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Sociocultural mediators of remembering: an extension of Bartlett's method of repeated reproduction

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**Sociocultural Mediators of Remembering:
An Extension of Bartlett's Method of Repeated Reproduction**

Abstract

The reported research uses an extension of Bartlett's method of repeated reproduction to provide data on the sociocultural processes underlying reconstructive remembering. Twenty participants worked in pairs to remember the *War of the Ghosts* story 15 minutes and one week after presentation. The observed transformations were comparable to previous research with individuals. Going beyond previous research, we analyse participants' discourse to provide a window on the processes underlying these transformations. Textual excerpts demonstrate how imagery, narrative coherence, deduction, repetition, gesture, questioning and deferring contribute to the transformation and conventionalization of the material. These diverse sociocultural mediators are integrated into a partially coherent recollection by participants self-reflecting, or as Bartlett termed it, turning around upon their schemas. We demonstrate that this self-reflection is both a social and a psychological process, occurring because participants are responding to their own utterances in the same way that they respond to the utterances of other people. These empirical findings are used to make a case for using discursive data to look not only at discursive processes, but also at socially situated and scaffolded psychological processes.

Keywords: Bartlett, sociocultural psychology, Mead, distributed cognition, schema, remembering.

**Sociocultural Mediators of Remembering:
An Extension of Bartlett's Method of Repeated Reproduction**

Bartlett's (1932) book *Remembering: A study in experimental and social psychology* is celebrated by cognitive psychology (Baddeley, Eysenck & Anderson, 2009) and discursive psychology (Middleton and Edwards, 1987). Cognitive psychology views Bartlett as demonstrating that the products of remembering are often distorted, focusing on the cognitive factors that lead to inaccuracy (e.g. Bergman & Roediger, 1999). Related studies here have compared individual remembering to conversational remembering and found that nominal groups (where individual scores are pooled) remember more than real groups because social processes can inhibit cognition (Weldon & Bellinger, 1997). Discursive psychology, on the other hand, has focused on the communicative pragmatics of conversational remembering. Edwards and Middleton (1986a) have shown how experimental contexts of remembering encourage rationally ordering events, while everyday contexts encourage focusing on evaluations and emotional reactions. In another study, they found that text has very different communicative conventions than talk, which leads them to believe that some of the transformations reported by Bartlett (1932) are an effect of text conventions (e.g. for narrative coherence) rather than cognitive processes (Edwards & Middleton, 1986b).

Split between cognitive and discursive approaches, Bartlett's own integrative view of remembering has become fractured. Some recent approaches have begun to reconnect the different aspects of Bartlett's legacy, such as extended and distributed cognition (e.g., Sutton, Harris, Keil, & Barnier, 2010). The present article welcomes these new efforts and advances this integration by offering a sociocultural extension of one of Bartlett's key experiments, with the aim of producing an analysis which simultaneously emphasises cognitive, social and cultural processes (Bruner, 1990; Cole, 1996).

Bartlett's Incomplete Theory of Remembering

Bartlett (1932) argued that remembering is reconstructive. He criticised Ebbinghaus' (1885/1913) use of nonsense syllables for assuming that memory is a cognitive storehouse without regard for meaning. In contrast, Bartlett argued that remembering involves an 'effort after meaning'. He asked English participants to remember meaningful narratives, such as the Native American folk-story *War of the Ghosts*, after increasing time delays. Qualitative single case analyses revealed that participants transformed the story towards a conventional English story, with supernatural elements being rationalized.

To theorize these results Bartlett (1932) developed the concept of schema, which he defined as "an active organization of past reactions, or of past experiences [...] which have been serially organized, yet which operate, not simply as individual members coming one after another, but as a unitary mass" (p. 201). In short, schemata are experiential or behavioural sequences, originating in past experiences, but adapting

to novel contexts (Wagoner, 2014). For example, the squirrel jumping from one branch to another is acting through past experience, yet each jump is unique, adapting to peculiarities of the given branches. Many human schemata, like narrative templates, are social in origin. Thus, group conventions play a key role in memory reconstruction. Because these schemata are brought from the past to a novel context they have a tendency to 'conventionalize' novelty, that is, to make the unfamiliar familiar. Bartlett, however, never demonstrated the actual processes through which schemas transform the to-be-remembered narrative.

Bartlett's "theory of remembering" (1932, p. 205 ff) emphasised the human ability to turn around upon and reflect on imagery. Rudimentary remembering is "simply the maintenance of a few 'schema', each of which has its natural and essential time order" (p. 205). However, in humans' higher-order remembering, the schema becomes "not merely something that works the organism, but something with which the organism can work" (p. 206). He describes this as the organisms' "capacity to turn around upon its own 'schemata' and to reconstruct them afresh" (p. 206). The problem is that Bartlett could not explain this capacity to turn around upon a schema, writing: "I wish I knew exactly how this is done" (p. 206). Unsurprisingly this aspect of his theory was widely criticised (Oldfield & Zangwill, 1942, p. 122; Wolters, 1933, p. 139; Gauld & Stephenson, 1967, p. 48).

The present article has two aims. First, we will use sociocultural psychology to analyse the process of reconstructive remembering in terms of sociocultural mediators and turning around upon ones schema. Second, we will introduce an extension of Bartlett's method of repeated reproduction which will enable us to achieve the first aim.

Contributions from Sociocultural Psychology

Sociocultural psychology shares with discursive psychology a sensitivity to the role of social context in remembering, a focus on everyday talk, and critique of decontextualized and individualizing research (Cole, 1996; Shweder, 1991). However, unlike discursive psychology, it shares with cognitive psychology a focus on psychological processes, especially how they are shaped by social processes (Valsiner, 2007). The sociocultural approach can make contributions to the two incomplete aspects of Bartlett's theory.

First, the sociocultural concept of mediation is used to conceptualise the way in which cultural artefacts (objects, practices and symbolic forms) are used in cognition (Zittoun, Gillespie, Cornish & Psaltis, 2007). The concept of mediation was first developed by Vygotsky (1995), who argued that all higher mental functions begin as actual relations between people and only later become cognitive processes within the child. For example, language between people becomes internalised by children, enabling them to talk themselves through problems (Ferryhough & Fradley, 2005). In development, psychological processes come to be increasingly mediated by cultural resources (tools, discourses, norms, representations, books, ideals, etc.) which are taken over directly from one's social group. Thus human cognition is distributed, with the social environment (people and cultural artifacts) scaffolding and augmenting human cognition (see also Sutton, Harris, Keil and Barnier, 2010; Hirst and Manier, 2008).

Sociocultural mediators of remembering in contemporary society include a wide range of technologies, such as diaries and smartphones. In Bartlett's experiment, however, participants only had access to symbolic resources. Bartlett (1932) himself

mentions narrative expectation, self-questioning and imagery as crucial to remembering. More recent research has further explored the role of narrative templates (Wertsch, 2002) and gesture (McNeill, 1996), and adds that within social situations, repetition (Rubin, 1996), questioning (Linell, 2009), and deferring to the other (Edwards & Middleton, 1987) can also play a role in mediating remembering. The following research attempts to empirically identify these mediators.

Second, turning around upon ones schema was central to Bartlett's "theory of remembering" (1932, p. 205 ff), but, as his critics argued, he was not clear on what it meant. We define it as a self-reflective shift of perspective, such that people end up reacting to and evaluating their own recollection. It is indicated by utterances such as 'but,' 'however,' and 'or' and also be hesitations such as 'I think,' 'maybe,' and 'I am not sure.' It is an evaluative process which weaves together the emerging recollection. Turning round upon ones schema is thus a higher-order mediation of the more basic mediators such as imagery, deduction, narrative templates etc.

The contribution of sociocultural psychology to turning round upon ones schema comes from Mead (1934). Mead conceptualized self-reflection as people responding to their own utterances in the same way that they respond to the utterances of others (Gillespie, 2007). This insight is important because makes the cognitive process of self-reflection, or turning round upon ones schema, comprehensible as a social process. Specifically, it might be people interacting with their own utterances.

Speaking: A Window on Cognitive, Social and Cultural Processes

Bartlett's method of repeated reproduction was innovative. Individual participants reproduced material at increasing time delays, with reproductions revealing not only the absence of elements but also the transformation of elements. Thus Bartlett had evidence on a series of outcomes of reconstructive remembering, but limited evidence on the actual process. Bartlett was aware of this limitation and often asked participants about the process of remembering (Edwards & Middleton, 1987, p. 87; see also Bartlett, 1936, p. 42). While interviewing participants undoubtedly gave Bartlett insights, self-report on psychological or social processes is problematic (Lyons, 1983).

Our methodological innovation has been to ask participants to complete a repeated reproduction task in dyads, this encourages them to converse naturally, and thus provides a window on the 'black box' between input and output (Moscovici, 1991). We assume that participants' conversation provides clues about the social, cultural and cognitive mediators of remembering. It is acknowledged that discourse can reveal social processes (Brown & Middleton, 2005) and cultural processes, such as cultural narratives (Wertsch, 2002); however, using discourse to reveal psychological processes is more contentious (Ericsson & Simon, 1998).

The idea that speaking can provide a window on psychological processes is longstanding (Mead, 1934; Marková, 2003; Merleau-Ponty, 1945/1962, p. 180). Two conceptualizations are evident (Gillespie & Zittoun, 2010). First, is the idea that what is said is sometimes a direct expression of thought, as with a spontaneous expletive (e.g. Werner and Kaplan, 1963; Valsiner, 2003). Second, is the idea that speaking and cognition sometimes form part of a 'thinking loop.' This idea is evident in Vygotsky and

Luria's (1994) observation that young children are better able to solve some tasks when they talk themselves through the task.

We are not the first to use the method of repeated reproduction with dyads, or to study the discourse of those dyads. Middleton and Edwards (1990) used a similar method to analyse conversational remembering. Accuracy is just one of many things being achieved in conversations, and often social relations, equality of participation, and telling a good story take precedence (Edwards & Middleton, 1986a, 1986b). Thus schema, rather than coming from an individual, are negotiated discourse conventions within a particular setting (Middleton & Brown, 2005). While we are enthusiastic about identifying these social processes, our aim in the following research is to exploit the discursive data further, so as to also provide insights into the sociocultural mediators of remembering.

Methodology

Participants. Twenty native English speaking students (ages 18-32) from the University of Cambridge were paired into 10 dyads. Each dyad was based on a pre-existing friendship.

Procedure. The experiment consisted of two reproductions of the Native American story *The War of the Ghosts*, the first after 15 minutes and the second after one week. The procedure followed Bartlett (1932) and is broadly the same as Bergman and Roediger (1999). Participants were given a sheet with the story typed on it and instructed "to read the story twice at regular speed". After they had finished reading

participants filled out a short demographic questionnaire and worked on a distractor task comprising easy mathematics problems.

Both Gauld and Stephenson (1967) and Bergman and Roediger (1999) reported a quantitative difference in recall between lenient and strict reproduction instructions. The present study used intermediate instructions. A scribe was randomly assigned, given a lined sheet of paper and the following instructions were read:

As a pair discuss and write down the story you read earlier as accurately as possible. If you decide to change what you have already written, put a single line through the portion you want to delete and rewrite your correction next to the deleted portion.

Data. The procedure yielded two data sets. First, we collected the written reproductions for each dyad in each trial in order to establish comparability with previous studies. Second, all the conversations of the dyads producing the written reproductions were audio recorded and fully transcribed. Table 1 provides an overview of the conversation data. There was considerable variability between dyads in terms of how much discussion occurred, but there did not seem to be any important differences on average between Trial 1 and Trial 2.

-- Insert table 1 here --

Method for Scoring the Reproductions. Bergman and Roediger's (1999) scoring procedure was used. The original story was divided into 42 idea propositions (originally proposed by Mandler & Johnson, 1977). For each proposition in the original, we tried to identify a corresponding proposition in the reproduction. When one was found it was coded as accurate or distorted. Distortion implies a change of meaning

(i.e., not just rephrasing). We agree with Edwards and Potter (1992) that focusing exclusively on accuracy and distortion is problematic. However, we maintain that it does provide an accessible and transparent entry point into the data, providing comparability with previous studies.

Method for Coding the Discourse. The data was coded for sociocultural mediators of remembering, using template coding procedures (King, 1998). The list of codes does not claim to be exhaustive, but rather focuses on the intersection between mediators which have been reported in the literature and which were evident in the data. The list of codes and their respective justification is presented below.

Imagery: Imagery was an important concept for Bartlett (1932). He conceptualised it as often something particular which participants would struggle to build their recollection around. Imagery is not simply mental, but it is closely connected with actions and gestures (McNeil, 1996). Imagery was operationalized in a narrow manner, by coding when participants explicitly referred to an image: “stuck in my head,” “clearly remember the phrase,” “all I remember is” and “sticking with my memory.”

Narrative coherence: Narrative coherence has been a key component of remembering for many theorists (e.g., Bruner, 1990; Brockmeier, 2012) including Bartlett. It was particularly evident when participants organised their recollection on the basis of what “must have been” the case. But we also found narrative coherence working at a deeper level, providing templates (Wertsch, 2002), which selected and conventionalized what was remembered.

Deduction: Deduction is quite similar to narrative coherence, in the sense that both seek some sort of logical or narrative closure. The difference is that deduction

seeks coherence on the basis of logic or common sense not on the basis of the emerging narrative. However, there were ambiguous cases that could have either been coded as narrative coherence or deduction.

Repetition: Repetition refers to individual or dyads repeating the same word or utterance two or more times. This is often done with a degree of rhythm, which has been linked to greater memorability (Rubin, 1996). Moreover, repetition seems to have the function of focusing attention, possibly by keeping the salient element in working memory or the auditory loop.

Gesturing: Gesturing refers to participants slapping hands, banging tables, or otherwise gesticulating in a way that might aid remembering. The role of gestures in cognitive processes has been insightfully demonstrated by McNeill (1996), who has illustrated how thinking, speaking and gesturing are tightly coordinated and mutually reinforcing.

Questioning: Questioning can serve many functions, including, introducing a suggestion, beginning a disagreement, focusing attention, or attempting to trigger some recollection. Questions can also be directed at the other or self. Indeed, it is not uncommon in the data for people to answer their own questions. Such instances, we suggest, are illustrations of the dialogicality of the human mind (Linell, 2009), where participants are interrogating their own feelings of recollection.

Deferring: Deferring refers to disagreements which result in one participant accepting to go with the other participant's recollection. As both Bartlett (1932, p. 96) and Edwards and Middleton (1987) observed, sometimes accuracy is a second priority to the demands of social relations.

Results and Analysis

Table 2 reports our data scored using Bergman and Roediger's (1999) protocol. The 'proportion of errors' refers to the number of distorted propositions divided by the total number of propositions. Despite the conversational nature of the task, which likely contributed to create a more informal atmosphere (see also Middleton & Edwards, 1990), the results suggest that our data is broadly comparable to the data from individuals in previous studies. Moreover, our data on distortions replicates the basic finding that remembering is not simply forgetting (i.e., getting less accurate), but an active reconstructive process which transformed 41% of the propositions.

-- Insert table 2 here --

Table 3 explores the sociocultural mediators underlying the observed transformations. Frequency, we suspect, is a misleading indicator of importance. For example, rhythmic gesture was the least frequent mediator, but this is possibly because it is difficult to identify in the audio data. Questions, in contrast, are particularly evident in audio data (because they tend to be verbal). This is to say that our data is an incomplete and selective window on psychological processes (Werner & Kaplan, 1963).

-- Insert table 3 here --

The following sub-sections explore how the sociocultural mediators lead to the observed transformations (or 'distortions' in Bergman and Roediger's terminology). The

presentation follows two dyads that have been selected to illustrate the range of sociocultural mediations observed. They are presented in a narrative form so that the reader can understand each dyad contextually.

Imagery and deferring to the other. The first excerpt comes from participants who we will call Nick and Ellen. It is their first reproduction and they are trying to recall the opening sentences of the story.

Excerpt 1

The original text:

One night two young men from Egulac went down to the river to hunt seals and while they were there it became foggy and calm. Then they heard war-cries, and they thought: "Maybe this is a war-party". They escaped to the shore, and hid behind a log.

Participants' written reproduction:

One night they went down to the river to fish.

Participants' dialogue:

47 Nick: [Writing down what has been agreed] One night [writing] went down
48 to the river to fish [finished writing]
49 Ellen: Yep, hmmm, I seem to think that they were hiding or something but I
50 can't remember. They were, I have this image of them sort of
51 crouching down [Ellen moves her body as if crouching]
52 Nick: Yeah
53 Ellen: Next to the log
54 Nick: Yeah
55 Ellen: You know sitting there but I may have just imagined
56 Nick: I didn't pick that up
57 Ellen: No, I probably imagined it then

Many scholars have identified imagery as central to remembering (Bartlett, 1932; Rubin, 1996; Yates, 1974). Imagery is not simply abstract mental imagery, but also an embodied and action-oriented feeling. Ellen (line 51) illustrates this because she does not simply have a mental image of "crouching" but she crouches in a spontaneous

gesture (McNeil, 1996). Interestingly, this imagery is not in the form that Ellen encountered it (i.e., as written text about someone else); it has become a first-person perspective embodied identification.

Bartlett (1932, p. 208-216) wrote that visual imagery had a particularizing function, providing a check on the generalizing tendency of schema. Given this function, Bartlett theorized that when imagery arose it would often be disconnected from other material and often difficult to integrate (Bartlett, 1932, chapter 11). The above quotation illustrates this: neither Nick nor Ellen is able to link her image to their emerging recollection.

Ellen tries to integrate the image, elaborating and rephrasing it (“hiding,” “crouching,” “next to the log,” and “sitting there”) but the integration fails: “but I may have just imagined.” The “but” indicates, as Mead (1934) observed, a change of perspective. Ellen turns round upon her schema and questions its validity, illustrating, as Bartlett (1932, p. 206) had observed that humans are not “dominated,” or trapped within, their schema. Nick supports Ellen’s doubt in the imagery, thus encouraging Ellen to consolidate her doubt and defer (“I probably imagined it then”).

Imagery and narrative coherence. In Excerpt 2, line 58, Ellen continues by remembering an approaching boat. This leads to some confusion about what the protagonists “heard” and what they “saw.” The idea of hiding returns to bring narrative coherence to these elements.

Excerpt 2

The original text:

Then they heard war-cries, and they thought: “Maybe this is a war-party”. They escaped to the shore, and hid behind a log. Now canoes came up, and they

heard the noise of paddles, and saw one canoe coming up to them.

Participants written reproduction:

They heard a worrying noise so they hid. Soon a boat appeared

Participants' dialogue:

- 58 Ellen: But the next, I can remember that they saw a boat
 59 Nick: But they heard something
 60 Ellen: They heard a noise
 61 Nick: They heard something and then they hid
 62 Ellen: They saw, they hid that was right that was -
 63 Nick: - They heard something and then they hid
 64 Ellen: Yeah, so they heard some -
 65 Nick: - They heard a noise. What happened was it was
 66 terribly frightening or something because they hid
 67 Ellen: Yeah
 68 Nick: So what can we put for that? Heard a worrying noise?
 69 Ellen: Yeah
 70 Nick: I don't know [both laugh]
 71 Ellen: That's why I thought of him sort of crouching down. 'Cause that's
 72 why they were hiding

Ellen and Nick repeat three actions (“saw”, “heard” and “hid”) in varying combinations. This seems to be done to hold the three actions in working memory, focusing their attention on them while trying out different narrative orderings. Maybe by repeating these elements Nick and Ellen hope to trigger related associations (see below on repetition). In this process what they “heard” becomes increasingly differentiated through the contribution of both participants: Nick’s “something” is changed to “noise” by Ellen, then Nick further specifies it as a “worrying noise” (line 68, which ends up in the written reproduction). This final change occurs as a result of Nick’s narrative integration: “what happened was it was terribly frightening or something because they hid”. Nick makes the action (hiding) understandable through an attribution (frightened). The moment of understanding is the moment of integration into a coherent narrative sequence, and no further repetition is required.

The narrative coherence of hearing a worrying noise turns Ellen's previous embodied image of "crouching" and "sitting" into the narratively coherent action "hiding" because it was a "terribly frightening" noise. Ellen's embodied imagery previously disconnected from the recollection can now be integrated into the narrative which is causally woven in the temporality of human action (Ricoeur, 1990).

Gesture and questioning. Turning to Ellen and Nick's second reproduction of the first few lines of the story, we see, in Excerpt 3, that they are again struggling to integrate fragmented images. Again the key words are "saw" and "heard." Now it is the idea that the protagonists "thought" something which sticks - possibly because, as established in the first reproduction, it is the thought that ghosts are approaching which leads to hiding. What we want to draw attention to, however, is how Nick uses questions and rhythmic gesture to differentiate and sequence these initially unintegrated images.

Excerpt 3

The original text:

Then they heard war-cries, and they thought: "Maybe this is a war-party". They escaped to the shore, and hid behind a log.

Written reproduction:

They heard a noise, and saw some canoes approaching. They hid as they feared # the canoes contained ghosts, who were going to make war.

Participants' dialogue:

- 32 Ellen: They heard a noise and the canoes approaching
 33 Nick: Yeah, it was caa- anything happen before that?
 34 Ellen: I don't think
 35 Nick: All right, so they hea- no, did the- did they think before they saw
 36 something, they thought it was someth- Did they think [pounds fist
 37 on table] before they saw anything? [pounds fist on table] They
 38 thought 'oh, it may be ghosts'
 39 Ellen: I thought that was after they saw the canoes coming. They said,
 40 'Oh it might be ghosts in the canoes'.
 41 Nick: Yeah, before they saw? So it was like they heard [pounds fist], they

42 thought [pounds fist] and then they saw?

Nick and Ellen are talking passed each other. Nick's question (line 33), "anything happen before that?" calls out his own answer. He first follows Ellen's utterance in remembering the scene ("all right, so they hea-"), but cuts off by returning to his question ("no, did the- did they think"). This truncated and repeated question is less an effort to communicate or describe; it is better understood as an expression of Nick's own unfolding stream of thought. It has the characteristics of inner speech identified by Werner and Kaplan (1963, p. 322-324), namely ellipsis, syntactic incompleteness, the confluence of diverse meanings, and more connotation than denotation. His utterances also comprise deictic words, filled with personal sense (e.g., "anything," "before that," "they", "something," and "it"). This looping back and repetition seems to focus Nick's attention on an unarticulated idea which is pregnant in his hesitation and questioning.

The answer begins to emerge in line 36 ("they thought it was someth"), but again he interrupts himself to ask a more refined question. He asks, "did they think before they saw anything?" and his gesture of pounding the table twice coincides with the differentiation of "think" from "saw". The answer to the question ("they thought 'oh, it may be ghosts'") suggests that this thought must have occurred before anything was seen. In lines 41-42, the elements of the narrative and differentiated and integrated once again accompanied by pounding the table: "they heard [pounds fist], they thought [pounds fist], and then they saw." In this case embodied gestures are not linked to the content of what is remembered (e.g., Ellen's "crouching"), but to help organise the process of remembering, specifically, the differentiation and integration of images in the

unfolding of schema. The gestures help to differentiate an otherwise vague feeling that there was “something.”

The excerpt illustrates the possibility of capturing spontaneous thinking in discursive data and opens up questions about the parallels between inter- and intra-psychological processes (Larrain & Haye, 2012). The parallel is that both involve responding to speech, produced by self or other; the major difference seems to be that speech responding to self takes a different, more truncated, form (Werner & Kaplan, 1963). This excerpt also illustrates, yet again, the embodied nature of cognition, where quite physical gestures (pounding the table) are part of the process through which vague feelings become differentiated recollections.

Deduction and repetition. The next three excerpts are from participants we will call Bill and Henry. Their interaction was unusually tense and short, yet they recalled slightly more than average. Excerpt 4 begins after they have agreed that the two protagonists were “hunting seals” and they are unsure what comes next.

Excerpt 4

The original text:

and while they were there it became foggy and calm

Written reproduction:

It becomes foggy and calm

Participants' dialogue:

6 Bill: Hunting seals. Two guys hunting seals [writing]. Ok, so there are

7 two guys hun-

8 Henry: -You know what I just realized? They must have had to club

9 the seals because remember later in the story they don't have any

10 arrows. You know what I mean?

11 Bill: All right, two guys hunting seals, ahmm,

12 Henry: And why were there seals there?

13 Bill: They go down to the-

- 14 Henry: -They hear some noises
15 Bill: No, no, no, no, no. Oh my God this is painful.
16 Henry: Well, I'm not good; I don't have a good memory
17 Bill: Ahhhhh! So, the two guys are hunting seals, da, da, da, da. It
18 becomes foggy and calm, right?

Henry deduces, based on what is agreed (hunting seals), that the protagonists must have had “to club” the seals (lines 8-10). He justifies this deduction by appealing to a recollection that the protagonists do not have any arrows. Bill ignores Henry, and Henry precedes his speculative thoughts to include the seals (line 12). Again, Bill ignores Henry and tries to repeat what is established, but eventually he erupts: “no, no, no, no, no. Oh my God this is painful” (line 15). The interaction is “painful” for Bill because Henry’s suggestions interfere with Bill’s own efforts to remember.

Bill’s strategy, in the face of distraction, is repetition. Bill repeats the one phrase he is confident in four times (“Two guys hunting seals”, “two guys hun”, “two guys hunting seals”, and “the two guys are hunting seals”). This repetition could serve three functions. First, it might be an attempt to occupy the airwaves and prevent Henry from speaking. Second, it might help to focus Bill’s attention in the context of distracting suggestions. Third, it is as if he is repeatedly evoking what is known in the hope that it will trigger, by association, the subsequent element. It is as if he is repeatedly charging at the unknown, hoping that the known will stimulate further schematic unfolding. These two functions likely work together, and seem to coalesce in the “da, da, da, da” (line 17) which both holds the floor (thus preventing another introjection from Henry) and also holds onto the thought of “hunting seals,” prolonging the feeling, which does indeed lead to the desired temporally associated phrase (“it becomes foggy and calm”).

Imagery, narrative coherence and questioning. In the following excerpt Bill and Henry are trying to recall the end of the story, and in so doing they introduce new elements to the story and also try to resolve the ambiguous ending.

Excerpt 5

The original text:

He told it all, and then he became quiet. When the sun rose he fell down.
Something black came out of his mouth.

Written reproduction:

People look at him strangely. He became quiet after telling his story. He woke up. Something black came out of his mouth.

Participants' dialogue:

- 93 Bill: He told his story and then became quiet. Right? And then the sun
94 sets [pause] or something
95 Henry: Well, he goes to sleep
96 Bill: It didn't say anything about sleep. In the morning he stood up and
97 died
98 Henry: Woke up and died
99 Bill: All right, so he became quite after telling the story. Ahh, a
100 photographic memory would be awesome right now. Ok now
101 we're to the point where he woke up. Did they say he woke up?
102 Henry: I don't think he stood up
103 Bill: I thought he
104 Henry: I don't think he stood up. I think he did wake up
105 Bill: Ok, so he woke up [writes]. Something black
106 Henry: Came out of his mouth

Bill and Henry are stuck trying to remember the phrase "When the sun rose he fell down". They easily remember the elements before ("he told his story and then became quiet") and after ("something black" "came out of his mouth"). But, the phrase in between is problematic. In their effort after meaning they speculate about sunsets, waking up, standing up, and sleeping. What is interesting is how these four new elements relate to either "the sun rose" or "he fell down."

Bill suggests, with a question, that they became “quiet” and “the sun sets” (which is the logical precursor to the original “the sun rose”) but he turns on this schema and expresses uncertainty with “or something”. Henry puts forward another possibility (“he goes to sleep”) which conventionally occurs after the “sun sets” and which might be a transformation of “he fell down.” This possibility is rejected by Bill (line 96), who suggests that “in the morning he stood up” (standing up possibly being the precursor to falling down). Henry counter-suggests with a question (line 101) that “he woke up”, which synthesizes his original position (“he goes to sleep”) with Bill’s suggestion. This is done firstly by transforming “he goes to sleep” into its opposite (“woke up”), which has long been recognised as a common transition in thinking (Meinong, 1902/1983; Marková, 1987).

Lakoff and Johnson (1980) argue that metaphors arise out of an experiential grounding in the body-image. Bill and Henry have an embodied feeling for UP-DOWN. The problem is that this feeling leads to three potential up/down movements which get entangled, namely, sunrise/sunset, stand-up/fall-down, and wake-up/fall-asleep. Thus, from the phrase “the sun rose he fell down” what is remembered is not the details, but some embodied imagery, a broad orientating metaphor. Participants struggle because the element violates the cultural expectation that when the sun goes down people also go down (to sleep), and when the sun rises then people also rise. Accordingly, it is unsurprising that none of the dyads correctly recollected this element by the second reproduction.

Excerpt 5 provides insight into the mechanisms underlying conventionalization. Bill and Henry fail to recollect the unfamiliar element, replacing it with something more

familiar. How does this occur? Suggestions based on an embodied up/down feeling are put forward, both directly and more hesitantly using questions. They then both evaluate these suggestions in terms of what feels familiar and coherent. But this evaluative step is grounded in their own cultural conventions, and as such, is predisposed to turning the unfamiliar into the familiar. In this case conventionalization occurs because familiar meanings are used both to generate suggestions and to evaluate those suggestions.

Narrative templates from Hollywood. Narrative coherence can operate in very subtle ways. One peculiar novel element introduced in five of the ten dyads was that the protagonist was himself a ghost.

Excerpt 6

The original text:

Something black came out of his mouth. His face became contorted. The people jumped up and cried. He was dead.

Written reproduction:

People look at him strangely. He became quiet after telling his story. He woke up. Something black came out of his mouth.

Participants' dialogue:

108 Henry: And everyone looked at him, strangely. No, remember people look
 109 at him strangely.
 110 Bill: When?
 111 Henry: Early, just before this because I remember when I was reading it
 112 the first time
 113 Bill: When he woke up?
 114 Henry: No, no, yeah, I remember thinking that he was a ghost
 115 Bill: Ok, so when did they look at him strangely?

Bill and Henry, in their written recollection, introduce a new element, namely, “people look at him strangely.” How does this new element end up in the written record? Henry introduces the idea (line 108) and he justifies it by reporting that he thought that

the protagonist was a ghost (line 114). The idea that the protagonist was a ghost never appeared in their written accounts, yet, the idea appears in the discourse, mediating recollections and producing new elements such as “people look at him strangely.”

Bartlett (1917, 1920, 1928, 1932) never reported his participants suspecting that the protagonist was a ghost. So, where has this suddenly widespread element come from? One possibility is that participants were applying a narrative template borrowed from Hollywood movies (cf. Radstone, 2010) such as *The Sixth Sense* and *The Others*, in which there is a surprise ending where the audience realizes the protagonist is a ghost. Both of these films were popular in 2006, when the research was conducted, and follow up interviews revealed that the five participants who introduced this idea had seen at least one of these films.

Introducing this “narrative template” (Wertsch, 2002, p. 60) makes otherwise unfamiliar elements of the Native Indian narrative familiar. In the Native American society, from which the story originates (see Boas, 1901), narrative templates for understanding what happens when one comes into contact with ghosts were readily accessible. English listeners, in contrast, struggle with their own ill-adapted conventions. According to participants’ conventions it does not make sense that the Indian does not feel unwell when he is hit by an arrow, nor does it make sense that he would suddenly die. The new narrative template, that the protagonist is a ghost who is unaware that he is a ghost, organises these elements, making these elements meaningful.

Turning Round Upon One’s Schema. How are the above mentioned sociocultural mediators woven together in remembering? Why are some mediations accepted while others are rejected? The mechanism suggested by Bartlett was turning

round upon one's schema. We operationalized this by examining instances when participants reflected upon their recollection, as indicated by words such as "but," "or" and "however."

Turning round upon one's schema is widespread in the data. Consider Excerpt 1, when Ellen says, "I seem to think they were hiding or something but I can't remember" (lines 49-50). Here Ellen is both putting forward a recollection, and doubting it. Another example is in Excerpt 6 when Bill says "the sun sets [pause] or something" (lines 93-94). Bill introduces an idea, and then turns upon it stating that something else might have happened. Additional instances can be found in Excerpt 1 (line 57), Excerpt 2 (line 70), Excerpt 3 (line 35), Excerpt 4 (line 16), and Excerpt 5 (lines 93, 99-100). In each of these instances a participant begins to put forward a recollection, and then they turn upon that recollection, or schema, and evaluate it. These evaluations are usually hesitant (e.g., "I seem to think") but sometimes they are more affirming (e.g., "I can remember" and "I remember").

Identifying the boundaries of turning round upon one's schema proved to be difficult, mainly because it is often unclear whether the reflection is initiated by the speaker alone or the social interaction. For example, in Excerpt 1, when Ellen introduces the idea of the protagonists crouching, there is a mixture of her being hesitant ("sort of" line 50) and Nick not really taking up the idea ("Yeah", lines 52 and 54), which results in Ellen turning around upon the recollection ("I may have just imagined", line 55). In such instances inter-personal and intra-psychological processes are not clearly separable.

Drawing upon the basic sociocultural insight that psychological processes such as self-reflection develop through social processes (Mead, 1934; Vygotsky & Luria, 1994), we proceeded to examine instances where participants were turning around upon each other's schema (i.e., commenting on or evaluating the recollections of their partner). We also found this to be widespread. One example is when Henry suggests that the protagonist "goes to sleep" and Bill responds "It didn't say anything about sleep" (Excerpt 5, lines 95-96). In such cases a recollection is put forward, and it is turned upon and evaluated (usually rejected) by the conversation partner. Often the participant who put forward a recollection would accept or at least defer to the evaluative judgement, revealing the peculiar ease with which participants moved between turning round on their own and the other's schema.

While Bartlett (1932, p. 205 ff) was convinced that turning around upon a schema was central to constructive remembering, he was unable to propose a mechanism. Mead's (1922, 1934; Gillespie, 2007) insight that people hear their own utterances in much the same way as they hear the utterances of others, can provide a mechanism. We argue that participants are reacting to their own utterances in the same way that they react to each other's utterances. For example, Nick (Excerpt 3, line 35) asks a question, and then answers it himself. Nick, in the same utterance, also makes a suggestion and then responds to it ("no"). Accordingly, turning around upon ones schema is no more remarkable than responding to someone else's schema. Such self-reflection is both social and cognitive, with the externalised utterance, in the gaze of the other, being like a mirror which creates a reflection.

Discussion

Bartlett (1932, p. 44) characterized remembering as an “effort after meaning.” But because his methodology focused upon outputs, the microgenetic processes involved in this reconstructive effort have been invisible (Wagoner, 2009). The present research has extended Bartlett’s research using dyads as a means to provide a window on the reconstructive process. As with previous research, we found widespread (41%) transformations (or ‘distortions’). A sociocultural analysis of participants’ discourse identified seven (question, repetition, deferring, imagery, coherence, deduction and rhythmic gesture) mediators underlying these transformations.

Bartlett (1932) observed, on the basis of participants’ outputs, that unfamiliar material was conventionalized. Our data provides insight into how this actually occurs. Participants’ reconstructive remembering entails interrogating themselves and each other (questions, repetitions). There is a weaving together of prior experience and feelings of reading the story (imagery and rhythmic gesture) with familiar cultural expectations (narrative coherence and deduction). Generated suggestions are then evaluated in terms of what ‘feels’ right, a process which again privileges that which is familiar. This analysis chimes with the two-stage ‘generate-recognize’ model of recollection (Anderson & Bower, 1972; Higham & Tam, 2005), but adds empirical data to show that this process can be socially distributed (Cole & Engström, 1993). Because the process is social, being shaped or scaffolded by the other (Sutton, Harris, Keil, & Barnier, 2010), it is also mediated by more purely social processes, such as deferring to the view of the other.

The foregoing analysis also revives Bartlett's (1932, p. 206) key concept of turning around upon one's schema. This concept has been widely criticised for having no evidence or mechanism (Olfield & Zangwill, 1942; Gauld & Johnston, 1967). Our data provides evidence for the phenomenon, and we have proposed that it might occur and develop through people responding to their own utterances in much the same way as they respond to other people's utterances (Mead, 1922). The concept could be seen to be an ancestor of the subsequent research on meta-memory (Flavell, 1979), namely, the idea that people have both recollections and cognitions about those recollections (Nelson, 1996, p. 105). Although self-reflection can, of course, be a wholly intracranial process, our data indicates that it can also be scaffolded by social relations. Thus, while meta-memory has been studied as a cognitive capacity, our analysis, building upon Bartlett's original approach, conceptualises it as a social psychological process.

The foregoing analysis has been based upon a model of distributed remembering (Sutton, Harris, Keil & Barnier, 2010), focusing on the ways in which cognitive, social and cultural processes form an interactive coupling within a particular context. Using the discourse of dyads to provide a window on these diverse processes may be contentious. We do not appeal to philosophical arguments about the ontological status of mind to justify our approach, rather, we point to the outcomes of the analysis which reveals a complex and situated interplay between cognitive, cultural and social factors. There are doubtless important differences between intra-psychological processes and what people say (Werner & Kaplan, 1963; Gillespie & Zittoun, 2010), and accordingly any analysis needs to proceed with caution. However, all methodologies for studying psychological processes have limitations. If social psychologists dare to push beyond

an exclusively discursive interpretation of conversational data, they may find that they are in possession of a powerful methodology for studying the situated coupling of cognition, culture and social interaction.

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Tables

Table 1: Overview of the conversation data

	Trial 1 (15 Minutes)			Trial 2 (1 week)		
	Mean	SD	Range	Mean	SD	Range
Duration in seconds	1272	726	597-2990	1050	443	540-2110
Words spoken	2222	1123	775-3739	1943	944	707-3434

Table 2: Mean proportions of propositions recalled accurately and with distortion

	Recall Session			
	First (15 min)		Second (1 week)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Bergman & Roediger (Individuals, strict instructions)				
Accurate	.26	.12	.12	.09
Distorted	.33	.09	.37	.14
Proportion of errors	.57	.12	.75	.19
Bergman & Roediger (Individuals, lenient instructions)				
Accurate	.17	.10	.13	.08
Distorted	.38	.10	.36	.10
Proportion of errors	.69	.14	.75	.13
Present study (Dyads, intermediate instructions)				
Accurate	.15	.10	.10	.08
Distorted	.41	.11	.41	.11
Proportion of errors	.75	.11	.82	.13

Table 3: Sociocultural mediators of remembering

	First Reproduction (15 minutes)		Second Reproduction (1 week)		Combined	
	Instances	Number of dyads	Instances	Number of dyads	Instances	Number of dyads
Question	175	10	251	10	426	20
Repetition	68	10	80	10	148	20
Deferring to the other	57	10	49	10	106	20
Imagery	43	10	43	10	86	20
Narrative coherence	30	9	43	9	73	20
Deduction	22	8	50	8	72	18
Rhythmic gesture	15	3	5	3	20	5