

# Duchenne vs. Non-Duchenne Smiles

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## Abstract

The present study aims to investigate whether we (humans) are able to accurately determine if someone won or lost a game based on the sincerity of a laugh. 65 Facebook-acquaintances participated in an online perception test in which they had to determine if people won or lost a game and had to rank the laugh of that particular person. The results showed no significant differences in the accuracy rates of winners versus losers, the ratings of the sincerity of the laugh of winners versus losers and the accuracy of determining if someone won or lost a game. Thus, peoples' general judgement about the sincerity of a laugh of winners and losers is not accurate. They were not able to see if someone produced a Duchenne or Non-Duchenne smile. Therefore, the three formulated hypotheses of this study had to be rejected.

**Keywords:** smiles; laugh; Duchenne; non-verbal communication; FACS.

## Introduction

Human facial expressions and emotions are often created and regulated in social interaction. Six different facial expressions can be classified according to Ekman and Friesen (1971), these are anger, disgust, fear, happiness, sadness and surprise. Happiness, for example can be shown when someone has won a game (Keltner, 1995). However, sometimes when people lose a game, they also smile. They smile different or less, trying not to show (negative) emotions or are just happy that it is over. According to Kerr, Wildon and Nakamura (2005) some individuals temper their emotions during games, because it can be a successful strategy.

When looking at a smile, we can distinguish two types of smiles, namely Duchenne and non-Duchenne (Ekman, Davidson & Friesen, 1990). The Duchenne smile can be recognized by raised mouth corners and raised cheeks (appearance of eye wrinkles) while the non-Duchenne smile has only raised mouth corners. Ekman and Friesen (1978) developed a Facial Action Coding System (FACS) with Action Units (AU). The non-Duchenne smile has only AU 12 while the Duchenne smile has AU 6 and AU 12 (Figure 1).

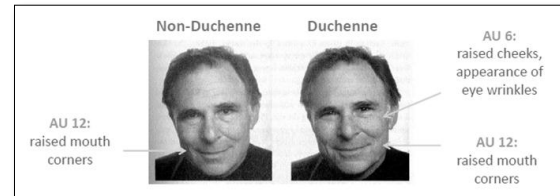


Figure 1. Non-Duchenne vs. Duchenne smile

Ekman (2003) claims that all enjoyment emotions are shown in the face by a Duchenne smile and Matsumoto and Willingham (2006) found that the Duchenne smile (with open mouth) is a signal of enjoyment. However, they did not find a unique expression of defeat.

Wagner, Macdonald and Manstead (1986) investigated if others can judge facial expressions correctly. The results show that only spontaneous facial expressions of anger, disgust and happiness were accurately judged. In addition Frank, Ekman and Friesen (1993) found that one is more likely to categorize a Duchenne smile as a true expression of emotion than a non-Duchenne smile. This research is outdated and it can also be a surprise if someone wins or loses a game, so this has led to the following research question: *Based on the sincerity of a laugh, are we able to accurately determine if someone won or lost a game?*

Based on previous research our hypotheses are:

H1: Respondents can judge if someone won or lost a game on the basis of a laugh.

H2: Respondents will judge a winning person with a Duchenne smile more accurate than a losing person with a non-Duchenne smile.

H3: Respondents will score best for images with a winning person.

## Stimuli Collection

### Selection criteria and procedure

The collected stimuli materials for this study were 40 screenshots of competitors in the Dutch game show 'Lingo', 20 shots of both, winners and losers. Examples of screenshots of winning and losing competitors can be seen in figure 2 and 3. YouTube was used to collect this material.



Figure 2. Screenshot of winning competitors



Figure 3. Screenshot of losing competitors

### Photo Editing

Immediately after the competitors knew that they had won or lost the game, a screenshot was made with the screenshot function on both a Mac and Windows computer. Only the upper body and the face were visible in the shot to exclude other body movements, which could influence the participants in determining whether the competitors won or lost the game.

## Perception Test

### Research design

To answer the research question, whether we are able to accurately determine if someone won or lost a game based on the sincerity of a laugh, an online perception test with a within-subject design was chosen to conduct the present study. Participants were shown winners and losers in a randomized order for both questions, to compare their smiles. A survey was administered to collect data on their accuracy of determining a sincere laugh of winners and losers.

### Participants

The participants are 65 Facebook-acquaintances of the five researchers conducting the present study. The selection of the participants for the present study was performed by using a convenience sampling method. All participants got another order of questions by applying the randomization option that the online survey software Qualtrics provides. The survey was filled out by 15 males and 50 females. The mean age of these participants was  $M$

$= 28.20$  ( $SD = 12.62$ ) and most participants were residents of the Netherlands. Moreover, most participants were highly educated.

### Materials and procedure

An online cross-sectional survey was used to collect data on the accuracy of determining a sincere laugh of winners and losers at one point in time over a period of one week.

To facilitate the data collection, the Internet was used. The Internet has some advantages over more traditional forms of data collection that consist of reaching participants on a larger scale and its rapid turnaround of data.

The present experiment was introduced to all participants with a short introduction, which stated why the survey was administered, how long the survey would take to complete, what would happen with the data, what the incentives were and that participants could quit the survey at any time if they happened to feel uncomfortable during the process. All participants were first asked to provide demographical information. Subsequently, the participants were shown pictures of people who have won or lost a game and they were asked if they think the particular person had won or lost the game. In addition, they were asked to rank the laugh of that particular person on a scale between 0 and 100 from a fake to a real laugh. All participants were exposed to screenshots of winners and losers.

## Results

Three dependent  $t$ -tests were conducted in order to answer whether we are able to accurately determine if someone won or lost a game based on the sincerity of a laugh, and to test our three hypotheses. The first analysis focused on the sincerity of a laugh of winners and losers, whereas the second analysis focused on the accuracy of determining a sincere laugh of winners and losers. Finally, the third analysis focused on the accuracy of determining if someone had won or lost a game.

For the first analysis, the differences between the sincerity of a laugh of winners ( $M = 52.80$ ,  $SD = 10.16$ ) and the sincerity of a laugh of losers ( $M = 52.98$ ,  $SD = 9.60$ ) were not significant,  $t(64) = -0.190$ ,  $p = 0.85$ . The difference between these means were  $-0.19$ , 95% CI  $[-2.143, 1.771]$ , with a small-sized effect,  $r = 0.02$ .

Since the differences between the two variables were not normally distributed for the second analysis, a bootstrapped dependent  $t$ -test was run.

The differences between the ratings of the sincerity of the laugh of winners ( $M = 10.32$ ,  $SD = 3.13$ ) and the ratings of the sincerity of the laugh of losers ( $M = 10.38$ ,  $SD = 1.98$ ) were not significant,  $t(64) = -0.180$ ,  $p = 0.86$ . The difference between these means were  $-0.06$ , BCa 95% CI  $[-0.753, 0.631]$ , with a small-sized effect,  $r = 0.02$ .

For the third analysis, the differences between the accuracy of determining if someone won a game ( $M = 10.32$ ,  $SD = 3.13$ ) and the accuracy of determining if someone lost a game ( $M = 9.62$ ,  $SD = 1.98$ ) were also not significant,  $t(64) = -1.281$ ,  $p = 0.21$ . The difference between these means were  $-0.71$ , 95% CI  $[-1.811, 0.396]$ , with a small-sized effect,  $r = 0.16$ .

### Discussion

Previous studies on the topic of Duchenne versus non-Duchenne smiles have provided support for the claim that spontaneous facial expressions can be judged accurately by others (Wagner, Macdonald & Manstead, 1986). Additionally, a Duchenne smile is more likely to be categorized as a true expression of emotion than a non-Duchenne smile (Frank, Ekman and Friesen, 1993). The findings of the present study, however, provides no support for such theories.

The fact that the findings of this study are not in line with previous studies could possibly be explained methodologically. To control for the accuracy of determining a sincere laugh of winners and losers, participants were exposed to screenshots. Showing photographs instead of short film fragments could have influenced the judgements of the participants. It was not always clear to see if someone also produced AU 6 while smiling. Another limitation of the present study was the duration of completing the survey. A high drop-out rate of participants alerted that it might be the case that the attention of participants began to slack and that most likely the final answers were given without really thinking about it. Furthermore, the sample was homogeneous in terms of gender, 75% of the participants were female. Therefore, one could argue that this study lacks external validity and reliability and findings have little generalizability. Future research on the accuracy of determining a sincere laugh of winners and losers could take into account these issues and increase its validity and reliability.

### Conclusion

The primary goal of the present study was to assess whether we are able to accurately determine if someone won or lost a game based on the sincerity of a laugh. It was hypothesized that respondents could judge if someone won or lost a game on the basis of a laugh, that respondents would judge a winning person with a Duchenne smile more accurate than a losing person with a non-Duchenne smile and that respondents would score best for clips with a winning person. Our findings provide no support for these hypotheses, as they demonstrated that no significant differences between the sincerity of a laugh of winners and the sincerity of a laugh of losers were found. The second hypothesis proposed that a winning person with a Duchenne smile would be judged more accurate. This hypothesis was not supported, as the mean difference was also not significant. The third hypothesis proposed that respondents would score better in judging images of a winning person instead of judging images of a losing person, but also this outcome was not significant.

In sum, based on this study peoples' general judgement about the sincerity of a laugh of winners and losers is not accurate; they were not able to see if someone produced a Duchenne or Non-Duchenne smile. Therefore, the three hypotheses of this study have to be rejected.

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