Threatening joy

Examining the process underlying concordant and divergent reactions to in-group and out-group emotions

Dissertation
zur Erlangung des akademischen Grades eines
Doktors der Philosophie
an der Philosophischen Fakultät III
der Universität des Saarlandes

vorgelegt von

Andrea Paulus

aus Freiburg im Breisgau

Saarbrücken, 2013

Dekan:
Prof. Dr. Roland Brünken, Universität des Saarlandes

Berichterstatter:
Prof. Dr. Dirk Wentura, Universität des Saarlandes
Prof. Dr. Juliane Degner, Universität Hamburg
Prof. Dr. Roland Neumann, Universität Trier

Tag der Disputation: 14.12.2012

Acknowledgment

Many people supported me in accomplishing this thesis. I want to thank:

- My supervisor and mentor Dirk Wentura who always had an open ear and open door for me but gave me the freedom to find my own questions.

- Juliane Degner who gave important input at crucial moments during the development of this work and agreed to review this thesis.

- My colleagues Charlotte, Kalina, Michaela, Melanie, Regine, and Angela who brightened up many of my days during countless Mensa breaks.

- The Hiwis Daniela, Jo, Sarah, Christiane, Anne-Kathrin, Demian, Christoph, Ansaf, Ewa, and Leon who collected all the data for this thesis and helped with literature research and referencing.

- Steffi, Michaela, and Melanie who gave feedback on earlier versions of this thesis and on life in general.

- My friends and family who always believed in me.

- Martin who was always there.

Author note

Several chapters of this thesis are based on manuscripts which are either submitted or in preparation, namely Chapter 4 (based on Paulus, Rohr, Neuschwander, & Seewald, 2012), Chapter 5 (based on Paulus, & Wentura, 2012) and Chapter 6 (based on Paulus, Rohr, Dotsch, & Wentura, 2012). I am the first author for all of these[1]. In order to allow a smooth reading, the respective parts are not marked; furthermore, I employ the term "we" instead of "I" throughout the whole thesis.

[1] For Paulus, Rohr, Neuschwander, et al., 2012, both authors contributed equally.

Abstract

Numerous studies examining affective reactions to emotional expressions find that humans show concordant reactions to the emotions of others: Positive facial expressions activate positive affective reactions whereas negative facial expressions activate negative ones. It has been argued that these reactions are – at least in part – triggered by the intention signaled by the emotional expression. This arguing suggests that each emotion signals a specific intention leading to a specific reaction. However, we argue that the link between emotional expression, intention, and affective reaction is much more flexible: Depending on situational and social factors, the same emotional expression can be interpreted as signaling different intentions and therefore trigger different reactions. One of these social factors influencing the interpretation of an emotion might be the group membership of the expresser of the emotion. Since group membership influences the relationship between individuals, it influences the light in which the intention of the emotional expression is seen. If expresser and perceiver of an emotion share group membership, their relationship will be friendly and cooperative; accordingly, the intention signaled by the emotional expression will be seen in this light and elicit a concordant reaction. On the contrary, if expresser and perceiver are members of different groups, they will have a negative and competitive relationship. As a result, the intention signaled by this emotional expression should be interpreted in this light and elicit a divergent reaction.

This assumption was examined in the experiments conducted for this thesis. The results show that approach and avoidance reactions to in-group and out-group emotions are indeed influenced by the intention signaled by the emotion: Emotions (happiness and fear) expressed by the in-group elicited concordant approach and avoidance reactions. Emotional expressions (happiness and fear) shown by out-group members, in contrast, elicited divergent approach and avoidance reactions. Since approach and avoidance reactions are influenced by the intention of the emotion, these results support our arguing that group membership influences which intention is inferred from an emotional expression. This conclusion is supported further by an experiment

employing the reversed correlation technique. The results demonstrate that the mental representations of in-group smiles are associated with benevolent intentions and that of out-group smiles with malevolent ones.

Importantly, the results of our experiments show that the influence of group membership on affective reactions to emotions is based on an automatic process: The interaction between group membership and emotional expression occurred in spite of the emotional expression (Experiment 1, Experiment 3b, Experiment 4), and the emotional expression and group membership (Experiment 2, Experiment 5) being task irrelevant. Additionally, group membership in Experiment 1 and Experiment 2 was manipulated by employing images of ethnical in-group and out-group members. Assuming that participants would be motivated to control their responses towards ethnical out-group members in order to not appear prejudiced, we conclude that the observed influence of group membership on affective reactions to emotions cannot be controlled.

In sum, employing different paradigms, groups, and dependent variables, our results show that group membership influences automatic affective reactions to emotions. Furthermore, they provide evidence that this effect is caused by an influence of the relationship between expresser and perceiver of an emotion on the interpretation of the intention signaled by the emotional expression.

Content

List of Figures IX
List of Tables X

Preface 1

1 Automatic categorization and group membership 6

2 Affective reactions to emotions 9
2.1 Defining the subject 10
2.2 Empirical findings 14
2.2.1 Mimicry and mood contagion 14
2.2.2 Priming with emotional expressions 19
2.2.3 Approach/avoidance experiments 22
2.2.4 Summary 25

3 The influence of group membership on affective reactions to emotions 27
3.1 Empirical evidence for an influence of group membership on affective reactions to emotions 28
3.1.1 Mimicry and mood contagion 29
3.1.2 Priming with out-group members' emotional expressions 37
3.1.3 Summary and discussion of automaticity 43
3.2 Possible mechanisms underlying the influence of group membership on affective reactions to emotions 45
3.2.1 Comparison focus 45
3.2.2 Affiliation 48
3.2.3 Social meaning of the emotion 49
3.2.4 Intention 51
3.3 Overview of Experiments 55

4 Stimulus material – Development and Validation 58
4.1 Creation of the database 59

4.2 Validation of the database 59
4.2.1 Method 59
4.2.2 Results 59
4.3 Discussion 61

5 Approach and avoidance reactions to emotions expressed by in-group and out-group members 62
5.1 Experiment 1 64
5.1.1 Method 64
5.1.2 Results 67
5.1.3 Discussion 69
5.2 Experiment 2 71
5.2.1 Method 72
5.2.2 Results 73
5.2.3 Discussion 75
5.3 Experiment 3a and 3b 76
5.3.1 Method 77
5.3.2 Results 81
5.3.3 Discussion 83
5.4 General Discussion 84

6 Visualizing the mental representation of in-group and out-group smiles 89
6.1 Method 92
6.1.1 Participants 92
6.1.2 Design 92
6.1.3 Materials 92
6.1.4 Procedure 93
6.2 Results 97
6.3 Discussion 102

7 Automatic affective reactions in the voice 105
7.1 Method 107
7.1.1 Participants 107
7.1.2 Design 107

7.1.3 Material 108
7.1.4 Procedure 109
7.2 Results 110
7.2.1 Standard Analysis 110
7.2.2 Alternative Analysis 111
7.3 Discussion 112

8 Discussion 117
8.1 Summary of the results 117
8.2 Intention and emotional expression 121
8.3 Automaticity of the finding 126
8.4 Open questions and future directions 129
8.4.1 The nature of the relationship between expresser and perceiver of an emotion 130
8.4.2 The emotional expression 133
8.5 Conclusion 136

References 137

Appendix 156

List of Figures

Figure 1 Examples for the basic emotional expressions 13

Figure 2 Reaction times to emotion words as a function of prime emotion and prime race 41

Figure 3 Interaction of emotion and ethnicity with regard to basic behavioral tendencies in Experiment 1 69

Figure 4 Examples of stimuli used in Experiment 2 73

Figure 5 Interaction of emotion and ethnicity with regard to basic behavioral tendencies in Experiment 2 75

Figure 6 Interaction of emotion and ethnicity with regard to basic behavioral tendencies in Experiment 3b 83

Figure 7 Exemplars of stimuli employed in Experiment 4 94

Figure 8 Exemplars for classification images obtained in Experiment 5. 99

List of Tables

Table 1 Mean RTs for approach and avoidance movement in the two blocks of Experiment 1 678

Table 2 Mean RTs for approach and avoidance movements of Experiment 2 74

Table 3 Mean RTs for approach and avoidance movements of Experiment 3a and 3b 82

Table 4 Meanings of Emotion Items employed in Experiment 4 96

Table 5 Factor Loadings for the Meanings of Emotion Items in Experiment 4 98

Table 6 Results of the hierarchical regression analyses in Experiment 4 101

Table 7 Mean ratings as a function of emotion and ethnicity in Experiment 5 111

Preface

Imagine you are walking down the street and come across a middle-aged blond guy, who reads the newspaper waiting at a bus stop. As you pass by, the guy briefly looks up and flashes a smile at you. Then he continues reading. What reaction would this short expression of emotion elicit? How would you feel or behave? The answer is simple: Most likely, this smile would elicit positive reactions in you; it would probably make you feel good and happy and maybe it would also make you smile.

Reactions like this are part of our everyday life and everybody has experienced them before: We feel good if we see one of our friends laugh and sad if we see her or him cry. We are drawn towards smiling people but retreat if they show fear. We mimic facial expressions, postures, voices. These and other effects are documented by numerous studies which show that emotions of others elicit concordant reactions in us (e.g., Dimberg, Thunberg, & Elmehed, 2000; Dimberg, Thunberg, Grunedal, 2002; Hatfield, Cacioppo, & Rapson, 1992; Lundquist, & Dimberg, 1995; Neumann & Strack, 2000; Rotteveel, & Phaf, 2004). Interestingly, these reactions do not only occur after conscious deliberation and in interactive settings, like most people would assume, but can also be elicited in a very controlled experimental set-up with voice samples or photographs of strangers displaying emotional expressions. Participants in such studies reported a more positive mood state after being repeatedly exposed to facial expressions of happiness or after listening to a happy voice than after watching negative facial expressions or listening to a threatened voice (Neumann & Strack, 2000). This *mood contagion* occurred even though the emotional content of the stimuli was very subtly manipulated: Participants were not instructed to pay attention to the emotional expression in the picture or to the tone of the voice but rather to other features of the image or the voice sample. Other studies show that emotional expressions can also trigger behavioral reactions: Participants were faster in initiating a step towards a happy face compared to an angry one (Stins, Roelofs, Villan, Kooijman, Hagenaars, & Beek, 2011). Similar results were obtained with even more artificial movements like pushing or pulling a joystick to categorize

photographs of emotional faces appearing on the screen (Rotteveel & Phaf, 2004; Seidel, Habel, Kirschner, Gur, & Derntl, 2010; Marsh, Ambady, & Kleck, 2005; but see Wilkowski & Meier, 2010). Studies like these show that reactions to emotions are very basic and occur automatically. Interestingly, almost all of them show that humans react with a concordant behavioral reaction to emotional expressions of others.

However, is it plausible that we always react with a concordant affective reaction? Are there no possible situations in which a divergent reaction would be more sensible? Imagine a situation slightly different from the one described at the beginning of this chapter: Again, you are walking down the street and pass the bus stop. This time, however, the guy smiling at you is black haired with darkish skin, maybe of Arabic origin. How would you react in this situation? Would his smile still make you feel good and happy? Or would it rather make you suspicious and assume that the guy is up to no good? And if your answer is yes – how automatically would this inference occur?

Broadly spoken, this question sums up the topic of this thesis: It examines the influence of group membership on automatic reactions to emotions and the possible mechanism underlying this influence. Importantly, the emphasis is on *automatic* reactions – reactions that occur without deliberate intention and sometimes even unconsciously. We will argue that these automatic reactions to emotions differ if the expresser is a member of the in-group compared to if he is an out-group member. Whereas in-group members' emotions typically elicit concordant affective reactions, emotions expressed by out-group members should elicit divergent reactions. We suggest that the reason for this is that reactions to emotions are influenced by the *intention* signaled by the emotion. Depending on the group membership of the expresser of an emotion, the same expression might be interpreted as signaling different intentions. Whereas the smile of the blond guy at the bus might be understood as a sign of affiliation, the smile of the Arabic looking man in contrast might be seen as signaling dominance, arrogance, or *Schadenfreude*. As a result, the same expression might activate different reactions.

There are already a couple of studies examining the influence of group membership on reactions to emotions. A study conducted in the aftermath of

the European Championship 2000 in soccer, for example, found that Dutch soccer fans reported an increase of *Schadenfreude* (an emotion defined as "malicious pleasure at an out-group's misfortune") after the rival Italy lost in the finals against England (Leach & Spears, 2009; Leach, Spears, Branscombe, & Dosje, 2003). Another study – related to the ones examining mood contagion mentioned above – found that participants experienced a concordant mood state after watching facial expressions shown by a same sex person but a divergent one if the emotion was expressed by a member of the opposite sex (Epstude & Mussweiler, 2009). These studies (and a couple of others) present some evidence that group membership influences reactions to emotions.

However, most of the studies examining the influence of group membership on reactions to emotions did not provide sufficient evidence explaining which underlying mechanism caused the divergence of reactions. Even though in most studies an explanation for the effects is offered, these differ between studies and fail to explain various results. It is therefore necessary to further examine the exact mechanism underlying the influence of group membership on reactions to emotions. A second problem of the studies reporting an influence of group membership on reactions to emotions is that they fail to show if these divergent reactions occur automatically or if they are caused by conscious considerations. In most of the studies which manipulated the group membership of the expresser, the intergroup situations created for the experiments were very competitive and extremely salient (e.g., Epstude & Mussweiler, 2009; Bourgeois, & Hess, 2008; Leach & Spears, 2009; Leach, et al., 2003; Ruys, Spears, Gordijn, & de Vries, 2007; Weisbuch & Ambady, 2008). Therefore, it seems likely that participants paid extra attention to the expressers and their emotions, reflected on the meaning and the implication of these expressions, and then altered their responses. In order to overcome this problem, studies controlling for the automaticity of the observed effects are needed.

The studies conducted for this thesis fill these two gaps: We examined the mechanism underlying the influence of group membership on reactions to emotions and assessed the automaticity of it. In order to test our hypothesis that group membership influences reactions to emotions because it influences the

intention which is inferred from an emotional expression we followed two different approaches. First of all, we examined approach and avoidance reactions to emotional expressions (Experiments 1 – 3). Since it has been argued that these reactions are activated by the intention inferred from the emotional expression, finding an influence of group membership on approach and avoidance reactions to emotional expressions would allow us to conclude that group membership influences the intention which is inferred from an emotion. Second, we conducted an experiment in which we visualized the mental representation of in-group and out-group smiles (Experiment 4) and assessed the intention associated with these mental representations.

In order to face the second problem we created intergroup situations in which emotional expression (Experiment 1, Experiment 3, Experiment 4) or emotional expression and group membership (Experiment 2, Experiment 5) were not task relevant, examining the intentionality and goal-dependency of the interaction. Moreover, group membership was rather subtly manipulated and mostly based on ethnicity. Due to the social norm not to appear prejudiced (e.g., Banse, & Gawronski, 2003; Dunton, & Fazio, 1997; Fazio, Jackson, Duntion, Williams, 1995; Gaertner, & Dovidio, 1986), participants' motivation to control their reactions should be high in such a situation. Finding an influence of group membership nevertheless would therefore allow us to conclude that the effect could be controlled.

Layout of the thesis

The layout of this thesis is as follows: The first chapter will give a short introduction into automatic categorizations and group membership. It will thereby mainly focus on the influence of group membership on the relationship between group members. Chapter 2 will present research that examined affective reactions to emotional expressions. Importantly, only studies looking at automatic reactions will be discussed here. While Chapter 2 solely focuses on studies in which the group membership of the expresser of an emotion was held constant, in Chapter 3 we will present those studies that manipulated the group membership of the expresser and examined the influence of this manipulation on affective reactions to emotions. In this chapter, studies most

relevant for the experiments conducted within the framework of this thesis will be described in detail and subsequently critically discussed. The main emphasis will be on the degree of automaticity of the observed effects. Subsequently, an overview of the mechanisms which were proposed as driving the results will be given. At the end of Chapter 3 we will present our own reasoning regarding the mechanism underlying the influence of group membership on affective reactions. We will then present our hypotheses. In Chapter 4, the material developed for and employed in the conducted studies will be presented. The following chapters will then present the empirical studies conducted for this thesis.

1 Automatic categorization and group membership

We all are group members: We are students, teachers, psychologists, Germans, Europeans, women, or men. These (as well as many other) memberships come to mind easily and we have no problems in classifying ourselves as well as others as belonging to one group or the other. Interestingly, identifying yourself as a group member influences your perception and cognition, and it also influences your attitude towards the members of the same group (called in-group members) and – more importantly for the present context – towards members of different groups (called out-group members).

In the present chapter, we will present an overview of the findings about group categorization and its influence on the relationship between in-group and out-group members. The focus thereby will be on the most popular experiments and definitions, and on those most relevant for the topic of the thesis; an extensive overview covering all points of discussion and competing definitions would be beyond the scope of this work (for an overview see, for example, Allport, 1954; Brown, 1995; Dovidio, Glick, & Rudman, 2005; Petersen, & Six, 2008).

It has repeatedly been shown that humans constantly categorize others and themselves into groups on the basis of visible (e.g., skin color) or invisible features (e.g., voting behavior); it has been argued that this process helps to organize the social environment (e.g., Allport, 1954; Turner, Hogg, Oakes, Reicher & Wetherell, 1987). This occurrence of categorization can be demonstrated – amongst others – with the so-called "Who said what" paradigm (Tyler, Fiske, Edcoff, & Ruderman, 1987): In an experiment employing this paradigm, participants see photographs of individuals combined with statements by these persons. These individuals are members of different social categories (e.g., gender, ethnicity, sexual orientation, etc.). However, this group membership is – if at all – only casually mentioned and not task relevant. Subsequently, after this presentation phase, the statements and photographs are shown again, but this time separately. The task of participants is to indicate which statement was uttered by which individual in the previous presentation phase. The errors occurring in this recall test can be classified into two kinds:

Within-category errors and between-category errors. Within-category errors refer to confusions within one social category, meaning that a statement was ascribed to a person who did not utter it but belongs to the same category as the actual speaker. Between-category errors are confusion between speakers of different categories meaning that a sentence, which was actually said by a member of one category, was erroneously assigned to a speaker of the other category. Typically, within-category errors are much more frequent than between-category errors. This has been demonstrated for many different categories in numerous experiments (e.g., Judd, & Park, 1988; Gawronski, Ehrenberg, Banse, & Klauer, 2003; Klauer, Wegener, & Ehrenberg, 2002; Strangor, Lynch, Dua, & Beth, 1992; see Klauer & Wegener, 1998, for an overview) and supports the notion that humans categorize others into groups.

The process of categorization is not only helpful in organizing the environment but also influences the relationship between humans. It has been repeatedly shown that group situations typically lead to liking of in-group members and (at least relative to the in-group) disliking of out-group members (e.g., Fazio, et al., 1995; Greenwald, McGhee, & Schwartz, 1998; Tajfel, Billig, Bundy, and Flament, 1971; Tajfel, & Turner, 1986). In a classic experiment conducted by Tajfel and colleagues (1972), for example, pairs of paintings from Klee and Kandinsky were shown to a group of pupils without informing them which paining was created by which artist; they were only asked to indicate which one of the two they preferred. Afterwards, the pupils received an ostensible feedback telling them that they either belonged to the group of people which preferred Klee or to the one which preferred Kandinsky. No further information about the Klee- or Kandinsky-lovers was given. However, through this simple manipulation, two groups were created. Subsequently, the pupils completed another task in which they allocated rewards and punishments to members of the respective in-group and out-group. These allocations did not affect their own outcome. The results show that the pupils assigned more rewards and fewer punishments to in-group compared to out-group members. Furthermore, when given the chance to either maximize their in-groups' but also the out-groups' outcome or to maximize the difference between the rewards allocated to the in-group and the out-group, they chose the

second option even if this meant assigning less outcome to their in-group. Importantly, all these effects occurred even though group membership was only established after the arrival to the lab and based on an arbitrary feature. This in-group favoritism has been repeatedly shown and can be seen as an automatic process which is not based on conscious reasoning (e.g., Otten & Wentura, 1999). This has been demonstrated with experiments employing an evaluative priming task (see Chapter 2.1 for a detailed description of the procedure): In these experiments, participants completed a minimal group manipulation similar to that employed by Tajfel and colleagues (1971). Subsequently they worked through an evaluative priming task with the category labels and unambiguous positive and negative words as primes and positive and negative words as targets. The results show that the labels describing the respective in-group and out-group category (primes) speeded the categorization of positive and negative words (targets) just as unambiguously positive and negative words did. Importantly, in these experiments, the primes were subliminally presented so that participants were not able to consciously process them. These results show that the in-group and its respective members automatically elicit a positive evaluation whereas the out-group and its members automatically elicit a negative one.

Both the finding that humans repeatedly and automatically categorize themselves and others into groups, as well as the finding that group membership influences the relationship between group members are very important for the arguing of the present thesis: They allow us to predict that our participants will categorize the expressers of emotional expressions into in-group and out-group members, even if group membership is not task relevant. Moreover, and even more importantly, they let us assume that the group membership of the expresser then influences the reactions to emotions because it influences the relationship between expresser and perceiver of an emotion. We assume that – depending on the relationship between expresser and perceiver of an emotion – the same emotional expression will be interpreted as signaling a different intention and will consequently activate a different reaction.

2 Affective reactions to emotions

The question of how humans react to emotions of others has been a subject of interest in many fields of psychology (e.g., evolutionary psychology, developmental psychology, cultural psychology, social psychology). With this question, the focus in emotion research has moved from the expresser of the emotion to the perceiver (Hess, Philippot, & Blairy, 1998). Examining reactions of others to emotional expressions is of big interest because the results can tell us something about the function of emotions for the individual as well as for the dyad (Keltner & Gross, 1999).

This chapter will give an overview of research examining affective reactions to expressions of emotions. The chapter thereby covers three broad research areas, namely mimicry and mood contagion, priming, and approach and avoidance behaviors. With *affective reactions* we refer to responses to the stimuli that are directly associated with the valence or emotion specific content of the emotional expressions, such as evaluations, facial muscle activity, or approach and avoidance reactions. Studies looking at dependent variables that are only indirectly associated with the valence or emotional content (e.g., reaction times in cueing experiments and visual search) were excluded[2]. Moreover, the chapter will only cover reactions that are assumed to occur – at least in part – automatically. That means that many studies whose results are based solely on self-report will not be described.

An *automatic* process is usually defined through the presence of one or more separate features such as fast, efficient, unconscious, unintentional, uncontrolled, goal independent, autonomous, and purely stimulus driven (e.g., Bargh, 1994; Moors & De Houwer, 2006). Even though there is some debate about the conceptual overlap of these features, research suggests that a distinction is feasible (Moors & De Houwer, 2006). Automaticity can therefore be established by introducing conditions that hinder non-automatic processes,

[2] By employing the term affective reactions we do not want to suggest that these reactions are necessarily associated with affective feeling states, even though some might be. We chose the term to imply that the respective reactions are affective or emotional in nature, rather than cognitive. We are, however, aware that drawing a distinction between cognition and emotion is also problematic (see Eder, Hommel, & De Houwer, 2007; Moors, 2007).

for example by forcing participants to speedy answers, by making critical features task irrelevant, or by heightening the motivation of participants to control their responses. If an effect occurs under such conditions, it is most likely that it is (at least in regard to the intended feature of automaticity) automatic. In the framework of this thesis we will call a process automatic even if only one of the features listed above is given. When referring to the process driving the results of our experiments, we will use automatic in the sense of unintentional, goal independent and (to a lesser extent) uncontrollable. In the context of the theoretical overview, we will specify to which component of automaticity we refer to.

However, before giving an overview of studies examining affective reactions to emotions, we will define the use of the terms *emotion* and *expression of emotion* in this thesis because these terms will be repeatedly employed. Furthermore, some information about theories of emotion and its functions are given.

2.1 Defining the subject

Emotions are a part of our everyday life and people continuously talk about them. However, even though most people seem to understand what the communication partner refers to when employing the term *emotion*, there are various different definitions of emotions. Within the scope of this thesis we will adopt a component oriented view which states that there is not one single "thing" which is an emotion. Rather, emotions can be described as "an episode of interrelated, synchronized changes in the states of all or most of five organismic subsystems (cognition, neurophysiological support, motivation, motor expression, subjective feeling)" (Scherer, 2005, p. 696). This definition therefore states that emotions consist of several components. The subjective state, which is often used synonymous to the term emotion in everyday theories, is only one of them. This multi-component view is shared by many researchers (see also Frijda, 1986; Leventhal & Scherer, 1987). It assumes that these components can, but do not need to, be activated at the same time. This notion is supported by experiments conducted in the laboratory which find that

the components of an emotion do not always cohere (e.g., Bradley & Lang, 2000). Why the components of an emotion are not always synchronized is subject to some debate: The role of social norms as well as the unnatural situation in the laboratory has been discussed here (see Niedenthal, Krauth-Gruber, & Ric, 2006). However, research shows that people associate the components with each other and can also allocate them to the respective emotional label: People reliably recognize the subjective emotional feeling from facial expressions (e.g., Ekman, 1972; Ekman, Sorenson, & Friesen, 1969; Izard, 1971) and assign the respective expression to the subjective feeling (e.g, Ekman, 1973) They are also able to indicate which motivation is signaled by a facial expression of emotion (e.g., Horstmann, 2003; Yik & Russell, 1999).

Once we have defined the subject of interest, the next question arises: Why do we experience and express emotions? Are emotions functional? Again, there is a debate regarding the answer to this question which ranges from the view that emotions have no function at all, to the perspective that they once had an adaptive function which they no longer hold, on to the notion that they serve the same purpose as they did when they evolved (e.g., Keltner & Gross, 1999; Niedenthal, et al., 2006). This later view is now shared by most scholars in the field of emotion (Niedenthal, et al., 2006) and supported by many studies. These find that emotions are functional for the individual, the dyad and the group (for an overview see Keltner, & Haidt, 1999). In the context of this thesis, however, only the function of emotions for the dyad is of interest since this is most relevant for the topic of the thesis: It has been argued that emotions and their expressions inform the opponent (the perceiver) about the feelings, the intentions as well as the orientation towards the relationship of the person experiencing and showing the emotional expression (the expresser) as well as about dangers and benefits in the environment (see Keltner & Haidt, 1999 for an overview). A fearful expression, for example, signals that the expresser feels frightened, has the intention to flee and feels low dominance. It also indicates that there is danger in the environment and therefore acts as a warning. These different messages and functions will be further addressed in Chapter 3.3.

The functionality of emotions for the interaction partner though depends on his ability to recognize the emotion of the expresser. This brings us to the topic of *facial expressions of emotions*, because these constitute one important way of communicating the emotion. Facial expressions of emotions can be allocated to the motor expression component of an emotion. It has been repeatedly argued that there is a limited number of facial expressions of emotions which are shared by all humans (eg., Ekman, 1992; Frank & Stennett, 2001; Izard, 1971; Matsumoto, 1990). This view, known as universality hypothesis, has been supported by cross-cultural studies finding recognition rates for emotional expressions in secluded cultures that were comparable to those of western cultures (e.g., Ekman, 1972, Ekman, et al., 1969; Izard, 1971). Inhabitants of Papua New Guinea, for example, who were asked to match photographs of facial expressions to a short vignette describing an emotional event, selected the same expressions as did inhabitants from western cultures (Ekman, 1973). Those expressions which are reliably recognized across cultures are labeled basic emotions. There is relatively high consensus that these are happiness, surprise, fear, anger, sadness and disgust (see Figure 1 for examples for these expressions). Contempt, interest, shame and embarrassment have been additionally suggested by other researchers (e.g., Ekman, 1992; Izard, 1971; Keltner, 1995).

However, even though the cross-cultural studies show that there are emotions that are universally recognized, recognition rates vary between cultures (e.g. Elfenbein & Ambady, 2002) and there are also culture specific interpretations of certain expressions (Haidt & Keltner, 1999). Therefore, most researchers acknowledge that culture influences the expression of emotion.

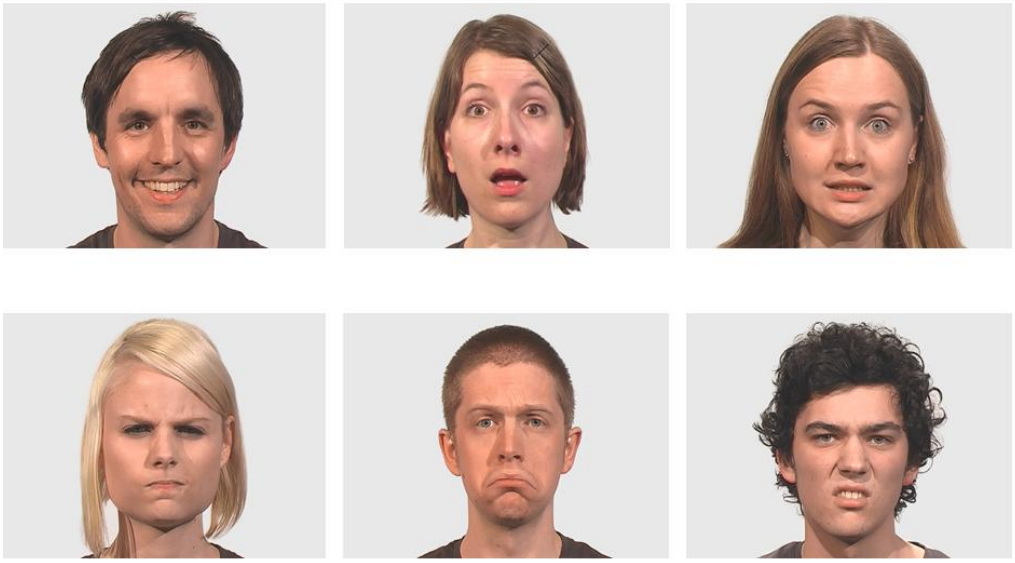


Figure 1 *Examples for the basic emotional expressions happiness, surprise, fear, disgust, sadness and anger (clockwise). Taken from Paulus, Rohr, Neuschwander, et al., 2012.*

This leads to another question (which is also related to the discussion regarding the function of emotions): What do facial expressions of emotions express? Do they signal the subjective component of the emotion (i.e., the feeling) or a social motive (i.e., intention, orientation towards relationship, information about environment)? To cut a long story short, both views have been supported by empirical results. On one hand it was found that participants' facial reactions correlate with their emotional states (e.g., Ekman, Friesen, & Ancoli, 1980; Cacioppo, Bush, & Tassinary, 1992), which supports the view that emotional expressions are a "read out" of subjective states. On the other hand, the occurrence and intensity of emotional expressions are also influenced by social motives such as the relationship between expresser and perceiver (e.g., Lanzetta & Englis, 1989; Likowski, Mühlberger, Seibt, Pauli, & Weyers, 2008) or the nature of the situation, for example its sociality (e.g., Buck, Losow, Murphy, & Costanzo, 1992; Hess, Kappas, & Banse, 1995; Wagner, & Smith, 1991), or if it is competitive or cooperative (Weyers, Mühlberger, Kund, Hess, & Pauli, 2009). Additional support for the notion that facial expressions of emotions signal a feeling as well as a social motive stems from the finding that people agree in assigning emotional labels as well as

behavioral intentions to facial emotional expressions (e.g., Horstmann, 2003; Yik & Russell, 1999).

In the empirical studies conducted for this thesis, mainly visual signs of emotions (i.e., facial expressions) were used. Therefore, we have to address one problem which arises when employing emotional expression as stimuli: Since people not only reliably recognize the subjective feeling (e.g., Ekman, 1972) but also the motivation (e.g., Horstmann, 2003; Yik & Russell, 1999) associated with the respective emotion from emotional expressions, one can hardly discern which component of an emotion triggered the measured response. Therefore, it is possible that reactions to emotions are not solely triggered by the facial expression per se but by other components of an emotion, even though these are not presented. This question has hardly been addressed with empirical methods. Only few of the recent approach and avoidance experiments try to shed some light on this question. Wherever available, results that allow drawing conclusions on the triggering component will be introduced.

2.2 Empirical findings

In the course of this chapter, empirical studies which examined automatic affective reactions to emotional expressions will be presented. This overview will first describe findings regarding mimicry and mood contagion, then those from priming experiments. Finally, studies employing approach and avoidance paradigms will be presented.

2.2.1 Mimicry and mood contagion

Affective reactions to expressions of emotions have often been examined in experiments looking at mood contagion and mimicry. The term *mood contagion* (also termed emotional contagion, affective contagion, emotional resonance) describes the transfer of an affective state from one person to another (e.g., Neumann & Strack, 2000). As a result, the perceiver

experiences the same mood or emotion as the expresser. *Mimicry* refers to the (conscious or unconscious) imitation of another person in regard to his/her posture, behavior or emotional expression (e.g., Chartrand, Maddux, & Lakin, 2005). In the context of this thesis, the overview of studies examining mimicry will be limited to those that study the imitation of emotional expressions. Mood contagion and mimicry were often seen as closely related concepts and defined in overlapping terms (e.g., Hatfield, et al., 1992). However, in more recent studies, mood contagion is used to describe an affective state (i.e., the subjective feeling component) whereas mimicry refers to the expressive behavior (i.e., the motor expression component; see Hess & Blairy, 2001; Neumann & Strack, 2000). Mimicry and mood contagion will be reported together in this chapter because many theories assume that mood contagion is caused by mimicry.

Mood contagion effects showing that humans experience a concordant affect after interacting with an emotionally attuned person have repeatedly been reported (for an overview see Hatfield et al., 1992; Hatfield, Cacioppo, & Rapson, 1993). However, even though it has been argued in many studies that mood contagion occurs without intention, most studies failed to test this assumption (Neumann, & Strack, 2000). This was finally accomplished by the study conducted by Neumann and Strack. In this study a situation was created in which the emotional experience of the other person was barely noticeable; then it was assessed if mood contagion occurred nevertheless. The logic was simple: If mood contagion occurs even though participants do not consciously recognize the emotional experience of the other person, then an intentional process cannot be responsible for this effect. In a number of experiments the authors measured mood contagion after participants had listened to emotionally colored voice samples. Importantly, the emotional coloring of the tone was so subtly manipulated that it was not apparent to participants who were not instructed to recognize the emotion expressed by the speaker but could be recognized by participants who were instructed to pay attention to the emotional coloring. Neumann and Strack found that participants reported a more positive mood after listening to happy voice samples compared to sad ones. This finding shows that mood contagion effects can occur in situations in

which the perceiver of the emotional expression does not recognize the emotion consciously and has no intention in experiencing the same emotion as the expresser.

Mimicry has also been examined for many years now. The results of numerous studies show that humans tend to react with concordant muscle activity when watching facial expressions of emotions (e.g., Dimberg, 1982; Dimberg, 1990; Lundquist, & Dimberg, 1995). Images of smiling individuals, for example, reliably elicit an activation of the *Zygomaticus Major* muscle which lifts the corner of the mouth in a smile, whereas the presentation of angry faces activates the *Corrugator Supercilli* muscle which pulls the eyebrows together in a frown. In most of these studies examining facial mimicry, muscle activity was recorded with facial Electromyography (EMG), a method which measures the activity of the facial muscles with the help of small surface electrodes that are attached to the skin above the muscles and connected to an amplifier and recorder.

The imitating reactions to emotional expressions are assumed to occur reflex-like and automatically. This assumption is supported by studies finding mimicry effects even if participants are instructed to inhibit their reactions (Dimberg, et al., 2002) or in cases in which the emotional faces were presented under conditions of limited awareness (Dimberg, Thunberg, & Elmehet, 2000). In the experiments conducted by Dimberg and colleagues (2000), images of angry, happy and neutral expressions were presented for 30 milliseconds and masked by a neutral expression for 5 seconds. A pretest had shown that these conditions prevent the recognition of the emotional expressions. Interestingly, the participants nevertheless reacted with a concordant muscle activity. The *Zygomaticus Major* muscle showed stronger activation after the presentation of happy faces compared to angry and neutral faces. The *Corrugator Supercili*, on the other hand, showed more activation after the presentation of angry compared to happy and neutral expressions. This finding is a strong support for the automaticity of facial mimicry.

It has been argued that facial mimicry is caused by the wish to affiliate (e.g., Chartrand & Bargh, 1999; Chartrand, et al., 2005; Lakin & Chartrand, 2003; Lakin, Jefferis, Cheng, & Chartrand, 2003). Indeed, studies show that

that the nature of the relationship between expresser and perceiver of an emotion influences mimicry: Disliking the other or being in a competitive relationship diminishes the imitation reaction (e.g., Lanzetta & Englis, 1989; Likowski, et al., 2008; Weyers, et al., 2009). Additionally, it was found that people are liked more if they mimic others' smiles (Van der Velde, Stapel, & Gordijn, 2010). The findings that mimicry reactions are influenced by social factors contradict the notion that mimicry reactions constitute a reflex-like process. Accordingly, there is now a discussion going on regarding the processes underlying facial reactions to emotions (e.g., Likowski, Mühlberger, Seibt, Pauli, & Weyers, 2011).

One point of this discussions concerns the question if facial reactions to emotional expressions are triggered by the subjective feeling or the intention signaled by the emotional expression. One hint to this question stems from a study conducted by Moody and colleagues (Moody, McIntosh, Mann, and Weisser, 2007): They examined facial reactions to emotional faces after a fear induction and found enhanced fear reaction to angry facial expressions compared to neutral ones. This finding shows that facial reactions to emotional expressions might be part of an affective process and – most importantly – that they are triggered (maybe amongst others) by the intention signaled by the facial reaction, in this case the intention to attack signaled by an anger expression. This result is further supported by the finding that divergent reactions to emotional expressions (i.e., a relaxation of the C*orrugator Supercilli* muscle in response to angry and sad expressions) are mediated by affective reactions, like the feeling of joy (Likowski, et al., 2011).

Regarding the relationship between mood contagion and mimicry, many theories assume that mood contagion is caused by mimicry via a feedback process (e.g., Hatfield et al., 1992; Lipps, 1907; Neumann & Strack, 2000). This arguing is supported by studies showing that adopting postural and facial expressions can influence subjective feeling states (e.g., Stepper & Strack, 1993; Strack, Martin, & Stepper, 1988). Participants in the study by Strack and colleagues, for example, rated comic strips as more funny when holding a pen between their teeth in a way that the *Zygomaticus Major* muscle was activated, compared to holding a pen such that the *Zygomaticus Major*

muscle was inhibited or holding no pen at all. Accordingly, it has been argued that mimicking facial expressions will lead to the respective emotional feeling, ergo to mood contagion.

However, even though the reasoning is convincing, studies yield mixed results. Support for the notion that mimicry causes mood contagion is found in one of the studies conducted by Neumann and Strack (2000) (see beginning of this chapter for a description of the other studies). In order to examine if a mimicking process was responsible for the mood contagion effect that occurred after participants listened to emotionally colored voice samples, the authors had participants vocally copy these voice samples. The copying was recorded and later replayed to a second sample of participants which rated the emotion of the copiers. The results show that the participants who had copied the happy voice sample were judged as being happier and less sad than participants who had copied the sad voice sample. This finding was interpreted as supporting the notion that mimicry causes mood contagion. However, examining mimicry and mood contagion after the exposure to emotional facial expressions, Hess and Blairy (2001) found significant mimicry as well as mood contagion effects but no correlation between these two measures. Participants in their study watched short video clips of relatively weak and idiosyncratic dynamic facial expressions of sadness, anger, disgust and happiness and indicated after each video clip which emotion was expressed and how they felt. Results show that displays of sadness, anger and happiness were mimicked and that displays of sadness and happiness also elicited a concordant affect in participants. These measures, however, were not correlated. This result is interpreted as contradicting the notion that mimicry causes mood contagion (e.g., Lishner, Cooter, & Zald, 2008; McIntosh, 2006; Van der Schalk, et al., 2011).

Taken together, it has repeatedly been demonstrated that humans experience a concordant affect after being exposed to an emotional other and that they also show concordant facial reactions. There is some support for the notion that these are signs of an affective reaction to the intention signaled by the emotional expression. Both processes can occur automatically. The connection between these two concepts, however, is still unclear.

2.2.2 Priming with emotional expressions

Automatic affective reactions to expressions of emotions are also often examined in studies employing priming paradigms related to the classical affective priming paradigm. In these paradigms, broadly spoken, two stimuli are presented consecutively, the prime – an emotional expression in this case – and the target. Typically, the participants' task is to ignore the prime and to respond to the target only. The required response is mostly an evaluation of the target. Of interest is if and how the prime influences this evaluation.

Originally developed to examine the representation of attitudes (Fazio, Sanbonmatsu, Powell, & Kardes, 1986), this priming procedure has been employed to examine reactions to emotional expressions for nearly two decades now. Typically, it is labeled affective priming or evaluative priming in the literature. However, two different kinds of paradigms hide beneath this label. Whereas in experiments of the one kind unambiguously positive and negative stimuli are employed as targets and the required response is a categorization of the valence or the emotion (e.g., Carroll, & Young, 2005; Pell, 2005; Rohr, Degner, & Wentura, 2012), in experiments of the other kind ambiguous images constitute the targets and the task of participants is to rate the valence or the pleasantness of the image along a continuous dimension or with a dichotomous response (e.g., Li, Zinbarg, Boehm, & Paller, 2008; Murphy, & Zajonc, 1993; Sweeny, Grabowecky, Suzuki, & Paller, 2009). Both procedures examine the response to the target as a function of the prime; the exact logic of the respective paradigm, however, is quite different. It will be described in more detail below. However, by looking at the reaction to the target, both paradigms examine the hypothesis that the valence or the specific emotional content of emotional expressions is processed automatically (i.e., unintentionally and maybe unconsciously) and that this processing influences consecutive responding. Since they are both often labeled affective priming in the literature, we will refer to the former procedure as evaluative priming and

to the later as affect misattribution procedure[3] to avoid confusion. We will first present results obtained with evaluative priming paradigms and subsequently those obtained with the affective misattribution procedure.

The dependent variable in experiments employing an evaluative priming paradigm is typically the speed or accuracy of the categorization response. It is examined as a function of the prime: It has been argued that responses should be faster if prime and target display the same valence or emotion (congruent trials), compared to if prime and target differ along the critical dimension (incongruent trials). This arguing is based on the assumption that the valence or even the specific emotional content of the prime is automatically extracted and triggers the consecutive response (called response priming; Klauer, Roßnagel, & Musch, 1997; Wentura, 1999). The dependent variable of interest, namely the reaction time or accuracy, is thereby only a by-product of the exact task participants' are following. The assumption that the valence of the prime influences the performance to the target is supported by studies employing evaluative priming paradigms. They were able to show that participants are faster in categorizing positive targets after the presentation of positive emotional expressions and negative targets after the presentation of negative emotional expressions compared to cases in which the valence of prime and target did not match (e.g., Andrews, Lipp, Mallan, & König, 2010; Lipp, Price, & Tellegen, 2009). This effect was also present with inverted faces, showing that the recognition of emotional faces does not depend on holistic processing (Lipp, et al., 2009). Sometimes even emotion specific priming effects were found: Participants were faster in categorizing the specific emotion of a facial expression or word after the respective emotional expression was presented compared to if prime and target showed a different emotional expression (Carroll, & Young, 2005, Rohr, et al., 2012). This effect also occurred across modalities with auditory primes and visual targets (Pell, 2005). Taken together, these results support the notion that the valence as well as the emotional content of the prime are excerpted and influence the

[3] We chose the term affect misattribution procedure because Payne, Cheng, Govoron, & Stewart (2005) chose this term for a related procedure designed to measure implicit attitudes.

consecutive responses even if the task is to ignore the prime (i.e. unintentional processing of the prime).

However, it has been argued that emotional expressions should not only influence reactions unintentionally, but also in cases in which the prime is presented outside of conscious awareness (i.e., subliminal). Such a condition is usually created by employing a very short prime presentation and a masking of the prime. Some experiments examining this question found a priming effect under conditions of limited prime awareness (Rohr, et al., 2012; Neumann, & Lozo, 2012) whereas others failed to show priming (Andrews et al., 2010). What also remains unclear is if emotion specific priming effects can be observed if the prime is presented subliminally: Whereas Neumann and Lozo observed significant emotion specific priming effects, Rohr and colleagues found results suggesting that the valence as well as the relevance (i.e., whether the emotion expressed was mainly relevant for the expresser or for the perceiver) of the emotion prime influenced reactions to the target but not the specific emotional content. Taken together, results from studies examining the influence of emotional expressions with evaluative priming paradigms show that emotional expressions are processed automatically and trigger concordant reactions. What remains unclear is whether these also occur if the prime is presented unconsciously and if emotion specific priming effects can be observed under conditions of limited awareness.

In experiments examining the influence of emotional expressions with the affective misattribution procedure, the rating of the valence or pleasantness of an ambiguous target (e.g., unknown Chinese character, surprise facial expression) constitutes the dependent variable. In contrast to the evaluative priming task, the variable of interest is therefore the direct response given by the participant and not a by-product of the task. The process which is assumed to underlie the effect is misattribution: It is suggested that the valence of the prime will be misattributed to the target, influencing its evaluation. Positive facial expression should therefore lead to a more positive rating of the target than a negative facial expression. This is exactly what has been found in many studies (e.g., Murphy, & Zajonc, 1993; Rotteveel, de Groot, Geutskens, & Phaf, 2001; Li, et al., 2008). Interestingly, and in comparison to studies

employing the evaluative priming paradigm, in most of these studies priming effects were observed even if the target was presented subliminally. The effect even seemed to be stronger under subliminal than under supraliminal conditions (Rotteveel, et al., 2001) and effect occurred mainly for participants who were not able to process the prime consciously (Sweeny, et al., 2009).

Taken together, reactions to emotional expressions were examined with various priming experiments. The findings support the notion that emotional expressions are processed automatically (unintentionally and sometimes even unconsciously) and influence subsequent responses in a concordant way.

2.2.3 Approach/avoidance experiments

Affective reactions to emotional expressions are also examined by experiments which examined approach and avoidance reactions to emotional expressions. It has often been argued that humans are motivated to approach positive states and avoid negative ones (e.g. Darwin, 1872; Lang, Bradley, & Cuthbert, 1990; Cacioppo, Gardner, & Berndson, 1997; Davidson, Ekman, Saron, Senulis, & Friesen, 1990). Accordingly it has been shown that positive stimuli elicit approach related behaviors whereas negative stimuli elicit avoidance related ones (Cacioppo, et al., 1997; Chen & Bargh, 1999; Solarz, 1960). For example, participants were faster to pull a lever towards themselves in response to positive words than to push it away. The reversed pattern was observed for negative words (Chen & Bargh, 1999). Such effects have been explained assuming a direct link between evaluative processes and the appetitive and defensive motivational systems by which evaluations automatically trigger the associated behavior (Bargh, 1997; Cacioppo, et al., 1997; Lang, et al., 1990; Neumann, 2003; Neumann, Förster, Strack, 2003). It has been argued that approach and avoidance behaviors serve an adaptive function since they help the individual to attain the most beneficial outcome. Following this rationale, it has been argued that positive emotions should elicit an approach related behavior, whereas negative emotions should elicit an avoidance related one.

Exactly this pattern was found by a number of researchers (Rotteveel & Phaf, 2004; Seidel et al, 2010; Stins, et al., 2011, Marsh, et al., 2005). In the study conducted by Rotteveel and Phaf, for example, participants had to push buttons that were perpendicularly aligned on a stand above and below a "home" button. Participants were instructed to categorize angry and happy faces appearing on the computer screen according to the emotional expression. The results show that an arm flexion – which is normally associated with an approaching behavior – was executed faster if the stimulus was a happy expression compared to an angry one. Arm tensions – typically associated with an avoiding behavior – were faster when categorizing angry expressions compared to happy ones. Interestingly, these results were only obtained in an experiment in which the emotional expression was task relevant. If the task was to categorize the gender of the face, no influence of emotional expression on behavioral reactions emerged. An influence of angry and happy facial expressions was also found if the approach avoidance reactions were executed with the whole body: In the study by Stins and colleagues, for example, participants were faster in initiating a step towards a happy face compared to an angry face.

However, even though the result that negative expressions elicit an avoidance reaction are intriguing, other studies reported an approach related behavior to negative expressions such as anger (Wilkowski & Meier, 2010) and fear (Marsh, et al., 2005). These converging results can no longer be explained by the valence of the emotional expression. Instead, they were explained as being caused by the behavioral intention signaled by the emotional expression. As introduced above, facial expressions of emotions not only communicate affective information but also the expresser's behavioral intention. Since behavioral approach and avoidance behaviors serve an adaptive function, it has been argued that behavioral reactions to emotional expressions are mainly influenced by these intentions, and not by the affective information (e.g. Marsh, et al., 2005; Wilkowski & Meier, 2010; Seidel et al, 2010.). This theoretical arguing is further supported by the results of a study which found that approaching behaviors are amplified by situational circumstances supporting this behavior. Wilkowski and Meier (2010) demonstrated that anger

leads to approach reactions particularly in situations in which this behavior is successful in overcoming the challenge implied by the angry expression. If the behavior is not successful in overcoming the challenge, an approach behavior is less likely. In their study, the authors manipulated the outcome that followed the reaction to an emotional expression: The anger expression changed to a happy or a fearful expression after the movement was initiated. The results show that approach related behaviors to angry expressions were faster if the anger expression changed to a fearful compared to a happy expression after the execution of the movement. The authors argue that the change from anger to fear signals submission of the expresser and therefore constitutes a success in overcoming the challenge signaled by the anger expression. On the contrary, the change from anger to joy signals high dominance and well-being of the expresser and therefore failure in overcoming the opponent. This results therefore demonstrates that it is actually the intention signaled by the emotion following the anger expression and not the valence of it that triggered the approach behavior. If valence was the critical factor, fear as a negative emotion would inhibit the approaching behavior whereas happiness as a positive emotion would facilitate it.

If approach and avoidance reactions to emotional faces constitute a truly automatic process has not (yet) been thoroughly examined. However, it has been argued that the influence of emotional expression on these behaviors should be automatic because studies examining approach and avoidance behaviors to generally valent stimuli found an influence of valence even if it was not task relevant (e.g., Chen & Bargh, 1999; Duckworth, Bargh, Garcia, & Chaiken, 2002; Krieglmeyer, Deutsch, & De Houwer, 2010). However, the only study (that we know of) that examined if emotional expressions influence approach and avoidance reactions even if they are not task relevant, failed to find significant effects (Rotteveel & Phaf, 2004). Therefore, even though we cannot finally conclude that approach and avoidance behaviors to emotional expressions are based on an automatic process, there is reason to believe that they can occur automatically.

Taken together, whereas all studies that we know of found an approach related behavior to happy expressions, the results regarding approach and

avoidance reactions to negative emotional expressions are rather mixed. Whereas some studies show an activation of avoidance behavior by negative emotions, there are some results suggesting that negative emotions (especially anger) can also elicit an approaching behavior. However, all researchers agree on the notion that approach and avoidance behaviors serve an adaptive function and the more recent studies also suppose that these behaviors are caused by the intention rather than the affect signaled by the emotional expression. Furthermore, it can be assumed that these reactions occur automatically, even though this assumption lacks definite evidence.

2.2.4 Summary

The influence of emotional expressions on affective reactions has been examined in various experiments employing different paradigms. Most results support the notion that humans react with concordant reactions to emotions of others: Priming experiments employing emotional expressions as primes found that those speeded the categorization of concordant targets and biased the ratings of ambiguous ones in a corresponding way. Experiments looking at mood contagion showed that emotional expressions induce a concordant mood or emotional experience in others. Additionally, it was shown that emotional expressions reliably elicit concordant facial reactions in the observer. Importantly, all of these effects can occur automatically, that is without intention and sometimes even without a conscious perception of the emotional expression.

Shedding light on the question which component of the emotion triggers the reaction of the expresser stems for experiments looking at approach and avoidance reactions to emotional expressions: Whereas happy expressions reliably elicit a concordant approach behavior, angry and fearful faces can activate an approach as well as an avoidance reaction. It has been shown that situational cues as well as the outcome of the behavior influence which reaction occurs. These divergent reactions have been explained as being caused by the intention signaled by the emotion. The notion that reactions to emotional expressions are triggered by the intention and not by the valence or the

emotional experience of the expresser is (alone) also supported by an EMG study finding fear reactions to anger expressions (Moody, et al., 2007).

Taken together, the results obtained from many experiments show that humans automatically react to emotional expressions of others. These reactions are often concordant to the expressed emotion and not only influenced by the valence of the emotion but also by the specific emotion and the intention associated with it.

3 The influence of group membership on affective reactions to emotions

The previous chapter presented evidence that humans automatically react to emotions expressed by others. Most of the times, these are concordant affective reactions: Positive emotional expressions speed up reactions to positive targets compared to negative ones, bring about positive ratings of ambiguous stimuli and result in an activation of the *Zygomaticus Major* muscle which is involved in smiling. Analogous results were obtained with negative emotional expressions. Explaining these findings, it has been argued that these reactions are (at least in part) triggered by the intention signaled by the emotional expression. The results from approach and avoidance experiments as well as facial mimicry support this assumption.

The arguing that concordant affective reactions are triggered by the intention signaled by an emotional expression suggests that each emotion signals one specific intention, which then triggers a corresponding reaction. However, we argue – as was already argued in the introduction – that the same emotional expression can be interpreted as signaling different intentions. A happy facial expression, for example, might be seen as signaling a wish for affiliation, but can also interpreted as a sign of dominance or arrogance. Whereas a concordant reaction constitutes an adaptive reaction in the former case, a divergent reaction might be more sensible in the later. We argue that the interpretation of the intention of an emotion depends on situational and social factors. Such a social factor might the relationship between expresser and perceiver of the emotion. If this relationship is negative, the intention of the emotional expression will be interpreted in the light of this hostile relationship. On the contrary, if the relationship is friendly and cooperative, the intention will be seen in the corresponding light. Accordingly, the happy expression will be interpreted as signaling dominance or arrogance if the relationship is negative but interpreted as signaling a wish for affiliation if the relationship is positive. Since affective reactions to emotional expressions are influenced by the intention signaled by the emotion, we argue that divergent affective reactions to emotional expressions should occur if the relationship between the

expresser and the perceiver is negative and concordant reactions if the relationship is positive.

One factor which influences the relationship between individuals is group membership (see Chapter 1): Whereas in-group members are typically evaluated positively and resources are cooperatively shared between members of the same group, out-group members are typically negatively evaluated and individuals will try to minimize the resources allocated to out-group members (e.g., Fazio, et al., 1995; Greenwald, et al., 1998; Tajfel, et al., 1971; Tajfel, & Turner, 1979). Following these findings and our arguing above, we assume that in-group and out-group members' emotional expressions elicit different affective reactions because they influence which intention is inferred from the emotional expression. It was one of the main goals of this thesis to (a) show an influence of group membership on affective reactions to emotions and to (b) provide evidence that this effect is caused by a different interpretation of the intention signaled by an emotional expression.

Importantly, we assume that the influence of group membership on affective reactions to emotional expressions occurs automatically, that is, unintentionally and maybe even uncontrollable. It was the second goal of this thesis to test this hypothesis.

In the following paragraphs, we will first present an overview on studies in which the group membership of the expresser of an emotion was manipulated. This paragraph will be followed by a presentation of the mechanisms proposed as being responsible for the influence of group membership on reactions to emotions. In the last section, we will present our arguing that group membership influences affective reactions to emotions because it influences the interpretation of the intention signaled by an emotional expression in more detail.

3.1 Empirical evidence for an influence of group membership on affective reactions to emotions

Group membership influences reactions to emotions – evidence for this hypothesis will be presented in this section. The layout will thereby closely

follow that of Chapter 2.1: First, experiments examining the influence of group membership on mood contagion and mimicry will be presented, then those employing priming paradigms. Since no experiments (as far as we know) looked at the influence of group membership and emotional expressions on approach and avoidance reactions, this paragraph will be dropped.

In comparison to Chapter 2, the studies presented in this chapter were not solely selected based on the automaticity of the underlying process. The reason for this is that there are only a small number of studies which examined the influence of group membership on reactions to emotions. Out of these, only a few directly addressed the question of automaticity. However, since one of the main aims of this thesis is to examine if the interaction between emotional expression and group membership can influence reactions automatically, the extent of automaticity will be intensively discussed for each result. Furthermore, since many studies in this chapter are of high relevance for the ones conducted within the scope of this thesis, those will be described in more detail than the studies presented in the previous chapters.

3.1.1 Mimicry and mood contagion

Humans catch others' emotions and imitate emotional expressions – evidence for this was presented in Chapter 2.1. However, what happens if the emotional expression is shown by an out-group member? Will this expression also activate a concordant mood state and a facial muscle reaction? This question shall be answered in the following paragraph. Therefore, we will first present studies that looked at the influence of group membership on mood contagion, then those that measured facial mimicry. Finally, we will present one study that examined the influence of facial mimicry on mood contagion in the context of in-group and out-group emotions.

Mood Contagion. An influence of group membership on mood contagion (for a definition see Chapter 2.1) has been reported several times. The findings of those studies generally show that less concordant or even divergent affective reactions occur if emotions are expressed by out-group

members whereas emotions expressed by in-group members elicit concordant affective reactions (as discussed above). Interestingly, even completely divergent *emotional* (as opposed to affective) reactions have been reported as a response to out-group members' emotions, for example, the experience of *Schadenfreude* by Dutch participants after the loss of the Italian soccer team in the European Championship 2000 (Leach, et al. 2003; Leach, & Spears, 2009). Preceding this match, the Italian team had defeated the Dutch team in the semifinals and was therefore responsible for its exit. Interestingly, this emotional reaction did not only occur after loss of the direct rival Italy, but the Dutch participants also reported *Schadenfreude* over the defeat of the general rival Germany, a team against which the Dutch soccer team did not compete during this tournament[4]. The results from these studies provide first evidence that negative emotions can elicit positive (i.e., divergent) emotional reactions in others if they are experienced by members of an out-group. However, they are only of limited relevance for the present research question since there is no reason to believe that this effect occurred automatically: In the experiment, participants were given enough time to think about the constellation and their feelings, were (most likely) not motivated to hide their emotions towards the defeat of the rivals, and probably recognized the intent of the study. Another limitation is that no actual emotional expressions or notion of emotional experience of the expressers were presented; we can only assume that the *Schadenfreude* experienced by the Dutch participants was elicited by the presumed negative emotional experience of the out-group members. Therefore, the applicability of this result to our research question is limited.

However, there also are studies which examined the influence of group membership on mood contagion with more indirect manipulations or methods. One of these studies conducted by Weisbuch and Ambady (2008) also employed team allegiance to manipulate group membership; the assessment of mood contagion, however, was much more subtle: Participants read aloud a short story featuring a young man who was a supporter of one of two rival

[4] The German soccer team was eliminated by England before even reaching the quarterfinals. Even though Germany did not directly compete against the Netherlands, these two teams have always been strong rivals. Germany therefore constitutes a general rival who experienced a defeat and (most likely) negative emotions.

football teams (Red Sox or Yankees) and who experienced either a happy or fearful life event. All participants were supporters of one of the two football teams. Therefore, for them, the protagonist was either a member of the same or the rival group. During the readings, participants' voices were recorded. The valence of the voice recordings was later rated by another sample of participants. The results show an interaction between emotion and team allegiance. For the happy scenarios, the voices were rated as more positive if the protagonist was a supporter of the same team as the reader compared to if he was supporting the rival team. For the fearful stories, the voices were rated as more negative if the protagonist and the reader shared team alliance compared to if they supported different teams.

Similar results were found in a study reported in the same paper (Weisbuch, & Ambady, 2008) in which the emotional expression was more subtly manipulated but the assessment of mood contagion was much more direct. In this study, participants listened to a voice sample that was either spoken in a nervous or in a neutral way. In the voice sample, a male voice either stated that he was politically liberal or politically conservative and then indicated that he agreed with the respective party on many issues. The US-American participants were all Democrats. After listening to the voice samples, participants rated their emotional state on several emotional adjectives. Again, an interaction between emotion and group membership occurred: Participants reported feeling more anxious after listening to the nervous voice sample in which the speaker stated that he held a liberal political attitude compared to the one in which he stated that he was rather conservative. Self-reported fear did not differ after the neutral voice samples as a function of political attitude of the speaker.

A similar method to manipulate mood contagion was employed in a study conducted by Epstude and Mussweiler (2009; Study 2), which was part of a set of studies on comparison processes. In this experiment, participants were exposed to the images of emotional expressions shown by in-group and out-group members. Afterwards their current mood state was assessed. The emotional content of the images was not directly mentioned to the participants; their task was to rate the image quality of the pictures. In contrast to the group

manipulations reported above, group membership was operationalized through gender in this experiment. Accordingly, half of the images displayed the emotional expressions of females and the other ones expressions shown by males. Iin order to emphasize the intergroup situation, participants were asked to read a short paragraph describing the rivalry between men and women on the German job market before the image viewing procedure. The results show an influence of group membership on the mood ratings: If expresser and perceiver were of the same gender, positive emotional expressions elicited a more positive mood than negative facial expressions. If the gender of expresser and perceiver, however, differed, a divergent affect occurred. Positive emotional expressions elicited a significantly worse mood than negative emotional expressions.

The studies reported above provide evidence that group membership indeed influences mood contagion. Importantly, the results of these studies occurred even though neither group membership nor emotional expression was directly relevant for the ongoing task, pointing to an automatic process. However, after taking a close look at the exact methods employed, we think that the automaticity of the effect can be questioned. In all of these studies, the intergroup situation employed was very competitive. Furthermore, the social norm regarding these groups asked for an open expression of the sympathy and antipathy towards the expressers, not for an inhibition. For example, since there is a strong, openly expressed rivalry between the two soccer teams employed in the study conducted by Weisbuch & Ambady (2008), the participants might have felt pressed to express their sympathy or antipathy towards the respective team and intentionally altered their voices. This seems even more likely if one keeps in mind that participants read the story into a microphone knowing that somebody would listen to them later. Furthermore, because the participants were strong supporters of one or the other team, the team allegiance of the protagonist in the story was very relevant for them. This might have let them to pay extra attention to the emotion experienced by the “friend” or “rival”. The same argument applies to the other experiments which examined the influence of group membership on mood contagion, for example the one conducted by Epstude and Mussweiler (2009): Participants might have paid extra attention to

the gender of the expressers, especially since the rivalry between men and women affected them personally. The emotional expression might then have been evaluated in the light of this very competitive situation (e.g., "this man is smiling because he got the job *I* wanted") and thus activated a divergent affect.

Another criticism of both of the studies conducted by Weisbuch and Ambady (2008) is that the analyses do not allow for a direct assessment if emotional expressions de facto elicited concordant and divergent reactions as a function of group membership. Apart from the significant interaction term, only the direct contrast between the reactions to in-group and out-group expressions of the same emotion were reported (e.g., in-group/fear vs. out-group/fear). The simple tests comparing reactions to positive and negative emotions for the in-group and the out-group separately are missing (e.g., in-group/happiness vs. in-group/fear). Since no standard deviations are available in the paper, it is not possible to assess if in-group members' emotions actually elicited concordant reactions and – this point is maybe even more important – if emotions expressed by out-group members activated divergent ones. Therefore, it can only be concluded with certainty that out-group members' emotions attenuated emotional reactions compared to those of in-group members.

Taken together, a couple of studies show that mood contagion is influenced by the group membership of the person experiencing the emotion. Whereas emotions experienced by in-group members elicited concordant affective reactions in the observers, out-group members' emotions brought forth a divergent affective experience. However, even though (in some studies) precautions were taken to keep the likelihood of intentional processes low, all studies fail to show that this influence can occur truly automatically.

Mimicry. An influence of group membership on reactions to emotions has also been examined in the field of facial mimicry. In these studies, facial reactions to facial displays of emotions expressed by in-group and out-group members were measured.

One of these studies looking at the influence of group membership on facial reactions of emotions varied the nature of the group membership.

Bourgeois and Hess (2008) examined the influence of group membership based on shared interest and group membership based on ethnicity on facial mimicry effects. In this experiment, participants passively watched angry, sad and happy facial expressions shown by African and White Caucasian men (ethnicity group membership). Half of the members of each of these ethnical groups were labeled basketball player and the other half non-basketball players (shared interest group membership). The participants were all White Caucasian men and either active basketball players or non-basketball players and no basketball supporters. Therefore, the expressers were either members of a double in-group (shared interest and same ethnicity), a double out-group (different ethnicity and differing interest) or a mixed group (same ethnicity and different interest or different ethnicity and shared interest). The results show that group membership based on shared interests influenced reactions to displays of sadness: If expresser and perceiver shared interests, more mimicry was elicited by the sadness of the expresser compared to if they had different interests. This was shown by a higher activation of the *Corrugator Supercilii* muscle compared to the *Zygomaticus Major* and the *Orbicularis Oculi* muscle (the muscle next to the eye which produces smile wrinkles) for in-group compared to out-group members. For the other two emotional expressions, no influence of group membership on the facial reactions of the observers emerged. Whereas happiness elicited a concordant mimicry reaction which was not qualified by group membership of the expressers, no mimicry effect occurred for the anger displays. The results show that facial reactions to expressions of emotions can be influenced by group membership. However, this effect was not very pronounced in this study. Group membership only moderated the reactions to displays of sadness, but not to those of anger and happiness. Additionally, only the group membership that was based on shared (or different) interests influenced the reactions. Ethnical group membership did not influence the reactions to the emotional expressions. The reason for this is not clear; it might be that shared interest was more salient than ethnicity in this experiment, since it was explicitly mentioned. However, it is also possible that participants consciously controlled their reactions to the ethnical in-group and

out-group displays in order to not appear prejudiced. Thus, regarding the automaticity of the effects, no final conclusion can be drawn.

A very recent study examined the influence of group membership on facial mimicry, mood contagion, and the interaction between those two reactions to emotions (Van der Schalk, et al., 2011). Participants in this study passively watched images or video clips presenting angry, fearful and happy facial expressions shown by in-group and out-group members. Facial reactions to these stimuli were measured with EMG or coded with the Facial Action Coding System (FACS; Ekman, & Friesen, 1978)[5]. Group membership was operationalized through subject of study (Experiment 1) or ethnicity (Experiment 2). After the presentation of each expression, participants were asked to indicate how much anger, fear, happiness and aversion they felt. The results regarding the facial reactions show that group membership influenced the imitation of fearful and angry expressions. Those emotions evoked a stronger activation of the respective muscle or Action Unit if shown by in-group members compared to out-group members. Reactions to happy facial expressions were not influenced by group membership. Surprisingly, and in contrast to many other studies, no evidence for mimicry reactions to happy expressions occurred at all. Interestingly, in this study, out-group membership not only attenuated concordant mimicry emotional reactions but elicited divergent mimicry and mood contagion: Fear expressions shown by the out-group evoked stronger facial reactions of aversion than the same emotion expressed by the in-group. Additionally, participants reported feeling more fear after anger expressions shown by out-group members compared to members of the in-group.

The self-report data which were collected after each stimulus presentation were analyzed in order to assess the amount of mood contagion. The results show that participants experienced concordant emotional feelings after the presentation of the emotional expressions. These reactions, however, were not moderated by group membership. Looking at the interaction between

[5] The FACS is a measurement method based on observations of facial muscles. Specifically trained coders thereby rate if certain action units (AUs), which are associated with certain emotions, are activated.

mood contagion and mimicry, the authors found no evidence for an influence of mimicry on mood contagion. They argue that the reason for this might be up to the nature of the assessment of the respective variables: It is conceivable that self-reports are based on less automatic and more controlled processes than facial reactions.

Taken together, the findings of this study support the notion that reactions to emotions are influenced by the group membership of the expresser: Emotions expressed by out-group members elicited less concordant reactions than emotional expressions shown by members of the in-group. Furthermore, truly divergent emotional reactions occurred to fear and anger expressions shown by out-group members. However, the automaticity of the results can be discussed again: Participants were instructed to rate the emotion of each expression after presentation. Combined with a long presentation duration, this focus on the emotional content might have triggered a conscious reasoning about the emotional expression. However, in comparison to the experiment conducted by Bourgeois and Hess (2008), ethnic group membership moderated facial mimicry in this study. Since it can be assumed that the participants were motivated not to appear prejudiced, they probably tried to control their facial reactions to ethnical out-group members. Therefore, one might argue that the influence of group membership was automatic in the sense of uncontrollable.

To sum up, the results of the studies presented in this paragraph suggest that group membership influences mood contagion reactions and mimicry to emotional expressions: Whereas in-group members' emotions typically elicit a concordant mood state and an imitation of the facial expression, these reactions are attenuated or even reversed for emotions expressed by out-group members. An influence of mimicry on mood contagion could not be found. However, even though a similar pattern of results was reported in all studies, the results also differ in detail. Whereas mood contagion was attenuated after happy expressions shown by out-group members (Epstude, & Mussweiler, 2009; Weisbuch, & Ambady, 2008), mimicry reactions to happy faces were not influenced by group membership (Bourgeois, & Hess, 2008; van der Schalk, et al., 2011). Furthermore, which negative emotion elicited different reactions for

in-group and out-group members also varied between studies (Bourgeois, & Hess, 2008; Van der Schalk, et al., 2011).

3.1.2 Priming with out-group members' emotional expressions

There are also studies which examined the influence of group membership on affective reactions to emotion with experiments employing priming paradigms. This paragraph will present two sets of studies in which primes showing emotions expressed by in-group and out-group members were employed. The first studies implemented a procedure that was modeled based on the affective misattribution procedure, whereas in the second study an evaluative priming paradigm was realized.

In the studies conducted by Ruys and colleagues (Ruys, et al., 2007), the authors examined if subliminal primes, consisting of emotional expressions shown by in-group and out-group members, influence the evaluation of subsequent neutral targets. The primes were angry and happy expressions shown by men and women of White Caucasian (Experiment 1) or White Caucasian and Asian origin (Experiment 2). Accordingly, an intergroup situation was created by making gender (Experiment 1) or ethnicity (Experiment 2) salient. The primes were presented for 31ms and 17ms, respectively, and subsequently masked. The targets were neutral expressions of men and women of White Caucasian (Experiment 1) and White Caucasian and Asian origin (Experiment 2). Participants were White Caucasian men and women. The design was realized completely between participants such that each participant was exposed to only one prime category (angry or happy emotional expression shown by either in-group or out-group members), and to targets showing either in-group or out-group members. The authors hypothesized that primes displaying angry out-group members would result in a more positive evaluation of the subsequent target than primes displaying happy out-group members. If the person expressing the emotion was a member of the in-group, however, the displayed emotion should influence the evaluation of the target in a concordant way. Importantly, the authors assumed that this effect would take place even though the primes were presented

subliminally. The results of both experiments mainly supported this hypothesis. The gender (Experiment 1), or the ethnicity (Experiment 2) of the expresser influenced the evaluation of a subsequent neutral target: Out-group members' emotions led to a divergent evaluation of the primes, such that positive primes led to a more negative evaluation of the target than negative primes. Emotions expressed by members of the in-group, however, did not influence the evaluation of the primes at all. These results thus support the assumption that group membership influences reactions to emotional expressions, leading to divergent reactions if the expresser of an emotion is a member of an out-group. Importantly, the results obtained in the study point to the automaticity of this influence, since they occurred even though the primes were presented subliminally. However, although intriguing, the results should be treated with some caution since they entail several caveats: In Experiment 1, the influence of group membership and emotional expression on the evaluation of a subsequent target was only observed for participants who were in a neutral mood state. If participants were in a positive or negative mood, no effects occurred. Another caveat consists of the fact that a very hostile intergroup situation was created in Experiment 2: Before working on the priming task, participants watched a short film clip about the inhumanities committed by Japanese soldiers against Westerners during World War II. This film clip might have created a situation in which Asian individuals were highly relevant and negative for the participants. This manipulation therefore might have influenced the results. Most startlingly, however, is the finding that the group membership of the targets did not influence the evaluations of the targets in either Experiment 1 or Experiment 2. In both experiments, not only the primes, but also the targets constituted in-group and out-group members. However, the reactions to the targets only varied as a function of the group membership of the primes. Group membership of the targets did not influence the reactions. Why the group membership of the primes but not the one of the targets influenced the evaluation of the targets is in need of explanation, especially in Experiment 2, in which a very hostile intergroup situation was created. It seems illogical to us that the intergroup manipulation influenced the processing or evaluation of the primes but not of the targets. A last critical point in this study

is the finding that emotional expressions shown by out-group members led to a divergent evaluation of the target face, whereas no concordant reaction was found if the expresser of the emotion was an in-group member. In this case, the evaluation of the prime did not vary as a function of either the primes' group membership or emotional expression. Taken together, even though the results of the study reported by Ruys and colleagues report an influence of group membership on reactions to emotions with an affective misattribution procedure, these seem to be (at least in part) disputable.

Another set of studies examining the influence of emotional expressions and group membership as primes on reactions to targets was conducted by Weisbuch and Ambady (2008; two other studies presented in the same paper were reported in Chapter 3.1.1.). In contrast to the studies by Ruys and colleagues reported above, these studies employed variants of the evaluative priming paradigm: Unambiguously positive and negative images and emotional words served as targets in three experiments, whereas emotional expressions shown by in-group and out-group members served as primes. In Experiment 1 and Experiment 2, the authors examined the influence of happy, fearful and anger expressions shown by White Caucasian and African American men and women on the time needed to categorize positive and negative images as positive and negative. The emotional expressions were either presented supra- (Experiment 1) or subliminally (Experiment 2). The participants were students of White Caucasian and African American ethnicity. In order to analyze the influence of the primes on the reaction times to the targets, affect scores were calculated by subtracting reaction times to positive targets from reaction times for negative targets for each prime category separately. The results show that group membership and emotional expression influenced the affect scores, resulting in an interaction: Happiness expressed by an in-group member elicited a more positive affect (i.e., speeded the categorization of positive targets compared to negative targets) than happiness expressed by an out-group member. Fear expressed by an in-group member, on the other hand, elicited more negative affect than fear expressed by an out-group member. For the neutral expressions, no influence of group membership was observed. The same pattern of results was found with supra- and subliminal prime

presentation and for White Caucasian as well as African American participants. In a third study, emotion specific reactions to emotional primes displaying fear, happiness and anger shown by in-group and out-group members were examined. As in Experiment 1 and 2, the emotional expressions shown by in-group and out-group members served as primes. Targets, however, were words relating to the emotions happiness, fear, anger and sadness, and non-words consisting of the same letters. In order to analyze the emotion-specific influence of the primes on the targets, an emotion score was calculated for each prime and target category separately by subtracting the reaction times for words describing a certain emotion from the reaction times for non-words consisting of the same letters. The results show that emotion-specific reactions to the prime categories were influenced by the group membership of the expresser (see Figure 2): Happiness elicited more fear reactions if shown by an out-group compared to an in-group member. No other differences between in-group and out-group expressers occurred for this emotional expression. Fear, however, activated stronger fear reactions if shown by an in-group compared to an out-group member. Again, no other differences between in-group and out-group expressers reached significance. For anger expressions, more anger reactions occurred if it was expressed by an out-group compared to an in-group member. This was the only significant in-group/out-group difference for this emotional expression.

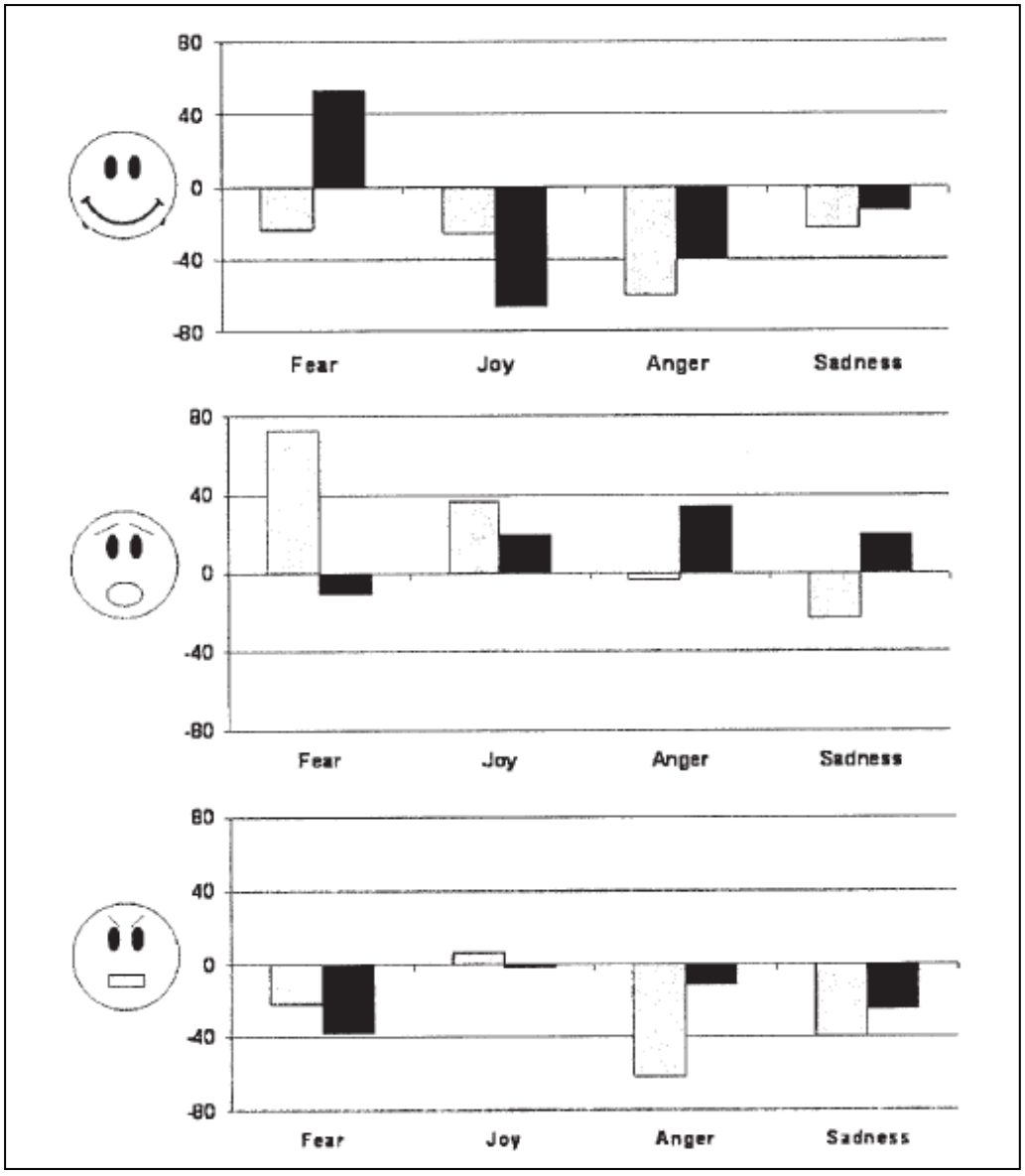


Figure 2 *Reaction times to emotion words as a function of prime emotion and prime race. Higher scores indicate increased speed to the emotion words, relative to the matched control words. Solid gray bars = In-group; solid black bars = Out-group. From "Affective divergence: Automatic responses to others' emotions depend on group membership" by M. Weisbuch & N. Ambady, N., 2008, Journal of Personality and Social Psychology, 95, 1063 – 1079. Copyright 2008 by the American Psychological Association. Reprinted with permission.*

Taken together, the results of these three studies reported by Weisbuch and Ambady (2008; and the two others reported in the same paper described above) support the notion that group membership and emotional expression interact. The results of Experiment 1 and 2 show that out-group members' emotions elicited less concordant affect than the same emotions expressed by

members of the in-group. This effect occurred even if the emotional expression was presented subliminally. Experiment 3 even presents evidence for emotion-specific reactions to in-group and out-group emotions: In-group fear elicited more fear than out-group fear, whereas out-group happiness elicited more fear than in-group happiness. Anger, however, activated more anger responses if shown by an out-group member compared to a member of the in-group. Altogether, the studies therefore provide strong evidence that group membership influences reactions to emotions. However, the results also leave many questions unanswered: The analyses in Experiment 1 and 2 do not allow for an assessment of whether the emotional primes actually elicited concordant and divergent reactions as a function of group membership (Please note that the same argument was presented in Chapter 3.1.1 for the other two experiments). Only comparisons between reactions to in-group and out-group expressions of one certain emotion were reported. If, however, different emotions elicited different reactions for one certain group, is not possible to assess. Even though the graphs shown in the paper indeed indicate a concordant affect for in-group members' emotions and a divergent affect for emotions expressed by the out-group, the lack of a reference of standard deviations does not allow for an inference about significance. The same argument applies to the results of Experiment 3: The results section only reports comparisons between groups for one certain emotional expression and one emotional target. If in-group members' emotions elicited concordant affective reactions (i.e., a fearful expression speeded responses to fear targets), and if the reactions were reversed for out-group members' emotions, is not answered. The numbers displayed in the paper, however, do only show a concordant reaction for fearful expressions shown by in-group members. Images displaying in-group members expressing happiness and anger, however, did not activate concordant affective reactions (see Figure 2). In our view, the validity of the results can be questioned if the standard effect, that is, concordant reactions to in-group emotions, is not observed.

Taken together, the two priming studies reported in this paragraph found that group membership and emotional expression interact and subsequently influence the evaluation and categorization of the targets.

Whereas happiness expressed by in-group members as well as anger and fear expressed by out-group members elicited positive reactions, negative expressions shown by members of the in-group and positive expressions shown by members of the out-group activated negative ones. This interaction seems to occur (at least in part) automatically since it was also obtained in cases in which the primes where presented subliminally. Both studies, however, entail some caveats which make it necessary to replicate and generalize the results.

3.1.3 Summary and discussion of automaticity

The results reported in this section show that group membership influences affective reactions to emotions. Whereas emotional expressions shown by the in-group typically elicit concordant reactions (more positive affective reactions after positive emotion, more negative affective reactions after negative emotions), these are reversed (or diminished) for emotions expressed by out-group members. This effect was observed with various methods such as EMG, priming and self-report. Therefore, even though the effects were sometimes small and the methods questionable, this cumulative finding shows that the influence of group membership on reactions to emotions is somehow reliable. It does not only occur for one specific reaction measured with one specific method, but shows itself in various reactions measured with various methods. Possible mechanisms for this effect will be described in the next paragraph.

However, regarding the automaticity of the effects, no final conclusion can be drawn. Even though precautions were taken in most of the experiments to prevent intentional processes, these were (at least from our point of view) sometimes more and sometimes less successful. The most dominant caveat in the experiments examining the influence of group membership on mood contagion is that all results (that we know of) were observed in intergroup situations in which a strong, openly expressed rivalry between in-group and out-group members existed. This rivalry was either already preexistent (e.g., Weisbuch, & Ambady, 2008; Leach, et al. 2003) or created in the laboratory (Epstude, & Mussweiler, 2009). No results were reported in which the

intergroup situation was not explicitly mentioned or in which groups were employed for which participants would try to control their negative attitudes. Therefore, it is conceivable that intentional processes played a role in the observed effect.

The priming experiments reported by Weisbuch and Ambady (2008) indicate that the observed interaction between group membership and emotional expression occurred automatically. The primes exerted an influence even though they were subliminally presented, the intergroup situation was created by employing ethnical out-group members, and the answers occurred rather fast. However, the conclusion that the effect observed here was truly automatic should also be treated with caution. In addition to the criticism pointed out above, it has to be noted that in Experiment 1 and 2, the participants' task was to evaluate the targets. Research on evaluative priming shows that priming effects mainly occur in conditions in which the participants are asked to evaluate the target; if the task is to name the target or to classify it on another dimension (e.g., person vs. object) evaluative priming effects are rare (see Klauer & Musch, 2003, for a review; see also Spruyt, De Houwer, Hermans, & Eelen, 2007). Thus, a context in which evaluations are required seems necessary for the prime to exert its influence on the response. Therefore the priming effect observed in these experiments might depend on the conscious goal to evaluate, making the automaticity of the effect "goal-dependent" (Bargh, 1989). Even though this point does not apply to Experiment 4, other caveats appear here, for example the limited number of trials and the simple comparisons.

Taken all of these points into account, it seems necessary to examine the degree of automaticity behind the influence of group membership on affective reactions to emotional expressions further. Concretely, it would be interesting to assess if group membership influences mood contagion if the intergroup situation is not explicitly made salient. Furthermore, it should be examined if the interaction between group membership and emotional expression depends on a conscious goal to evaluate. It was one of the goals of the current thesis to investigate these questions.

3.2 Possible mechanisms underlying the influence of group membership on affective reactions to emotions

Group membership can influence affective reactions to emotions as the previous paragraph showed: Whereas emotions expressed by in-group members typically elicited concordant affective reactions, out-group members' expressions elicited divergent ones. However, what is the reason for this effect? Why does group membership influence reactions to emotions?

We argue that group membership influences affective reactions to emotions because it influences which intention is inferred from an emotional expression: In an in-group situation, the intention of emotional expressions will be interpreted in the light of this positive, cooperative relationship. If shown by out-group members, however, the intention signaled by the same emotional expressions will rather be seen in the light of the hostile, competitive intergroup situation. Since empirical evidence suggests that emotional expressions are influenced by the intention signaled by the emotional expression, these different intentions should activate different reactions, resulting in a difference between reactions to in-group and out-group members' emotions. This argument will be presented in more detail in this section.

However, several other mechanisms were proposed to explain the influence of group membership on affective reactions to emotion, namely a comparison focus, the wish to affiliate and the social meaning of emotional expressions. These mechanisms nicely explain the findings of the studies in which they were introduced. However, they often fail to account for the results found in other studies. Before the presentation of our proposition regarding the mechanism underlying the interaction between group membership and emotional expression, these explanations will be presented and discussed in detail.

3.2.1 Comparison focus

Several researchers explain the influence of group membership on reactions to emotions by the human tendency to engage in comparison

processes (Epstude, & Mussweiler, 2009; Ruys, et al., 2007). Comparison processes influence judgments regarding the self and others in a variety of topics: It has repeatedly been shown that people use available comparison standards when making judgments regarding attitudes, person perception, decision making and the self (for an overview see Mussweiler, 2003). The result of such a comparison process can be contrast or assimilation, which means that the judgment is either contrasted away or assimilated towards the comparison standard. Interestingly, both contrast and assimilation can occur in the same field. It has been found, for example, that participants rate themselves as either less competent (Morse, & Gergen, 1970) or as more competent (Brewer, & Weber, 1994) if the comparison standard is a very competent individual compared to a less competent one. One factor that has repeatedly been proposed as determining if assimilation or contrast occurs is the perceived similarity or dissimilarity between the target and the comparison standard (e.g., Ruys, et al., 2007; Bless, & Wänke, 2000; Mussweiler, 2003): If both are judged as being similar, assimilation is likely. However, if target and comparison standard are judged as being dissimilar, contrast is more likely to be the result of the comparison process. Supporting this assumption, it has been shown that group membership, which has an impact on the perceived similarity between target and comparison standard, influences whether assimilation or contrast occurs in behavior (e.g., Schubert, & Häfner, 2003) or self-knowledge (Mussweiler, & Bodenhausen, 2002).

Drawing back on these results, authors examining mood contagion argued that an evaluation of the own affective state can also be influenced by comparison processes (Epstude, & Mussweiler, 2009). Moreover, it was assumed that depending on the group membership of target and comparison standard, this comparison process can lead to assimilation or contrast (Epstude, & Mussweiler, 2009; Ruys, et al., 2007). Concretely, Ruys and colleagues argued that in a salient intergroup situation people will compare themselves with the out-group but to a much lesser extent with the in-group. This will result in a contrast effect for the out-group but assimilation for the in-group. They use this explanation to account for the priming effects reported above: According to them, the participants compared themselves with the expressers

of the emotion and resulting in a divergent response if the expresser is a member of the out-group and a concordant one if he is an in-group member.

Epstude and Mussweiler (2009) also explain their results regarding mood contagion with comparison processes. However, they employ a slightly different argumentation: They assume that – depending on the group membership of the expresser and perceiver – different comparison processes are likely to occur. If the other person is a member of the in-group, the subject will focus on similarities between himself and the other; as a result, attributes that describe both the perceiver and the comparison standard will be activated and are therefore more readily available, resulting in a concordant affect. On the other hand, if the other person is a member of the out-group, the subject will rather focus on dissimilarities and such attributes that are not shared by the perceiver and the comparison standard will be activated; as a result, these are more readily available, resulting in a contrast effect. The findings of the study reported above support this hypothesis (see above). Furthermore, this arguing is supported by other studies in which the comparison focus was directly manipulated with a priming procedure. The results were comparable to those observed after the group manipulation: If the focus was on similarities, a concordant affective reaction occurred. However, if the focus was on dissimilarities, a divergent affective reaction was found.

However, even though the assumption that a comparison focus is responsible for concordant and divergent reactions to emotional expressions shown by in-group and out-group members nicely explains the concordant and divergent affective reactions found by Epstude and Mussweiler (2009), and Ruys and colleagues (2007), it also entails some limitations: It has problems accounting for the occurrence of emotion-specific divergent reactions, like the fear reaction to out-group anger observed by Van der Schalk and colleagues (2011) and the difference between affective reactions to fear and anger found by Weisbuch and Ambady (2008). It is logical to assume that a general positive affect is the contrasting reaction to a negative emotional expression and vice versa, but what is the contrasting reaction to fear, anger, or joy expressions? This problem of the comparison focus explanation does not appear in the results reported by Ruys and colleagues since here only general evaluative

reactions were measured and not specific emotional ones. The same is true for the effect reported by Epstude and Mussweiler. Here, the influence of group membership was also only found on a general affective reaction and not on specific emotional measures. Thus, while the comparison focus constitutes a plausible explanation for the effect of group membership on general affective reactions to emotions, it has to be supplemented by a process explaining emotion-specific results.

3.2.2 Affiliation

A different process which has been proposed as being responsible for the influence of group membership on affective reactions to emotions arises from the findings that mimicry influences affiliation. It has been shown that mimicking your interaction partner increases liking and liked individuals are mimicked more (see Chapter 2.2). Since typically out-group members are liked less than in-group members, sending a sign of affiliation would be a counterproductive process. Accordingly it has been predicted that in-group members' emotional expressions should be mimicked more than those shown by members of the out-group (Bourgeois, & Hess, 2008; Van der Schalk, et al., 2011). This prediction was supported by the results of studies in which facial reactions to in-group and out-group members' emotions were measured: Emotions expressed by in-group members elicited more concordant facial reactions than the same expressions shown by out-group members (Bourgeois, & Hess, 2008; Van der Schalk, et al., 2011; see above). The argument that it was actually the positive or negative attitude towards the expresser of the emotion which created the effect was further supported by a study in which the attitudes towards the expresser were explicitly manipulated before facial reactions were measured. The results show that happiness and sadness expressed by avatars which were associated with positive traits were mimicked more than the same emotions expressed by avatars associated with negative traits (Likowski, et al., 2008). However, this explanation entails the same problem as the one drawing on comparison processes. It cannot account for emotion-specific effects such as fear reactions to anger expressions (van der

Schalk, et al. 2011) and happiness to fear expressions (Weisbuch, & Ambady, 2008). Accounting for this problem, several authors (e.g., Bourgeois, & Hess, 2008; van der Schalk, et al., 2011) argued that an additional factor to affiliation was driving the results: The meaning of the expressed emotion. This argument will be presented in the following paragraph.

3.2.3 Social meaning of the emotion

It has been argued by various researchers that emotional expressions are social signals which inform the perceiver about the status of the social environment (e.g., Fischer, & Manstead, 2008; Fridlund, 1994; Keltner, & Haidt, 1999; van Kleef, 2009). In this view, emotions not only differ along the valence dimension but they also communicate information relevant for the perceiver – they have a social meaning (see also Chapter 2.1 about the function of emotions). A fearful expression, for example, signals to the perceiver that there is danger around, but also that the expresser feels threatened, has a low coping potential and intends to flee. Anger, on the other hand, signals that the perceiver experiences an obstacle blocking his goals, that he feels dominant and intends to attack (e.g., Horstman, 2003; Marsh, et al. 2005; Knutson, 1996). These meanings have been used to explain the difference within affective reactions to in-group and out-group members' emotions: Whether affective reactions to out-group emotions are attenuated in comparison to in-group emotions should depend on the specific meaning of the specific emotion for the perceiver (Bourgeois, & Hess, 2008; Van der Schalk, et al., 2011; Weisbuch, & Ambady, 2008). It has been argued that a fearful expression, for example, should elicit less concordant reactions if shown by an out-group member compared to a member of the in-group because it is not only a threat related signal but also a sign of submission. Many or the empirical results reported above are in line with this arguing (e.g., Van der Schalk, et al., 2011; Weisbuch, & Ambady, 2008). The notion that affective reactions to emotional expressions are triggered by the meaning of the specific emotion also nicely explains the occurrence of a divergent affective reaction. A happiness reaction to the fearful face of a disliked out-group member, or a fearful reaction to the

angry face of this person constitute adaptive reactions to the specific meaning of the respective emotions.

However, the argument that the specific social meaning of the emotion is responsible for the difference between reactions to in-group and out-group emotions also entails some problems. First of all, which reaction should be activated by the meaning of an emotion is not clear; therefore, this explanation can be adapted to flexibly explain diverging results. A closer look at the arguments of the researchers referring to the "meaning explanation" shows that this problem is (at least in part) caused by the fact that the respective authors interpret the meaning of an emotion differently: Whereas Bourgeois and Hess (2008), for example, argue that different emotions should be mimicked to a different extent because they vary in their affiliative content as well as in the costs associated with mimicking, Weisbuch and Ambady (2008) state that out-group emotions signal relative group dominance and should therefore elicit different reactions. These two meanings might be correlated; however, they also differ in their predictions and explain contrary results. In the arguing by Bourgeois and Hess, reactions to happiness should not differ between in-group and out-group expressers because happiness signals a high wish for affiliation and a mimicking reaction is associated with low costs. This is exactly what they found. According to Weisbuch and Ambady, however, the emotional expression should be interpreted in the light of relative group dominance and out-group happiness should therefore be seen as signaling high dominance and elicit more negative reactions than in-group happiness. The findings by Weisbuch and Ambady support this notion. This example shows that the meaning of an emotion can be flexibly used to explain contrasting results. This problem of the meaning explanation is not only apparent between studies employing different dependent variables, but also between those examining the same reactions (e.g., mimicry). For example, both Van der Schalk and colleagues (2011) and Bourgeois and Hess explain the mimicry reactions to anger expressions observed in their respective study by the meaning signaled by the anger expression. However, the results which are explained by the same mechanism differ. Whereas Van der Schalk and colleagues found that out-group anger elicited less concordant facial reactions than in-group anger, no

difference in reactions to anger expressions occurred in the study conducted by Bourgeois and Hess. Therefore, although the notion that affective reactions to emotions are influenced by the meaning of the emotional expressions is intriguing, it is unclear if it only constitutes an a posteriori explanation of observed, unexpected effects. It is therefore necessary to thoroughly test if reactions to emotions are actually influenced by the signaled meaning and by which specific component.

Another limitation of the "meaning explanation" is that none of the authors specify how group membership influences which meaning is inferred from an emotion – why would in-group fear signal distress but out-group fear low dominance? Why would out-group anger elicit fear but in-group anger would not? The exact mechanism by which in-group and out-group emotions are interpreted differently has to be specified.

It was one of the main goals of the experiments conducted for this thesis to overcome the problems of the meaning explanation. We therefore formulate a theory how and why group membership influences the meaning of an emotion. Concretely, we hypothesize that reactions to expressed emotions differ depending on the group membership of the expresser because the group membership influences the *intention* signaled by an emotional expression. Moreover, we posit that this is the case because the intentions of in-group emotions are seen in the light of the friendly, cooperative relationship that exists between in-group members, whereas the intention signaled by out-group members should be interpreted in the light of the hostile, competitive relationship which can be found between members of different groups. We will describe our argument in much detail in the next chapter.

3.2.4 Intention

As was already mentioned in the previous paragraph, there is now agreement that emotional expressions do not only carry affective information but they also provide information about the environment, about the expressers' orientation towards the relationship and – most importantly – about his intention (Horstmann, 2003; Keltner, & Haidt, 1999; Yik & Russell, 1999). A

smile, for example, is seen as signaling the intention to affiliate, an anger expression the intention to attack and a fear expression the intention to flee. The view that emotions carry information about the expresser's intention was firstly formulated by Fridlund (1994). According to his "behavioral ecology view", emotional expressions evolved evolutionary. Consequentially he argued that emotional expressions convey intentions[6] rather than feelings because expressing intentions and action requests might influence the behavior of the interaction partner; such an influence might be more beneficial than informing the other person about your feeling state. Accordingly, emotional expressions which were successful in changing the course of the interaction brought about evolutionary benefits and were further transmitted. This view was in contrast to Ekmans neurocultural theory (1972) stating that emotional expressions are readouts of internal feeling states. Bridging the gap, component oriented theories of emotions (e.g., Frijda, 1986; Scherer, 1984) see behavioral intentions and facial expressions as two components of an emotion, with physiological arousal, subjective feeling, and cognitive appraisals constituting the other ones. These theories suggest that the components of a specific emotion are correlated; hence the facial expression associated with one specific emotion is closely linked to the feeling state as well as the behavioral intention associated with this emotion. This arguing received empirical support (e.g., Scherer, & Grandjean, 2008).

Since the intention signaled by the emotional expression informs the perceiver about the plans of the interaction partner, it makes sense to assume that reactions to emotions are influenced by this factor – it is just more sensible to respond to the intention to attack signaled by an anger expression than to the expressers' subjective feeling of anger[7]. This arguing is also put forward by other researchers, especially those examining approach and avoidance

[6] With the term intention we refer to both action tendencies and behavioral requests signaled by an emotional expression. These are the two social motives of an emotional expression proposed by Fridlund (1994).

[7] Precisely spoken, this means that reactions to emotional expressions are activated by the *implication* that they have for the perceiver. Since this implication is, however, a direct consequence of the intention, we will base our focus on the intentions signaled by an emotional expression.

reactions to emotional expressions (e.g., Marsh, et al., 2005; Wilkowski, & Meier, 2010; see also Chapter 2.3.). The results from these experiments show that approach and avoidance behaviors are influenced by the intention signaled by the emotional expression and not by the subjective feeling.

However, if reactions to emotions are activated by the intention of the emotion, why do they differ if the expresser is an out-group compared to an in-group member? What is the role of the group membership in this intention-reaction link? We argue that group membership influences the reaction to emotions because it influences which exact intention is associated with an emotion. There already is some evidence that the same emotional expression is seen as signaling different intentions which then can accordingly trigger different reactions. A smile, for example, does not unconditionally signal the intention to affiliate; it might potentially signal shame and embarrassment, as well as high dominance and *Schadenfreude* (e.g., Ambadar, Cohn, & Reed, 2009; Niedenthal, Mermillod, Maringer, & Hess, 2010; Keltner, 1995). A fearful facial expression, by contrast, acts as a warning of threat but can also signal the intention to flee and to capitulate (Horstmann, 2003; Marsh, et al., 2005).

We now argue that factors such as the social situation influence how the perceiver of an emotion interprets the intention (see also Niedenthal, et al., 2010). We suggest that in a friendly, cooperative interpersonal situation, the emotional expression will be interpreted in this light. If the situation is, however, hostile and competitive, the intention of the expresser will rather be seen against the background of this situation. Following this arguing, a smiling face, for example, should be interpreted as signaling affiliation if the relationship is positive and cooperative. In this case, a positive affective reaction should follow. If the relationship is, however, negative, it should rather be seen as indicating dominance, arrogance, and *Schadenfreude*. In this case, a negative affective reaction should occur. A similar logic can be applied to fearful expressions. In a friendly, cooperative situation this expression might be interpreted as a warning of a common threat. Since this threat has a potential negative implication for the perceiver, a negative affective reaction should be triggered. However, if the fearful expression is shown by a rival, it might rather

be interpreted as a sign of submission than as a cooperative warning. Since the implications of this sign are positive for the perceiver, a positive affective reaction should follow.

As was already presented in Chapter 1, one factor that influences the relationship between humans is group membership. It has been repeatedly shown that group situations typically lead to liking of in-group members and (at least relative to the in-group) disliking of out-group members (Fazio, et al., 1995; Greenwald, et al., 1998; Tajfel, & Turner, 1979). This is seen as an automatic process which is not based on conscious reasoning (e.g., Otten & Wentura, 1999). By determining the possible relationship between expresser and perceiver of an emotion, different group membership of expresser and perceiver of an emotion should therefore impact the intention signaled by an emotional expression and – as a consequence – influence following reactions to this expression.

The assumption that group membership influences affective reactions to emotions because it influences which intention is inferred from an emotional expression overlaps with the explanation drawing back on the social meaning of an emotion to explain different reactions to in-group and out-group emotions: Both approaches refer to the implication of the emotional expression for the perceiver. However, they also differ in important points: First of all, in comparison to the "social meaning" approach, our theory specifies which component of an emotion should be responsible for the concordant and divergent reactions to emotional expressions, namely the intention signaled by an emotional expression. The intention might be closely related to other meanings of an emotion, for example dominance. However, in comparison to the other meaning dimensions, it is specific for an emotion. The intentions associated with anger and happiness, for example, are clearly different even though both emotions signal high dominance. Therefore, no other components than the intention have to be used to explain differences in the influence of group membership on reactions to these emotions. The approach formulated by Weisbuch and Ambady (2008) in comparison is mainly based on dominance. Explaining the different influence of group membership on reactions to anger and happiness expressions, they needed to draw back on specific differences

between those two emotions, complicating their theory. Second, our approach provides an explanation why in-group and out-group emotions are seen as signaling different meanings. We argue that (a) different intentions are associated with a specific emotion and (b) the relationship between expresser and perceiver of an emotion provides the background against which the intention of the emotion is interpreted. As a result – depending on the group membership of the expresser – different intentions are inferred from an emotional expression resulting in differing affective reactions. This theory is very precise in the underlying mechanism and responsible factors and therefore allows the formulation of precise hypotheses. It was one goal of this thesis to thoroughly test these hypotheses.

3.3 Overview of Experiments

The goal of the empirical work conducted for this thesis was twofold: First of all, we wanted to thoroughly test our hypothesis that group membership determines which intention is inferred from an emotional expression, influencing the affective reactions of the perceiver. Our hypothesis was that the intention of an in-group emotion should be seen in the positive and cooperative relationship which typically characterizes in-group situations. The intention of an out-group emotion, on the other hand, should be interpreted in the light of the negative and competitive relationship characterizing intergroup situations. Depending on the intention inferred from an emotional expression, the same emotion should thereby result in different reactions.

The second goal of this thesis was to examine the degree of automaticity behind the influence of group membership on affective reactions to emotional expression. We thereby hypothesized that in-group members' emotional expressions would elicit concordant affective reactions, whereas out-group members' emotions would activate divergent ones. This effect should occur even if no goal for an explicit evaluation is given and if conditions are created which prevent controlled processing.

We conducted six experiments in order to test our two hypotheses:

Experiments 1, 2, 3a, and 3b examined approach and avoidance reactions to emotional expressions. In these experiments, participants responded to emotional expressions shown by in-group and out-group members by an approach or avoidance movement. With this paradigm we were hoping to gain insight into the question which mechanism underlies the influence of group membership on emotional expressions. Since it has repeatedly been argued that approach and avoidance behaviors are elicited by the intention signaled by the emotional expression (see Chapter 2.3), finding an influence of group membership on approach and avoidance reactions would provide strong evidence that group membership influences which intention is inferred from an emotion. A second goal of these experiments was to assess if the interaction between group membership and emotional expression depends on the exact task participants carry out. Therefore, emotional expression (Experiment 1 and 3) or emotional expression and group membership (Experiment 2) were task irrelevant. Should group membership influence affective reactions to emotional expressions even though one or both factors are irrelevant for the ongoing task, we could conclude that the effect occurred automatically in the sense of unintentionally.

Experiment 4 was designed to obtain a more direct test of the hypothesis that in-group and out-group members' emotions are indeed associated with different intention. Employing a reverse-correlation technique, we visualized participants' representations of in-group and out-group smiles and assessed the intentions signaled by these images. This designed enabled us to further examine our hypothesis that group membership influences the intention associated with an emotional expression. Again, the emotional expression was irrelevant in this experiment; this allows us to conclude that the association between group membership and intention is activated automatically (i.e., unintentionally).

The goal of Experiment 5 was to assess if the automatic influence of group membership on affective reactions to emotions also occurs if the material is presented in a non-visual modality. Furthermore, we wanted to employ a dependent variable in which the affective reaction was only a by-product of a natural occurring behavior. Experiment 4 thus clearly differs from

that of the other experiments in material employed and dependent variable measured. Because this experiment is the only one employing these methods, and the results are comparatively weak, it should be seen as showing possible directions that the project could take rather than drawing final conclusions.

Before the description of the experiments, we will briefly report the construction and validation of a stimulus set employing emotional facial expressions which we used in (most of) our studies. If the reader is impatient to find out about the experiments, however, this chapter can be skipped.

4 Stimulus material – Development and Validation

Most experiments reported in this dissertation employed visual material: We presented photographs and short video clips of emotional expressions shown by men and women of German and Turkish/Arabic ethnicity to participants. These stimuli had to meet two crucial criteria: The emotional expression as well as the group membership of the expressers had to be highly recognizable and prototypical. This was especially important since the emphasis of the studies was on examining the influence of group membership on automatic reactions to emotional expressions; because of this, the emotional expression as well as the group membership of the expressers was neither task relevant nor explicitly mentioned in most of the experiments. Therefore, in order to exercise an influence unintentional, the emotional expression of the stimulus had to be highly recognizable and prototypical. Since group membership was operationalized through ethnic membership (Turkish/Arabic vs. German) in some of the experiments, it was also very important that the stimuli were very prototypical for the respective group.

Unfortunately, only two of the available stimulus sets of emotional expressions (that we know of) employed individuals of Arabic origin (Langner, et al., 2011; Van der Schalk, Hawk, Fischer, & Doosje, 2011). Out of these, only a few of the photographs of Arabic individuals met our expectations: In many cases, the individual did not look like the prototypical Turkish/Arabic young man in Germany. In other cases, the recognition rates for the emotional expressions were not sufficiently high. Therefore, in order to overcome these limitations, we created a new stimulus set that employed men and women of German and Turkish/Arabic origin showing seven emotional plus one neutral facial expression. Since it is not of high relevance for the research questions of this thesis, the development and results of the stimulus set will be only briefly presented in this chapter. A more detailed description can be found in Appendix A.

4.1 Creation of the database

43 individuals were videotaped for the stimulus set. However, 15 individuals were excluded for the stimulus validation, resulting in seven German females, four Turkish/Arabic females, nine German men, and eight Turkish/Arabic men. Each expresser was videotaped while showing seven emotional and one neutral facial expression, resulting in 224 stimuli. However, in this context, only the validation data for the expressions employed in our experiments, which is happiness, fear, and neutral will be reported.

4.2 Validation of the database

4.2.1 Method

Participants. The stimuli were rated by 112 students of Saarland University. Thereby 81 participants rated only a subset of the whole dataset. Each image was rated by at least 66 raters.

Procedure. For the ratings, stimuli were presented in random order on the computer screen. Each participant indicated for each presented image which emotion was expressed and how intense, natural and arousing the expression was. Furthermore, attractiveness and typicality ratings for the respective group of the expressers were obtained with the neutral facial expressions.

4.2.2 Results

Raw recognition rates were calculated and arcsine transformed (Winer, 1971). A 2 (Emotion: joy, fear, neutral) × 2 (Ethnicity: German vs. Turkish/Arabic) ANOVA with all factors varied between stimuli yielded a significant main effect of emotional expression: F (2, 78) = 116.55; $p < .001$, η_p^2 = ..75. No other significant effect emerged (Fs < 1.98; ps > .14). The means

show[8] that joy had the highest recognition rate (98%), followed by neutral (74%), and fear (71%). These rates are comparable to those reported for other sets (e.g., Beaupré & Hess, 2005; Biehl, Matsumoto, Ekman, & Hearn, 1997; Ekman & Friesen, 1976; Goeleven, De Raedt, Leyman, & Verschuere, 2008; Langner et al., 2010; Tracy, Robins, & Schriber, 2009; Van der Schalk, et al., 2011).

In order to correct for response biases in the raw recognition rates, we also calculated unbiased hit rates (Wagner, 1993) for each participant and each emotion separately. A 3 (Emotion: joy, fear, neutral) × 2 (Ethnicity: German vs. Turkish/Arabic) ANOVA with all factors varied within participants yielded a significant main effect of emotion (F (2, 116) = 196.30; $p < .001$, $\eta_p^2 = .77$), and a significant main effect of ethnicity: (F (1, 117) = 9.65; $p < .01$, $\eta_p^2 = .08$). The means[9] show that the emotions shown by the Turkish/Arabic expressers had higher unbiased hit rates ($M = .73$; $SD = .13$) than those shown by German expressers ($M = .71$; $SD = .11$). These main effects were qualified by a significant emotion by ethnicity interaction (F (2, 116) = 4.09; $p = .02$, $\eta_p^2 = .07$). Planned contrasts (Bonferroni corrected) comparing the unbiased hit rates between German and Turkish/Arabic expressers for each emotion separately showed that the neutral expression was recognized better if expressed by Turkish/Arabic ($M = .71$, $SD = .24$) than German expressers ($M = .65$, $SD = .22$): t (117) = 3.62; $p < .001$. No other comparison reached significance ($|t|$s < .175; ps > .08).

In order to examine the ratings of arousal, naturalness, and intensity, we calculated a 3 (emotion: joy, fear, neutral) × 2 (ethnicity: German vs. Turkish/Arabic) between-subjects ANOVA with the images as cases on each of these variables. In the context of this thesis, only effects in which a significant main effect of ethnicity or a significant interaction with ethnicity emerged shall be reported. For none of those variables, a main effect of or interaction with ethnicity emerged (all Fs < 3.50; ps > .06).

Comparing German and Turkish/Arabic expressers on their ratings of typicality and attractiveness revealed no difference in rating ($|t|$s < 1.6; p >

[8] For readability, the untransformed raw recognition rates are reported.
[9] For readability, the untransformed unbiased hit rates are reported.

.14). The individuals of both groups were rated as rather typical for their respective group (German: *M* = 3.68, *SD* = .37; Turkish/Arabic: *M* = 3.28, *SD* = 1.24) and as averaged attractive (German: *M* = 2.61, *SD* = .55; Turkish/Arabic: *M* = 2.59, *SD* = .47).

4.3 Discussion

The validation data obtained for our stimulus set showed that we were successful in developing a new stimulus set employing German and Turkish/Arabic expressers. The recognition rates for the emotional expressions relevant for this thesis were comparable to those reported for other sets. Importantly, no main effect of ethnicity on the raw recognition rates was observed. The main effect of ethnicity obsereved with the unbiased hit rates shows that the emotions shown by the Turkish/Arabic expressers were even recognized better than those shown by German expressers. Furthermore, the expressers were rated as rather typical for their respective group. Therefore, we conclude that the stimuli are suitable for examine our research question.

5 Approach and avoidance reactions to emotions expressed by in-group and out-group members

We conducted a series of four experiments employing an approach and avoidance paradigm in order to examine behavioral reactions to in-group and out-group members' emotions. The main goal of these experiments was to examine our hypothesis that group membership influences which intention is inferred from an emotional expression. Since approach and avoidance reactions are seen as adaptive responses to environmental constraints, and it has repeatedly been argued that approach and avoidance reactions to emotional expressions are influenced by the intention signaled by the emotion (see Chapter 2.3.), we expected to find an interactive influence of group membership and emotional expression on these reactions. Finding concordant reactions to in-group emotions and divergent ones to emotions shown by the out-group would allow us to conclude that this pattern is caused by different intentions inferred from in- and out-group members' emotions.

Moreover, with these experiments, we wanted to examine the degree of automaticity driving the interaction between group membership and emotional expression. Therefore, emotional expression was never task relevant in the experiments. Furthermore, in Experiment 2, neither group membership nor emotional expression was task relevant.

Overview

We employed the same method in all four experiments reported below. Participants were instructed to push or pull the computer mouse along a straight line in order to categorize stimuli appearing on the computer screen. These stimuli constituted of photographs of in-group and out-group members displaying fear and happiness. Participants had to categorize stimuli depending on group membership (Experiment 1 and 3) or depending on an arbitrary feature (orthogonal to group membership; Experiment 2). The emotion displayed was never relevant for the task.

We chose happiness and fear expressions as critical emotions for two reasons: First of all, since we argue that the group membership of the expresser

influences which intention is signaled by an emotional expression, we had to select emotional expression, which (a) signal different intentions which are (b) associated with contrasting behavioral tendency (i.e., avoidance instead of approach and vice versa). Finally it was important to assume that (c) the relationship between expresser and perceiver of an emotion influences which intention is inferred from the emotion. Fear and happiness fulfilled these requirements: Expressed by a positively evaluated in-group member, a smile should signal the intention to affiliate (which triggers an approach behavior) whereas a fearful expression in contrast should act as a warning (which should then trigger avoidance, at least compared to happiness expressions). On the other hand, if the same expressions are shown by a negatively evaluated out-group member, they might dominantly signal dominance (which should trigger avoidance behavior) and submission (which should trigger approach).

The second reason to choose happiness and fear was based on the consideration that these emotional expressions were differently strong associated with specific behaviors in past research: With happiness, we chose an emotion which has reliably elicited an approaching behavior (e.g., Rotteveel & Phaf, 2004; Seidel, et al., 2010; Stins, et al. 2011). Finding nevertheless an influence of group membership on this established emotion-behavior association would provide a strong support for our hypothesis that approach and avoidance behaviors constitute adaptive and flexible reactions to environmental factors and are not invariably linked to certain emotional expressions. The case is different for fearful expressions since experiments examining approach and avoidance reactions to this emotion yield mixed results (e.g., Marsh, et al. 2005; Wilkowski, & Meier, 2010). This might be caused by the relatively strong ambiguity of the meaning of this expression. We assume that manipulating the group membership of the expresser can help to dissolve this ambiguity: We argue that a fearful expression will rather be seen as a warning if it is shown by in-group members (and accordingly elicit an avoidance reaction) and as a sign of submission if it is expressed by out-group members (and accordingly elicit an approach reaction). Finding such a pattern would therefore support our notion that the group membership of the expresser influences which intention is mainly inferred from an emotional expression

which then influences the following behavioral reactions. Please note that we thereby do not assume that the group membership of the expresser will dissolve every ambiguity of an emotional expression but rather that it serves as an indicator which intention might be more likely to be signaled by an emotional expression.

Following this arguing we predict an interaction between group membership and emotional expressions: Emotion-group combinations which are hypothesized to be approach related (in-group/happiness, out-group/fear) should activate more approach related behavior than avoidance related combinations (in-group/fear, out-group/happiness).

The dependent variable in all of our studies constituted of the time between onset of stimulus presentation and the beginning of the first movement of the computer mouse.

5.1 Experiment 1

5.1.1 Method

Participants. Sixty-two non-psychology students (34 females, 28 males) at Saarland University, Germany, participated in the experiment. The age range was 18 to 31 years with a median of 23.5 years. All participants were native Germans. The experiment was the first part of a one-hour experimental session for which participants were paid eight Euros for compensation.

Design. The design followed a 2 (Emotion: fear vs. happy) × 2 (Stimulus Ethnicity: Turkish/Arabic vs. German) × 2 (Movement: approach, avoidance) × 2 (Block: Block 1 vs. Block 2) within-participants design.

Material. Stimuli consisted of photographs of emotional expressions shown by White-Caucasian (German, Dutch) and Turkish/Arabic young men. Pictures were taken from the Radboud Faces Database (Langner, et al., 2010), the Amsterdam Dynamic Facial Expression Set (Van der Schalk, et al., 2011) and our own collection (Paulus, Rohr, Neuschwander, et al., 2012). We

selected fear and joy expressions from 10 White-Caucasian men and from 10 Turkish/Arabic men, resulting in 40 pictures. Since it has been shown that emotional expressions by out-group members sometimes are recognized less accurately than the same expressions shown by in-group members (e.g., Elfenbein & Ambady, 2002), we carefully selected pictures on the basis of recognition rates for the critical emotional expressions (fear and joy), intensity ratings of emotional expressions, and on ratings of attractiveness and prototypicality for White-Caucasians and Turks/Arabs, respectively (if available). Importantly, Western European and Turkish/Arabic pictures did not differ significantly on any of these variables (all $|t|$s < 1.2, *ns*). Therefore, we could conclude that the different facial features of Western Europeans and Turkish/Arabic men did not influence the perception of the emotional expression itself. Pictures were edited in a way that the face and top of the neck were shown on a white background. All depicted headshots of target persons in a straight orientation and gaze directed at the viewer. They measured 400 by 530 pixels and were presented on a CRT display set to a resolution of 1024 by 786 pixels. The images are displayed in Appendix B.

Procedure. Participants were tested in groups of up to five individuals. They were seated individually in front of personal computers, separated by partition walls. On each desk, two parallel white lines with the length of approximately 40 cm marked the alignment along which the computer mouse had to be moved.

Participants were instructed to categorize pictures of young men as being either of White-Caucasian or of Turkish/Arabic origin by moving the computer mouse away or towards themselves. The task consisted of two phases. In Phase 1, half of the participants were instructed to push the computer mouse away from them if the person on the picture was Turkish/Arabic (avoidance) and to pull the mouse towards them if the person was White-Caucasian (approach). The other half of participants was instructed to push the computer mouse away from them if the person on the picture was White-Caucasian and to pull the mouse towards them if the person was Turkish/Arabic. In Phase 2 the assignment for each group was reversed. Both

phases comprised two blocks. During the first block (Block 1) of each Phase, each stimulus was presented once and participants' task was to categorize it exerting a certain movement. In the second block (Block 2) of each Phase, each stimulus was presented again and participants had to categorize it exerting the same movement as in the block before.

Each trial started with a fixation cross displayed for 2600ms. The picture of a White-Caucasian or Turkish/Arabic man appeared in the middle of the screen in its original size. When participants moved the mouse, the picture increased or decreased in size depending on the direction of the movement. If participants pushed the mouse away from them the picture size decreased until it had reached 75% of its original size. Then it disappeared and the fixation cross appeared again. If participants pulled the mouse towards them the picture size increased until it had reached 130% of its original size; then the picture disappeared and the fixation cross was shown again. The speed of the change in size was dependent on the speed of the mouse movement. This increase and decrease in picture size created the illusion that the face would move towards or away from participants. This visual feedback was implemented in order to overcome the limitation that push and pull movements are ambiguous with regard to approach and avoidance movements (Eder & Rothermund, 2008; Seibt, Neumann, Nussinson, & Strack, 2008), and has been successfully used before (Rinck & Becker, 2007, Wentura, Rothermund, & Bak, 2000). Participants were instructed to move the mouse back to its original position while the fixation cross was displayed.

Participants first completed 10 practice trials in which they categorized five White-Caucasian and five Turkish/Arabic men, displaying neutral expressions. Afterwards participants were informed that the main experiment would start and that the pictures would now show emotionally expressive faces. In Phase 1, participants worked through two blocks consisting of 40 trials each. Within each block, each picture was presented once; pictures were presented in random order. For Phase 2 of the experiment, participants were informed that the assignment of movement to group membership was reversed for the following two blocks. Participants again received 10 practice trials,

categorizing five White-Caucasian and five Turkish/Arabic men. Then they worked again through two blocks consisting of 40 trials each.

Throughout the experiment a feedback message ("Error!") was displayed if the categorization of a picture was incorrect. In trials in which the mouse movement differed more than 5% on the y-axis from a straight movement, the message "Please move mouse straight" was shown.

Reaction times (RTs) were recorded as the onset of the first mouse movement greater than 50 pixels. This was done to ensure that no artifacts like hand trembling were recorded as reaction times.

5.1.2 Results

Trials in which the stimulus was incorrectly classified were excluded from analysis (4.8%). RTs below 200 ms or above 1200 ms were discarded (1.7%).[10] Mean reaction times are displayed in Table 1.

In order to enhance comprehensibility, we subtracted RTs for avoidance movements from RTs for approach movements for each stimulus category for each block. These avoidance scores indicate the relation between approach and avoidance movements: A higher avoidance score indicates relatively more activation of avoidance compared to approach-related behavior by the stimulus whereas a lower score indicates relatively more activation of approach compared to avoidance-related behavior by the stimulus.[11]

[10] The same results reported here were found if other outlier criteria were employed.

[11] In general, RTs for avoidance movements were shorter than RTs for approach movements. Therefore the Avoidance Scores are all positive. We argue that this effect occurred because pulling the computer mouse is easier to execute than pushing it. Due to this main effect, however, we never observed "true" approach related behavior. Therefore we only refer to more and less avoidance when describing the results.

Table 1 *Mean RTs for approach and avoidance movement in the two blocks of Experiment 1(standard deviation in parentheses)*

		Movement			
Ethnicity	Emotion	Approach		Avoidance	
		Block1			
White-Caucasian	Happiness	667	(77)	656	(108)
	Fear	651	(83)	654	(99)
Turkish/Arabic	Happiness	657	(112)	634	(84)
	Fear	642	(100)	623	(87)
		Block2			
White-Caucasian	Happiness	649	(69)	640	(91)
	Fear	638	(71)	621	(82)
Turkish/Arabic	Happiness	639	(103)	617	(94)
	Fear	619	(88)	615	(74)

Note: Small deviations between the Avoidance Score and the difference between approach and avoidance RTs (as shown) are due to rounding.

In a 2 (ethnicity) × 2 (emotion) × 2 (block) analysis of variance a significant triple interaction emerged, $F(1, 61) = 4.61$, $p < .05$, $\eta_p^2 = .07$. Analyzing each block separately, for Block 1 no significant main effect or interaction emerged (all Fs < 2.6; ps > .11) For Block 2, the expected ethnicity × emotion interaction reached significance, $F(1, 61) = 6.35$, $p = .01$, $\eta_p^2 = .09$ (see Figure 4). A happy facial expression shown by a Turkish/Arabic men activated more avoidance compared to approach related behavior (M = 22 ms, SD = 72) than a fearful facial expression shown by the same persons (M = 4 ms, SD = 52), t (61) = -2.31, $p < .05$. For the White-Caucasian stimuli, a happy facial expression activated less avoidance compared to approach related behavior (M = 9 ms, SD = 60) than a fearful facial expression (M = 17 ms, SD = 63). This difference, however, did not reach significance (t < 1.1).

A further analysis made clear that the moderation by block was dominantly due to the first block of Phase 2, that is, the block in which participants had to follow a new movement-to-category assignment after more than 80 repetitions of the opposing assignment rules. An overall analysis discarding data of this block yielded a significant emotion by ethnicity interaction, $F(1, 62) = 8.69$; $p = .005$, $\eta_p^2 = .13$.

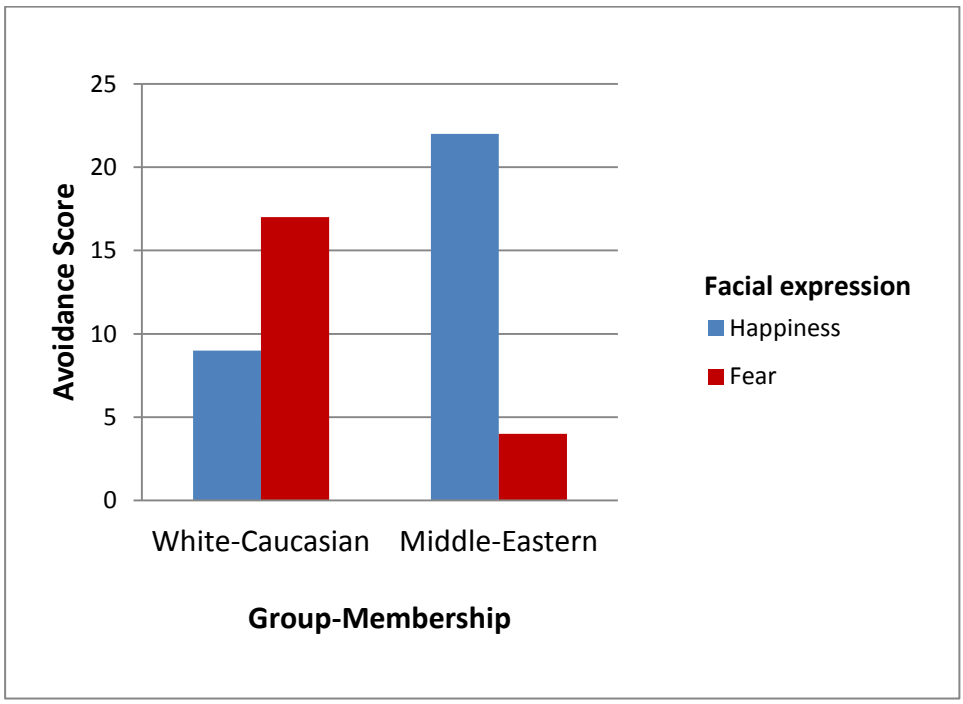


Figure 3 *Interaction of emotion and ethnicity with regard to basic behavioral tendencies (Experiment 1; Block 2). The Avoidance Score is the difference in mean RT between approach and avoidance responses.*

5.1.3 Discussion

In Experiment 1, we provided first evidence that the behavioral tendency activated by an emotional expression depends on the social group memberships of the expresser and the perceiver. Emotion-group combinations that were supposed to be approach related (happiness/in-group, fear/out-group) activated more approach related behavior than avoidance related combinations (fear/in-group, happiness/out-group). Since approach and avoidance reactions to emotional expressions are most likely influenced by the intention signaled by the emotion, this finding shows that the influence of group membership on

reactions to emotions is caused by a differently evaluated intention inferred from the emotion. Moreover, these results demonstrate that approach and avoidance behaviors are not activated by the emotional expression or the intention *per se* but are more flexible responses.

Importantly, we demonstrated an influence of emotion on approach and avoidance related behavior in a task in which emotion was not task-relevant. The only study known by the authors which examined approach and avoidance related behavior to emotional faces in a task in which emotion was not relevant did fail to find an influence of emotion on movement (Rotteveel & Phaf, 2004). Therefore, our experiment adds to the broader literature by showing that emotions can influence behavioral tendencies without being task relevant.

However, Experiment 1 entails some caveats. We observed an influence of block on the interaction between emotion, ethnicity, and movement. The expected interaction between emotion, ethnicity, and movement only emerged after participants had repeatedly categorized stimuli by exerting a given movement. This is an unexpected finding since many studies examining approach and avoidance movements do not employ many repetitions and still find significant effects (e.g., Lavender & Hommel, 2007; Neumann, Hülsenbeck, & Seibt, 2004; Rotteveel & Phaf, 2004). However, this might depend on the exact task participants have to carry out. In a recent study examining different approach-avoidance methods, Krieglmeyer and colleagues showed that approach-avoidance effects are generally small if valence is irrelevant for the completion of the task (Krieglmeyer, et al., 2010). They suggest that the method used to study approach and avoidance behaviors has to be sufficiently sensitive in order to detect an influence of task-irrelevant valence on behavior. It might be that in our study the approach-avoidance task became more sensitive after participants had repeatedly categorized stimuli with a certain movement. It is conceivable that the behavior became more automatic and less controlled after learning the category-movement assignment. This assumption is supported by the finding that the interaction with Block is dominantly due to problems of relearning the movement-to-category assignment in Phase 2. This might be owed to the fact that our design comprised of many trials employing the same movement but a relatively short

practice phase of only 10 trials. By this, participants might have internalized a certain category-to-movement assignment after Phase 1. To overcome this problem, it seems necessary to replicate results, preferably in a design in which no change of movement is required.

A second caveat of Experiment 1 is that participants were instructed to categorize stimuli based on the ethnicity of the displayed person. Thus, attention was explicitly directed to this category which might increase evaluative effects of group membership. Therefore, with reference to Bargh (1989) the results might be of the "goal-dependent automaticity" type, that is, they depend on the conscious goal to categorize stimulus person according to their ethnicity (see Degner & Wentura, 2010; Olson & Fazio, 2003, for similar effects in evaluative priming studies). However, if the influence of group membership on the behavioral reaction to emotional expression serves an adaptive function it should also arise if attention is not directed to the group membership. Moreover, studies show that emotional expression as well as group membership can be processed automatically (e.g., Ruys, et al., 2007). Therefore, we wanted to examine whether the result found in Experiment 2 would be replicated in a design in which attention was not explicitly directed to the ethnicity of the targets. We instructed participants in Experiment 2 to categorize the stimuli on the basis of an arbitrary feature, varied orthogonally to emotional expression and group membership. Finding an interaction in such a task would allow us to assess the level of automaticity driving our results.

5.2 Experiment 2

Experiment 2 was implemented to replicate and extend the results of Experiment 1. We employed the same design used in Experiment 1 with the difference that participants were instructed to categorize stimuli according to a (slight) blurring of one side of the face. This allowed us to assess the influence of group membership on the reactions to facial expressions without making it task relevant. Furthermore, this manipulation enabled us to examine approach and avoidance reactions to each stimulus category without having participants change the categorization movement throughout the experiment.

5.2.1 Method

Participants. Sixty-two non-psychology students (30 females, 32 males) of Saarland University participated in the experiment. The age range was 18 to 39 years with a median of 22 years. The data of one participant were excluded because he was identified as a multivariate outlier with regard to the four critical Avoidance Scores (i.e., in-group/ happy, in-group/fear, out-group/happy, out-group/fear; Mahalanobis distance = 15.52, p = .004). All participants were native White-Caucasians. The experiment was the first part of a one-hour experimental session. Participants were paid eight Euros for compensation.

Design. The design followed the same 2 (emotion: fear, happy) × 2 (ethnicity: Turkish/Arabic, White-Caucasian) × 2 (movement: approach, avoidance) within-participants design as Experiment 2.

Material. Stimuli consisted of the same 40 faces used in Experiment 1. The only difference was that we slightly blurred either the left or the right side of each of these faces, respectively, resulting in 80 pictures. The blurring was done in a way that it did not impair recognition of ethnicity or emotional expression but was strong enough to ensure an easy classification (see Figure 4 for an example).

Procedure. The procedure was the same as in Experiment 2 with the following exceptions: Participants were instructed to categorize pictures of young men depending on the blurry side of the face by moving the computer mouse away or towards themselves. The task consisted of four blocks with 40 trials each. Throughout the experiment, participants categorized stimuli by the same movement. The allocation of right and left side to approach or avoidance movements, respectively, was varied between participants. Each block consisted of 40 trials; 20 of these trials required an approach and 20 required an avoidance movement. Within each of these movement conditions, each stimulus category was employed five times. Therefore, in one block, 10

pictures of each category were presented, five asking for an approach and five asking for an avoidance movement. Stimuli were presented in random order. After the first block, the second block presented the remaining 40 stimuli. That is, after two blocks each stimulus was once paired with an approach and once with an avoidance movement. The next two blocks were repetitions of the first two ones (with new randomization of trial sequence). Before the start of Block 1, participants completed 12 practice trials, in which they categorized the pictures of six White-Caucasian and six Turkish/Arabic men displaying neutral expressions depending on the blurry side of the face.

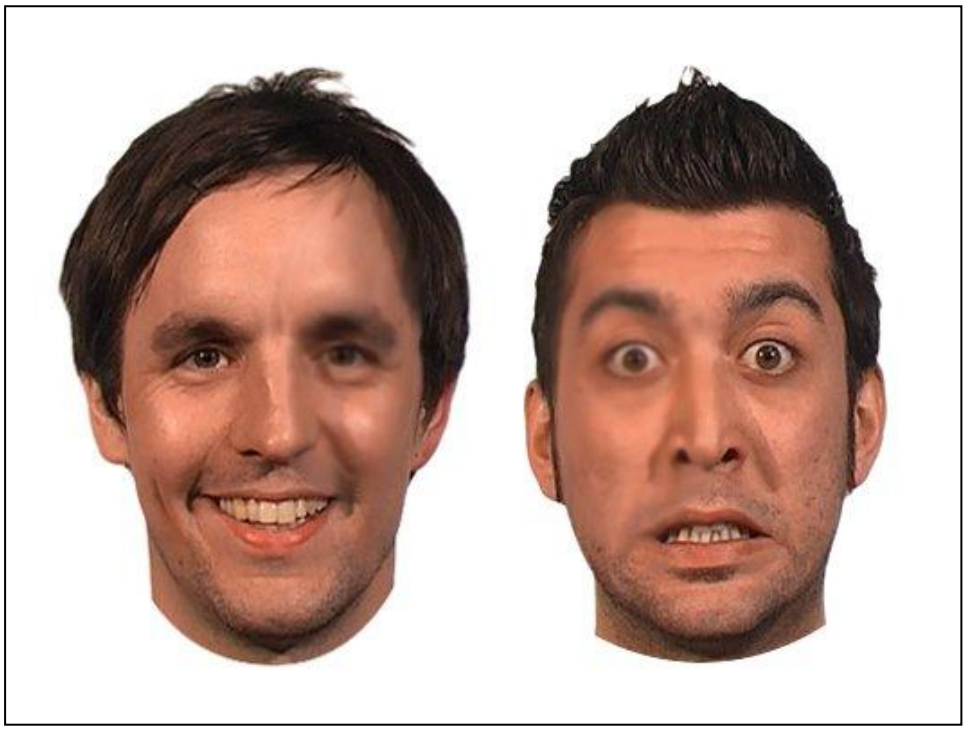


Figure 4 *Examples of stimuli used in Experiment 2 (taken from our collection) with a slight blurring of one side of the face.*

5.2.2 Results

As in Experiment 1, trials in which an incorrect movement occurred (4%) and trials in which the RT was below 200ms and above 1200 ms were excluded from analysis (3%).[12] Mean reaction times are displayed in Table 2.

[12] The same results reported here were found if other outlier criteria were employed.

Table 2 *Mean RTs for approach and avoidance movements of Experiment 2 (standard deviations in parentheses).*

		Movement			
Ethnicity	Emotion	Approach		Avoidance	
White-Caucasian	Happiness	672	(82)	670	(94)
	Fear	667	(89)	652	(85)
Turkish/Arabic	Happiness	694	(96)	664	(80)
	Fear	676	(84)	654	(86)

Note: Small deviations between the Avoidance Score and the difference between approach and avoidance RTs (as shown) are due to rounding.

Again we computed avoidance scores to enhance comprehensibility of the results. We subtracted RTs from avoidance movements from RTs from approach movements for each stimulus category for each block. Preliminary data analysis showed no interaction with the factor block. Therefore, this factor was dropped from further analyses.

The 2 (ethnicity) × 2 (emotion) analysis of variance showed a significant main effect of ethnicity, $F(1, 60) = 13.42$, $p = .001$, $\eta_p^2 = .18$, indicating that Turkish/Arabic stimuli ($M = 26$, $SD = 43$) activated relatively stronger avoidance compared to approach-related behavior compared to White-Caucasian stimuli ($M = 8$, $SD = 48$). No main effect for emotion emerged ($F < .66$, $p = .59$). Most important, the main effect of ethnicity was qualified by the expected ethnicity × emotion interaction, $F(1, 60) = 5.59$, $p < .05$, $\eta_p^2 = .08$ (see Figure 5). A happy facial expression shown by a Turkish/Arabic men activated more avoidance compared to approach related behavior ($M = 30$ ms, $SD = 55$) than a fearful facial expression shown by the same persons ($M = 22$ ms, $SD = 53$). However, this difference did not reach statistical significance ($t < 1$). For the White-Caucasian stimuli, a happy facial expression activated less avoidance compared to approach related behavior ($M = 1$ ms, $SD = 58$) than a

fearful facial expression (*M* = 15 ms, *SD* = 48). This difference reached significance: t (60) = 2.38, $p < .05$.

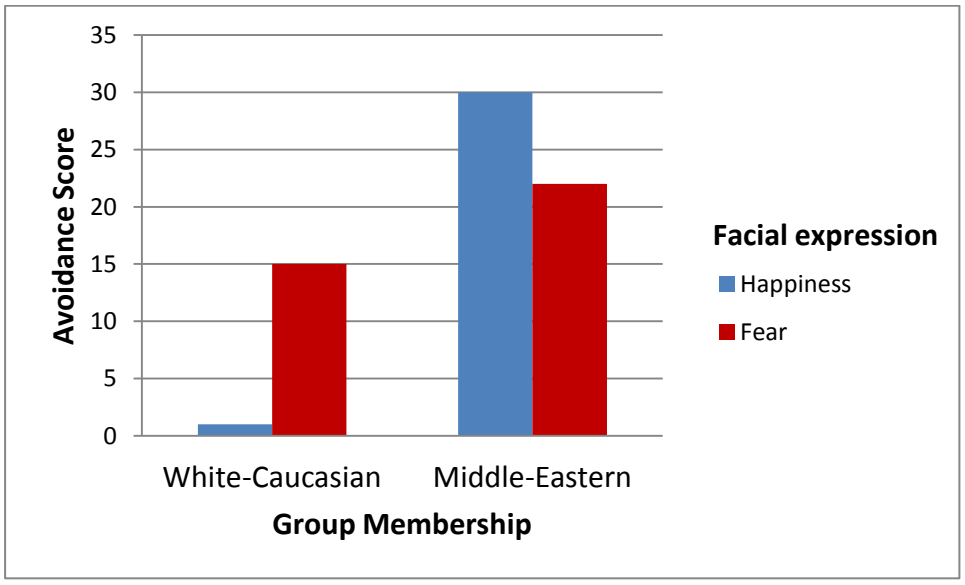


Figure 5 *Interaction of emotion and ethnicity with regard to basic behavioral tendencies (Experiment 2). The Avoidance Score is the difference in mean RT between approach and avoidance responses.*

5.2.3 Discussion

In Experiment 2 we replicated and extended the results of Experiment 1. Experiment 2 demonstrates that group membership and emotional expression exert an interactive influence on approach and avoidance behaviors, even if both are task-irrelevant. In a task in which participants had to categorize targets on the basis of an arbitrary feature (orthogonal to the relevant manipulations) and not on group membership, behavioral reactions to facial expressions still differed for in-group and out-group targets. This finding further supports the assumption that the influence of group membership on reactions to emotional expressions serves an adaptive function. Group membership *and* emotional expression have to be processed automatically in order to allow a flexible adjustment of reactions. Taken together, Experiment 1 and Experiment 2 therefore indicate that approach and avoidance behaviors to in-group and out-group members' emotions are influenced by the intention signaled by the emotion and not by the emotion *per se*. They therefore support

our hypothesis that group membership influences which intention is inferred from an emotional expression.

Additionally, Experiment 2 replicates previous findings demonstrating the activation of avoidance related behaviors by out-group members and the activation of approach related behavior by in-group members (Neumann et al., 2004; Paladino & Castelli, 2008). This behavioral pattern has been found to correlate with implicit (Neumann et al., 2004) as well as explicit measures of prejudice (Wyer, 2010). The main effect for group membership found in Experiment 2 might therefore be an indicator that the interaction between group membership and emotion is caused by negative attitudes.

However, both Experiment 1 and Experiment 2 entail the caveat that they employed a quasi-experimental design. In both experiments, group membership was linked to a specific set of stimuli. One might therefore argue that the different pattern of approach and avoidance behaviors to the emotional stimuli was influenced by specific features of these sets and not caused by an influence of group membership on the evaluation of emotions. Therefore, we conducted two experiments in which we employed a traditional minimal group design and a variant of it. Despite controlling for the influence of stimulus set, this experiment allowed us to assess the generalizability of the results found in Experiment 1 and Experiment 2.

5.3 Experiment 3a and 3b

Experiment 3a and 3b were implemented in order to overcome the quasi-experimental nature of Experiment 1 and Experiment 2 by employing a Minimal Group Paradigm. By varying the group membership of two sets of stimuli we were able to use the same pictures as in-group group as well as out-group members. With this we were able to exclude that the interaction between group-membership and emotional expression observed in Experiment 1 and Experiment 2 was caused by specific features of the stimulus sets.

Participants in Experiment 3 were assigned to one of two groups, apparently based on their perceptional style (Experiment 3a) or their personality style (Experiment 3b). The minimal group manipulation in

Experiment 3a was a traditional one. Participants were randomly assigned to one of two arbitrary groups they had no previous experience with and whose labels were of neutral valence. In Experiment 3b, we implemented an additional manipulation in order to achieve a negative evaluation of the out-group: Participants received information about the two groups, describing the in-group as positive and possessing majority status and the out-group as negative and possessing minority status. This manipulation was implemented because previous research has shown that minimal group effects are typically based on a positive evaluation of the in-group and not on an (absolute) negative evaluation of the out-group (e.g., Brewer, 1979; Otten & Wentura, 1999). However, we hypothesized that an influence of group membership on the evaluation of the intention signaled by an emotional expression might depend on a strong negative evaluation of the out-group. A positive evaluation of the low dominance signaled by a fearful expression, for example, should be most adaptive in cases in which the expression is shown by someone strongly disliked.

5.3.1 Method

Participants. *Experiment 3a.* Sixty-six non-psychology students (40 females, 26 males) of Saarland University, Germany, participated in the experiment. The age range was 18 to 29 years with a median of 23 years. All participants were native Germans. The experiment was the first part of a one-hour experimental session for which participants were paid eight Euros for compensation.

Experiment 3b. Sixty-three non-psychology students (33 females, 31 males) of Saarland University, Germany, participated in the experiment. The data from four participants (1 female, 3 males) were excluded because these participants indicated that the feedback about their personality style did not match their own observations about their personality and that the traits of the other personality style would be much more applicable. The age range of the remaining fifty-nine participants was 18 to 31 years with a median of 22 years. All participants were native Germans. The experiment was the first part of a

one-hour experimental session for which participants were paid eight Euros for compensation.

Design. The design for both experiments followed the same 2 (emotion: fear, happy) × 2 (group membership: in-group, out-group) × 2 (movement: approach, avoidance) within-participants design as Experiment 1 and Experiment 2. Most important, facial stimuli that served as in-group and out-group members were counterbalanced.

Material. *Photographs.* Stimuli employed in the approach avoidance task in both experiments consisted of photographs of emotional expressions shown by White-Caucasian men and women. Pictures were taken from the same picture sets as those employed in Experiment 1 and 2. We selected fear and joy expressions from eight men and eight women, resulting in 32 pictures. We created two stimulus sets, each consisting of happiness and fear expressions shown by four men and four women. The recognition rates of the emotions as well as intensity ratings of emotional expressions and ratings of attractiveness did not differ between the two stimulus sets (all |t|'s < 1, *ns*). Pictures were edited in the same way as those employed in Experiment 2 and 2. All images are displayed in Appendix C.

Group information. In both experiment participants received information about the so-called *basal* and *focal* perception (Experiment 3a) or personality (Experiment 3b) style. The meaning and the valence of the information about the two styles differed between experiments.

In Experiment 3a we informed participants that one could distinguish between two perceptional styles, labeled *basal* and *focal*. Participants were given the information that people having a *basal* perception style processed stimuli in their environment starting from the background whereas people having a *focal* perception style processed stimuli in their environment starting from the salient features.

In Experiment 3b we informed participants that one could distinguish between two personality styles, labeled *basal* and *focal*. The description of the *basal* style characterized people with that style as social, agreeable, social

thinking, and balanced, as well as sometimes imprecise and forgetful. People with the *focal* style were described as egoistic, reckless, sometimes aggressive, technically skillful and intelligent. We modeled the styles in a way that the majority of students would identify with the *basal* style and none with the *focal* one. Importantly, the *basal* style was clearly positive and the *focal* one clearly negative. The slightly negative features associated with the basal style – to be sometimes imprecise and forgetful – as well as the positive features associated with the focal style – to be technically skillful and intelligent – were added for reasons for plausibility of the cover story.

The group information given to participants in Experiment 3a and 3b is displayed in Appendix D.

Procedure. The procedure of both experiments basically consisted of three parts: The minimal group manipulation, a learning phase and the approach/avoidance task.

Minimal group manipulation. At the beginning of the session, participants were informed that the first part of the experimental session would be an assessment of their perceptional (Experiment 3a) or personality (Experiment 3b) style. They were then seated in front of personal computers and the ostensible test was started.

In Experiment 3a the minimal group manipulation consisted of an ostensible perception test (taken from Otten & Wentura, 1999). In this test ambiguous pictures (mostly taken from Escher, 1992) were presented to the participants on the computer screen followed by three alternative interpretations of the picture; their task was to indicate which interpretation matched their first perception. After the rating of the last picture, a message saying "Please wait! Your perception style is assessed" was shown for four seconds. Then participants received an ostensible feedback, telling them that they possessed a *basal* perceptional style or a *focal* perceptional style. Assignment to perceptional style was randomized. Finally the information about the perceptional styles was presented again.

In Experiment 3b the minimal group manipulation consisted of an ostensible personality test. In this test, twenty self-describing statements (e.g.,

"I am moody.") were presented to the participants on the computer screen; their task was to indicate to what extend these statements applied to them personally. After the rating of the last statement, a message saying "Please wait! Your personality style is assessed" was shown for four seconds. Then participants received an ostensible feedback, telling them that they possessed a *basal* personality style. Finally they were given information about the *basal* and the *focal* personality style. The assignment of group label to personality style was fixed because we wanted to avoid confusion if participants talked to each other after the experiment. After the completion of the personality test participants filled out a questionnaire asking to what extend the results from the test matched the participants' own observations about themselves.

Learning Phase. After the minimal group manipulation, participants in both experiments were informed that the goal of the next part of the study was to examine the influence of perceptional/personality style on performance in a face learning task. They were shown the neutral facial expressions with first names of the members of the two sets as in-group and out-group members (Set 1 and Set 2, group-membership counterbalanced). After the reckoning of the faces, participants completed several tasks in which they had to categorize these pictures, as well as two silhouettes presenting themselves as well as another anonymous participant as in-group and out-group members. We included the silhouettes in order to increase participants' identification with the in-group. During these categorization tasks, participants categorized the faces while their first names were shown (minimum of three times) and without the first names shown (minimum of three times). They had to categorize each face correctly before the next task would start. If participants made an error, each of the 16 faces was shown again.[13]

Approach/Avoidance Task. The procedure of the approach/avoidance task was the same as in Experiment 1 with the exception that participants completed 20 practice trials instead of 10. The main task consisted of two

[13] In Experiment 3b we also added a block of trials in which the faces were slightly blurred and one in which participants had to respond within 1000ms. These tasks were implemented in order to decrease the high error rate in the Approach/Avoidance task observed in Experiment 3a. (Blurring and speed instruction were introduced to add some variety to the rather boring task.)

phases with two blocks each. Each block consisted of 32 trials. Assignment of group membership to movement was alternated after Phase 1 (see Experiment 1 for details). Before the start of Phase 2, participants again completed 20 practice trials.

After finishing the entire experiment participants were thanked and dismissed. They were completely debriefed via email after the completion of the data collection.

5.3.2 Results

Trials in which the stimulus was incorrectly classified were excluded from analysis in Experiment 3a (12 %) and Experiment 3b (8 %). Trials with RTs 3 interquartile ranges above the third quartile with respect to the individual distribution (see Tukey, 1977) or below 200 ms were discarded from analysis (2 % in both Experiments). We defined individual cutoffs because average RTs and, more importantly, standard deviations of average RTs in these experiments (Experiment 3a: M = 874, SD = 164; Experiment 3b: M = 842, SD = 154) were higher than in Experiment 1 (M = 656, SD = 99) and Experiment 2 (M = 695, SD = 106). Mean reaction times are displayed in Table 3.

Again we computed avoidance scores to enhance comprehensibility of the results. We subtracted RTs from avoidance movements from RTs from approach movements for each stimulus category for each block. Preliminary data analysis showed no interaction with the factor block. Therefore, this factor was dropped from further analyses.

Experiment 3a. The 2 (group membership) × 2 (emotion) analysis of variance showed a significant main effect of group membership, $F(1, 65) = 4.46$, $p < .05$, $\eta_p^2 = .06$, indicating a successful minimal group manipulation with out-group stimuli (M = 56, SD = 107) activating relatively stronger avoidance behavior compared to in-group stimuli (M = -3, SD = 98). No main effect for emotion emerged ($F < .1$). Interestingly, no group membership × emotion interaction emerged ($F < .1$). A happy facial expression shown by an out-group member did not activate more avoidance compared to approach

related behavior (*M* = 40 ms, *SD* = 120) than a fearful facial expression shown by the same persons (*M* = 52 ms, *SD* = 128): *t* < .8. For pictures of the in-group members, a happy facial expression did not activate more approach compared to avoidance related behavior (*M* = -2 ms, *SD* = 93) than a fearful facial expression (*M* = -5 ms, *SD* = 140): *t* < .3.

Table 3 *Mean RTs for approach and avoidance movements of Experiment 3a and 3b (standard deviations in parentheses).*

		Movement			
Group-Membership	Emotion	Approach		Avoidance	
Experiment 3a					
In-Group	Happiness	838	(159)	840	(175)
	Fear	855	(166)	860	(201)
Out-Group	Happiness	866	(185)	825	(175)
	Fear	872	(185)	820	(142)
Experiment 3b					
In-Group	Happiness	804	(148)	825	(173)
	Fear	815	(163)	818	(171)
Out-Group	Happiness	852	(180)	780	(141)
	Fear	838	(167)	786	(128)

Note: Small deviations between the Avoidance Score and the difference between approach and avoidance RTs (as shown) are due to rounding.

Experiment 3b. The 2 (group membership) × 2 (emotion) analysis of variance showed a significant main effect of group membership, *F* (1, 58) = 8.1, *p* < .01, η_p^2 = .12, indicating that out-group stimuli (*M* = 62, *SD* = 107) activated relatively stronger avoidance behavior compared to in-group stimuli (*M* = -12, *SD* = 119). No main effect for emotion emerged (*F* < .01). Most important, the main effect of group membership was qualified by the expected

group membership × emotion interaction, $F(1, 58) = 5.25$, $p < .05$, $\eta_p^2 = .08$ (see Figure 6).

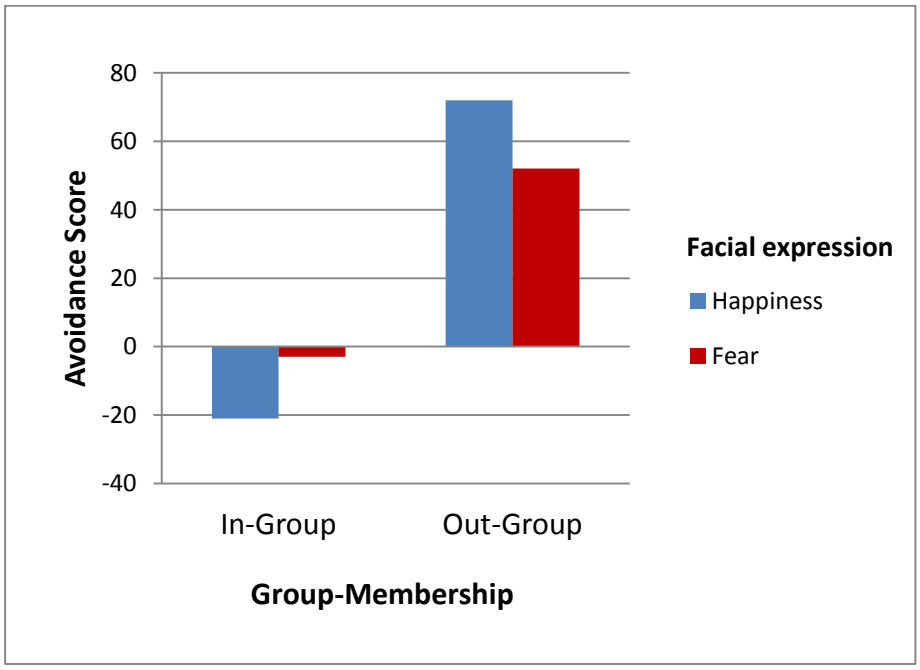


Figure 6 *Interaction of emotion and ethnicity with regard to basic behavioral tendencies (Experiment 3b). The Avoidance Score is the difference in mean RT between approach and avoidance responses.*

A happy facial expression shown by an out-group member activated more avoidance compared to approach related behavior (M = 72 ms, SD = 133) than a fearful facial expression shown by the same persons (M = 52 ms, SD = 105). This difference failed to reach significance: t (58) = - 1.4, p = .07 (one-tailed). For pictures of the in-group members stimuli, a happy facial expression activated less avoidance compared to approach related behavior (M = -21 ms, SD = 137) than a fearful facial expression (M = -3 ms, SD = 118). Again, this difference failed to reach statistical significance: t (58) = 1.55, p = .06 (one-tailed).

5.3.3 Discussion

With Experiment 3a and Experiment 3b we further extended the results found in Experiment 1 and Experiment 2. Using a Minimal Group Paradigm,

we employed two sets of stimuli and each set served as the in-group as well as the out-group in a balanced design. By alternating the assignment of stimulus set to group we were able to show that the interaction between group membership and emotion found in Experiment 1 and Experiment 2 was not due to specific features of the stimulus sets employed. Interestingly, this critical interaction was just obtained in Experiment 3b in which we induced a negative evaluation of the out-group. In Experiment 3a, which employed a more traditional Minimal Group Paradigm, no influence of group-membership on reactions to emotional expressions emerged. We argue that this is the case because a Minimal Group Manipulation typically results in in-group favoritism but not out-group derogation (e.g., Brewer, 1979; Otten & Wentura, 1999). Note that the absence of the group by emotion interaction in Experiment 3a cannot be attributed to an unsuccessful manipulation, since a main effect of group-membership was obtained. Out-group members elicited a higher avoidance score than in-group members. This main effect replicates previous findings (e.g., Paladino & Castelli, 2008) and shows that the minimal group manipulation was successful. However, this main effect was not moderated by emotional expression. The finding that a negative evaluation of the out-group is necessary to influence reactions to emotional expressions further supports our reasoning that reactions to emotions are triggered by the intention signaled by an emotional expression.

Furthermore, this experiment shows that the influence of group membership on reactions to emotional expressions found in Experiment 1 and 3 is not limited to the Turkish/Arabic versus White-Caucasian group situation but also arises for newly formed groups.

5.4 General Discussion

Behavioral reactions to facial expressions of emotions are influenced by the relationship between expresser and perceiver of an emotion; in three studies we provided evidence that the same emotional expression can trigger opposing behaviors depending on the group membership of the expresser. Emotion-group combinations that were hypothesized to be approach related (in-

group/happiness, out-group/fear) activated more approach related behavior than avoidance related combinations (in-group/fear, out-group/happiness). We suggest that this reversal of effects depending on the group membership of the expresser is due to an influence of the relationship between expresser and perceiver of an emotion on the intention inferred from the emotion. The results reported here therefore support our hypothesis that concordant and divergent reactions are caused by an influence of situational factors on the intention inferred from an emotional expression. It furthermore shows that behavioral reactions to emotional expressions are adaptive reactions and are therefore sensitive to situational and social factors. Such factors might also be responsible for the contrary behavioral reactions to anger and fear expressions reported in the literature (see Chapter 2.3). Our results show that – depending on the relationship between expresser and perceiver – the same emotional expression can activate contrary behaviors. Therefore, this finding highlights the importance of taking into account such factors when examining behavioral reactions to emotional expressions.

Importantly, an influence of group membership and emotional expression of the targets on behavioral reactions was found even though one (i.e., emotion in Experiment 1 and Experiment 3a/b) or both (Experiment 2) features were irrelevant for the task at hand. Participants categorized targets depending on group membership (Experiment 1 and Experiment 3a/b) or based on an arbitrary feature (Experiment 2). The results for all three tasks were similar: Behavioral reactions to emotional expressions differed depending on the group membership of the expresser. Finding an influence of task irrelevant features on approach and avoidance allows us to assess the level auf automaticity driving our results. We conclude that the observed effects occurred unintentionally because participants exerted a task that was independent of group membership and emotional expression. The low error rates show that participants clearly attended to the arbitrary feature in Experiment 4. Thus, it is implausible that they intentionally controlled their behaviors with regard to emotion and ethnicity. Moreover, the interaction found in our studies is much more complex than just a linear effect of emotion or group membership on approach and avoidance behaviors. We think it is very

unlikely that participants influenced their behavior strategically to produce such a pattern. Therefore, the results show that the flexible adjustment of approach and avoidance behaviors to the situation occurs automatically. This again supports the notion that these behaviors serve an adaptive function.

Moreover, the influence of group membership on behavioral reactions to emotions was also observed in an experiment in which the groups were newly formed and the same pictures served as in-group as well as out-group members in a balanced design. This finding provides evidence that the effect observed in Experiment 1 and 2 is not caused by the specific stimuli used and is not limited to the groups employed here. This further supports the notion that the interaction between group membership and emotional expression is caused by an evaluation of the intention signaled by the emotion. Behavioral reactions to emotional expressions are influenced by the relationship to the out-group and not by specific features of the groups employed. Most interestingly, we found this effect for newly former groups only if the out-group was negatively connoted. We will return to this issue below.

Finding an influence of group membership and facial expression on approach and avoidance behaviors is interesting with regard to another topic: Studies examining the influence of irrelevant valence on approach and avoidance tasks so far have yielded mixed results. Whereas some groups were able to find an influence of valence on approach and avoidance reactions even if the task did not require attending to valence (e.g., Chen & Bargh, 1999; Duchworth, Bargh, Garcia, & Chaiken, 2002; Krieglmeyer et al., 2010) others did not (e.g., Lavender & Hommel, 2007; Rotteveel & Phaf, 2004). The only study known by the authors that employed emotional facial expressions without emotion being task-relevant failed to find an influence of emotion on movement (Rotteveel & Phaf, 2004). Therefore, our results add to the discussion by providing evidence that – under certain conditions – group membership and facial expressions can exert an influence on behavior without being task relevant. The possible reasons for this are twofold. First, one reason why we were able to observe these effects might be the visual feedback that was provided to participants during the task. A recent study demonstrated impressively that the same movement can be defined as approach or avoidance

behavior depending on the reference point (Seibt et al., 2008). Due to the increase and decrease of the size of the stimuli in our studies the assignment of movement to approach and avoidance was unambiguous. Thereby possible error variance that might have diminished effects in other studies could be reduced (see also Krieglmeyer, & Deutsch, 2010, for this argument). Second, our results show that it is important to take into account the relationship between expresser and perceiver when examining approach and avoidance related behaviors to facial expressions. Individual attitudes of the participants might influence their behaviors, especially on tasks in which emotion is not relevant. If emotion is relevant, individual characteristics of the expresser attract less attention and might therefore exert less influence on reactions compared to tasks in which emotional expressions are not task-relevant. However, this speculation needs further empirical support.

Finally, our paradigm and our results add to the growing literature on implicit attitudes (i.e., automatically activated evaluations of attitude objects assessed by indirect measures like evaluative priming or IAT; see Degner, Wentura, & Rothermund, 2006; Wittenbrink & Schwarz, 2007). Previous studies found a correlation between approach and avoidance behaviors and implicit, as well as explicit attitudes. Participants with negative attitudes towards specific groups were faster in exerting avoidance than approach movements towards members of that group (e.g., Neumann et al., 2004; Wyer, 2010). The main effect for group membership found in Experiment 2 and 3 might imply that the majority of our participants held negative attitudes towards the respective out-groups. Therefore, the reversal of the emotion-concordant behavioral pattern for Turks/Arabs might be caused by prejudice. More importantly, the effects of Experiment 3a and 3b suggest that the interaction between group-membership and emotional expression is caused by out-group derogation and not in-group favoritism since it was not obtained in a classical Minimal Group Paradigm that typically leads to in-group favoritism only. In Experiment 3b, in which we combined the minimal group manipulation with evaluative information about the groups, the interaction occurred. However, this assumption as well as the general influence of

prejudice on reactions to emotional expressions should be the subject of future investigations.

Taken together, the experiments reported in this chapter provide strong evidence that the interaction between group-membership and emotions is indeed caused by the intention signaled by an emotion. However, one might argue that this conclusion is still based on an indirect inference: We did not directly measure the intention associated with an emotional expression but only approach and avoidance reactions which are assumed to be influenced by the intention. It is still possible that our results are caused by a different mechanism. It is, for example, conceivable that the emotions expressed by out-group members were perceived as less intense than the in-group emotions; this difference might then have influenced approach and avoidance reactions. It is also possible that emotions expressed by in-group and out-group members are seen as signaling the same intention which is then evaluated differently. The results reported above cannot distinguish between the three different mechanisms. Therefore, we conducted an experiment in order to visualize the mental representations of in-group and out-group smiles in order to assess if they differ in expressed intentions, affect or none of the two.

6 Visualizing the mental representation of in-group and out-group smiles

The purpose of this experiment was to further examine the mechanism that underlies the influence of group membership on automatic reaction to expressions of emotions. The results of the four approach-avoidance experiments suggest that group membership influences which intention is associated with an emotional expression. However, as was argued above, the results might also be explained by different mechanisms: It is, for example, conceivable that the emotions expressed by in-group and out-group members differ in perceived intensity, producing the observed effect. Moreover, it might also be that in-group and out-group emotions are seen as signaling the same intention which is then evaluated differently. Therefore, this experiment was designed to shed light into the exact mechanism underlying the interaction between group membership and emotional expression. We thereby hypothesized that in-group and out-group emotions are indeed associated with different intentions.

In order to test this assumption we decided to visualize the mental representations of an emotional expression shown by in-group and out-group members, namely smiles. We hypothesized that the assumed association between group membership and intention of an emotion would influence the mental representation of this emotion: A smile shown by an in-group group member should be visualized as expressing benevolent intentions and that of an out-group member as showing malevolent intentions. This approach therefore allowed us examine if in-group and out-group emotions are indeed associated with different intentions, supporting our hypothesis, or if they are rather associated with the same intention or with a different underlying affect. Thereby we could test the competing explanation for the effect observed with the approach avoidance paradigm.

We chose to examine smiles in this experiment because it has been shown that individuals can differentiate between subtle differences within smiles, like true and false smiles (e.g., Bernstein, Young, Brown, Sacco, & Claypool, 2008), felt, false, and miserable smiles (Ekman & Friesen, 1982),

and embarrassed, shameful and amused smiles (Keltner, 1995). These findings provide evidence that intentions of smiles indeed influence the expression of this emotion. This might be an important prerequisite for our arguing that the intention associated with an emotional expression influences the mental representation of this emotion. However, theoretically, other emotions should also be suitable for examining our hypothesis.

There is already first evidence for our notion that different mental representation of an emotional expression exist: Recent research shows that there the mental representation of emotions differ between cultures (Jack, Caldara, & Schyns, 2012; Jack, Garrod, Yu, Caldara, & Schyns, 2012). However, in comparison to these studies we assume that the mental representations of emotional expressions do not only differ between individuals but that the same individuals hold different mental representations about an emotional expression. Regarding smiling expressions, this would implicate that there exist a representation of what, for example, a felt smile or a mischievous smile looks like. We argue that depending on the group membership of the imagined expresser, different mental representations of a smile are activated. This should be the case because people attribute different intentions to the smiles of in-group and out-group members (as was already argued above). Whereas smiles shown in-group members should be interpreted as the wish to affiliate, those expressed by members of an out-group might rather be seen as expressing dominance, arrogance, or *Schadenfreude*.

In order to examine the mental representations of in-group and out-group smiles, we employed a reverse-correlation image classification technique (Mangini, & Biederman, 2004; Todorov, Dotsch, Wigboldus, & Said, 2011). Recently, a number of studies using the reverse-correlation image classification technique has been published in social-cognitive research (e.g., Dotsch, Wigboldus, Langner, & van Knippenberg, 2008; Imhoff, Dotsch, Bianchi, Banse, & Wigboldus, 2011; Dotsch, Wigboldus, & van Knippenberg, 2011). In an experiment employing this technique, participants are asked to select one out of two noisy images as belonging to a certain category of interest. The presented images consist of a constant base face superimposed by varying random noise patterns. By averaging all images selected, an individual

classification image is obtained. The final image constructed with this technique thus represents an estimate of the information relevant for this category and can be seen as an approximation of a mental representations of the target category (Mangini, & Biederman, 2004; Dotsch, et al., 2008). The reverse-correlation image classification technique is therefore used to assess which information is used by participants to classify stimuli into categories (Mangini, & Biederman, 2004).

The reverse-correlation image classification technique has been used to visualize mental representations of in-group and out-group members (Dotsch et al, 2008; Imhoff, et al., 2011), traits (Dotsch et al. 2011; Todorov, et al., 2011), emotions (Mangini, & Biederman, 2004; Jack, Caldara, et al., 2012), and specific individuals (Karremans, Dotsch, & Corneille, 2011; Mangini, & Biederman, 2004). Our study visualized the mental representations of smiling in-group and out-group members and the different intentions attributed to these images by subjects uninformed about the existence of different groups.

Overview

We used the reverse-correlation image classification technique to obtain visualizations of what participants imagine smiling in-group and out-group members to look like. To this end, after undergoing a minimal group manipulation, participants repeatedly indicated which of two noisy, but smiling faces most resembled a member of either the in-group or the out-group (manipulated between subjects). Because we wanted participants to be able to tap into a mental representation in order to complete the reverse-correlation task, we presented photographs of arbitrary, neutral-looking men and women as in-group and out-group members prior to the reverse-correlation task. The images in the classification task were averaged per participant in order to obtain the personal classification image of a smiling in-group or out-group member, representing what that participant thought a typical smiling in-group or out-group member looked like.

The stimuli used for the classification task consisted of the image of a smiling male face (different from all individuals shown in the group manipulation) as base face, superimposed with a random noise pattern. The

noise pattern altered the features as well as the expression of the base face differently on each trial. Because of the base face, however, each image was showing a smiling expression. This emotional expression was not mentioned in the instructions.

After the image construction, a further sample of participants – blind with regard to the manipulation – rated each of these images on various variables designed to assess the meaning of the emotional expression, that is which intention (i.e., benevolent vs. malevolent) it expressed and what the underlying affect (i.e., positive vs. negative) was. We hypothesized that group membership would be the best predictor of the nature of the intention signaled by a smile but not predictive of the affect behind the smile.

6.1 Method

6.1.1 Participants

Forty non-psychology students (23 females, 17 males) at Saarland University, Germany, participated in the experiment. The experiment lasted approximately 40 minutes. Participants were paid six Euros for compensation.

6.1.2 Design

The experiment followed a one-factorial design with two conditions (group membership: in-group vs. out-group) varied between participants.

6.1.3 Materials

The material consisted of the images used for the group manipulation and the stimuli in the reverse-correlation task.

Group manipulation images. We presented two groups of photographs of arbitrarily selected Caucasian men and women as in-group and out-group members to participants. The two groups consisted of six morphs each, which

were created by morphing the photograph of each of six people with the photograph of a seventh person[14]. By doing so, the six members of a given group resembled each other to a degree that was noticeable but not blatant. This was done in order to enforce the creation of a mental image of the respective group in participants and to enhance the plausibility of the cover story. The photographs were taken from the Radboud Faces Database (Langner, et al., 2010), the Amsterdam Dynamic Facial Expression Set (Van der Schalk, et al., 2001) and our own collection (Paulus, Rohr, Neuschwander, et al., 2012) and displayed men and women with a neutral facial expression. Each of these persons was assigned a first name. The group images are displayed in Appendix E.

Stimuli. Participants categorized 800 pictures that were presented as pairs side by side. Each picture consisted of the same base face with a random noise pattern superimposed. The base face was the male smiling face of the Averaged Karolinska Directed Emotional Faces Database (Lundqvist & Litton, 1998). For the creation of the noise pattern, see Mangini and Biederman (2004). Each pair consisted of one image for which the base face was superimposed by one particular noise pattern, and another image with the base face superimposed by the reverse of this noise pattern (for details see Dotsch et al, 2008). Since the base face expressed a smile, all images showed a smiling expression (see Figure 7 for an example of a stimulus pair).

6.1.4 Procedure

Image Creation. Participants in the image creation phase participated in groups of up to five people. After arriving to the lab they were seated individually in front of personal computers, separated by partition walls. Before the image creation, a minimal group manipulation was conducted.

At the start of this manipulation, participants were informed that the first part of the experimental session would be an assessment of their

[14] The morphing factor was 50%

perception style. The ostensible test of perceptual style was the same as employed in Experiment 3b. Assignment to perception style was randomized.

After the perception test, participants were informed that the goal of the main experiment was to examine how the individual perception style influences the recognition and the categorization of other people possessing the same or a different perception style. The two groups of morphed faces were then presented to the participants with the group labels *basal* and *focal* written beneath the images. Accordingly, participants were told that the members of one of those groups possessed a *basal* perception style, and the others possessed a *focal* one. To enhance the manipulation, within the group of people that had the same perception style as the participant, a silhouette with the label "Me" was embedded. (To parallelize, within the other group, a silhouette with a first name, differing from the one of the participant, was included.) After familiarizing the faces, participants completed several trials in which they had to categorize these pictures as in-group and out-group members. This learning phase was implemented so that participants would create a mental image about the in-group and out-group on which they could base their decision in the image creation task. The assignment of perception style to group was fixed.

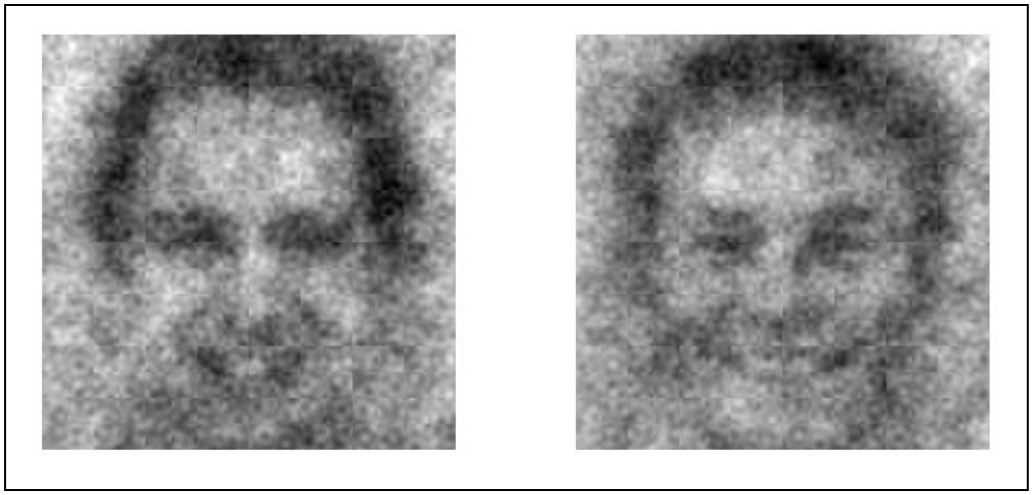


Figure 7 *Exemplars of stimuli employed in Experiment 4*

After participants had successfully learned the categorization of the morphed faces, the image creation task started. Participants were shown the pairs of noisy images side by side and were asked to select the image that most

resembled a member of the *focal* group (see Figure 7 for an example). Thus, half of the participants always selected the image that resembled an in-group member and half selected the image that resembled an out-group member. Note that all participants could refer during the reverse-correlation task to a mental image that was based on exactly the same exemplars shown during learning. Participants worked through 400 trials. After each block of 80 trials, the participants were reminded to always select the pictures that resembled a member of the *focal* group and the overview of the *focal* group was presented again.

After finishing the entire experiment participants were thanked and dismissed. They were completely debriefed via email after the completion of the data collection.

The selected images were later averaged per participant to create the classification images which visualized the mental representation of an in-group or out-group member, respectively, for each participant. Each of these images thereby displayed a smiling expression since the base face was expressing a smile.

Image rating. The 40 images (i.e., 20 images created on the basis of the categorizations of those participants that were instructed to select out-group members and 20 images of participants that were instructed to select in-group members) obtained were rated by an independent groups of participants (N = 29) on the meaning of the displayed smile,

For the assessment of the meaning of the smile, we gave descriptions of seven possible meanings to the raters and asked them to indicate how much each face expressed each of these meanings. We chose these meanings based on the literature concerning different types of smiles (Niedenthal, et al., 2010; Ekman, 2001) and on our own considerations. Descriptions of these meanings are displayed in Table 4. The meanings contain information about intention (benevolent vs. malevolent) as well as felt affect (positive vs. negative) of the expresser. Intention and felt affect are thereby (at least in part) independent of each other: A smile can signal a positive intention but the expresser can experience negative affect (e.g., a shameful smile) and vice versa (e.g.,

mischievous smile). Since we were mostly interested in the intention and not the affect signaled by a smile, we phrased the description of the meanings of a smile with a focus on intention and not felt affect. Each meaning, however, nevertheless contains information about the intention and the underlying affect. We hypothesized that group membership would only be predictive of the nature of the intention and not the underlying affect.

Table 4 *Meanings of Emotion Items employed in Experiment 4*

Item	*The smile shows…*
Enjoyment smile	*The smile shows that the person is happy about something that is not related to the presence of another person.*
Affiliative smile	*The smile shows that the person is happy about the presence of the other person.*
Shameful smile	*The smile shows that the person is ashamed about something.*
Superior smile	*The smile shows that the person feels superior.*
Mischievous smile (Schadenfreude)	*The smile shows that the person is happy about the misfortune of another person.*
Scheming smile	*The smile shows that the person has dishonest intentions.*
Polite smile	*The smile shows that the person is just smiling because it is expected in the particular situation.*

Before the start of the rating of the meaning of the smiles, information about the different meanings was given and participants rated two images (created by student researchers with the reverse-correlation procedure) to familiarize themselves with the procedure. Faces in the main experiment were presented in random order. Participants indicated on scales ranging from 1 (not at all) to 10 (very much) to which extend the smile signaled each of the seven meanings (see Table 4). The rating scales for each meaning were presented below each other on the computer monitor. Thus, each face was rated on each

of the seven meanings before the next face was presented. Participants showed a high internal consistency (Cronbach's Alpha = .91).

To obtain indicators of discriminant validity, a further sample of independent participants (N = 30) rated (a) the intelligence of the displayed person, (b) the clarity of the image, and (c) the intensity of the emotion. These ratings were collected independently to prevent influence of the prior rating of emotion meaning. The intelligence, image clarity, and emotion intensity were collected in consecutive blocks, i.e., each of the 40 classification images were rated on one variable before the next variable was assessed. Intelligence was rated on a scale ranging from 1 (stupid) to 10 (smart). Clarity and intensity were rated on a scale ranging from 1 (very low) to 10 (very high). As with the emotion meaning ratings, participants completed two practice trials before they rated the classification images. The raters showed satisfying internal consistency (Intelligence: Cronbach's Alpha = .92; Clarity: Cronbach's Alpha = .94; Intensity: Cronbach's Alpha = .96)

6.2 Results

The ratings for each of the seven meanings of a smile, as well as the clarity, intensity, and intelligence ratings were averaged across raters. This resulted in one mean score for each of these variables for each classification image. The values for the items scheming, mischievous, and superior were reversed such that a higher value indicated a more benevolent and less malevolent intention.

Since we predicted that the meanings contain information about the intention as well as the affective state of the perceiver, we submitted the seven meaning variables to a principal component analysis in order to test the hypothesized structure. As predicted, this resulted in a two factorial solution with the first factor explaining 67% of the variance and the second one explaining 23%. The two factors with the respective loadings, after VARIMAX-rotation, of the seven variables are displayed in Table 5.

Table 5 *Factor Loadings for the Meanings of Emotion Items (PCA; VARIMAX rotation) in Experiment 4*

Item	Factor1 (intention)	Factor2 (affect)
Enjoyment smile	.56	**.81**
Affiliative smile	.64	**.73**
Shameful smile	.43	**-.85**
Superior smile *(reverted)*	**.95**	.16
Mischievous smile (Schadenfreude) *(reverted)*	**.96**	.07
Scheming smile *(reverted)*	**.93**	.32
Polite smile	**.90**	-.07

Note: Numbers printed in bold indicate the higher factor loading of each Meaning of Emotion Item

As can be seen, the variables that were mainly descriptive for the intention signaled by a smile showed high positive loadings on the first factor (mischievous, superior, scheming, affiliative, polite). We therefore interpreted the first factor as representing the intention (benevolent vs. malevolent) signaled by a smile. The second factor, in contrast, was interpreted as indicative for the affective component of a smile since the meanings describing positive affect showed high positive loadings (affiliative, enjoyment) and the meaning describing negative affect had a negatively signed loading (shameful). Please note that the loadings of the item "shameful", which were substantial on both factors, had a positive sign for factor one and a negative sign for factor two, indicating the presence of positive intention and the absence of positive affect. Since several of the meanings had substantial loadings on both factors, we extracted factor score variables. A higher value on the first factor (intention) indicated more benevolent intention whereas a higher value on the second one (affect) indicated more positive affect.

In order to assess the influence of group membership, intensity of the emotion, clarity of the expression, and intelligence of the expresser on the respective factors, we conducted multiple hierarchical regression analyses on both factor scores separately. We hypothesized that group membership would be the best predictor for the intention signaled by a smile (Factor 1) whereas intensity would predict the affect behind the smile (Factor 2). As can be seen in Table 6, the results mainly supported our hypotheses. Group membership (out-group = 0, in-group = 1) was a significant predictor of the factor intention in Step 1and remained to be a significant predictor after intensity was entered in Step 2, clarity in Step 3, and intelligence in Step 4. The signs of the Betas show that in-group smiles were associated with a more positive intention than out-group smiles (see Figure 8 for sample images for the respective groups).

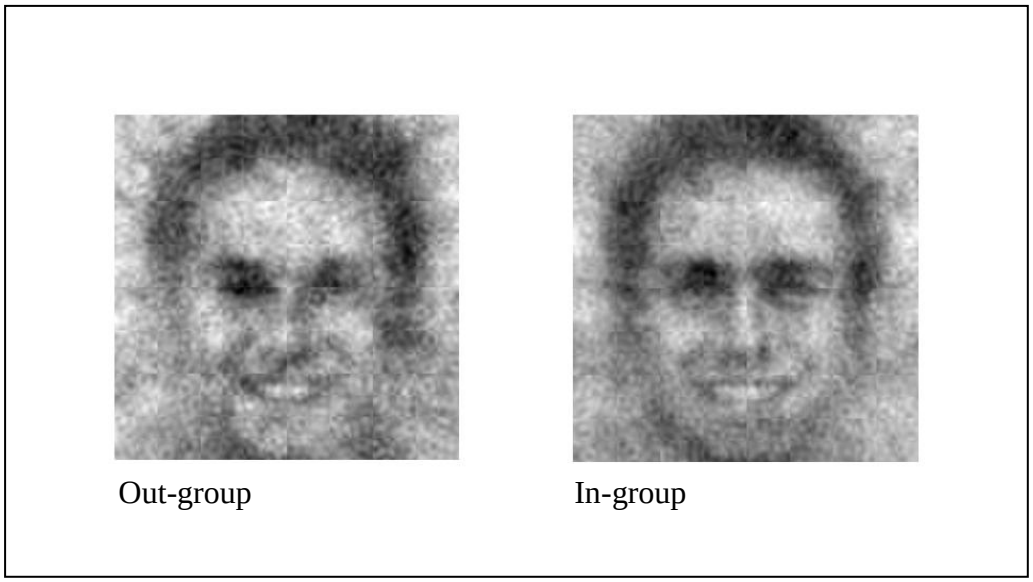


Figure 8 *Exemples for classification images obtained in Experiment 5. The images are selected based on their values of the factor intention. The left image displays the median out-group image, the right image the median in-group image with respect to the distribution of this factor.*

Intensity, which was clearly a non-significant predictor of the factor intention in Step 2, surprisingly reached significance in Step 3 and Step 4. However, we believe that this change in significance is due to a suppression effect caused by the correlation between clarity and intensity. Clarity was a significant predictor when entered in Step 3, but failed to reach significance

after intelligence was entered in Step 4. The results showing that group membership significantly predicted intention above and independently of the other variables throughout the analysis therefore support our hypothesis that group membership influences the intention signaled by a smile.

The same analysis was also run on the factor affect. The results show that intensity was the only significant predictor in Step 2, in Step 3 in Step 4. Group membership never predicted the affect shown in a smile, even if it was the only predictor. These results support our hypothesis that the affect shown in a smile is inferred from the intensity of the expression. In-group and out-group membership, on the other hand, is not associated with the affective component of the smile.

Table 6 *Results of the hierarchical regression analyses (Beta-weights and R^2) in Experiment 4*

	Factor 1 (intention)				Factor 2 (affect)			
	Step 1	Step 2	Step 3	Step 4	Step 1	Step 2	Step 3	Step 4
Group	**.40**	**.40**	**.38**	**.32**	.20	-.04	-.04	-.04
Intensity		.01	**-.34**	**-.32**		**.69**	**.72**	**.73**
Clarity			**.63**	.45			-.07	-.09
Intelligence				.22				.02
R^2	**.16**	**.16**	**.43**	**.44**	.04	**.45**	**.46**	**.46**

Note: Group: out-group = 0, in-group = 1; numbers printed in bold are associated with $p < .05$.

6.3 Discussion

The results of this experiment support the hypothesis that emotions expressed by in-group and out-group members are associated with different intentions. By employing the reverse-correlation image classification technique we visualized participants' mental representations of smiling in-group and out-group members. Independent participants then rated the intention of the smile shown by these images. The results demonstrate that the intention signaled by the respective smile differed as a function of group membership: As predicted, the mental representations of in-group smiles expressed a more benevolent intention than those of out-group smiles. The affective content of these smiles did not differ. These results show that group membership influences which intention is associated with an emotional expression.

Importantly, the effect found in this study occurred even though participants in the image creation task were not instructed to base their decision on the nature of the smile but rather on arbitrary group images. The emotional expression was neither task relevant nor mentioned. However, the resulting in-group and out-group images show that the smiles influenced participants' categorizations. Therefore, we assume that this influence occurred unintentionally and unconsciously; it is caused by an association between group membership and expected intention of a shown facial expression. This association influences the visualized mental representation of group members which in turn influences the decision.

Interestingly, the mental representations of in- and out-group members' smiles did not differ in underlying affect but only in signaled intention. As argued above, a certain meaning might be indicative of a benevolent intention but is associated with a negative affect (e.g., shame) and vice versa. Examining the influence of group membership and intensity on the intention and the affective component of the mental representations, group membership predicted the intention signaled by the smile whereas intensity predicted the felt affect of the expresser. The more intensive the expression in an image was rated, the more the smile expressed positive affect. This effect was independent

of group membership. The finding points to an association between group membership and intention and not group membership and affect.

Therefore, this result provides evidence that the interaction observed with the approach avoidance task (most likely) occurs because in-group and out-group emotions are interpreted as signaling different intentions. Accordingly, they elicit different reactions. However, this conclusion is still an indirect one since the results obtained with the reversed correlation technique only point to an association between group membership and intention of an emotion. They do not provide direct evidence that this association also influences the interpretation of presented emotional expressions. However, since mental representations reflect previous experiences as well as expectancies (Jack, Caldara, et al. 2012), it is plausible to assume that the effects obtained in the approach and avoidance tasks are (at least in part) based on the anticipation of a benevolent or malevolent intention. This seems particularly likely because intergroup situations are often characterized by competition and conflict (e.g., Campell, 1965; de Dreu, 2012; Deutsch, 1949; Tajfel, et al., 1971; Tajfel, & Turner, 1979). In such a situation, it is natural to expect a malevolent intention.

Apart from providing evidence that group membership influences the intention associated with an emotion, the results obtained in this experiment might also be of interest for another field of emotion research, namely emotion recognition. It has repeatedly been found that emotion recognition is influenced by the group membership of expresser and perceiver of an emotion. Typically, emotions are recognized better if perceiver and expresser of an emotion share cultural group membership, suggesting an influence of a cultural dialect (for a meta-analysis on this effect see Elfenbein, & Ambady, 2002). Interestingly, however, this effect also occurs if group membership is only established with a minimal group paradigm (Young, & Hugenberg, 2010). This in-group advantage was explained by motivational processes. However, we propose a different reason for the difference in recognition rates: We consider it possible that emotions expressed by western in-group members are recognized more accurately than those expressed by western out-group members because the mental representations for the respective emotions differ between in-group and

out-group members. Assuming that a posed facial expression of a western stimulus set rather resembles the mental representation of an in-group emotion than that of an out-group emotion, this might result in a mismatch between mental representation and visual input if the expresser is labeled an out-group member. This mismatch might then impair emotion recognition compared to a situation in which visual input and mental representation match (see Jack, et al., 2012 for a similar argument). However, this assumption is very preliminary and needs further empirical support.

Taken together, the results of this experiment reveal an association between group membership and intention signaled by an emotional expression: The mental representations of in-group members' smile showed more benevolent intentions than that of out-group members. Importantly, this result occurred even though the emotional expression was not relevant for the ongoing task, suggesting an automatic process. The finding of this experiment therefore supports our assumption that group membership influences reactions to emotions because it automatically influences which intention is associated with an emotional expression.

However, this experiment as well as all others reported in this thesis so far employed visual material. Emotions expressions were manipulated by employing images of emotional expressions. Therefore, we cannot conclude if this effect can be generalized to other modalities or if it is restricted to the visual domain. Furthermore, even though indirect, the dependent variables assessed so far required performing an artificial task (Experiments 1 – 3). These variables therefore constitute very artificial reactions. We think it would be interesting to examine if the interaction between group membership and emotional expression also influences natural everyday behavior. The last experiment was designed to overcome these limitations.

7 Automatic affective reactions in the voice

The last goal of this thesis was to assess if the automatic interaction between group membership and emotional expression also occurs if the stimuli are presented in a non-visual modality and the affective reaction occurs only incidental. For this, we conducted an experiment that was a modified version of one employed by Weisbuch and Ambady (2008): Group membership and emotional expression were manipulated by presenting short stories instead of visual material. Participants' task was to read these stories aloud while their voices were recorded. The affective coloring of the voices constituted our dependent variable. Therefore, the affective reaction was only a by-product of an everyday occurring behavior. The nature of this experiment thus clearly differs from the others reported in this thesis in material used and dependent variable assessed; since it is the only one employing these methods, it should be seen as showing possible directions that the project could take rather than drawing final conclusions. Accordingly, the results should only be taken as a first indicator for the observed effect[15].

In the original experiment by Weisbuch and Ambady (2008), which was part of a larger set of studies, the authors found concordant affective reactions in the voice recordings of participants that read about an emotional life event of an in-group member, but divergent reactions if the protagonist in the story was a member of an out-group. Group membership was established through team allegiance: The protagonist was either a supporter of the same football team as the participant or supporter of the rival team. Because of this group manipulation, we think that it is likely that participants consciously altered their voices when reading the short stories. This assumption is based on the fact that there exists a strong, openly expressed rivalry between the two employed football teams in the northeastern United States (Weisbuch &

[15] We also have to note that we tried to replicate the results reported in this chapter with a different set of voice recordings and ratings. Unfortunately, the expected effect did not emerge again. However, since the second data collection differed from the first in various aspects (experimenters, recording locations, recording quality), and the power of this experiment was very low (n = 52), we believe that no final conclusion can be drawn regarding the replicability of the results.

Ambady). Because of this, participants might have felt hard-pressed to express their sympathy and antipathy to the respective groups by altering their voices. We therefore believe that the findings reported by Weisbuch and Ambady are not necessarily based on an automatic process. Accordingly, these results do not provide evidence that the automatic influence of group membership on affective reactions can be found with non-visual material.

In order to examine this question, we replicated the experimental design with an ethnical intergroup situation. We assume that this manipulation should heighten participants' motivation for a controlled process. This effect, as well as a moderation of non-automatic measures by the motivation to control prejudiced responses has repeatedly shown before (e.g., Banse, & Gawronski, 2003; Dunton, & Fazio, 1997; Fazio, et al., 1995). Based on these findings we argue that finding an influence of group membership on affective reactions would allow us to conclude that this effect was uncontrollable. Finding nevertheless an interaction between group membership and emotional expression would allow us to conclude that this process is hard or impossible to control. Furthermore, in our experiment, no information about the relationship between the two groups was provided. Therefore we created a situation in which the influence of group membership on the consecutive reaction should be unintentional. Finding an influence of ethnic group membership on affective reactions to emotional expressions in this situation would allow us to assess the automaticity (in the sense of controllability and unintentionality) of this process. We believe that these modifications of the design constitute an important change to the original study in which an intergroup situation was created that was explicitly competitive in nature and asked for an open expression of a negative attitude against the out-group.

Overview

The design of the experiment closely followed that used by Weisbuch and Ambady (2008): German participants read aloud a short story while their voices were recorded. The protagonist of the story was either a Turkish or German young men who experienced either a happy or fearful life event. An independent sample of raters later rated the valence of the voice recordings.

We hypothesized that the voice recordings would show a concordant affect if the protagonist was German and a divergent affect if he was Turkish. Importantly, we expected this to be the case *even though* group membership was only casually mentioned and participants did not report strong negative attitudes towards the out-group (either because they were controlled, not accessible or not existent).

7.1 Method

7.1.1 Participants

Voice recordings. Seventy-eight voice recordings were obtained from unknown men and women that were approached at public places. Two of these recordings had to be excluded for the ratings because of a severe cold of one reader and severe problems with reading of another. Therefore, the final set consisted of seventy-six voice recordings from 39 females and 39 males with 19 voice recordings in each of the four conditions. The distribution of males and females on the four conditions was approximately equal. The age range was 15 to 76 years with a median of 34.5 years. All participants were native Germans.

Ratings. The voice recordings were rated by 27 (22 females, 5 males) independent raters. All raters were psychology students at the Saarland University, Germany; their mother tongue was German. The age range was 19 to 40 years with a median of 21 years. Participants were given course credit for participation.

7.1.2 Design

The design followed a 2 (ethnicity: German vs. Turkish) by 2 (emotion: joy vs. fear) design with all factors varied between participants. The rating of the voice recordings served as the dependent variable.

7.1.3 Material

The material for this experiment consisted of the short stories, the recording device, and a questionnaire.

Short Stories. The short stories participants were asked to read aloud were developed after those employed by Weisbuch and Ambady (2008). They featured a young man who was either of Turkish or German origin and who experienced a happy or fearful life event. The complete short stories are displayed in Appendix F.

At the beginning of the story the protagonist was introduced with his first name (*Peter* vs. *Ahmed*) and some general information about his life was given. This paragraph, which was kept the same for the happy and the fearful life event, finished with the information that the protagonist had moved to Cologne (from Düsseldorf or from Istanbul, respectively) when he was a child. Therefore, the first paragraph served the purpose to inform the reader about the group membership of the protagonist.

The second paragraph contained the emotional information. It informed the reader that this day was special for Peter/Ahmed either because he was going to a very important soccer match of his favorite soccer team or because he was going to find out if he had cancer. We tried to keep this paragraph as similar as possible for the two emotions. The text was 170 and 171 characters long.

Recording Device. The voices were recorded with a Zoom H2 digital voice recorder and with an EM-9600 cardioid microphone. They were later edited on the computer with Audacity software. Each recording was clipped so that the information about the group membership of the protagonist was cut off and the recording began with the emotional information. This was done to ensure that the judgments of the raters were not influenced by the ethnicity of the protagonist. Each sample was normalized and converted into mono recording.

Questionnaire. After the voice recording, participants filled out the German version of the *Subtle and Blatant Prejudice Scale* (Pettigrew, & Meertens, 1995) designed to assess their personal attitudes towards Turkish immigrants.

7.1.4 Procedure

The procedure consisted of two parts, the collection of the voice recordings and the rating of these.

Voice Recordings. For the voice recordings, participants were approach at public places by one or two female experimenters and asked if they would be willing to participate in a short experiment. If they agreed, the experiment was implemented on the spot. Participants were told that the experiment was part of a study project in the context of German philology and designed to measure the natural speech pattern of German speakers. The participant was informed about the general procedure and that the anonymity of her/his data was assured. The experimenter asked the participant to select one of four envelopes containing the four short stories as well as the questionnaire[16]. This was done to assign participants to conditions and to enhance the impression of anonymity. After the selection, the experimenter asked the participant to read the short story in a natural way aloud into the microphone. In order to avoid anticipation effects and to provide anonymity, the experimenter put on headphones while the participant was reading the story. After the reading was finished, the participant filled out the questionnaire, was debriefed, thanked and dismissed.

Ratings. The ratings of the voice recordings were obtained in the laboratory. Participants were assigned to rate either the fearful or happy voice recordings. Participants were tested in groups of up to four people. After arriving to the lab they were seated individually in front of personal computers,

[16] We prepared 20 envelopes per condition; ten of these were reserved for female and ten for male participants. This resulted in 80 envelopes together. Therefore, at the end of data collection, the four envelopes might have contained the same stories.

separated by partition walls. They were asked to put on headphones. The voice recordings and ratings were implemented in an E-Prime experiment. The instruction for the rating was given at the computer, asking participants to rate the general tone of the voice while ignoring the content.

Each trial of the rating started with a fixation cross that was displayed for 1 second. Afterwards, one of the voice recordings was replayed. Then a rating scale appeared, ranging from one (very negative) to six (very positive). The next trial started after the answer was given.

Before the rating of the critical voice recordings, each participant rated four voice recordings which were obtained from members of the psychology department at Saarland University in order to serve as practice trials. Then 38 critical voice recordings were rated in a random order. 19 of these recordings featured Peter as protagonist and 19 featured Ahmed.

7.2 Results

Our dependent variable was analyzed in two different ways: In the standard analysis, the voice recordings were treated as cases, whereas in the alternative analysis the raters constituted the cases.

7.2.1 Standard Analysis

The ratings of the voice recordings showed satisfying internal consistency (joy: Cronbach's Alpha = .89; fear: Cronbach's Alpha = .76). Therefore, a mean rating value including all individual ratings was calculated for each voice recording. Examining the mean rating separately for the joy and fear conditions, three voice recordings in the fear condition were identified as outliers (more than 1.5 interquartile ranges above the third quartile of the distribution). These were excluded in the analysis. Therefore, the main analysis focused on 19 voice recordings in the happy/Turkish, 19 voice recordings in the happy/German, 17 voice recordings in the fear/Turkish and 18 voice recordings in the fear/German condition.

The mean rating was analyzed in a 2 (Ethnicity: Turkish vs. German) × 2 (Emotion: happy vs. fear) complete between participants ANOVA. As predicted, the main effect for emotion was not significant (F < .05; *n.s.*). Unfortunately, also neither the main effect for ethnicity (F (1, 69) = 1.74; p = .19), nor the interaction (F (1, 69) = 1.71; p = .2) reached statistical significance even though the means were in the predicted direction (see Table 6).

We also calculated a moderation analysis to examine if the level of explicit prejudice moderated the interaction between emotional expression and ethnicity. Emotional expression, ethnicity and prejudice were entered into a regression analysis with the mean rating as criterion in Step 1, followed by the two-way interactions. The three-way interaction was entered in Step 3. The results show that level of prejudice was a significant predictor for the mean rating variable throughout all steps of the regression analysis (all βs > - .27, |t|s > 2.28; ps < .05) with higher levels of prejudice associated with less positive ratings. No other predictor reached significance (all βs < .13; *ns*).

Table 7 *Mean ratings as a function of emotion and ethnicity in Experiment 5. (In parentheses: standard deviations in the standard analysis, standard deviations in the alternative analysis)*

	Emotional content	
Group membership	Happiness	Fear
German	3.82 (.91/.43)	3.59 (.40/.41)
Turkish	3.42 (.72/.28)	3.58 (.40/.24)

Note: Ratings were obtained on a scale ranging from 1 (very negative) to 6 (very positive)

7.2.2 Alternative Analysis

We also analyzed the data collected in this experiment in a different manner, that is, we treated the raters as cases and the voice recordings as variables. This procedure has also been used by other researchers (e.g., Dotsch, et al., 2008; Imhoff, et al., 2011). However, the results obtained with this

analysis should be treated cautiously since this procedure is not as conservative as the standard one. Please note that the means in this analysis are exactly the same as in the analysis reported above. However, the standard deviation differs since the means are calculated across voice recording in this analysis and not across raters (see Table 7). We excluded the same voice recordings as in the standard analysis.

The 2 (Ethnicity: Turkish vs. German) × 2 (Emotion: happy vs. fear) ANOVA with the first factor varied within and the second between participants revealed a significant main effect for ethnicity (F (1, 25) = 13.14; p = .001, η_p^2 = .34). The means show that the voice recordings featuring the Turkish protagonist were rated as containing more negative affect than those featuring the German one. The main effect for emotion did not reach statistical significance (F < 1; *n.s.*). However, with this analysis, the ethnicity by emotion interaction reached significance, F (1, 25) = 12.91; p = .001, η_p^2 = .34. The interaction shows that the short stories which were hypothesized to elicit negative affect (German/fear, Turkish/happiness) were indeed associated with lower positive affect ratings than the emotion/group combinations which were hypothesized to elicit positive affect (German/happiness, Turkish/fear). The means indicate that the affect in the voice recordings featuring the German protagonist was more positive for the happy than the fearful life event. This pattern did not reach significance: t (25) = -1.45; p = .08 (one signed). The pattern was reversed for the German protagonist but also failed to reach significance: t (25) = 1.35; p = .08 (one signed).

7.3 Discussion

Cautiously interpreted, the results of Experiment 5 provide first evidence that group membership influences affective reactions to emotions automatically even if non-visual material is employed and the affective reaction is only a by-product of a naturally occurring behavior. In this experiment, participants read aloud short stories featuring a young man of Turkish or German background, who experienced either a happy or fearful life event. The results show that ethnic group membership and the emotional

coloring of the life influenced the affective tone in the voice of a reading person. As predicated, short stories which were supposed to elicit negative affect (German/fear, Turkish/happiness) were indeed associated with more negative ratings of the tone of the voice than those which were supposed to elicit positive affect (German/happiness, Turkish/fear). This result, however, has to be taken with precaution since it was only found in a not very conservative analysis. If the data was treated in a traditional way, the interaction between group membership and emotion failed to reach significance. We will now first discuss the implications of the significant interaction and then the differences between the two different analyses.

The significant interaction between group membership and emotion found in this experiment demonstrates that the automatic effect observed in the others is independent of the stimulus material employed. In all experiments reported in this thesis, the emotion experienced by an in-group member automatically elicited concordant affective reactions, whereas out-group members' emotions resulted in divergent reactions. This effect occurred regardless whether emotional expression and group membership were manipulated by employing images of emotional expression (Experiments 1 – 4) or by presenting short stories (Experiment 5). The result of Experiment 5 accordingly provides evidence that the findings obtained in the other experiments generalize to other modalities and are not limited to the visual perception of in-group and out-group emotions.

Importantly, the emotional expression or the group membership and the emotional expression were not task relevant in all of these experiments. Furthermore, group membership was only subtly manipulated. Therefore, we believe that the interaction in each experiment was based on an automatic process. This arguing is supported by the finding that the nonverbal channel is hard to control consciously (Rosenthal, & DePaulo, 1979).

The result of this experiment furthermore shows that the affective response elicited by an in-group or out-group emotion can be measured by assessing the affective coloring of the tone of the voice. This finding converges with studies which used this method to assess the occurrence of mood contagion (e.g., Neumann, & Strack, 2000). It therefore provides evidence that

the interaction between group membership and emotional expression not only influences short, artificial reactions like those measured in Experiment 1 – 4, but also more long-lasting truly affective reactions.

This experiment differs from the others in another important aspect: In comparison to facial expressions, the short stories provided information about the emotion eliciting event. The emotion might accordingly not have been interpreted as directly elicited by or directed towards the perceiver (i.e., reader). It is therefore not clear if the interaction between group membership and emotion was again caused by an influence of group membership on the interpretation of the intention signaled by the emotion, or by a different mechanism. It is conceivable that the emotion experienced by the protagonist was again seen in the light of the relationship between the protagonist and perceiver or their respective groups, and accordingly interpreted as indicating dominance or submission. This assumption is particularly plausible for the happy life event; Participants might have automatically assumed that the protagonist was a supporter of a rival soccer team if he was an out-group member. This assumption is supported by theories arguing that group members strive to attenuate differences between in-group and out-group members (e.g., Brewer, 1991; Jetten, Spears, & Postmes, 2004; Tajfel & Turner, 1986; Turner, 1978). If the protagonist was seen as a supporter of the rival soccer team, his happiness and excitement might accordingly have been interpreted as a sign of dominance and arrogance towards the reader's in-group. For the fearful life event it is, however, hard to imagine that the group membership influenced the interpretation of the intention or implication associated with the emotion. Further research is therefore needed to assess if the affective reactions observed in this study were elicited by the intention associated with the emotion or by a different mechanism.

Unfortunately, as already mentioned above, this study entails the caveat that the significant interaction was only found with one of two analyses. If the voice samples were treated as cases, no significant interaction emerged. Only if the raters constituted the cases, the interaction between group membership and emotional expression reached significance. Please note thereby that both calculations are based on the same mean values. The reason for the difference

between the two seems to be twofold: First of all, the factor ethnicity was varied between participants in the standard analysis but within participants in the alternative one; in this analysis, each rater indicated for short stories featuring the German as well as the Turkish protagonist how positive or negative the affective tone in the voice was. Therefore, the analysis of variance took into account the fact that each rater judged several voice recordings and did therefore not evaluate them independently but in comparison to each other. By employing a mixed design with ethnicity varied within and emotion varied between participants we were able to account for this dependency of the ratings. Second, in the alternative analysis, the variance between the voice samples was diminished. As indicated by the high standard deviation of the first analysis (see Table 6), the affective tone of the voice samples was quite variable. The variance between raters, however, was a lot smaller, as indicated by the lower standard deviation of the alternative analysis. The reason for the variability within the voice samples is obvious: The affective tone of the voice samples was not only influenced by the experimental manipulations (ethnicity and emotional life event) but also by numerous variables we could not control for (pitch of the voice, mood of speaker, background noise, recording quality, etc.). Therefore, the individual voice samples differed quite a lot. Since we obtained only a limited number of covariates (e.g., age, gender), we could not account for the error variance within the voice samples. As a result of the high variance, the analysis in which voice samples were treated as cases did not reach significance.

Please note, however, that the standard analysis better accounts for the nature of the design used in the study: First of all, our manipulations were implemented completely between participants; each participant only read one short story and was not aware of the content of the others. Second, the manipulation affected the reader and not the raters. They experienced the affective reaction. Therefore, this analysis is more appropriate for the design employed. In the future, it might therefore be a good idea to record participants' voices while reading a neutral text before reading the short stories. These recordings would allow us to assess the general tone of the voice which could then serve as a covariate, diminishing the error variance.

To sum it up, this experiment provides first evidence that the automatic influence of group membership on affective reactions to emotion also occurs if the material is presented in a non-visual modality and if the dependent variable is only indirectly assessed. This finding provides a first look-out on the direction this project could take. However, the results are only preliminary. Future studies are needed to examine if this finding can be replicated. Furthermore, the underlying mechanism is also in need of further clarification.

8 Discussion

The goal of this thesis was twofold: First of all, we wanted to look at the mechanisms underlying the interaction between group membership and emotional expression. Specifically, we examined the hypothesis that group membership influences which intention is associated with an emotional expression, influencing the following reaction. Our second goal was to examine if group membership influences affective reactions to emotional expressions automatically. In this chapter, the results of the experiments conducted for this thesis will be summarized and then discussed with regard to our two research questions. Since we employed various different paradigms to examine our hypotheses, we will only discuss the commonalities and implications of our results here. Method specific conclusions are presented in the discussion paragraphs following each experiment. Finally, open questions and future directions will be addressed.

8.1 Summary of the results

Supporting our main hypothesis, the results from the experiments conducted for this thesis show that group membership influences affective reactions to emotional expressions because it influences which intention is inferred from an emotional expression. We hypothesized that the intention of an in-group emotion should be interpreted in the light of the positive, friendly relationship which typically exists between members of the same group, whereas the intention of an out-group emotion should be seen in the light of competition and rivalry which can typically be found between members of different groups (e.g., Campbell, 1965; de Dreu, 2012; Deutsch, 1949; Tajfel, et al., 1971; Tajfel, & Turner, 1979). Following this hypothesis, happiness expressed by an in-group member should be interpreted as signaling affiliation, whereas fear expressed by an in-group member should mainly be seen as a warning. By contrast, we expected that happiness expressed by an out-group member should be interpreted as a sign of dominance or arrogance, whereas out-group fear should be seen as a sign of submission. Accordingly, in-group

happiness and out-group fear should elicit more approach compared to avoidance reactions than in-group fear and out-group happiness. The behavioral pattern observed with three approach and avoidance experiments supports these hypotheses. The reaction times show that group/emotion combinations that were hypothesized to be approach related (in-group/happiness, out-group/fear) activated more approach related behavior than avoidance related combinations (in-group/fear, out-group/happiness). Since previous research has shown that approach and avoidance reactions are caused by the intention inferred from the emotional expression (e.g., Wilkowski, & Meier, 2010), this pattern allows us to conclude that group membership indeed influences which intention in inferred from the expression, influencing the following reaction.

This conclusion is further supported by an experiment in which we visualized participants' mental representations of in-group and out-group smiles. The results support our hypothesis: As predicted, the mental representation of in-group members' smiles showed more benevolent and less malevolent intentions than that of out-group members' smiles. Interestingly, group membership did not influence the affective connotation of the expression. The results obtained with two different paradigms therefore allow us to conclude that in-group and out-group emotions are indeed associated with different intentions which then lead to different reactions towards the emotions expressed by in-group and out-group members. The generalizability of this finding to the results reported in other studies will be discussed below.

Importantly, the set-up of our experiments also show that this effect occurred automatically: Even though either the emotional expression or the emotional expression and the group membership of the expresser were not task relevant, the experiments conducted for this thesis found that in-group emotions elicited concordant affective reactions whereas out-group emotions led to divergent reactions. This shows that the influence of group membership on affective reactions does not depend on a conscious goal to evaluate the stimulus and is not necessarily based on an intentional process.

Another interesting finding of our experiments is that in all of them, the same effect occurred even though different intergroup manipulations were

employed such as an ethnical intergroup situation and a minimal group paradigm. In Experiment 1 and Experiment 2, images of German and Turkish/Arabic looking young men were presented as in-group and out-group members. Group membership was thereby only manipulated by employing this visual material – no other information about the intergroup situation (e.g., the rivalry between Germans and Turks in Germany) was given. The same is true for Experiment 5 in which only written information about the group membership was presented. In Experiment 3 and Experiment 4, a minimal group manipulation was realized which allowed us to employ the same images as in-group as well as out-group members. In all experiments, the same effect occurred, irrespective of the exact groups used. This allows us to conclude that the influence of group membership on affective reactions to emotions is not limited to ethnical intergroup situations but can occur in various different intergroup situations.

Critics might object to this conclusion by pointing out that the critical interaction between group membership and emotional expression in Experiment 3b only occurred after a negative attitude towards the out-group was created. In the experiment in which a more traditional minimal group manipulation was employed (Experiment 3a), no influence of group membership on affective reactions to emotional expressions was observed. However, we argue that this difference between the two experiments occurs because the minimal group paradigm typically results in in-group favoritism but not in out-group derogation (e.g., Brewer, 1979; Otten & Wentura, 1999). As our manipulation of Experiment 3b shows, the interaction between emotional expression and group membership, however, seems to be based on a negative attitude towards the out-group. Therefore, we believe that this non-significant result of Experiment 3a does not diminish the conclusion drawn from the other experiment but rather provides important information on the prerequisites needed for this interaction to occur. Based on the convergent findings of our experiments we therefore conclude that the influence of group membership on affective reactions to emotional expression can be generalized to most, if not all, intergroup situations in which a negative attitude towards the out-group exists.

One point important to note thereby is that in comparison to Experiment 3a and 3b, in Experiment 4 a traditional minimal group manipulation was sufficient to influence the intention associated with an emotional expression. However, we assume that this difference between these experiments is a result of the nature of task participants had to carry out. In Experiment 4, which employed the reverse-correlation task, participants had to select one of two smiling faces either as resembling an in-group or an out-group member. To fulfill this task, a simple differentiation between in-group and out-group is sufficient. It is imaginable that participants always identified the face showing the more benevolent smile as an in-group member, and the face showing the more malevolent smile as a *non*–in-group member. Such an approach would result in the observed effect even if the out-group is only less positively evaluated than the in-group and not negatively per se. The same argument can explain the main effect in Experiment 3a: In this experiment, out-group members elicited a stronger avoidance score than in-group members. This effect might be based on the same mechanism as the one observed in Experiment 4; for the main effect to arise it is sufficient if members of the in-group and the out-group are only evaluated differently. Different reactions to happiness and fear within one group, however, might be based on a special attitude towards the respective group, and not only on a difference between attitudes toward the two groups. Please note that this arguing does not diminish the conclusions drawn from Experiment 4; the results show that in-group and out-group members' smiles are associated with different intention. If this process is based on in-group favoritism, out-group derogation, or both is not central to the implication of this finding.

Our arguing that group membership influences reactions to emotional expressions because it influences the nature of the relationship between expresser and perceiver of an emotion is supported by studies examining facial mimicry. They find that manipulations of cooperation and competition generate the same effects on facial reactions to emotional expressions as manipulations of group membership: Participants in those studies reacted with concordant facial muscle activity to the emotions of an avatar in the cooperative and the neutral setting, but showed divergent reactions in the competitive setting

(Likowski, et al., 2011). Interestingly, this effect even occurred if cooperation and competition were only subliminally primed (Weyers, et al., 2009). Furthermore, the same pattern was found if participants' attitude towards the avatars was explicitly manipulated (Likowski, et al., 2008). The fact that such a direct manipulation of the nature of the relationship between expresser and perceiver has the same impact on reactions to emotions as a manipulation of the group membership supports the notion that group membership indeed affects reactions to emotions because it influences the relationship between expresser and perceiver.

To put it in a nutshell, the results obtained with the experiments conducted for this thesis show that group membership automatically influences affective reactions to emotion. Furthermore, they suggest that this interaction occurs because group membership influences which intention is inferred from an emotional expression which in turn influences the affective reactions. These two implications will be discussed in more detail in the following paragraphs.

8.2 Intention and emotional expression

As was already presented above, we argue that group membership influences the relationship between expresser and perceiver; as a result, different intentions are inferred from an emotional expression, leading to different reactions. To put it more precisely, if the relationship is of friendly and cooperative nature, like it is typically the case between members of the same group, happiness is seen as a sign of affiliation whereas fear acts as a cooperative warning. As a result, happiness elicits a positive affective reaction and fear a negative one. If the relationship between expresser and perceiver is however marked by competition and hostility, like it is typically the case between members of different groups, happiness is interpreted as a sign of dominance or arrogance whereas a fearful expression is seen as a sign of submission. As a result, negative affective reactions arise to the expression of happiness and positive affective reaction to the expression of fear. The results obtained from the experiments employing the approach and avoidance paradigm and from the one using the reversed correlation technique support

these hypotheses, showing that in-group and out-group emotions are associated with different intentions.

Our explanation of the influence of group membership on affective reactions to emotions has several advantages over the other proposed explanations (see Chapter 3.2): First of all, it specifies which divergent emotional reactions should result from which emotional expression, a point which is not addressed by the comparison approach. Second, and most importantly, it sheds light on the mechanism by which group membership influences which meaning is inferred from an emotional expression. This specificity of our approach allowed us to come up with testable predictions, which were examined with the experiments conducted for this thesis. The results support our assumptions.

We argue that our approach might also be suitable to explain the influence of group membership on affective reactions observed with other paradigms. The concordant and divergent facial reactions to emotional expressions shown by in- and out-group members reported in Chapter 3.1, for example, are in line with our predictions. Further support for this arguing comes from a study which examined the influence of competition and cooperation on facial reactions to emotional (see above). In the study conducted by Likowski and colleagues (2011), participants played a game of dice against an avatar in a competitive, a cooperative or a neutral setting. The avatar expressed happy, sad, neutral, or angry expressions after he tossed the dices. As already mentioned above, participants showed concordant facial reactions to the emotional expressions shown by the avatar in the cooperative and neutral setting, but divergent reactions in the competitive situation. The setup of this study allows us to conclude that these reactions were caused by the intention and implication of the emotional expression: If the avatar in the competitive setting showed a happy facial expression, for example, after tossing his dice, the participant could infer that it was an unlucky round for himself and that the smile indicated dominance rather than affiliation. Since the participant was in direct competition to the avatar, this had negative implications for him. Experiencing less joy and showing divergent facial muscle activity was therefore a sensible reaction. If, however, the avatar

showed the happy expression in the cooperative setting, the smile indicated to the participant that this cast had positive implications for both of them. Accordingly, he showed a concordant facial reaction which is a sensible reaction in this situation. This experiment therefore provides evidence that concordant and divergent facial reactions to emotional expression can also be explained by an influence of the relationship between expresser and perceiver on the intention inferred from an emotional expression. This finding therefore supports our assumption that this mechanism might be responsible for the influence of group membership on affective reactions reported with various paradigms. To draw a final conclusion, however, this arguing needs more empirical support.

However, our experiments also differ to those obtained with Likowski and colleagues (2011) in important aspects: They provide strong evidence that it is indeed the relationship between expresser and perceiver which influences which intention is associated with an emotional expression. In our experiments, no information about the emotion eliciting cause was given (except Experiment 5). The only contextual information was the group membership of the expresser. In this aspect our experiments clearly differ to those conducted by Likowski and colleagues: In this study, the event causing the emotional expression was obvious; the emotion of the avatar was caused by the outcome of the dice tossing. Our results therefore show that a manipulation of the relationship between expresser and perceiver is sufficient to influence the interpretation of the intention inferred from an emotional expression. No contextual information has to be given.

One reason why the manipulation of group membership had such a strong influence on the interpretation of the emotional expressions in our experiments might be rooted in the intergroup situation per se: Seeing an emotional expression of an out-group member might be an unfamiliar experience for the participants. This arguing is supported by several findings. First of all, it has been demonstrated that facial expressions of emotions are a lot less frequently shown if the perceiver of the emotion is a stranger compared to if he is a friend (e.g., Buck, et al., 1992; Hess, et al., 1995; Wagner, & Smith, 1991). Second, the emotions employed in most of our experiments

(happiness and fear) were rather untypical expressions for out-groups (e.g., Hugenberg, & Bodenhausen, 2004). And last but not least, it has been found that an expression of happiness signals that a relationship is cooperative in nature (Van Doorn, Heerdink, & van Kleef, 2012). This signal was is in conflict with the competitive intergroup situation. The findings of all of these studies suggest that the emotional expressions shown by the out-group members constituted unexpected stimuli for our participants; accordingly, they might have looked for an explanation. Since the situation did not provide any cues about the emotion eliciting event, the participants might have considered the emotional expressions as directed towards them. As a result, they might have interpreted them in the light of the relationship between themselves and the expressers, leading to the observed effect. However, the assumption that the intention signaled by an emotional expression is more relevant in an intergroup than in an intragroup situation is rather speculative and requires further examination.

The finding that group membership influences the intention associated with an emotional expression is not only of interest for researchers examining intergroup processes but also of theoretical relevance for theorists examining the meaning of facial expressions: They show that the same emotional expression is associated with different intentions. As far as we know, this point has not been discussed or thoroughly examined in detail yet; most discussions regarding the meaning of an emotional expression evolve around the debate whether an emotional expression communicates an emotional state or a motive (e.g., Parkinson, 2005). First evidence for the notion that one emotion is associated with different intentions can be found in studies in which participants were asked to freely describe the intention signaled by an emotional expression (e.g., Horstmann, 2003). The answers show that different intentions are inferred from the same emotional expression. Fearful faces, for example, were described as a "request to stop acting or to act differently, help, go away, or notice something" (Horstmann, 2003; p 161). However, in these studies, no emphasis was put on the reason for the different answers. Additional evidence for the assumption that emotional expressions are associated with different intentions stems from studies examining reactions to

smiles. It was found that participants can distinguish between true and false smiles (e.g., Bernstein, et al., 2008), felt, false, and miserable smiles (Ekman & Friesen, 1982), and embarrassed, shameful and amused smiles (Keltner, 1995). These results suggest that expressions which belong to the same emotional category can indicate different intentions or implications. In these experiments, however, slightly different expressions of the same emotion were used; therefore, the images employed different visual features. As long as we know, no study so far examined experimentally which factor apart from visual features determines which intention is inferred from an emotional expression (for a theoretical attempt see Niedenthal, et al., 2010). Therefore, our studies are the first to provide empirical evidence that a simple manipulation of a situational factor influences the interpretation of emotional expressions. Importantly, they thereby show that this interpretation does not depend on visual features since in our experiments the same visual input was given for in-group and out-group members' emotions (Experiment 3 and Experiment 4).

At a last point we have to note that the firmness of our conclusion that affective reactions to emotions are influenced by the group membership of the expresser because group membership influences the intention associated with an emotional expression is mainly based on the findings regarding facial expressions of happiness. One might argue that the effects observed with the approach and avoidance paradigm are caused by a different evaluation of the intention signaled by the emotional expression and not by a different intention (this point was already discussed in Chapter 5). The results from our reversed correlation experiment suggest that this is not the case since the data from this experiment shows that and out-group smiles are visualized as expressing different intentions. However, strictly speaking, this result only allows us to conclude that happiness expressed by in-group and out-group members is associated with different intentions. It is conceivable that the mechanism responsible for the influence of group membership on reactions to emotional expressions differs between happiness and other emotional expressions. To examine if fear expressed by an out-group member is indeed interpreted as a sign of submission and interpreted as a warning if expressed by an in-group member needs further examination.

8.3 Automaticity of the finding

The second goal of the experiments conducted for this thesis was to examine the degree of automaticity of the influence of group membership on affective reactions to emotions. We therefore wanted to assess if the interaction between group membership and emotional expression was based on an intentional process, if it was goal-dependent and if it could be consciously controlled. We implemented several steps to test these questions: First of all, the intergroup situation in all of our experiments was very subtly manipulated and no information about the nature of the situation was given. Additionally, we chose dependent variables which assessed the affective reactions of our participants in a rather indirect way, like the approach and avoidance behaviors measured in Experiments 1 – 3. By assessing the affective tone of the voice we furthermore collected an affective reaction which was only a by-product of a naturally occurring behavior. These manipulations should make an intentional responding unlikely.

Furthermore, emotional expression was never relevant for the ongoing task and in Experiment 2 and Experiment 5 group membership was irrelevant as well. This allowed us to assess if the interaction between group membership and emotional expression was of "goal dependent" automaticity (Bargh, 1989).

Finally, we introduced an ethnical intergroup situation. We assumed that participants' motivation to control their reactions should be high in such a situation due to the social norm not to appear prejudiced (e.g., Banse, & Gawronski, 2003; Dunton, & Fazio, 1997; Fazio, Jackson, Duntion, Williams, 1995; Gaertner, & Dovidio, 1986). Finding nevertheless an influence of group membership on the affective reactions to the emotional expressions would allow us to conclude that this effect was uncontrollable.

The results from our studies show that despite all these preventive methods, in-group members' emotional expressions elicited concordant reactions whereas out-group members' emotions triggered divergent ones. Furthermore, participants in the reversed correlation experiment (Experiment 4) categorized those faces as out-group members whose smiles expressed negative intentions whereas faces showing smiles expressing positive

intentions were categorized as in-group members, even though emotional expression was not even mentioned. Based on these results we conclude that this interaction occurred automatic in the sense of unintentional, not goal-independent, and uncontrollable. Importantly, from this it follows that the process underlying this interaction, namely the influence of group membership on the intention associated with an emotion also occurred automatically.

This finding and conclusion constitutes an important extension to existing studies which reported an influence of group membership on affective reactions to emotional expressions because (as we see it) none of them provided evidence for an automatic process. On the contrary, a closer look at the set-up of most of these experiments suggests that an intentional process might have played a role in the occurrence of the observed effect: In most of the experiments reporting an influence of group membership on affective reactions to emotional expressions, group membership was manipulated either by highlighting the rivalry between the two respective groups (e.g., Epstude, & Mussweiler, 2009), or by employing groups for which participants held a strong negative attitude which was socially accepted (e.g., Weisbuch, & Ambady, 2008; Leach, et al., 2003). Because of this nature of the intergroup situation it seems conceivable that those manipulations triggered a conscious reasoning about the meaning of the emotional expressions in participants, leading to the observed effects. Those experiments in which group membership was more subtly manipulated often employed an evaluation task so that the unconditional automaticity of the process could not be assessed (e.g., Weisbuch, & Ambady, 2008). Our experiments overcome these limitations. Therefore, they are the first to show that the interaction between group membership and emotional expression is automatic in the sense of unintentional, non-goal dependent and maybe even uncontrollable.

Finding that the influence of group membership on affective reactions to emotional expressions occurs automatically is of high theoretical relevance because it shows that automatic reactions to emotional expressions are not influenced by the valence or the specific emotional content alone like other researchers have suggested (e.g., Murphy, & Zajonc, 1993; Rohr, et al., 2012; Rotteveel, & Phaf, 2004; Rotteveel, et al., 2001; Wilkowski, & Meier, 2010).

On the contrary, this result indicates that the social meaning of the emotional expression is also extracted automatically. Depending on the relationship between expresser and perceiver, the same expression can automatically elicit divergent reactions. These results suggest that researchers employing emotional expressions as stimuli should pay extra attention to the context in which they present those stimuli. The facial expression of a stimulus person who resembles a disliked person for the respective group of participants, for example, might distort the results observed in an experiment designed to measure automatic reactions to emotional expressions. Such factors might also be responsible for the contrary behavioral reactions to anger and fear expressions reported in the approach and avoidance literature.

With the finding that group membership automatically influences the intention inferred from an emotional expression our experiments also add to studies examining the influence of emotions on social processes in real life settings (e.g., van Kleef, De Dreu, & Manstead, 2004; van Doorn, et al., 2012; van Kleef, 2009). In these studies, mainly non-automatic processes were measured. The results from the studies show that emotional expressions regulate social interactions like negotiation situations by providing information about the affective state as well as the intention of the expresser. Interestingly, they also provide evidence that the intention exerts more influence on reactions to emotions if information processing is deep whereas the affective component of an emotion is more influential if information processing is shallow. This conclusion is based on various different manipulations of the level of information processing, for example a manipulation of power. The results show that individuals with low power, which should enhance deep information processing, responded more to the intention signaled by the expression whereas individuals with high power, which leads to low information processing, attended more to the affective information (van Kleef, et al., 2004; van Kleef, De Dreu, Pietroni, & Manstead, 2006). This finding fits well to our results: Since a competitive intergroup situation forms a positional threat to the power status, the intergroup situation might have enhanced deep information processing, thereby putting more weight on the intention signaled by the emotional expression. In comparison to the study by van Kleef and colleagues,

however, our results show that this process can occur automatically. Therefore, our finding that the intention signaled by an emotional expression is extracted automatically adds an important point to studies examining the function of emotions in real life settings.

However, the findings from our experiments are not only of theoretical but also of practical relevance because they imply that automatic divergent reactions to out-group emotions might also arise in intergroup situations in everyday life. The smile of an out-group member waiting at the bus stop, for example, might automatically elicit a feeling of suspicion, even if the perceiver of this smile is not reasoning about the exact intention of the emotional expression. Even though this automatic reaction might be rather small and may not be noticed by the interaction partner, it might still influence future interactions. It has been shown, for example, that others are liked less if they show less concordant facial reactions to the emotional expressions of others (e.g., van der Velde, et al., 2010) compared to if they mimic more. Furthermore, the feeling of suspicion or safety elicited by a smiling or threatening out-group face might trigger corresponding cognitions in the perceiver, influencing more open behavior. The interaction between group membership and emotional expressions might thus influence intergroup relations on a broader scale. Even though these considerations are only speculative, examining these assumptions further might add important insights into intergroup processes.

8.4 Open questions and future directions

Our results provide evidence for our notion that group membership influences the interpretation of the intention signaled by an emotional expression. Moreover, they show that the interaction between group membership and emotional expression is based on an automatic process. New research questions arise from this notion. Those shall be presented and discussed below. Concretely, we will describe research questions related to the relationship between expresser and perceiver of an emotional expression and those that follow from the role of the emotional expression.

8.4.1 The nature of the relationship between expresser and perceiver of an emotion

Our results show that the group membership of the expresser of an emotion influences the affective reactions to these emotions. Furthermore, they provide evidence that this effect occurs because group membership influences the interpretation of the intention signaled by the emotional expression. We thereby argue that this effect arises because group membership influences the relationship between expresser and perceiver of an emotion: If expresser and perceiver share group membership, the relationship between them should be friendly and cooperative. If they however differ in group membership, the relationship should be rather hostile and competitive. Because the intention signaled by an emotional expression is interpreted in the light of this relationship, different interpretations arise. Since group membership and the relationship between expresser and perceiver play such an essential part in our arguing, new research questions arise from this factor.

One interesting question would be to address the influence of participants' individual levels of negative attitudes towards the out-group (i.e., prejudices) on our results. It is conceivable that variations in this individual difference might influence our effects. If the different reactions to in-group and out-group emotions are caused by the attitude towards the respective groups, this effect should be larger if the out-group is associated with a strong negative attitude and the in-group with a strong positive one compared to if in-group and out-group members are evaluated (more or less) similarly. Unfortunately, the moderation analysis of Experiment 5 – the only experiment in which we assessed individual attitudes towards in-group and out-group members – did not yield any effects. The only indication that our participants held negative attitudes towards the out-group members which might then have influenced our results was therefore obtained in Experiment 2 and Experiment 3a/b in which we observed a main effect of group membership: Out-group members elicited a stronger relative avoidance reaction than in-group members. As was already discussed in Chapter 6.4, this main effect has been found to correlate with individual attitudes. A similar main effect was observed with the alternative

analysis of Experiment 5. Moreover, Experiment 3a and 3b show that a negative attitude towards the out-group might play a key-role in the interaction between group membership and emotional expression. However, since we did not conduct any supplementary measurements of individual attitudes, the assumption that the interaction between group membership and emotional expression was caused by individual levels of prejudice remains speculative. It should therefore be the subject of future research.

Another interesting topic related to the relationship between expresser and perceiver of an emotion is the exact nature of the negativity of this relationship. We argue that – at least in our experiments – the intergroup relation was characterized by cooperation and friendliness in an in-group situation and competition and hostility in the case of an out-group situation. Depending on this relationship, the same emotional expression should then be associated with different intentions, leading to different reactions. This assumption is supported by the results of Experiment 3a and 3b which show that negative information about the out-group was necessary to observe the expected interaction between group membership and emotional expression. However, it might be that a simple negative attitude towards the out-group is not enough to produce the expected effect: Recent research from the field of implicit attitudes suggests that negative attitudes towards out-groups can have different connotations (Degner, Wentura, 2011; see also Degner, Wentura, Gniewosz, & Noack, 2007; Wentura & Degner, 2010). Referring to Peeters (1983; Peeters & Czapinski, 1990), this research differentiates between an automatic evaluation component of other-relevant negativity and possessor-relevant negativity. The former one refers to negative traits that are unconditionally negative for the social environment of the trait-holders, but not necessarily for themselves (e.g., to be aggressive, to be intolerant); the latter one refers to negative traits that are unconditionally negative for the trait-holders, but not for their social environment (e.g., to be lonely, to be incapable). Degner and Wentura found prejudice towards Turks to be of the other-relevant type whereas “ageism” (i.e., prejudice towards the elderly) was of the possessor-relevant type. The results obtained in the experiments conducted for this thesis fit well into this arguing. Since we hypothesized that

emotions expressed by out-group members are interpreted in the light of a hostile, competitive relationship, the rationale underlying our experiments implicitly hypothesizes an other-relevant negativity towards the out-group. It would be hard to explain how an emotional expression shown by an out-group member whose negativity does not directly affect the perceiver would produce a divergent affective reaction. As a result of the assumption that an other-relevant negativity associated with the out-group members is responsible for the influence of group membership on affective reactions to emotions, the negative information about the out-group which we provided to participants in Experiment 3b was of the other-relevant type. However, since we did not contrast this out-group to one possessing self-relevant negativity, the arguing that the connotation of negativity plays a role in the interaction between group membership and emotional expression is only preliminary. In order to support this arguing with empirical data, we would have to conduct an experiment in which we systematically manipulated the type of negativity associated with the out-group. This would be an interesting point for future research.

A third topic related to the relationship between expresser and perceiver of an emotion which would be interesting to examine is the overlap between an intergroup manipulation and a manipulation in which competition and cooperation between expresser and perceiver of an emotion are directly manipulated. The similar results observed by us and by researchers examining the influence of competition and cooperation on reactions to emotions (Weyers, et al., 2009; Likowski, et al., 2011) suggest that both manipulations similarly affect reactions to emotional expressions. Emotions expressed by out-group members as well as by individuals in a competitive situation evoked divergent reactions compared to emotions shown by in-group members and individuals in a cooperation situation. These findings are supported by theories suggesting that intragroup relations are typically associated with cooperation whereas intergroup relations are rather associated with competition (e.g., Bourgeois, & Hess, 2008; Campell, 1965; de Dreu, 2012; Deutsch, 1949; Tajfel, et al., 1971; Tajfel, & Turner, 1979). The results from experiments examining the minimal group paradigm, for example, show that individuals prefer to maximize the difference between resources allocated to in-group and

out-group members than to maximize the in-group resources if this also results in a maximization of the out-group resources (e.g., Tajfel, et al. 1971). This finding indicates that even minimal intergroup situations are characterized by intergroup competition. However, in order to support the reasoning that an intergroup situation has the same effect as a manipulation of cooperation and competition, it would be important to empirically show that both manipulations yield the same effect. One possibility to test for this would be to prime a cooperative or competitive mindset in participants and then let them rate the intentions signaled by emotional expressions.

Taken together, there are several points related to the relationship between expresser and perceiver of an emotion which inspire future research, namely the influence of prejudice, the type of negativity associated with the out-group and the overlap between an intergroup manipulation and one manipulating competition and cooperation.

8.4.2 The emotional expression

In the previous paragraph we discussed future research questions related to the relationship between the perceiver and the expresser of an emotion. However, this is only one factor of the interaction. Obviously, there are also points related to the other factor – the emotional expression – which should be discussed.

The first point thereby relates to the question if concordant and divergent affective reactions to in-group and out-group emotions depend on the exact emotional expression employed. In the experiments conducted for this thesis, we examined the influence of group membership on reactions to fearful and happy facial expressions or experiences. Our results show that group membership influenced which intention is associated with an emotional expression. We chose happiness and fear for several reasons; the most important ones were that (a) these emotions are associated with different intentions which (b) should be associated with different affective reactions. Finally, (c) the group membership of the expresser should influence which intention is inferred from the emotional expression. Only this constellation

allowed us to test our hypotheses. However, since there are obviously more emotional expressions, it would be interesting to examine the influence of group membership on the reactions to these other expressions. Depending on the exact expression and the intentions associated with this expression, the hypothesized reaction might differ. We assume that a sad facial expression, for example, would elicit reactions comparable to a fearful expression. This should be the case because a sad expression can be seen as a request for help but also as an attempt to manipulate the perceiver of the emotion (consider the "Dackelblick" [*puppy dog eyes*]; see also Horstmann, 2003). These two intentions should elicit different reactions and it is conceivable that the relationship between expresser and perceiver of an emotion influences which intention is mainly inferred from a sad expression. An expression of disgust, in contrast, signals the wish to reject something and the request to go away or do something differently. These intentions are not necessarily associated with different affective reactions. Therefore, we would predict that group membership should not influence the reactions to a disgust expression. However, this assumption needs empirical support.

Another point related to the emotional expression which would be interesting to examine is the ambiguity of the situation in which the expression is shown. As was already discussed above, in our experiments employing visual material, no clue about the emotion eliciting event was given. A next logical step would therefore be to examine how group membership influences affective reactions to emotional expressions if the emotion is clearly elicited by the interaction partner or clearly elicited by a different source. The similarity between the results obtained by Likowski and colleagues (2011) and those found in our experiments already show that the same behavioral pattern occurs if the elicitor of the emotional expression is obvious to the perceiver compared to if the cause of the emotion is ambiguous. However, in the experiment by Likowski and colleagues, the emotion eliciting cause was confounded with the manipulation of the relationship; the competitive and cooperative nature of the relationship was based on the dice tossing game, which was the elicitor of the emotional expression. Therefore, this result does not provide sufficient information how an emotion elicitor, which is not related to the relationship

between expresser and perceiver, would influence the interaction between group membership and emotional expressions. To examine this question, further studies are needed.

One possible operationalization thereby would be to manipulate the eye gaze of the expresser of an emotion: An averted eye gaze informs the perceiver of the emotional expression that he is not the cause of it. As a result, the emotional expression might gain a totally different meaning; most likely, it would not be interpreted in the light of this relationship. There already is empirical support for the assumption that the gaze direction has informative value and influences the interpretation of emotions. It has been shown, for example, that the eye gaze helps individuals to understand what their interaction partner refers to when speaking (e.g., Hanna, & Brennan, 2007). Referring to the signal function of emotions, it has also been argued that the eye gaze helps individuals to infer the intention signaled by an emotion. Supporting this assumption, fearful expressions, which generally signal an avoidance tendency, were recognized better if presented with an averted compared to a direct gaze whereas the opposite pattern emerged for anger expressions (Adams, & Kleck, 2003). Additionally, fear with averted gaze and anger with directed gaze were rated as more intense than the opposite combinations (Adams, & Kleck, 2005). These results suggest that the eye gaze influences the interpretation of the emotional expression. Accordingly, the interaction between group membership and emotional expression should differ depending on the gaze direction. Manipulating the eye gaze would furthermore have the benefit that no other information about the situation has to be given. This would allow us to employ the same paradigm as used in our experiments.

To sum it up, apart from the relationship between expresser and perceiver of an emotion, there are several connecting research questions regarding the emotional expressions shown by in-group and out-group members. It would, for example, be interesting to examine the influence of group membership on affective reactions to different emotions than the ones employed in the experiments conducted for this thesis. Furthermore, a manipulation of the eliciting event of the emotional expression by gaze direction would provide an interesting extension to our results.

8.5 Conclusion

The results of the experiments conducted for this thesis provide evidence that affective reactions to emotional expressions are automatically influenced by the group membership of the expresser. Even though emotional expression (Experiment 1, Experiment 3), and group membership and emotional expression (Experiment 2, Experiment 5) were task irrelevant and subtly manipulated, an interaction between emotional expression and group membership occurred in our experiments. The data show that emotions expressed by in-group members elicit concordant reactions whereas the same expressions shown by out-group members elicit divergent ones. Importantly, the same pattern occurred even though different paradigms, different dependent variables, and different groups were employed. Furthermore, our experiments provide evidence that this effect occurs because emotions expressed by in-group members are associated with different intentions than those expressed by out-group members: The results from three experiments employing an approach and avoidance paradigm show that the intentions signaled by in-group emotions are interpreted in the light of the positive, cooperative relationship characterizing in-group situations, whereas the intentions signaled by out-group emotions are interpreted in the light of the negative, competitive relationship which typically exists between members of different groups. This finding is supported by an experiment employing the reversed correlation technique. The results of this experiment show that the mental representations of in-group and out-group smiles are associated with different intentions. This finding provides further evidence for our hypothesis that the group membership of the expresser influences which intention is associated with an emotional expression.

References

Adams, R., & Kleck, R. (2003). Perceived gaze direction and the processing of facial displays of emotion. *Psychological Science, 14,* 644 – 647.

Adams, R., & Kleck, R. (2005). Effects of direct and averted gaze on the perception of facially communicated emotion. *Emotion, 5,* 3–11.

Allport, G. W. (1954). *The nature of prejudice*. Oxford England: Addison-Wesley.

Ambadar, Z., Cohn, J., & Reed, L. (2009). All smiles are not created equal: Morphology and timing of smiles perceived as amused, polite, and embarrassed/nervous. *Journal of Nonverbal Behavior, 33*, 17 – 34.

Andrews, V., Lipp, O. V., Mallan, K. M., & König, S. (2011). No evidence for subliminal affective priming with emotional facial expression primes. *Motivation and Emotion, 35*, 33 – 43.

Banse, R., & Gawronski, B. (2003). Die Skala Motivation zu vorurteilsfreiem Verhalten: Skaleneigenschaften und Validität [The scale motivation to act without prejudice: Scale properties and validity]. Diagnostica, 49, 4 – 13.

Bargh, J. A. (1989). Conditional Automaticity: Varieties of Automatic influence in social perception and cognition. In J. A. Bargh & J. S. Uleman (Eds.), *Unintended thought* (pp. 3 – 41). New York, NY: Guilford Press.

Bargh, J. A. (1994). The four horsemen of automaticity: Awareness, intention, efficiency, and control in social cognition. In R. S. Wyer Jr., & T. K. Srull (Eds.), *Handbook of social cognition (2nd ed.).* (pp. 1 – 40). Hillsdale, NJ England: Lawrence Erlbaum Associates, Inc.

Bargh, J. A. (1997). The automaticity of everyday life. In R. S. Wyer (Ed.), *Advances in social cognition*, 10 (pp. 1 – 62). NJ: Erlbaum.

Beaupré, M. G., & Hess, U. (2005). Cross-cultural emotion recognition among Canadian ethnic groups. *Journal of Cross-Cultural Psychology, 36,* 355 – 370.

Bernstein, M. J., Young, S. G., Brown, C. M., Sacco, D. F., & Claypool, H. M. (2008). Adaptive responses to social exclusion: Social rejection improves detection of real and fake smiles. *Psychological Science, 19,* 981-983.

Biehl, M., Matsumoto, D., Ekman, P., & Hearn, V. (1997). Matsumoto and Ekman's Japanese and Caucasian facial expressions of emotion (JACFEE): Reliability data and cross-national differences. *Journal of Nonverbal Behavior, 21,* 3 – 21.

Bless, H., & Wänke, M. (2000). Can the same information be typical and atypical? How perceived typicality moderates assimilation and contrast in evaluative judgments. *Personality and Social Psychology Bulletin, 26,* 306 – 314.

Bourgeois, P., & Hess, U. (2008). The impact of social context on mimicry. *Biological Psychology, 77,* 343 – 352.

Buck, R., Losow, J. I., Murphy, M. M., & Costanzo, P. (1992). Social facilitation and inhibition of emotional expression and communication. *Journal of Personality and Social Psychology, 63,* 962 – 968.

Bradley, M. M., & Lang, P. J. (2000). Affective reactions to acoustic stimuli. *Psychophysiology, 37,* 204 – 215.

Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological Bulletin, 86,* 307 – 324.

Brewer, M. B. (1991). The social self: On being the same and different at the same time. *Personality and Social Psychology Bulletin, 17,* 475 – 482.

Brewer, M. B., & Weber, J. G. (1994). Self-evaluation effects of interpersonal versus intergroup social comparison. *Journal of Personality & Social Psychology, 66,* 268 – 275.

Brown. R. (1995), *Prejudice: Its social psychology*. Malden: Blackwell Publishing.

Cacioppo, J. T., Bush, L. K., & Tassinary, L. G. (1992). Micro expressive facial actions as a function of affective stimuli: Replication and extension. *Personality and Social Psychology Bulletin, 63,* 962 – 968.

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1997). Beyond bipolar conceptualizations and measures: The case of attitudes and evaluative space. *Personality and Social Psychology Review, 1,* 3 – 25.

Campbell, D. T. (1965). Ethnocentric and other altruistic motives. In D. Levine (Ed.), *Nebraska Symposium on Motivation* (pp. 288-311). Lincoln, NE: University of Nebraska Press.

Carroll, N. C., & Young, A. W. (2005). Priming of emotion recognition. The Quarterly Journal of Experimental Psychology, 58, 1173 – 1197.

Chartrand, T. L., & Bargh, J. A. (1999). The chameleon effect: The perception–behavior link and social interaction. *Journal of Personality and Social Psychology, 76,* 893 – 910.

Chartrand, T. L., Maddux, W. W., & Lakin, J. L. (2005). Beyond the perception-behavior link: The ubiquitous utility and motivational moderators of nonconscious mimicry. In R. R. Hassin, J. S. Uleman & J. A. Bargh (Eds.), *The new unconscious* (pp. 334 – 361). New York, NY US: Oxford University Press.

Chen, M., & Bargh, J. A. (1999). Consequences of automatic evaluation: immediate behavioral predispositions to approach or avoid the stimulus. *Personality and Social Psychology Bulletin, 25,* 215 – 224.

Darwin, C. (1872). *The expression of the emotions in men and animals*. London: John Murray.

Davidson, R.J., Ekman, P., Saron, C.D., Senulis, J.A., & Friesen, W.V. (1990). Approach-withdrawal and cerebral asymmetry: Emotional expression and brain physiology: I. Journal of Personality and Social Psychology, 58, 330–341

De Dreu, C. K. W. (2012). Oxytocin modulates cooperation within and competition between groups: An integrative review and research agenda. *Hormones and Behavior, 61,* 419 – 428.

Degner, J., Wentura, D., & Rothermund, K. (2006). Indirect assessment of attitudes with response-time-based measures: Chances and problems. *Zeitschrift für Sozialpsychologie, 37,* 131 – 139.

Degner, J., Wentura, D., Gniewosz, B. & Noack, P. (2007). Hostility-related prejudice against Turks in adolescents: masked affective priming allows for a differentiation of automatic prejudice. *Basic and Applied Social Psychology, 29,*45 – 256.

Degner, J. & Wentura, D. (2010). Automatic prejudice in childhood and early adolescence. *Journal of Personality and Social Psychology, 98*, 356 – 374.

Degner, J. & Wentura, D. (2011). Types of Automatically Activated Prejudice: Assessing Possessor- versus Other-relevant Valence in the Evaluative Priming Task. *Social Cognition, 29*, 182 – 209.

Deutsch, M. (1949). A theory of cooperation and competition. *Human Relations, 2,* 129 – 152.

Dimberg, U. (1982). Facial reactions to facial expressions. *Psychophysiology, 19,* 643 – 647.

Dimberg, U. (1990). Facial electromyography and emotional reactions. Psychophysiology, 27, 481–494.

Dimberg, U., Thunberg, M., & Grunedal, S. (2002). Facial reactions to emotional stimuli: Automatically controlled emotional responses. *Cognition and Emotion*, *16*, 449 – 472.

Dimberg, U.,Thunberg, M., & Elmehed, K. (2000). Unconscious facial reactions to emotional facial expressions. *Psychological Science, 11,* 86–89.

Dotsch, R., Wigboldus, D. H. J., Langner, O., & van Knippenberg, A. (2008). Ethnic out-group faces are biased in the prejudiced mind. *Psychological Science, 19*, 978 – 980.

Dotsch, R., Wigboldus, D. H. J., & van Knippenberg, A. (2011). Biased allocation of faces to social categories. *Journal of Personality and Social Psychology, 100*, 999 – 1014.

Dovidio, J. F., Glick, P., & Rudman, L. A. (2005). *On the nature of prejudice: Fifty years after Allport*. Malden: Blackwell Publishing.

Duckworth, K. L., Bargh,J. A., Garcia, M., & Chaiken, S. (2002). The automatic evaluation of novel stimuli. *Psychological Science, 13*, 513 – 519.

Dunton, B. C., & Fazio, R. H. (1997). An individual difference measure of motivation to control prejudiced reactions. *Personality and Social Psychology Bulletin, 23*, 316–326.

Eder, A. B., Hommel, B., De Houwer, J. (2007). How distinctive is affective processing? On the implications of using cognitive paradigms to study affect and emotion. *Cognition and Emotion, 21*, 1137 – 1154.

Eder, A. B. & Rothermund, K. (2008). When do motor behaviors (mis)match affective stimuli? An evaluative coding view of approach and avoidance reactions. *Journal of Experimental Psychology*, *137*, 262 – 281.

Ekman, P. (1972). Universals and Cultural Differences in Facial Expressions of Emotion. In J. Cole (Ed.), *Nebraska symposium on motivation*, (Vol. 19, pp. 207 – 283). Lincoln: University of Nebraska Press.

Ekman, P. (1973). Universal facial expressions in emotion. *Studia Psychologica, 15*, 140 – 147.

Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion, 6*, 169 – 200.

Ekman, P. (2001) Telling lies: Clues to deceit in the marketplace, politics, and marriage. W.W. Norton.

Ekman, P., & Friesen, W. V. (1978). *Facial action coding system.* Palo Alto, CA: Consulting Psychologists Press.

Ekman, P., Friesen, W., & Ancoli, S. (1980). Facial signs of emotional experience. *Journal of Personality and Social Psychology*, *39,* 1125 – 1134.

Ekman, P., Sorenson, E. R., & Friesen, W. V. (1969). Pan-cultural elements in facial displays of emotion. *Science (New York, N.Y.), 164*, 86 – 88.

Elfenbein, H. A., & Ambady, N. (2002). On the universality and cultural specificity of emotion recognition: A meta-analysis. P*sychological Bulletin*, *128*, 203 – 235.

Epstude, K., & Mussweiler, T., (2009). What you feel is how you compare: How comparisons influence the social induction of affect. *Emotion*, *9*, 1 – 14.

Escher, M. C. (1992). The graphic work. Köln: Benedikt Taschen Verlag.

Fazio, R. H., Jackson, J. R., Dunton, B. C., & Williams, C. J. (1995). Variability in automatic activation as an unobtrusive measure of racial attitudes: a bona fide pipeline? *Journal of Personality and Social Psychology*, *69*, 1013 – 1027.

Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology*, *50*, 229–238.

Fischer, A. H., & Manstead, A. S. R. (2008). Social functions of emotion. In M. Lewis, J. M. Haviland-Jones & L. F. Barrett (Eds.), *Handbook of emotions (3rd ed.).* (pp. 456 – 468). New York, NY US: Guilford Press.

Fridlund, A. J. (1994). *Human facial expression: An evolutionary view*. San Diego, CA: Academic Press.

Frijda, N. H. (1986). *The Emotions*. Cambridge: Cambridge University Press.

Frank, M. G., & Stennett, J. (2001). The forced-choice paradigm and the perception of facial expressions of emotion. *Journal of Personality and Social Psychology, 80*, 75 – 85.

Gaertner, S. L., & Dovidio, J. F. (1986). The aversive form of racism. In J. F. Dovidio & S. L. Gaertner (Eds.), *Prejudice, discrimination, and racism* (pp. 61 – 89). Orlando, FL: Academic Press.

Gawronski, B., Ehrenberg, K., Banse, R., Zukova, J., & Klauer, K. C. (2003). It's in the mind of the beholder: The impact of stereotypic associations on category-based and individuating impression formation. *Journal of Experimental Social Psychology, 39,* 16–30.

Goeleven, E., De Raedt, R., Leyman, L., & Verschuere, B. (2008). The Karolinska Directed Emotional Faces: A validation study. *Cognition and Emotion, 22,* 1094 – 1118.

Greenwald, A.G., McGhee, D.E. & Schwartz, J.L.K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology, 74,* 1464 – 1480.

Hanna, J., & Brennan, S. (2007). Speakers' eye gaze disambiguates referring expressions early during face-to-face conversation. *Journal of Memory and Language, 57,* 596–615.

Haidt, J., & Keltner, D. (1999). Culture and facial expression: Open-ended methods find more expressions and a gradient of recognition. *Cognition and Emotion, 13,* 225 – 266.

Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1992). Primitive emotional contagion. In M. S. Clark (Ed.), *Emotion and social behavior.* (pp. 151 – 177). Thousand Oaks, CA US: Sage Publications, Inc.

Hatfield, E., Cacioppo, J. T., & Rapson, R. L. (1993). Emotional contagion. *Current Directions in Psychological Science, 2,* 96 – 99.

Hess, U., & Blairy, S. (2001). Facial mimicry and emotional contagion to dynamic emotional facial expressions and their influence on decoding accuracy. *International Journal of Psychophysiology, 40,* 129 – 141.

Hess, U., Kappas, A., & Banse, R. (1995). The intensity of facial expressions is determined by underlying affective state and social situation. *Journal of Personality and Social Psychology, 69,* 280 – 288.

Hess, U., Philippot, P., & Blairy, S. (1998). Facial Reactions to Emotional Facial Expressions: Affect or Cognition? *Cognition and Emotion, 12,* 509 – 531.

Horstmann, G. (2003). What do facial expressions convey: Feeling states, behavioral intentions, or actions requests? *Emotion, 3,* 150 – 166.

Hugenberg, K., & Bodenhausen, G. V. (2004). Ambiguity in social categorization: The role of prejudice and facial affect in race categorization. *Psychological Science, 15,* 342–345.

Imhoff, R., Dotsch, R., Bianchi, M., Banse, R., & Wigboldus, D. H. J. (2011). Facing Europe: Visualizing spontaneous in-group projection. *Psychological Science, 22,* 1583 – 1590.

Izard, C. E. (1971). *The face of emotion*. East Norwalk, CT US: Appleton-Century-Crofts.

Jack, R. E., Caldara, R. & Schyns, P.G. (2011). Internal representations reveal cultural diversity in expectations of facial expressions of emotion. *Journal of Experimental Psychology: General, 114,* pp 19 – 25.

Jack, R. E., Garrod, O. G. B.,Yu, H., Caldara, R., & Schyns, P. G. (2012). Facial expressions of emotions are not culturally universal. *Proceedings of the National Academy of Science, 109,* 7241 – 7244.

Judd, C. M., & Park, B. (1988). Out-group homogeneity: Judgments of variability at the individual and group levels. *Journal of Personality and Social Psychology, 54,* 778-788.

Jetten, J., Spears, R., & Postmes, T. (2004). Intergroup distinctiveness and discrimination: A meta-analytic integration. *Journal of Personality and Social Psychology, 86,* 862 – 879.

Karremans, J. C., & Dotsch, R. (2011). Romantic relationship status biases memory of faces of attractive opposite-sex others: Evidence from a reversed correlation paradigm. *Cognition, 212,* 422 – 426.

Keltner, D. (1995). Signs of appeasement: Evidence for the distinct displays of embarrassment, amusement, and shame. *Journal of Personality & Social Psychology*, *68*, 441 – 454.

Keltner, D. & Gross, J. J. (1999). Functional accounts of emotions. *Cognition and Emotion, 13*, 467 – 480.

Keltner, D., & Haidt, J. (1999). Social functions of emotions at four levels of analysis. *Cognition and Emotion, 13*, 505 – 521.

Klauer, K. C. & Musch, J. (2003). Affective priming: findings and theories. In J. Musch & K. C. Klauer (Eds.), *The psychology of evaluation: Affective processes in cognition and emotion* (pp. 7 – 50). Mahwah, NJ: Erlbaum.

Klauer, K. C., Roßnagel, C., & Musch, J. (1997). List-context effects in evaluative priming. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 23*, 246 – 255.

Klauer, K. C., & Wegener, I. (1998). Unraveling Social Categorization in the `Who Said What?' Paradigm. *Journal of Personality & Social Psycholog*y, *75*, 1155 – 1178.

Klauer, K. C., Wegener, I., & Ehrenberg, K. (2002). Perceiving minority members as individuals: The effects of relative group size in social categorization. *European Journal of Social Psychology*, *32*, 223–245.

Knutson, B. (1996). Facial expressions of emotion influence interpersonal trait inferences. *Journal of Nonverbal Behavior, 20*, 165 – 182.

Krieglmeyer, R. & Deutsch, R. (2010). Comparing measures of approach-avoidance behavior: the manikin task vs. two versions of the joystick task. *Cognition and Emotion, 24*, 810 – 828.

Krieglmeyer, R., Deutsch, R., de Houwer, J., & De Raedt, R. (2010). Being moved: Valence activates approach-avoidance behavior independantly of evaluation and approach- avoidance intentions. *Psychological Science*, *21*, 607 – 613.

Lakin, J. L., & Chartrand, T. L. (2003). Using nonconscious behavioral mimicry to create affiliation and rapport. *Psychological Science, 14*, 334 – 339.

Lakin, J. L., Jefferis, V. E., Cheng, C. M., & Chartrand, T. L. (2003). The chameleon effect as social glue: Evidence for the evolutionary significance of nonconscious mimicry. *Journal of Nonverbal Behavior, 27*, 145 – 162.

Lang, P. J., Bradley, M. M. & Cuthbert, B. N. (1990). Emotion, attention, and the startle reflex. *Psychological Review, 97*, 377 – 395.

Langner, O., Dotsch, R., Bijlstra, G., Wigboldus, D. H. J., Hawk, S. T., & van Knippenberg, A. (2010). Presentation and validation of the Radboud Faces Database. *Cognition & Emotion, 24*, 1377 – 1388.

Lanzetta, J. T., & Englis, B. G. (1989). Expectations of cooperation and competition and their effects on observers' vicarious emotional responses. *Journal of Personality and Social Psychology, 56*, 543 – 554.

Lavender, T. & Hommel, B. (2007). Affect and action: Towards an event-coding account. *Cognition and Emotion*, *21*, 1270 – 1296.

Leach, C. W. & Spears, R. (2009). Dejection at in-group defeat and schadenfreude toward second- and third-party out-groups. *Emotion*, *9*, 659 – 665.

Leach, C. W., Spears, R., Branscombe, N. R., & Doosje, B. (2003). Malicious pleasure: Schadenfreude at the suffering of another group. *Journal of Personality and Social Psychology*, *84*, 932 – 943.

Leventhal, H., & Scherer, K. (1987). The relationship of emotion to cognition: A functional approach to a semantic controversy. *Cognition and Emotion, 1*, 3 – 28.

Li, W., Zinbarg, R. E., Boehm, S. G., & Paller, K. A. (2008). Neural and behavioral evidence for affective priming from unconsciously perceived emotional facial expressions and the influence of trait anxiety. *Journal of Cognitive Neuroscience, 20*, 95 – 107.

Likowski, K. U., Mühlberger, A., Seibt, B., Pauli, P., & Weyers, P. (2008). Modulation of facial mimicry by attitudes. *Journal of Experimental Social Psychology, 44*, 1065 – 1072.

Likowski, K. U., Mühlberger, A., Seibt, B., Pauli, P., & Weyers, P. (2011). Processes underlying congruent and incongruent facial reactions to emotional facial expressions. *Emotion, 11*, 457 – 467.

Lipp, O. V., Price, S. M., & Tellegen, C. L. (2009). No effect of inversion on attentional and affective processing of facial expressions. *Emotion, 9*, 248 – 259.

Lipps, T. (1907). *Vom Fühlen, Wollen und Denken*. Leipzig: Barth.

Lishner, D. A., Cooter, A. B., & Zald, D. H. (2008). Rapid emotional contagion and expressive congruence under strong test conditions. *Journal of Nonverbal Behavior, 32,* 225–239.

Lundqvist, L.- O., & Dimberg, U. (1995). *Facial expressions are contagious. Journal of Psychophysiology, 9,* 203 – 211.

Lundqvist, D., & Litton, J. E. (1998). *The Averaged Karolinska Directed Emotional Faces - AKDEF* [CD ROM] Stockholm: Karolinska Institutet.

Mangini, M. C., & Biederman, I. (2004). Making the ineffable explicit: Estimating the information employed for face classifications. *Cognitive Science, 28*, 209.

Marsh, A. A., Ambady, N., & Kleck, R. E. (2005). The effects of fear and anger facial expressions on approach- and avoidance-related behaviors. *Emotion*, 5, 119 – 124.

Matsumoto, D. (1990). Cultural similarities and differences in display rules. *Motivation and Emotion, 14*, 195 – 214.

McIntosh, D. N. (2006). Spontaneous facial mimicry, liking and emotional contagion. *Polish Psychological Bulletin, 37,* 31–42.

Moody, E. J., McIntosh, D. N., Mann, L. J., & Weisser, K. R. (2007). More than mere mimicry? The influence of emotion on rapid facial reactions to faces. *Emotion, 7*, 447 – 457.

Moors, A. (2007). Can cognitive methods be used to study the unique aspect of emotion: An appraisal theorist's answer. *Cognition and Emotion, 21,* 1238 – 2369.

Moors, A., & De Houwer, J. (2006). Automaticity: A theoretical and conceptual analysis. *Psychological Bulletin, 132,* 297 – 326.

Morse, S., & Gergen, K. J. (1970). Social comparison, self-consistency, and the concept of self. *Journal of Personality and Social Psychology*, *16*, 148 – 156.

Mussweiler, T. (2003). Comparison processes in social judgment: Mechanisms and consequences. *Psychological Review, 110,* 472.

Mussweiler, T., & Bodenhausen, G. (2002). I know you are but what am I? Self-evaluative consequences of judging in-group and out-group members. *Journal of Personality and Social Psychology*, *82,* 19 – 32.

Murphy, S. T. & Zajonc, R. B. (1993). Affect, cognition, and awareness: Affective priming with optimal and suboptimal stimulus exposures. *Journal of Personality and Social Psychology*, *64*, 723 – 739.

Neumann, R. (2003). Bewerten und Verhalten: Die Rolle der Motorik in Einstellung und Emotion. *Psychologische Rundschau, 54*, 157 – 166.

Neumann, R., Förster, J., Strack, F. (2003). Motor compatibility: The bidirectional link between behavior and evaluation. In J. Musch, & K. C. Klauer (Eds.), *The Psychology of evaluation* (pp. 371 – 391). Mahwah, N. J.: Lawrence Erlbaum Associates..

Neumann, R., Hülsenbeck, K., & Seibt, B. (2004). Attitudes towards people with AIDS and avoidance behavior: Automatic and reflective bases of behavior. *Journal of Experimental Social Psychology*, *40*, 543 – 550.

Neumann, R., & Strack, F. (2000). "Mood contagion": The automatic transfer of mood between persons. *Journal of Personality and Social Psychology, 79,* 211 – 223.

Neumann, R., & Lozo, L. (2012). Priming the activation of fear and disgust: Evidence for semantic processing. *Emotion, 12,* 223 – 228.

Niedenthal, P. M., Krauth-Gruber, S., & Ric, F. (2006). *Psychology of emotion: Interpersonal, experiential, and cognitive approaches*. New York, NY US: Psychology Press.

Niedenthal, P. M., Mermillod, M., Maringer, M., & Hess, U. (2010). The Simulation of Smiles (SIMS) model: Embodied simulation and the meaning of facial expression. *Behavioral and Brain Sciences, 33*, 417 – 433.

Olson, M. A., Fazio, R. H. (2003). Relations between implicit measures of prejudice: What are we measuring? *Psychological Science, 14*, 636 – 639.

Otten, S., & Wentura, D. (1999). About the impact of automaticity in the minimal group paradigm: Evidence from affective priming tasks. *European Journal of Social Psychology*, *29*, 1049 – 1071.

Parkinson, B. (2005). Do facial movements express emotions or communicate motives. *Personality and Social Psychology Review*, *9*, 278 – 311.

Paulus, A., Rohr, M., Neuschwander, M., Seewald, M., & Wentura, D. (2012) Validation of the Saarland University Emotion Database. Manuscript in preparation.

Paulus, A., Rohr, M, Dotsch, R., & Wentura, D. (2012). Good emotion, bad intention: In-group and out-group smiles are associated with different intentions. Manuscript in preparation.

Paulus, A., & Wentura, D. (2012). Threatening joy: Approach and avoidance behaviors to emotions are influenced by the group membership of the expresser. Manuscript submitted for publication.

Payne, B. K., Cheng, C. M., Govorun, O., & Stewart, B. D. (2005). An Inkblot for Attitudes: Affect Misattribution as Implicit Measurement. *Journal of Personality and Social Psychology, 89*, 277–293.

Paladino, M.-P. & Castelli, L. (2008). On the immediate consequences of intergroup categorization: Activation of approach and avoidance motor behavior toward ingroup and outgroup members. *Personality and Social Psychology Bulletin, 34*, 755 – 768.

Peeters, G. (1983). Relational and informational patterns in social cognition. In W. Doise, & S. Mascovici (Eds.), *Current issues in european social psychology* (Vol. 1, pp. 201 – 237). Cambridge, UK: Cambridge University Press.

Peeters, G. & Czapinski, J. (1990). Positive-negative asymmetry in evaluation: The distinction between affective and informational negativity effects. *European Review of Social Psychology*, *1*, 33 – 60.

Pell, M. D. (2005). Nonverbal emotion priming: Evidence from the 'facial affect decision task'. *Journal of Nonverbal Behavior, 29*, 45 – 73.

Petersen, L.-E., & Six, B. (2008). *Stereotype, Vorurteile, & soziale Diskriminierung.* Belz Psychologie Verlags Union.

Pettigrew, T. F., & Meertens, R.W. (1995). Subtle and blatant prejudice in Western Europe. *European Journal of Social Psychology*, *25*, 57–76.

Rinck, M. & Becker, E. S. (2007). Approach and avoidance in fear of spiders. *Journal of Behavior Therapy and Experimental Psychiatry*, *38*, 105 – 120.

Rohr, M., Degner, J., & Wentura, D. (2012). Masked emotional priming beyond global valence activations. *Cognition and Emotion, 26*, 224 – 244.

Rosenthal, R., & DePaulo, B. M. (1979). Sex differences in eavesdropping on nonverbal cues. *Journal of Personality and Social Psychology, 37*, 273–285.

Rotteveel, M., de Groot, P., Geutskens, A., & Phaf, R. H. (2001). Stronger suboptimal than optimal affective priming? *Emotion, 1*, 348 – 364.

Rotteveel, M., & Phaf, R. H. (2004). Automatic affective evaluation does not automatically predispose for arm flexion and extension. *Emotion, 4,* 156 – 172.

Ruys, K. I., Spears, R., Gordijn, E. H., & de Vries, N. K. (2007). Automatic contrast: Evidence that automatic comparisons with the social self affects evaluative responses. *British Journal of Psychology, 98,* 361 – 374.

Scherer, K. R. (1984). On the nature and function of emotion: A component process approach. In K. R. Scherer & P. Eckman (Eds.), *Approaches to Emotion (pp. 293 – 318)*. Hillsdale, N.J.: Erlbaum.

Scherer, K. R., & Grandjean, D. (2008). Facial expressions allow inference of both emotions and their components. *Cognition and Emotion, 22,* 789 – 801.

Scherer, K. R. (2005). What Are Emotions an how can they be measured? *Social Science Information, 44,* 695–729.

Schubert, T. W., & Häfner, M. (2003). *Contrast from social stereotypes in automatic behavior. Journal of Experimental Social Psychology, 39,* 577 – 584.

Seibt, B., Neumann, R., Nussinson, R., & Strack, F. (2008). Movement direction or change in distance? Self- and object-related approach–avoidance motions. *Journal of Experimental Social Psychology, 44,* 713 – 720.

Seidel, E.-M., Habel, U., Kirschner, M., Gur, R. C., & Derntl, B. (2010). The impact of facial emotional expressions on behavioral tendencies in women and men. *Journal of Experimental Psychology: Human Perception and Performance, 36,* 500 – 507.

Solarz, A. (1960). Latency of instrumental responses as a function of compatibility with the meaning of eliciting verbal signs. *Journal of Experimental Psychology, 59,* 239 – 245.

Spruyt, A., De Houwer, J., Hermans, D., & Eelen, P. (2007). Affective priming of nonaffective semantic categorization responses. *Experimental Psychology*, *54*, 44 – 53.

Stepper, S., & Strack, F. (1993). Proprioceptive determinants of emotional and nonemotional feelings. *Journal of Personality and Social Psychology*, *64*, 211 – 220.

Stins, J. F., Roelofs, K., Villan, J., Kooijman, K., Hagenaars, M. A., & Beek, P. J. (2011). Walk to me when I smile, step back when I'm angry: emotional faces modulate whole-body approach-avoidance behaviors. *Experimental Brain Research, 212*, 603 – 611.

Strack, F., Martin, L. L., & Stepper, S. (1988). Inhibiting and facilitating conditions of the human smile: A nonobtrusive test of the facial feedback hypothesis. *Journal of Personality and Social Psychology*, *54*, 768 – 777.

Stangor, C, Lynch, L., Duan, C, & Glass, B. (1992). Categorization of Individuals on the basis of multiple social features. *Journal of Personality and Social Psychology*, *62*, 207-218.

Sweeny, T. D., Grabowecky, M., Suzuki, S., & Paller, K. A. (2009). Long-lasting effects of subliminal affective priming from facial expressions. *Consciousness and Cognition, 18*, 929 – 938.

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and intergroup behavior. *European Journal of Social Psychology*. *1*, 149 – 178.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds), Psychology of intergroup relations (pp. 7 – 24). Chicago:Nelson Hall.

Tajfel, H. & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds), *The Social Psychology of Intergroup Relations* (pp. 33 – 47). Monterey, CA: Brooks/Cole.

Todorov, A., Dotsch, R., Wigboldus, D. H. J., & Said, C. P. (2011). Data-driven methods for modeling social perception. *Social and Personality Psychology Compass, 5*, 775 – 791.

Tracy, J. L., Robins, R. W., & Schriber, R. A. (2009). Development of a FACS-verified set of basic and self-conscious emotion expressions. *Emotion, 9*, 554 – 559.

Tukey, J. W. (1977). Some thoughts on clinical trials, especially problems of multiplicity. *Science (New York, N.Y.), 198*, 679 – 684.

Turner, J. C. (1978). Social comparison, similarity and ingroup-favoritism. In H. Tajfel (Ed.), Differentiation between social groups: Studies in social psychology of intergroup relations (pp. 235 – 250). London: Academic Press.

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Cambridge, MA US: Basil Blackwell.

Taylor, S. E., Fiske, S. T, Etcoff, N. J., & Ruderman, A. J. (1978). Categorical and contextual bases of person memory and stereotyping. *Journal of Personality and Social Psychology, 36*, 778-793.

Van der Schalk, J., Fischer, A. H., Doosje, B. J., Wigboldus, D. H. J.,Hawk, S. T., Rotteveel, M., Hess, U. (2011). Convergent and divergent responses to emotional displays of ingroup and outgroup**.** *Emotion, 11, 286 – 298***.**

Van der Schalk, J., Hawk, S. T., Fischer, A. H., & Doosje, B. (2011). Moving faces, looking places: Validation of the Amsterdam Dynamic Facial Expression Set (ADFES). *Emotion, 11*, 907 – 920.

Van Doorn, E. A., Heerdink, M. W., & van Kleef, G. A. (2012). Emotion and the construal of social situations: Inferences of cooperation versus competition from expressions of anger, happiness, and disappointment. Cognition and Emotion, 26, 442 – 461.

Van Kleef, G. A. (2009). How emotions regulate social life: The emotions as social information (EASI) model. *Current Directions in Psychological Science, 18*, 184 – 188.

Van Kleef, G. A., De Dreu, C. K. W., & Manstead, A. S. R. (2004). The interpersonal effects of emotions in negotiations: A motivated information processing approach. *Journal of Personality and Social Psychology, 87,* 510–528.

Van Kleef, G. A., De Dreu, C. K. W., Pietroni, D., & Manstead, A. S. R. (2006). Power and emotion in negotiation: Power moderates the interpersonal effects of anger and happiness on concession making. *European Journal of Social Psychology, 36,* 557–581.

Van der Velde, S. W., Stapel, D. A., & Gordijn, E. H. (2010). Imitation of emotion: When meaning leads to aversion. *European Journal of Social Psychology, 40*, 536 – 542.

Wagner, H. L. (1993). On measuring performance in category judgment studies on nonverbal behavior. *Journal of Nonverbal Behavior, 17*, 3 – 28.

Wagner, H. L., & Smith, J. (1991). Facial expressions in the presence of friends and strangers. *Journal of Nonverbal Behavior*, *15*, 201 – 214.

Weyers, P., Mühlberger, A., Kund, A., Hess, U., & Pauli, P. (2009). Modulation of facial reactions to avatar emotional faces by nonconscious competition priming. *Psychophysiology, 46,* 328 – 335.

Weisbuch, M. & Ambady, N. (2008). Affective divergence: Automatic responses to others' emotions depend on group membership. *Journal of Personality and Social Psychology*, *95*, 1063 – 1079.

Wentura, D. (1999). Activation and inhibition of affective information: Evidence for negative priming in the evaluation task. *Cognition and Emotion, 13,* 65 – 91.

Wentura, D. & Degner, J. (2010). Automatic Evaluation isn't that crude! Moderation of Masked Affective Priming by Type of Valence. *Cognition and Emotion, 24*, 609 – 628.

Wentura, D., Rothermund, K., & Bak, P. (2000). Automatic Vigilance: The attention-grabbing power of approach- and avoidance-related social information. *Journal of Personality and Social Psychology, 78*, 1024 – 1037.

Wilkowski, B. M. & Meier, B. P. (2010). Bring it on: Angry facial expressions potentiate approach-motivated motor behavior. *Journal of Personality and Social Psychology, 98,* 201 – 210.

Wittenbrink, B. & Schwarz, N. (2007). Implicit measures of attitudes*:* Procedures and controversies. New York: Guilford Press.

Wyer, N. A. (2010). Salient egalitarian norms moderate activation of out-group approach and avoidance. *Group Processes & Intergroup Relations,* 13*,* 151-165.

Yik, M. S. M. & Russel, J. A. (1999). Interpretation of faces: A Cross-cultural study of a prediction from Fridlund's theory. *Cognition and Emotion*, *13,* 93 – 104.

Young, S., & Hugenberg, K. (2010). Mere social categorization modulates identification of facial expressions of emotion. *Journal of Personality and Social Psychology, 99,* 964–977.

Appendix

Appendix A - Validation study of the Saarland University Emotion Database **157**
A1 Creation of the database 157
A1.1 Description of the image set 157
A1.2 Development of the stimulus set 157
A2 Validation of the database 159
A2.1 Method 159
A2.2 Results 160
A2.3 Discussion 164
Appendix B – Stimuli employed in Experiment 1 and 2 ..... **166**
Appendix C – Stimuli employed in Experiment 3a and 3b **168**
Appendix D – Group information given in Experiment 3a and 3b **170**
Appendix E – Group images employed in Experiment 4 ..... **172**
Appendix F – Short stories employed in Experiment 5 ..... **173**

Appendix A – Validation study of the Saarland University Emotion Database

For the Saarland University Emotion Database (SUED), short video clips were taken from 43 individuals. From these clips, we extracted photographs which were then validated. In a later stage of development, the photographs were edited again in order to increase their perceptual quality, and then newly validated[17].

A1 Creation of the database

A1.1 Description of the image set

43 individuals were videotaped for the stimulus set (5 Arabic females, 11 German females, 12 Arabic males, 15 German males). Each expresser was videotaped while showing seven emotional and one neutral facial expression, resulting in 344 video clips. The exact facial muscle configuration for each expression was instructed based on the FACS (Ekman, 2007). We later extracted frames from these videos to obtain still images of the emotional expressions. We chose the emotions joy, surprise, anger, fear, sadness, disgust and contempt, since these are seen as the basic emotions (e.g., Ekman, 1972). Expressers were videotaped against a uniform gray background, wore black T-Shirts and no make-up or jewelry. We also ensured that no dominant facial hair was visible.

A1.2 Development of the stimulus set

Models for the dataset were either approached on campus or recruited through notices on campus boards and through the internet. In order to create a

[17] Since these edited photographs were employed in the studies conducted for this thesis, the sections describing the validation phase and the results will be based on the second validation phase, whereas the section reporting the creation of the database will describe the creation of the video clips as well as the photographs in the diploma thesis.

stimulus set with highly recognizable prototypical emotional expressions, expressers were trained before the recording session. They received a training manual designed in PowerPoint that explained the basic expressions and the required muscle configurations, gave instructions on how to exert them, and showed prototypical images of the respective emotions. The training manual was developed after the Directed Facial Action Task by Paul Ekman (e.g., Ekman, 2007). Expressers were asked to practice the emotional expressions at home with a hand mirror for at least one hour. After arriving at the recording studio, expressers received another 15 to 30 minutes of training by one of two certified FACS (see above) coders until the emotional expressions met our requirements. Thereby particular attention was paid to the activation of the critical action units for the respective emotion (see Langner, et al., 2010). Then the recording session started during which feedback and instructions were repeatedly given by one of the FACS coders.

Each recording of an emotional expression started with a neutral expression. Since we wanted to obtain dynamic emotional expressions that were standardized as much as possible, we replayed two low sounds to participants as an orientation: Participants were asked to start the emotional expression with the first sound, reach the apex of the expression with the second sound (which was one second later) and hold the apex for at least 5 seconds. Several versions of each emotional expression were recorded.

The video clips were later screened by the FACS coders and the best take of each emotional expression for each expresser was selected. This video clip was edited with Adobe Aftereffects to a standard length of 6 seconds consisting of one second of neutral expression before the onset of the emotional expression, approximately one second of movement until the apex was reached, and an apex of approximately 4 seconds. For the still images, the video frame showing the most prototypical and intense expression was extracted and edited with Adobe Photoshop for cropping and color balancing (see also the RAFD for such an approach, facedb.blogspot.com). The preliminary validation study showed satisfying recognition rates for the video clips as well as the still images. However, the luminance and chromaticity of

the images did not meet our requirements. Therefore, the images were edited to improve their overall quality. The edited images then were newly validated[18].

A2 Validation of the database

The validation of the database was conducted in two phases. Sample 1, which consisted of psychology students, rated a random subset of the images whereas Sample 2, consisting of non-psychology students, rated all images. All participants indicated for each presented image which emotion was expressed and how intense, natural and arousing the expression was. Furthermore, attractiveness and typicality ratings for the respective group of the expressers were obtained with the neutral facial expressions to ensure that these ratings were not influenced through emotional aspects.

A2.1 Method

Participants. Eighty-seven psychology students (69 female and 18 male) and 31 non-psychology students (20 females, 11 males) participated in the validation study. Psychology students were given course credit and non-psychology students were paid eight Euros for participation. The age range was 18 to 42 years with a median of 21 years.

Procedure. All ratings were administered on the computer screen. The session started with the ratings of the emotional expressions: participants indicated for each presented image which emotion was expressed as well as how intense, natural and arousing it was. In each trial of this rating phase, one of the images was presented for 3.5 seconds, followed by the question asking which emotional expression was shown [19]. To indicate their answer,

[18] We also excluded the expressions of 15 individuals due to low recognition rates. The validation data is therefore based on the expressions shown by 28 individuals (7 German females, 4 Turkish/Arabic females, 9 German men, 8 Turkish/Arabic men).

[19] This presentation duration was chosen to keep the expression comparable to the video clips, so that the recognition rates of the photographs can also be taken as an approximation for the recognition rates of the video clips. However, usually dynamic stimuli yield better

participants had to select one out of nine boxes. Eight of the boxes were marked with the labels of the expressions and one with "other" (see Frank & Stennett, 2001 for this procedure). The arrangement of boxes on the screen was counterbalanced between participants but held constant for one participant. After the rating of the emotional expression, participants were asked to judge the intensity of the emotional expression on a scale ranging from 1 (not intensive at all) to 5 (very intensive). The same was done for the naturalness of the expression. Finally, participants rated how arousing the emotional expression was by clicking on the respective manikin of the self-assessment-manikin scale (Bradley & Lang, 1994). Then the next trial started. Images were presented in random order with the restriction that neither the same emotional expression nor the same individual was presented consecutively. Sample 1 rated only 128 out of the 224 images due to time constraints. Sample 2 rated all images.

After the emotion rating, participants judged each individual on attractiveness and typicality. For this, the neutral expression of the individual was presented. Attractiveness of each individual was rated on a scale ranging from 1 (very unattractive) to 5 (very attractive). Then, the typicality of the Turkish/Arabic individuals and subsequently the typicality of the German expressers for the respective group were rated on a scale ranging from 1 (very untypical) to 5 (very typical). Images were presented in random order.

A2.2 Results

Each image was rated by at least 66 raters. We calculated separate ANOVAS with (a) the recognition rates of the expressions, (b) the intensity, (c) the naturalness and (d) the arousal as dependent variables.

Expressions. For each image, a raw recognition rate was calculated by the ratio between the number of selections of a targeted expression and the number of its presentations. Recognition rates are displayed in percentage in

---

recognition rates. Thus, the rates of the photos might be regarded as very conservative estimation of the real recognition rates.

Table 2. The average recognition rate was 76% with a median of 79%. All expressions were recognized above chance (*p*s < .001) with chance level set at 33%, which is a conservative criterion (see Tracy, Robins, & Schriber, 2009). Joy had the highest recognition rate (89%) and contempt the lowest (48%). This pattern, as well as the recognition rates of the emotional expressions are comparable to those reported for other sets (e.g., Beaupré & Hess, 2005; Biehl, Matsumoto, Ekman, & Hearn, 1997; Ekman & Friesen, 1976; Goeleven, De Raedt, Leyman, & Verschuere, 2008; Langner et al., 2010; Tracy, Robins, & Schriber, 2009; van der Schalk, et al., 2011).

Table 1 *Raw recognition rates (in %) for the complete set and the German and Turkish/Arabic expressers separately (standard deviations in parenthesis).*

	All	German	Turkish/ Arabic
Joy	98 (2)	99 (1)	98 (1)
Anger	89 (7)	92 (6)	85 (8)
Anger	84 (7)	87 (6)	81 (8)
Neutral	78 (14)	77 (15)	80 (14)
Fear	74 (14)	72 (15)	78 (12)
Fear	71 (12)	73 (13)	69 (10)
Disgust	67 (12)	71 (11)	62 (12)
Contempt	50 (14)	47 (15)	50 (12)
All	76 (18)	77 (19)	75 (17)

For the main analyses, the raw recognition rates were arcsine transformed (Winer, 1971). For readability, however, raw recognition rates are reported. An ANOVA with expression (joy, surprise, anger, fear, disgust, sadness, contempt, neutral) and ethnicity (German vs. Turkish/Arabic) as between factors yielded a significant main effect of expression: F (7, 208) =

65.80; $p < .001$. Planned contrasts showed that joy had a significant higher recognition rate (ts > 7.90; ps < .001) than all other emotions whereas contempt had a significant lower recognition rate than all other emotions (ts > -5.47; ps < .001). The recognition rates of all other expressions were in-between. Neither the main effect of ethnicity nor the interaction reached significance (all Fs < 3.52; ps > .06).

In order to correct for response biases in the raw recognition rates, we also calculated unbiased hit rates (Wagner, 1993). The unbiased hit rate corrects for participants' possible tendencies to overuse a certain emotion label in the rating. If a participant, for example, tends to classify every negative emotion as anger (maybe because of a perception bias), this will heighten the recognition rate for angry expressions; however, this is not caused by the high recognizability of the expression but by the bias of the participant and his heightened use of the label. To correct for this bias, the unbiased hit rate sets the number of correctly identified expressions in relation to the number of presentations of this certain expression *and* to the number of selections of this expression by participants. The unbiased hit rate can vary between 0 and 1 whereby a hit rate of 1 means that each presentation of a certain emotion was correctly identified and that the respective emotion label was only used for this expression. We calculated unbiased hit rates for each participant for each emotional expression shown by German and Turkish/Arabic expressers separately. The unbiased hit rates were arcsine transformed before the analysis. Unbiased hit rates are displayed in Table 2.

A 8 (expression: joy, surprise, anger, fear, disgust, sadness, contempt, neutral) x 2 (ethnicity: German vs. Turkish/Arabic) ANOVA with all factors varied within participants yielded a significant main effect of expression: $F(7, 111) = 111.82$; $p < .001$. Planned contrasts showed that joy had a significant higher unbiased hit rate than all other expressions (Fs > 72.07) whereas contempt had a significant lower unbiased hit rate than all other expressions (Fs > 37.01). In contrast to the raw recognition rates, a significant expression by ethnicity interaction emerged: F (7, 111) = 6.52; $p < .001$. Bonferroni corrected single comparisons showed that surprise and neutral expressions were associated with lower unbiased hit rates if expressed by German

individuals compared to Turkish/Arabic individuals (|*t*|s > 3.01, *p*s < .001). No other difference between the two groups emerged (|*t*|s < 2.70, *p*s > .003).

Table 2 *Unbiased hit rates for the complete set and for German and Turkish/Arabic expressers separately (standard deviations in parenthesis).*

	All	German	Turkish/ Arabic
Joy	.93 (.09)	.92 (.10)	.93 (.10)
Sadness	.77 (.17)	.80 (.18)	.74 (.21)
Anger	.69 (.20)	.72 (.19)	.66 (.24)
Surprise	.67 (.17)	.64 (.19)	.69 (.21)
Neutral	.68 (.20)	.65 (.22)	.71 (.24)
Fear	.56 (.22)	.57 (.22)	.55 (.27)
Disgust	.60 (.26)	.62 (.28)	.57 (.29)
Contempt	.37 (.29)	.39 (.29)	.36 (.31)
All	.66 (.12)	.66 (.12)	.65 (.14)

Other Ratings. We also calculated 8 (expression: joy, surprise, anger, fear, disgust, sadness, contempt, neutral) x 2 (ethnicity: German vs. Turkish/Arabic) ANOVAs for the dependent variables naturalness, intensity and activated arousal. Each ANOVA showed a significant main effect of expression: *F*s(1, 208) > 56, *p*s < .001. Details of the respective variables are described below.

For the naturalness of the emotional expression, neither a significant main effect of ethnicity nor a significant interaction with ethnicity emerged. The means show that joyful (*M* = 3.75; *SD* = .47) as well as neutral (*M* = 3.76; *SD* = .15) expressions were rated as above-average natural, whereas the means of the other expressions were distributed around the midpoint of the scale (i.e., 3). For the intensity rating, also no significant main effect of ethnicity or interaction with ethnicity emerged. All expressions except neutral (*M* = 2.36)

and contempt (M = 2.60) were rated above the midpoint of the scale (M = 3.51 to M = 4.07). On the arousal rating, German expressions (M = 3.96, SD = .66) were judged as significantly more arousing than the Turkish/Arabic ones (M = 3.86, p = .65): F (1, 208) = 4.12, p < .05. Overall, happy expressions were judged to be the most arousing ones (M = 4.76, SD = .58) whereas neutral expressions were the least arousing ones (M = 2.78, SD = .29). No interaction between emotional expression and ethnicity occurred (F < 1).

Comparing German and Turkish/Arabic expressers on their ratings of typicality and attractiveness revealed no difference in rating (t < 1.6). The individuals of both groups were rated as rather typical for their respective group (German: M = 3.68, SD = .37; Turkish/Arabic: M = 3.28, SD = 1.24) and as averaged attractive (German: M = 2.61, SD = .55; Turkish/Arabic: M = 2.59, SD = .47).

A2.3 Discussion

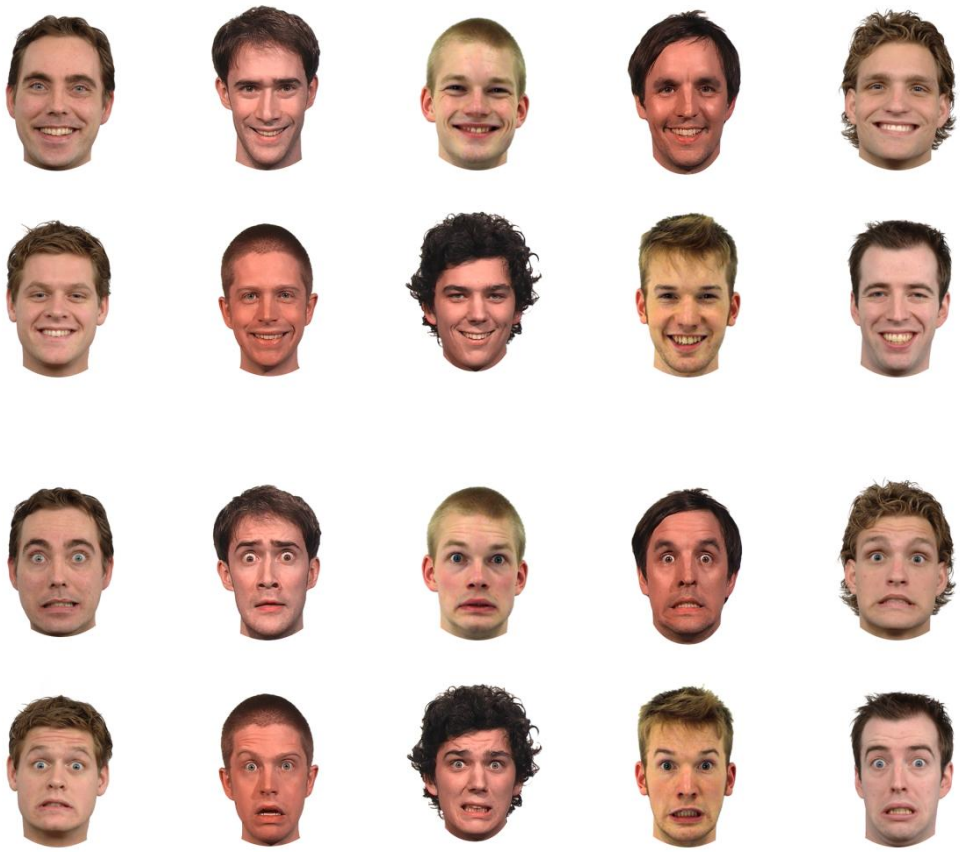
The results of the validation data show that we were successful in developing a stimulus set that includes emotional expressions shown by expressers of two ethnicities. The recognition rates of the new set are comparable to or even outperform those reported for other stimulus sets (Beaupre´ & Hess, 2005; Biehl et al., 1997; Ekman & Friesen, 1976; Goeleven, De Raedt, Leyman, & Verschuere, 2008; Langner et al., 2009; Tracy, Robins, & Schriber, 2009; van der Schalk, Hawk, Fisher, & Doosje, 2011). Importantly, and in contrast to other sets (Elfenbein & Ambady, 2002; van der Schalk, Hawk, Fisher, & Doosje, 2011), the recognition rates of the expressions shown by German and those shown by Turkish/Arabic individuals did not systematically differ. This is a major advantage of our set, since our research questions requires emotional expressions of in- and out-group members that do not differ per se in order to be able to examine the influence of group-membership on reactions to emotions.

Additionally, the validation data of the SUED provides information about the typicality of the individual expressers. This is important information because in studies examining the influence of group-membership on reactions

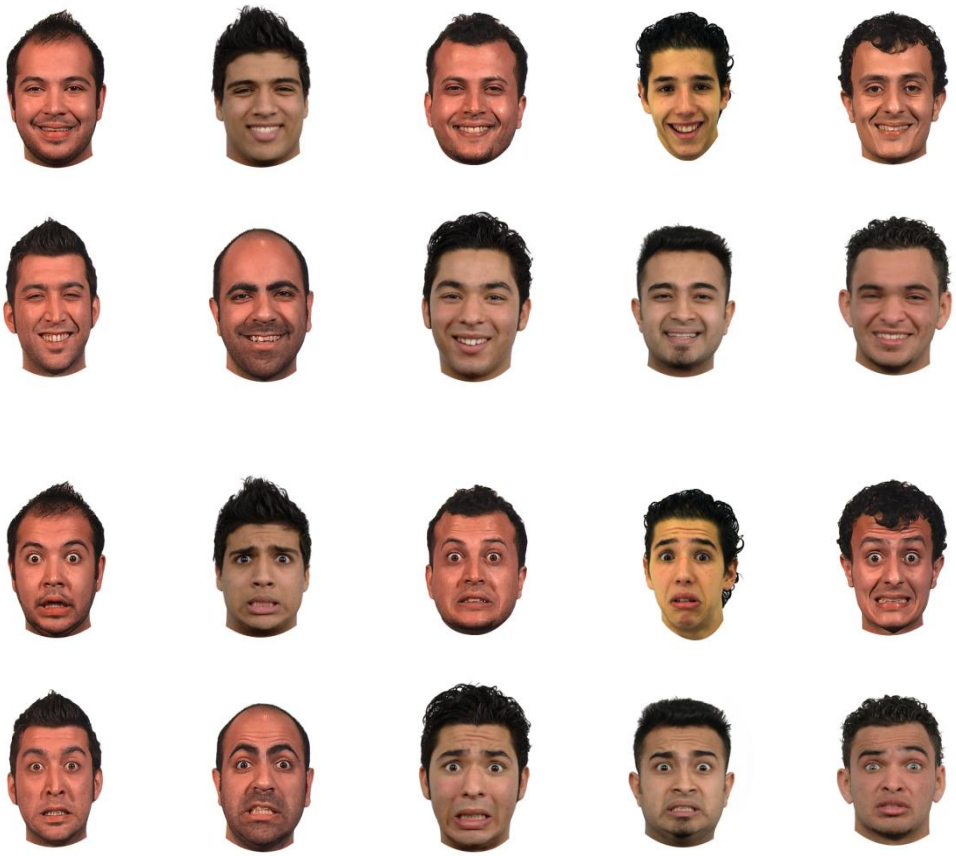
to emotions it is often necessary that the stimulus-persons are highly typical for their respective group, especially in cases in which group membership is not explicitly mentioned in the experiment. The same holds for attractiveness: this factor can influence reactions to stimulus persons like other affective information (e.g., Marsh, et al. 2003) and should therefore be carefully controlled for when selecting stimulus material. Therefore we were successful in developing a high quality stimulus set of emotional expressions shown by German and Turkish/Arabic individuals. In addition, we provide valuable information that enables researchers to thoroughly control their stimuli for their experiments.

Appendix B – Stimuli employed in Experiment 1 and 2

German expresser

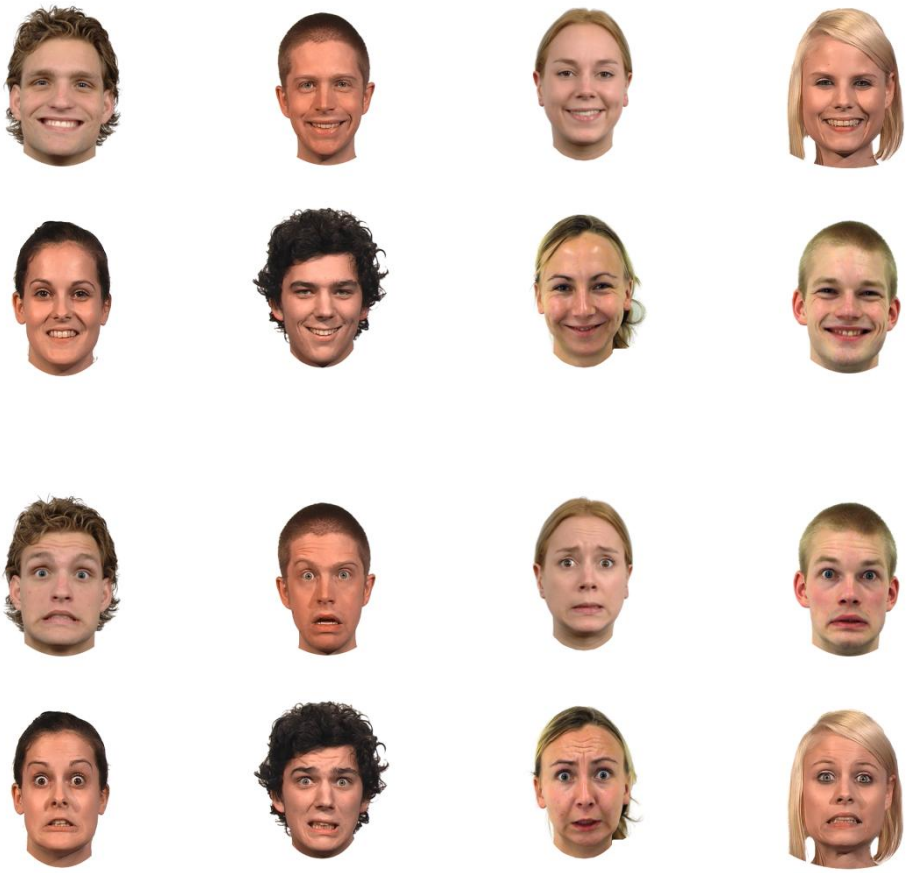


Turkish/Arabic expresser

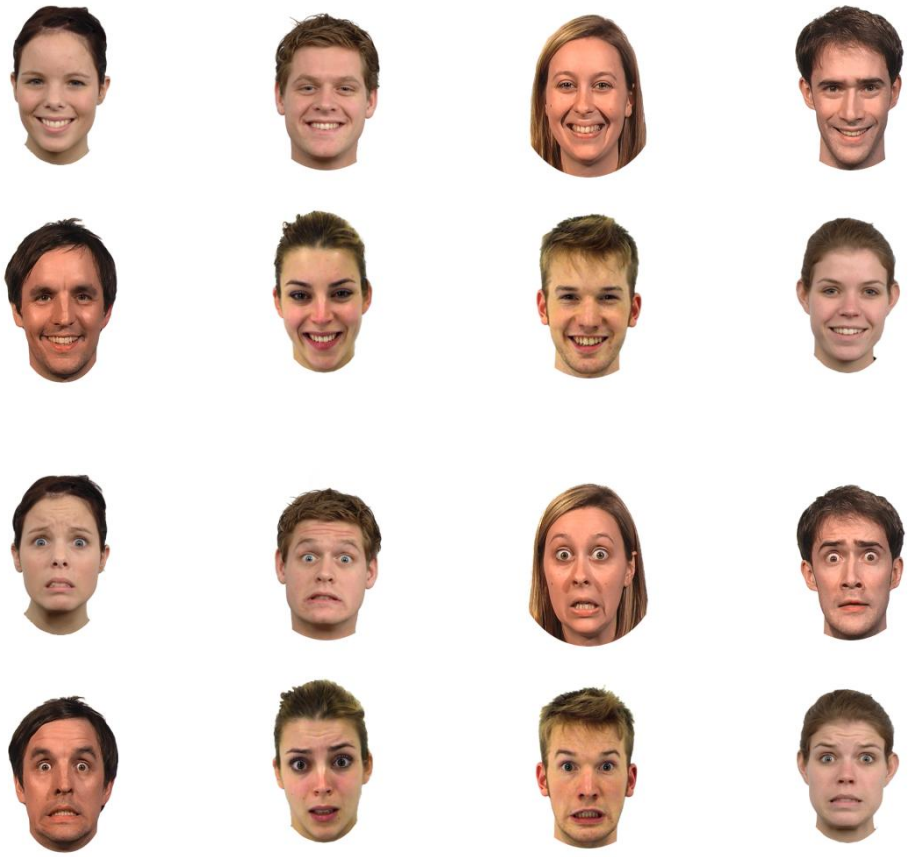


Appendix C – Stimuli employed in Experiment 3a and 3b

Set1



Set 2



Appendix D – Group information given in Experiment 3a and 3b

Group information given in Experiment 3a

„Um die vielfältigen Reize in unserer Umwelt verarbeiten zu können, müssen wir unsere Wahrnehmung strukturieren. Trotz der vielfältigen individuellen Unterschiede in der Art und Weise, wie komplexe Informationen 'sortiert' werden, lassen sich zwei grundlegende Wahrnehmungsstile unterscheiden, der sogenannte FOKALE Wahrnehmungsstil und der BASALE Wahrnehmungsstil.
Beim fokalen Wahrnehmungsstil wird die Information ausgehend von hervorstechenden Merkmalen, den Figuren, strukturiert.
Beim basalen Wahrnehmungsstil dagegen ist die Richtung der Informationsverarbeitung genau umgekehrt, nämlich ausgehend vom Allgemeinen, dem Hintergrund, hin zu den spezifischen Reizen der Wahrnehmungsinformation.“

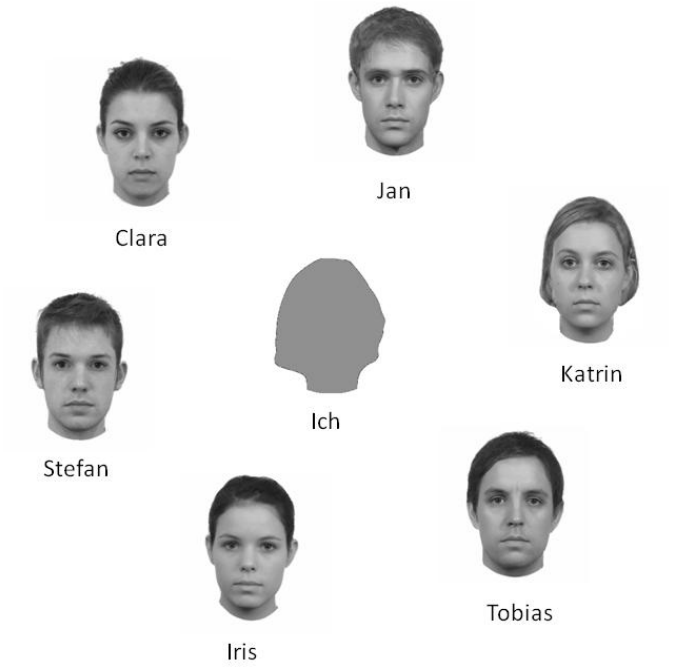
Group information given in Experiment 3b

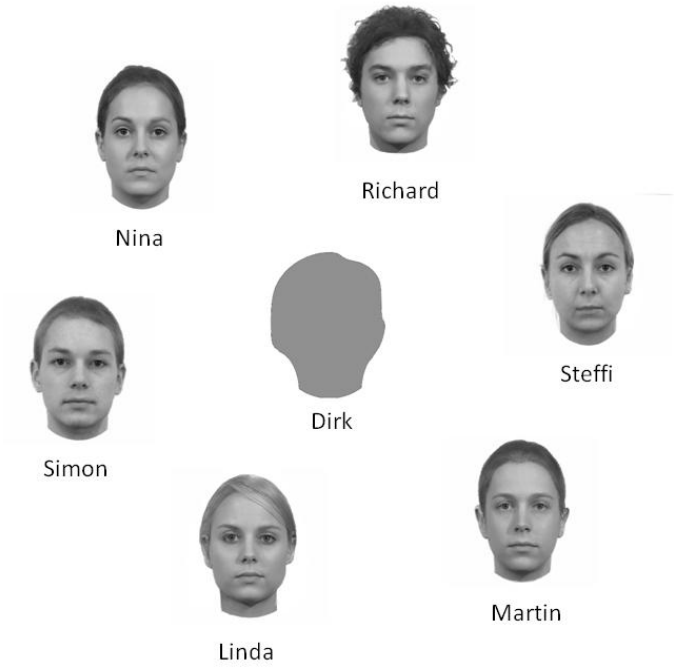
„Personen mit einem basalen Persönlichkeitsstil sind meist sozial verträgliche Menschen, die gerne Zeit mit anderen verbringen. Sie sind umgänglich und versuchen etwaige Konflikte einvernehmlich zu lösen. Daher haben sie oft einen großen Freundeskreis oder auch wenige, aber enge Freunde. Sie sind recht ausgeglichen und meistens positiver Stimmung. Sie halten sich an bestehende Regeln und Maßstäbe. Manchmal sind sie etwas ungenau und vergesslich.”

„Personen mit einem fokalen Persönlichkeitsstil geraten oft in Schwierigkeiten mit ihren Mitmenschen, da sie sich häufig egoistisch und rücksichtslos, manchmal auch aggressiv anderen gegenüber verhalten. Es ist ihnen wichtig, ihren Willen durchzusetzen. Oft fühlen sie sich dazu berechtigt sich zu

"nehmen" was ihnen zusteht. Dabei überschreiten Sie mitunter auch das Gesetz. Ihre Intelligenz ist meistens hoch; zudem sind sie oft handwerklich sehr geschickt.“

Appendix E – Group images employed in Experiment 4





Appendix F – Short stories employed in Experiment 5

Happy life event

„*Peter/Ahmet* ist ein typischer 21-jähriger junger Mann, der sich in seiner Freizeit gerne mit seinen Freunden trifft und Fußball spielt. Normalerweise steht er um sieben Uhr auf, um sich auf den Weg in die Berufsschule zu machen. Momentan jobbt er zweimal die Woche abends in einem Café. Er wohnt noch bei seinen Eltern, mit denen er bereits als kleines Kind aus *Düsseldorf/Istanbul* nach Köln gezogen ist.

Heute ist ein besonderer Tag für ihn, denn er freut sich auf das alles entscheidende Fußballspiel seiner Lieblingsmannschaft um den Meisterschaftstitel, das heute stattfindet. Er hat sich extra den Nachmittag frei genommen, um das Spiel live sehen zu können, da er von seinen Eltern Karten geschenkt bekommen hat. Zwei Stunden vor dem Spiel trifft er sich mit seinem Freund, der ihn begleiten wird. Er kann seine Aufregung kaum zurückhalten. Seinem Freund fällt sofort auf, dass er sehr nervös ist und einen außergewöhnlich freudigen Gesichtsausdruck hat. Damit sich die Zugfahrt zum Stadion nicht zu lange hinzieht, kaufen sie sich am Kiosk noch ein paar Zeitschriften.“

Fearful life event

„*Peter/Ahmet* ist ein typischer 21-jähriger junger Mann, der sich in seiner Freizeit gerne mit seinen Freunden trifft und Fußball spielt. Normalerweise steht er um sieben Uhr auf, um sich auf den Weg in die Berufsschule zu machen. Momentan jobbt er zweimal die Woche abends in einem Café. Er wohnt noch bei seinen Eltern, mit denen er bereits als kleines Kind aus *Düsseldorf/Istanbul* nach Köln gezogen ist.

Heute ist ein besonderer Tag für ihn, denn er fürchtet sich vor seinem Arzttermin bei einem anerkannten Spezialisten, für den er sich extra den Nachmittag frei genommen hat. Vor ein paar Tagen hat er sich einem Bluttest unterzogen und wird heute erfahren, ob er Leukämie hat. Zwei Stunden vor dem Arzttermin trifft er sich mit seinem Freund, der ihn begleiten wird. Er

kann seine Aufregung kaum unterdrücken. Seinem Freund fällt sofort auf, dass er sehr nervös ist und einen außergewöhnlich ängstlichen Gesichtsausdruck hat. Um sich abzulenken, gehen die beiden in ihre Lieblingskneipe, um sich dort ein Fußballspiel anzusehen und ein Bier zu trinken.