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Adjusting Shared Reality:

Communicators' Memory Changes as Their Connection With Their Audience Changes

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## Abstract

Communicators' memory can be shaped by their tuning of a message to their audience's attitude, reflecting their creation of a shared reality with the audience. We investigated whether this audience-tuning effect on communicators' subsequent memory is sensitive to post-message changes in their personal connection with their audience. In Experiment 1, we created conditions unfavorable to shared reality, i.e., communication with an out-group audience. The audience-tuning memory effect was absent when communication-success feedback was impersonal (experimenter-transmitted), replicating previous findings. However, it was present when success feedback was *personally* communicated by the out-group audience. In Experiment 2, the effect was eliminated when communicators learned that their message, intended for an in-group audience, was mistakenly delivered to an out-group audience. In Experiment 3, such elimination also occurred when the mistaken audience remained an in-group member. Thus, the personal (*vs.* group) relation is critical. In sum, memory adjustment reflects the situatedness of shared reality.

[150 Words]

*Keywords:* communication, memory, situated adjustment, audience tuning, feedback, shared reality, intergroup relations

## Adjusting Shared Reality: Communicators' Memory Changes as Their Connection With Their Audience Changes

Communicators often adapt what they say to their audience's characteristics, such as the audience's knowledge or attitude on a topic (e.g., Clark & Murphy, 1982; Higgins, 1981; Krauss & Fussell, 1991). Intriguingly, audience tuning not only affects message formulation, but can also have consequences for communicators' subsequent cognition (Chiu, Krauss, & Lau, 1998). Consider the adaptation to the audience's attitude or evaluation about a topic, often referred to as *audience tuning* (Higgins, 1992). As numerous studies have shown, after communicators have tuned a message about a target person's ambiguous behaviors to an audience's (positive or negative) attitude toward the target, they often end up with memories of the target that are consistent with their audience-tuned message (Echterhoff, Higgins, & Groll, 2005; Echterhoff, Higgins, Kopietz, & Groll, 2008; Higgins & Rholes, 1978). To illustrate, an audience-tuning effect on memory occurs when a faculty member recounts a new student's behavior in her class rather positively to a colleague who likes the student, and later remembers the student's initial behaviors more positively, consistent with her audience-tuned message.

This audience-tuning memory bias has been investigated in a paradigm in which participants are given ambiguous behavioral information about a target person (Higgins & Rholes, 1978). Participants are asked to describe the target person to an audience who has already formed an impression about the target. They are told not to mention the target's name because the audience's task is ostensibly to identify the target based on their message. Those who communicate with an audience who likes (*vs.* dislikes) the target person describe the target more positively. Saying becomes believing when communicators' memory of the original target material, assessed with a surprise free-recall task, matches the evaluative tone of their audience-tuned messages (e.g., Echterhoff et al., 2005, 2008; for a review see Echterhoff, Higgins, &

Levine, 2009). Hence, audience tuning not only affects the message, but also communicators' own *subsequent* memory of the message topic. The effect can be regarded as communication-driven because it depends on the production of an audience-congruent message (Higgins & Rholes, 1978; Higgins, Echterhoff, Crespillo, & Kopietz, 2007), and it has been found with message-memory intervals ranging from a few minutes to three weeks (e.g., Higgins & Rholes, 1978; Echterhoff et al., 2008).

Memory is the basis for many other social-cognitive processes like judgment and attitude formation (Hastie, 1980; Wyer & Srull, 1989). Hence, the audience-tuning memory bias can be considered as a profound influence on how communicators construe their social reality (see Echterhoff & Higgins, 2010). The effect represents an instance of social influence, specifically a communication-driven alignment of memory with the audience's attitude. In this process, communicators create a reality view that is shared with, or assimilated to, the audience's view. In this respect, the effect has been conceptualized as the communicators' creation of a shared reality with the audience (Echterhoff et al., 2009; Hardin & Higgins, 1996; Higgins, 1992).

An open question is whether this communication effect on memory from creating a shared reality depends on the communicators' *personal connection* with the audience (Echterhoff et al., 2009). To address this issue, we examined whether the audience-tuning memory effect is flexibly adjusted to (post-message) changes in communicators' personal connection with their audience. Our focus on the situated adjustment of communicators' cognition is consistent with psycholinguistic communication research that has demonstrated the communicators' instantaneous adaptation of their communicative behavior and underlying cognition to responses from their partner (e.g., Clark & Brennan, 1991; Pickering & Garrod, 2004; Schober & Brennan, 2003). The role of personal connection in communication effects on memory is suggested by

shared-reality theory (Echterhoff et al., 2009), but post-message adjustment of memory from changes in personal connection has not been examined.

#### Situated Adjustment of Communication Versus Post-Communication Memory

The sensitivity of meaning making to the unfolding conversational dynamics, including feedback from the conversation partner, has been extensively studied in psycholinguistic research (Clark & Brennan, 1991; Krauss, 1987; Pickering & Garrod, 2004; Schober & Brennan, 2003). This literature draws attention to the moment-by-moment adjustment of language production and comprehension to responses from the audience (e.g., Brennan & Hanna, 2009; Fussell & Kreuz, 1998). In spoken discourse communicators often instantaneously take into account their addressee's verbal and non-verbal responses, such as "yes," "uh-huh," or a head nod, that indicate understanding of the speaker's message (Clark & Wilkes-Gibbs, 1986; Schegloff, 1981). For instance, depending on whether an addressee says, "yes, I see" or, "sorry, I didn't get that," the speaker will either continue or attempt to clarify what she means. Thus, message planning and production are closely tethered to, and co-constructed by, the audience (Bavelas, Coates, & Johnson, 2000; Krauss, 1987).

In our studies, we applied the notion of feedback-based adjustment to communication effects on *communicators' own memory*. Psycholinguistic research has concentrated on the ongoing management of interpersonal dialog and the adjustment of the underlying processes (Bangerter & Clark, 2003). Moving the spotlight to communicators' *subsequent* cognition (Chiu et al., 1998), we examined the adjustment of a specific kind of post-communication memory, that is, the audience-tuning memory effect. Thus, while we were inspired by the psycholinguistic literature, we shifted the focus from the management and adjustment of discourse itself to the adjustment of subsequent memory.

#### Audience-Tuning Effects on Memory: Creating and Adjusting Shared Reality

A growing body of research suggests that the audience-tuning effect on memory occurs to the extent that communicators trust their audience's judgment about the target person and create a shared reality with the audience about the target (Echterhoff et al., 2005; 2008; Hellmann, Echterhoff, Kopietz, Niemeier, & Memon, 2011; for a review, see Echterhoff et al., 2009). According to the recent formulation of the theory, shared reality is characterized by the experience of a commonality of inner states (e.g., attitudes, judgments) about a target with another person (Echterhoff et al., 2009). As such, shared reality is fundamentally an interpersonal phenomenon. People strive for shared reality with others because its creation can satisfy epistemic needs (that is, to achieve a reliable and truthful understanding of the world) and relational needs (that is, to affiliate and be connected with others) (Higgins, 2012). Focusing on the latter aspect, the present research examines the role of the *connection* with the other person in shared-reality creation (Echterhoff et al., 2009).

People's experience of interpersonal connection and rapport can be affected by features of communication, such as the use of the collective pronoun "we" (Fitzsimons & Kay, 2004), describing personal matters in concrete, experiential (*vs.* abstract) language (Fiedler, Semin, & Koppetsch, 1991; Rubini & Kruglanski, 1997), and feedback signaling understanding and commonality (Reis & Shaver, 1988). To the extent that a shared reality depends on the communicators' personal connection with the audience, the shared reality—and thus their memory of the target—should also be sensitive to such features, including feedback events.

Imagine, for example, an employee who recently joined the branch of a large organization and is now being interviewed over the phone by a representative at the organization's headquarters about her new team. The employee has not yet formed an impression of the new team, but feels that the representative views it positively. She would hence begin to create a shared reality with the representative by depicting the team's performance rather

positively, and align her own memory of the team with her positively tuned message. But now imagine that the employee discovers that the representative she actually had talked to was not the person she thought he was—not the one who knows the team well and has a positive attitude. That is, her audience-tuned message was not received by the intended audience but, instead, by a different person. Would the employee adjust her shared reality and thus change her memory of the team, which would attenuate the audience-tuning memory effect?

According to one of the four conditions of shared reality formulated by Echterhoff and colleagues (2009), shared reality depends on whether “people experience a successful connection to someone else’s inner state” (p. 498). Regarding saying-is-believing studies, these authors argue that the sense of shared reality is susceptible to “events following message production” (p. 503) that affect the connection with the intended audience. However, empirical evidence for this proposal has been limited to one type of post-message event, that is, feedback regarding the audience’s successful identification of the target referent based on the communicator’s message (Echterhoff et al., 2005). Post-message events that could impact the interpersonal connection between communicator and audience have not been investigated. To fill this gap, we examined the adjustment of shared reality, as indicated by the audience-tuning memory effect, to changes in the communicators’ personal connection with the audience.

Support for this prediction would have a wider significance for several reasons. First of all, it would reveal that memory is not only adapted to and formed by the communication context (Hirst & Echterhoff, 2012), but that it is also flexibly *re-adapted* to changes in the communication context, specifically to changes in communicators’ connection with their audience. Such evidence would add to the growing literature on situated remembering in particular (Sutton, 2009) and situated cognition in general (Smith & Semin, 2004, 2007). Our studies could also suggest ways in which the shared-reality experience of one communication

partner can be enhanced or diminished by incoming cues about the interpersonal relationship between the communicator and the audience. Insights into these processes could be applied fruitfully in intercultural communication, counseling, or psychotherapy to facilitate the achievement of a sense of connectedness, mutual trust, and rapport.

A few related studies have focused on the effect of feedback regarding the success of a message in a referential communication task (Echterhoff et al., 2005, Exp. 1 & 3; Hausmann, Levine, & Higgins, 2008, Exp. 2). Some communicators were informed that the audience correctly identified the target person they had described in their message (referential communication success). Other communicators were informed that the audience failed to identify the target they had described (referential communication failure). The audience-tuning memory effect, indicating the communicators' creation of a shared reality, was found after success feedback but not after failure feedback. These results provided initial evidence for the susceptibility of shared reality to events that *follow* the communicator's message production.

These feedback studies (Echterhoff et al., 2005; Hausmann et al., 2008) have provided important insights into the conversational conditions of shared reality. Failure feedback regarding identification obstructs shared-reality creation at the basic level of conversational reference; that is, what a message is "about" (Echterhoff et al., 2009). According to shared-reality theory, shared aboutness is one of the main conditions for creating a shared reality. Thus, the finding of earlier studies that shared reality is eliminated after failure feedback regarding identification is consistent with the theory. However, the focus of the present research is on another condition, specifically, the personal connection with the potential sharing partner. Because the feedback in previous studies was transmitted by the experimenter rather than being expressed personally by the audience, these studies could not detect effects of personal connection on shared-reality creation.

## Shared Reality in Communication with Out-Group Audiences

The potential effect of creating a *personal* connection with the audience is particularly interesting in communication with out-group audiences. Often, the perception of and responses to an out-group member operate at the level of her or his category or group membership, rather than at the personal or individual level (Brewer, 1988; Fiske & Neuberg, 1990; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). When people relate to a stranger based on her or his category membership, the relation is often less positive and accepting than when people relate to others on a personal or individual level (Brewer & Brown, 1998; Gaertner & Dovidio, 2000; Miller, 2002). However, the initial categorization of another person as an out-group member, which often biases the relation in an unfavorable way, can be overridden by personal contact and individuation of that person (Fiske & Neuberg, 1990; Wilder, 1978). In a nutshell, “personalized contact (...) detracts from generalization.” (Miller, 2002, p. 400) For instance, anticipated or actual cooperative interaction with an individual member of stigmatized out-groups can induce a shift from category-based to personalized impressions (e.g., Neuberg & Fiske, 1987), and thus allows more favorable views of the out-group (Bettencourt, Brewer, Croak, & Miller, 1992).

We have found in our studies that communicators also tune messages to out-group audiences but, despite such tuning, they later do not exhibit the audience-tuning memory effect (Echterhoff et al., 2005, 2008). Thus, although communicators overtly exhibit appreciation of an out-group audience’s position through message tuning, they do not incorporate the audience-tuned view into their own knowledge and memory. This dissociation can be interpreted as a hidden disregard of the audience’s viewpoint on reality. This denial of shared reality presumably occurs because an audience assigned to an out-group category is not perceived as suitable for shared-reality creation. In this respect, communication with an out-group audience provides an ideal arena for testing the shared-reality enhancing effects of personally expressed feedback.

The intergroup literature summarized above suggests that this bias can be overcome by personal and direct (*vs.* impersonal and distant) forms of interaction. In terms of shared-reality theory, this process would promote one key condition for shared-reality experience; that is, the personal connection to the other person. Thus, shared-reality creation should be facilitated when the relation to an out-group audience is shifted to a personal (*vs.* categorical) level.

### The Present Studies

In three saying-is-believing studies, we introduced changes relevant to the personal connection with the audience *after* communicators had already tuned their message to their audience's attitude. For the sake of experimental control, we applied minimal changes to the established saying-is-believing paradigm (e.g., Echterhoff et al., 2005, 2008; Higgins & Rholes, 1978) by adding simple feedback events after communicators' message production. As in many previous studies, the audience ostensibly participated from a different location, and communication was mediated, either by the experimenter or a computer interface. In this respect, our procedure differs from more naturalistic psycholinguistic studies of discourse adjustment, which have examined spoken face-to-face conversation. However, by reducing differences to previous studies to a minimum, we can better compare the present and previous studies.

In Experiment 1, we examined the effect of personal (*vs.* impersonal) feedback on shared reality, as reflected by the audience-tuning memory effect. In this study, we replicated conditions in which communicators typically refrain from creating a shared reality—that is, when communicating with an out-group audience. We predicted that shared reality is *enhanced* when a personal connection to the audience is added. In this study all communicators received post-message feedback that the out-group audience successfully identified the target person. In one condition the feedback was communicated directly and personally by the out-group audience; in another condition the feedback was transmitted by the experimenter and thus was impersonal.

In Experiments 2 and 3, we replicated conditions of previous saying-is-believing studies in which communicators typically create a shared reality, but this time we considered whether the audience-tuning memory effect would be reduced, or even eliminated, when the personal connection to a specific audience was lost. In these studies, communicators learn that the audience to whom the message was actually transmitted was different from the initial and intended audience. Thus, we operationalized the loss of personal connection by a post-message change (ostensibly) in the audience to whom the message was actually transmitted.

In Experiment 2, the message was ostensibly delivered to an out-group audience rather than the intended in-group audience. In Experiment 3, a condition was added in which the message was ostensibly delivered to a different (*vs.* the intended) in-group audience. This study pitted the role of intergroup processes against the role of interpersonal processes in reducing the audience-tuning memory effect. As outlined earlier, shared reality is fundamentally an interpersonal phenomenon and requires the subjective experience of an interpersonal connection. Hence, we predicted that the audience switch would diminish or eliminate the audience-tuning memory effect even when the audience remains an in-group member.

We note that no personally expressed success feedback was provided in Experiment 2, but that in Experiment 3 all participants received such feedback from the new audience. This feature allowed us to assess whether such success feedback could compensate for the loss of a personal connection, as created in Experiment 2.

### Experiment 1

The first experiment examined whether communication feedback can enhance the audience-tuning memory effect, reflecting shared reality, in a situation where the initial motivation for shared-reality creation is low. We found in our previous research that when communicators tune their message to an out-group audience there is no subsequent audience-

tuning memory effect, reflecting the absence of a shared reality (Echterhoff et al., 2005, 2008). But in these studies the communicators did not receive *personal* feedback from their out-group audience about the successful identification of the target person: The success feedback employed in these past studies was provided by the experimenter rather than by the audience. Such *impersonal* success feedback has not facilitated shared reality with audiences from a stigmatized out-group like Turks in Germany (see Echterhoff et al., 2008, Experiment 1).

Research on intergroup processes suggests that shared-reality creation with an out-group audience *can* be facilitated when the relation to the audience is shifted to a personal (*vs.* categorical) level (Bettencourt et al., 1992; Miller, 2002). We thus manipulated the personal connection with an audience from a stigmatized out-group (Turks in Germany) by providing participants with personal (*vs.* impersonal) identification-success feedback. We expected to find an audience-tuning memory effect with personal feedback from the out-group audience, but not with impersonal, experimenter-mediated feedback.

According to this rationale, what is necessary for an enhancement of shared reality with out-group members is a change in *interpersonal* perception; a change at the category or group level is not necessary. To control for possible changes in the perception of the group, we assessed participants' post-feedback perception of the out-group with a subtle prejudice measure (Pettigrew & Meertens, 1995) and a measure of perceived similarity to the out-group. Perceived dissimilarity to an out-group reflects distance to the out-group and hence is a key factor of intergroup bias (Stone & Crisp, 2007). Because shared reality is fundamentally an interpersonal phenomenon, there was no reason to assume that a facilitating effect of personal feedback would depend on a general improvement of perceptions at the group level.

### *Method*

*Participants and design.* Seventy German students at a university in Germany (64 female, 6 male; mean age = 22.8) participated for course credit. The experiment was based on a 2 (audience attitude: positive vs. negative) X 2 (success feedback: impersonal, by experimenter vs. personal, by audience) between-participants design.

*Procedure and materials.* The experiment was ostensibly about interpersonal perception and communication. A computer-based administration of the saying-is-believing paradigm was designed using VisualBasic to guide participants through the stages of the study and to register their responses (see Echterhoff et al., 2008; Kopietz, Hellmann, Higgins, & Echterhoff, 2010). Participants were told they would read a short essay about a target person (Michael), who supposedly was a student volunteer in a long-term research project on interpersonal perception. They were told that they were to describe Michael to another student volunteer named Ahmed (i.e., an out-group audience) without mentioning Michael's name.<sup>1</sup> Ahmed's task then would be to identify Michael as the referent of their description among 30 project participants.

As in previous research, the essay describing the target person consisted of six ambiguous passages (see Echterhoff et al., 2008, Appendix A). The passages were carefully pretested to ensure that they would evoke a positive or negative trait label (e.g., thrifty vs. stingy) with approximately equal likelihood. Furthermore, the essay as a whole was then pretested to ensure that readers could form both positive and negative impressions with approximately equal likelihood (see Echterhoff et al., 2008, Footnote 3 for more details).

Participants were informed in a casual, off-hand manner about their audience's attitude toward the target person: "*Since Ahmed knows Michael personally, he has developed his own impression of him. Our observations indicate that Ahmed seems to like [doesn't seem to like] Michael and believes Michael has [doesn't have] many good qualities.*" These instructions had been prerecorded as sound files and were played over headphones. This way, we could keep

constant the subtlety of delivering the information about audience's attitude (for the role of subtle delivery, see Echterhoff et al., 2008; Kopietz et al., 2010).

After sending their message and filling out various filler-task items, participants received feedback regarding the referential communication task. In both feedback conditions participants received feedback that Ahmed (their audience) was successful in identifying Michael based on the description they had provided. This success feedback was either conveyed by the experimenter (impersonal feedback) or communicated directly by the out-group audience (personal feedback). We conveyed the feedback in both cases using a chat window that opened after participants had sent their message to the audience. Depending on experimental condition, participants were greeted either by the experimenter or by the audience and told that the target person described in their message was identified as Michael. They were then thanked for their participation, and the chat ended. After an unrelated 5-minute filler task, we administered a surprise free-recall task, which required participants to remember and write down the original information they had received about the target. Participants were instructed to remember the information as best they could, ideally verbatim, and in the original order.

We assessed the perception of the out-group at the category level by administering two kinds of rating items. First, participants indicated the perceived similarity of the out-group (*vs.* in-group) based on two items (“*How similar do you feel to the group of Turks?*”, “*How similar do you feel to the group of Germans?*”, ranging from 1 = *not at all* to 8 = *very much*). Based on Pettigrew and Meertens (1995), we also used two items assessing subtle prejudice toward the out-group (“*How often have you felt admiration for Turks living here?*”, “*How often have you felt sympathy for Turks living here?*”, ranging from 1 = *never* to 7 = *very often*).

Personal (*vs.* impersonal) success feedback might enhance participants' mood, which could affect memory processes (Eich & Macauley, 2000). Participants indicated their mood on

two items (“*Are you presently in a good or bad mood?*”, “*How do you feel right now?*”, ranging from 1 = *very bad* to 7 = *very good*). In a suspicion check at the end of the experiment, none of the participants indicated doubts about the existence of the audience or guessed the predictions or rationale of the experiment. Finally, all participants were thanked and debriefed.

*Measures.* Two coders blind to the experimental condition rated the overall valence of the message protocols and recall protocols on an 11-point scale, ranging from -5 (extremely negative) to +5 (extremely positive). Protocols were presented to the coders in random order, each coder receiving a different order. Coders broke down each protocol into passages corresponding to the passages in the target essay and assigned scores for positive or negative distortions to each passage (see Echterhoff et al., 2008). Using these scores for each protocol’s passages, they then assigned an overall valence rating to each protocol. Intercoder correlations for message valence and recall valence were sufficiently high,  $r(68) = .93, p < .001$ , and  $r(68) = .88, p < .001$ , respectively. Thus, the means of the two coders’ scores for message and recall valence were used for all subsequent analyses. Because the two mood measures were highly correlated,  $r(68) = .94, p < .001$ , the mean of the measures was used in subsequent analyses.

To obtain a score for relative similarity to the out-group, we subtracted the item regarding similarity to the in-group from the item regarding similarity to the out-group (Stone & Crisp, 2007). As the correlation between the two subtle-prejudice items was sufficiently high,  $r(68) = .47, p < .001$ , the mean of the item was used in the analyses.

### *Results and Discussion*

We report analyses of variance (ANOVAs) with partial eta squared ( $\eta_p^2$ ) as an effect size measure for main and interaction effects. For pairwise contrasts, we report  $t$  scores and Cohen’s  $d$  as an effect size measure. We report exact  $p$  values from two-tailed tests.

*Message and recall valence.* We calculated a 2 (audience attitude: positive vs. negative) X 2 (success feedback: impersonal, by experimenter vs. personal, by audience) ANOVA on message valence, which yielded a main effect of audience attitude: All participants tuned to their audience, that is, they described the target person more positively when he was liked (vs. disliked),  $F(1,66) = 35.69, p < .001, \eta_p^2 = .35$ . There were no other significant effects,  $F_s < 1.18, p_s > .28$  (for descriptive statistics, see Table 1, top panel).

The same 2 X 2 ANOVA on recall valence yielded significant main effects of audience attitude,  $F(1,66) = 18.83, p < .001, \eta_p^2 = .22$ , and success feedback,  $F(1,66) = 5.12, p = .027, \eta_p^2 = .07$ . As expected, there was an Audience Attitude X Success Feedback interaction,  $F(1,66) = 10.56, p = .002, \eta_p^2 = .14$  (for descriptive statistics, see Table 1 bottom panel). We further probed the pattern of means by testing simple main effects of audience attitude: Replicating previous studies, we found that participants who received impersonal feedback (from the experimenter) about the out-group audience's identification success did not exhibit the audience-tuning memory effect. However, as predicted, those participants who received personal feedback (from the out-group audience) *did* exhibit an audience-tuning memory effect (for test statistics, see Table 1, bottom panel). This finding indicates that communicators who received personal feedback created a shared reality with the out-group audience.

*Mood.* We found no differences in mood as a result of the feedback manipulation in an independent samples t-test for the two feedback conditions,  $t < 1, ns$ . Thus, the type of delivery of success feedback (personal or impersonal) did not affect participants' mood.

*Perceptions of the out-group.* We found no significant differences between the two conditions for either perceived similarity or subtle prejudice in an independent samples t-test. Perceived similarity did not differ between the personal-feedback condition ( $M = 2.03, SD = 2.05$ ) and the impersonal-feedback condition ( $M = 1.72, SD = 1.95$ ),  $t < 1$ . Likewise, there was

no difference in participants' subtle prejudice toward the out-group ( $M = 4.08$ ,  $SD = 1.05$  vs.  $M = 4.25$ ,  $SD = 1.12$ , for the impersonal vs. personal feedback condition, respectively,  $t < 1$ ). Hence, there was no evidence that the observed effect of feedback was driven by changes in the perception of the audience at the group or category level.

In sum, Experiment 1 supports our claim that making a personal connection contributes to shared-reality creation within the saying-is-believing paradigm, reflected by the audience-tuning memory effect. When communicators' connection with the audience was enhanced by personal communication success feedback, the audience-tuning memory effect emerged under conditions where it is typically absent (Echterhoff et al., 2005, 2008). The personal connection led communicators to create a shared reality under unfavorable conditions; that is, with a stigmatized out-group member. Regarding the perception of the out-group audience, we did not find that personal feedback improved attitudes toward Turks at the group level. Instead, our findings are consistent with the notion that the observed enhancement of shared reality depends on processes operating at the interpersonal level.

### Experiment 2

In Experiment 1, shared-reality creation was *facilitated* through intergroup communication, specifically by personally connecting the out-group audience to the communicator. Experiment 2 was designed to test the complementary effect: We tested whether a shared reality that has been already built *collapses* when communicators are disconnected from their audience. Following a shared-reality account the audience-tuning memory effect should be diminished or even eliminated when communicator's experience of making a connection with the audience is lost.

In Experiment 2, participants were (vs. were not) informed about an audience switch after they had learned about the attitude of their in-group audience, had encoded the original target

material, and had tuned their messages to their audience. We know from our previous research that communicators typically have already created a shared reality at this stage (Echterhoff et al., 2005, 2008; Kopietz et al., 2010). Thus, we were interested in whether a disruption at this time would diminish the communicator's shared reality with the audience and thus reduce the audience-tuning memory effect.

To make the disruption as salient as possible, we switched from the initial in-group audience to an out-group audience. In contrast to Experiment 1, the audience did not provide personal communication feedback. The intergroup literature suggests that category-based impression-formation is the default mode for perceiving and judging out-group members (Fiske & Neuberg, 1990; Gaertner & Dovidio, 2000). Category-based perception can be shifted to individuating perception by personalized interaction (Miller, 2002). Thus, in the absence of personalized contact with an out-group member, communicators should relate to the out-group audience primarily on the basis of the audience's category or group membership. Typically, categorical perception of out-group members allows intergroup biases to take precedence. Because personal feedback was omitted in Experiment 2, there was no reason for communicators to experience a personal connection with the out-group audience. Hence, as in previous studies (Echterhoff et al., 2005, 2008), communicators should regard the out-group (vs. in-group) audience as less appropriate for shared-reality creation.

### *Method*

*Participants and design.* Sixty-nine German students at a university in Germany (49 female, 20 male; mean age = 24.2) participated for course credit. The experiment was based on a 2 (audience attitude: positive vs. negative) X 2 (audience change: no audience change vs. change to out-group audience) between-participants design.

*Procedure and materials.* Experiment 2 was based on Experiment 1 with the following alterations: First, the intergroup context was made salient from the start by informing participants about the different group memberships of their potential addressees. At the beginning of the study they were made aware that the student-volunteer group consisted of Germans (i.e., the in-group) and Turks (i.e., the out-group), and that they would randomly be paired with one of the volunteers. The first names were pretested to ensure that German participants would perceive them as belonging to the in-group (Germans) versus out-group (Turks) (also see Footnote 1). In contrast to Experiment 1, all participants were told at the start that their audience would be Thomas, an in-group member. However, after participants in the audience-change condition had already written their message and sent it to their audience (supposedly to Thomas, the in-group member), the experimenter informed them that there had been a problem with the transmission of their message, and that as a result, another audience named Ahmed (an out-group member) had received and read their message. They were told that there was no way to change this but that Ahmed did have the *same attitude* toward Michael as Thomas; that is, participants received consensus information regarding the audience's perspective toward the target. Participants in the no-audience-change condition were only told that their message had been transmitted to Thomas.

After an unrelated 5-minute filler task, participants answered the same questions as in Experiment 1 (except the group-perception items) and recalled the original target information. The unexpected switch to a new audience might create a sense of frustration and negative mood in participants, which could in turn affect memory (Eich & Macauley, 2000). To control for this possibility, we employed the two mood measures from Experiment 1. In a final suspicion check, none of the participants indicated doubts about the existence of the audience or guessed the predictions or rationale of the experiment. Finally, all participants were thanked and debriefed.

*Measures.* Again, correlations for message valence and recall valence were sufficiently high,  $r(67) = .88, p < .001$ , and  $r(67) = .93, p < .001$ . Thus, the means of the two coders' scores for message and recall valence were used for all subsequent analyses. The two mood measures were highly correlated,  $r(67) = .89, p < .001$ , and thus, we combined them into one measure.

### *Results and Discussion*

*Message and recall valence.* As indicated by a significant main effect of audience attitude on message valence in a 2 (audience attitude: positive vs. negative) x 2 (audience change: no audience change vs. change to out-group audience) ANOVA, all participants described the target person more positively when he was liked (vs. disliked),  $F(1,65) = 18.62, p < .001, \eta_p^2 = .22$ . No other effects reached significance,  $F_s < 1.67, p_s > .20$  (for details, see Table 2, top panel).

Furthermore, as predicted, the 2 X 2 ANOVA on recall valence yielded a significant Audience Attitude X Audience Change interaction,  $F(1,65) = 4.16, p = .045, \eta_p^2 = .06$ . (for means and *SDs*, see Table 2, bottom panel). We further probed the pattern of means by testing simple main effects of audience attitude: Only participants in the no-audience-change condition remembered the original target information more positively in the positive-attitude (vs. negative-attitude) condition (for test statistics, see Table 2, bottom panel). No such difference was found in the audience-change condition. No other effects reached significance,  $F_s < 2.04, p_s > .15$ .

*Mood.* An independent samples t-test for the two audience-change conditions with mood as the dependent variable was not significant,  $t < 1, ns$ . Thus, the loss of connection due to the audience change did not affect participants' mood.

To summarize, a novel post-message manipulation of disconnecting the communicators from their audience eliminated the audience-tuning memory effect. The disconnection was achieved by telling communicators that their audience-tuned message was erroneously delivered to a different (out-group) audience, rather than the intended (in-group) audience. [In this study,

like in the standard saying-is-believing paradigm, communicators did not receive personal feedback of successful identification of the target person.] Experiment 2 thus complements the findings of Experiment 1. Whereas enhancing the experience of connecting to the audience led to an audience-tuning memory effect, indicating shared reality, under conditions where it is typically absent in Experiment 1, the disconnection of communicators from their audience in Experiment 2 destroyed the memory effect under conditions where it is typically found. Interestingly, we found the effect even after communicators had received information that the attitude toward the target person of the two audiences (both the intended and the unintended audience) was the *same*. However, this social consensus information—that is, that the out-group audience shared the initial in-group audience’s attitude toward the target person—was not sufficiently powerful to counteract the detrimental effect of disconnecting the communicator from their initial audience.

One might wonder whether the change of the audience in the middle of the referential communication task could have impacted participants’ mood in some way that affected their memory (Eich & Macaulay, 2000). But there was no effect of audience change on mood.

### Experiment 3

The findings from Experiment 2 are consistent with a personal-connection account, but they are still open to different explanations. Possibly, the elimination of the audience-tuning memory effect was due to the change of the audience from the initial in-group member to a new *out-group* member. After all, the memory effect has been found to vary with the audience’s group membership (Echterhoff et al., 2005, 2008). Alternatively, the memory effect might be eliminated because there was a change from the original intended audience to a different *new* audience, regardless of whether the new audience is or is not an out-group member.

As we have argued, the personal connection should be critical for maintaining a shared reality that one has begun to form. If this is the case, then the results of Experiment 2 should be replicated even if the change was from an original in-group audience to another, but *new*, in-group audience. If the same elimination effect were found, this would highlight the postulated importance of the communicator having a personal connection with the audience rather than simply having the same group membership as the audience.

Also, it is possible that the lack of personal success feedback in Experiment 2 contributed to the lack of shared reality with the novel out-group audience. To rule out this possibility, we added such personal success feedback in all conditions of Experiment 3. Taken together, Experiment 3 allowed us to test whether the effect of audience change found in Experiment 2 depends on the audience's group membership, the lack of personal success feedback, or, as hypothesized, the loss of personal connection.

### *Method*

*Participants and design.* One hundred and eighteen German students at a university in Germany (87 female, 30 male, 1 not reporting gender; mean age= 23.4) participated for € 5 or course credit. The experiment was based on a randomized 2 (audience attitude: positive *vs.* negative) x 3 (audience change: no audience change *vs.* change to in-group audience *vs.* change to out-group audience) between-participants design.

*Procedure and materials.* The procedure and materials were the same as in Experiment 2 except for the following modifications: The computer-based administration was programmed with the software MediaLab 2010 (Jarvis, 2010) using the custom item feature. That is, the complete experiment was programmed in HTML with MediaLab as the server. Thus, it had the look and feel of a typical online study. As in Experiment 2, the intergroup context was salient from the beginning. Participants were directed to a webpage were one of four (two German and

two Turkish) audiences was randomly assigned to them. In fact, all participants initially communicated with an in-group audience named Thomas. In addition to the audience-change condition from Experiment 2 (change from the initial in-group audience to an out-group audience), we employed another audience-change condition—from the initial in-group audience (Thomas) to another in-group audience (named Christian). Again, the first names were pretested to ensure that German participants would perceive them as belonging to the in-group versus the out-group (see Echterhoff et al., 2008).

Via a chat window, all participants also received explicit success feedback regarding the referential communication task directly from the (initial or changed) audience (as in Experiment 1). The chat interaction was programmed using HTML and JavaScript. The design and timing of the audience's responses (i.e., the transmission of the feedback) was carefully pilot-tested to maximize realism. Participants in the no-audience-change condition learned directly from Thomas that he was able to identify the target person *successfully*. Participants in two audience-change conditions learned directly from a new audience, who was either from the in-group (Christian) or from the out-group (Mehmet), that Thomas was not available at the moment and that instead they (i.e., the new audience) had received their message *and* were able to identify the target person successfully. As in the no-audience-change condition, participants in both audience-change conditions received this information personally from their new audience via the HTML chat window. Given the previous null findings, we did not assess mood. In a suspicion check, none of the participants indicated doubts about the existence of the audience or guessed the rationale of the experiment. Finally, all participants were thanked and debriefed.

*Measures.* Again, intercoder correlations for message valence and recall valence were sufficiently high,  $r(116) = .93, p < .001$ , and  $r(116) = .85, < .001$ , respectively. The means of the two coders' scores were used in subsequent analyses.

### Results and Discussion

*Message and recall valence.* First, we calculated a 2 (audience attitude: positive vs. negative) x 3 (audience change: no audience change vs. change to in-group audience vs. change to out-group audience) ANOVA for message valence (for descriptive statistics, see Table 3, top panel). As expected, there was a significant main effect of audience attitude on message valence,  $F(1,112) = 31.43, p < .001, \eta_p^2 = .22$ . There was no main effect of audience change,  $F(1,112) = 1.25, p = .29$ . The interaction effect failed to attain statistical significance,  $F(2,112) = 2.39, p = .10$ . Given the post-hoc timing of the audience-change manipulation this trend must reflect random variation. Differences in message tuning could be problematic if message tuning is lower in conditions in which the subsequent memory effect is also lower. However, message tuning was, if anything, slightly *stronger* in the audience-change conditions.

The same 2 X 3 ANOVA for recall valence (for descriptive statistics, see Table 3, bottom panel) yielded a significant main effect of audience attitude,  $F(1,112) = 6.98, p = .009, \eta_p^2 = .06$ . Importantly, and as predicted, this effect was qualified by a significant Audience Attitude X Audience Change interaction,  $F(2,112) = 4.04, p = .020, \eta_p^2 = .07$ . Replicating Experiment 2 and past findings, an audience-tuning memory effect was found when the audience did not change. In contrast, the memory effect disappeared when the audience changed, and this was true for *both* the switch to an out-group audience, replicating Experiment 2, *and* for the switch to a new in-group audience (for test statistics, see Table 3, bottom panel).

In sum, Experiment 3 replicated, but also extended Experiment 2. An audience-tuning memory effect, reflecting shared reality, occurred in the no-audience-change condition, but it did not occur when the audience-tuned message was erroneously delivered to either an out-group member (a Turk) *or* a different in-group member (another German). The audience change reduced the memory effect, and hence shared reality, even when the audience's group

membership remained the same. This finding suggests that the reduction of the memory effect is not simply due to intergroup biases. Apparently, the audience's *personal* identity rather than the audience's *group* identity is critical. Moreover, the memory effect was eliminated by the audience change despite feedback from the novel audience about successful identification. This finding indicates that personal success feedback did not compensate for the loss of a personal connection with the initial intended audience.

### General Discussion

The findings of three experiments demonstrate the sensitivity of shared reality to the concurrent communication situation; specifically to changes in communicators' interpersonal connection with the audience. As in previous research, the empirical index of shared reality was the audience-tuning memory effect for target person information in the saying-is-believing paradigm. Building on extant research (see Echterhoff et al., 2009), we created conditions in which the initial audience was either appropriate for creating a shared reality (that is, an in-group member) or not sufficiently appropriate for shared-reality creation (that is, an out-group member). We found that communicators exhibited an audience-tuning memory effect when the personal connection with an initially inappropriate audience, an out-group member, was enhanced by the audience personally providing direct feedback to the communicator about the success of the message (Experiment 1), and when the personal connection with an appropriate audience was not disrupted (Experiments 2 and 3). But when the personal connection with an appropriate audience was not established (out-group audience without personal success feedback) or was disrupted (the new audience was not the intended audience), the audience-tuning memory effect was absent.

In Experiment 1, communicators received feedback that an out-group audience had successfully identified the target person based on their message. When the feedback was

impersonal (conveyed by the experimenter), there was no audience-tuning memory effect—replicating previous results with out-group audiences. However, when the feedback was personal and communicated directly by the out-group audience, the audience-tuning memory effect emerged. This experiment shows that what matters is the personal relationship between the communicator and the audience rather than the group membership of the audience per se.

In Experiment 2, the audience-tuning memory effect was found when the audience remained constant throughout. However, when communicators were told that their message was erroneously delivered to an out-group audience (a Turk) rather than to the initial in-group audience (a fellow German), the memory effect was eliminated. Experiment 3 showed that the memory effect was also eliminated when there was an erroneous delivery to an in-group member audience who was different from the initial in-group member audience. These two experiments show that what matters is the interpersonal connection between communicators and their initial audience to whom they tuned their message.

Putting the results of all three experiments together, what matters for communicators to create a shared reality with their audience is to experience a *personal* connection with their audience (see Echterhoff et al., 2009). In this respect, the present studies differ from our previous feedback studies (Echterhoff et al., 2005, Exp. 1 and 3). These previous studies were not concerned with the interpersonal connectedness of communicator and audience, but emphasized instead the epistemic concerns of communicators.

Regarding the adaptivity of the relevant processes, the findings demonstrate that the shared reality that communicators create about a target person with their audience can be adjusted to the concurrent communication situation *after* the message has been encoded and delivered. This adjustment was reflected in the communicators' memory for that target person.

Experiment 3 also suggests that not all kinds of personal connection are equally instrumental for shared-reality creation. In this study, the memory bias was eliminated despite *personal* feedback from the novel audiences that identification was successful. Hence, personal contact by itself was not sufficient for the occurrence of the audience-tuning memory effect. This finding allows more specific conclusions about which features of a personal connection contribute to shared reality. It suggests that what matters is the communicators' *continued* experience of a personal connection with the specific audience with whom communicators intended to create a shared reality via audience-tuned communication. What is not sufficient is personal contact independent of the process of creating a shared reality with an intended audience through message tuning. The sense of a continued connection with the intended partner of the shared reality is disrupted when the message that is tuned for one audience is delivered instead to a different audience.

#### Appraisal of Alternative Accounts

Now that we have articulated the shared-reality account of the present findings, we consider other possible factors that might have contributed to our findings. For example, differences in perceptions of the audience's appropriateness for sharing, such as intergroup biases (Brewer & Brown, 1998; Gaertner & Dovidio, 2000), could explain the elimination of the audience-tuning memory effect from the switch between an initial in-group audience to a new (and unintended) out-group audience (Experiment 2). However, this mechanism cannot explain why this effect also occurred after the switch from one in-group audience to another in-group audience (Experiment 3). Moreover, there was no evidence that the personal success feedback from an out-group audience in Experiment 1 altered the communicators' perception of the out-group and yet such feedback produced an audience-tuning memory effect. Hence, our findings do not support the notion that changes in intergroup biases drive the observed effects.

The audience changes in Experiments 2 and 3 also warrant attention. Given that participants received no forewarning about a possible audience change, it occurred unexpectedly. Could a sense of expectancy violation or frustration resulting from the disruption of the connection with the audience account for the obtained findings? According to one prominent approach (Burgoon, 1993), violations of expectancies about an interaction partners' communication behavior can induce arousal, distraction, and uncertainty, which leads people to focus their attention on the relationship, the partner, or the meaning of the violation itself.

However, one of our findings cannot be easily reconciled with such an account. An expectancy violation of the above kind should affect participants' mood negatively. However, we found no differences in mood between the audience-change conditions in Experiment 2. Furthermore, expectancy violation theory per se is not designed to account for memory processes of the kind examined in our studies. It is not clear how differences in expectancy violation between the audience-change conditions would translate into differences in the audience-tuning memory effect. Finally, an expectancy violation explanation cannot account for the whole pattern of findings, such as the effect we found after enhancement of the personal connection in Experiment 1. In contrast, our shared-reality account can account for all of our findings.

#### Evaluative Versus Conceptual Alignment

As outlined in the introduction, there is an influential line of psycholinguistic research that has demonstrated the situated adjustment of joint meaning-making to the unfolding conversational dynamics, including feedback from the conversation partner (e.g., Pickering & Garrod, 2004; Schober & Brennan, 2003). A key function of such adjustment processes is to ensure that the communication partners can rely on having a common understanding of what is said. Hence, such adjustment processes are in the service of creating a commonality between the conversation partners that helps them to manage their dialog. What is the relation between this

type of commonality and the commonality that is created through audience-tuned communication in the present studies?

The audience-tuning memory effect refers to a commonality of valenced representations about a target person. In this respect, the audience-tuning memory effect captures *evaluative* alignment between communicator and audience regarding an object of evaluation (Echterhoff et al., 2009). Such an assimilation of the communicators' evaluative representation to the audience's evaluation is a specific type of social influence through communication, which we conceptualize as creating a shared reality. The commonality is not only about what something is but, given what it is, how it should be evaluated (for similar distinctions, see Higgins, 2012).

In contrast, extant psycholinguistic approaches primarily address commonality at the conceptual level regarding what something is and how they refer to it. The key outcome measures in psycholinguistic research, such as an addressee's successful decoding of a speaker's verbal reference (e.g., Clark & Wilkes-Gibbs, 1986; Krauss & Weinheimer, 1966; Schober & Clark, 1989) or lexical entrainment (Brennan & Clark, 1996), represent (temporary) conceptual alignment between conversation partners. Such alignment requires partner-specific agreement about how to conceptualize a target referent, for example, by agreeing on the reference "sad rabbit" to describe an ambiguous tangram figure (Clark & Wilkes-Gibbs, 1986). Conceptual alignment is a key element of common ground (Brennan & Clark, 1996; Clark & Schaefer, 1989; Clark & Wilkes-Gibbs, 1986). According to a seminal definition, common ground consists of "the propositions whose truth he [a speaker; *our addition*] takes for granted as part of the background of the conversation" (Stalnaker, 1978, p. 320). In subsequent formulations, common ground has been characterized as the set of information that conversation partners take for granted as mutually understood (Clark & Carlson, 1981; Clark & Schaefer, 1989), or the conversation partners' mutual belief that they are talking about the same thing (Brennan, 1998).

Importantly, common ground entails conceptual alignment, but not necessarily evaluative alignment. In other words, agreement between people about the referent of a description does not mean that they have a shared reality regarding how to evaluate that referent (see Echterhoff et al., 2009). For instance, there can be common ground between Israelis and Palestinians, in the sense of a shared reference, regarding what is referred to by the expression “Road Map” (which formulates steps toward a two state solution). However, any such agreement on the reference of “Road Map” would not mean that they agreed in their evaluation of the Road Map.

To be sure, depending on the breadth and generality of definitions of common ground, common ground may also be conceptualized in ways that do not explicitly deny the role of evaluative elements in mutually recognized beliefs. However, as discussed above, the notion of common ground was designed for answering specific research questions about the possibility of common understanding of what something is and how it is referred to in conversation, rather than question about evaluative or attitudinal alignment between communication partners.

Across our studies, we varied whether communicators received feedback indicating successful referential communication, and thus whether common ground about the target person had been achieved (see Echterhoff et al., 2005, Exp. 1 & 3). Our findings show that such feedback per se was neither a sufficient nor a necessary condition for the occurrence of the audience-tuning memory effect. First, the findings from Experiments 1 and 3 show that identification-success feedback is *not* sufficient to create a shared reality, because the audience-tuning memory effect was absent in conditions where there was success feedback (either impersonal as in Experiment 1, or personal as in Experiment 3). Second, in Experiment 2, no identification-success feedback was provided but an audience-tuning memory effect was found in the condition in which the audience did not change. This is consistent with many previous

studies (Echterhoff et al., 2009). Hence, explicit feedback about the audience's agreement with the reference of the communicated message is also *not* necessary for the memory effect.

Feedback about successful referential communication does indicate a commonality, but at a conceptual rather than an evaluative level. Hence, in our studies, feedback about conceptual commonality was not critical. In contrast, the personal connection with the audience was critical. When an audience switch disrupts the personal connection, this disruption is not compensated by the mere fact that the referential communication with the new audience was successful.

### Implications and Outlook

Our findings have implications for issues cutting across the fields of memory, social cognition, and intergroup processes. First of all, our studies are relevant to the budding work on situated social cognition because the audience-tuning effect on memory epitomizes the situatedness of cognition (Smith & Collins, 2010; Smith & Semin, 2004). As Smith and Collins (2010) succinctly put it: "Human communication is not merely the translation and output of pre-existing cognitions but involves online construction of cognitions, attitudes, and actions in response to all elements of the situation" including "communicative relationships" (p. 134). Indeed, in our studies communication affected the construction of memory and representations of the topic, and these processes in turn depended on the communicative relationship.

Furthermore, according to a main tenet of the situated-cognition approach, cognition involves short-term, moment-by-moment adjustments to the immediate situational context (Smith & Collins, 2010; Smith & Semin, 2004): "Human judgments (...) and adaptive behaviors are generally constructed from locally available resources and situational cues" (Smith & Collins, 2010, p. 129). Consistent with this view, our studies suggest that the shared-reality experience, including its reflection in the audience-tuning memory effect, is sensitive to incoming and updated information regarding the personal connection to the audience. In

conclusion, we believe that the potential sensitivity of memory and memory experience to changes in the communication situation could be an interesting topic for research conducted from the perspective of situated social cognition. Future studies could examine, for instance, what processes allow communicators to achieve the quick adjustment of person memory observed in the present studies.

A burgeoning body of research shows that what people remember is profoundly shaped by and adapted to the concurrent communication context (Hirst & Echterhoff, 2012; Marsh, 2007; Rajaram & Pereira-Pasarin, 2010). For instance, speakers recall more, particularly more novel and more elaborated, information when they retell a story to an attentive (*vs.* a distracted) listener (Pasupathi, Stallworth, & Murdoch, 1998). Our present findings extend this work by demonstrating the continuous, ongoing adaptiveness of memory to *changes* in the communication context. At a time when communicators have already adjusted their cognitive representation and memory to their audience's position (that is, after audience tuning), they can readily perform a re-adjustment depending on changes in the personal connection with the audience. Thus, once communicators have started to align their memory to the audience's attitude, they can spontaneously "de-align" it in response to a changing context.

These conclusions also speak to a classical controversy in social cognition research concerning the adjustment of person memory to changes in relevant context information (Bellezza & Bower, 1981; Snyder & Uranowitz, 1978). Once perceivers have encoded person information under the influence of an initial context (for example, a schema or stereotype), can they adjust their memory to novel context information (for example, a different schema or stereotype)? Finding effects of late, post-message changes on memory would affirm this possibility, which is consistent with the more recent formulations emphasizing the adaptive situatedness of social cognition in general and knowledge accessibility in particular (see Eitam &

Higgins, 2010).

Last but not least, the findings from Experiment 1 suggest ways of reducing barriers to shared reality between people from different groups and communities. In a world characterized by unprecedented mobility and migration, intergroup interaction has become ubiquitous and almost inevitable. Despite egalitarian norms, people often find subtle ways of rejecting interaction partners from an out-group (e.g., Dovidio, Gaertner, Kawakami, & Hodson, 2002). One subtle but devastating way of rejecting the out-group is to withhold a shared reality (Echterhoff et al., 2009). Indeed, communicators in saying-is-believing studies typically do *not* create a shared view with their audience about the target person when the audience belongs to a stigmatized or minority out-group (e.g., Echterhoff et al., 2005, 2008). However, providing people with the experience of receiving direct feedback from an out-group member about their successful message during interpersonal communication could lower or even eliminate barriers to the creation of a shared reality between communicators from different social groups. What matters for creating a shared reality is forming a personal connection between the communicator and the audience. And once the shared reality is created, the communicator and audience can share not only what they know about the world but also how they evaluate it. This is potentially a powerful tool for change in a world of ethnic, political, and religious conflict.

Finally, we should note that our findings do not suggest that mere contact is sufficient to motivate the creation of shared realities between in-group and out-group members. Instead, as suggested by Experiment 1, there appears to be a need for personal success feedback from audience to communicator, which may occur infrequently even when there is contact. Hence, interventions aimed at overcoming the intergroup denial of shared reality should focus on conditions where such personal success feedback is encouraged.

## References

- Bangerter, A., & Clark, H. H. (2003). Navigating joint projects with dialogue. *Cognitive Science*, 27, 195-225. doi: 10.1207/s15516709cog2702\_3
- Bellezza, E. S., & Bower, G. H. (1981). Person stereotypes and memory for people. *Journal of Personality and Social Psychology*, 41, 856- 865. doi: 10.1037/0022-3514.41.5.856
- Bavelas, J. B., Coates, L., & Johnson, T. (2000). Listeners as co-narrators. *Journal of Personality and Social Psychology*, 79, 941-952. doi: 10.1037/0022-3514.79.6.941
- Bettencourt, B. A., Brewer, M. B., Croak, M. R., & Miller, N. (1992). Cooperation and the reduction of intergroup bias: The role of reward structure and social orientation. *Journal of Experimental Social Psychology*, 28, 301–319. doi: 10.1016/0022-1031(92)90048-O
- Brennan, S. E. (1998). The grounding problem in conversation with and through computers. In S. R. Fussell & R. J. Kreuz (Eds.), *Social and cognitive psychological approaches to interpersonal communication* (pp. 201-225). Hillsdale, NJ: Lawrence Erlbaum.
- Brennan, S. E., & Clark, H. H. (1996). Conceptual pacts and lexical choice in conversation. *Journal of Experimental Social Psychology: Learning, Memory, and Cognition*, 22, 1482-1493. doi: 10.1037/0278-7393.22.6.1482
- Brennan, S. E., & Hanna, J. E. (2009). Partner-specific adaptation in dialogue. *Topics in Cognitive Science*, 1, 274-291. doi: 10.1111/j.1756-8765.2009.01019.x
- Brewer, M. B. (1988). A dual process model of impression formation. In R. S. Wyer & T. K. Srull (Eds.), *Advances in social cognition* (Vol. 1, pp. 1–36). Hillsdale, NJ: Erlbaum.
- Brewer, M. B., & Brown, R. J. (1998). Intergroup relations. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology* (Vol.2, 4th ed., pp. 554-594). New York, NY: Oxford University Press.

- Burgoon, J. K. (1993). Interpersonal expectations, expectancy violations, and emotional communication. *Journal of Language and Social Psychology, 12*, 13-21. doi: 10.1177/0261927X93121003
- Chiu, C. Y., Krauss, R. M., & Lau, I. Y.-M. (1998). Some cognitive consequences of communication. In S. R. Fussell & R. Kreuz (Eds.), *Social and cognitive approaches to interpersonal communication* (pp. 259-278). Hillsdale, NJ: Erlbaum.
- Clark, H. H., & Brennan, S. E. (1991). Grounding in communication. In L. B. Resnick, J. M. Levine, & S. D. Teasley (Eds.), *Perspectives on socially shared cognition* (pp. 127-149). Washington: American Psychological Association.
- Clark, H. H., & Carlson, T. B. (1981). Context for comprehension. In J. Long & A. Baddeley (Eds.), *Attention and performance IX* (pp. 313-331). Hillsdale, NJ: Erlbaum.
- Clark, H. H., & Murphy, G. L. (1982). Audience design in meaning and reference. In J. F. Le Ny & W. Kintsch (Eds.), *Language and comprehension* (pp. 287-296). New York: Elsevier.
- Clark, H. H., & Schaefer, E. F. (1987). Concealing one's meaning from overhearers. *Journal of Memory and Language, 26*, 209-225. doi: 10.1016/0749-596X(87)90124-0
- Clark, H. H., & Schaefer, E. F. (1989). Contributing to discourse. *Cognitive Science, 13*, 259-294. doi: 10.1207/S15516709COG1302\_7
- Clark, H. H., & Wilkes-Gibbs, D. (1986). Referring as a collaborative process. *Cognition, 22*, 1-39. doi: 10.1016/0010-0277(86)90010-7
- Dovidio, J. F., Gaertner, S. L., Kawakami, K., & Hodson, G. (2002). Why can't we just get along? Interpersonal biases and interracial distrust. *Cultural Diversity and Ethnic Minority Psychology, 8*, 88-102. doi: 10.1037/1099-9809.8.2.88
- Echterhoff, G., & Higgins, E. T. (2010). How communication shapes memory: Shared reality and implications for culture. In G. R. Semin & G. Echterhoff (Eds.), *Grounding sociality: Neurons, minds, and culture* (pp. 115-146) New York: Psychology Press.

- Echterhoff, G., Higgins, E. T., & Groll, S. (2005). Audience-tuning effects on memory: The role of shared reality. *Journal of Personality and Social Psychology, 89*, 257–276. doi: 10.1037/0022-3514.89.3.257
- Echterhoff, G., Higgins, E. T., Kopietz, R., & Groll, S. (2008). How communication goals determine when audience tuning biases memory. *Journal of Experimental Psychology: General, 137*, 3–21. doi: 10.1037/0096-3445.137.1.3
- Echterhoff, G., Higgins, E. T., & Levine, J. M. (2009). Shared reality: Experiencing commonality with others' inner states about the world. *Perspectives on Psychological Science, 4*, 496–521. doi: 10.1111/j.1745-6924.2009.01161.x
- Eich, E. E., & Macauley, D. (2000). Fundamental factors in mood-dependent memory. In J. P. Forgas (Ed.), *Feeling and thinking: The role of affect in social cognition* (pp. 109–130). New York, NY: Cambridge University Press.
- Eitam, B., & Higgins, E. T. (2010). Motivation in mental accessibility: Relevance Of A Representation (ROAR) as a new framework. *Social and Personality Psychology Compass, 3*, 1–17. doi: 10.1111/j.1751-9004.2010.00309.x
- Fiedler K., Semin G. R., & Koppetsch, C. (1991). Language use and attributional biases in close personal relationships. *Personality and Social Psychology Bulletin, 17*, 147–155. doi: 10.1177/014616729101700205
- Fiske, S. T., & Neuberg, S. L. (1990). A continuum of impression formation, from category based to individuating processes: Influences of information and motivation on attention and interpretation. In M. P. Zanna (Ed.), *Advances in experimental and social psychology* (pp. 1–74). New York: Academic Press.
- Fitzsimons, G. M., & Kay, A. C. (2004). Language and interpersonal cognition: Causal effects of variations in pronoun usage on perceptions of closeness. *Personality and Social Psychology Bulletin, 30*, 547–557. doi: 10.1177/0146167203262852

- Fussell, S. R., & Kreuz, R. J. (1998). Social and cognitive approaches to interpersonal communication: Introduction and overview. In S. R. Fussell & R. J. Kreuz (Eds.), *Social and cognitive approaches to interpersonal communication* (pp. 3-17). Mahwah, NJ: Erlbaum.
- Gaertner, S. L., & Dovidio, J. F. (2000). *Reducing intergroup bias: The common ingroup identity model*. Philadelphia: Psychology Press.
- Gawronski, B. (2002). What does the Implicit Association Test measure? A test of the convergent and discriminant validity of prejudice-related IATs. *Experimental Psychology*, *49*, 171-180. Doi: 10.1027//1618-3169.49.3.171
- Hardin, C. D., & Higgins, E. T. (1996). Shared reality: How social verification makes the subjective objective. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition, Vol. 3: The interpersonal context* (pp. 28-84). New York, NY: The Guilford Press.
- Hastie, R. (1980). Memory for information which confirms or contradicts a general impression. In R. Hastie, T. M. Ostrom, E. B. Ebbesen, R. S. Wyer, D. L. Hamilton, & D. E. Carlston (Eds.), *Person memory: The cognitive basis of social perception* (pp. 155-177). Hillsdale, NJ: Erlbaum.
- Hausmann, L. R. M., Levine, J. M., & Higgins, E. T. (2008). Communication and group perception: Extending the "saying is believing" effect. *Group Processes and Intergroup Relations*, *11*, 539-554. doi: 10.1177/1368430208095405
- Hellmann, J. H., Echterhoff, G., Kopietz, R., Niemeier, S., & Memon, A. (2011). Talking about visually perceived events: Communication effects on eyewitness memory. *European Journal of Social Psychology*, *41*, 658-671. doi: 10.1002/ejsp.796

- Higgins, E. T. (1981). The “communication game”: Implications for social cognition and persuasion. In E. T. Higgins, C. P. Herman, & M. P. Zanna (Eds.), *Social cognition: The Ontario symposium* (Vol. 1, pp. 343-392). Hillsdale, NJ: Erlbaum.
- Higgins, E. T. (1992). Achieving “shared reality” in the communication game: A social action that creates meaning. *Journal of Language and Social Psychology, 11*, 107–131. doi: 10.1177/0261927X92113001
- Higgins, E. T. (2012). *Beyond pleasure and pain: How motivation works*. New York: Oxford University Press.
- Higgins, E. T., Echterhoff, G., Crespillo, R., & Kopietz, R. (2007). Effects of communication on social knowledge: Sharing reality with individual versus group audiences. *Japanese Psychological Research, 2*, 89-99. doi: 10.1111/j.1468-5884.2007.00336.x
- Higgins, E. T., & Rholes, W. S. (1978). “Saying is believing”: Effects of message modification on memory and liking for the person described. *Journal of Experimental Social Psychology, 14*, 363-378. doi: 10.1016/0022-1031(78)90032-X
- Hirst, W., & Echterhoff, G. (2012). Remembering in conversation: The social sharing and reshaping of memories. *Annual Review of Psychology, 63*, 55-79. doi: 10.1146/annurev-psych-120710-100340
- Jarvis, B. G. (2010). MediaLab (Version 2010.2.19) [Computer Software]. New York, NY: Empirisoft Corporation.
- Kopietz, R., Hellmann, J. H., Higgins, E. T., & Echterhoff, G. (2010). Shared-reality effects on memory: Communicating to fulfill epistemic needs. *Social Cognition, 28*, 353-378. doi: 10.1521/soco.2010.28.3.353
- Krauss, R. M. (1987). The role of the listener: Addressee influences on message formulation. *Journal of Language and Social Psychology, 6*, 81-97. doi: 10.1177/0261927X8700600201

- Krauss, R. M., & Fussell, S. R. (1991). Perspective-taking in communication: Representations of others' knowledge in reference. *Social Cognition, 9*, 2-24. doi: 10.1521/soco.1991.9.1.2
- Krauss, R.M., & Weinheimer, S. (1966). Concurrent feedback, confirmation, and the encoding of referents in verbal communication. *Journal of Personality and Social Psychology, 4*, 343-346. doi: 10.1037/h0023705
- Miller, N. (2002), Personalization and the promise of contact theory. *Journal of Social Issues, 58*, 387-410. doi: 10.1111/1540-4560.00267
- Neuberg, S. L., & Fiske, S. T. (1987). Motivational influences on impression formation: Outcome dependency, accuracy-driven attention, and individuating processes. *Journal of Personality and Social Psychology, 53*, 431-444. doi: 10.1037/0022-3514.53.3.431
- Pasupathi M., Stallworth, L. M., & Murdoch, K. (1998). How what we tell becomes what we know: Listener effects on speakers' long-term memory for events. *Discourse Processes, 26*, 1–25. doi: 10.1080/01638539809545035
- Pickering, M. J., & Garrod, S. (2004). Towards a mechanistic Psychology of dialogue. *Behavioral and Brain Sciences, 27*, 169-226. doi: 10.1017/S0140525X04000056
- Pettigrew, T. F., & Meertens, R. W. (1995). Subtle and blatant prejudice in Western Europe. *European Journal of Social Psychology, 25*, 57–75. doi: 10.1002/ejsp.2420250106
- Rajaram S., & Pereira-Pasarin, L. P. (2010). Collaborative memory: Cognitive research and theory. *Perspectives on Psychological Science, 5*, 649–63. doi: 10.1177/1745691610388763
- Reis, H. T., & Shaver, P. (1988). Intimacy as an interpersonal process. In S. Duck (Ed.), *Handbook of personal relationships* (pp. 367-389). Chichester, England: Wiley.
- Rubini, M., & Kruglanski, A. W. (1997). Brief encounters ending in estrangement: Motivated language use and interpersonal rapport. *Journal of Personality and Social Psychology, 12*, 1047-1060. doi: 10.1037/0022-3514.72.5.1047

- Schegloff, E. A. (1981). Discourse as an interactional achievement: Some uses of uh-huh and other things that come between sentences. In D. Tannen (Ed.), *Analyzing discourse: Text and talk. Georgetown University Roundtable on Languages and Linguistics 1981* (pp. 71-93). Washington, DC: Georgetown University Press.
- Schober, M. F., & Brennan, S. E. (2003). Processes of interactive spoken discourse: The role of the partner. In A. C. Graesser, M. A. Gernsbacher, & S. R. Goldman (Eds.), *Handbook of discourse processes* (pp. 123-164). Hillsdale, NJ: Lawrence Erlbaum.
- Schober, M. F., & Clark, H. H. (1989). Understanding by addressees and overhearers. *Cognitive Psychology*, 21, 211–232. doi: 10.1016/0010-0285(89)90008-X
- Smith, E. R., & Collins, E. C. (2010). Situated cognition. In B. Mesquita, L. F. Barrett, & E. R. Smith (Eds.), *The mind in context* (pp. 126-145). New York: Guilford Press.
- Smith, E. R., & Semin, G. R. (2004). Socially situated cognition: Cognition in its social context. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 36, pp. 53–115). San Diego, CA: Academic Press. doi: 10.1016/S0065-2601(04)36002-8
- Smith, E. R., & Semin, G. R. (2007). Situated social cognition. *Current Directions in Psychological Science*, 16, 132–135. doi: 10.1111/j.1467-8721.2007.00490.x
- Snyder, M., & Uranowitz, S. W. (1978). Reconstructing the past: Some cognitive consequences of person perception. *Journal of Personality and Social Psychology*, 36, 941-950. doi: 10.1037/0022-3514.36.9.941
- Stalnaker, R. C. (1978). Assertion. In P. Cole (Ed.), *Syntax and semantics: Pragmatics* (Vol. 9, pp. 315-332). New York: Academic Press.
- Stone, C. H., & Crisp, R. J. (2007). Superordinate and subgroup identification as predictors of intergroup evaluation in common ingroup contexts. *Group Processes and Intergroup Relations*, 10, 493–513. doi: 10.1177/1368430207081537

- Sutton, J. (2009). Remembering. In M. Aydede, & P. Robbins (Eds.), *The Cambridge handbook of situated cognition* (pp. 217-235). Cambridge: Cambridge University 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*. Oxford: Basil Blackwell.
- Wilder, D. A. (1978). Reduction of intergroup discrimination through individuation of the out-group. *Journal of Personality and Social Psychology*, 36, 1361–1374. doi: 10.1037/0022-3514.36.12.1361
- Wyer, R. S., & Srull, T. K. (1989). *Memory and cognition in its social context*. Hillsdale, NJ; Erlbaum.

*Table 1.* Message and recall valence as a function of audience attitude and type of identification-success feedback for Experiment 1, including *t* values, *p* values, effect sizes (Cohen's *d*), and sample sizes.

Success Feedback	Audience Attitude				<i>t</i>	<i>p</i>	<i>d</i>	<i>n</i>
	positive		negative					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Message								
personal (by audience)	1.65	1.82	-1.44	1.74	4.92	< .001	1.74	34
impersonal (by experimenter)	1.31	1.56	-0.83	2.14	3.51	< .001	1.14	36
Recall								
personal (by audience)	2.38	1.32	0.06	1.32	5.29	< .001	1.76	34
impersonal (by experimenter)	0.69	1.20	0.36	1.28	< 1	.443	0.30	36

*Note.* Message valence and recall valence were coded on an 11-point scale, ranging from -5 (extremely negative) to +5 (extremely positive).

Table 2. Message and recall valence as a function of audience attitude and post-message audience change for Experiment 2, including *t* values, *p* values, effect sizes (Cohen’s *d*), and sample sizes.

Audience Change	Audience Attitude				<i>t</i>	<i>p</i>	<i>d</i>	<i>n</i>
	positive		negative					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Message								
no audience change	1.38	1.09	-0.30	2.15	3.23	.002	0.99	33
to out-group audience	0.92	1.26	-0.88	2.02	2.88	.005	1.07	36
Recall								
no audience change	1.06	1.18	0.04	1.09	2.40	.019	0.90	33
to out-group audience	0.33	1.10	0.51	1.44	< 1	.664	-0.14	36

Note. Message valence and recall valence were coded on an 11-point scale, ranging from -5 (extremely negative) to +5 (extremely positive).

*Table 3.* Message and recall valence as a function of audience attitude and post-message audience change for Experiment 3, including *t* values, *p* values, effect sizes (Cohen's *d*), and sample sizes.

Audience Change	Audience Attitude				<i>t</i>	<i>p</i>	<i>d</i>	<i>n</i>
	positive		negative					
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Message								
no audience change	.20	1.59	-1.08	1.42	2.22	.028	0.85	38
to out-group audience	1.38	1.59	-1.47	1.90	5.00	< .001	1.62	39
to in-group audience	.88	2.07	-0.50	1.95	2.48	.015	0.69	41
Recall								
no audience change	0.48	1.38	-1.19	1.09	3.66	< .001	1.34	38
to out-group audience	0.28	1.04	-0.21	1.37	1.08	.284	0.40	39
to in-group audience	0.33	1.71	0.43	1.65	< 1	.814	-0.06	41

*Note.* Message valence and recall valence were coded on an 11-point scale, ranging from -5 (extremely negative) to +5 (extremely positive).

## Footnotes

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<sup>1</sup> We selected the Turkish first names (*Ahmed* in Experiments 1 and 2, *Mehmet* in Experiment 3) from Gawronski's (2002) stimuli for a Turkish-German Implicit Association Test. Both are typical Turkish male names, and they were matched with the German first names on popularity (for additional pretest info, also see Echterhoff et al., 2008, Exp. 1).