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Abstract

In everyday life remembering occurs within social contexts, and theories from a number of disciplines predict cognitive and social benefits of shared remembering. Recent debates have revolved around the possibility that cognition can be distributed across individuals and material resources, as well as across groups of individuals. We review evidence from a maturing program of empirical research in which we adopted the lens of distributed cognition to gain new insights into the ways that remembering might be shared in groups. Across four studies, we examined shared remembering in intimate couples. We studied their collaboration on more simple memory tasks as well as their conversations about shared past experiences. We also asked them about their everyday memory compensation strategies in order to investigate the complex ways that couples may coordinate their material and interpersonal resources. We discuss our research in terms of the costs and benefits of shared remembering, features of the group and features of the remembering task that influence the outcomes of shared remembering, the cognitive and interpersonal functions of shared remembering, and the interaction between social and material resources. More broadly, this interdisciplinary research program suggests the potential for empirical psychology research to contribute to ongoing interdisciplinary discussions of distributed cognition.

Keywords

autobiographical memory, distributed cognition, intimate relationships, memory systems, social memory

Socially distributed remembering: theoretical and empirical background

Remembering the past plays a crucial role in our lives, our identities, our plans, and our social relationships (Harris et al., 2013b), and the fact that we frequently talk about the past with others

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has important consequences for the way we remember (Campbell, 2003; Harris et al., 2008, 2010; Pasupathi, 2001; Sutton et al., 2010; Weldon, 2000). In the current article, we apply the theoretical framework of distributed cognition (Barnier et al., 2008; Hutchins, 1995; Sutton, 2006) to group remembering. As we have argued elsewhere (Barnier et al., 2008; Sutton et al., 2010), a distributed cognition framework provides explanatory power for complex social memory phenomena; it drives novel research questions, new methods, and empirically testable hypotheses. In the current article, we update this argument by presenting findings from a maturing program of empirical research on shared remembering in couples.

Distributed cognition: definitions

The distributed cognition framework suggests that cognitive states and processes are sometimes distributed, such that neural and bodily resources couple in coordinated ways with material or social resources to accomplish cognitive tasks (Barnier et al., 2008; Clark, 1997). According to this view, external resources can become parts both of occurrent cognitive processes and of enduring integrated cognitive systems: ‘When parts of the environment are coupled to the brain in the right way, they become parts of the mind’ (Chalmers, 2008: 1; see also Sutton, 2010). This definition begs the question of what the ‘right way’ is for coupling to occur. Clark and Chalmers (1998) proposed the following criteria:

1. That the resource be reliably available and typically invoked ...
2. That any information thus retrieved be more-or-less automatically endorsed ...
3. That information contained in the resource should be easily accessible as and when required. (Clark, 2010: 6–7)

While debate continues to refine these conditions (Sterelny, 2010; Sutton, 2010; Sutton et al., 2010), we can usefully adopt them for the purposes of this exposition, to motivate and test against empirical research.

What kinds of cognitive tasks?

There are three compatible possibilities for the kinds of cognitive tasks that lend themselves to distribution across internal and external resources. First, cognitive distribution might enable the accomplishment of highly complex tasks that cannot be completed by an individual alone, such as navigating a ship (Hutchins, 1995). Second, cognitive distribution might enable individuals to accomplish tasks ‘better’ in some way, or more efficiently, or at least differently and with different outcomes from doing the tasks alone. Third, cognitive distribution might enable the maintenance of capacity to complete everyday tasks (which used to be done alone) as individual cognitive resources decline or fail. For instance, Clark and Chalmers (1998) described a thought experiment regarding ‘Otto’, a man with Alzheimer’s, whose notebook entries have literally become the contents of his memory. In observing strikingly similar real-world cases, Dennett (1996) noted that older individuals often ‘load their home environments with ultra-familiar landmarks, triggers for habits ... Taking them out of their homes is literally separating them from large parts of their minds’ (see also Dahlbäck et al., 2013; Drayson and Clark, in press).

Socially distributed cognition

Cognitive distribution is arguably an everyday phenomenon, and the examples used to illustrate it are likewise everyday, like the cocktail waiter who relies on the shape of the glasses to remember

ingredients in drinks, or an artist using a sketchpad (Clark, 1997; Van Leeuwen et al., 1999). Despite the field's focus on material resources, distributed cognitive systems are likely to involve both material and social resources (Barnier et al., 2008; Sutton et al., 2010). In the current article, we review empirical research motivated by the view that social sharing of memories is one of the most mundane examples of distributed cognition (see also Barnier et al., 2008; Barnier, 2010).

We focus here on intimate couples remembering together. We have a number of reasons to expect that they are a particularly good example of the kinds of groups in which socially distributed cognition occurs (see also Wu et al., 2008). Adapting Clark and Chalmers' (1998) criteria for considering objects as part of cognition, Tollefsen (2006) suggested that Person A can be incorporated into Person B's cognitive processing under the following conditions: (1) if Person A is available and typically invoked; (2) if Person B accepts Person A's information without question; (3) if Person A is readily accessible by Person B; and (4) if information stored by Person A was endorsed by Person B at some point. Long-married couples who frequently discuss their past and future across their lives may meet these criteria (see also Sutton et al., 2010; Tollefsen, 2006). Put another way, couples are 'persisting integrated systems' (cf. Rupert, 2010; see also Wegner, 1987; Wegner et al., 1985).

Making couples the unit of analysis can yield insights not available when studying individuals (see also Hinsz et al., 1997). That is, groups such as couples may exhibit emergence when they remember together; meaning the group product is different from the aggregation of individual memories (see also Theiner, 2013; Theiner and O'Connor, 2010). Such emergence may be positive (such as the generation of new information) or negative (such as the introduction of errors). Wegner's (1987) Transactive Memory theory predicts benefits of shared remembering as one kind of emergence: 'group memory structures develop and become capable of memory feats far beyond those that might be accomplished by any individual' (Wegner, 1995: 319).

Shared remembering in experimental psychology

In cognitive psychology, the collaborative recall paradigm was developed to measure the impact of remembering with others (Weldon and Bellinger, 1997). Using this method, the memory output of a group is compared to the pooled or aggregated (non-redundant) output of the same number of individuals remembering alone (see Basden et al., 2000; Harris et al., 2008; Rajaram and Pereira-Pasarin, 2010). This comparison is useful for considering whether groups show the kind of emergent properties that would be predicted by conceptualising them as distributed cognitive systems, since it indexes whether the recall of a collaborative group is quantitatively different from the sum of its parts.

Collaborative groups reliably remember less than aggregated groups; that is, they show *collaborative inhibition*. This 'cost' of collaboration has been demonstrated for materials such as word lists, stories, pictures and historical facts (see Harris et al., 2008). Typically, groups of strangers are tested (Rajaram and Pereira-Pasarin, 2010), although groups of friends also show collaborative inhibition (Harris et al., 2013a). However, a study by Meade et al. (2009) found that expert pilots, who are trained to communicate efficiently, reversed the typical effect and showed benefits of collaboration – *collaborative facilitation* – when remembering aviation-relevant information, such that collaborative groups remembered more than aggregated groups.

A handful of studies suggest that intimate couples may also benefit from remembering together. For instance, Ross et al. (2004) found that older couples made fewer memory errors on a shopping list task when they collaborated, whereas Johansson et al. (2005) found that a subset of older couples – those high on division of responsibility and on agreement about expertise – were relatively less impaired by collaboration. However, these studies have not reliably demonstrated the memory

facilitation that we might expect, and a number of other studies have failed to find any benefits of shared remembering in couples at all (e.g. Gould et al., 2002).

In our studies, we extended the methodology of the standard collaborative recall paradigm to study shared remembering in its everyday social context. We focused on intimate couples – the kinds of groups who regularly remember together. We also focused on a range of memory tasks, from basic word lists to significant, shared autobiographical events. Finally, we focused on the communication and interaction during collaboration and other differences between couples (e.g. relationship intimacy). We examined whether the benefits of shared remembering, as suggested by a distributed cognition framework, may be identifiable in certain kinds of groups and for certain kinds of memories.

A program of research

Four studies

In the remainder of the article, we review, discuss and interpret findings from four of our studies to evaluate whether the memory performance of intimate couples can be better understood by considering couples as a system (see also Barnier et al., 2008; Sutton et al., 2010). Based on the literature reviewed above and the outcomes of these four studies, in this article we consider six themes emerging from the results: (1) the costs and benefits of shared remembering; (2) who benefits from shared remembering and why; (3) what kinds of memories show benefits; (4) the nature of successful remembering and different kinds of emergence; (5) the interaction between social and material resources; and (6) distributed cognition and memory compensation.

In Study 1 (Harris et al., 2011), we tested 12 couples (24 older adults) aged 60–89 years, married 26–60 years. Couples were tested twice, recalling first individually and then collaboratively 2 weeks later. Recall consisted of three memory tasks: (1) recalling a categorized word list; (2) recalling a personally relevant list (the names of members of their social club); and (3) reminiscing about the events of their lives in a semi-structured interview. We compared performance of couples when they collaborated versus when they remembered alone.

In Study 2 (Harris et al., in preparation), we tested 19 couples (38 older adults) aged 69–86 years, married 15–62 years. Couples were tested twice in the same session with half of the couples recalling first individually and then collaboratively, and the other half recalling individually twice. Recall consisted of three memory tasks: (1) recalling a categorized word list; (2) recalling a personally relevant list (the places they had visited on holiday together); and (3) recalling two significant autobiographical events in detail. We compared performance of couples who collaborated versus couples who recalled alone. Additionally, we administered the Memory Compensation Questionnaire (MCQ; Dixon et al., 2001) to assess couples' reported day-to-day memory strategies.

In Study 3 (Barnier et al., in press), we tested 20 couples (40 older adults) aged 60–88 years, married 38–65 years. Again we tested them twice in the same session, with half of the couples recalling first individually and then collaboratively, and the other half recalling individually twice. Recall consisted of a memory task based on the Episodic Recombination paradigm (Addis et al., 2008), in which the couples elicited and then remembered in detail six autobiographical events that they had experienced together. We compared the recall performance of couples who collaborated versus couples who recalled alone.

In Study 4 (Barnier et al., in press), we repeated Study 3 with 13 younger couples (26 individuals) aged 26–42 years, married or cohabiting 2–19 years, to test whether our findings were specific to older adults. We tested them twice in the same session. Again we tested them twice in the same

session, with half of the couples recalling first individually and then collaboratively, and the other half recalling individually twice. As in Study 3, recall consisted of a memory task based on the Episodic Recombination paradigm (Addis et al., 2008) in which the couples elicited and then remembered in detail six autobiographical events that they had experienced together. We compared the recall performance of couples who collaborated versus couples who recalled alone. These couples also completed the Personal Assessment of Intimacy in Relationships (PAIR; Schaefer and Olson, 1981) and the Social Provisions Scale (SPS; Cutrona and Russell, 1987), to assess the qualities of their relationships.

Costs and benefits of shared remembering

First, we were interested in whether we could demonstrate benefits of shared remembering as predicted by a distributed cognition framework. In Study 1, couples completed a word-list recall task and a personally relevant task (Harris et al., 2011). In Study 2, couples completed a more difficult word-list recall task. Using these three tasks, we eliminated the standard collaborative inhibition effect for both simple, non-personal material and personally relevant material: that is, in these tasks couples did not show the usual detrimental effects of remembering together.

Given the robustness of the collaborative inhibition effect, this is a notable finding, and adds to a body of evidence suggesting that couples are a special kind of remembering group (e.g. Johansson et al., 2005; Ross et al., 2004). These findings – taken together with Meade et al.'s (2009) study of pilots – suggest that there may be two elements to the advantages experienced by collaborating couples: like the pilots, couples may be skilled and practised in communicating effectively, and they also have shared knowledge and shared experiences on which to base their collaboration – although the extent of the couples' shared knowledge varied across tasks and couples.

Who benefits from shared remembering and why?

Overall, we did not see the costs of collaboration usually found in this literature (Harris et al., 2008; Rajaram and Pereira-Pasarin, 2010). However, we also did not see (overall) the kinds of benefits we had predicted: on average, there was no collaborative facilitation in Studies 1 and 2. However, in Study 1 we found striking differences across couples in collaborative recall performance. Some couples collaborated more successfully, and showed collaborative facilitation, in that there were strong benefits of remembering together compared to recalling alone. Others couples showed strong collaborative inhibition, and performed better when they remembered as two separate individuals (see also Harris et al., 2011).

Given these differences we were interested in whether there were ways of predicting which couples collaborated successfully and which did not. As above, previous theory and research suggests that communication processes may be one important factor in determining the benefits of shared remembering (Meade et al., 2009; Wegner, 1987). In Study 1, we coded the communication within couples, and found that these processes were powerful predictors of the outcomes of collaborative recall. For the categorised word list, couples who used a coordinated strategy (e.g. prompting each other with categories or dividing responsibility) showed collaborative facilitation, whereas those who did not showed collaborative inhibition (Harris et al., 2011). For the personally relevant list task, we found that communication variables predicted costs versus benefits of collaboration: perceived uneven expertise, strategy disagreements and corrections, simple acknowledgements (such as 'yes', 'ok') and off-topic extra information were associated with collaborative inhibition; cuing attempts and repetitions or mirroring of speech, conversely, were associated with collaborative facilitation. Based on a regression analysis, these variables combined predicted 84%

of the variance in successful couple collaboration (Harris et al., 2011: 284), further indicating that communication features can determine the outcomes of collaboration.

As well as differences in communication, we also focused on differences in relationship intimacy and its effects on shared remembering. In terms of distributed cognition, it is a partner's reliability and constant accessibility that makes him or her a candidate for cognitive distribution, suggesting a crucial role for relationship quality. The development of intimate relationships may involve the incorporation of one's partner into one's sense of self. One way that this can be measured is by the use of the plural pronoun: that is, the tendency to speak in terms of 'we', 'us' and 'our' rather than in terms of 'I', 'me' and 'my' (Agnew et al., 1998). This simple measure can yield quite powerful insights into the nature and quality of intimate relationships (e.g. Acitelli et al., 1999; Reid et al., 2006; Slatcher et al., 2008).

The results from Study 1 (Harris et al., 2011) indicated that couples spoke more in terms of 'we' and less in terms of 'I' when they remembered together versus alone. Moreover, this pronoun shift was associated with changes in both the content and processes of remembering. In terms of the content, when couples collaborated they spoke more about 'home and family' and less about individual achievement. In terms of process, the more that couples spoke in terms of 'we', the more rapid was the switching back and forth between speakers during collaborative remembering. In Study 4 (Barnier et al., in press), we studied the role of relationship intimacy more directly by administering two questionnaires. Those individuals with higher scores on measures of intimacy and social satisfaction had richer, more detailed episodic memories of events that they had shared with their partner, compared to those with lower scores (Barnier et al., in press).

Consistent with a distributed cognition framework and with the criteria suggested by Tollefsen (2006), these findings suggest that intimacy and shared identity can influence the nature of shared remembering in terms of both the contents and the processes of shared remembering. Although intimate couples may represent a unique kind of relationship (see also Tollefsen, 2006), not all couples develop intimacy and a shared identity to the same extent. In general, our findings of marked differences across the couples in the costs and benefits of shared remembering – even for these long-standing, intimate groups – provide important insights into the nature of distributed cognitive systems. Such systems are not developed or utilised universally, and there are certain tasks and groups in which cognitive activity is more effective or more productive when undertaken alone. Our focus on strong and predictable differences between couples provides an important advance in a field that usually focuses on overall averages rather than subtle individual variations, and our findings emphasise the complex nature of real-world distributed cognitive systems.

What kinds of memories show benefits?

We were also interested in whether benefits of collaboration might be particular to certain kinds of memories. In Study 2, we conducted a personal-list memory task ('recall all the holiday destinations you and your partner have visited'). Couples showed an overall collaborative inhibition effect – they remembered fewer holidays when they collaborated. However, we noticed that couples who collaborated had a tendency to 'go episodic'. That is, collaborating couples tangentially began to reminisce about specific events, and at a much greater rate than individuals recalling alone. Consider the following excerpt from a couple collaboratively recalling their shared holidays:

Interviewer: And how many more trips did you do? There's the Greek Islands.

Wife: South America.

Husband: We did South America, yes, we did Peru and Brazil and Argentina and Bolivia and The Andes. We went up to ...

- H: Do you remember munching the coca leaf to try ...
- W: Oh yes.
- H: We went up to The Andes at 5,000 metres, and munching coca leaf, and [wife] decided that she needed to have a pee.
- W: So we were on the road here, you see, but the little latrine was up on the top.
- H: It was about 50 metres higher.
- W: So we had to climb up from the road.
- H: So I said, alright, I'll take you up there. By the time I got down, which at 5,000 metres climbing, I'd just about had it.
- W: Yes, we thought we were going to faint, but we didn't. But those coca leaves were very good, I rather liked them.

Despite the interviewer's best attempts to keep the task of listing the holidays on track, when remembering in their everyday context – together – the couple instead began to recall specific episodes. Despite scoring lower on this task in terms of the total number of holidays listed, the nature of this collaboration did not seem consistent with 'inhibition'. This observation was striking because older adults are normally found to have an age-related episodic deficit, meaning they recall fewer episodic memories (memories of specific events), while semantic memory (memory for general information) is generally spared with age (Addis et al., 2008; Levine et al., 2002).

In Study 3, we followed this up more formally to test whether shared remembering in couples provides a particular advantage for rich episodic aspects of autobiographical memories (Barnier et al., in press). We adapted the Episodic Recombination paradigm (Addis et al., 2008), previously used to index episodic and semantic details recalled by younger and older adults. In our study, older couples completed the Episodic Recombination task either individually (as is standard), or in collaboration with their spouse. We found that collaborating couples indeed showed facilitation of episodic details (compared to those who remembered alone) with no effect on semantic details (Barnier et al., in preparation). One reason that episodic remembering is selectively enhanced by collaboration could be that this is the kind of information that older adults have difficulty remembering alone. In this case, the rich cuing that occurs with a partner means that detailed, specific memories can be recalled that neither individual is able to access when tested by themselves. This is consistent with a view of distributed cognitive systems as having particular utility for tasks that the individual is unable to accomplish without external supports (cf. Hutchins, 1995).

The nature of successful remembering and different kinds of emergence

Our findings that the benefits of shared remembering were not universal even in intimate couples raise the issue of what successful remembering might look like. Measuring productivity is only one way of indexing memory benefits. Definitions of emergence (Theiner and O'Connor, 2010; Wegner, 1987) emphasise that shared remembering may transform individual memory in a variety of ways, both quantitative and qualitative. Across studies, we noted three different kinds of emergence when couples jointly remembered autobiographical events.

The first was emergence of new details, when new information (that neither individual could recall alone) became available during collaboration. Consider this example, where a husband and wife remembered their honeymoon, 40 years prior (from Study 1; see Harris et al., 2011):

- Wife: And we went to two shows, can you remember what they were called?
- Husband: We did. One was a musical, or were they both? I don't ... no ... one ...
- W: John Hanson was in it.
- H: Desert Song.

- W: Desert Song, that's it, I couldn't remember what it was called, but yes, I knew John Hanson was in it.
- H: Yes.

We also noted a second kind of emergence; 'emergence of quality', when remembering was emotionally richer and more vivid collaboratively than alone. As shown above, this could be seen when formally scoring memories for these kinds of rich episodic details in Study 3. We could also see this process more qualitatively. Take this example from Study 1 when a couple remembered their early courtship, first in their individual interviews and then together (see Harris et al., 2011):

- Husband: Ah, I used to turn up ... down her ... she used to give, umm, what do you call it, teaching, she used to teach, umm, women in Manly how to cook. So she ran teaching classes. So I used to turn up there after, and take her out for coffee or something.
- Wife: And then the next week he appeared at my work after the evening class had finished, taking me out for coffee – that was the beginning of the courtship.

These separate, individual accounts can be compared with the more specific and emotionally rich accounts that emerged during collaboration:

- Husband: No, I asked her out that night, but she said she couldn't go.
- Wife: No, that's right.
- H: So then I started to pester her the next week.
- W: You did, you turned up after my classes.
- H: Cooking classes.
- W: On Monday night.
- H: That'd be it.
- W: And took me for coffee.
- H: Yes, the next Monday night.
- W: And impressed me.
- H: Yes.

Third, we noted emergence of new understanding, such that following collaboration, the same event was now understood differently. Consider this example from Study 3 when a couple remembered a trip they took (Barnier et al., in press):

- Husband: I remember pulling into that little area and I recall him being a little concerned because it was private property, remember? The big sign that said ...
- Wife: Do not enter!?
- H: Do not enter. Prosecution may occur.
- W: And yes. And then he was in his very well marked moose safari coach that would have been very easy to locate again should they wish to have taken action.
- H: And remember the police car went past and he wouldn't go in until the police car had disappeared.
- W: Oh is that, oh ok. I didn't quite understand the significance of that, but now ... right. Yeah I didn't remember, I didn't understand that at the time.

The suggestion that there are different kinds of emergence serves as a reminder that the function of joint reminiscing may not always be to remember as much, or as accurately, as possible (see also Harris et al., 2011) and poses a challenge to develop ways of measuring outcomes of remembering that go beyond simply the amount recalled.

Interaction between social and material resources

In the literatures on both distributed cognition and the neuropsychology of ageing, different kinds of cognitive support have rarely been studied together (for an exception, see Wu et al., 2008). In Study 2, older couples completed Dixon's MCQ (Dixon et al., 2001). This questionnaire measures the extent to which people report using a range of memory compensation strategies including: (1) external memory aids (e.g. lists, notes, calendars); (2) internal mnemonic strategies; (3) extra time spent learning; (4) extra effort spent remembering; (5) reliance on others; (6) commitment to success in remembering; and (7) strategy changes over 5–10 years. We were interested in the kinds of memory compensation strategies reported by older adults – particularly external and reliance (social) strategies – and whether strategies reported by partners might be similar to each other. In fact, our results indicated that relationships between different compensation strategies were complicated, and that there may be rich but diverse interactions between social and material resources.

Consistent with previous research, external strategies were reported the most, and reliance/social strategies were reported the least (Dixon et al., 2001), reflecting the importance of external memory aids in people's everyday lives. For instance, one man, when asked about the couple's shared calendar, stated, 'It's our bible'; another described the couple's shared diary as 'the structure of our lives'. Unexpectedly, partners' scores for external compensation use and reliance on others were uncorrelated with each other. There were, however, positive relationships between the husbands' and wives' reported use of internal strategies and their perceptions of change in strategy use over time. Interestingly, husbands' greater concern with memory success was associated with their wives' increased use of external strategies. The only overall gender difference was that men reported reliance/social strategies more than women, consistent with previous evidence that social reliance becomes increasingly important for men as they age (Dixon et al., 2001). Our pattern of results was consistent with more anecdotal evidence of the wives' role in implementing external strategies in daily life. Several of the couples noted that the woman was responsible for maintaining, updating, and checking their external memory systems. For instance, one man commented, 'I don't use the calendar, but [wife] sort of refers to it constantly, and she'll remind me ... So she's a constant reminder'. Similarly, another said, 'No, I don't use memory aids ... Oh hang on, [wife] carries a diary with her all the time. ... Oh well, if she's got the diary, we're always together and that's it'. These observations are consistent with the criteria for socially distributed cognition described by Tollefsen (2006). For both of these men, their wives (and thus the calendar/diary) are readily available, trustworthy, easy to access and have a history of being utilised and endorsed.

Future research plans include following this up more formally and expanding existing measures in order to capture the complexity of everyday cognitive systems. One way to do this is to develop a taxonomy of the important dimensions on which external resources may vary, and then to measure how these dimensions influence the way in which resources are incorporated, coordinated, updated and relied upon, and how effective they are. Based on our interviews (Harris et al., in preparation), we identified the following dimensions: (1) type of material resource (diaries, calendars, iPhones, etc.); (2) extent to which couples and individuals need such resources based on how regular their routine is and their life circumstances (e.g. retirement); (3) redundancy of resources shared by the couple (single shared resource vs. separate but equal resources); (4) who is responsible for entering information into the external resources; (5) the physical location of the resources (e.g. the kitchen fridge or the wife's handbag); and (6) use and interpretation of the resource – how often and by whom it is checked (e.g. daily reviews, weekly reviews, ad hoc).

These variations and the complex coordination of material resources suggest a broader view of distributed cognitive systems. In everyday life, such systems are frequently not *either* social or material, but, in fact, involve a rich interaction between and coordination of the social and the

material. Such interaction and coordination may not be picked up by asking about social and material resources separately.

Distributed cognition and memory compensation

This research and the distributed cognition framework may have important applications to memory and ageing. Such a framework provides one way of interpreting the fact that up to 30% of older individuals who appear cognitively healthy and retain their mental and memory capacities actually have significant neural signs of dementia (Morris et al., 2004; Pike et al., 2007). Similarly, notions of ‘cognitive reserve’ refer to the fact that brain pathology is not always consistent with clinical signs of illness (Katzman et al., 1988; Stern, 2002). One explanation for cognitive reserve is internal/neural resources: the declining hippocampus may be bypassed as the brain develops compensatory mechanisms (Addis et al., 2007; Stern, 2002). However, perhaps the external resources that individuals adopt in daily life – remembering with a spouse, remembering with a diary, or a combination of the two – also compensate for age-related neuro-cognitive declines.

Research has suggested that intimate couples may be interdependent in terms of their cognitive performance (see also Dixon, 2011). Gerstorf et al. (2009) found that the cognitive trajectories of older couples in their large, longitudinal sample were linked, such that a husband’s cognitive functioning predicted his wife’s cognitive decline with a 1-year lag. In the neuropsychology domain, Rauers et al. (2011) found that older couples performed better than pairs of strangers on a joint word-guessing task, and collaborating with one’s spouse eliminated the effects of baseline cognitive function. That is, early evidence suggests that intimate couples may be interdependent in their performance on cognitive tasks and that collaboration with a spouse may compensate for the effects of age-related cognitive decline.

In our own research, we found some anecdotal evidence of how this might work – when couples combine their intimacy, shared knowledge and finely tuned communication skills. In Study 1, one of the men had a brain injury, resulting in major short-term memory problems. His wife reflected on how she helped him:

I personally feel that I’ve got to be careful that I don’t over tread. I’ve got to still make him feel that he’s in control and can make decisions without pushing in and saying ‘oh forget it, you can’t do it anyway’ or something ... But see if he’s in the middle of telling you something and I butt in, he loses the train of thought and he can’t remember what he was telling you. And that’s really hard, because sometimes when you hear him say something and you want to put in something as well, and then of course as soon as I say that, he says, ‘Oh, now I’ve forgotten what I was going to say’. So that’s why I’ve got to retrain myself to be more tolerant and more patient, to try not take over because I think it’s important that he still feels very important.

This quote illustrates both the interpersonal and communication considerations of this woman as she consciously adjusted her strategies for sharing memories with her husband. The utility of these strategies was clear in their joint remembering: each time, she waited for him to remember until he could not continue, and then provided prompts and support. A more formal investigation regarding the role that shared remembering with a spouse plays in reducing memory impairment is currently underway.

Summary and conclusion: distributed cognition in couples

Across four studies, we found that shared remembering in couples could be understood by considering them as systems of distributed cognition. Using this framework as a lens for examining data

from our research, we found emerging themes that provide new insights into the way the way that memory might be shared in groups – one of the most common contexts in which we remember. Conceptualising couples as a distributed cognitive system has pointed the way for novel questions and methods for investigating social memory and has challenged us to extend experimental paradigms to study different kinds of groups, different kinds of remembering tasks and different measures of memory. Studying people in their everyday contexts – social and material – provided new insights into the products, processes and functions of shared remembering, as well as insights into the complexity of systems that couples adopt and the complexity of outcomes we might expect from a distributed cognitive system. Our evidence suggests that everyday remembering is better understood by conceptualising people and their social and material environments as dynamic, coordinated systems.

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