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"Mood Contagion": The Automatic Transfer of Mood Between Persons

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The current studies aimed to find out whether a nonintentional form of mood contagion exists and which mechanisms can account for it. In these experiments participants who expected to be tested for text comprehension listened to an affectively neutral speech that was spoken in a slightly sad or happy voice. The authors found that (a) the emotional expression induced a congruent mood state in the listeners, (b) inferential accounts to emotional sharing were not easily reconciled with the findings, (c) different affective experiences emerged from intentional and nonintentional forms of emotional sharing, and (d) findings suggest that a perception–behavior link (T. L. Chartrand & J. A. Bargh, 1999) can account for these findings, because participants who were required to repeat the philosophical speech spontaneously imitated the target person's vocal expression of emotion.

Feelings usually arise from different forms of cognitive processing (for an overview, see Clore, Schwarz & Conway, 1994). From that perspective, feelings are either a by-product (Koriat, 1994) or an end product of cognitive processing (e.g., Lazarus, 1991; Roseman, 1984). However, cognitive processes are not the only source of feelings. Feelings can also be elicited by patterns of facial, postural, and behavioral expressions. William James (1890) proposed that bodily expressions might temporally precede and causally determine feelings. By now there is considerable support for the assumption that facial and postural expressions can exert an influence on subjective feelings (for a review, see Adelman & Zajonc, 1989). Various mechanisms have been proposed: a self-perception view (Laird, 1974), physiological processes (Ekman, Levenson, & Friesen, 1983), and learning processes (Buck, 1988). Several studies have shown that motor action exerts an influence even though the emotional expression is not recognized (Stepper & Strack, 1993; Strack, Martin, & Stepper, 1988). Because self-perception presupposes that the emotional expression is recognized, it is unlikely that this mechanism usually mediates the influence of motor actions on feelings.

From a social psychological perspective, it might be interesting to determine whether feedback processes can also be spontaneously activated if one merely observes another person's emotional expression. Recently, Hatfield, Cacioppo, and Rapson (1992) speculated that people "catch" someone else's feeling by unintentionally mimicking her or his emotional expression. Given that individuals unintentionally imitate the emotional expressions of interactants, it is conceivable that this imitation results in a congruent mood state in the observer by a feedback mechanism. Because individuals are not aware that they are influenced by the emotional expressions of other people, we postulate that "mood states" are induced in the observers and that it is therefore appropriate to talk about mood contagion. This view is based on the insight that emotions presuppose that a person knows the origin of her or his feelings, whereas moods do not depend on such knowledge (Ortony & Clore, 1989). Thus, although some authors have assumed that contagion results in emotions on the side of the observer (Hatfield, Cacioppo, & Rapson, 1992), we suggest that an automatic mechanism induces a mood state. In sum, mood contagion can be conceived of as a two-stage mechanism that hinges on the unintentional imitation of another person's emotional behavior, which in turn activates a congruent mood state in the observer.

The unintentional imitation of emotional expressions of interactants, recently referred to as "motor mimicry" (Chartrand & Bargh, 1999; Bavelas, Black, Lemery, & Mullet, 1987), represents the first step of the contagion mechanism. This tendency might be due to a more general mechanism, by which any image or thought of a movement can elicit or facilitate the actual behavior in the observer. According to the principle of ideomotor action formulated by Lotze (1852) and James (1890), it is sufficient to think of or merely observe a behavior to elicit it. In line with these assumptions, Bargh, Chen, and Burrows (1996) found that students primed with the stereotype of elderly individuals being slow unintentionally adopted the walking speed of elderly people. In a similar vein, smiles and mannerisms are capable of automatically eliciting the same behavior in an observer, although she or he is unfamiliar with the target person (Chartrand & Bargh, 1999). Bargh et al. (1996) suggested that these findings can be taken as evidence that action is closely linked to perception (for further evidence, see Dijksterhuis & van Knippenberg, 1998). Other research has shown that the facilitation of motor responses is not restricted to imitative behavior (Prinz, 1990). Rather, motor responses were facilitated whenever the movement of a stimulus resembled movement of the required response. Therefore, cognitive researchers have speculated that the reason why the interface between sensory input and generation of movements seems to be so seamless is that a common coding exists for both (Prinz, 1990).

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For that reason, the perception of another person's behavior might activate the same action codes in the observer that were used to generate the behavior.

If we assume that action codes can automatically elicit feelings, as is evident from facial feedback research, it is conceivable that the observation of another person's emotional expression might spontaneously evoke congruent feelings in the observer. We therefore suggest that mood contagion might hinge on a perception–behavior link that automatically elicits congruent feelings in response to one's own or to another person's emotional expression. Most important, this kind of mediation does not require an interpersonal goal toward the person observed. Thus, contagion can be conceived of as an automatic mechanism that induces a congruent mood state by means of the observation of another person's emotional expression.

Support for these assumptions comes from a study in which participants had to watch a prerecorded videotape of a target person describing the happiest or saddest events of his or her life (Hsee, Hatfield, Carlson, & Chemtob, 1990). It was shown that participants tended to experience the emotions of the target person. More specifically, they felt happier and expressed more happiness if they had watched an interview with a happy target person. Similar results were obtained in a related study by Laird et al. (1994), in which participants watched short film sequences of a person displaying an overt emotional expression.

However, these studies could not supply clear evidence for the existence of an automatic form of mood contagion, because none of them ruled out the possibility that participants invoked the intention to responded vicariously. For example, in trying to understand the target person's situation, participants might have engaged in perspective taking and thus shared the target person's emotion. Mood contagion should be triggered exclusively by the emotional expression of another person. However, because the emotion of the target persons was evident from their verbal utterances and their emotional behavior, it is unclear to which of the cues the participants in these studies were responding. For example, the description of an emotion-eliciting event by the target person in the study (Hsee et al., 1990) may have provided observers with an additional cue for inferring their feelings and imagining how they themselves or the target person would have felt in this situation. Moreover, in the first study by Laird et al. (1994), participants watched a film clip in which a woman bends down to fill her canteen in a river and suddenly a crocodile leaps out of the water. The use of such a procedure makes it unclear whether the viewer's feelings are prompted by the target person's situation or by the emotional expression. A more stringent test of the assumption that the contagion of feelings is mediated by an perception–behavior link would therefore require that emotional information be restricted to expressive behavior.

Moreover, because facial expressions might represent salient cues that attract attention, it is conceivable that participants used these cues to infer their own affective feeling. Self-perception theory (Bem, 1967) assumes that individuals use their own reactions to infer evaluative judgments about attitudes and feelings. In line with self-perception theory, Olson (1992) showed that individuals sometimes make use of the expressive behavior of others to derive judgments about their own emotional responding. More specifically, he provided participants with the information that a laugh track would either facilitate or inhibit their affective response to a set of jokes. After having been exposed to a number of jokes with and without laughter, participants who were led believe that the laugh track would inhibit their affective response were more interested in jokes unaccompanied by laughter, whereas those who were informed that the laugh track would facilitate their affective response were more interested in jokes accompanied by laughter. Although this is not the mechanism underlying automatic mood contagion, such an approach is compatible with previous findings, because in these studies the emotional expressions used are quite salient. Because awareness of an influence is a prerequisite for an inferential approach (Olson, 1992), it would be necessary to find emotional expressions that are not spontaneously attended to. Consistent with research in emotion recognition (O'Sullivan, Ekman, Friesen, & Scherer, 1985), we assumed that this is the case for the vocal expression of emotions. Although people are able to detect an emotion if their attention is directed on the vocal expression (e.g., Scherer, 1986), in everyday interaction the vocal expressions of emotions embedded in the speaking voice is rather subtle compared with other forms of nonverbal mediation (O'Sullivan et al., 1985). Usually, one does not spontaneously pay attention to another person's vocal expression, especially if listening to the communicated contents is attention consuming. Nevertheless, the perception of another person's vocal expression of emotion might be sufficient to elicit compatible action codes in the listener, and these action codes might create shared feelings. Similar conclusions can be derived from models of speech perception (Liberman, Cooper, Shankweiler, & Studdert-Kennedy, 1967; Prinz, 1990), which suggest that semantic representations and action codes are activated simultaneously and independent of each other as a response to another person's utterance. In fact, the assumption that action codes are activated while listening to another person can account for a variety of phenomena, for example, the shape of dialects by one's social environment.

The present studies were designed to investigate whether affective feelings are automatically transferred between persons. Four experiments were conducted in which participants were exposed to the speaking voice of an unfamiliar other expressing an emotion. We hypothesized that vocally expressed emotions elicit congruent mood states in the listener, even though she or he does not have the goal to share the target person's feelings. To test this prediction, in our studies participants had to listen to an orally presented text that was recited in a slightly sad or happy voice. The text was allegedly presented to test participants' text comprehension. This cover story was used to prevent participants from paying attention to the target's affective feeling. Experiment 1 explored whether a congruent mood state would result from listening to a sad, neutral, or happy voice. Experiment 2 addressed whether listening to another person's speech activates congruent action codes. Experiment 3 was concerned with whether inferential processes can account for the contagion effect. Finally, Experiment 4 tested the hypothesis that the goal of sharing another person's emotion promotes different affective consequences.

Experiment 1

Method

Overview and Participants

Participants were recruited for a study on text comprehension. After arriving at the laboratory, they were asked to listen to a philosophical text. The participants were unaware that the text was recited in a happy, neutral,

or sad voice, and were randomly assigned to one of these conditions. Following the text, participants answered questions about their present affective feelings and their subjective comprehension of the text. A total of 30 students at the University of Trier (15 women, 15 men) served as participants. Because our preliminary analysis did not reveal any gender differences, data from male and female participants were combined.

Procedure

Participants were individually brought to cubicles and were informed that we wanted to find out whether orally presented material is learned more easily than written material. Once participants were seated, they could see neither each other nor the experimenter for the duration of the experiment. All instructions were in written form and the experimenters were blind to the experimental conditions. The instructions informed participants that they had been assigned to the group that had to listen to an orally presented philosophical text. Following their exposure to the text, they were going to be tested for their text comprehension. Once they had read the instructions, participants had to put on headphones and start the cassette player on the table in front of them. To avoid contents that would be affective in nature or elicit imagery, the text presented was abstract in nature, a selection from the German version of David Hume's "Philosophical Essay Concerning Human Understanding" (Herring, 1967). Both a male and a female actor who were trained in vocally expressing emotions recited the text in a neutral, slightly happy, or slightly sad voice, and each version lasted about 320 s. The content of the text was held constant across all three conditions. To control possible gender differences in the expressiveness of women and men (Hatfield, Cacioppo, & Rapson, 1994; Sullins, 1991), a female and a male speaker were used and the gender of the speaker was balanced across conditions.

After they had listened to the text, participants were given two questionnaires, which recorded their affective state and their text comprehension. Following the questionnaires, participants were probed for suspicion in a "funneled" question sequence (Chartrand & Bargh, 1999). Therefore, participants were asked if they had seen a relationship between the speech and their thoughts and feelings. Then they had to indicate whether the real purpose of the study was different from what was told in the cover story. Subsequently, participants were fully debriefed as to the real purpose of the experiment to make sure that no residual mood effects remained. Finally, participants were paid, debriefed, and sworn to secrecy.

Extensive pretesting was conducted to ensure that the differences in emotional expression were not apparent to listeners, who were not intended to recognize the emotional expression of the speakers. On the other hand, the participants should be able to recognize the emotional expressions if they had the intention to do so. Thus, to study whether the emotion expressed by the speakers was spontaneously recognized, 35 pretest participants were given the same instructions (text comprehension) as in the main experiment. They then listened to the text and were asked to indicate among other questions whether an emotion had been expressed by the speaker ("yes" or "no"). Across all six conditions (Female vs. Male × Happy vs. Neutral vs. Sad), approximately half the participants indicated that an emotion was expressed by the speaker. Because the recognition rate did not reliably differ between conditions ($\chi^2 < 2$) and because none of the conditions differed from chance (50%), we concluded that the differences in emotional expression were rather subtle. Of course, this is not a stringent test of whether the emotional expression was spontaneously recognized, because the requirement to judge the speaker's emotion might have forced participants to recollect the speaker's voice and categorize it accordingly. As a result, more participants than those that might have spontaneously recognized the emotional expression answered "yes." Nonetheless, despite this reactivity in the measure, the recognition rate was at chance.[1]

To investigate whether the posed expressions actually displayed the emotion in question, we conducted a second pretest in which participants were not given the text comprehension instruction. Instead, they were asked to evaluate the voice on the basis of several emotion adjectives while listening to the speech. More specifically, they were informed that they had to indicate on 10-point rating scales ranging from 0 (*not at all*) to 9 (*very strong*) how strongly the speaker expressed emotions (cheerful, happy, angry, anxious, sad, and bored). Compared with the other emotion adjectives ($M = 4.7$), the sad voice received the highest intensity ratings on sadness ($M = 6.1$), $t(25) = 1.9$, $p < .04$. The happy voice received the highest intensity ratings on happiness ($M = 7.3$), compared with the other emotion adjectives ($M = 5.9$), $t(25) = 1.7$, $p < .05$. Within conditions, no difference was obtained between the emotional expression of the female and the male speaker ($F < 1$).

In conclusion, the pretests ensured that the vocal expressions actually displayed either happiness or sadness and that these emotional expressions were subtle if participants were not intended to recognize it. Thus, the divergent findings in the two pretest studies depend on whether participants were intended to recognize the emotional expression. Hence, because participants do not spontaneously pay attention to the emotion expressed by the target person unless they are required to do so, it is unlikely that participants will judge their mood state on the basis of inferences. Taken together, our stimulus materials seem to be appropriate for investigating whether an automatic form of empathy exists.

Dependent Variables

Following the text, participants were given a questionnaire, the ostensible purpose of which was to determine the impact of feelings on text comprehension. First, participants were asked for their present mood state ("How do you feel right now?"). Responses were provided on a 10-point scale, ranging from 0 (*very bad*) to 9 (*very good*). Next, they were given six emotion adjectives and asked to indicate on 10-point scales, ranging from 0 (e.g., not at all cheerful) to 9 (e.g., very much cheerful), how strongly they were feeling each emotional state. The adjectives were (in order of their presentation) *cheerful*, *happy*, *angry*, *anxious*, *sad*, and *bored*. In line with our conceptualization, we expected that more general mood items are influenced by the exposure to the speech, whereas more specific emotion items are not. To tap participants' state of arousal, experimenters asked them to indicate how "relaxed" they were. This was done to control for a possible mediating role of arousal. Again, participants' responses were recorded on a 10-point scale, ranging from 0 (*not at all*) to 9 (*very much*).

Perspective taking can be regarded as a function of the liking felt for the target person. To test whether perspective taking might play a role in our study, experimenters asked participants to rate how much they liked the target person on a 10-point scale, ranging from 0 (*not at all*) to 9 (*very much*). Finally, they had to indicate (on 10-point scales) their comprehension of the text (0 = *did not comprehend the text at all*, 9 = *comprehended the text completely*) and how much they liked the recited text (0 = *did not like the text at all*, 9 = *liked the text very much*). This variable was recorded to determine if possible affective responses to the speech were due to an impaired text comprehension. It is conceivable that emotional responses are elicited if participants are not able to reach their goal of understanding as much of the text as possible.

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[1] Note that awareness of the emotional tone in our experiment is interesting only with respect to a self-perception account. More important, in the context of our research, listeners share another person's feeling without having the intention of doing so. However, as will be evident from our further experiments, we do not assume that the vocal expression of emotion is subtle under all circumstances. Rather, we propose that the vocal expressions used in our studies were subtle to the extent that one's attention is not directed toward the properties of the voice. This, however, does not imply that people are not able to recognize the emotion on the basis of vocal expression as is evident from several studies (Scherer, 1986). Importantly, however, in all these emotion recognition studies, participants had the explicit goal of recognizing the emotion. In contrast, we made every effort to divert participants' attention away from the emotional expression of the speakers.

Results

One person was dropped from the analysis because he or she believed that the study focused on emotion research. Because this person had listened to the neutral speech and none of the other participants expressed any doubts about the ostensible purpose of the experiment, we assume that this person may have been informed about the real purpose of the study before the experiment started.

Mood State and Specific Emotions

To test the statistical reliability of the obtained differences, participants' responses were analyzed in a one-way analysis of variance (ANOVA), with emotional expression (happy vs. neutral vs. sad) as the single factor. As depicted in Table 1, participants' general mood was influenced by the exposure to the speech, $F(2, 26) = 5.32$, $p < .01$. Single contrast analysis revealed that those who listened to the happy voice rated their mood as significantly better than those who listened to the sad voice, $t(26) = 3.2$, $p < .004$, with the neutral condition falling in between.

In contrast, none of the analyses of the more specific emotional adjectives (cheerful, happy, angry, anxious, sad, and bored) revealed significant effects (all $F < 1.6$). Moreover, composite scores did not show an overall effect. Neither adding up positive (happy $M = 4.2$, neutral $M = 4.3$, sad $M = 3.6$) and negative emotions (happy $M = 1.8$, neutral $M = 1.6$, sad $M = 2.1$) separately nor computing a single index (whereby negative emotions were weighted negatively) yielded a reliable effect ($F < 1$).

Finally, to test whether emotional expression had an influence on participants' arousal, the ratings on the adjective *relaxed* were submitted to a one-way analysis. No influence of the emotional expression could be observed on this variable ($F < 1$).

Attitude Toward the Speaker

Participants' estimates on how much they liked the target person were entered in a one-way ANOVA, with emotional expression as the single factor. The results of this analysis revealed that target persons speaking in a sad voice were liked less than the target persons who were speaking in a neutral or happy voice, $F(2, 26) = 11.08$, $p < .001$. The means are presented in Table 1. Specifically, target persons with a sad voice were evaluated more negatively than target persons with a neutral voice, $t(26) = 3.3$, $p < .002$, or with a happy voice, $t(26) = 4.5$, $p < .001$. Target persons with a neutral voice and with a happy voice did not differ reliably ($t < 1$).

Table 1
Mean Affective Responses, Liking, and Text Comprehension as a Function of Emotional Expression in Experiment 1

Variable	Emotional expression			
	Happy	Neutral	Sad	$F(2, 26)$
Mood	6.5_b	5.0_a	4.4_a	4.7
Cheerful	3.9_a	4.1_a	3.3_a	<1
Happy	3.7_a	3.6_a	3.0_a	<1
Angry	1.4_a	1.3_a	1.5_a	<1
Anxious	1.2_a	0.8_a	1.5_a	<1
Sad	1.6_a	1.4_a	2.0_a	<1
Bored	3.2_a	2.7_a	3.7_a	<1
Relaxed	5.0_a	5.1_a	4.5_a	<1
Liking of the target	7.0_a	6.0_a	2.7_b	11.1
Text comprehension	5.0_a	4.1_a	3.7_a	<1
Liking of the text	3.3_a	2.9_a	2.0_a	<1

Note. Within rows, means not sharing a subscript differ at $p < .05$.

Text Comprehension and Text Preference

To check whether text comprehension or text preference had an influence on the affective response to the speech, ratings of participants' text comprehension and text preference were submitted to separate one-way ANOVAs, with emotional expression as the single factor. As depicted in Table 1, analysis has shown that participants judged themselves equally able to comprehend the content of the text across conditions ($F < 1$). The means revealed only a slight tendency for the text recited in a happy voice to be comprehended better than the text recited in a sad voice.

Analysis of the preference ratings of the text revealed that the text was preferred slightly more if spoken in a happy voice. But again, this result did not reach level of significance ($F < 1$).

Discussion

The results of this study provide the first support for the assumption that an automatic form of mood contagion exists. Even though participants did not have the goal of sharing the feelings of the target person, exposure to the emotional expression promoted a congruent mood in the listener. However, there are several possible motivational explanations for this observation. As a first alternative explanation, it is conceivable that the emotional expressions affected participants' arousal differently. That is, assuming that the happy voice increased participants' arousal, this experience might have been interpreted as positive mood after listening to the happy voice. However, no evidence emerged that the exposure to the emotional expressions affected participants' arousal. Consequently, an excitation transfer approach (Zillmann, 1983) is not easily reconciled with our data.

Another alternative explanation might be that the speakers' communicative style influenced participants' interest in their experimental task. For example, one can imagine that listening to the sad voice decreased interest in the speech or affected how much the text was liked. Results reveal, however, that the vocal expression of the speaker did not affect participants' liking of the text. The boredom ratings are another indicator for participants' interest. That is, differences in interest might influence feelings of boredom rather than general mood. Specifically, participants should feel more bored after listening to the sad voice. Results indicate that this was not the case. The boredom ratings were not reliably affected by the emotional expression. Thus, this kind of motivational approach cannot account for the obtained pattern of results.

Another explanation might be that participants' mood was evoked by an impaired text comprehension. Recall that participants were asked to comprehend a philosophical text. Although the comprehension of the sad version was slightly impaired, this effect did not reach significance. Thus, it is unlikely that affective feelings were influenced by the text comprehension. Nevertheless, we addressed this issue in the next experiment by directly influencing participants' text comprehension.

Unlike in previous studies, we did not provide participants with information about the situation of the target person, and the text did not contain utterances about his or her emotional state. According to our conceptualization, people who try to intentionally share another person's emotion by perspective taking should know why they feel good or bad. Because knowledge concerning the origin of an affective experience can be regarded as a constituting feature of emotions, perspective taking should prompt discrete emotions. Moods, however, are sometimes experienced without any awareness of their causes (Ortony & Clore, 1989). Mood contagion also presupposes that one is not aware of the origin of one's affective response. Consequently, it is reasonable to conclude that mood contagion results in a global mood state rather than a discrete emotion. Consistent with this prediction, we found that mood contagion was evident only on a more global mood rating, whereas the more specific emotion adjectives were not influenced. Apparently, participants take into account whether they have reason to experience an affective feeling or not (Ortony & Clore, 1989). Nevertheless, the lack of an effect must always be treated cautiously. Also, one might argue that our method for assessing a global mood state is not appropriate.[2] For that reason, this issue will be further addressed in Experiments 3 and 4.

Unlike Chartrand and Bargh (1999), who assumed that mimicry increases the liking of the interaction partners, we found that the target person with the happy voice was liked more than the target person with the sad voice. Thus, although we had assumed that the contagion effect is mediated by a perception–behavior link, the parallel findings on the mood and the liking ratings allows for an alternative explanation: Given that the liking ratings reflect the emotional attractiveness stereotype (Zuckerman, Miyake, & Hodgins, 1991), it is conceivable that the mood effects resulted from the activation of this stereotype. Therefore, we will address the mechanisms underlying the obtained mood effects more closely in the following studies.

Experiment 2

Experiment 1 provided evidence that listening to another person's emotional expression triggers a congruent mood state. We have assumed that the perception of the vocal cues is automatically transformed into action codes, which in turn evoke congruent mood states. Consistent with this assumption, Chartrand and Bargh (1999) recently observed that another person's smile is spontaneously imitated. These findings suggest that action codes are automatically activated upon the perception of a certain behavior. Chartrand and Bargh (1999) proposed that these effects are mediated by a perception–behavior link. On the basis of this reasoning, it might be possible that action codes which underlie speech generation are activated upon the perception of another person's speech; this is precisely what is assumed in the theories of speech perception (Liberman et al., 1967; Prinz, 1990). In the context of our research, it is therefore conceivable that another person's way of speaking spontaneously activates compatible action codes in the listener, which shape his or her own speech production. In contrast to the domain of facial expressions, however, imitation is evident only if the listener intends to speak. Because the perception–behavior link is invoked at a representational level, it is possible that one need not openly imitate another person's behavior. Rather, this approach implies that action codes can be activated without a concomitant peripheral activation. Indeed, there are many occasions in which another person's behavior might facilitate the execution of similar behavior without openly imitating this behavior at the time of the perception (Berkowitz, 1993; Van den Bergh, Vrana, & Eelen, 1990).

A second study was conducted to test the notion that the affective quality of another person's vocal expression automatically activates compatible action codes in the listener. In this study, participants were required to repeat the content of the text while listening to it. Given that the perception of the vocal expression of an emotion automatically activates corresponding action codes in the listener, these codes should in turn shape the vocal expression of the participants. We therefore predicted that the emotional expression of the participants' speech would closely resemble the one they had been listening to, although they were not instructed to copy the style of the speech. To test this prediction, we audiotaped the repeated speech of the participants and had their emotional expression judged by a different sample.

Method

Participants and Design

Forty-four students at the University of Würzburg participated. They were paid DM 7.00 (at the time $3.88) for their participation. The experimental design was a 2 × 2 design, comparing targets' emotional expression (happy vs. sad) and emotion (happy vs. sad).

Procedure

This experiment consisted of two parts. In the first part of the study, participants were required to repeat the philosophical speech aloud while being audiotaped. In the second part of the study, a different sample of participants were required to judge the emotions of the participants from the first part of the study (yoked design).

In the first part of the study, participants were again recruited for an experiment on text comprehension. The instructions were similar to Experiment 1 except that participants were additionally informed that we wanted to know whether the reproduction of the speech content is improved if one repeats the speech aloud while listening. Participants listened to the same audiotaped versions of the speech that were used in the Experiment 1. Unlike in Experiment 1, the tape with the neutral emotional expression was omitted for reasons of experimental efficiency. After reading aloud the speech, participants were probed for suspicion by the use of the same funneled question sequence that was used in Experiment 1.

In a second step, the audiotapes of the participants were presented to an independent sample of participants who were required to judge the emotion of the participants. Thus, the tape of every single participant who had to repeat the speech in the first part of the study was presented to a single participant in the second part of the study who had to judge the emotional expression of the speaker.

Dependent Variables

To judge the emotion of the participants from the first part of the study, participants from the second part were required to indicate on 10-point

[2] One might object that mood states are commonly recorded by composite measures but not by a single item. However, using aggregated measures to assess a general mood state blurs the distinction between moods and emotions. Specifically for our purposes, we had to use a measure that is sensitive to the distinction between moods and emotions. Thus, although the method of using composite mood scores might have the advantage of increasing the reliability of the measurement, a single item measure is more sensitive to the distinction of moods and emotions. In fact, this conclusion is further supported by the results in Experiment 3 and 4.

rating scales how strongly the speaker felt happy, angry, anxious, sad, and aroused.

Results

Because no one expressed any doubts about the ostensible purpose of the experiment, all participants were included in the analysis. We conducted a 2 (targets' emotional expression: happy vs. sad) × 2 (emotion: happy vs. sad) repeated measures ANOVA on the judged emotional quality of the participants repetition of the speech.

As depicted in Table 2, the expressed emotion of the repeated speech was influenced by the emotional expression of the original recitation. Participants judging the emotion of the speakers on the tape rated those who had originally listened to the happy target person as happier and less sad than those who had originally listened to and repeated the speech of the sad target person, $F(1, 20) = 3.83$, $p < .06$. As predicted, persons who had to repeat the speech of the sad target person were judged to be more sad than those who had to repeat the speech of the happy target, $F(1,20) = 2.85$, $p < .05$, one-tailed. Moreover, persons who had to repeat the speech of the happy target person were judged to be happier than those who had to repeat the speech of the sad target, $F(1,20) = 2.69$, $p < .06$, one-tailed.

Furthermore, the other emotional ratings were submitted to separate ANOVAs. None of the analyses reached the level of significance. Thus, in line with our expectations, the obtained results suggest that persons who had to repeat the speech of a happy or sad target person spontaneously imitated their emotional expression.

Discussion

Experiment 2 suggests that listening to another person's emotional expression embedded in their speaking voice activates action codes in the listener, which then shape the generation of the listener's own speech. Thus, convergent evidence suggests that compatible actions codes are automatically activated upon the mere perception of emotional expressions (Chartrand & Bargh, 1999). Over and above these findings, we assume that in line with the facial feedback approach these action codes evoke congruent mood states.

Our findings, however, do not imply that someone automatically moves his or her lips while listening to another person. Rather, the imitation was obtained only if participants were required to speak themselves. In other words, another person's vocal expression does not influence the listener's intent to speak but leaves memory traces that influence the production of his or her own vocal expressions. At the same time, and independent from the effects on speech production, we assume that the action codes influence the affective state of the listener. Taken together, our findings suggest that action codes are activated in parallel to semantic representations while listening to another person talk. Both the semantic representations and the action codes have different consequences. These conclusions extend previous approaches to facial-feedback mechanisms in that the peripheral activation is not a necessary condition for these effects.

Moreover, consistent with research showing that listeners are good at inferring affective states of speakers (Scherer, 1986), the findings of Experiment 2 reveal that participants are able to detect the emotional expressions embedded in the speaking voice if they have to judge the speaker's emotion. In contrast, participants do not spontaneously detect the affective state of an unfamiliar speaker if their attention is directed to the content of the speech, as was shown in Experiment 1. The issue of whether participants are aware of the source of the contagion effect will be further addressed in Experiment 3.

Table 2
Mean Judged Emotion of the Repeating Person as a Function of the Target's Emotional Expression in Experiment 2

	Target's emotional expression	
Emotion	Happy	Sad
Happy	4.6_a	3.0_b
Sad	0.8_a	2.5_b
Angry	1.4_a	1.3_a
Anxious	3.7_a	3.8_a
Bored	3.2_a	2.7_a
Relaxed	4.5_a	4.1_a

Note. Within rows, means not sharing a subscript differ at $p < .05$.

Experiment 3

According to our conceptualization, the perception of vocal cues is automatically transformed into action codes, which in turn evoke congruent mood states. In Experiment 3, we will try to provide evidence that the activation of conceptual codes cannot account for the mood contagion effect. As was pointed out in the introduction, Olson (1992) proposed a self-perception account for contagion effects that holds that participants might have simply inferred their mood state from the emotional expression of the target person. However, an essential requirement for an inferential approach is that participants should be aware of the source of their response (Olson, 1992). By contrast, an automatic form of mood contagion should not be mediated by such inferences. If mood contagion hinges on a truly automatic process, a person's mood should be affected without that person being aware that this has happened or caused it.

A method to disentangle inferential from noninferential bases of mood judgments was developed by Strack and Gonzales (1993). They led participants to think about positive or negative live events either in a vivid or in a pallid mode. After this task, they were asked what their momentary mood state was and how the experimental procedure had changed their mood. The valence of the recollected live event influenced the momentary mood state only if participants thought about the event in a vivid mode. In contrast, the mood change measure was influenced by the valence of the remembered event but not by the mode of thinking. Apparently, because people have no access to what might have influenced mental processes (Nisbett &Wilson, 1977), they infer what might have influenced their mood state on the basis of subjective theories.

Thus, this technique might be useful to distinguish between what had actually influenced one's mood state and what might have influenced one's mood. Similar findings on the mood state and mood change measure would indicate that both judgments were based on inferences. Thus, given that participants might have inferred their mood state from the emotional expression of the

target person, as was obvious in Olson's (1992) studies, parallel findings should be obtained on the mood state and the mood change measure. In contrast, we expect that participants are not aware that the emotional expression of the target person influenced their mood state. Accordingly, the emotional expression would exert an influence on the mood state measure but not on the mood change measure.

Beside such simple inferences, the sharing of feelings is commonly explained by more complex inferences such as perspective taking. Such intentional forms of emotional sharing are not necessarily based on another person's emotional expression, but can use all sorts of knowledge. Perspective taking requires that a person controls her or his own viewpoint while mentally simulating the view of another person (Higgins, 1981). Consequently, empathy that is based on these skills has often been regarded as an attention-consuming activity (Wispé, 1986). A cognitive load should therefore undermine the attempt to see a situation from another person's perspective. Assuming that the congruent affective response to another person's emotional expression stems from perspective taking, a secondary task should dampen the empathetic response. Conversely, mood contagion should not be impaired by a cognitive load, because the activation of action codes should not operate on attention-consuming processes. Thus, in the context of our research, manipulating participants' cognitive capacity while they listened to the speech offered the opportunity to distinguish between perspective taking and mood contagion.

However, more recent findings suggest that reducing participants' cognitive resources is not sufficient to rule out perspective taking. For example, participants are able to adopt another person's perspective even when they are distracted (Hodges & Wegner, 1997). This might be due to the fact that some perspectives are very easy to adopt, indicating that individuals sometimes have a lot of prior practice at it. It might therefore be reasonable to assume that participants in our study were used to taking a speaker's perspective, because this strategy promotes comprehension of university lectures. Because of our instruction, participants may have interpreted the experimental task as a lecture that was best remembered by adopting the perspective of the speaker. Thus, it is conceivable that the obtained affective responses resulted from listeners spontaneously taking the perspective of the speaker. To further scrutinize whether such an automatic form of perspective taking mediated the vicarious response, we thus decided to vary a second determinant of perspective taking. In addition to other factors, the attitude toward the target person is a well-known determinant of perspective taking (Batson, 1995; McHugo, Lanzetta, Sullivan, Masters, & Englis, 1985; Zillmann & Cantor, 1977). Individuals are more likely to adopt the view of persons they like than of those they dislike. For example, the emotions reported after watching a speech by then President Reagan determined whether viewers of a speech shared his emotions (McHugo et al., 1985). More specifically, the feelings of participants with a positive attitude toward Reagan were more congruent to his emotional display than were the feelings of participants with a negative attitude toward him. Evidently, a positive attitude toward the target person enhanced perspective taking, which resulted in an empathetic response, whereas counterempathetic responses emerge from a negative attitude. Interestingly enough, however, McHugo et al. (1985) found evidence that motor mimicry is independent of the attitude toward the target person. The autonomic and facial response was exclusively determined by Reagan's emotional display but not by the attitude toward him. Thus, intentional and nonintentional forms of emotional sharing might sometimes be at odds. In the context of the current research, manipulating the attitude toward the target person might be one way of disentangling intentional and nonintentional forms of emotional sharing. Varying the cognitive capacity in addition to the attitude toward the target gives us the additional opportunity to test whether the affective response to another person's emotional expression is based on automatic forms of perspective taking.

In sum, Experiment 3 concerns the question of whether inferential approaches provide an alternative explanation to the finding that emotional expressions prompt congruent mood states. Given that another person's vocal expression is capable of eliciting compatible action codes in the listener, we expected that the congruent affective response toward another person's emotional expression is influenced neither by the attitude toward the target nor by the cognitive capacity allocated to the processing of the vocal expression. Moreover, assuming that the empathetic response is not based on participants' knowledge about the impact of emotional expressions on affective feelings, we predicted that the exposure to the text should influence the mood state but not the mood change measure.

Method

Participants and Design

Eighty students at the University of Trier served as participants. Because it is reasonable to assume that women and men differ in their stereotype for physical attractiveness, only women were admitted to this experiment, and a male target person was used. They were paid DM 5.00 (at the time $ 3.57) for their participation. The experiment was conducted in groups of three participants. The experimental design was a 2 (emotional expression: happy vs. sad) × 2 (physical appearance: attractive vs. unattractive) × 2 (cognitive load: with vs. none) between-subjects design. Participants were randomly assigned to conditions.

Procedure

Participants were again recruited for an experiment on text comprehension. The procedure for Experiment 2 was identical to that of Experiment 1 except for the following points.

Cognitive load. While listening to the text, half the participants were randomly assigned to the cognitive load condition. This was achieved by giving participants the Finger Dexterity Test (O'Connor, 1932), which supposedly assessed their ability to pay attention to the presented text. Specifically, they were instructed to insert three metal pins into each of 100 holes in a wooden board while listening to the text. A buzzer on the tape indicated the beginning and end of this task. We expected that performing this task while listening to the text would reduce the mental capacity to process its content. To test this hypothesis, a recognition test was conducted after the mood change measure, in which participants were asked to indicate whether a sentence had been part of the text.

Physical appearance. To manipulate the attitude toward the target person, his physical appearance was varied in this experiment. The selection of the physical appearance was motivated by the speculation that the mood effect in Experiment 1 had been mediated by the attractiveness stereotype. To exclude this possibility, the attractiveness of the speaker was manipulated. Different from in Experiment 1, participants were told that the speech was part of a broadcast program about philosophy. This allowed us to introduce the speaker with a photo and his name, Werner Burkhard. The physical attractiveness of the photos were determined by female participants in pretests. We chose the most attractive and the least attractive

photos from a sample of 10 male portraits. To avoid guiding participants' attention to the real purpose of the study, no emotion was expressed in the selected portraits. Half the participants in the second experiment were randomly assigned to the attractive male person and half were assigned to the less attractive person.

Emotional expression. Again, the same audiotaped versions of the speech were used in Experiment 3. In keeping with the cover story, only the tapes with the male speaker were included.

Dependent Variables

The same series of dependent variables as in the previous experiments were used. Moreover, to assess participants' knowledge of the influence of the emotional expression on subjective mood, participants were asked whether they felt their mood had improved as an effect of listening to the voice. Using a 10-point rating scale, ranging from 0 (*worsened*) to 9 (*improved*), participants could indicate how much they thought their mood was influenced by the style of the lecture. Following this second questionnaire, participants were given a recognition test consisting of five sentences from the speech and five sentences that had not been mentioned in the text (foils).

Moreover, the Finger Dexterity Test, which was used to reduce participants' cognitive capacity, can also serve as a nonreactive mood measure. Because mood states influence psychomotor speed (Morris, 1992; Velten, 1968), the performance on this manual task was used as a dependent variable for half the participants. A baseline of their performance was assessed at the beginning of the experiment. This preexperimental test was disguised as a task of manual skills. Because negative mood states are known to slow the psychomotor speed, we expected that participants listening to the sad voice would insert fewer metal pins into the holes of the wooden board than would participants listening to the happy voice.

Results

Because none of the participants expressed any doubts about the cover story, all were included in the analysis.

Manipulation Checks

First of all, we examined whether the manipulation of physical appearance had the expected effect on the attitude toward the target person. A 2 (emotional expression: happy vs. sad) × 2 (physical appearance: attractive vs. unattractive) × 2 (cognitive load: with vs. none) ANOVA on participants' liking ratings revealed that the target person with the highly attractive portrait yielded higher liking ratings ($M = 5.4$) than the target person with the less attractive portrait ($M = 4.4$), $F(1, 72) = 4.5$, $p < .04$. Moreover, consistent with Experiment 1, the target person with the happy emotional expression was liked more ($M = 6.1$) than the target person with the sad expression ($M = 3.7$), $F(1, 72) = 26$, $p < .001$. No interaction was obtained ($F < 1$).

Second, the effect of the distraction task was examined. Participants read five statements taken verbatim from the target speech (presented items) and five statements that were not part of the philosophical text (foils). Discrimination indexes (P_r values) were computed following the proposals of Snodgrass and Corvin (1988).[3] The P_r values were analyzed in a 2 (physical appearance: attractive vs. unattractive) × 2 (cognitive load: with vs. none) ANOVA. Recognition performance was impaired when participants had to perform the Finger Dexterity Test while listening to the speech, ($Ms = 0.46$ vs. 0.63), $F(1, 72) = 4.7$, $p < .03$. No further effects were obtained on the recognition responses (all $Fs < 1$). Consistent with our expectations, cognitive load impairs the recognition performance. On the basis of these manipulation checks, our hypothesis can be tested. Moreover, these findings suggest that an impairment of the text comprehension by the distraction has no impact on the contagion effect.

Table 3
Mean Mood State as a Function of Cognitive Load, Physical Appearance, and Emotional Expression in Experiment 3

	Attractive speaker		Unattractive speaker	
Emotional expression	With	None	With	None
Happy	6.2_a	6.3_a	6.4_a	6.4_a
Sad	5.4_b	4.9_b	5.1_b	4.1_b

Note. Within rows, means not sharing a subscript differ at $p < .05$. With = with cognitive load; None = without cognitive load.

Mood State and Specific Emotions

A 2 (emotional expression: happy vs. sad) × 2 (physical appearance: attractive vs. unattractive) × 2 (cognitive load: with vs. none) ANOVA on participants' mood ratings was computed.

As Table 3 clearly reveals, emotional expression has an effect on the mood state of the participants, $F(1, 72) = 17$, $p < .003$. Participants who had listened to the happy voice were in a better mood ($M = 6.3$) compared with those participants who had listened to the sad voice ($M = 4.9$). No main effect or interaction was obtained for physical appearance ($F < 1$). The same is true for cognitive load ($F < 1$).

Consistent with the findings of the previous study, no effects were obtained for the specific emotion adjectives (all $F < 1$). Moreover, the analysis of the relaxed ratings yielded no significant effects (all $F < 1$).

Mood Change

According to our hypothesis, the emotional expression should not influence the mood change ratings. As can be seen in Table 4, the results confirm our prediction. Mood change ratings were not influenced by the emotional expression ($F < 1$). However, those participants who had been exposed to the attractive speaker and were distracted while listening to the speech assumed that their mood must have improved more ($M = 5.2$) than participants in all other conditions ($M = 4.3$). Analysis revealed a Cognitive Load × Physical Appearance interaction, $F(1, 72) = 6.0$, $p < .02$. No other effect reached the level of significance ($F < 1$).

Dexterity Performance

Half the participants performed the Finger Dexterity Test both at the outset of the experiment and while listening to the speech. The deviation from the first measurement point (percentage) served as dependent variable. A one-way ANOVA on this index revealed

[3] According to Snodgrass and Corwin (1988), the discrimination performance can be computed from the difference between the proportions of correct and false responses. Higher P_r values indicate better recognition performance.

Table 4
Mean Mood Change as a Function of Cognitive Load, Physical Appearance, and Emotional Expression in Experiment 3

	Attractive speaker		Unattractive speaker	
Emotional expression	With	None	With	None
Happy	5.1_a	4.0_b	4.0_b	4.9_b
Sad	5.3_a	4.6_b	4.1_b	4.2_b

Note. Within rows, means not sharing a subscript differ at $p < .05$. With = with cognitive load; None = without cognitive load.

that the dexterity performance had improved more for participants who listened to the happy voice, $F(1, 38) = 8.6$, $p < .01$ (happy voice $M = 7\%$, sad voice $M = 3\%$). Note that the recognition performance was not differently affected by this effect.

Discussion

Consistent with Experiment 1, the results demonstrated that the emotional expression elicited a congruent mood state in the listener. In addition, the experiment replicated the finding that the mood measure but not the more specific emotional adjectives were affected by the emotional expression. One might object that this dissociation between the global mood measure and the more specific emotion adjectives is due to a lack of sensitivity in our self-report measures. However, the findings in the Finger Dexterity Test further corroborated the assumption that a congruent mood state was evoked by the exposure to the vocal expression. Listening to the happy emotional expression resulted in a better performance at the dexterity test. Thus, in line with previous research, mood influenced psychomotor speed (Morris, 1992; Velten, 1968). The finding that self-report measures and psychomotor speed were both affected renders it unlikely that the lack of evidence on the more specific emotion adjectives is merely because of a lack of sensitivity. Rather, we assume that an affective experience was induced by the emotional expression without any awareness of its cause.

Congruent emotional responses to another person's emotion are generally explained by perspective taking. Perspective taking is a function of cognitive capacity and of the attitude toward the target person. Although the manipulation of both determinants of perspective taking was successful, neither attitude nor cognitive capacity influenced the affective response. As a further consequence, these findings rule out a simpler path of mediation. It is conceivable that the attitude toward the target person directly influences the affective response. For example, listening to an attractive person may improve participants' mood, whereas negative mood should result from the exposure to an unattractive person. However, the attractiveness of the target person had no effect on the affective response. Moreover, a replication of Experiment 1 with a different target person who had a less attractive voice revealed the same contagion effect (Neumann, 1996). Apparently, even negatively evaluated persons might be able to elicit positive affective responses. Thus, it is unlikely that the congruent mood state was mediated by the activation of the attractiveness stereotype. Exposure to the emotional expression of another person's emotion thus exerts a parallel and independent effect on the attractiveness stereotype and affective response.

Moreover, a self-perception approach is not easily reconciled with our findings. Such an approach presupposes that individuals are aware of the influence of another person's emotion on their own feelings. To test this hypothesis, we asked participants to indicate how much they thought their mood had been influenced by the style of the spoken text. The results revealed that participants apparently did not believe that their mood had changed because of the emotional expression. Instead, participants who had been distracted while listening to the text seem to have assumed that physical attractiveness of the speaker had an impact on their own mood. Thus, although their mood state was in fact affected by the emotional expression of the target person, participants were apparently not aware of that influence. In sum, these findings support our expectation that individuals sometimes catch another person's emotion without knowing where their affective response stems from. In conclusion, an automatic form of contagion exists that does not hinge on inferential processes.

There is still another aspect of our results that deserves to be mentioned. This study tested the recognition performance of the text presented to the participants. Assuming that recognition performance hinges in part on text comprehension, it is unlikely that the affective response was due to an impairment in text comprehension. Distraction while listening to the speech impaired recognition performance but had no impact on the induced mood state. A similar dissociation was obtained in a study by Gilbert, Pelham and Krull (1988), in which cognitive busyness undermined comprehension of a spoken text but left the implications of the nonverbal behavior unimpaired. Thus, consistent with our conceptualization, these findings suggest that the extraction of semantic meaning from the speech and affective responding to the emotional expression of the voice operate through different mechanisms.

Taken together, it appears that listening to the emotional expression of another person is sufficient to trigger congruent affective responses. No evidence was found that this effect was mediated by knowledge-based mechanisms. Instead, we assume that action codes induced by the perception of another person's voice might be critical in the elicitation of congruent responses. However, it may still be possible that the manipulation of the antecedents of perspective taking in this study was too weak to influence the vicarious response. This issue is addressed in the next experiment.

Experiment 4

Automatic and intentional forms of emotional sharing differ not only in their antecedents but also in their consequences. As was previously mentioned, mood contagion should result in a global mood state, whereas adopting another person's perspective should evoke discrete emotions. Such a prediction can be derived from the assumption that knowledge referring to the source of an affective response is regarded as a defining feature of emotions but not of moods (Ortony & Clore, 1989). However, we do not assume that moods and emotions are entirely different. Rather, we propose that emotions possess at least two interacting components: a cognitive component (Ortony, Clore, & Collins, 1988) based on people's knowledge and an affective component based on their subjective experience. According to this view, the experiential component

can be conceived of as a common basis of both moods and emotions. This might explain why moods are sometimes residuals of emotions once the source is no longer thought about.

In the context of the current research, mood contagion and moods both presuppose that the source of one's affective response is not known, whereas emotions and perspective taking have in common that the source of one's affective experience is known.[4] On the basis of this assumption, the present study sought to disentangle intentional and automatic forms of emotional sharing by focussing on the affective consequences of both. Instructing half the participants to adopt the perspective of the target person should direct participants' attention to the emotional quality of the target person's voice. In recognizing that the target person is sad or happy, participants should come up with a plausible cause for this feeling. Thus, in addition to their positive or negative feeling, participants should know where this feeling stems from and therefore experience a discrete emotion in addition to the more diffuse mood state. By contrast, if participants' attention is not directed at the target person's emotion, a more diffuse mood state is all that should emerge. Our assumption implies that if one knows why one is happy or sad, there is no reason to deny that one is also in a good or bad mood, insofar as emotions include moods. Importantly, however, the reverse is not true: If one is in a good or bad mood, one does not simultaneously experience an emotion until one knows the origin of the feeling.

Method

Participants and Design

Fifty-two students (38 women and 14 men) at the University of Würzburg were randomly assigned to a 2 (emotional expression: happy vs. sad) × 2 (knowledge: with vs. without) factorial design, with both factors varied between participants.

Procedure

The instructions and procedures were virtually identical to those used in Experiment 1, with the exceptions indicated below.

Knowledge. Half the participants were asked to adopt the perspective of the speaker while listening to the speech and imagine how this person feels about his situation. We expected that this instruction would direct participants' attention to the emotional expression of the target person. On the basis of our pretest findings, we expected that participants would be able to identify the emotional expression of the speaker and therefore try to imagine a situation that could have elicited the emotion. To test whether participants were successful in adopting the view of the speaker, the liking ratings were assessed. We expected that participants were more inclined to like the target person if they actually adopted his view.

Emotional expression. Consistent with Experiment 2, the tapes with the female speaker and the neutral vocal expression were not included.

Dependent Variables

The same series of dependent variables as in Experiment 1 were used.

Results

Attitude Toward the Speaker

To find out whether participants actually adopted the perspective of the target person, we preferred an indirect measure. Assuming that the instruction to adopt the perspective of the target person leads to an other-oriented empathetic response (Batson, 1987), such a mental state should be accompanied by a more positive attitude toward the target person, regardless of whether the target person is happy or sad. Thus, to check whether we were successful in manipulating perspective taking, the liking ratings were analyzed. Consistent with our expectations, the difference between the happy and sad conditions disappeared when participants were instructed to take the perspective of the target person. A 2 (emotional expression: happy vs. sad) × 2 (knowledge: with vs. without) ANOVA yielded the predicted interaction between knowledge and emotional expression, $F(1, 48) = 4.4, p < .04$. The target person was evaluated more negatively only when he or she spoke in a sad voice and participants' attention was not directed toward the feelings of the speaker. Moreover, a marginal main effect was obtained for emotional expression, $F(1, 48) = 3.6$, $p < .06$.

Mood State

According to our hypothesis, participants' mood ratings should be influenced by emotional expression but not by knowledge. Listening to the happy voice resulted in a better mood ($M = 6.3$) than did listening to the sad voice ($M = 4.8$). The ANOVA revealed that this difference was significant, $F(1, 48) = 14$, $p < .001$. No other effect was reliable ($F < 1$).

Specific Emotions

The happiness and sadness ratings were analyzed in a 2 (emotional expression: happy vs. sad) × 2 (knowledge: with vs. without) × 2 (emotion: happy vs. sad) multivariate analysis of variance. Table 5 reveals that listening to the happy voice resulted in higher happiness ratings with the instruction to adopt the perspective of the target person than without that instruction. Conversely, listening to the sad voice resulted in lower happiness ratings for those who were instructed to adopt the perspective of the target person than for those who were not instructed to do so. The reverse pattern was obtained for the sadness ratings. That is, listening to the sad voice resulted in higher sadness ratings if participants were instructed to adopt the perspective of the target person. Listening to the happy voice resulted in lower sadness ratings only under the condition with knowledge.

A significant interaction between emotional expression and emotion was obtained, $F(1, 48) = 4.8$, $p < .03$. That is, participants were happier after listening to the happy voice and sadder after listening to the sad voice. However, as is obvious from the means, this interaction is qualified by the expected three-way interaction between emotional expression, knowledge and emotion, $F(1, 48) = 8.8$, $p < .005$. Furthermore, the ratings on the two emotions differ significantly, $F(1, 48) = 25.26$, $p < .001$. No other effect was reliable ($F < 1$).

Discussion

Experiment 4 supported our expectation that automatic and intentional forms of contagion yield divergent consequences.

[4] Lazarus (1991) called attention to the fact that there are emotion specific topics. Conversely, there are occasions in which people might know the source of their current affective feeling but they nevertheless do not experience an emotion.

Table 5
Mean Effects of Knowledge and Emotional Expression on Happiness and Sadness in Experiment 4

	Happy		Sad	
Emotional expression	With	None	With	None
Happy	5.0_c	4.0_b	1.6_a	1.0_a
Sad	3.5_b	4.3_b	3.8_b	1.3_a

Note. Within rows, means not sharing a subscript differ at $p < .05$. With = with knowledge; None = without knowledge.

Whereas automatic contagion triggered a global mood state, perspective taking evoked discrete emotions in addition to a global state. Consistent with our expectation, knowledge of the affect-eliciting episode plays a central role in perspective taking but not in automatic contagion.

The pattern of the liking ratings confirms that different processes were elicited by the instruction to adopt the perspective of the speaker. In line with our previous studies, without the instruction to adopt the perspective the target person with the sad voice was evaluated more negatively than the target person with the happy voice. However, this difference disappeared when participants were instructed to adopt the perspective of the target person. Both the sad and the happy speaker were evaluated more favorably if participants were instructed to adopt the speaker's perspective. In the context of our research, a person's attention might be focussed on the emotional expression if participants are instructed to adopt the perspective of the target person. Given that they are able to recognize the emotional expression of the target person, they might try to imagine a situation that is compatible with the recognized emotion. A discrete emotion may emerge in response to this imagined situation.

General Discussion

Mood contagion can be conceived of as a mechanism by which affective feelings are transferred between persons. Our studies provided evidence that listening to another person's emotional expression is sufficient to automatically evoke a congruent mood state in the listener. This effect was obtained even though participants were not provided with any verbal or semantic information about the emotion of the target person or an emotion-eliciting situation.

Our findings allow us to further specify conditions under which this automatic effect occurs (Bargh, 1997). First, our results reveal that the mediating process may operate spontaneously in that participants do not need to have the goal to share the emotion of the target person. Second, participants were unaware that the vocal expression of the speaker might have influenced their mood state. This is evident from the finding that participants were not aware that their mood had varied as a function of the emotional expression of the target person (Experiment 3). Third, giving participants a concurrent task while they listen to the speech impairs linguistic processing more strongly than it does the processing of expressive behavior. Thus, mood contagion is not due to the comprehension of the text, and even busy individuals are influenced by other person's feelings. Accordingly, mood contagion is instigated by expressive cues without usurping cognitive resources.

Mechanisms traditionally used to explain the transfer of affective feelings between persons cannot account for the current findings. Contrary to a self-perception approach to contagious laughter (Olson, 1992), we collected evidence that inferences about another person's emotion did not play a mediating role. Because the findings in Experiment 3 revealed that participants apparently did not know the correct source of their affective response, it is unlikely that mood judgments were based on inferences.

Perspective taking is commonly regarded as a basis of vicarious feelings, and this mechanism could also be used to explain previous research on mood contagion. Our results, however, suggest that this mechanism cannot account for the current findings. Neither the allocation of cognitive capacity nor the attitude toward the target person influenced the induction of a congruent mood state in the listener. Because both can be regarded as determinants of perspective taking, it is unlikely that this mechanism mediates the obtained affective effects. Moreover, because perspective taking results in a discrete emotion, whereas mood contagion evokes a diffuse mood state (Experiment 4), it is unlikely that the obtained effects can be accounted for by mechanisms of perspective taking.

In sum, automatic and intentional forms of emotional sharing differ both in their determinants and their consequences. Previous research has extensively studied the conditions under which individuals try to adopt another person's view and thereby share the target person's feelings. The current research extends these findings by showing that individuals do not always have to see a situation from the perspective of the other to respond vicariously. As an alternative route of mediation, the emotional expression activates action codes in the observer (Experiment 2), which in turn evoke a congruent mood state.

Previous research has documented that the vocal expression of an emotion is able to induce the corresponding feeling (Hatfield, Hsee, Costello, & Weisman, 1995; Siegman & Boyle, 1993). Going one step further, we have investigated whether the same feedback cues can be induced by exposure to another person's voice. Our findings suggest that the exposure to another person's voice not only activates representations that are used to understand what another person has said but representations that are used to articulate the same contents. This is the reason why the production of speech is susceptible to influences of the social context such as another person's emotion or dialects. Compatible action codes, however, are not only activated as a function of another person's vocal expression. Recent research has demonstrated that postures and facial expressions are unintentionally synchronized (Chartrand & Bargh, 1999). Whether facial and postural expressions of emotion are capable of eliciting the same affective responses that we have obtained in our research is a question that must be answered in future research. An interesting implication of our research is that peripheral activation on the side of the observer or listener is not a necessary condition for contagion effects to occur. This reasoning is consistent with research showing that skilled typists prefer letter combinations that are easy to write on the typewriter to letter combinations that are difficult to type (Van den Bergh, Vrana, & Eelen, 1990). Because participants were not intended to type the letter combinations, these findings suggest that motor codes can be involved in the absence of any peripheral activation.

According to our conceptualization, emotions can be conceived of as compounds of moods and knowledge. Both moods and emotions have an experiential component; emotions, however, are unique in their noetic aspect. Such a distinction between noetic and

experiential representations has been suggested by Strack and his collaborators (Stepper & Strack, 1993; Strack & Gonzales, 1993; see also Buck, 1988; Murphy, Monahan, & Zajonc, 1995; Johnson & Multhaup, 1992). Noetic representations are assumed to stem from a conceptual mode of processing, have a propositional structure, always refer to specific contents, and follow the laws of semantic memory. In contrast, experiential representations are perceptual in nature and follow the laws of psychophysics. They are elicited and upheld by sensory input (e.g., the sound of the voice) without cognitive interpretation. Apparently, it does not matter if the sensory input stems from proprioceptive determinants of feelings, as is known from facial and postural feedback research, or if this input is caused by exteroceptive sources, as the experiments reviewed here were able to show.

The current research has demonstrated that automatic mood contagion can be conceived of as a tool by which a mood state is induced without the participant knowing its origin. However, if participants were provided with a plausible cause for their mood state (Experiment 3), the feeling state was experienced as an emotion. These assumptions give rise to the hypothesis that different emotions might emerge if individuals are provided with different plausible causes for an affective response of unknown origin. This contention was further investigated in three experiments, in which a general mood was induced unobtrusively by our mood contagion procedure, followed by a subsequently elicited emotion (Neumann & Strack, 1999). One study demonstrated that humor responses to jokes were influenced by the hedonic valence of the concurrent mood state. That is, participants in a sad mood were less amused by a cartoon than participants in a happy mood. Moreover, in a second study, participants in a happy mood showed greater pride following positive feedback than participants in a sad mood. Thus, our findings suggest that emotional responses were influenced by the hedonic valence of a concurrent mood state (Neumann & Strack, 1999). These findings confirm our assumption that different emotions are activated if individuals are provided with different plausible causes for an affective response of unknown origin.

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