

The influence of a talent show audition on facial expression and emotions of the jury

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Abstract

This study examines the facial movements and displayed emotions of singing competition judges and whether the outcome of the audition (rejection vs. acceptance) can predict these facial movements and emotions. Youtube was used as a database to collect videos of the Dutch and American singing competitions in which participants both pass and do not pass. The following queries were used, for example: “bad audition Idols/X Factor” or “good audition Idols/X Factor”. A total of 40 clips were used for this study. Then, an analysis of the clips was performed with the help of CERT. The results showed that the outcome of an audition does not influence the facial expressions and emotion in general. However, there are differences between judges, hence some judges are more frequent in their use of specific facial expressions.

Keywords: facial features, eyebrows, mouth, emotion, singing competitions, judges

Introduction

Singing competitions have a standard structure: contestants are invited to show off their singing talent in front of a critical jury. After an a Capella rendition of a verse and a chorus from a song that the contestants have selected themselves, the contestant can either go back to singing in the shower or go on to the next round (Reijnders, Rooijackers & van Zoonen, 2007).

Prior research shows that different parts of the face express whether that person displays positive or negative emotions. Heckmann, Teichmann, Schröder, Sprengelmeyer, and Ceballos-Baumann (2003) state that the expression of emotions in human beings indicate the emotional status of an individual and can signal approval or aggression, desire or disgust. This immediate transmission of emotional information to others has been fundamental to human evolution (Heckmann et al., 2003). Our present understanding of how emotions are processed in humans is almost entirely based on studies investigating the perception of facial expressions (Adolphs, 2002; Van den Stock, Righart, & De Gelder, 2007). Therefore, the aim of the present study is to explore whether the facial expressions and the displayed emotions of talent show judges can be influenced by the outcome of an audition (rejection vs. acceptance). In addition, the study examines whether these facial expressions and emotions differ between judges. The following research question is formulated:

‘What are the interactions among an audition result and the individual judge on facial expressions and displayed emotions of talent show judges?’

Eyebrow Movement

Davies, Ellis and Shepherd (as cited in Sadr, Jarudi, & Sinha, 2003) found that the most important features concerning the recognition of different facial features are the eyes followed by the mouth and nose. Haig (1986) defined the eye and the eyebrow as one unit while investigating facial features and found that the eye and eyebrow feature were the most powerful in making a modified face compared to an original face. Therefore, eyebrows have been acknowledged as an important feature relative to emotional expression and nonverbal communication in general. Eyebrows have the ability of expressing aggression, fear and every other human emotion, in combination with different facial movements.

H1: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the brow muscles of the judge moves.*

H1a: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the outer brow muscles of the judge moves.*

H1b: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the lower brow muscles of the judge moves.*

Mouth movement

Likewise the eyebrows, the mouth plays a significant role in recognizing normal upright faces (Williams, Moos, & Bradshaw, 2004). According to Watanabe, Miki, and Kakigi (2005) mouth movements are essential for perceiving the facial expression of emotion. For example, smiling is perceived as a positive emotion, which is likely to occur while judging an audition. Therefore, concerning this study it is relevant to investigate this facial feature. To examine the complete mouth movement, the lip corner pull and stretch as well as the smile will be explored.

H2: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the lip muscles of the judge moves.*

H2a: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the lip corner pull muscle of the judge moves.*

H2b: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the lip stretch muscles of the judge moves.*

H2c: *Acceptance or rejection of the contestant and the individual judge influences the extent in which a smile is visible on the face of the judge.*

Eyebrow Movement and Emotion

Ekman and Friesen (1978) did a study on the function of eyebrows in facial expressions that signal emotions. They divided the face into three regions: an upper component consisting of the eyebrows and forehead; a middle component consisting of the eyes and cheekbones; and a lower component consisting of the nose, mouth, and chin. Ekman and Friesen (1978) investigated these regions of the face on six emotions that are universally expressed; happiness, sadness, anger, fear, disgust and surprise. Especially the eyebrow was found to be essential in the expression of happiness, surprise and anger. For example, anger is perceived when the eyebrows are pulled downwards and inwards. This possibly will be magnified together with squinting the eyes and a tightly closed mouth. Darwin considered frowning as one of the most important facial expressions in human beings because of contractions of the corrugator muscle by which the eyebrows are lowered and brought together, so that vertical furrows are formed on the forehead (Heckmann et al., 2003).

Mouth Movement and Emotion

Knapp, Hall, and Horgan (2013) analyzed the facial movement patterns with the help of photographs. The researchers found that in cases where exclusively facial movement comprises information, the bottom of the face appears more valuable for the recognition of happiness, disgust and sadness. For example, the upper lip will be raised. In addition, the lower lip will also be raised and pushed up to the upper lip (Knapp et al., 2013). These movements will happen as signs of disgust or aversion. The perception of sadness seemed more subtle. It consists of a slight upward displacement in the area of the chin whereas the forehead area shows an inward and upward movement of the eyebrows (Knapp et al., 2013). Happiness consists of an upward displacement of each side of the mouth and of the cheeks (Bassili, 1979). This movement results in a smile. According to the study of Knapp et al. (2013) surprise was one of the easiest emotions to recognize. The expression involves a strong upward displacement of the brows and an equally strong downward displacement of the jaw. The expression of anger includes a downward movement in the forehead area combined with a compression in the mouth area. Fear involves a downward and outward movement in the mouth area.

As previously described, happiness, surprise, anger, disgust and sadness are the most important emotions that can be perceived by movement of the eyebrows and mouth. With regard to the result of an audition, the emotions of judges can either be positive or negative. Therefore, happiness, specifically joy, would be the most relevant positive emotion and disgust the most relevant negative emotion concerning audition judgement. Of the five emotions perceived by

eyebrow and mouth movement, joy and disgust are the most likely to occur with regard to audition judgement.

H3: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the judge shows the emotion joy and/or disgust. The perceived surprise emotion of judges leads to either a positive or a negative audition judgment.*

H3a: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the emotion disgust is displayed.*

H3b: *Acceptance or rejection of the contestant and the individual judge influences the extent in which the emotion joy is displayed.*

In the last two decades, facial expression analysis has been thoroughly researched (Biel, Teijeiro-Mosquera, & Gatica-Perez, 2012). Facial Action Coding Systems (FACS), including CERT, have become standard frameworks for detecting facial actions and for classifying facial expressions of emotion (Biel et al., 2012). FACS is an objective measure used to identify facial configurations before interpreting displayed affect (Grafsgaard, Wiggins, Boyer, Wiebe & Lester, 2013). These tools recognize the presence of a face and then locate facial features such as the corners of the mouth and eyes (Grafsgaard et al., 2013). CERT defines action units (AUs) that code the movement of facial muscles. Seven facial expressions of emotion are considered as universal: Anger, Contempt, Surprise, Fear, Joy, Sad and Disgust (Biel et al., 2012).

Stimuli collection

Youtube was used as a database to collect the videos containing auditions from contestants in two conditions: good auditions in which the contestant passed the audition and bad auditions in which the contestant did not pass the audition. Four judges from two different signing contests, the American version of 'X Factor' and the Dutch version of 'Idols', were selected, namely Jamai Loman, Martijn Krabbé, Ronald Molendijk, and Nicole Scherzinger. The queries 'worst Idols/X Factor USA audition' and 'Idols/X Factor USA audition good', also translated in Dutch, were used on YouTube to find potential videos. Only videos from the first audition round were selected. All the selected videos had a quality of at least 720p. The selected videos were converted to an mp4 file via an online converter and subsequently edited with Windows Movie Maker. The editing was based on the judgement of the researcher and on a number of criteria. First of all, only 1 judge was allowed to be visible and the timeframe in which that judge was continuously visible had to be at least 2 seconds. In addition, the judge did not speak to another judge. Last, the camera angle had to be frontal. Initially it was intended that only the first reaction of the judge would be selected. However, generally the judges were only visible for a too short amount of time (i.e., less than 2 seconds). Therefore, also reactions further into the audition

were selected. For example, when a contestant hit a high note or was completely out of tune. The videos were cropped into clips of at least 2 seconds and at most 5 seconds and the sound was deleted. Next the clips were saved with a quality of 1020p. This quality was necessary for the analysis in CERT. In total, 40 clips were selected and edited. For all four of the selected judges, 10 clips were selected: 5 clips of a reaction during a bad audition and 5 clips of a reaction during a good audition. Examples of a clip in both conditions, bad audition and good audition, can be find in Figure 1.



Figure 1. Example film stills condition 1: bad audition (left) & condition 2: good audition (right)

Perception tests

Materials and procedure of CERT

CERT (Computer Expression Recognition Toolbox) was used to analyze the 40 YouTube clips. This statistical program allows frame-by-frame tracking of a wide variety of facial action units (Grafsgaard et al., 2013). The output of CERT indicates presence or absence of a facial action unit (AU). A detection threshold of 0.25 is empirically determined. The associations between automatically extracted facial expressions of emotions and the judgement on the auditions will be explored.

Results

(AU 2) Outer Brow Raise

To test how the judgement by the judge and the judge influenced the movement of the outer brow muscles, Frontalis and pars lateralis, a two-way ANOVA was performed. The movement of the outer brow muscles, Frontalis and pars lateralis, was not normally distributed due to a significant skewness and kurtosis in five out of six groups. The assumption of homogeneity of variances was not met. Levene's test was significant: $F(7, 32) = 6.60, p < .001$. For these reasons the ANOVA may not be completely reliable.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 0.61, p = .439, \eta_{\text{partial}}^2 = .02$. In cases in which the judge accepted the participant there was more movement of the outer brow muscles, Frontalis and pars lateralis ($M = 70190, SD = 243382$) than in cases in which the judge rejected the participant ($M = 31743, SD = 119438$). There was a significant main effect of the judge, $F(3, 32) = 7.48, p = .001, \eta_{\text{partial}}^2 = .41$. Nicole showed more movement of the outer brow muscles, Frontalis and pars lateralis ($M = 252187, SD = 290524$) than Jamai ($M = -19051,$

$SD = 90628$), Martijn ($M = -10562, SD = 25649$) and Ronald ($M = -18705, SD = 59150$). Finally there was no significant interaction effect, $F(3, 32) = 1.19, p = .330, \eta_{\text{partial}}^2 = .10$.

As can be seen in Figure 2, the effect of the judge was more outspoken among Nicole than among the other judges. In fact, the judge Nicole shows more movement of the outer brow muscles, Frontalis and pars lateralis, in both conditions and the most in the condition in which the participant is accepted by the judges.

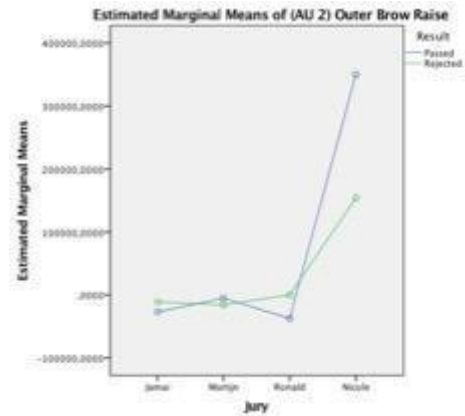


Figure 2. H1a, the influence by the judge.

To conclude, the hypothesis H1a can partially be rejected, as there is a significant effect of the judge on the outer brow raise, but no significant interaction effect of the judgement and the judge on the outer brow raise.

(AU 4) Brow Lower

To test how the judgement by the judge and the judge influenced the movement of the lower brow muscles, Corrugator supercilii and Depressor supercilii, a two-way ANOVA was performed.

The movement of the lower brow muscles, Corrugator supercilii and Depressor supercilii, was not normally distributed due to a significant skewness and kurtosis in two out of six groups (rejected: $z_{\text{skew}} = 8.73, z_{\text{kurt}} = 20.16$; judge Nicole: $z_{\text{skew}} = 4.60, z_{\text{kurt}} = 7.50$). The assumption of homogeneity of variances was not met. Levene's test was significant: $F(7, 32) = 7.11, p < .001$. For these reasons the ANOVA may not be completely reliable.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 1.00, p = .325, \eta_{\text{partial}}^2 = .03$. In cases in which the judge accepted the participant there was less movement of the lower brow muscles, Corrugator supercilii and Depressor supercilii ($M = -0.02, SD = 0.33$) than in cases in which the judge rejected the participant ($M = 1923, SD = 8601$). There was no significant main effect of the judge, $F(3, 32) = 1.00, p = .406, \eta_{\text{partial}}^2 = .09$. Nicole showed more movement of the lower brow muscles, Corrugator supercilii and Depressor supercilii ($M = 3846, SD = 12164$) than Jamai ($M = 0.15, SD = 0.26$), Martijn ($M = -0.11, SD = 0.14$) and Ronald ($M = 0.29, SD = 0.27$). Finally there was no significant interaction effect, $F(3, 32) = 1.00, p = .405, \eta_{\text{partial}}^2 =$

.09. Therefore, H1b can be rejected, as there is no significant main effect of the judgement by the judge and the judge on the movement of the lower brow muscles.

(AU 12) Lip Corner Pull

To test how the judgement by the judge and the judge influenced the movement of lip corner pull muscle, Zygomaticus major, a two-way ANOVA was performed.

The movement of the lip corner pull muscle, Zygomaticus major, was not normally distributed due to a significant skewness and kurtosis in one out of six groups (rejected: $z_{sk} = 4.61$, $z_{ku} = 5.48$. The assumption of homogeneity of variances was not met. Levene's test was significant: $F(7, 32) = 5.03$, $p = .001$). For these reasons the ANOVA may not be completely reliable.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 0.22$, $p = .643$, $\eta_{p^2} = .01$. In cases in which the judge accepted the participant there was more movement of the lip corner pull muscle, Zygomaticus major ($M = 271577$, $SD = 727985$) than in cases in which the judge rejected the participant ($M = 192952$, $SD = 421553$). There was a significant main effect of the judge, $F(3, 32) = 3.04$, $p = .043$, $\eta_{p^2} = .22$. Martijn showed the most movement of the lip corner pull muscle, Zygomaticus major ($M = 551749$, $SD = 641698$) compared to Jamai ($M = -125384$, $SD = 565910$), Ronald ($M = 133841$, $SD = 373100$) and Nicole ($M = 368853$, $SD = 585297$). Finally, there was no significant interaction effect, $F(3, 32) = 2.13$, $p = .116$, $\eta_{p^2} = .17$.

As can be seen in Figure 3, the effect of the judge was more outspoken among Martijn and Nicole than among Ronald and Jamai. In fact, Martijn and Nicole show more movements of the lip corner pull muscle, Zygomaticus major than the other judges in the condition that the participant is accepted.

To conclude, H2a can be partially rejected, as there is a significant effect of the judge on the lip corner pull muscle, but no significant interaction effect of the judgement and the judge on the lip corner pull muscle.

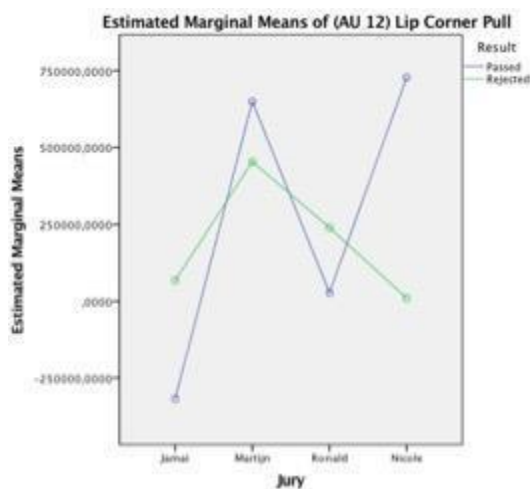


Figure 3. H2a, significant effect of judge on the lip corner pull muscle

(AU 20) Lip stretch

To test how the judgement by the judge and the judge influenced the movement of the lip stretch muscle, Risorius w/ platysma, a two-way ANOVA was performed.

The movement of the lip stretch muscle, Risorius w/ platysma, was not normally distributed due to a significant skewness and kurtosis in one out of six groups (Jamai: $z_{sk} = -3.56$, $z_{ku} = 5.00$). For this reason, the ANOVA may not be completely reliable.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 1.41$, $p = .244$, $\eta_{p^2} = .04$. In cases in which the judge accepted the participant there was more movement of the lip stretch muscle, Risorius w/ platysma ($M = 1452083$, $SD = 628057$) than in cases in which the judge rejected the participant ($M = 1207891$, $SD = 814139$). There was a significant main effect of the judge, $F(3, 32) = 4.68$, $p = .008$, $\eta_{p^2} = .31$. Jamai showed more movement of the lip stretch muscle, Risorius w/ platysma ($M = 1801525$, $SD = 573662$), than Nicole ($M = 856358$, $SD = 701911$), Martijn ($M = 1603151$, $SD = 570103$) and Ronald ($M = 1058913$, $SD = 700462$). There was no significant interaction effect, $F(3, 32) = 0.45$, $p = .717$, $\eta_{p^2} = .04$.

As can be seen in Figure 4, the effect of the judge was more outspoken among Jamai than among Nicole. In fact, this figure shows that Jamai shows the most movements of the lip stretch muscle, Risorius w/ platysma, and Ronald shows the biggest difference in the lip stretch muscle, Risorius w/ platysma in different conditions.

To conclude, H2b can be partially rejected, as there is a significant effect of the judge on the lip stretch muscle, but no significant interaction effect of the judgement and the judge on the lip stretch muscle.

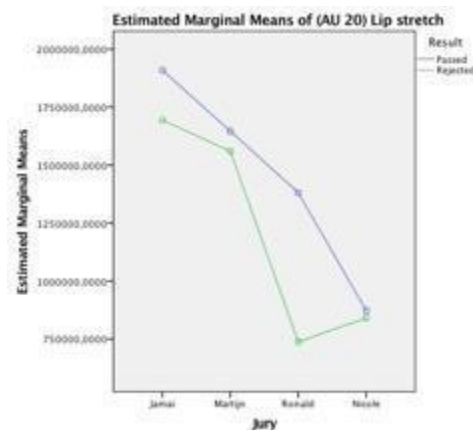


Figure 4. H2b, significant effect of the judge on the lip stretch movement

Smile detector

To test how the judgement by the judge and the judge influenced the smile, a two-way ANOVA was performed.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 0.14$, $p = .710$, $\eta_{p^2} = .00$. In both conditions, the accepted and the rejected condition, there is no smile detected by CERT, as all means

are negative, and it could be interpreted that the opposite movement of a smile was shown by the judges (Accepted: $M = -2163019$, $SD = 2042505$; rejected: $M = -2448152$, $SD = 2788159$). There was no significant main effect of the judge, $F(3, 32) = 1.67$, $p = .193$, $\eta_{\text{partial}}^2 = .14$. No judge showed a smile, and as stated before, as there are only negative values measured, this could be interpreted that the opposite of a smile was shown by the judges (Jamai: $M = -2775501$, $SD = 1760167$; Martijn: $M = -836172$, $SD = 2311441$; Ronald: $M = -2888327$, $SD = 2865004$; Nicole: $M = -2722341$, $SD = 2333455$). Finally there was no significant interaction effect, $F(3, 32) = 0.76$, $p = .526$, $\eta_{\text{partial}}^2 = .07$. Therefore, H2c can be rejected, as there is no significant main effect of the judgement and the judge on the smile shown by the judge.

Disgust (v3)

To test how the judgement by the judge and the judge influenced the extent in which the emotion disgust was shown by the judges, a two-way ANOVA was performed.

The extent in which the emotion disgust was shown by the judges was not normally distributed due to a significant skewness and kurtosis in five out of six groups. The assumption of homogeneity of variances was not met. Levene's test was significant: $F(7, 32) = 5.41$, $p < .001$. For these reasons the ANOVA may not be completely reliable.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 1.30$, $p = .262$, $\eta_{\text{partial}}^2 = .04$. In cases in which the judge accepted the participant the judges showed less disgust ($M = 0.01$, $SD = 0.02$) than in cases in which the judge rejected the participant ($M = 0.02$, $SD = 0.03$). There was a significant main effect of the judge, $F(3, 32) = 6.47$, $p = .002$, $\eta_{\text{partial}}^2 = .38$. Jamai showed more disgust ($M = 0.04$, $SD = 0.04$) than Martijn ($M = 0.01$, $SD = 0.01$), Ronald ($M = 0.02$, $SD = 0.02$) and Nicole ($M = 0.00$, $SD = 0.00$). Finally there was a significant interaction effect, $F(3, 32) = 2.95$, $p = .047$, $\eta_{\text{partial}}^2 = .22$.

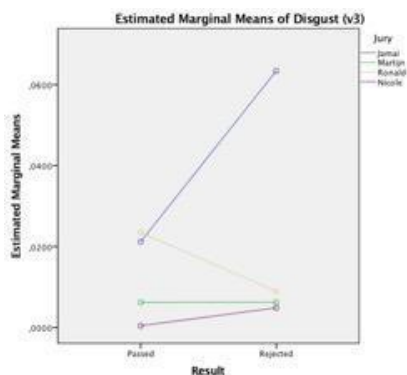


Figure 5. H3a, significant effect of the judge on the showing of disgust

As can be seen in Figure 5, the effect of Judge was more outspoken among Jamai than among the other judges. In fact, Jamai and Ronald show opposite results. Even though, Jamai shows more disgust in the rejection condition than in the condition where the participant gets a pass, Ronald shows more disgust in the condition where the participant gets a pass

than when the participant is rejected.

To conclude, H3a can be partially rejected, as there is a significant effect of the judge on the showing of disgust by the judge, but no significant interaction effect of the judgement and the judge on the showing of disgust by the judge.

Joy (v3)

To test how the judgement by the judge and the judge influenced the extent in which the emotion joy was shown by the judges, a two-way ANOVA was performed.

The extent in which the emotion joy was shown by the judges was not normally distributed due to a significant skewness and kurtosis in five out of six groups. For this reason, the ANOVA may not be completely reliable.

The factorial ANOVA showed no significant main effect of the judgement by the judge, $F(1, 32) = 0.00$, $p = .947$, $\eta_{\text{partial}}^2 = .00$. In cases in which the judge accepted the participant the judges showed almost the same amount of joy ($M = 0.07$, $SD = 0.09$) as in cases in which the judge rejected the participant ($M = 0.07$, $SD = 0.11$). There was no significant main effect of the judge, $F(3, 32) = 1.84$, $p = .161$, $\eta_{\text{partial}}^2 = .15$. Martijn shows the more joy ($M = 0.13$, $SD = 0.12$) than Jamai ($M = 0.06$, $SD = 0.10$), Ronald ($M = 0.04$, $SD = 0.08$), and Nicole ($M = 0.04$, $SD = 0.07$). Finally there was no significant interaction effect, $F(3, 32) = 0.46$, $p = .716$, $\eta_{\text{partial}}^2 = .04$. Therefore, H3b can be rejected, as there is no significant main effect of the judgement and the judge on the showing of joy by the judge.

Discussion

This study investigated whether the outcome of an audition in a singing competition can predict the facial movements and emotions of the judges. Previous research suggests that different facial movements are present in the different outcomes of auditions. However, the results of this research showed no significant effect for the relationship between the outcome of the audition and the facial expressions and emotions of the judges. Only some main effects of judges and one interaction effect for disgust were found significant.

The fact that the findings of this study are not in line with our expectations could possibly be explained by taking a critical look at the methodology of this study. Due to limited time and resources, the clips are not as consistent as possible. Not all the clips have the exact same length, which could have generated biased results in CERT. For example, an eyebrow raise in a long clip would give different results in CERT in comparison to the same eyebrow raise in a shorter clip. In addition, the time in the audition could have influenced the results. The first reaction could have been more exuberant than a later reaction. As explained earlier it was originally intended to sample only first reactions, but because of a lack of videos that were long enough (i.e., at least 2 seconds) it was decided to also select reactions further into the audition. For example, when a contestant hit a high note or was completely out of tune, since these events give exuberant reactions as well. However, these reactions still might be less

exuberant, only not be visible for the naked eye. CERT however, would pick up on these miniscule differences.

In addition, the amount of used clips was rather small (i.e., 40 clips). Especially when investigating the clips per condition (i.e., 5 clips per judge per audition outcome). A larger sample could generate more significant results.

Another limitation of this study is the method of analysis. Because of limited time and experience it was decided to solely use CERT as a measurement. CERT is a automatic program and is therefore a very objective method of measurement. However, an additional manual evaluation with a program like Elan, could enhance the results of the study by giving it a broader view. Manual evaluation gives a better understanding of how the emotions and facial expressions are perceived in comparison with the limited objective view of CERT. Future research should expand their method with manual evaluation to investigate if manual evaluation would give significant results.

The last concern about this research is something that Reijnders et al. (2007) has pointed out in earlier research. They explain that in Idols, the comments the judges make are either extremely negative or positive, meaning the judges often state that the contestant has absolutely no chance or they state that the contestant will win the show. Reijnders et al. (2007) conclude that the program does all it can to live up to this reputation. This is why the nonverbal behavior of the judges might be exaggerated. It's a ritual that successful singers are praised and 'bad' contestants will be heavily rejected. In the judge's view the 'less-than -talented' are completely disappointing and should abandon their dreams (Reijnders et al, 2007). The expected extreme reactions of the judges could establish that the emotions of the judges are not sincere and exaggerated. CERT could therefore pick up on their facial expressions in a different way than it would on sincere facial expressions, which could have biased the results. Future research could look for other situations in which participants get judges to investigate if these situation would give significant results.

Conclusion

The aim of this study was to examine the facial movements of judges of singing competitions and to discover whether the outcome of the audition can influences these facial movements. Two aspects of the face (eyebrows and lip corners) and two emotions (disgust and joy) were chosen to be explored. This was done by examining 40 short clips of judges from the Dutch Idols and American X Factor, using CERT. The results showed that the outcome of the audition cannot influences the facial expressions and emotions overall. However, there were several significant main effects of judges, meaning there are differences in the amount of facial expression the different judges use. Also, there was one interaction effect for one of the emotions, namely *disgust*. This results indicate that the outcome of an audition does not influence the facial expressions and emotion in general, but there are significant differences between judges, hence some

persons are more outspoken or frequent in their use of specific facial expressions.

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