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Gender-related differences in emotion

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Abstract

This article discusses a study into gender-related differences in the experience, display and perception of positive and negative emotions. This specific problem is addressed by a combination of a production and a perception experiment. The production study makes use of a mood induction procedure which aims to elicit positive and negative emotions in subjects by letting them view movie clips that were either positive or negative. This method turned out to be extremely effective, and also revealed that women experience emotions more intensively than men. Video clips collected through the production study were then used in a perception study, in which they were shown to independent observers, whose task it was to judge whether the recorded speakers were in a negative or positive condition. Overall, judges were very accurate in estimating whether a displayed speaker was positive or negative. Moreover, there were again gender differences in that female speakers were more expressive than male speakers, and female observers were more accurate in their judgments than male observers.

Index Terms: emotion, gender, facial expression, production, perception

1. Introduction

There is a whole body of research which suggests that men differ from women in the way they deal with emotions, where the stereotypical view is that women are more emotional than men. There is an ongoing debate regarding the extent to which such differences are due to sociocultural, cognitive or biological factors (Knapp & Hall 2006). On the one hand, it has been argued that one reason why women have better emotional skills than men is because the former make better use of specific designated brain areas (e.g. Schirmer & Kotz 2006). On the other hand, the extent to which women differ from men in how they deal with emotions could also be biased by a specific culture (Eifgen et al 2002) or situational context (Ekman 1972), and should be nuanced for specific kinds of emotions (e.g. in that anger is better expressed by men, and sadness by women) (Rotter & Rotter 1988).

Despite such previous work, our knowledge of gender differences in emotion is still incomplete. As a matter of fact, the claim that women are more emotional than men could mean different things: it could refer to the fact that women experience emotions more intensively than men, to the fact that they display such emotions more clearly, or to the fact that they are better in judging emotions in others (Knapp & Hall 2006). As yet, there are virtually no studies which provide an integrated approach in which these different perspectives on gender differences in emotion are combined. Moreover, research in this area has often been hampered by serious methodological problems (Scherer 2003). One important drawback is that previous

studies tend to use data with limited ecological validity. For instance, perception studies are often based on still images (like photographs) that may not be representative of the way we perceive emotions in natural interactions, where we observe moving images (Schmidt & Cohn 2001), as our perception of emotions differs for static and moving images. In addition, production studies usually rely on posed expressions, whereby “actors” are recorded whom are instructed to display different emotions. Such acted emotions tend to be more exaggerated and stereotypical than spontaneous expressions, so that they are also not representative of natural interactions (Wilting et al 2006).

The current study tries to solve the problems mentioned above. First, it aims to combine different perspectives on emotional differences between men and women in one integrated approach by focusing on experience, expression and perception of emotions. Second, it makes use of a specific mood induction paradigm that has been shown to be very effective in spontaneously eliciting positive and negative emotions in speakers, i.e., the film mood induction procedure (Westerman et al 1996). To this end, the current study starts with a production study that tests to what extent women and men differ in the way they experience negative and positive emotions. Video clips collected through the production study are then used in a perception study, in which they are shown to independent observers, whose task it was to judge whether the recorded speakers were in a negative or positive condition. Note that the current study focuses exclusively on facial expressions (Darwin 1872, Ekman 1972), but the paradigm sketched here could also work to investigate vocal or audiovisual expressions of emotions.

2. Production experiment

2.1. Goal

The current experiment aims to induce either a negative or a positive mood in female and male participants through the use of a film mood induction procedure. The goal is to find out whether there is any evidence that the two genders differ in the extent to which they experience a positive or a negative feeling.

2.2. Method

2.2.1. Procedure

The actual experimental procedure consisted of a number of steps, and was conducted on an individual basis. Participants were first informed by written instruction about the fact that they were going to participate in an experiment whose aim it is to investigate how various moods could affect their choice behaviour when confronted with certain dilemmas. They were told that they would see a 7-minute fragment of a movie to get them in a certain mood. After the instruction phase, the partic-

ipants first had to respond to 3 different dilemmas, such as the following one:

“You had intended to go out for working out, but as soon as you leave your house, it starts raining. What will you do?”

A *You get on your bike, and you go ahead anyway*

B *You decide to wait for 15 minutes, and if the weather hasn’t changed after that, you cancel.”*

In the next stage, participants had to watch the movie fragments. In the positive mood condition, participants viewed the first 7 minutes, excluding the begin tune, of episode 5.14 of *Friends* (*The one where everyone finds out*). Participants in the negative mood condition watched a 7-minute fragment (the “liquidation of the ghetto, March 1943”-scene) of *Schindler’s list*, corresponding to scene 13/14 of Disc 1 of the commercial dvd. After having watched either of these two film clips, participants were asked to complete a short written questionnaire, based on a larger questionnaire adapted from Krahmer and van Dorst (2004). The questionnaire consisted of 6 bipolar 7-point scales (Dutch), the items of which can be translated into English as follows: happy/sad, pleasant/unpleasant, satisfied/unsatisfied, content/discontent, cheerful/sullen and high spirits/low-spirited. For 4 scales, “1” corresponded to a very positive mood and “7” to a very negative one, whereas for the other 2 scales, the extremes of the scales had opposite interpretations; the variable interpretation of the extremes of the scale was introduced to keep the participants alert. Finally, the participants were interviewed about the film-fragment they had just seen, after which they were given 3 other dilemmas similar to the ones given before the movie. The whole procedure took about 30 minutes per participant. Note that participants were filmed by a visible camera while they were watching the movie fragments, during the interview session and when responding to the dilemmas given before and after the movie fragment. Figure 1 gives some representative stills of male and female speakers in positive and negative mood conditions. The stills come from the first part of the production experiment, where the participants were watching a happy or sad movie.

2.2.2. Participants

33 participants (17 female, 16 male), all students from the Arts faculty at Tilburg University, between the age of 18 and 30, took part in the experiment on a voluntary basis: 17 of them (8 male, 9 female) were randomly assigned to the positive mood condition, 16 (8 male, 8 female) to the negative mood condition. All of them signed a written consent form in which they agree that the video recordings of their reactions during the movie fragments, the interview and the session in which they responded to the dilemmas could be analysed for academic purposes and shown to third parties. After the experiment, all participants received a candy bar to thank them for their participation.

2.2.3. Design

The experiment had a between-subjects design with 2 main factors, i.e., mood (positive, negative) and gender (female, male). The choice to have a between- rather than a within-subject design is that it would seem very difficult to have participants switch between two extreme moods in the same experiment.

Figure 1: Representative stills from male and female speakers in positive and negative mood conditions (while they watch a movie)

2.3. Results

Before testing the effect of the positive and negative conditions on the experienced moods, the internal consistency between the scores of our 6 scales was tested by means of Cronbach’s α . To this end, the scores for 2 out of the 6 scales were reversed to make sure the extremes would have similar interpretations (positive or negative) with 1 being “very positive” and 7 being “very negative”. Cronbach’s α turned out to be very high (0.93) which points out that the internal consistency between the different scales was very good. In the remaining analyses, the scores for the different scales were first pooled, in that we got one average score per participant.

We performed an analysis of variance with mood (negative, positive) and gender (female, male) as independent factors, and the average score per participant as dependent variable. This analysis revealed a significant main effect of mood ($F_{(1,29)} = 58.845, p < .001, \eta_p^2 = .662$), whereas the main effect of gender turned out not to be significant. The mood effect was such that the positive condition led to a significantly more positive score of 2.259 (std. error = .182) than the negative score of 4.177 (std. error = .177). In addition to the main effects, there was a significant 2-way interaction between mood and gender ($F_{(1,29)} = 6.527, p < .05, \eta_p^2 = .184$). Even though split analyses revealed that the difference between positive and negative scores was significant for both the male ($t = -2.682, df = 14, p < .05$) and the female participants ($t = -11.977, df = 15, p < .001$), it is clear from Table 1 that the difference between the positive and the negative mood conditions is bigger for female (2.567) than for male participants (1.268).

2.4. Discussion

The production experiment discussed above thus revealed that the film mood induction procedure is extremely effective to turn participants in either a positive or negative mood by means of film clips. Interestingly, the method also brought to light gender differences in that female participants appeared to produce more extreme scores on the valency scales than the male participants, meaning that the former experienced the different moods

Table 1: Average self-ratings, standard deviations and difference scores from male and female participants in positive and negative mood conditions (1=very positive to 7=very negative)

Gender	Mood condition		
	Positive (1)	Negative (2)	Diff (2-1)
Male	2.625 (.258)	3.893 (.258)	1.268
Female	1.893 (.258)	4.460 (.243)	2.567

more extremely than the latter. Given these production results, it remains to be seen whether the differences are also perceived as such by independent observers, and if so, whether the gender of observers matters there as well.

3. Perception experiment

3.1. Goal

Given the results of the previous experiment about gender differences in the way positive or negative moods are experienced, the current experiment aims to test whether the different experiences are reflected in gender differences in the expression and perception of different moods.

3.2. Method

3.2.1. Stimulus materials

The stimulus materials were selected from the video recordings of the participants of the earlier production study. Using the Adobe Premiere software, we cut 10-second fragments from exactly the middle of the recording of participants watching the 7-minute movie scenes. In addition, we took 10 seconds from the middle of the interview session conducted after the movie session and the completion of the questionnaire. The audio-channel of both kinds of fragments were removed from the clips, so that observers had to base their judgments on the visual information only.

3.2.2. Procedure

All the fragments (from movie and interview segments) were presented in random order to observers (individually performed experiment), who were asked to judge the emotional content of the presented clip on a 5-point scale (with 1 meaning “very positive” and 5 meaning “very negative”). To compensate for possible learning effects, half of the participants received the clips in one order, whereas the other half received them in the opposite order. The participants saw a clip after which they had 3 seconds to express their judgment on the scale (paper-and-pencil task). To make subjects acquainted with the experimental procedure and the kinds of stimuli, the experiment was preceded by a short practice session where they had to judge 2 clips. After the practice session, there was no further interaction with the experimenters. The whole experiment (including practice session and instructions) lasted about 15 minutes.

3.2.3. Participants

24 participants, equally balanced across gender and presentation order, all students from the Arts faculty at Tilburg University between the ages of 18 and 30, took part in the perception study on a voluntary basis. None of them had participated as

Table 2: Average scores (1=very positive to 5=very negative) for different instances of mood, fragment, gender speaker and gender observer

Factor	Level	Score
Mood	Positive	2.623
	Negative	3.715
Fragment	Movie	3.468
	Interview	2.870
Gender speaker	Male	3.302
	Female	3.036
Gender observer	Male	3.159
	Female	3.178

Table 3: Observed mood scores, standard deviations and difference scores for male and female speakers in positive and negative mood conditions (1=very positive to 5=very negative)

Speaker	Mood condition		
	Positive (1)	Negative (2)	Diff. (2-1)
Male	2.941 (.081)	3.662 (.086)	.721
Female	2.304 (.090)	3.768 (.101)	1.464

speakers in the production study.

3.2.4. Design

The design of this experiment was a mixed design with gender of the observer (female, male) as a between-subjects factor and gender of speaker (female, male), film fragment (movie, interview) and mood condition (positive, negative) as within-subject factors. Since order of presentation did not have a significant effect on the results, this factor will be skipped for the remaining analyses.

3.3. Results

The data were analysed with a $2 \times 2 \times 2 \times 2$ repeated measurements anova with gender of observer (male, female) as a between-subject factor, with gender of speaker (male female), mood (positive, negative) and fragment (movie, interview) as within-subject factors, and the perceived mood (on a scale from 1 to 5) as dependent variable. The analysis revealed main effects of gender of speaker ($F_{(1,22)} = 10.985, p < .01, \eta_p^2 = .333$), mood ($F_{(1,22)} = 271.256, p < .001, \eta_p^2 = .925$), and fragment ($F_{(1,22)} = 70.564, p < .001, \eta_p^2 = .762$), whereas gender of observer turned out not to be significant. From table 2, it can be seen that the significant results can be interpreted as follows: fragments from a negative condition are indeed perceived as being more negative than the positive ones.

In addition, it appears that fragments from the movie sequence are perceived on average as being more negative than the interview fragments. And finally, male speakers are on average perceived as being slightly more negative than the female speakers. In addition there turned out to be significant 2-way interactions between between mood and gender of speaker ($F_{(1,22)} =$

Table 4: Observed mood scores, standard deviations and difference scores from male and female observers in positive and negative mood conditions (1=very positive to 5=very negative)

Observer	Mood condition		Diff. (2-1)
	Positive (1)	Negative (2)	
Male	2.679 (.110)	3.639 (.106)	.960
Female	2.566 (.110)	3.791 (.106)	1.225

Table 5: Observed mood scores, standard deviations and difference scores from negative and positive moods in interview and movie fragment (1=very positive to 5=very negative)

Fragment	Mood condition		Diff. (2-1)
	Positive (1)	Negative (2)	
Film	3.372 (.090)	4.058 (.090)	.686
Interview	2.368 (.073)	2.877 (.104)	.509

52.699, $p < .001$, $\eta_p^2 = .705$), between fragment and gender of speaker ($F_{(1,22)} = 130.737$, $p < .001$, $\eta_p^2 = .856$) and between fragment and gender of observer ($F_{(1,22)} = 7.694$, $p < .05$, $\eta_p^2 = .259$), whereas the interaction between mood and gender of observer was marginally significant ($F_{(1,22)} = 4.010$, $p = .058$, $\eta_p^2 = .154$). All other 2-way and higher-level interactions were not significant. Of particular interest for our research are the interactions between mood and gender of speaker, and between mood and gender of observer. Tables 3 and 4 give averages and difference scores for negative and positive moods, as a function of the gender of the speaker and the observer, respectively. Table 3 reveals that the difference between the 2 modes is bigger for clips coming from female speakers (1.464) than for those coming from male speakers (.721). Similarly, table 4 shows that female observers perceive the difference between positive and negative moods as more extreme (1.225) than the male observers (.960). As indicated above, the interaction between fragment and mood turned out not to be significant. Table 5 shows the average scores for different moods as a function of the kind of fragment. It reveals that, while interview fragments are on average more positively scored than the film fragments, the distinction between positive and negative moods is very similar.

3.4. Discussion

The perception experiment revealed that men and women differ in how they perceive emotions in others, with women producing more extreme scores than men. Moreover, the difference between negative and positive emotions is more extremely displayed by women than by men.

4. General discussion

The current paper has reported about a study of gender-related differences in emotion, which used a combination of a film mood induction procedure which turned out to be extremely effective, and a perception study in which two kinds of clips were presented to independent observers. Our first general finding is that the research reported above indeed provides support for the claim that women are more emotional than men. Interestingly,

this gender difference is reflected in the fact that women experience, express and perceive emotions in others more extremely than men.

In addition, it is also interesting to observe that the perception results for the movie fragments are different from the interview fragments in that the latter on average appear to be more positive than the former (even though within both sets observers are able to make a correct distinction between positive and negative mood conditions). The more positive appearance of the interview fragments could be due to the fact that they reflect some correlates of the social emotions that speakers display in interactions with a conversation partner. In that respect, it is interesting to observe that most of our participants, irrespective of whether they were in the positive or negative condition, smiled after the interviewer's first question, even when they had explicitly stated that they felt quite negative after having seen the movie. This smile does not necessarily display a happy feeling, but seems to be produced to reflect some social bonding with the interviewer.

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