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Misremembering Bartlett: A study in serial reproduction

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According to much of the recent psychological literature on memory, Bartlett should be credited with the insight that remembering can never be accurate but is, instead, more or less of a distortion (a view to which many modern authors themselves seem to subscribe). In the present paper, we argue that Bartlett did not himself provide such an unqualified account of remembering. Although he sought to challenge the idea that remembering is largely an accurate record of past events, he did not maintain that it is always inaccurate. Despite unqualified claims by Bartlett to the contrary, neither his own experiments nor his theoretical position warrant the conclusion that remembering is inherently unreliable. Indeed, as we explain, Bartlett himself provides several examples of impressively detailed and accurate recall, and sought to explain them within the framework of his schema theory.

"I did not say, I think I did not imply that literal retrieval is impossible, but I did imply that it requires special constricting conditions" (Bartlett, 1968, cited in Crampton, 1978; p. 340).

Sir Frederic Bartlett is widely regarded as one of the early pioneers of modern cognitive psychology. After a negative reaction around the time of his death (e.g. Zangwill, 1972), Bartlett's well-known text, *Remembering* (1932), has come to be widely accepted as having very direct relevance to current-day cognitive psychology. Not only has Bartlett remained one of the most widely cited authors in cognitive psychology, but also there is general agreement about his major contribution to modern psychology: the proposal that remembering is not reproductive, but reconstructive and hence inherently unreliable.

In this paper, we first examine how Bartlett's work is represented in modern textbooks and more specialist research literature. Then, we consider how Bartlett himself represented his own theory and findings. Finally, we argue that not only the subsequent commentaries, but also Bartlett himself, have misremembered the true implications of Bartlett's findings and theory.

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The 'textbook Bartlett'

Theoretical approaches to memory have ranged along a number of polarities, including procedural vs. representational, explicit vs. implicit, declarative vs. non-declarative, and cognitive vs. social. But perhaps one of the most basic polarities has been that between reproductive and reconstructive theories. The reproductive theory, that memory may be based on 'unalterable traces', is typically identified with Freud:

The way the memory behaves in dreams is certainly most important for any theory of memory in general. It teaches us that 'nothing that is once mentally our own can ever be entirely lost' (Scholz [1887], p. 34). Or, as Delboeuf [1885] puts it, '*que tout impression même la plus insignifiante, laisse une trace inaltérable, indéfiniment susceptible de rapaître au jour*,' [every impression, even the most insignificant, leaves an unalterable trace indefinitely capable of coming out into the open] a conclusion which so many other - pathological - phenomena of the psychic life likewise force us to make. (Freud, 1900/1976, p. 19.)

The diametrically opposed position, that memory is inherently reconstructive, is typically identified with Bartlett and his classic text, *Remembering* (1932). This reading of Bartlett is certainly consistent with the general subjectivistic emphasis within modern cognitive psychology upon the active, transformative role of the 'knower'. Interestingly, it has also proved highly consistent with an apparently radical alternative to cognitivism, namely social constructivism (Bloor, 2000).

Neisser, the foremost contemporary exponent of the constructivist approach to memory, has acknowledged his debt to Bartlett over many years:

Following Bartlett, I myself have often metaphorically described memories as constructions, that is, as products that are skilfully built from available parts to serve specific purposes. Because they are constructions rather than copies, they can often be seriously mistaken even when the individual is explicitly aiming at correspondence. (Neisser, 1996, p. 204.)¹

In many psychological texts on memory, one can find largely unqualified endorsements of Bartlett's theory of reconstructive memory as it has been widely represented. Here are some recent examples:

Much of what we recall from long-term memory is not an accurate representation of what actually happened previously . . . An early experiment by Bartlett (1932) called attention to this fact . . . Bartlett concluded that people remember only a few striking details of an experience and that during recall they construct the missing portions in accordance with their own expectations. (Carlson, Buskist, & Martin, 2000, p. 265.)

[Bartlett] showed that when people read a story, their comprehension and remembering of it are not faithful renderings. They are based on idiosyncratic and societal schemas available to the reader; these schemas assimilate salient details and the emotional tone of a story and can then, if remembering is required, generate a construction of it that is more or less inaccurate. (Oatley, 1999, p. 102).

Bartlett argued that the process of retrieval involves reconstruction, which is influenced by the frameworks that people already have in their heads. So memory, just like perception, is both selective and interpretive. It involves construction as well as reconstruction. (Butler & McManus, 1998, p. 35.)

¹ Neisser (1967, p. 285) has used the analogy of reconstructing a dinosaur from a few bone chips. However, such metaphors from palaeontology or archaeology can have quite different implications depending on the supposed status of 'the bone chips' or archaeological remains (see Larsen, 1987).

Forgetting is the loss of information from any point in the memory process or memory system. William James suggested that in real life, in spite of occasional surprises, most of what happens is actually forgotten. Sir Frederic Bartlett indicated that memory is hardly ever exact. (Anderson, 1996, p. 358.)

An important concept to grasp in the understanding of long-term memory is that of the *schema*. Memory schemas, which are similar but not identical to the sense in which Piaget used them, are discrete units of information which relate to a typical object or event in the world. The schema framework was first put forward by Frederick Bartlett (1932), who was interested in the ways in which memory was a *construction* rather than a copy of the information that was presented. (Coulson, 1995, p. 92.)

Bartlett has also been widely cited in the more specialized literature, for example on hypnotically-induced memories:

The role of cognitive schemata is also underscored by another principle (Bartlett, 1932) . . . In the final analysis, memory is not so much like *reading* a book as it is like *writing* one from fragmentary notes. The reconstruction principle is of utmost importance in the present context because it means that any particular memory is only partly derived from trace information encoded at the time of the event (Kihlstrom, 1994; see also Kihlstrom, 1998.)

Most conspicuously, Bartlett's work on remembering figures centrally in the recent debates about 'recovered memories' — claims made by adults, often, but not exclusively, as a consequence of therapy, about having been sexually abused in their childhood (see Lindsay & Briere, 1997; Lindsay & Read, 1994). To a remarkable extent, these debates have come to revolve around a theoretical contrast between two views of memory (Brewin & Andrews, 1997): is memory based on 'unalterable traces', or is it inherently reconstructive and hence unreliable? This first position has (rightly or wrongly) been typically identified with Freud. The *diametrically opposed* position, that memory is *inherently* reconstructive, has been consistently attributed to Bartlett (1932). For example, Crews, a persistent and searching critic of Freud and psychotherapy, has drawn an explicit contrast between the Freudian notion of a permanent store of memory and Bartlett's theory (e.g. Crews, 1994).

The reconstructive interpretation of memory fuels much of the argument from the proponents of the so-called 'false memory syndrome'. Pendergrast, author of the popular *Victims of memory* (1996), a book charting the rise of the recovered memory movement and the false memory syndrome, invokes Bartlett in support of his case:

Bartlett concluded that our memories generally serve us well, not by offering photographic recall, but by selectively sampling experience and molding it so that our lives have purpose and meaning . . . Bartlett was right when he talked about a 'schema' to which the mind refers. Whenever we remember something we literally reconstruct it, grabbing tiny bits of imagery and information from millions of neurons that interconnect in a vast and complex web. Until that moment the memory cannot be said to exist at all. (Pendergrast, 1996, pp. 54 & 84.)

The implication, of course, is that if memory is intrinsically reconstructive and unreliable, then 'false memories' must be the rule rather than the exception. Bartlett's text is also widely invoked in the academic literature on recovered memory to support 'one of the fundamental findings of cognitive psychology over the last 50 years', namely that memory is 'highly susceptible to change' (Schooler, Bendiksen, & Ambadar, 1997, p. 254). Neisser himself has made an explicit connection between the idea of

reconstructive memory (which, as we have seen, he credits to Bartlett) and the 'false memory syndrome':

Images and memories are never simply 'observed' by the patient and then 'reported' to the analyst, as the archaeological metaphor would imply. *They are always constructs*, shaped by the shared need to establish a psychoanalytically satisfactory narrative of the patient's mental development. (Neisser, 1994, p. 6; emphasis added.)

There is, then, both in the textbooks and in the more specialist literature, a wide consensus concerning Bartlett's views on memory: *remembering is intrinsically reconstructive and hence inevitably unreliable*. Indeed, even those rare researchers who have, over the years, challenged Bartlett's theory as an adequate account of remembering nevertheless accept the textbook view of Bartlett's theory as an accurate representation of the target of their criticism (e.g. Gauld & Stephenson, 1967; Kintsch, 1995; Wynn & Logie, 1998). As we will now explain, much of what Bartlett himself says about his findings and theory does seem to support the 'textbook Bartlett'.

Bartlett on Bartlett

Bartlett's empirical studies

As Bartlett himself acknowledged, the experimental procedure he adopted might well have encouraged both conservation *and* transformation. On the one hand, Bartlett notes that the very act of taking part in an experiment might well result in participants producing more accurate reproductions:

A subject who takes part in an experiment is, as a rule, more careful than usual, and hence we may reasonably suppose that the changes effected by Serial Reproduction in the course of the social intercourse of daily life will probably occur yet more easily and be yet more striking than those which have been illustrated in the present tests. (Bartlett, 1932, p. 175.)

Yet he also acknowledges that his methodology would also be likely to encourage the participants to transform the stimulus material:

I think it certain that experimental conditions themselves very greatly favour abbreviation (Bartlett, 1932, p. 174).

It has been noted that his choice of stimulus material was often far from 'ecologically valid'. As Roediger, Bergman, and Meade (2000, p. 117) have complained, *The war of the ghosts* is 'about as similar to normal prose as Ebbinghaus's . . . nonsense syllables are to words'. But this was hardly an oversight on Bartlett's part. He chose such material precisely because it was unusual and exotic:

The folk stories were used . . . because they are predominantly a type of material which passes very rapidly from one group to another; because most subjects regard it as interesting in itself; because stories can easily be chosen which were fashioned in a social environment very different from that of any social group that is likely to yield subjects for a given experiment; and because, both as to form and as to content, they frequently contain characters which would *normally be expected to undergo much change in the course of transmission* (Bartlett, 1932, p. 119).²

² Bartlett did also use more familiar material in some of his experiments (Bartlett, 1932, pp. 146–154) and still found evidence of transformations.

Furthermore, contrary to some accounts of his work (see Davis, 1996, for examples), Bartlett's own methodology was far from representative of how information is normally conveyed from one person to another. As Edwards and Middleton (1987) note:

if we . . . consider the essential nature of text, of discourse generally and of relations between experiencing and remembering, it is immediately clear that serial reproduction studies are unlike much of everyday remembering. (Edwards & Middleton, 1987, p. 83; see also Davis, 1996.)

Yet Bartlett appears to have been well aware that his methodology was not a perfect analogue for the everyday transmission of information. But unlike his choice of stimulus material (which, as we will shortly explain very much fitted in with his initial research agenda) he never properly explained why in his experiments 'the subjects effected their reproduction . . . as isolated individuals than definitely as members of a group' (Bartlett, 1920, pp. 30-31). As he conceded in his 1932 book:

To write out a story which has been read is a very different matter from retelling to auditors a story which has been heard. The social stimulus, which is the main determinant of form in the latter case, is almost absent from the former. (Bartlett, 1932, p. 174.)

Given the special conditions involved in Bartlett's empirical studies, such as the use of unusual material and its written transmission, what kind of conclusions did he himself try to draw from them? Throughout his book, Bartlett presents a series of summaries of the implications of his experiments on remembering. Sometimes his conclusions are quite categorical, that memory is *always* subject to distortion:

Remembering is not the re-excitation of innumerable fixed, lifeless and fragmentary traces. It is an imaginative reconstruction, or construction, built out of the relation of our attitude towards a whole active mass of organised past reactions or experience and to a little outstanding detail which commonly appears in image or in language form. It is thus hardly ever really exact, even in the most rudimentary cases of rote recapitulation, and it is not at all important that it should be so. (Bartlett, 1932, p. 213.)

Sometimes, however, such seemingly unqualified claims are hedged:

It looks as if what is said to be reproduced is, *far more generally than is commonly admitted*, really a construction, serving to justify whatever impression may have been left by the original. (Bartlett, 1932, p. 176, emphasis added.)

Yet Bartlett's unqualified conclusions about the unreliable nature of remembering could hardly be justified on the basis of his studies. Why then did Bartlett present the results of his empirical studies in such a seemingly one-sided and misleading way? *Remembering* had taken a very long time to write (it was initially planned as a text on conventionalization) and, when he was appointed as the first Professor of Psychology at Cambridge in 1931, Bartlett still had a reputation to establish. So it is perhaps understandable that Bartlett was tempted to overstate his case. Indeed, he was also remarkably grudging about acknowledging the work of previous researchers (see Davis, 1996; Kintsch, 1995; Roediger, Wheeler, & Rajaram, 1993; Roediger *et al.*, 2000). He certainly wished to challenge what he took to be the standard view (attributed by Bartlett to Freud) that memories form a 'static mass' (Bartlett, 1932, p. 15). However, his findings, we have argued, do not justify the conclusion that remembering is always unreliable, but only the more moderate claim that it is usually *more* 'schematic' 'than is commonly admitted'.

Bartlett's theoretical approach to remembering

So far, we have considered Bartlett's findings, and the unjustified claims he sometimes makes that they prove that remembering is inherently unreliable. We now consider Bartlett's accounts of his own theory.

Bartlett adopted a biological or functional approach to the study of remembering, and insisted that it would be maladaptive for the behaviour of an organism to be rigidly tied to its past experiences. As Bartlett put it, the capacity to be influenced by past reactions conflicts with 'the demand, issued by a diverse and constantly changing environment, for adaptability, fluidity and variety of response' (Bartlett, 1932, p. 218). This consideration alone would seem to justify Bartlett's claim that accurate recall 'is an artificial construction of the armchair or of the laboratory' (Bartlett, 1932, p. 15). Yet, as Bartlett also eventually acknowledged, adaptation demands both *innovation* and *conservation*. After all, environments are not completely chaotic, '[the] external environment . . . partially changes and in part persists, so that it demands a variable adjustment, *yet never permits an entirely new start*'. (Bartlett, 1932, p. 224; emphasis added.)

Bartlett's schema theory of remembering was not only an account of how remembered material might become transformed, but also a theory of *retention*. Bartlett had originally conducted most of his empirical studies years before the appearance of his 1932 book, in order to study the psychological basis of cultural change, and the effects of contact between cultures and how material becomes assimilated into a new context. Yet, in contrast to his later apparent emphasis upon change, he had initially regarded the influence of the immediate cultural context as essentially *conservative*. As he put it in his 1923 book, *Psychology and primitive culture*, the possibilities for any individual to introduce radical change are 'very much limited':

He may analyze; he may be the source of much reduplication; he may make new patterns of the old material; he may introduce peculiar interpretations; but *in the actual invention of new detail he is practically helpless*, unless he has access to communities outside his own and of a different culture. It is this, beyond anything else, which . . . acts as the spur to those constructive processes as a result of which new forms of social organization may be achieved; new cultures produced; and radical changes brought into being. (Bartlett, 1923, p. 238; emphasis added.)

Doubtless stories change from time to time. They suffer transformation as they pass from people to people. Yet it remains true that within a given group they are often remarkably persistent. Not only does their theme remain unaltered, but the very terms in which the story is told *suffer but slight change*. (Bartlett, 1923, pp. 63–64, emphasis added; cf. Goody, 1998.)

The experiments reported in *Remembering* were initially conceived and designed to provide the psychological underpinning for the anthropological doctrine of diffusionism. According to this doctrine (promoted by W. H. R. Rivers, Grafton Elliot Smith and W. J. Perry), progressive change within groups is not spontaneous but provoked by 'connexion' between cultures (Bartlett, 1932, pp. 243, 273 & 289; see also Kuklick, 1991; Kashima, 2000).³

Although, by 1932, Bartlett had come to emphasize creativity and distortion rather than conservation in memory, and downplay the artificial nature of the materials used in his own experiments, the logic of his schema theory remained unchanged.

³ In the late nineteenth century the anthropologist, A. C. Haddon, had already been promoting diffusionism at Cambridge (see Haddon, 1895; Costall, 1991).

Transformation and conservation are just two sides of the same coin: when the material to be remembered does *not* conform to available schemas but can nevertheless be assimilated, it will be transformed; otherwise, it should persist relatively unchanged. Furthermore, at the level of the individual or the social, the effect of the process of reconstruction is *ultimately* conservative:

the final product approaches *stability*, that of the determined and relatively fixed individual memory in the one case, and that of the social conventionalisation in the other. (Bartlett, 1932, p. 309; emphasis added.)

Bartlett emphatically and convincingly challenged 'pure trace theory' (e.g. Bartlett, 1932, p. 197), but he was far from embarrassed by evidence of accurate recall, not even cases which he himself admitted seemed to demand the concept of trace. Take his example of a woman who, having taken part in his early experiments, was able to recall two of the proper names from *The war of the ghosts* some 10 years after she was first tested. Although Bartlett noted that her vivid recall of proper names was unusual, he went on to assert that 'the immediate return of certain detail is common enough and it certainly looks very much like the direct re-excitation of certain traces' (Bartlett, 1932, p. 209). According to Bartlett, such vivid detail not only provides the basis of the reconstruction, but can also be 'picked out' of schemata (e.g. Bartlett, 1932, pp. 209 and 303), and reinstated 'with much if not all of its individuality unimpaired' (Bartlett, 1932, p. 219).

However, as Neisser himself noted, in addition to the supplementation of the schema concept by that of the trace, Bartlett also found resources within the schema concept itself to explain how recall, such as that of the African herdsmen, could be achieved with 'astonishing accuracy'. Such recall might be based upon 'detailed and articulate schemata into which new material can be fitted' (Neisser, 1967, p. 288). Furthermore, as we have seen, the schema concept is also essential to Bartlett's account of the persistent retention of novel details, and of rote remembering.

Bartlett's examples of accuracy in recall

So far, we have noted how Bartlett's summaries of his theoretical position and the implications of his empirical findings are often misleading. According to the logic of his theory, remembering should be both transformative and conservative. Furthermore, his empirical studies could not in themselves justify the general conclusion that remembering is inevitably subject to error. In fact, within his 1932 book, Bartlett himself provides several examples of accurate recall. We now consider each of these in turn.

The retention of meaningless details

When Bartlett summarized the results of his experiments on the serial reproduction of pictorial material, he noted 'a strong tendency to preserve apparently trivial or disconnected detail of a non-representative character or in a non-representative setting' (Bartlett, 1932, p. 185; see also p. 117 on the survival of 'novel detail'). He returns to this issue in his chapter on 'Conventionalization', where he notes how, within social groups, 'small features often . . . resist change in an astonishing manner' (Bartlett, 1932, p. 274). He concluded that Elliot Smith and W. J. Perry were right, therefore, to rely upon such resistant features as evidence for their theory of contact between distant cultures and

diffusion of motifs. Thus, according to Bartlett, details not readily assimilated to an existing schema should be *resistant* to change.

The schematic determination of rote memory

According to Bartlett, transformation in recall is not the direct consequence of schematic determination, but the need—under certain circumstances—for the person to reconstruct that schema. When, however, the schema is well established, and the environment relatively stable or predictable, the schema is best left 'undisturbed' (Bartlett, 1932, p. 203). Bartlett begins his discussion of rote memory with the example of an old man, whose adventures are over, engaging in 'almost word-perfect reminiscence' (Bartlett, 1932, p. 203). But, as Bartlett goes on to explain, such rote remembering is not restricted to those in their dotage:

There is the low-level mental life which, being cut off from all but a few often-repeated environmental stimuli, shows unusual rote memory. All of us, in reference to some of our 'schemata', have probably completed the model and now merely retain it by repetition. All relatively low-level remembering tends, in fact, to be rote remembering, and rote remembering is nothing but the repetition of a series of reactions in the order in which they originally occurred. (Bartlett, 1932, p. 203, see also p. 264.)

In his account of schemata, Bartlett, like Henry Head, emphasized the importance of their temporal structure. He returned to this issue when, later in his book, he came to consider how cultures help make things memorable, by imposing rhythmic structure on the material to be remembered, and hence ensure that 'the order of reaction' associated with various rituals can be 'jealously preserved' (Bartlett, 1932, p. 290).

Sonia Kovalsky

Bartlett included an example of a memory prodigy, Sonia Kovalsky (Bartlett, 1932, p. 230). As a young child in her nursery, she had been surrounded by sheets of paper on the walls which were covered with mathematical formulae. Although they were meaningless to her at the time, she had been fascinated by them, and when she began her studies in calculus, their meaning is supposed to have immediately dawned upon her. In his discussion of this case, it is clear that Bartlett accepted such remarkably persistent and detailed retention as well within the bounds of possibility.

The 'wonderful memory' of the Bantu

Of the many examples Bartlett provides of accurate recall, those based on his visit to South Africa are perhaps the best known (see Cole, 1996, pp. 58–60; Neisser, 1967, p. 288). First, there are the examples of rote recall. Initially, he attributes this form of remembering to an *individual* limitation of the rememberer, 'a person of few interests, and those largely unorganised and concrete in nature' (Bartlett, 1932, p. 265). However, Bartlett also opened up a social dimension, referring to a particular form of *society*, which had time for, and encouraged, detailed recall:

there is behind [rote recital] the drive of a group with plenty of time, in a sphere of relatively uncoordinated interest, where everything that happens is about as interesting as everything else, and where, consequently, a full recital is socially approved. (Bartlett, 1932, p. 266.)

Bartlett's social account of reproductive remembering relates to a more general,

though still neglected, theme in his 1932 book: remembering as a social activity dependent upon the 'social position of the narrator' and his or her relation to the group from which the 'audience' is drawn (Bartlett, 1932, p. 266; see Edwards & Middleton, 1987).⁴ As Bartlett appreciated, detailed attention to accuracy may be not only inappropriate but positively subversive. Paradoxically, the example he gives is based upon a trial in Swaziland, where (on the face of it) one might suppose that careful attention to accurate detail would be an advantage:

The Magistrate: Now tell me how you got that knock on the head.

The woman: Well, I got up at daybreak and I did . . . (here followed a long list of things done, and of people met, and things said). There we went to so and so's kraal and we . . . (further lists here) and had some beer, and so and so said . . .

The Magistrate: Never mind about that. I don't want to know anything except how you got the knock on the head.

The woman: All right, all right. I am coming to that. I have not got there yet. And so I said to so and so . . . (there followed again a great deal of conversational and other detail). And then after that we went on to so and so's kraal.

The Magistrate: You look here; if we go on like this we shall take all day. What about that knock on the head?

The woman: Yes, all right, all right. But I have not got there yet. So we (on and on for a very long time relating all the initial details of the day). And then we went on to so and so's kraal . . . and there was a dispute . . . and he knocked me on the head, and I died, and that is all I know. (Bartlett, 1932, pp. 264-265.)⁵

To explain such rigid and meticulous recall, Bartlett wavers awkwardly between an individualistic account based on the idea of the 'relatively primitive' or 'poorly educated' mind, and a social explanation based on the generally undemanding expectations of the society for conciseness and relevance (Bartlett, 1932, p. 266). In fact, Bartlett also acknowledged that the Swazi people are perfectly capable of adapting their recall to the situation at hand, and he provides examples where their recall is very much geared to the topic at hand, and yet still impressively detailed and accurate. The most notable example of this 'prodigiously retentive capacity' concerns a Swazi herdsman who could rapidly recall the most exact details of various cattle transactions (Bartlett, 1932, p. 250).

It is important to note that Bartlett, in acknowledging the existence of rote remembering, on the one hand, and the kind of prodigious and flexible recall shown by the herdsman, on the other hand, did not regard these phenomena as exceptions to his theory (cf. Brewer, 2000; Brewer & Nakamura, 1984). In the first case, rote remembering, although not reconstructive, does nevertheless depend on a schema, but one whose temporal organization is simply repeated, or 'recapitulated' rather than

⁴ According to Edwards and Middleton (1987) and also Douglas (1986), remembering should be regarded a process occurring between people and they focus on how people in conversations construct accounts of events and the 'interactional business' people accomplish by describing events in particular ways (Edwards, Potter, & Middleton, 1992, p. 441).

⁵ Admittedly, the witness's report of her own death is somewhat exaggerated, but there is no reason to question the accuracy of the other details.

flexibly deployed. In the case of prodigious recall, specific individual or social interests give rise to 'an active tendency to notice, retain and *construct* specifically along certain directions' (Bartlett, 1932, p. 255; emphasis added) be it the detailed recall of cattle transactions, or (to take an example closer to home) cricket scores in Wisden. Both reproductive and reconstructive remembering, according to Bartlett, are dependent on schemata, both can be accurate, and, as Bartlett makes very clear, they are not restricted to any particular social group.

Accurate recall of 'gist'

Finally, and very briefly, we should remember that Bartlett did not identify 'accuracy' entirely with exactness of detail. As many commentators have noted, Bartlett's theory actually provides an alternative conception of 'accuracy' in relation to memory of past events:

In discussing the forms of memory errors it seems appropriate to start with the types of errors that Bartlett (1932) noted: gist and intrusions. The gist is the general understanding of what took place. People tend to lose the specifics of an event in favor of a more general understanding of the experience. For example, Bransford and Franks (1971) documented this in clever experiments . . . Such statements at the gist level are errors in the sense that they do not match what originally happened *but they also preserve the basic idea and in that sense can be seen as correct* (Hyman, 1999; pp. 231–232; emphasis added.)

We have to admit it is difficult to find any very clear statements where Bartlett seems to be making this point explicitly, but this alternative conception of accuracy does logically follow from Bartlett's biological perspective on remembering. In terms of adaptation, what matters is that the organism grasps the essence of a situation and not the intricate and incidental details.

Conclusion

In a scholarly commentary on schema theory, Brewer and Nakamura (1984) have argued that any 'pure reconstructive schema theory' is untenable, since it 'allows no recall of unique episodic information from the original episode' (p. 124). In fact, when Neisser first promoted his constructivist approach, he conceded that even 'if the constructive nature of memory is fully acknowledged, the fact remains that information about the past must be somehow stored and preserved for subsequent use' (Neisser, 1967; p.280; see also pp. 170, 284, 288). As Neisser (1967, p. 284) noted, 'the metaphor of construction implies some raw material'. Indeed his own example of how a complete, if speculative, dinosaur is reconstructed from a few fossil bones clearly assumes that there is some definite 'raw material' from which to work, as does Kihlstrom's (1994) account of reconstruction from 'fragmentary notes'. Neisser goes on to suggest that any *sensible* schema theory (including Bartlett's) must logically be a variant of trace theory (see also Larsen & Berntsen, 2000).

So did Bartlett subscribe to a *pure* schema theory, or to a *sensible* schema theory instead? To a large extent, our 're-reading' of Bartlett's *Remembering* agrees with the searching account provided by Brewer and Nakamura (1984) some years ago. As they themselves made very clear, there is a tension in Bartlett's account of remembering. They suggest that Bartlett had two theories: an 'official' theory and a surreptitious 'unofficial' theory. According to Brewer and Nakamura, Bartlett's official theory is a pure

schema theory; his unofficial theory is a variant of trace theory, and only that version seriously copes with the retention of specific, episodic information, by sneaking in the concept of 'trace' (see also Brewer, 2000).

We disagree with Brewer and Nakamura on just one of their points—their characterization of Bartlett's *sensible* schema theory as his 'unofficial' version. After all, that version and the various supporting observations constitute the main body of the book. In contrast, the so-called 'official' version appears primarily in the summaries Bartlett provides of his findings and theory. In our view, a more apt characterization of the inconsistency in his work is in terms of a Bartlettian process of reproduction. In his own summary 'reproductions', Bartlett often 'forgets' the details and qualifications for the sake of a more coherent and engaging 'story'. Subsequent commentators, in turn, have mainly relied upon Bartlett's own 'repeated reproduction' as the basis for their own 'serial reproductions'. Thus, the fate of Bartlett's original message nicely demonstrates both sides of his sensible schema theory, that remembering can be both accurate or inaccurate depending on the conditions. Whilst there was indeed a remarkable transformation in Bartlett's first reproduction of his 'story', later reproductions have remained remarkably stable and resistant to change or indeed further correction.

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