

# Once upon a time: Detecting emotions in Disney animated movies

Dorottya Rusz, Mariana Dias da Silva, Eirini Mouchika, Sara Justin,  
Anastasia Katopodi, and Mine Pasamehmetoglu

## Abstract

Walt Disney Movies are characterized by certain features in terms of the messages they convey and the characters they portray. The present study aims to investigate whether good and bad characters are depicted differently in Disney movies and how people perceive the intensity of their expression of specific emotions. 30 Tilburg University students participated in a perception test in which they had to rate the extent to which the emotions of anger and happiness were portrayed. The results of the perception test showed that good characters express happiness more intensely than bad characters. Bad characters on the other hand, express anger more intensely than good characters. Gender differences were found as well, as females rated all characters to express happiness more intensely than males.

**Keywords:** Disney characters, nonverbal communication, visual depiction, emotions, anger, happiness, incongruence.

## Introduction

The spectacular Walt Disney Movies have been fascinating kids for decades, while cartoon characters of the most famous animations have become particularly popular and gained millions of fans worldwide. Such a global prominence of Disney movies has led researchers to conduct several studies on Disney animation characters concerning topics such as the portrayal of beauty-goodness stereotypes (Bazzini, Curtin, Joslin, Regan, & Martz, 2010), racial composition and gender roles (Hoerner, 1996; Lacroix, 2004), mental illness (Lawson & Fouts, 2004) and most recently, the depiction of elderly Disney characters (Robinson, Callister, Magoffin, & Moore, 2007).

The aim of the present study, however, is to analyze the depiction of the emotions of anger and happiness in Disney characters. More precisely, our aim is to investigate how good and bad cartoon characters are portrayed to visually depict these two emotions differently and to what extent we, as viewers, perceive this. Furthermore, we will also investigate whether female participants will perceive these emotions in a different way than male ones, based on several studies that attribute to women

an augmented ability in perceiving emotions. According to Briton and Hall (1995), women are better nonverbal encoders and decoders of emotions, especially as far as facial expressions are concerned (Rosenthal, Hall, DiMatteo, Roger, & Archer, 1979). Similarly, women also tend to be more perceptive to nonverbal cues and their underlying messages than men (Hall & Matsumoto, 2004).

Inspired by previous research on Disney movies, and taking into account prominent gender differences in decoding emotions, our guiding research question in this study then is: Are people biased towards the nature of the character in perceiving their expression of emotions? In order to answer these questions, we propose the following three hypotheses:

H1: Subjects will rate good characters expressing happiness more intensely than bad ones.

H2: Subjects will rate bad characters expressing anger more intensely than good ones.

H3: Females will rate all characters expressing emotions more intensely than males.

## Stimuli Collection

### Selection criteria

We selected fragments from comparable Disney movies – particularly the following fairy tales: Aladdin, Snow White, Cinderella, Beauty and the Beast, Sleeping Beauty, Little Mermaid. We focused on four types of fragments, in which either good or bad characters were shown expressing either anger or happiness. In order to focus on the visual depiction of nonverbal communication alone, we selected the fragments without listening to the audio, although we did watch the movies beforehand in order to familiarize ourselves with the story and characters. The short clips were on average three to ten seconds. To make sure the fragments were comparable in terms of the intensity of emotion expressed, we conducted a pretest with five Tilburg university students.

### Video Editing

The video fragments were cut from the movies with Windows Movie Maker. As a first step we chose eight fragments from each movie and then compiled them into a ten minute long video. The video contained the instructions and 48 fragments in total, with 12 clips per condition of good and bad characters expressing happiness and anger in a random order. Before each fragment, the name of the particular character that participants had to focus on was shown on the screen, and after each fragment there was a five second break, so that participants could rate the intensity of the emotion expressed.

### Coding

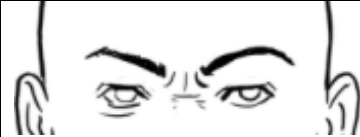



	A
	B
	C
	D

Figure 1: Coding Scheme

Since most coding schemes (ECSI, FACS) have been developed to examine human behavior, we decided to set up our own coding system for Disney characters. After careful consideration we decided to focus our attention only on the eyebrows and the mouth of the character, as we discovered the most striking differences between these two features. As can be seen in figure 1, we developed four codes. The first two refer to the whether the eyebrows are furrowed (A) or in a relaxed position (B), and the second two refer to whether the mouth is in a smiling (C) or a frowning (D) position. Taking into account the

general physical characteristics of the expression of happiness and anger we would assume that in the former case there should be a smile with the eyebrows in a relaxed position (B with C). In the latter case, however, there should be a frown with the eyebrows in a furrowed position (A and D). Any other combination of mouth and eyebrow position would be incongruent.

### Perception Test

#### Participants and Design

Participants were 30 mainly international students from Tilburg University. 14 males (46, 6%) and 16 females (53, 3%) participated in the experiment. The age of the participants varied from 19 to 27 years of age. The mean age was 23.5. Students participated in the experiment voluntarily and did not receive any compensation. We used a within-subjects design in our study, as all participants were exposed to the same four conditions: bad characters expressing happiness, bad characters expressing anger, good characters expressing happiness, and good characters expressing anger.

#### Materials and Procedure

All 30 participants were informed at the beginning of the experiment that a ten-minute video of 48 fragments would be presented to them, during which they had to complete a questionnaire concerning the extent to which happiness or anger was expressed. The questionnaire contained 48 questions, one question for each fragment. Each question demanded participants to rate on a seven-point Likert scale how intensely the character expressed a particular emotion, where 1 represented the lowest and 7, the highest. (For instance: To what extent do you think the character expresses happiness?) The order of the fragments in the video was randomized, but the same randomized order was shown to all the participants. Once the participant completed the questionnaire they were debriefed, thanked and dismissed.

### Results

#### Anger Ratings

Mauchly's test indicated that the assumption of sphericity had been violated, therefore degrees of

freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = 1.00$ ). There were no main effects concerning the nature of the character,  $F(1.00,28.00) = .606$ ,  $p = .44$ , partial  $\eta^2 = .021$ . A repeated measures ANOVA showed that, for the different characters, good and bad, the difference in intensity ratings for the display of anger of bad characters was ( $M = 4.468$ ,  $SD = .13$ ), with a 95% CI [4.42, 4.93] and good characters ( $M = 4.58$ ,  $SD = 0.13$ ), with a 95% CI [4.32, 4.85] was not statistically significant. Bad characters were rated to express anger only slightly more intensely than good characters.

In addition, no main effects were found for gender  $F = 2.669$ ,  $p = .114$ , partial  $\eta^2 = .087$ . A repeated measures ANOVA showed that, for the different genders, male and female detecting happiness, the difference in intensity ratings for the display of happiness of good and bad characters for males ( $M = 4.45$ ,  $SD = .16$ ), with a 95% CI [4.11, 4.78] and females ( $M = 4.81$ ,  $SD = .15$ ), with a 95% CI [4.50, 5.13] was not statistically significant. We can see here, that although female participants rated both good and bad characters to express emotions more intensely than males, this was only a trend.

Table 1: Anger Ratings

Gender	Mean	SD	Sig.(p)
Males	4.45	.16	.114
Females	4.81	.15	.114

### Happiness Ratings

Mauchly's test indicated that the assumption of sphericity had been violated, therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\epsilon = 1.00$ ). Main effects were found for the nature of the character,  $F(1.00, 28.00) = 8.74$ ,  $p = .006$ , partial  $\eta^2 = .238$ . A repeated measures ANOVA showed that, for the different characters, good and bad, the difference in intensity ratings for the display of happiness of bad characters was ( $M = 4.484$ ,  $SD = .176$ ), with a 95% CI [4.12, 4.84] and good characters ( $M = 5.178$ ,  $SD = 0.140$ ), with a 95% CI [4.892, 5.465] was statistically significant. This indicates that participants perceived

good characters to express happiness more intensely than bad characters.

In addition, main effects were found for gender  $F = 5.126$ ,  $p = .032$ , partial  $\eta^2 = .155$ . A repeated measures ANOVA showed that, for the different genders, male and female detecting happiness, the difference in intensity ratings for the display of happiness of good and bad characters for males ( $M = 4.59$ ,  $SD = .16$ ), with a 95% CI [4.27, 4.91] and females ( $M = 5.07$ ,  $SD = 0.15$ ), with a 95% CI [4.78, 5.37] was statistically significant. Unlike participants' perception of anger, clear gender differences were found. Female participants perceived both good and bad characters to express happiness more intensely than male participants.

Table 2: Happiness Ratings

Gender	Mean	SD	Sig.(p)
Males	4.59	.16	.032
Females	5.07	.15	.032

### Congruent features

Pearson's Chi-Squared test indicate that the relationship between the variables character and emotion was significant ( $\chi^2(3, 30) = 34.08$ ,  $p < .001$ ). There was the highest percentage of incongruent features when bad characters expressed happiness (91, 7%), however, the incongruence rate in the good-angry combination was only 8, 3%. As for the good-happy combination, there were no incongruent expressions. Finally, in the combination of bad-angry, only one expression was incongruent (8, 3 %).

Table 3: Incongruence Rate

Nature of the character and the expressed emotion	Number of incongruent fragments	Total number of fragments	Incongruence rate
Bad-happy	11	12	91,7 %
Good-angry	1	12	8,3 %
Good-	0	12	0,0 %

<b>happy</b>			
<b>Bad-</b>	1	12	8,3 %
<b>angry</b>			
<b>Total</b>	<b>13</b>	<b>48</b>	<b>100 %</b>

### Discussion

In the present study we investigated the effect of the nature of the character on detecting emotions in Disney movies. As we expected, participants rated good characters expressing happiness and bad characters expressing anger more intensely, however in the latter case, the results were not significant. Furthermore, as we hypothesized, women's ratings for the expression of emotions were in general, higher than men's. After careful review of the fragments, we came to the conclusion that high contextual cues led participants to rate emotions more intensely. Furthermore, fragments that contained an interaction between characters were also rated more intensely compared to those with scenes where there was no interaction between characters. Finally, characters who expressed their feelings with multiple nonverbal cues (e.g. gestures, facial expressions, body posture) had higher ratings than characters who only displayed emotions with their facial expressions.

There are two possible explanations for why participants rated the expressions in this manner. On the one hand it could be the case that people are influenced by their previous background knowledge about Disney movies. Most people are familiar with fairy tales and know that bad characters are usually happy because of someone's loss. Participants might perceive this self-focused happiness not as intense as happiness that can be considered as genuine and pro-social, as the happiness expressed by good characters. As far as anger ratings are concerned, participants were more likely to rate bad characters as angrier than good characters, perhaps because anger, which has a negative connotation, is more likely to be associated with bad characters. Nevertheless, differences in anger ratings were not significant possibly because when good characters expressed anger, they most likely had legitimate reasons for doing so.

On the other hand we can speculate that people's perception of good characters displaying happiness to be congruent with their nature, while

bad characters displaying happiness to be rather incongruent with their nature. This may also explain why people perceived good characters express anger less intensely than happiness; they may find it incompatible for good characters to express anger. To further investigate this assumption we examined the coded fragments. We assumed that the incongruence can derive from a discrepancy within certain facial features of the characters. As we assumed the incongruent features were the highest when bad characters expressed happiness; they were smiling while their eyebrows remained furrowed. As for good characters expressing anger, the percentage of incongruent features was only 8,3 %. We can explain it by postulating that it is not incongruent for good characters to express anger, as they most likely have a legitimate reason to do so (unfair treatment, suffering, etc.). In the case of good characters expressing happiness and bad characters expressing anger, we expected to find no incongruent elements, however in the latter case there was one out of twelve fragments which showed incongruence. We consider this to be a result of a discrepancy in scene selection, because in this particular scene the movement and the position of the eyebrows are difficult to detect.

### Conclusion

Although we had some interesting findings, we have come across several limitations in our study. The highly creative nature of the visual depiction of cartoon characters made it difficult for us to find comparable scenes. Moreover we could have further investigated our results by using a post-questionnaire or a "think aloud" method that focuses on the participants' motivation to rate the expressions in a certain manner. This additional subjective component would have made our results more sophisticated.

Despite the limitations, this study sheds some light on how animated characters are depicted and perceived by their viewers. These characters and stories have been affecting people, and especially children for decades. They have influenced their perceptions of what is good and bad, of what is beautiful and ugly, and of what is love and happiness. Animated characters are created according to human features and reflect the dominant worldviews of those who create them. They have a particular influence on our perception of human interactions and general

social norms and values. It would be interesting, thus, to further investigate, to what extent Disney animators and illustrators knowingly depict dominant ideologies in these cartoons, what messages they aim to convey, and how successful they are in doing so.

## References

- Bazzini, D., Curtin, L., Joslin, S., Regan, S., & Martz, D. (2010). Do Animated Disney Characters Portray and Promote the Beauty–Goodness Stereotype? *Journal of Applied Social Psychology, 40*(10), 2687-2709.
- Briton, N. J., & Hall, J. A. (1995). Beliefs about female and male nonverbal communication. *Sex Roles, 32*(1-2), 79-90.
- Hall, J. A., & Matsumoto, D. (2004). Gender differences in judgments of multiple emotions from facial expressions. *Emotion (Washington, D.c.), 4*(2), 201-6.
- Hoerner. (1996). Gender roles in Disney films: Analyzing behaviors from Snow White to Simba. *Women's Studies in Communication, 19*, 213–228.
- Lacroix, C. (2004). Images of Animated Others: The Orientalization of Disney's Cartoon Heroines From The Little Mermaid to The Hunchback of Notre Dame. *Popular Communication, 2*(4), 213-229.
- Lawson, A., & Fouts, G., (2004). Mental Illness in Disney Animated Films. *Canadian Journal of Psychiatry, 49*(5) , 310–314.
- Robinson, T., Callister, M., Magoffin, D., & Moore, J. (2007). The portrayal of older characters in Disney animated films. *Journal of Aging Studies, 21* (3), 203-213.
- Rosenthal, R., Hall, J., DiMatteo, M., Roger, P., & Archer, D. (1979). *Sensitivity to nonverbal communicatio: the PONS test*. Baltimore : MD: The Johns Hopkins University .