expressing positive feelings is...” (facilitation), “Expressing negative feelings is...” (facilitation), “Hiding positive feelings is...” (inhibition), “Hiding negative feelings is...” (inhibition), “Expressing positive feelings with a smile/laugh is...” (qualifying), “Composing one’s face is...” (neutralisation), “Substituting negative feelings with a smile/laugh is...” (masking), and “Acting as if you like the joke is...” (simulation). A ninth item was: “Smiling/laughing in this situation is...”.

Results

Data reduction. A principal components analysis with varimax rotation was performed on the 27 items (i.e., social motives *and* display rules) of the questionnaire. Seven factors emerged which together explained 65% of the variance. The “motivation” and “display rules” items loaded on different factors. In constructing scales, items were deleted as appropriate in order to enhance Cronbach’s alpha. A composite score was calculated by averaging the remaining item scores. The first scale was interpreted as reflecting prosocial motivation ($\alpha = .85$) and consisted of the items “not to offend the other”, “to take the other person’s feelings into account”, “to please the other”, “out of politeness”, “not to be disloyal towards the other”, “because it is expected”, and “to reassure the other”. The second scale was interpreted as reflecting a motivation to share positive affect ($\alpha = .87$) and consisted of the items “to show the other I enjoy the joke”, “because I like the joke”, “to show the other I am cheerful”, and “because I feel relaxed”. The third scale was interpreted as reflecting a motivation to hide negative affect ($\alpha = .78$) and consisted of the items “to hide my discomfort”, “to hide my uncertainty”, “to hide being embarrassed”, and “to avoid trouble”. The fourth scale was interpreted as masking ($\alpha = .74$) and consisted of the items “acting as if you like the joke”,

“substituting negative feelings with a smile/laugh”, and “hiding negative feelings”. The fifth scale was interpreted as bonding ($\alpha = .73$) and consisted of the items “because I want to show that I feel a bond with the other” and “to show the other I like him/her”. The sixth scale was interpreted as facilitation and consisted of the items “expressing positive feelings with a smile/laugh”, “smiling/laughing in this situation”, and “expressing positive feelings” ($\alpha = .68$). The final scale only had a reliability index of .52 and was therefore excluded from further analyses.

Analysis of variance. A 2×2 (Joke Type \times Other’s Identity) MANOVA was performed using self-reported facial behaviour (smiling and laughing), social motives (prosocial, share positive affect, hide negative affect, and bonding), and display rules (masking and facilitation) as dependent variables. First, a multivariate main effect was found for Joke Type, $F(8, 134) = 32.13, p < .01$.² Univariate tests showed significant main effects on self-reported smiling, $F(1, 141) = 19.70, p < .01$, self-reported laughing, $F(1, 141) = 172.12, p < .01$, prosocial motivation, $F(1, 141) = 15.27, p < .01$, motivation to share positive affect, $F(1, 141) = 134.54, p < .01$, and facilitation, $F(1, 141) = 21.44, p < .01$. Means are shown in Table 1. Unsurprisingly, respondents indicated that they would smile and laugh more intensely when they heard a funny joke. Moreover, respondents were more likely to be prosocially motivated when they heard a not funny joke and to be motivated to share positive affect when they heard a funny joke. In addition, respondents indicated that it was more appropriate to express positive feelings (i.e., facilitation) when they heard a funny joke. Second, a multivariate main effect for Other’s Identity was found, $F(8, 134) = 6.60, p < .01$. Univariate tests showed significant main effects on self-reported laughing, $F(1, 141) = 11.05, p < .01$, motivation to share positive affect, $F(1, 141) = 9.85, p < .01$, bonding, $F(1, 141) = 24.74, p < .01$, and a marginally significant effect on masking, $F(1, 141) = 3.62, p = .06$. Respondents indicated that they would laugh more intensely when the joke was told by a close friend. In addition, respondents were more likely to share positive affect and to be motivated to show their bond when they were together with a close friend. Respondents reported that it was somewhat more appropriate to mask negative emotions when the joke teller was a stranger. Finally, a significant multivariate interaction effect emerged on self-reported facial behaviour, $F(8, 134) = 4.20, p < .01$. Univariate analyses showed that self-reported smiling was most intense when a stranger told a funny joke but least intense when a stranger told a not funny joke, $F(1, 141) = 8.51, p < .01$. Self-reported laughing was most intense when a funny joke was told by a close friend but almost absent when the joke was not funny, $F(1, 141) = 13.03, p < .01$. No interaction effects were found for social motives or display rules.

² Fifteen respondents were excluded due to listwise deletion of missing cases.

TABLE 1
Means for self-reported facial behaviour, social motives, and display rules
(SDs in parentheses) as a function of joke type and other's identity

<i>Measure</i> <i>Dependent variable</i>	<i>Joke type</i>			
	<i>Funny</i>		<i>Not funny</i>	
	<i>Close friend</i> (<i>n</i> = 34)	<i>Stranger</i> (<i>n</i> = 36)	<i>Close friend</i> (<i>n</i> = 38)	<i>Stranger</i> (<i>n</i> = 37)
Self-reported facial behaviour				
Smiling	3.41 (1.54)	4.14 (0.93)	3.13 (0.99)	2.78 (0.89)
Laughing	4.21 (0.88)	3.14 (0.99)	1.63 (1.00)	1.68 (0.82)
Social motives				
Prosocial	2.59 (0.91)	2.79 (0.82)	3.14 (0.69)	3.27 (0.72)
Share positive affect	4.12 (0.75)	3.67 (0.90)	2.39 (1.12)	1.88 (0.82)
Hide negative affect	1.67 (0.62)	2.01 (0.82)	1.90 (0.95)	1.88 (0.69)
Bonding	2.96 (1.12)	2.35 (0.81)	2.87 (1.01)	1.92 (0.80)
Display rules				
Masking	2.66 (0.95)	2.87 (0.75)	2.73 (0.80)	3.05 (0.85)
Facilitation	4.32 (0.58)	4.22 (0.49)	3.88 (0.61)	3.76 (0.67)

Mediational analysis. To provide evidence for the mediating effects of display rules and/or social motives on self-reported facial behaviour we used a 2×2 (Joke Type \times Other's Identity) MANCOVA with self-reported smiling and self-reported laughing as dependent variables and display rules (masking and facilitation) and social motives (prosocial, share positive affect, hide negative affect, and bonding) as covariates. According to Baron and Kenny (1986) a variable can be regarded as a mediator when: (a) the manipulation has a significant effect on the mediator; (b) the manipulation has a significant effect on the dependent variable; and (c) the mediator has a significant relationship with the dependent variable while at the same time the effect on the dependent variable due to the manipulation must disappear or at least be reduced.

As reported above, conditions (a) and (b) were satisfied. The multivariate effect of the set of covariates on the set of dependent variables was significant, $F(12, 268) = 5.04$, $p < .01$, thereby satisfying condition (c). At the

univariate level the set of covariates were significant for self-reported smiling, $F(6, 135) = 5.00$, $p < .01$, and for self-reported laughing, $F(6, 135) = 5.49$, $p < .01$. Moreover, the univariate main effect for Other's Identity on self-reported laughing was no longer significant, $F(1, 135) = 3.74$, $p = .06$ [originally: $F(1, 141) = 11.05$, $p < .01$]. The univariate main effects for Joke Type on self-reported smiling, $F(1, 135) = 10.63$, $p < .01$, and self-reported laughing, $F(1, 135) = 36.38$, $p < .01$, remained significant, although the F -values decreased substantially [originally: $F(1, 141) = 19.70$ for self-reported smiling, and $F(1, 141) = 172.12$ for self-reported laughing]. The univariate interaction effects for self-reported smiling and self-reported laughing remained significant. To summarise, the set of covariates seem to mediate the relationship between the manipulations (i.e., main effects only) and self-reported facial behaviour.

Discussion

On the basis of the principal components analysis we succeeded in distinguishing the theoretical constructs of display rules and social motives at an empirical level. Respondents reported that they would smile and laugh more intensely when a funny joke was told. Interestingly, if the joke teller was a close friend, the laughing response was intensified. This finding can be seen as related to Matsumoto's (1990) suggestion that social facilitation effects for positive emotions toward ingroup members may exist in some cultures. Consistent with such reasoning, Matsumoto, Takeuchi, Andayani, Kouznetsova, and Krupp (1998) found that Americans reported less control of displays of happiness towards close friends than Russians and Japanese did. When respondents had to respond to a not funny joke they reported that they would be motivated to act in a prosocial way, and when the joke teller was a stranger it was deemed to be somewhat more appropriate to mask negative emotions. A low intensity smile would be displayed when a stranger told a not funny joke. In the latter case negative emotions may be masked, using a (polite) smile for prosocial reasons. Therefore, smiling may have a dual character. Either people know that it is appropriate to smile as a way of masking negative emotions, or they smile as a way of sharing positive affect with their interaction partner.

Analysis of covariance showed that display rules and/or social motives mediated the relationship between the main effects of the manipulation on self-reported facial behaviour without further specification of the mediating process itself. This mediating process will be examined in greater detail in the next study. In Study 2, we conducted an experiment in which a confederate actually told participants a funny or a not funny joke. The social context was varied by using a male or female joke teller. Subjective emotion, display rules, social motives, and facial behaviour were measured.

STUDY 2

Overview

A confederate actually told participants a joke that was funny or not funny.³ Then participants completed a questionnaire assessing emotions and motivations for smiling and/or laughing. They also reported their personal views about display rules in this context. We had several objectives in conducting this study. First, we expected to replicate, and therefore to validate, the measurement scales for display rules and social motives in relation to the experimental setting. Second, drawing on the results of Study 1, we predicted that participants in the funny joke condition would feel happy and amused and would be motivated to share these positive emotions. We also expected a “facilitation” display rule to be judged to be more appropriate than in the not funny joke condition, which should be reflected in longer and/or intense Duchenne smiling. We expected participants in the not funny joke condition to feel awkward and embarrassed, and to be motivated to act prosocially by using a “polite” smile, and thereby mask negative emotions (see Edelman et al., 1987).

We assessed facial behaviour by using the Facial Action Coding System (FACS; Ekman & Friesen, 1978) to observe action units (AUs). The Duchenne smile (i.e., AU6 + AU12 + [AU25/26/27]) and other types of smile consist of different action units (Bugental, 1986; Ekman, 1992; Ekman & Friesen, 1982; Ekman et al., 1990; Ekman, Friesen, & O’Sullivan, 1988; Fernández-Dols & Ruiz-Belda, 1995; Goldenthal et al., 1981; Hecht & LaFrance, 1998; Keltner, 1995; LaFrance & Hecht, 1995; Lockard et al., 1977; Preuschoft, 1992; Van Hooff, 1972). By using fine-grained observations it is possible to distinguish Duchenne smiling from other facial behaviour, including a “polite” smile. Third, analysis of covariance was used in order to show that display rules and/or social motives can be regarded as factors that

³ The flood and the priest (funny joke): Everybody, including the priest, fled to the roof of the church. After some time a lifeboat arrived. The priest was the only one who did not want to leave: “*God will save me.*” After some time a second boat arrived, but again the priest did not want to leave: “*God will save me.*” Then a helicopter approached. Again the priest did not want to leave: “*God will save me.*”. The priest drowned. Arriving at the gates of Heaven the priest complained to Saint Peter: “*I thought God would save me.*” Saint Peter did not understand it either and sent the priest to see God. When he was in front of God’s throne the priest asked: “*Why did you not save me when I was waiting on the roof?*” God said: “*Yes, I do not understand it either. Something must have gone wrong. I sent you two lifeboats and a helicopter.*”

The judge and the condemned person (not funny joke): The judge asked the defendant who was seated in the dock: “*How many times have you been sentenced?*” The defendant answered the judge by saying: “*Twice, Your Honour.*” The judge carefully turned over the pages of the defendant file and finally said: “*Here it says that you have been sentenced 32 times.*” Upon which the defendant said with a shrug of the shoulders: “*That might be possible too.*”

mediate the effects of a specific stimulus on facial behaviour. Finally, LISREL 8.30 and PRELIS 2.30 (Jöreskog & Sörbom, 1993) were used in an exploratory fashion to examine the relation between display rules, social motives, and facial behaviour.

Method

Pretest of joke stimuli. A total of 14 different jokes⁴ were pre-tested by means of a questionnaire using two groups of 30 students⁵ at the University of Utrecht. The students participated on a voluntary basis. One group rated 10 jokes, and the other group rated five jokes (one joke was presented to both groups). Respondents first received the following general instruction: "Listed below you will find 10 [5] jokes. Read each joke carefully and answer the following questions. Answer each of these questions by circling an appropriate scale point. What matters is how *you* evaluate the jokes." Respondents then had to answer five questions in relation to each joke, for example, "How funny do you think this joke is?" Jokes were also rated on scales assessing how bad, silly, racist, and sexist they were found to be. All scales ranged from 1 (*not at all*) to 5 (*very*). We selected two jokes (one from each group) of approximately equal length. The ratings of the two jokes were entered into a principal components analysis with varimax rotation. This revealed two factors explaining 73% of the variance. An "evaluation" scale that consisted of the funny and *not* bad items ($\alpha = .95$), and a "discrimination" scale consisting of the racist and sexist items ($\alpha = .66$) were constructed. A one factor (Joke Type) MANOVA was used with evaluation, rated silliness of the joke, and discrimination as dependent variables. A multivariate main effect was found for Joke Type, $F(3, 56) = 20.70$, $p < .01$. Univariate tests showed significant main effects on evaluation, $F(1, 58) = 58.16$, $p < .01$, and discrimination, $F(1, 58) = 6.27$, $p < .02$. The funny joke was evaluated as more funny ($M = 3.28$, $SD = 1.17$) than the not funny joke ($M = 1.35$, $SD = 0.75$). The funny joke was also rated as more discriminatory than the not funny joke ($M = 1.13$, $SD = 0.29$; $M = 1.00$, $SD = 0.00$, respectively), although in absolute terms rated discrimination was extremely low. The funny ($M = 3.47$, $SD = 1.25$) and not funny joke ($M = 3.70$, $SD = 1.51$) were rated as equally silly, $F(1, 58) = 0.42$, n.s.

⁴ Eight jokes were selected from a sample consisting of 35 jokes provided by Kuipers (2001). Five jokes were chosen from Max Tailleir booklets (a well-known Jewish joke teller who lived in The Netherlands). One joke was told to the first author.

⁵ One group consisted of 15 males and 15 females. Ages ranged from 20 to 30 for men ($M = 24.3$, $SD = 2.9$) and 19 to 24 for women ($M = 22.2$, $SD = 1.8$). The other group consisted of 12 males and 18 females. Ages ranged from 18 to 28 for men ($M = 22.1$, $SD = 3.2$) and 18 to 28 for women ($M = 20.9$, $SD = 2.6$).

Design and participants. We employed a 2×2 (Joke Type \times Confederate Gender) factorial design. Participants were randomly assigned to one of the four conditions. Most of the 50 (18 male and 32 female) participants were students at the University of Amsterdam. Some participants responded to an advertisement in a local newspaper. Ages ranged from 18 to 28 for men ($M = 22.3$, $SD = 2.8$) and 18 to 27 for women ($M = 21.3$, $SD = 2.6$). Participants received course credit or were paid 10 Dutch guilders (approximately US\$4) for their participation.

Procedure. Participants were invited to participate in a questionnaire study on emotion. The experimenter met the participant and the confederate, who was always present before the participant arrived, and took them to the experimental room. Participants were led to believe that the confederate was a fellow participant. The experimenter provided a brief overview of the procedure and some information concerning ethical aspects of the research. Participants were asked to read the informed consent sheet carefully and to complete a short questionnaire concerning their current emotional state, which served as a pretest measure of emotion. The experimenter then left the room and said he would return soon with the next questionnaire. While waiting for him to return the confederate initiated a conversation by asking two standard questions. The first was: "Have you ever participated in research before?" If the participant asked the same question in return, confederates were instructed to give a standardised answer. The second question was: "How did you come to participate in this research?" Again, confederates were instructed to give a standardised answer if the same question was asked to them. Moreover, confederates had been instructed to make the following remark at a prearranged time: "It seems to be taking him [i.e., the experimenter] a long time." The confederate then told the funny or not funny joke in a standardised way. Confederates had received prior instruction to make eye contact while telling the joke and to show as neutral a face as possible after telling the joke. Participants' facial behaviour was unobtrusively videotaped. At this stage participants were still unaware that they were already taking part in an experiment. The experimenter then returned and took the confederate to a nearby room. Participants were then told that they just had taken part in an experiment investigating peoples' responses to the conversational strategies of others. Participants were also told that the other "participant" had been instructed to tell the joke and that the experimenter was interested in how they had felt just after the punchline. Participants were asked to complete a questionnaire assessing emotions and motivations for smiling and/or laughing, focusing on the moment that they had heard the punchline of the joke. They also answered questions about the display rules applicable to this context. Next, participants were debriefed and asked for permission to use the videorecordings of their facial behaviour by signing the informed consent sheet. All participants agreed.

Pretest emotion and dependent variables. Participants completed a pretest of emotional state in which they responded to the stem: “*At this moment I feel...*” There followed eight items (cheerful, threatened, discomfort, anger, fear, disgusted, embarrassed, relaxed) that were rated on 5-point scales ranging from 1 (*not at all*) to 5 (*very intense*).

After the joke, participants were first asked to report how they had felt *just after* they had heard the joke. There followed 10 items (cheerful, ashamed, amused, discomfort, compassion, embarrassed, surprised, a bond, uncertain, relaxed) assessing emotion, each to be rated on a 5-point scale ranging from 1 (*not at all*) to 5 (*very intense*). The next section of the questionnaire consisted of 17 items⁶ measuring social motives related to smiling/laughing. These were identical to the ones used in Study 1, and were rated on 5-point scales ranging from 1 (*very unlikely*) to 5 (*very likely*). Display rules were assessed by the same nine items used in Study 1. Participants were asked to rate the appropriateness of a number of expressive behaviours in the social encounter in which they just had been. Scale anchors were 1 (*very inappropriate*) to 5 (*very appropriate*).

As a manipulation check participants were asked to evaluate the joke. As in the pretest, jokes were rated on funny, bad, silly, racist, and sexist scales ranging from 1 (*not at all*) to 5 (*very*). Using a similar 5-point scale, participants were also asked to what extent they liked the other participant.

Facial actions⁷ during the 5 second interval following the punchline were coded using FACS (Ekman & Friesen, 1978) and MacSHAPA (Sanderson et al., 1994). Single AUs were then combined into unique combinations using co-occurrence (i.e., overlap in time) as the criterion. If unique combinations occurred more than once during this 5 second interval, total durations were calculated by summing all parts. A total of 44 combinations were found. Some of these combinations occurred infrequently. To reduce data, the durations of 29 combinations were added. This resulted in two types of smile, consisting of [AUs 1/2] + AU6 + AU12 + [AUs 25/26/27] (i.e., Duchenne smile) and AU12 + [AUs 1/2/4/7/15/17/20/23/24/25/26/27] (i.e., “polite” smile). The intensity of AU12 was also coded using a 5-point scale. Intensity ratings were averaged in the event that AU12 occurred more than once during the 5 second interval. The intensity of AU12 was coded as missing if AU12 did not occur. The duration of eye contact with the confederate was coded when participants fixated the confederate with his/her eyes and was scored regardless of participants’ blinks. We scored the duration of talking (AU50), which was defined as “verbal utter-

⁶ The item “because I would feel better” decreased Cronbach’s α of the motivation to hide negative affect scale in Study 1. This item was not used in Study 2.

⁷ AUs were; AU1, AU2, AU4, AU6, AU7, AU12, AU15, AU17, AU20, AU23, AU24, AU25, AU26, AU27, AU50, AU70, AU72, AU74. AUs were coded during talking (AU50), with the exception of AU25/26/27.

ances''. Simply making a sound (e.g., laughing) was not coded. Inter-coder agreement⁸ (Cohen's kappa) was .81.

Results

Manipulation check. Two participants already knew the joke and a further two voiced suspicions about the procedure. These participants (all female) were excluded from further analyses. The joke ratings were subjected to a principal components analysis with varimax rotation. This revealed two factors that together explained 72% of the variance. An "evaluation" scale (consisting of the funny and *not* bad items, $\alpha = .88$) and a "discrimination" scale (consisting of the racist and sexist items, $\alpha = .78$) were constructed. A 2×2 (Joke Type \times Confederate Gender) MANOVA with scores on evaluation, discrimination, and rated silliness of the joke as the dependent variables revealed a multivariate main effect for Joke Type, $F(3, 40) = 4.57, p < .01$, one-tailed. Univariate tests showed a significant main effect on the evaluation scale, $F(1, 42) = 10.59, p < .01$, one-tailed. As expected, the funny joke ($M = 2.66, SD = 1.13$) was evaluated as funnier than the not funny joke ($M = 1.73, SD = 0.81$). The two jokes did not differ with regard to rated discrimination or silliness. Unexpectedly, a marginally significant multivariate main effect was found for Confederate Gender, $F(3, 40) = 2.54, p = .07$. Univariate tests showed a significant main effect on silliness, $F(1, 42) = 7.22, p = .01$. Jokes were rated as sillier when told by the female joke teller than by the male joke teller ($M = 4.09, SD = 1.08$ and $M = 3.09, SD = 1.38$, respectively). No interaction effects were found.

Data reduction. Principal components analyses with varimax rotation were used. Analysis of the emotion pretest data revealed two factors that together explained 52% of the variance. A *negative* scale (discomfort, embarrassed, fear) and a *positive* scale (cheerful, *not* disgusted) were constructed. However, only the negative scale had adequate reliability (Cronbach's α s were .83 and .50, respectively). Then separate analyses were performed on the emotions, social motives and display rules sections of the post-joke questionnaire. Analysis of the emotion ratings revealed two factors that together explained 58% of the variance. A *negative* scale (discomfort, uncertain, embarrassed, ashamed; $\alpha = .89$), and a *positive* scale (cheerful, amused; $\alpha = .82$) were constructed. Analysis

⁸ Both observers were certified FACS coders. They coded facial behaviour of 11 participants during a 10 s period with the punchline of the joke as the midpoint. Occurring AUs could be located anywhere within this 10 s interval. An agreement between coders was defined as co-occurring (i.e., partly overlapping) AUs. For this reason we used Cohen's kappa as an index of agreement and not the index of agreement as described in the Investigators Guide, Part 1 (Ekman & Friesen, 1978). Both coders also reached agreement when an action unit did not occur at all. Such "nonexisting" AUs received a duration of zero seconds. This decision rule inflates Cohen's kappa if coders score many "nonexisting" AUs. Without using this rule Cohen's kappa was still an acceptable .70.

of the motivation ratings identified three factors that together explained 63% of the variance. The scales were interpreted as *prosocial* (abbreviated items: please the other, not offend the other, politeness, not being disloyal, take other's feelings into account, was expected, reassure the other; $\alpha = .90$), motivation to *share* positive affect (abbreviated items: enjoyed joke, liked joke, liked other, was cheerful, felt relaxed, felt a bond; $\alpha = .81$), and motivation to *hide* negative affect (abbreviated items: hide uncertainty, hide discomfort, hide being embarrassed; $\alpha = .84$). Finally, analysis of the display rules ratings revealed four factors that together explained 67% of the variance. Only one of these had adequate reliability⁹ and this scale was interpreted as *masking* (substituting negative feelings with a smile/laugh, acting as if you like the joke; $\alpha = .61$).

Potential covariates. The unanticipated finding that participants rated the two jokes as sillier when the joke teller was female led us to perform a 2×2 (Joke Type \times Confederate Gender) MANOVA with rated silliness of the joke, negative emotions at pretest, and liking of the other participant as the dependent variables. A significant multivariate main effect of Confederate Gender emerged, $F(3, 40) = 4.27$, $p = .01$. Univariate tests revealed significant main effects on rated silliness (as reported above) and negative emotions at pretest, $F(1, 42) = 5.16$, $p = .03$. Participants reported more negative emotions at the beginning of the study when they were paired with the female confederate ($M = 2.07$, $SD = 0.93$) than they did with the male confederate ($M = 1.54$, $SD = 0.60$). No other main or interaction effects were found. These unwanted differences with respect to negative emotions at pretest and rated silliness of the joke as a function of the joke teller led us to use these two variables as covariates in the subsequent analysis of the questionnaire data.

Analyses of variance. First, a 2×2 (Joke Type \times Confederate Gender) MANCOVA was performed with the emotion, social motives, and display rules scales as the dependent variables and negative emotions at pretest and rated silliness of the joke as covariates. As predicted, a significant multivariate main effect was found for Joke Type, $F(6, 35) = 3.07$, $p < .01$, one-tailed. The adjusted means are shown in Table 2. Univariate tests revealed significant main effects on negative emotion, $F(1, 40) = 3.73$, $p = .03$, one-tailed, and sharing positive affect, $F(1, 40) = 11.46$, $p < .01$, one-tailed. Participants felt less negative emotion and were more motivated to share positive affect when they heard a funny joke. No other main or interaction effects were found. Performing a MANOVA that was identical except that the covariates were dropped showed an additional multivariate main effect for Confederate Gender, $F(6, 37) = 2.67$, $p = .03$. Univariate tests revealed significant main effects on prosocial motivation, $F(1, 42) = 6.38$, $p = .02$, masking display rule, $F(1, 42) = 5.85$, $p = .02$, and a

⁹ Other scales had reliability indices of .52, .42, and .31, respectively.

TABLE 2
Adjusted means for subjective emotion, social motives, and display rules
(SDs in parentheses) as a function of joke type and confederate gender

<i>Measure</i> <i>Dependent variable</i>	<i>Joke type</i>			
	<i>Funny</i>		<i>Not funny</i>	
	<i>Male</i> (<i>n</i> = 11)	<i>Female</i> (<i>n</i> = 11)	<i>Male</i> (<i>n</i> = 12)	<i>Female</i> (<i>n</i> = 12)
Subjective emotion				
Negative	1.89 (0.78)	2.25 (1.07)	2.57 (1.06)	2.68 (1.04)
Positive	3.24 (0.87)	3.21 (1.07)	2.74 (1.00)	3.14 (0.90)
Social motives				
Prosocial	2.83 (1.03)	2.99 (0.73)	2.36 (0.69)	2.94 (0.82)
Share positive affect	2.78 (1.02)	2.55 (0.69)	1.80 (0.67)	2.08 (0.47)
Hide negative affect	1.77 (0.59)	1.71 (1.02)	2.34 (1.06)	2.03 (0.94)
Display rules				
Masking	2.82 (0.72)	3.67 (0.75)	3.04 (0.72)	3.10 (0.81)

marginal effect on negative emotion, $F(1,42) = 3.69$, $p = .06$. Participants reported that they were more prosocially motivated and found it more appropriate to mask negative emotions (which they tended to experience somewhat more strongly) when the joke was told by the female confederate. The fact that this effect disappeared when controlling for the two covariates suggests that the covariates mediated the relationship between Confederate Gender and the questionnaire data. We therefore included the covariates in our path analysis (see below).

Second, a 2×2 (Joke Type \times Confederate Gender) MANOVA¹⁰ was performed with duration of talking (AU50), duration of eye contact with the confederate, intensity of AU12, and duration of facial behaviour (i.e., Duchenne smile and “polite” smile) as the dependent variables. Consistent with our hypothesis, a significant multivariate main effect was found for Joke Type,

¹⁰ Another five participants were excluded from this analysis for different reasons. Observational data were not recorded for one participant and another participant was outside camera shot. One participant had an incomplete time interval (less than 5 s). One participant covered his lower face with his hand. One participant did not show any AU12 and the intensity score of AU12 was therefore “missing”.

TABLE 3
Means for facial behaviour (SDs in parentheses) as a function of joke type
and confederate gender

Measure Dependent variable	Joke type			
	Funny		Not funny	
	Male (n = 9)	Female (n = 11)	Male (n = 11)	Female (n = 10)
Facial behaviour				
Talking	0.89 (0.73)	0.86 (0.64)	0.77 (0.41)	0.82 (0.42)
Eye contact	3.21 (1.44)	2.76 (1.55)	4.85 (0.30)	3.56 (1.19)
Intensity of AU12	3.89 (0.78)	4.27 (0.65)	3.50 (1.07)	3.30 (0.82)
AU6 + AU12 ("Duchenne" smile)	2.69 (2.25)	1.36 (2.34)	1.30 (1.91)	0.71 (1.51)
AU12 + [other AUs] ("polite" smile)	2.07 (2.18)	3.64 (2.34)	3.08 (2.08)	4.11 (1.75)

Note: Durations were measured in seconds with the exception of the intensity of AU12.

$F(5, 33) = 2.86, p = .02$, one-tailed. Means are shown in Table 3. Univariate tests revealed significant main effects on eye contact, $F(1, 37) = 10.27, p < .01$, and intensity of AU12, $F(1, 37) = 6.55, p < .01$, one-tailed. A marginally significant main effect was found on Duchenne smiling, $F(1, 37) = 2.57, p = .06$, one-tailed. Participants made less eye contact with the confederate, showed more intense AU12, and somewhat longer Duchenne smiling when they heard a funny joke. A significant multivariate main effect for Confederate Gender was also found, $F(5, 33) = 2.55, p = .05$. Univariate tests revealed a significant main effect on eye contact, $F(1, 37) = 5.27, p = .03$, and a marginal effect on "polite" smiling, $F(1, 37) = 3.89, p = .06$. Participants made less eye contact with the confederate and showed somewhat longer "polite" smiling when the female told the joke. No interaction effects were found.

Mediational analysis. To test for mediation we used a 2×2 (Joke Type \times Confederate Gender) MANCOVA with duration of talking (AU50), duration of eye contact with the confederate, intensity of AU12, and duration of facial behaviour (i.e., Duchenne smile and "polite" smile) as the dependent variables and joke ratings (i.e., rated funniness of the joke) and social motives (i.e., sharing positive affect) as covariates. Due to the relatively small sample size ($N = 41$) the number of covariates had to be limited in order to avoid unstable estimates of the

adjusted means (see Stevens, 1996, p. 321). We selected joke ratings and social motives as the covariates because the joke manipulation had a relatively strong effect on these variables, compared to other potential mediators. As reported above, the experimental manipulations significantly affected several behavioural measures. The multivariate effect of the set of covariates on the set of dependent variables was significant, $F(10, 62) = 1.98, p = .05$. At the univariate level the set of covariates was only significant for eye-contact, $F(2, 35) = 4.45, p = .02$. More importantly, the univariate main effects of Joke Type on eye contact, $F(1, 35) = 2.23$, n.s., intensity of AU12, $F(1, 35) = 1.64$, n.s., and Duchenne smiling, $F(1, 35) = 0.37$, n.s., were no longer significant [originally: $F(1, 37) = 10.27, p < .01$ for eye contact, $F(1, 37) = 6.55, p < .01$, for intensity of AU12, and, $F(1, 37) = 2.57, p = .06$, for Duchenne smiling]. The univariate main effect of Confederate Gender on "polite" smiling also disappeared, $F(1, 35) = 2.18$, n.s., [originally: $F(1, 37) = 3.89, p = .06$], although the main effect on eye contact became stronger, $F(1, 35) = 8.16, p < .01$ [originally: $F(1, 37) = 5.27, p = .03$]. To conclude, the set of covariates mediated the relationship between main effects of the manipulation and actual facial behaviour. We used structural equation modelling in an exploratory fashion to examine the mediating process, including other potential mediators, more fully.

Path analysis. LISREL 8.30 and PRELIS 2.30 (Jöreskog & Sörbom, 1993) with maximum likelihood estimates were used to explore the relationships among joke ratings, negative emotion at pretest, subjective emotion, display rules, social motives, and facial behaviour. The main objective was to describe the mediating process and to predict actual facial behaviour. For interpretational purposes, we analysed the correlation matrix¹¹ of the observed variables and used the overall goodness-of-fit index χ^2 as an indication of adequate model fit. PRELIS was used to normalise "negative" emotion, Duchenne smiling, and "polite" smiling in order to meet the criterion of a (multi)normal distribution when using maximum likelihood parameter estimates. We also report the Comparative Fit Index (CFI), which indicates acceptable fit when the CFI is close to .95 (Hu & Bentler, 1999), and the Standardised Root Mean squared Residual (SRMR). The SRMR indicates good fit when the SRMR value is less than .10 (Hu & Bentler, 1999). Modification indices, which are measures of predicted decrease in χ^2 if parameters are relaxed, were used to improve the fit of the model. Each latent variable had only one indicator that was used to scale the latent variable. Measurement errors were fixed (i.e., set to zero) to avoid identification problems. In order to reduce the number of parameters to be estimated, the motivation to hide negative affect was excluded from this analysis because modification indices showed that this variable did not have significant relationships with facial behaviour. The structural model depicted in Figure 1

¹¹ Using the covariance matrix yielded exactly the same fit and goodness-of-fit statistics.

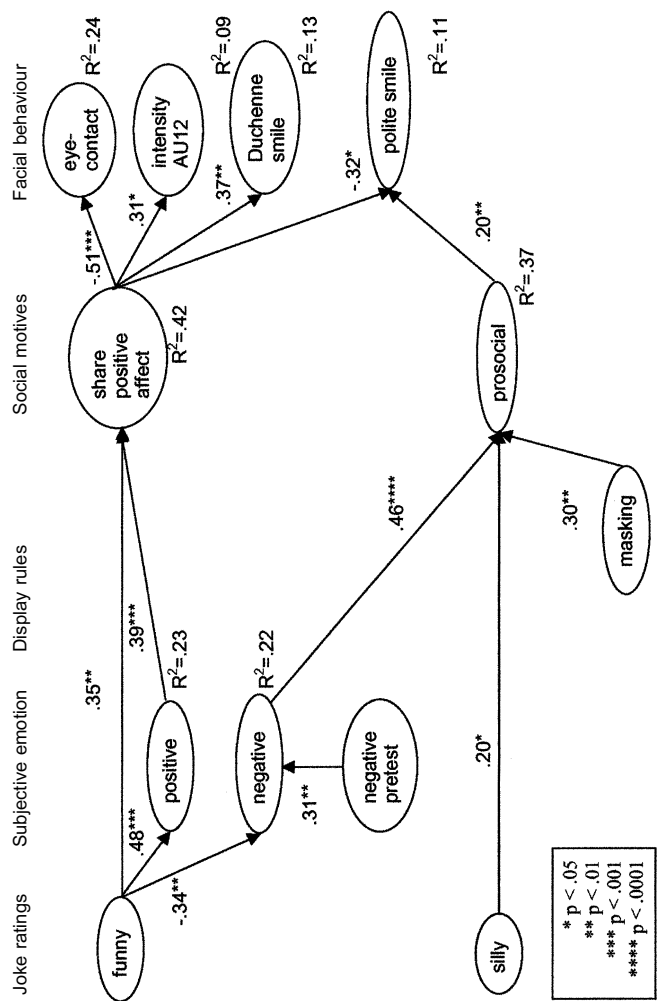


Figure 1. Relations between joke ratings, negative emotion on the pretest, subjective emotion, display rules, social motives, and facial behaviour.

has adequate model fit with $\chi^2(48, N = 41) = 59.74$, $p = .12$, CFI = .93, and SRMR = .097. For the sake of clarity (correlated) error terms of the latent variables are not depicted in this figure. The path coefficients can be interpreted as standardised regression weights. Unsurprisingly, more positive emotion and less negative emotion (after controlling for negative emotions at pretest) was induced when the jokes were rated as funnier. Positive emotion partly mediated the relationship between rated funniness of the joke and the motivation to share positive affect. An increase in positive emotions was associated with an increase in the motivation to share positive affect. Our model suggests that the motivation to share positive affect mediated the relationship between rated funniness of the joke and eye contact with the confederate, intensity of AU12, Duchenne smiling, and “polite” smiling. Moreover, an increase in the motivation to share positive affect was associated with an increase in the intensity of AU12 and the duration of Duchenne smiling, but a decrease in the duration of eye contact with the confederate and the duration of “polite” smiling. Negative emotion mediated the relationship between rated funniness of the joke and prosocial motivation. The latter was also predicted by rated silliness of the joke (covariate) and the appropriateness of masking negative emotions. Prosocial motivation mediated the relationship between negative emotion, rated silliness of the joke, masking negative emotion, and “polite” smiling. An increase in prosocial motivation was associated with an increase in the duration of “polite” smiling.

Discussion

The principal components analysis revealed two motivational factors (prosocial and motivation to hide negative affect) that were consistent with the motivational factors found in Study 1. The motivation to share positive affect and bonding factors clustered together in Study 2 (and were interpreted as motivation to share positive affect), presumably because the bonding items (i.e., “showing that you feel a bond with the other” and “showing the other that you like him/her”) reflect relationally oriented motivations which are more meaningful when participants are actually confronted with the joke teller. The masking display rule was again found, but the reliability of the facilitation display rule was inadequate in Study 2. Consistent with our hypothesis, the funny joke was rated as funnier than the not funny joke, resulted in less negative emotion, elicited a stronger motivation to share positive affect, elicited higher AU12 intensity, elicited somewhat longer Duchenne smiling, and (an unpredicted finding) resulted in a decrease in the duration of eye contact with the confederate. The fact that the funny joke did not elicit more positive emotion than the not funny joke is probably due to the fact that 11 out of 46 participants rated the funny joke as not especially funny. This explanation seems plausible because our LISREL model suggests a strong association between rated funniness of the joke and positive emotion.

Contrary to our hypothesis, a not funny joke did not elicit a display rule to mask negative emotions, or a prosocial motivation; nor did it result in longer “polite” smiling. However, somewhat stronger negative emotion, the greater appropriateness of masking negative emotions, stronger prosocial motivation, somewhat longer “polite” smiling, and decreased eye contact with the confederate were found when the female told jokes. Despite its exploratory nature, our LISREL model suggests that participants who experienced an increase in negative emotion but knew the inappropriateness of overtly showing such emotion (i.e., masking) became more prosocially motivated, which could have resulted in a “polite” smile. We can only speculate about why participants were especially likely to reveal such behaviour when the joke teller was female. First, participants reported more negative emotion at the beginning of the study, which suggests that they did not feel at ease in the presence of the female confederate, a feeling of discomfort that may have continued or been re-evoked after the joke was told. Second, both jokes were rated as more silly in the female confederate condition. This may have been due to individual (or sex) differences in the way the confederates told the two jokes. According to our LISREL model both explanations may hold, because negative emotion (at pretest) and rated silliness of the joke predicted prosocial motivation and thereby “polite” smiling. Although both confederates were trained in how the jokes were supposed to be delivered, the quality of the delivery itself was not assessed in any way. Any explanation for differences in participants’ self-reports and facial behaviour as a result of the confederate manipulation must therefore remain speculative.

GENERAL DISCUSSION

Our main objective in conducting this research was to investigate the process mediating the effects of social context on facial behaviour in response to an emotional stimulus. We hypothesised that knowledge of display rules (i.e., the extent to which certain facial behaviour is rated as appropriate in a specific context) and the social motivation to adapt one’s facial behaviour when needed, are conceptually and empirically distinguishable components of such a mediating process. In Study 1, we succeeded in empirically distinguishing the constructs of display rule and social motive. Moreover, measures of the display rule “*masking* of negative emotion”, and of the social motivations “*prosocial* motivation”, “*motivation to hide* negative affect”, and “*motivation to share* positive affect” also emerged as empirically distinct scales in Study 2.

In both studies evidence of the mediating effects of display rules and/or social motives on (self-reported *and* visible) facial behaviour was found. Although the interaction between joke type and other’s identity on self-reported smiling and laughing remained significant in Study 1 after controlling for the potential mediators, this presumably reflects the fact that significant interaction effects were not found on any of these mediators. In Study 2, the main effects of the

joke manipulation on eye contact with the confederate, intensity of AU12, and duration of AU6 + AU12 (i.e., Duchenne smiling) disappeared after controlling for rated funniness of the joke and the motivation to share positive affect. Path analysis was used to investigate the mediating process in greater detail. Two paths emerged. On the one hand, higher rated funniness of the joke was associated with greater positive emotion, which in turn seems to have motivated participants to share their feelings, which in turn manifested itself in the form of longer Duchenne smiling. On the other hand, the knowledge that the masking of negative emotion was appropriate in the context of telling jokes was associated with an increase in the motivation to act prosocially, and was visible as a “polite” smile.

A possible problem with both studies is that social motives and display rules were measured by means of self-report. Despite the fact that participants were asked to provide honest answers and were reassured that there were no right or wrong answers, they were asked to answer questions about a process that under normal circumstances might take place outside awareness. Participants were certainly able to provide answers to these questions, and the fact that at least some of their responses were systematically related not only to self-reported behaviour but also to observed behaviour suggests that participants had some insight into the rules and motives that shape their behaviour in these settings. It is nevertheless possible that such insights are incomplete and/or biased.

The complex pattern of different types of smile occurring in response to the same jokes may reflect the fact that the two jokes were rated (both at pretest *and* in the experiment) as higher in silliness than in funniness. The mean scores in Table 2 show that the joke-telling situation (regardless of condition) elicited more positive than negative emotion, yet some negative emotion was also reported. Such a mixture of reactions was also apparent among social motives (see Table 2) and facial behaviour (see Table 3). Thus, prosocial motives were somewhat stronger than were motives to share positive affect in all conditions, and both Duchenne smiling and “polite” smiling were observed in all conditions. Thus, the multidimensionality of the stimulus material may have led (via different motivations) to different types of smile.

To summarise, variation in rated funniness of the joke resulting from the joke manipulation was associated with variation in the duration of Duchenne smiling, whereas variation in the rated silliness of the joke due to the confederate manipulation was associated with variation in the duration of “polite” smiling. Whether this latter type of smiling was motivated by politeness or prosociality, or was simply an effort to mask negative emotions, remains unclear. Our operational definition of a “polite” smile was in fact an aggregate of 24 combinations of mainly idiosyncratic smiling patterns. By studying the mediating process more extensively in future research it should be possible to arrive at a better understanding of such individual variations in patterns of response to emotional stimuli. By studying the mediating process in social situations other

than the social situation of telling jokes we will be able to determine the extent to which our findings can be generalised. In the present research the operation of the mediating process was studied by varying the social context in which an emotional stimulus was presented. Future research should find ways of manipulating the mediating process more directly in order to establish more clearly the causal relationship between components of such a mediating process (i.e., display rules and social motives) and facial behaviour.

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