Boy or Girl? The Nonverbal Emotional Expressivity of Expecting Parents during Gender Reveals

A study containing three methods to measure the differences in nonverbal emotional expressivity of joy between masculine and feminine cultured parents and the influence of the parents' gender

Natasja van Hummel (2034179 - u822097)

method 3

Tilburg University School of Humanities and Digital Sciences

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Dr. M. Goudbeek

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Research questions and hypotheses

RQ: *"What are the differences in nonverbal emotional expressions of joy between American (masculine culture) and Dutch (feminine culture) expecting parents when the sex of their baby is revealed during a GRP, and do these expressions differ between the gender of the expecting parents?"*

H1: Expecting parents from feminine cultures (i.e., The Netherlands) have a higher nonverbal emotional expressiveness of joy when the sex of the baby is revealed than expecting parents from masculine cultures (i.e., United States).

H2: Women show more intense nonverbal emotional expressiveness of joy when the sex of the baby is revealed compared to men.

Methods

Design

To test the hypotheses, a 2x2 study design was employed with two independent variables: culture (masculine vs. feminine) and gender of the parents (male vs. female). The dependent variable of this study design was the emotional expressivity of joy (both intensity and frequency). To test our hypotheses, we used three different methods to ensure reliability.

Stimuli and video editing

The corpus for this study consisted of 40 clips of both American and Dutch GRPs (including a few compilation videos of several GRPs) that were retrieved from YouTube (20 American videos and 20 Dutch videos). Videos were included if they met the following criteria: a) both parents were clearly visible in terms of facial expressions and body language, b) a balloon or confetti cannon was used to reveal the sex of the baby, and c) an audience was present, as this might yield a different reaction than revealing the baby's sex without an audience. Furthermore, we also ensured that the videos included parents that were not aware of their baby's sex before the GRP. Figure 1 shows screenshots of two of the videos that were included in our corpus.

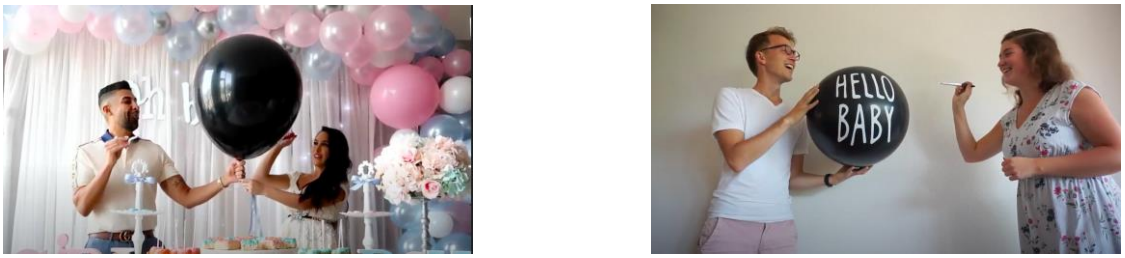

Figure 1. Example of a fragment of an American (left) and Dutch (right) GRP on YouTube.

Method 1: Coding scheme: facial expressions

Two researchers watched 20 videos each (10 Dutch videos and 10 American videos) and coded them according to the Facial Action Coding System (FACS) and Scherer literature.

First, the videos were examined according to the FACS guidelines. Researchers analyzed the videos and coded all cases of happiness/joy, with the FACS used to confirm the presence of these emotions. FACS is a measurement form by Ekman & Friesen (1978) and is based on 44 facial movements/actions of anatomical facial muscles (called Action Units) which, when combined in certain combinations, form the expression of emotions. Based on the assessment of the videos, it can be concluded that the majority of emotions expressed are happiness/joy. According to FACS, the emotion of happiness/joy can be assigned when cheeks are raised and lip corners are pulled up (Ekman & Friesen, 1978). This was coded for the videos per gender as happiness/joy present or not present.

Second, Schrerer's (2005) research on emotions was used as a guideline to measure the intensity and duration of the present emotions. Schrerer focuses on the emotional response during an event (E) in a range of component, with facial expressions as one of them, which was used as a second measure in this research, by measuring the intensity of emotion in five hierarchical categories from very low to very high (VL = Very Low, L = Low, M = Medium, H = High, VH = Very High) which are measured as the subjective perception of the intensity of the emotion (in this study the researchers perception of the emotions shown in the videos).

To increase reliability, both researchers watched and coded 4 randomly sub-sampled videos from one another, without consulting on the outcomes beforehand, and compared results. This reliability analysis showed no differences in results from one researcher to the other and depicts a good interrater reliability of the research method.

Finally, the coded data was combined as one dataset to perform statistical tests to test the hypotheses of this study for facial expression of emotions.

Method 2: Corpus analysis

Measurements

The coding scheme for interpersonal expressions of joy is composed based on several studies which conducted experiments with bodily expressions of emotions (Ruffman, Sullivan & Dittrich, 2009; Light, Grewen & Amico, 2005; Kelsey & O'Brien, 2011). To measure the interpersonal expression of joy, four interactions are chosen: holding-hands, kissing, hugging and high fives. These measures are based on the study of Ruffman, Sullivan and Dittrich (2009), who stated that holding hands can be seen as an expression of joy, the study of Light, Grewen and Amico (2005) who stated that hand-holding and hugging can be seen as an expression of emotional support and affection and the study of Kelsey and O'Brien (2009) who stated that high fives are examples of natural happiness.

Since there are no differences in the initiating of expressing happiness between women and men (Mahon, Yarcheski & Yarcheski, 2005), this study also focuses on who is initiating the interpersonal contact. Therefore, the variable gender was added to the coding scheme.

The coding scheme is made in Microsoft Excel. This scheme includes: the link of the video, the time of the emotional expression, country of origin parents, gender and which interpersonal expression of joy is shown.

Procedure and analysis

The videos are coded by one researcher. In order to protect the validity of the study, the researcher watched all the videos on two occasions (intracoder reliability), on different moments in time. There appeared no differences in coding results between the two outcomes. In order to test the hypotheses, two Chi-square tests were performed.

Method 3: Perception test

Design and participants

A perception test with a between-subjects design was used to assess the intensity of the emotional expressivity of the parents in the GRPs. Forty-one participants judged the emotional expressivity of joy of both parents of one of the two conditions of culture. Participants were recruited via convenience sampling and the test in the form of an online survey was distributed via social media networks. Seventeen participants were male (41.5%) and 23 were female (56.1%). One participant indicated a different gender. The mean age of the participants was 29.68 years old (*SD* = 11.46).

Materials

A survey with two conditions was created in Qualtrics, consisting of either American videos or Dutch videos. For both conditions, 20 videos were randomly selected from the corpus (every second video was selected). The videos were cropped into fragments of about 5 seconds and included the reveal of the gender and the emotional reaction of both parents. To reduce a possible drop-out rate due to the survey's length, only 20 videos were included in the perception test. The order of the videos was randomized to avoid that responses were influenced by this. In total, 20 participants rated videos of American GRPs and 21 participants rated videos of Dutch GRPs.

Measurements

The perceived intensity of the emotional expressivity of joy was measured on a 10-point scale, ranging from extremely unhappy to extremely happy. Participants were asked to rate the emotional expression of both parents (see appendix A). The scale was based on the study by Grossard et al. (2018), in which the authors created a scale to rate the quality of a facial expression. The original quality scale was based on 10 items in which 0 corresponded

to the absence of the expression, 5 to a recognition of the emotion (but the emotion did not seem credible), and 10 to the presence of a credible emotion. For the current study, the credibility of the emotion was left out as the participants (raters) were not experts in the field of recognizing emotions. The reliability of our scale was excellent for both conditions: $\alpha = .94$ for the American videos and $\alpha = .95$ for the Dutch videos.

Procedure

Before entering the survey, participants received instructions about the perception test. They were also ensured that their participation was voluntary and that their data was handled confidentially and anonymously. By agreeing to continue the survey, participants gave their consent to participating in the study. Participants were assigned to one of two conditions of the survey (American or Dutch videos). Participants viewed 20 individual fragments. After watching each fragment, the participants were asked to indicate the intensity of the emotional expression for both parents. Concludingly, participants were asked a few demographic questions. The perception test took about 10 minutes to complete.

Analysis

The data was analyzed in SPSS version 24. A mixed ANOVA was used to analyze the results. The gender of the expecting parents was included as the within-subjects factor and culture was included as the between-subjects factor. Means for the intensity of the expression of joy were calculated per culture. Mean scores on the left side of the 10-point Likert scale indicated a lower intensity of the expression and mean scores on the right side indicated a higher intensity of the expression.

Results

Facial expressions

To test whether expecting parents from feminine cultures have a higher nonverbal emotional expressiveness of joy when the sex of the baby is revealed than expecting parents from masculine cultures, an independent-samples t-test is performed. On average, feminine cultures (M = 3.90, SD = 0.96) showed higher nonverbal emotional expressiveness of joy than masculine cultures (M = 3.75, SD = 1.30). However, the assumption of homogeneity of variances was not met, because Levene's test of equality of error variances was significant F (71.73) = 5.63, p = .020. This difference was not significant ($Mdif$ = -.15, t(71.73) = -.59, p = .558). In general, the data of this method does not support the hypothesis. This indicates that there is no difference between expecting parents from feminine cultures and masculine cultures regarding nonverbal emotional expressiveness of joy when the sex of the baby is revealed.

To test whether women show more intense nonverbal emotional expressiveness of joy when the sex of the baby is revealed than men, a second independent-samples t-test is performed. However, the assumption of homogeneity of variances was not met, because Levene's test of equality of error variances was significant F(69.22) = 9.57, p = .003. On average, women (M = 4.13, SD = 0.88) showed more intense nonverbal emotional expressiveness of joy than men (M = 3.53, SD = 1.28). This difference was significant ($Mdif$ = -.60, t(69.22) = -2.44, p = 0.017). The difference represents a medium-sized effect d = .55. In general, the data of this method supports the hypothesis that women show more intense nonverbal emotional expressiveness of joy when the sex of the baby is revealed than men.

Given the hypothesis and results presented above, an ANOVA was performed to check whether an interaction effect would be present. However, no significant interaction effect (p = 0.227) has been found regarding the culture and the gender of the parent.

Interpersonal expression

The videos with no intention of interpersonal expression of joy between the parents are excluded from the sample. The new sample consisted of 15 American GRP videos and 17 Dutch GRP videos. In these videos, the interpersonal expression of joy was 17 (51.5%) times initiated by the father to be and 15 (45.5%) times initiated by the mother to be. Out of the 32 times the parents showed intention for interpersonal expression, 24 times it was answered by their partner. Out of these 24 interpersonal expressions of joy between the parents, 22 (55%) of them were hugs and 2 (5%) were kisses.

In order to test whether expecting parents from feminine cultures have a higher interpersonal expressiveness of joy when the sex of the baby is revealed than expecting parents from masculine cultures, a Chi-square test was performed with the country as the independent variable and emotional expression as dependent variable. Since the observations were not independent from each other, the *p*-value from Fisher was used. There was no significant association between countries and whether or not an interpersonal expression was shown between the parents, $\chi^2(1) = 2.05$, $p = .229$. In the American GRPs 64.7% of the parents showed interpersonal expressions of joy and in the Dutch GRPs 86.7% of the parents showed interpersonal expressions of joy. The odds of American parents showing interpersonal expressions of joy when the sex of the baby is revealed is 3.67 times lower than those of Dutch parents showing interpersonal expressions of joy when the sex of the baby is revealed. These results do not support the hypothesis that parents from feminine cultures have a higher interpersonal expressiveness of joy when the sex of the baby is revealed than expecting parents from masculine cultures.

In order to test whether women get more interpersonal expressiveness of joy answered by their partner when the sex of the baby is revealed than men, a Chi-square test was

performed with gender as the independent variable and emotional expression as dependent variable. Since the observations were not independent from each other, the *p*-value from Fisher was used. There was a significant association between gender and whether or not they showed more interpersonal expressiveness, $\chi^2(1) = 7.07$, $p = .013$. The man in the GRPs got 94.1 % of his interpersonal expressions of joy answered by their partner and the woman got 53.3% of her interpersonal expressions of joy answered by their partner. The odds of men getting more interpersonal expressions of joy answered by their partner is 14.67 times higher than those of women getting more interpersonal expressions of joy answered by their partner. These results do not support the hypothesis that women get more interpersonal expressiveness of joy answered by their partner when the sex of the baby is revealed than men.

Perception test

The culture of the parents did not show a significant effect $F(1, 39) = 2.32$, $p = .135$, partial $\eta^2 = .056$, which indicates that the participants did not perceive the emotional expressivity to differ between Dutch parents ($M = 6.69$, $SE = .20$) and American parents ($M = 7.11$, $SE = .20$) when the sex of the baby was revealed. Based on the perception test, we cannot support our first hypothesis.

However, the results reveal that there was a significant effect of the gender of the parents on the perceived intensity of joy, $F(1, 39) = 129.92$, $p < .001$, partial $\eta^2 = .77$ (large effect size). This indicates that the participants of the perception test did perceive women ($M = 7.31$, $SE = .14$) to be more emotional expressive than men ($M = 6.49$, $SE = .15$) when the sex of the baby was revealed. Thus, based on the perception test, we can support our second hypothesis.

Lastly, we investigated whether there was an interaction effect between gender and culture. The interaction effect was significant, $F (1, 39) = 17.42$, $p < .001$, partial $\eta^2 = .31$,

which indicates a large effect. This means that the effect of gender of the parents on the emotional expressivity of joy differed between masculine and feminine cultures (see figure 2).

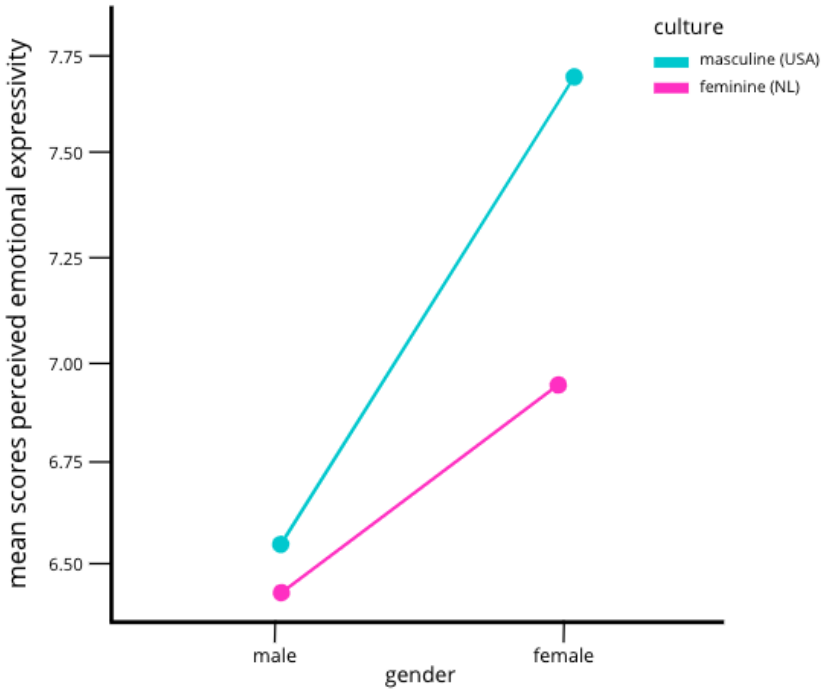

Figure 2. Interaction effect between gender of the expecting parents and culture.

Conclusion and discussion

The aim of this study was to find out what the differences in nonverbal emotional expressions of joy were between American (masculine culture) and Dutch (feminine culture) expecting parents when the sex of their baby was revealed during a gender reveal party. In addition, we investigated whether these expressions differed between the gender of the expecting parents. We hypothesized that Dutch (feminine culture) expecting parents show a more intense nonverbal emotional expression of joy than American (masculine culture) expecting parents and that women show a more intense nonverbal emotional expression of joy than men. Three methods were used to test the hypotheses, resulting in different outcomes. To draw clear conclusions from the results, we need to look at results of the three methods.

Firstly, the FACS was used to measure the intensity of the emotion joy. Compared to the other two methods, this method gave insight in the facial details of the expecting parents. This method found support for the second hypothesis, meaning that the facial expressions of joy were more intense for women than for men. The third method, a perception test, found support for this hypothesis as well. However, the second method (coding scheme for interpersonal expressions) did not find support for this hypothesis. As two out of three methods found support for the hypothesis, we need to take a closer look at this second method.

This method investigated the hypothesis in a slightly different way. Instead of looking at the expression, this method looked at the answering of the interpersonal expressiveness. The altered hypothesis supposed that women get more interpersonal expressiveness of joy answered by their partner than men. The results found the opposite, meaning that men get more interpersonal expressiveness answered by their partner than women. So, the results show that women answer their partner’s interpersonal expressions more and showing interpersonal expressions is related to the intensity of expressing emotions. Thus, when

interpreting this result in a way that women show more, interpersonal expressions of joy than men, it does in fact support the hypothesis.

None of the results found support for the first hypothesis, meaning that there was no significant difference in expressing joy between feminine and masculine cultures. The lack of prove for this difference could come from the fact that we did not include other cultural dimensions. According to Hofstede (1983), there are various classical variables in research about cultural differences (e.g., feminine vs. masculine, individualism vs. collectivism). The feminine vs. masculine variable was included in the current study, investigating differences between American (masculine) and Dutch (feminine) cultures. However, the USA and the Netherlands are both seen as individualistic countries, meaning that the two countries are maybe more related than we thought. Compared to collectivistic cultures, individualistic cultures tend to openly express nonverbal expressions (Fernández et al. 2000). This means that both people from the USA and the Netherlands are used to openly expressing their emotions and this could have been the reason for not finding any differences between the two.

Furthermore, the sex of the baby was not included in the current study. According to Miller (2018), parents could prefer sons over daughters or vise versa. This preferences for one or another could have influenced the nonverbal emotional expression of the expecting parents at the moment of seeing blue or pink confetti. So, it could have been that (one of the) parents felt a feeling of disappointment that influenced the intensity of the joyful expression. Future research could include the baby's sex as a moderating variable to see whether the relation between the gender or culture of the parents and the intensity of the emotion joy is strengthened by the baby's sex.

Some limitations of the used methods should be considered as well. Even though the used FACS was the only method including the facial details of the expecting parents, it has been found that rating the intensity of an emotional expression is hard for humans and that

extensive training is needed to achieve reliable results (Cohn, Zlochower, Lien, & Kanade, 1999). Future research could include computer vision in the form of an automated coding program to objectively rate the intensity of an emotional expression. The use of an automated coding system reduces the labor-intense work for humans to code the expressions and makes sure that the results are more reliable (Cohn et al., 1999).

In addition, the perception test included other people rating the intensity of the emotional expression. The study by Condry and Condry (1976) revealed that our expectations influence the way that we perceive things. They found that observers rated the same emotional responses of children differently for boys and girls. For the current study, the influence of gender stereotypes should be taken into account as the interpretations of the observers could have been biased.

The collected corpus of videos also has some limitations. The quality of the videos used in this study was a bit poor. One of the participants of the perception test mentioned that the facial expression in one of the videos was not clearly visible. The poor quality of the videos could have influenced the interpretation of the expressions.

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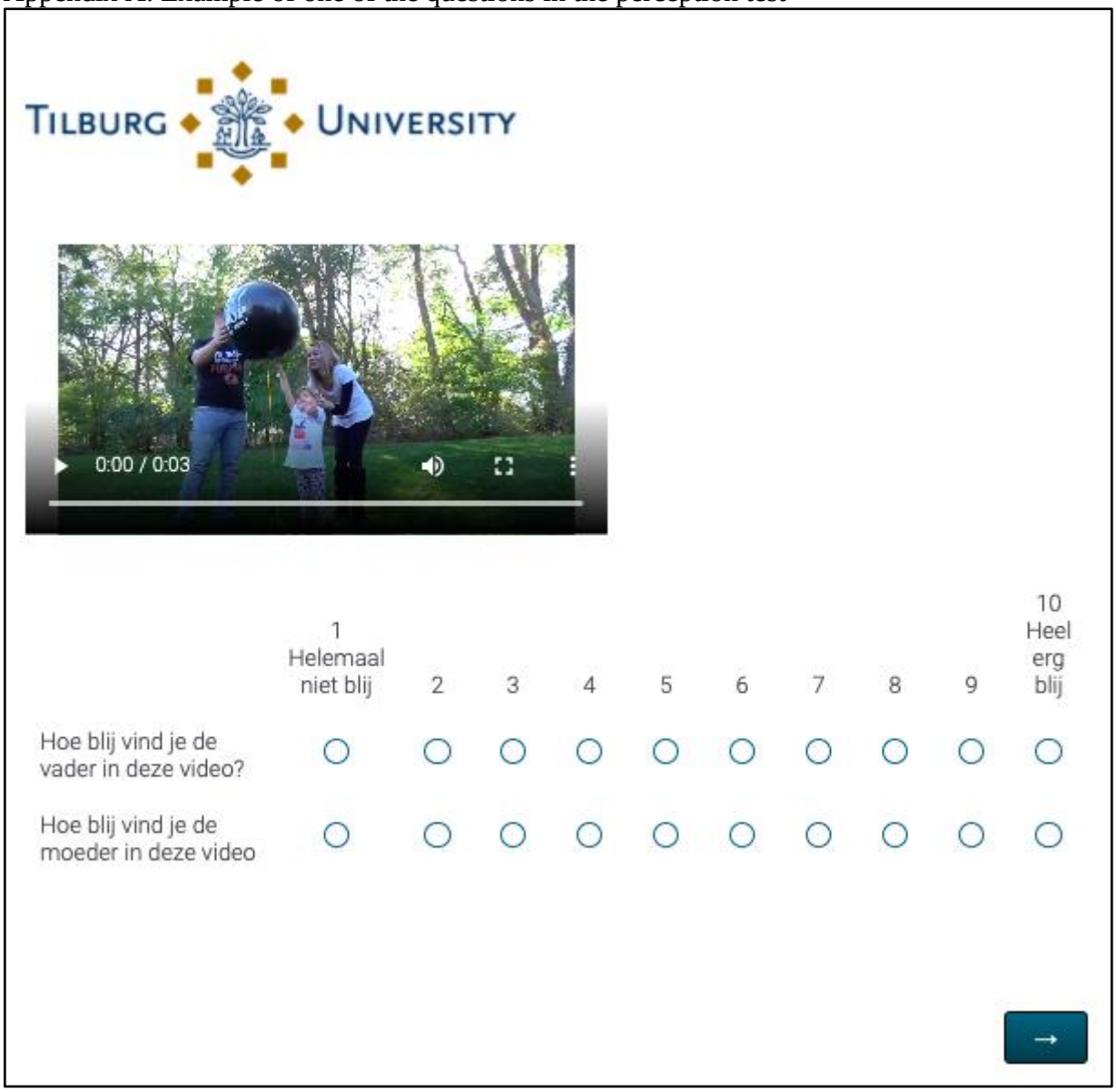
Appendices

Appendix A. Example of one of the questions in the perception test



Appendix B: Group Process Document

Planning

We decided to form smaller deadlines to make sure we stay on track. After we passed the date of a deadline, we had a video meeting to discuss our findings and set the new deadline for the next part. The following small deadlines were made:

Date	**What has to be done?**	**Did everybody do it?**
16-04-2020	Videos gender reveal party and references • **Group meeting**	Yes
24-04-2020	Introduction including hypotheses and research question • **Group meeting**	Yes
15-05-2020	Method section • **Group meeting**	Yes
20-05-2020	Result section • **Group meeting**	Yes

Roles

We worked together on every part of the paper. The method section was divided by everybody's personal interests. This resulted in three different method sections.

- Method 1: Coding scheme: facial expressions. This method was carried out by Annouk van der Burg and Karlijn Simons.
- Method 2: Corpus analysis: interpersonal expressions. This method was carried out by Femke van Gent.
- Method 3: Perception test: intensity of emotional expressivity. This method was carried out by Natasja van Hummel and Robin Verhof.

Other group roles

We decided that the most important thing was that everybody handed in their section in time. Besides, we made sure to help each other when this was necessary.