Mnemonic convergence in a social network: Collective memory and extended influence

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ABSTRACT

Research on the social influences on remembering has focused on how people influence one another's memory through direct conversation. This project examined indirect influence, that is, the influence of those to whom one may be connected through a social network. We extend Christakis and Fowler's (2007. The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine, 357*(4), 370–379) discovery that factors may propagate across several degrees of influence; influences of social remembering may also propagate. In a naturalistic study, we tracked weekly recollections of a narrative in a small social network. Two individuals' mnemonic convergence could be predicted by their degree of separation. Directly and indirectly connected pairs show more convergent remembering than unconnected pairs, indicating that conversation is not the only route by which two individuals may come to hold a shared representation of the past. This propagation of memories across the links of a social network is an important means by which a group converges on a collective memory.

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In what might be a uniquely human endeavor, people will often talk to each other about shared past experiences or mutually acquired knowledge. Over a one-month period, for instance, Mehl and Pennebaker (2003) recorded the conversations people had after learning of the terrorist attacks of September 11, 2001, using an innovative audio-recording device. They found that people frequently talked to each other about the attack and did so over several weeks. This paper explores the consequences of such repeated discussion.

There is a burgeoning literature on communicative effects on memory. A primary empirical set of findings indicates that what one person says to another can potentially reshape the memories of both speaker and listener (Hirst & Echterhoff, 2012). People may experience an event and, because of individual differences, form different mnemonic representations of the event. Critically, when two people subsequently talk to each other, they can alter each other's distinctive memories in a way that leads to a convergence on a mutually shared representation, despite their original differences.

Our interest here is whether conversational influences propagate, that is, whether a memory of someone in a group can be affected not by someone with whom they have spoken directly, but by others in the group to whom they are connected indirectly. That is, can John's memories be affected by Mary, if Mary spoke to Peter and Peter, in turn, spoke to John? The question of propagation is relevant in that it bears on a possible mechanism of mnemonic convergence in a memory community. Can indirect conversational influence promote a shared mnemonic representation, just as direct conversational influence do?

The present work could be viewed as an extension of work by Christakis and Fowler (2007), who have examined health outcomes as influences propagate. In perhaps their most well known study, they showed that a friend of a friend of a friend's obesity could predict an individual's probability of being obese. Their research suggests that there may be six degrees of separation in a (small world) social network, but, in general, there are only three degrees of influence. To frame our interest here in the terms of Christakis and Fowler's: Does the content of a friend of a friend of a friend's memory predict the content of your memory? And, to go slightly beyond Christakis and Fowler, if so, can this propagation, at least in part, account for the formation of a group-level collective memory?

This paper, then, concerns the dynamics by which collective memories are formed through conversations across a group of connected individuals. Conversations have been recognized as a means of constructing a collective memory, by which we mean here memories shared across a community (Hirst & Echterhoff, 2012). Their

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role is best appreciated in small groups, such as families or a group of friends, but they can also play a role in the formation of collective memories in large groups, such as nations (Fentress & Wickham, 1992; Wertsch, 2002). In repressive societies, for instance, conversations between friends, relatives, and acquaintances may be the only means of building a shared representation of the past that differs from the official one (Fentress & Wickham, 1992; Schuman, Rieger, & Gaidys, 1994). We focus here, however, exclusively on small groups.

1. Collective memory

Since Halbwachs (1950) laid the foundations for the study of collective memory, there has been an ever-growing interest in the means by which individuals in a community interact to form such collective memory. To a large extent, this interest has focused on the way in which society forms and maintains "publicly available symbols" and, consequently, students of collective memory have mainly attended to the use of power and politics to foster the construction and maintenance of these symbols (Olick, Vinitzky-Seroussi, & Levy, 2011; Hirst & Manier, 2008). Work on memetics and the epidemiology of beliefs provides an alternative framework by specifically focusing on propagation. It rarely, however, discusses memories per se, preferring to examine related concepts such as knowledge, innovations, or beliefs (e.g. Sperber, 1996; Boyer, 1997; Barrett, 2000). The exception might be a line of research that builds on Bartlett's (1932) serial reproduction task. As Sperber and Hirschfeld (2004) suggest, information should be more likely to be transmitted along a linear chain and form the foundation of a collective memory if it clusters around psychologically relevant "attractors." As a result, collective memories might be built around schematically consistent material with minor schematic inconsistencies (Norenzayan, Atran, Faulkner, & Schaller, 2006), intuitive conceptual structures (Barrett & Nyhoff, 2001), or social information (Mesoudi, Whiten, & Dunbar, 2010; Mesoudi & Whiten, 2008). Kashima and his colleagues have suggested that researchers need to consider not only mnemonic changes that occur with transmission, but also the decisions members of a transmission chain make about what to communicate (Lyons & Kashima, 2003).

No one to date has studied serial reproduction of already extant memories, especially in the context of the formation of collective memories. Coman and Hirst (2011) examined how communicative influence on memory propagates to future conversations carried on by the same pair, but did not explore propagation beyond that pair. Perhaps more relevant, Choi, Blumen, Congleton, and Rajaram (2014) explored both collaborative inhibition and collective memory formation in groups repeatedly recalling a word list. Group configurations remained the same across repetitions or were reconfigured. Although reconfigurations were not undertaken primarily to explore the issue of propagation, the reconfigured groups did provide a quantifiable index of the influence of distal partners, that is, individuals who had never directly interacted with each. An effect of distal partners on post-collaborative recall was found.

We build on this work, but employ both a different method and a more naturalistic setting. Consequently, this is the first study to examine how conversational influence propagates to reshape extant memories of rich episodes so that, in time, these memories become more alike. To undertake such a study, one could modify Bartlett's task by first teaching all group members a story and then begin the serial reproduction task. Although this approach has many advantages, it does not allow for the transmission of a memory to occur spontaneously. Furthermore, it examines a fairly simple network structure, a chain. Social network structures outside the laboratory are much more complex (Newman, 2003).

With these concerns in mind, we decided to explore mnemonic propagation in a naturalistic setting. Students in a lecture course taught by the first author were told a story and then asked to talk to each other about the story over the next few weeks. They were encouraged to talk about the story with one another as much as they could. We assessed their memory for the story at different points in the study. We also asked participants to keep track of their conversational partners; from this data we could map their social network and measure the degree of separation between each pair of individuals.

We sought to test two specific predictions: (1) that communicative influence can propagate across a network and is not confined to direct communication and (2) that this propagation can promote mnemonic convergence and the formation of a collective memory.

2. Methods

2.1. Participants

Students in an undergraduate Fundamentals of Cognitive Psychology class agreed to participate for extra credit. Twenty-two students at Week 1 and 20 at Week 2 submitted diary entries; seventeen of them successfully completed the two required diary entries. Thirteen identified as female, 4 as male. They ranged in age from 18 to 26, median = 20. All indicated English as a first language, although two were concurrent bilinguals, one Spanish–English, the other Hindi–English. For our analyses, we calculated convergence scores and degrees of separation for each individual paired with each other individual, yielding 135 unique pairings from the 17 individuals who successfully completed both journal entries. These 135 pairs represent the cases of our analyses.

2.2. Material

A richly detailed 3025-word fragment from Murakami's (2004) novel *After Dark* served as the to-be-remembered material. The fragment was self-contained, in that it told of an encounter in a restaurant from start to end, with two individuals interacting, reminiscing about a shared past experience, and finally recounting a folk-tale. The fragment was divided into 167 propositions of interest, where a proposition was defined as an independent clause containing a subject and a predicate, following Haden and Hoffman (2013).

2.3. Design and procedure

The first author read aloud the short narrative to participants at the end of a class. The reading took 15 min. Participants were instructed to listen so that they would remember as many details as possible if asked to recall the fragment. They were also encouraged to discuss the story as much as they wanted to with their classmates during the two-week course. Although they clearly understood that some discussion of the story was important for the success of the study, they also understood that there was no demand on them to discuss it multiple times, or even discuss it at all. They were told not to take written notes about the story itself at any time during the length of the study. At the end of the two classes that followed in the next two weeks, they were asked to write down in as much detail as possible what they could remember of the fragment. They were then asked to list all the people in the class with whom they had spoken about the narrative during the previous week. When they were originally asked to study the story, they were told that these tasks would be given in the two subsequent classes. At that time, they were also told that it might be helpful to keep track of their conversational partners through the week so that their account of their conversations would be as accurate as possible. They could do