



Original Articles

I remember emotional content better, but I'm struggling to remember who said it!



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ABSTRACT

The joint impact of emotion and production on conversational memory was examined in two experiments where pairs of participants took turns producing verbal information. They were instructed to produce out loud sentences based on either neutral or emotional (Experiment 1: negative; Experiment 2: positive) words. Each participant was then asked to recall as many words as possible (content memory) and to indicate who had produced each word (reality monitoring). The analyses showed that both self-production and emotion boost content memory, although emotion also impairs reality monitoring. This study sheds light on how both factors (emotion and production) may constrain language interaction memory through information saliency.

1. Introduction

You and your colleague are talking about a dinner organized at your boss's house tomorrow. As the interaction unfolds, you should both encode information about what was said, although there is evidence that you and your partner might subsequently remember this information differently. Researchers have typically addressed this issue by investigating unemotional conversations, even though emotion colors our daily life experience. Indeed, imagine that no one likes your boss and that negative information has been exchanged about this dinner, or imagine that your boss is great and that someone mentions that they are very excited about tomorrow night. Are you more likely to remember negative, positive or neutral information? An additional question concerns memory for who said what. Indeed, you might remember a piece of information well, but could you accurately say whether you produced this information yourself, or whether it was produced by someone else, depending on its emotional valence? This study seeks to examine how memory processes and emotional content jointly impact content memory and memory for who said what in a conversation-like setting.

1.1. The impact of emotion and production on memory for conversational content

Memory plays a central role in human conversation. Indeed, the contributions produced during any interaction are usually encoded in

each participant's memory. This information may then be resorted to during subsequent interactions to support dialogic partner-adaptation (for examples, see Clark & Schaefer, 1989; Clark & Wilkes-Gibbs, 1986; Horton & Brennan, 2016; Horton & Gerrig, 2005, 2016; Kronmüller & Barr, 2015). Various factors may affect memory for the content of an interaction, including the nature of the partners' relationship (acquaintances vs. friends; Samp & Humphreys, 2007), or whether they share the same job status (e.g., Holtgraves, Srull, & Socal, 1989). In this context, the fact that this previous work has seldom investigated the link between conversational memory and emotion is surprising, as some authors have already pointed out that emotion could be the key to understanding conversational memory. For instance, Keenan, MacWhiney, and Mayhew (1977) wrote that "findings that interactional content improves memory can be explained [by] the affective nature of high interactional content statements" (p. 558–559). Why study conversational memory as an unemotional construct, when it inherently results from social interaction – thus necessarily involving both emotion and cognition (see Keltner & Horberg, 2015)?

Key to the proposal that emotion can influence conversational memory is the evidence that emotional words are memorized better than neutral ones in standard memory tasks involving free recall (e.g., Talmi & Moscovitch, 2004), short-term memory (e.g., Monnier & Syssau, 2008) or recognition (e.g., Thapar & Roudier, 2009). The few studies which have directly examined the influence of emotion on conversational memory per se have shown, for instance, dialogue partners recall conversational content more accurately after pleasant

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interactions (Samp & Humphreys, 2007).

It is also important to point out at this stage that one of the key features of any conversation is that both (or more) conversational partners have the opportunity to produce utterances during the interaction. This involves that from each partner's point of view, some utterances are self-produced whereas others are partner-produced. This has a major impact on conversational memory, due to a *production* effect in memory. This term refers to the fact that information produced out loud is remembered better than information read silently or produced by someone else (MacLeod, 2011; MacLeod, Gopie, Hourihan, Neary, & Ozubko, 2010). This effect has been generalized to spontaneous dyadic interactions (Knutsen & Le Bigot, 2014; 2015; McKinley, Brown-Schmidt, & Benjamin, 2017; Yoon, Benjamin, & Brown-Schmidt, 2016; see also Knutsen & Le Bigot, 2017), revealing that each conversational partner tends to remember what he or she said better than what the other person said after the end of the interaction. However, once again, one limitation of this work is that it has focused solely on unemotional conversations (map tasks, matching tasks involving Tangram figures, etc.), making it difficult to determine whether self-production affects conversational memory regardless of emotion.

1.2. The impact of emotion and production on conversational reality monitoring

During any conversation, partners memorize not only *what was said*, but also *who said what*. In a basic, one on one conversation, this implies being able to distinguish between internally versus externally generated utterances (e.g., Fischer, Shult, & Steffens, 2015; Johnson & Raye, 1981; Raye & Johnson, 1980). This ability, which is not specific to conversation, is usually referred to as *reality monitoring*. The results of related past research on the effect of emotion on memory for contextual information such as reality monitoring are somewhat mixed. Some researchers have reported that although emotional content is memorized better than neutral content, contrasted patterns are found when participants are asked to remember who said what (i.e., a disadvantage, or no particular effect, for emotional items; e.g., Davidson, McFarland, & Glisky, 2006); in contrast, other studies have found that emotion causes participants to remember better who said what (e.g., D'Argembeau & Van der Linden, 2004; Doerksen & Shimamura, 2001). However, the information provider was not systematically an actual person in these studies, limiting the generalization of the findings to conversational settings. What is more, none of these studies involved situations in which the participant provided some of the information him- or herself. In Davidson et al.'s (2006) study, the information was provided by one of two prerecorded voices (one male, one female). In D'Argembeau and Van der Linden (2004), and Doerksen and Shimamura's (2001) studies, the "source" of the information was operationalized as a feature of the target word (i.e., ink or background color). These limitations imply that the effect of emotional valence on conversational reality monitoring has not yet been examined directly.

Reality monitoring has also been examined in the context of research on the production effect. When a piece of information benefits from self-production, reality monitoring is less efficient, as self-production causes the identity of the provider of the information to be remembered less well (e.g., Fischer, Schult, & Steffens, 2015; Jurica & Shimamura, 1999; although see also McKinley et al., 2017, who reported no significant effect of production on reality monitoring). The contrast between content memory and reality monitoring is in line with a content-context trade-off hypothesis, whereby concomitant encoding of content (e.g., what was said) and contextual information (e.g., who said what) causes competition for limited cognitive resources (Jurica & Shimamura, 1999; Nieznański, 2011). However, once again, the information provider was not systematically an actual person in previous studies, nor did the participant generate information him- or herself, limiting the generalization of the findings to conversational settings. For instance, in Jurica and Shimamura's study, participants interacted

with faces shown on a computer screen, rather than actual people.

1.3. The current study

The current study sought to overcome the limitations of previous related work by examining the combined effect of emotion and production on participants' memory for words (emotional vs. neutral) produced either by themselves or by another participant in a conversation-like setting. The participants' performance on a subsequent reality monitoring task was also examined. Although the participants did not have the opportunity to engage in spontaneous conversation (which would have made the emotional content of their utterances difficult to control), they did have the opportunity to take turns producing information. This study also sought to examine whether the joint effect of emotion and production on memory is found for negative (Experiment 1) and positive (Experiment 2) content. The latter point was addressed for two reasons. Firstly, consistent with the negativity-bias literature, some studies suggest that negative information is more likely to be processed automatically and to have an influence on psychological functioning as a whole (for a review, see Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). Secondly, studies have highlighted that although both negative and positive stimuli are more likely to be remembered than neutral ones, negative emotions make stimuli details particularly salient, at the expense of contextual information (Kensinger, 2009). This is consistent with research on the *weapon focus effect* (for a review, see Fawcett, Russell, Peace, & Christie, 2013), whereby the presence of a weapon on an event decreases memory for peripheral information. Consequently, the nature of what is remembered may vary depending on the valence of the information stored in memory, suggesting a potential modulation of the content-context trade-off hypothesis. The predictions were that self-produced and emotional words are better recalled than partner-produced and neutral words; the opposite pattern should be found for reality monitoring.

2. Experiment 1

2.1. Method

2.1.1. Rationale

In Experiment 1, pairs of participants were first informed that they would have to perform a collaborative task together. They were then shown neutral and negative words and took turns to produce out loud sentences which included these words. After this, each partner was asked to recall as many of these words as possible (content memory) and to indicate who had produced each word (or reality monitoring). Finally, the interaction ended with the collaborative task which the partners had previously been told about and during which they elaborated a short story together based on the information they had memorized. The data from this final phase were not of prime interest here; thus, they were not analyzed (the sole purpose of this phase was to emphasize the collaborative dimension of the experiment to the participants). The main analysis sought to examine the influence of production (i.e., whether the words initially shown on screen were self- or partner-produced) and emotion (i.e., whether the words initially shown on-screen were negative or neutral) on the participants' performance on the recall and reality monitoring tasks.

2.1.2. Participants

Forty-six University students (42 women; *Mean age* = 20.33, *SD* = 1.73) provided informed consent before taking part in the study in exchange for course credit or payment and were divided into 23 dyads. Four participants were removed from the final sample because they did not follow the instructions or they were not native French speakers, thus resulting in a sample of 42 participants in 21 dyads (38 women; *Mean age* = 20.86, *SD* = 2.39).

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