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THE ROLE OF FACE PARTS:
THE PERCEPTION OF EMOTIONS IN THE VOICE AND THE FACE

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Throughout her impressive career, Leonor Scliar-Cabral has consistently promoted a broad integrative view of language as a means of communication. So, it seemed appropriate to present her, on this important occasion, with this little piece, which deals with the integration of several communicative acts, the speaker's facial gestures with the linguistic message in the speech he produces.

Emotions are an important source of information in social interactions. In normal circumstances emotional information is provided by more than just a single cue. For example, when a person is angry, his emotion is expressed by his facial movements just as well as by his tone of voice. The perceiver is thus faced with the problem of combining different cues provided by separate sensory modalities. Two alternative solutions can be envisaged for achieving intermodal integration. One is to appeal to a post-perceptual decision process as a result of which the information provided by the face is combined with that proved by the voice. Our previous research (de Gelder and Vroomen, 1995; submitted) shows, though, that a second solution is more likely to be the correct one. Previous experiments showed that the combination of an emotional expression in the voice with the information provided by the face is an automatic, mandatory process.

The goal of the study reported here is to find out whether different halves of the face, either the lower or the upper half, are selectively important in conveying an emotion, and whether the informativeness in the visual channel affects the impact of the auditory channel.

METHOD

◆ *Visual Materials*

Two B/W pictures taken from a male model of the Ekman and Friesen (1976) series expressing anger and fear served as end-points for two separate *continua*. In one *continuum*, the eyes were varied in 11 physically equally steps between the angry and fear expressions while the lower half of the face remained constant. In the other continuum, the mouth was varied between the angry and fear expressions while the eyes remained constant. The nine intermediate steps were obtained by a morphing procedure (for details, see de Gelder, Teunisse, Benson, 1997). The non-changing part of each *continuum* was obtained by the 50% interpolation between the angry and fear faces.

The photographs occupied a 9.5 by 6.5 rectangle on a computer screen, and the mean viewing distance was 60 cm.

◆ *Auditory materials*

A sentence of neutral content (his girlfriend came by plane) was spoken by an actor in three different tones of voice (angry, fearful, neutral). Each sentence was presented together with one of the visual stimuli for the duration of the sentence (1.8 s.).

◆ *Design and Procedure*

The experiment consisted of 330 randomly presented trials (5 repetitions x 22 different pictures x 3 voices). The subjects pressed two keys in front of them, one labeled as fear, the other as anger. Subjects were instructed to judge the face thereby ignoring the voice.

RESULTS

Separate ANOVAs were performed on identification responses and reaction times for the continuum in which the eyes were kept constant and the mouth was changed, and for the continuum where the mouth was kept constant and the eyes changed.

◆ *Eyes change/mouth constant*

There was a stepwise identification function, but there was almost no effect of the auditory variable. In the ANOVA on the identification responses, there was a significant effect of the visual stimulus, $F(10,150) = 153.61$, $p < .001$, but the effect of the auditory stimulus, $F(2,30) = 1.46$, $p = .24$, and the interaction between the visual and auditory stimulus ($F < 1$) were not significant. In the analysis of the reaction time, there was an effect of the visual stimulus, $F(10,150) = 10.71$, $p < .001$, but the auditory utterance did not change reaction time ($F < 1$). The interaction between the auditory and visual stimulus was only marginally significant, $F(2,300) = 1.56$, $p = .06$.

◆*Mouth change/eyes constant*

There was again a stepwise identification function, but less steep than in the other continuum. There was now also an effect of the auditory variable. The effect of the visual stimulus was significant, $F(10,150) = 59.06$, $p < .001$, as was the effect of the auditory stimulus, $F(2,30) = 3.60$, $p < .05$. There was also an interaction between audition and vision because the effect of the auditory variable was biggest at the intermediate levels of the visual variable, $F(20,300) = 1.81$, $p < .02$. In the analysis on reaction times, there was an effect of the visual, $F(10,150) = 4.56$, $p < .001$, and auditory stimulus, $F(2,30) = 4.64$, $p < .02$. The interaction was not significant ($F < 1$).

Discussion

The present study addressed whether different parts of the face carry an emotional expression. When the emotion was in the lower part of the face, most prominently the shape of the mouth, the impact of the visual stimulus was small if compared with the situation in which the eyes carried the emotion. In other words, at least for these two emotions, the mouth is less important than the eyes, suggesting that there is an unbalanced contribution of the lower versus the upper half of the face. Conversely, the impact of the voice was present in the case that the visual stimulus was more ambiguous. This shows that the information value of one channel cannot be simply added to the other, but that one information channel can modulate the other.

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