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Qualitative Experiments in Psychology: The Case of Frederic Bartlett's Methodology

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Abstract: In this article, I explore the meaning of experiments in early twentieth century psychology, focusing on the qualitative experimental methodology of psychologist Frederic BARTLETT. I begin by contextualizing BARTLETT's experiments within the continental research tradition of his time, which was in a state of transition from a focus on elements (the concern of psychophysics) to a focus on wholes (the concern of Gestalt psychology). The defining feature of BARTLETT's early experiments is his holistic treatment of human responses, in which the basic unit of analysis is the active person relating to some material within the constraints of a social and material context. This manifests itself in a number of methodological principles that contrast with contemporary understandings of experimentation in psychology. The contrast is further explored by reviewing the history of "replications and extensions" of BARTLETT's experiments, demonstrating how his methodology was progressively changed and misunderstood over time. An argument is made for re-introducing an open, qualitative and idiographic experimental method similar to the one BARTLETT practiced.

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1. Introduction

BARTLETT's (1995 [1932]) early experimental studies have been praised for their originality and have continued to exert a considerable influence on memory research, as well as on the study of other psychological phenomena. At the same time, contemporary experimental psychologists have often criticized them as methodologically loose pseudo-experiments (KINTSCH, 1995; ROEDIGER, 1997). This critique comes in part from psychology's current understanding of an experiment as the manipulation of an independent variable while holding all other variables constant, and inferring a relation between variables through statistical analysis of a large sample of subjects. This definition was not, however, dominant in BARTLETT's time and only became so in the 1960s; the natural sciences, by contrast, still tend to use a much more open definition of an experiment

(WINSTON & BLAIS, 1996).[1] In the first half of the 20th century what counted as an "experiment" in psychology was still quite an open proposition, and included many qualitative and idiographic approaches, as can be seen in the classic experimental studies of Jean PIAGET (1932) on children's development, Wolfgang KÖHLER (1929) on gestalt laws, and Lev VYGOTSKY (1986 [1934]) on thought and language.[2] [1]

The aim of this article is to re-examine BARTLETT's experimental approach in light of the earlier understanding of an experiment. First, I present the historical context in which he developed his methods, by reviewing the experimental studies of Hermann EBBINGHAUS (1913 [1885]), the Würzburg School (e.g., KÜLPE & BRYAN, 1904) and Jean PHILIPPE (1897). This choice of researchers is necessarily selective, but will suffice to draw out the general background of BARTLETT's approach through an exploration of what he accepted and rejected from each of them. Second, I will review the procedures and findings of his earliest experiments conducted between 1913 and 1916. Third, I will highlight some of the distinctive features of his methodological approach, which shares much in common with the German-Austrian approach of the time, but diverges in significant ways from contemporary understanding. Lastly, I will discuss the numerous replications and extensions of BARTLETT's experiments by psychologists. This will help to illustrate the transformations in experimental practice from BARTLETT's time to today. [2]

2. From Elements to Wholes: Experimental Psychology, 1885-1910

BARTLETT conducted his most well know experiments at a time when psychology was beginning to move away from the traditional model borrowed from psychophysics towards a more holistic approach. BARTLETT (1995 [1932], Chapter 1) argued that psychological processes involve an active mind and therefore one cannot simply use a methodology that simply looks for cause-effect relationships between variables. Traditional experimentation involved isolating and itemizing responses in order to identify how a stimulus directly causes a sensation in the organism. For example, FECHNER (1912 [1860]) had used experimental methods to discover a non-linear mathematical relationship between a stimulus's physical intensity and the psychological sensation it produced in a subject. It was FECHNER's "Elements of Psychophysics" (1912 [1860]) that inspired Hermann EBBINGHAUS (1913 [1885]) to apply this methodology to "higher mental functions" in order to discover the quantitative laws of memory. [3]

To apply the psychophysics model, EBBINGHAUS (ibid.) needed to find stimuli that were simple and homogenous so that they could be treated as constant and

1 WINSTON and BLAIS (1996) demonstrate that natural science textbooks tend not to define an "experiment" at all.

2 KLEINING (1986) has earlier described "qualitative experiments" in relation to the Würzburg school, Gestalt psychology and PIAGET's developmental studies. According to KLEINING, this form of experimentation operates by a logic of systematic variation in a controlled setting while at the same time remaining close to the phenomena of interest; this allows the experimentalist to discover the underlining "structure" of the research object. As we will see, BARTLETT's own experimental methodology fits squarely within this definition.

interchangeable units. This was found in his famous "non-sense syllable," a consonant-vowel-consonant combination, such as SEH or RUP. EBBINGHAUS prepared all possible syllables, which were then mixed together and selected them by chance to construct series of non-syllables of varying lengths. He looked at each syllable in the series for a fraction of a second, keeping the order of syllables constant, and pausing for 15 seconds before going through the series again. This was repeated until he could recite each syllable in the series without error. EBBINGHAUS then measured the time it took to learn a list as a function of the number of syllables in the list, and the amount of work "saved" in relearning a list as a function of the time that had passed since it was learned, which was measured by subtracting the number of exposures to relearn the list from the number it originally took. The former is a near linear relationship (i.e. it takes about twice as long to learn a list with twice as many syllables, once the first seven immediately memorized units are accounted for), whereas the latter represent a non-linear relationship (i.e. most forgetting occurs in the first twenty minutes after having learned the list; as more time elapses the rate of forgetting decreases). [4]

BARTLETT (1995 [1932], Chapter 1) critiqued EBBINGHAUS (1913 [1885]) by arguing that it is impossible to fully remove meaning from stimuli that require a human response and that attempting to do so creates artificial conditions with little generalizability to everyday life. EBBINGHAUS wrongly assumed that he could eliminate meaning from the laboratory and in so doing study memory in its simplest and purest form, uncontaminated by other influences. In fact, in attempting to do this, he lost the very phenomena he set out to study in his pursuit of greater experimental control. Moreover, this method ignores other important aspects of remembering, such as imagination, emotion, and context. What is most essential about remembering, as it normally occurs, is that it is done through previous experience, in a social context and activates a person's interests (BARTLETT, 1995 [1932]). These factors are precisely the ones that EBBINGHAUS tried to remove from his investigation. [5]

This critique applies to all forms of experimentation in psychology that take psychophysics as their model and attempt to rigidly control conditions by striping complex processes down to their simplest elements. According to BARTLETT (1995 [1932], p.6), "[i]n it all is the tendency to overstress the determining character of the stimulus or of the situation, the effort to secure isolation of response by ensuring simplicity of external control." In short, these experimentalists come to worship the stimuli. This causal method may have been successful in psychophysics but its application to psychological processes is questionable, because psychology must deal with the whole person making a response within a particular context, not just how some stimulus causes an isolated reaction. BARTLETT advocated a methodological holism, in which whole organisms are seen as being actively involved with their environment. In other words, he was much more interested in what an individual contributes to a reaction than how it is caused by some external factor. [6]

This analytic focus on an active person was found the Würzburg School's experimental method, which was being fervently debated in Cambridge when BARTLETT was conducting his own experiments.[3] The Würzburgers were critical of the tendency to think of the mind as mechanically reacting to stimuli. In one early experiment, KÜLPE and BRYAN (1904) presented subjects with a series of non-sense syllables, but unlike EBBINGHAUS' lists, their cards were of different colors, letters and arrangements. The subjects were instructed to remember one of these aspects (e.g., the color). They found subjects could easily remember the task specified aspect but remained oblivious to other aspects of the syllables, even though they impinged on their sense organs just as the apprehended features had. To explain these differences a passive mind mechanically responding to stimuli would not do; instead the mind would need to be conceptualized as possessing "intentionality." [7]

Intentionality is a technical word borrowed from the philosopher Franz BRENTANO (1973 [1874]).[4] The term should not be confused with the common language usage of having an intention; rather it describes how every mental act (in contrast to the physical) has "aboutness"—it points beyond itself to an object. This idea was also an essential part of James WARD's (1918) psychology, which played a major role in BARTLETT's thought. The Würzburg psychologists elaborated the idea to develop a theory of consciousness that emphasized mental directedness over mechanical association. For instance, ACH (1905) and WATT (1905) experimentally demonstrated that subjects could easily give synonyms or superordinate associations of words, over more strongly associated words, if the task demanded it (BORING, 1950, pp.403ff.). [8]

Subjects in ACH (1905) and WATT's (1905) experiment also reported the experience of task orientation and monitoring of progress towards a goal (e.g. experiences of doubt, hesitation and confidence). These were characteristics of consciousness that the Würzburgers claimed could not be reduced to either

3 In the first decade of the twentieth century a fierce debate raged over whether "imageless thought" was possible and through what methods of investigation could the question be approached. On one side, WUNDT (1907) argued that experimental psychology must limit itself to the study of *inner perception*, in which some external stimulus could be varied and the subject's experience was *immediately* reported. WUNDT believed this experience could be decomposed into sensations, images and feelings. On the other side, the Würzburg psychologists argued that a rigorous experimental methodology of thought was possible, using *retrospective* self-observation (e.g. BÜHLER, 1908). In this method, subjects or "observers" were given an experimental task, such as providing a word association, making a judgment or solving a thought puzzle. They were to silently resolve the task and then immediately afterwards provide a detailed introspective report or "experiential protocol" of how they arrived at the solution. The aim was to access the *process* of thought. In their analysis, the Würzburgers borrowed heavily from BRENTANO's (1973 [1874]) "act psychology" to highlight *intentional* aspects of consciousness irreducible to WUNDT's sensationist typology. Thus, they emphasized the active goal-directed character of mind. This debate was carefully followed at Cambridge, especially by BARTLETT's mentors James WARD (1918, pp.308-311) and Charles MYERS (1911), who adopted opposing views. It is thus not surprising that BARTLETT had an active interest in the Würzburg approach, sometimes borrowing from them and at other times criticizing them. Through his career there is a trend from the former to the latter position.

4 BARTLETT (1917, pp.10-11) himself makes a specific reference to BRENTANO, when he characterizes all psychological processes as "an effort after meaning," which he defines as "a very constant general tendency on the part of the subject to link on that which is now being experienced with something that has been experienced already, so that a present object is given a setting."

sensations or images. This new mental content was first labeled *Bewusstseinslage* (literally "position of consciousness") (MAYER & ORTH, 1901). The word has been used to describe both goal-directedness (e.g., a state of readiness and monitoring of progress toward a goal) and a general impression or summary feeling of some material (e.g., "this is familiar" or "this is foreign"). The Würzburg psychologists that followed developed similar concepts to describe this directed and diffuse characteristic of mind, such as "determining tendency," "task," "conscious attitude" and "awareness." In all cases, directedness was considered the principle "motor" of mind, rather than passive associative laws. [9]

BARTLETT used the concept of "attitude" in a manner similar to the Würzburg concepts in order to describe both a subject's monitoring of progress toward a goal as well as a summary feeling or general impression of some material. In fact, TITCHENER (1909) first (mis)translated *Bewusstseinslage* as "attitude of consciousness." BARTLETT (1917) himself explicitly recognized the similarity between his concept and the Würzburg psychologist BETZ's (1910) term *Einstellung* [setting, attitude, or mental set]. The early concept of attitude should not be confused with the way it is used in contemporary psychology as a static evaluation of some object, which is easily measured on a rating scale. Instead, an attitude is here a holistic orientation to the world that occupies a moment or position within a serial process, elsewhere described as schema (see WAGONER, 2013). Some attitudes named by BARTLETT (1952, p.88) are "surprise," "astonishment," "suspicion," "doubt," "indifference," "anticipation," "expectancy." [10]

BARTLETT applied the concept of attitude to his own experimental methodology in carefully observing and listening to his subjects as they performed his experimental task. From the Würzburgers' research as well as his brief clinical experience, he knew that inner conditions of a response were just as important as the external, and thus simply keeping the environment constant was not enough to ensure objectivity in an investigation.

> ”[T]he external environment may remain constant, and yet the internal conditions of the reacting agent—the attitudes, moods, all that mass determining factors that go under the names of temperament and character—may vary significantly. These, however, are precisely the kind of determinants [of experience and behavior] which are pre-eminently important for the psychologist” (BARTLETT, 1995 [1932], p.10). [11]

BARTLETT notes, for example, that on entering the context of an experiment an "analytic" attitude tends to arise in subjects, such that they become more concerned with details and accuracy than they would be in their everyday lives.[5] [12]

Although BARTLETT borrows key features from the Würzburg psychologists, he is also critical of their reliance on retrospective data. This is not to say that

5 MIDDLETON and EDWARDS (1990) also demonstrated this by leaving a tape recorder running after the experimental task was completed by participants. During the experiment participants focused on accurately describing and ordering events of a film, whereas their post-experiment discussion shifted to their feelings and evaluation of it.

introspective data should not be used in psychology—he is clear that it should—but it should be captured spontaneously, so that the beginning and end of a process are not privileged, as tends to happen when subjects are asked about their thinking retrospectively. We know from EBBINGHAUS's (1913 [1885]) experiments that the first and last items in a series are remembered with a much higher frequency than those in the middle—what is called "serial position effect." Moreover, BARTLETT's primary data is always subjects' (re)construction of some given material, which can then be interpreted in light of introspective evidence. Thus, introspective data tends to be used by him more as a resource to interpret objective constructions. [13]

The most important and direct methodological inspiration for BARTLETT's method, by his own account, was French psychologist Jean PHILIPPE's (1897) experimental study of mental images, which James WARD had encouraged him to explore (BARTLETT, 1995 [1932], p.63). PHILIPPE (1897) had his subjects close their eyes and handle a small object, so as to obtain a mental image of it. Subjects were then to draw the image they formed immediately and at intervals of one or two months. From the series of drawings subject's produced, PHILIPPE identified three different types of changes occurring in them: 1. the image tends to disappear: its details drop out one by one or become so vague that the subject will not even be able to indicate it verbally; 2. while certain details drop out others grow and become dominant in the whole. This in turn fosters new details being substituted for those in the original; or 3. the image becomes generalized: it conforms more and more to a general type for which it belongs, such that specific details of the object disappear and those that are most central remain. [14]

This analysis of qualitative changes occurring through a series of reproductions comes very close to the one BARTLETT (1995 [1932]) used in his experiments on remembering. In his fellowship dissertation, BARTLETT (1917, p.9) even accepts the qualitative changes PHILIPPE identified as the starting point for his inquiry and modestly aims to extend them in his own study. Thus, PHILIPPE provided BARTLETT with a holistic method to study the mind as active, affective and most importantly, in the process of change. Against the traditional view of images as static remnants of sense perception, PHILIPPE (1897) argued, "images are mobile, living, constantly undergoing change, under the persistent influence of our feelings and ideas" (quoted in BARTLETT, 1995 [1932], p.15). BARTLETT approves of this point and adopts a similar view of images when he later articulates a "theory of remembering" (WAGONER, 2013). However, from the very start, he rejects PHILIPPE's account of images as things hiding in the unconscious, coming up occasionally to be seen in mental life. Instead, BARTLETT adopts a "functionalist view," exploring the conditions under which images arise. [15]

There is another important difference between the thinkers worth pointing out. PHILIPPE (1897) makes a sharp distinction between images and memory. According to him, memory describes those mental features that are lifeless and fixed, while images are just the opposite, though the two lie side by side. This division perpetuates the view of memory as a distinct faculty that is isolated from

total organismic functioning (the same fallacy committed by EBBINGHAUS). Thus, while PHILIPPE provided a powerful new method for studying holistic transformations, his analytic distinctions lead him back into old ways of thinking. BARTLETT is more consistent in his holism, recognizing that it is the whole person involved in a particular setting that makes a response. The mind cannot be divided into separate faculties, each to be studied in isolation from the others. Any sharp distinctions made between perceiving, imagining, remembering and thinking will always be arbitrary; these processes differ in degree rather than kind. Thus, we find studies focused on perceiving and imagining directly contributing to the study of remembering in BARTLETT's (1995 [1932]) work. [16]

In summary, EBBINGHAUS' (1913 [1885]) study was instructive to BARTLETT (1995 [1932]) in that it showed the dangers of overly simplifying psychological reactions to obtain greater experimental control. A psychophysical method would not due if one wanted to study truly psychological responses. By contrast, the Würzburgers helped to analyze factors that the person contributed to a reaction, such as the dynamic attitude to the stimulus material and experimental task. The objectivity of the experimenter thus required knowing the inner conditions of a response as well as the outer. PHILIPPE then provided BARTLETT with a method for accessing and analyzing qualitative transformations in experience, though BARTLETT rejected his distinction between images and memory. From these influences BARTLETT developed a holistic methodology that did not isolate human responses from the person who makes them, nor did it try to artificially separate these responses from the environment in which they occur and the material they work on. Instead, BARTLETT aimed to show how a situated person actively responds to a meaningful situation with the help of previous experience. [17]

3. Experiments on Perceiving and Imagining

According to BARTLETT's (1995 [1932], p.p.xvii, 1958, p.139) own account, his experimental program began on the day of the official opening of the Laboratory of Experimental Psychology at the University of Cambridge, in May 1913. The founder and then director of the laboratory, C.S. MYERS, asked BARTLETT if he would carry out a variety of routine visual perception experiments on the visitors to the laboratory. BARTLETT was fascinated by the variety of interpretations that people made of the same diagrams and pictures. This event inspired him to invent his own study for "demonstrating experimentally those parts particularly of the complex perceiving response for which the observer himself was responsible" (BARTLETT, 1958, p.140). This led into an investigation of imagining, to some extent thinking, and eventually to remembering. [18]

To study perceiving, BARTLETT used a tachistoscope to present subjects with visual material for intervals of 1/15 to 1/4 of a second and then asked what they had seen. The material presented was highly diverse, progressing from simple designs and patterns to concrete picture material, including paintings. BARTLETT (1995 [1932]) notes that subjects immediately set up an attitude or general impression to the material. From it they constructed a unified interpretation out of the limited information that they took in during the brief interval; this in turn helped

to "fill in the gaps" in what they had seen. With regards to designs and patterns, the general impression was the "plan of construction" and with picture material it was a feeling for the kind of situation depicted. One fairly confident subject described his experience doing the task with complex designs thus:

> "In every case ... I kept my gaze fixed on the screen for a few seconds after the window had shut down. I was trying to get a clear image of what I had seen, and in doing this I usually felt part of the design escaping me, while the rest set into a firm enough shape to be transferred to paper" (BARTLETT, 1916, p.233). [19]

From the beginning, BARTLETT noted subjects' spontaneous act of "naming" the material. This functioned to render their attitude toward it more "definite and contented" (1995 [1932], p.18) With the simplest designs, naming was done immediately but did not change their reproduction; however, with the slightly more complex designs this did occur. For example, one design was given pointed prongs by a subject who called it a "pick-axe," a rounded blade by a subject that called it a "turf-cutter," a larger ring at the top of the shape by several subjects who called it an "anchor," and the blade was correctly reproduced by a subject who called it a "prehistoric battle axe." This finding directly foreshadows a famous experiment by CARMICHAEL, HOGAN, and WALTER (1932) that showed the way a design was remembered depended strongly on the name given to it. CARMICHAEL et al.'s experiment differs in that they provided the name for their subjects, whereas subjects spontaneously generated it in BARTLETT's perceiving experiment. However, in BARTLETT's method of picture writing (see below) he also provides his subjects with names for the material to be remembered. [20]

BARTLETT often presented the same or similar material multiple times, so as to slow down the process of perceiving to capture early and intermediate phases.[6] Some designs progressed in a series from simple to complex. For these, subjects got an impression of the whole and its symmetry, while readily "feeling" changes from one design to the next. Their perception also included an anticipation of what was to come in the next design. When their expectation of changes did not pan out their reproductions suffered. When a painting was presented multiple times, subjects tended to add details but held fast to their first impression. For example, every person made something different out of a well-known painting of "Hubert and Arthur" by W.F. YEAMES.[7] One commented on the first trail:

> "It is a woman in a white apron with a child standing by her knee. She is sitting and has her legs crossed. She is on the right of the picture as I see it, and the child is looking at her" (BARTLETT, 1995 [1932], p.29). [21]

6 This technique was later mastered by the Second Leipzig School of psychology, which they called *Akualgenese*, sometimes translated as "microgenesis" (see WAGONER, 2009). Interestingly, their key phrase "striving for the whole" (see WAGONER, 2011) comes very close to BARTLETT's own "effort after meaning" (BARTLETT, 1917, p.14). However, I have not discovered any evidence of a direct influence between them. Instead, these ideas seem to be a part of the *zeitgeist* of early twentieth century psychology.

7 In the painting, we see young Arthur, the rightful heir of the throne, plead with Hubert not to blind him, as he has been instructed to do by Arthur's usurper uncle King John.

On a second showing the subject decided the woman was standing up but did not change much on the following thirty-six presentations. [22]

Subjects got a feeling for the material as a whole but some dominant details also stood out. The most easily apprehended figures were those in which there was a dominant detail in the center around which other features were organized. Details that seemed out of place in the whole were also often recognized, such as the missing corner in a square with dialogues, although what corner was missing was not easily identified. For complex designs, subjects noticed the circles in the design and often tended to multiple them in their drawing, particularly when they did not comprehend the plan of construction.[8] Finally, with picture material many subjects attended to and claimed to be able to read the nearly illegible writing on a sign next to a gate. Interestingly, 80% of his subjects saw "trespasses will be persecuted" (p.27), while others saw very different letters but words with similar meaning—for example, "No road" or "keep off the grass" (ibid.), which is a sign still commonly seen today in front of Cambridge College lawns. [23]

In perceiving we already find the rudiments of imagining. A study of imagining was thus a natural next step. BARTLETT gave subjects (n=36) a series of thirteen inkblots on cards and asked them to "see what you can make of them, as you sometimes find shapes for clouds and faces in the fire" (p.252). To do the task subjects quickly developed the habit of holding the cards at arm's length so as to better observe the whole situation, and as such, outstanding details played a lesser part in these reactions. For particularly complex inkblots, however, some subjects adopted the method of breaking the inkblot into parts and dealing with each separately. These subjects tended to develop less fantastical images than subjects who did not adopt an analytic attitude. In all cases, subjects had to find something to link the material to; what one subject described as "rummaging around" in his mind to find the appropriate image. [24]

One of the most striking general results of the imagining study was the enormous variety of interpretations subjects came up with. The same inkblot suggested entirely different things for different subjects. For instance, one blot evoked the following images for different subjects, a "camel," a "tortoise," "a dog worrying[9] a tablecloth," "two dead ducks and an ostrich," an "octopus," "a baby in a cot with a doll following out," "a picture of Sohrab and Rustum in a book of Arnold's poems" (p.36). To say interpretations were varied is not, however, to say that they are random, without consistency or constraint. A number of factors influenced the interpretations. First, BARTLETT observes that the majority of interpretations concerned dynamic animal life and that inanimate objects were rare. Second, images tended to be related to an active interest in the subject. For example, a woman saw a series of clothing items (e.g., "bonnet with features") and fabrics (e.g., "furs' marabout"); a clergyman saw scenes of the biblical King Nebuchadnezzar; while the same blot reminded a physiologist of the "basal

8 This tendency towards multiplication of a particular feature had been identified by HADDON (1894) as a key mechanism of cultural *elaboration*, and as the characteristic device of the decorative mind.

9 He may have meant "wearing" instead.

region of the digestive system" (p.38). Third, BARTLETT noticed that an interpretive stance or attitude set up toward one inkblot often persisted through the series. For instance, one subject saw "ghosts, more ghosts kissing, more kissing green ghosts" (ibid.). This occurred independently of any conscious effort on the part of the subject, further confirming Würzburger's observations about attitudes. [25]

In the last step of his analysis, BARTLETT classifies his subjects into two general types: a *particularizing* type, who tend to form images of a definite character, and a *generalizing* type, who imagine an object of general kind, outside of a specific situation or time. Particularizers made up 59% of subjects, generalizers 24% and mixed only 17%. BARTLETT further subdivides particularizers into those whose images are mostly reminiscent and those who are not. Reminscent particularizers tended to get a strong personal feel of an earlier experience from the blots which was accompanied by distinct visual imagery. One subject even turned her face in disgust from an inkblot that reminded her of an incident many years before in which she suffered a shock on finding a snail crawling along a bread plate. Particularizers who were not dominantly reminiscent were generally amused with the strangeness of their suggestions. All particularizers tended to form detailed and lively images at a rapid pace. By contrast, generalizers reacted slowly, without visualization and often no interpretation for an inkblot. They approached the task analytically, impersonally, and disinterestedly, as a problem to be solved. These subjects often had highly specialized scientific interests. [26]

Taken together these studies demonstrate the importance of interests, values, feelings and previous experience in psychological acts, such as perceiving and imagining. All subjects related to the material given by connecting it to some previous experience, as such perceiving and imaging are already infused with memory. From this observation BARTLETT (1917, p.14) argued that psychological acts involve what he calls "an effort after meaning." This refers to the general tendency "to connect what is immediately given with something else not actually present" (ibid.). The "something else" is later referred to as a "setting," "scheme" or "schema," which BARTLETT defines as an active organization of past reactions and experience (see WAGONER, 2013). Moreover, by "effort" he does not mean to imply strain but rather the work of an active mind. "Effort after meaning" comes very close to BRENTANO's notion of "intentionality" with its analytic focus on the transitive character of psychological acts (see §8 above). BARTLETT (1995 [1932]) also makes an analogy with RUBIN's (1915) insight that a figure (e.g., the face-vase) only stands out against some background, the background here being the active organization of past experience. This framework would be essential to interpreting his experiments on remembering. [27]

4. Experiments on Remembering

BARTLETT's most famous experiments on "remembering" were in fact first framed as "a contribution to the experimental study of the process of conventionalization" in his 1917 St. Johns Fellowship dissertation. "Conventionalization" was coined by BARTLETT's mentor William H.R. RIVERS (1912) to refer to the process by which foreign cultural elements are transformed towards familiar patterns when they enter a recipient group (see WAGONER, 2014). BARTLETT designed his studies to explore some of the psychological aspects of this process. He writes in his dissertation, that the studies will additionally contribute to the psychology of imagining (by extension of PHILIPPE's [1897] work) and lead into a study of thinking (BARTLETT, 1917). Remarkably, the issue of remembering is only briefly mentioned in his early writing. There is, nonetheless, much consistency in his analysis of these experiments from their discussion in his dissertation through their publication as articles in the 1920s to his book "Remembering" (1995 [1932]). The methodological strategy of these experiments will be my focus here. [28]

The four methods found in BARTLETT's dissertation (1917), and in "Remembering" (1995 [1932]) under the heading of "Experiments on Remembering," follow the same general form: subjects were shown stimuli (i.e., images, stories, or other prose passages), which they were to reproduce from memory at increasing time intervals. The interval of reproduction was carefully selected to capture the emergence of qualitative changes in reproductions: if the intervals were too short the reproductions would become fixed[10] and if too long the research would not see the intermediate phases of change. The four methods differ mainly in the conditions under which reproduction takes place. BARTLETT purposely varied conditions to explore different aspects of reconstruction. Let us consider each method in turn. [29]

In the method of description[11] subjects (n=20) were shown five faces[12] of military men consecutively for ten seconds each (see Figure 1 below). These experiments were carried out during the First World War and as such these kinds of images were familiar to subjects. After an interval of 30 minutes subjects were asked a series of questions about each face, regarding its details and direction of view.[13] A slightly different set of questions was used in the second reproduction,

10 There is a phenomenon called "hypermnesia," in which memory will actually improve when reproductions happen at short intervals from one another (see WHEELER & ROEDIGER, 1992).

11 This experiment was first published as "The Functions of Images" (BARTLETT, 1921) and thus was originally conceived by BARTLETT to be focused on the process of imagining, though the boundary with remembering was for him an arbitrary one.

12 Interestingly, BARTLETT (1917) opens his dissertation with this quotation from R.L. STEVENSON on memory of faces: "Faces have a trick of growing more and more spiritualised and abstract in the memory until nothing remains of them but a look, a haunting expression, just that secret quality in a face that is apt to slip out under the cunningest painter's touch" (p.1).

13 For example, for one face he asked: "(1) Which way does he look? (2) Was he smiling? (3) Was he getting old? (4) Did you see both ears? (5) Had he a square chin? (6) Did you notice the cap? (7) Was it round, without a peak? (9) Did you notice the ribbons? (10) What was the name on the cap in black or in white? (11) Was the cigarette half-smoked? (12) Had he an open front

which occurred after a week or two, and additional reproductions were done after longer intervals. Some of the questions asked suggested details not present in the particular face discussed. The suggested but inaccurate detail was either to be found in another face in the series or else simply in the subject's broader knowledge of faces.[14] This allowed BARTLETT to compare "transferences" of detail from one face to another within the series and "importations" of details into a face from without the series. Importations were about twice as frequent as transferences. Regarding to the latter, BARTLETT finds that dominant details in the series, such as a pipe, a mustache, and cap badges, were most frequently transferred. We are told that cap badges were of general public interest during WWI, which also helps to explain why familiar cap badges that were not in the original series were commonly imported into reproductions. Two other frequent transformations were confusions concerning the order of faces (occurring in 35% of subjects by the first reproduction) and change in the "direction of regard" (by 60% of subjects).

Figure 1: Faces in BARTLETT's method of description experiment (1995 [1932], p.47) [30]

In addition to categorizing the changes introduced into reproductions, BARTLETT also analyzed the influence of the attitudes, interests and methods used by subjects to recall the faces. As with his experiments on perceiving, he emphasizes subjects' reliance on a general impression, partly formed out of dominant details, selected based on the subject's interests. Faces are first described as "with a smiling look," "good humored," "with a broad grin" or "a grave expression," "He is about fifty, stern, serious and unattractive-looking," "He looked very well-feed and groomed" (p.53). BARTLETT further notes the power of affective attitudes to shape the subject's image. One subject had the impression of a face as being "serious and determined" (p.54). Compared to the original, the image that she developed "was very much more serious; his mouth was firmer, his chin more prominent, his face more square" (p.54). This effect was even more striking when subjects were reminded of a conventional representation of a face, such as British drawings of a common soldier (i.e., "the Tommy Atkins"[15]) or a sailor. These images tended to conform more to this general type, as PHILIPPE's (1897) study had also shown. [31]

to his uniform?" (BARTLETT, 1917, p.43)

14 As such this could be seen as an early experiment on memory suggestibility (see e.g. LOFTUS, 1975).

15 This was the colloquial name for a common soldier during the First World War in Great Britain.

As with his experiment on imagining, BARTLETT concludes his analysis with a typology of subjects. Here he identifies two methods of remembering used by subjects—visualization and vocalization. Visualizers are those who rely primarily on visual imagery, while vocalizers rely more on linguistic cues. These describe the preferred persistent method used by a subject in dealing with an experimental task, which he identifies through participants' reports. Through these reports he finds that visualization carries certainty with it whereas vocalization is accompanied by doubt. This is the case because of visual images' vivid, rich, and exciting expression in consciousness. Due to these characteristics, when a subject is torn between a visual and vocal memory of an object they will choose the former. This, however, does not mean that visualizers reproduce the material more accurately; demonstratively they do not. Secondly, vocalization is a direct expression of meanings, while meanings have to be developed out of visualization. For this reason, remembering through visualizing appears "jerky" in comparison with vocalizing. BARTLETT also comments that subjects tend to prefer the use of one of these modes in their engagement with his experimental tasks, which he can say because he used some the same subjects in multiple experiments. [32]

The other three methods deal more directly with the question of "the way in which conventional modes of representation and behaviour are developed within the social group and transmitted from group to group" (BARTLETT, 1995 [1932], p.95). In other words, these latter methods were meant to directly model the psychological processes involved in conventionalization. To do this, BARTLETT borrowed the majority of stimuli material for these experiments from his wide anthropological readings—in particular, from TAYLOR's (1883) comprehensive study of "The Alphabet," MALLERY's (1894) study of North American petroglyphs, and BOAS' (1901) study of native American folklore. All these studies demonstrated a variety of ways in which culture is "simplified" and "elaborated" in systematic directions by receiving groups (WAGONER, 2014). Using unfamiliar material also helped to make visible social psychological processes that normally operate unnoticed. The dramatic changes introduced into a foreign story or image when it is reproduced foregrounds the social background through which these processes occur. BARTLETT also used more familiar material to compare with, such as a journalist's description of a croquet match, selections from EMERSON's "Self-Reliance" (1908) and a drawing of a house. [33]

The method of picture writing was designed to explore the transformation of written language signs, as one finds in petroglyphs. Subjects were required to learn eighty signs, each standing for a specific word, which they did by grouping the signs together by representativeness, association, common reference or principles. Fifteen minutes after the subject had finished learning the signs, BARTLETT (1995 [1932], p.97) told them:

> "I am going to dictate to you a short story in which some of the words that had signs will be used. Whenever a sign-word comes, write the sign for it. Write as quickly as you can, and don't worry too much about exact accuracy. I shall keep you writing as fast as you can go." [34]

With this method BARTLETT was intentionally setting up conditions in which subjects are unable to make a directed and laborious effort to secure accuracy of reproduction. This was for him a great virtue of the method, because in everyday life accurate reproduction is incidental to our main purposes. In contrast, when subjects in an experiment are directly ask for a reproduction they generally adopt a careful and diligent attitude. Finally, as with the method of description, the method of picture writing allowed BARTLETT to explore cross-modal dimensions of memory—here between word and image. [35]

In subjects' reproductions omissions were common and tended to occur when the form of the sign had no representative significance in relation to the word, to some signs in a sign-grouping that were similar in form, and where there was a simple sign in an easy series. Of the 920 total test words reproduced by his subjects, nearly half (i.e., 466) were significantly transformed (BARTLETT, 1917, p.153). Signs were frequently given a different direction, but this change did not seem to follow any given rule. After a week, there was also widespread blending and confusion of details for signs that were similar in form but unlike in assigned significance. Some other common changes were signs taken to be representative losing details which are not essential to their significance (e.g., an eye sign loses its eye-lashes) and those with a similar conventional representation changed to look more like the familiar form (e.g., a squiggle changes to look more like lighting). As in the other methods, odd and novel details were often retained and exaggerated, while unrepresentative signs containing repetition of some feature frequently multiplied it further. Furthermore, signs grouped together tended to be assimilated to a class of signs and lost their distinctive features. Finally, naming an unrepresentative sign strongly influenced how it was reproduced. [36]

BARTLETT (1995 [1932]) is perhaps most famous for his method of repeated reproduction. He used many different written texts with this method but in "Remembering" he confined himself to an analysis of participants' reproductions of the native American folk tale *War of the Ghosts (see below),* while keeping in mind throughout corroborative detail from the use of other material. The story is particularly apt to the task because it involves numerous narrative disjunctures, seeming lack of logic, strange and vivid imagery, among other puzzling elements. French anthropologist LÉVY-BRUHL would have interpreted the story as a good example of "primitive mentality" (WAGONER, 2012). For BARTLETT, the striking difference to British ways of thinking provided a powerful illustration of the process of conventionalization. He says, "I wished particularly to see how educated and rather sophisticated subjects would deal with this lack of obvious rational order" (1995 [1932], p.64). [37]

Interestingly, the story itself had already gone through a number of transformations before finding its way into BARTLETT's experiment. BARTLETT's source for the story was a book "Kathlamet Texts" published by the American anthropologist Franz BOAS (1901), who learned it from one of the last remaining Kathlamet speakers. Boas transcribed two versions of the story, told to him on different occasions, and then translated them into English with his informant's help. Before publishing it, BOAS smoothed the language out to make

it more readable. BARTLETT then "slightly modified" one of these stories, removing phrases such as "blood came out of his anus," apparently to make it more palatable to his British participants.[16] In this way the story had already been partially conventionalized before it had even been shown to BARTLETT's participants. Here is the version of the story he used in his experiments:

> "War of the Ghosts
>
> 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. Now canoes came up, and they heard the noise of paddles, and saw one canoe coming up to them. There were five men in the canoe, and they said:
>
> 'What do you think? We wish to take you along. We are going up the river to make war on the people.'
>
> One of the young men said, 'I have no arrows.'
>
> 'Arrows are in the canoe,' they said.
>
> 'I will not go along. I might be killed. My relatives do not know where I have gone. But you,' he said, turning to the other, 'may go with them.'
>
> So one of the young men went, but the other returned home.
>
> And the warriors went on up the river to a town on the other side of Kalama. The people came down to the water and they began to fight, and many were killed. But presently the young man heard one of the warriors say, 'Quick, let us go home: that Indian has been hit.' Now he thought: 'Oh, they are ghosts.' He did not feel sick, but they said he had been shot.
>
> So the canoes went back to Egulac and the young man went ashore to his house and made a fire. And he told everybody and said: 'Behold I accompanied the ghosts, and we went to fight. Many of our fellows were killed, and many of those who attacked us were killed. They said I was hit, and I did not feel sick.'
>
> He told it all, and then he became quiet. When the sun rose he fell down. Something black came out of his mouth. His face became contorted. The people jumped up and cried.
>
> He was dead" (1995 [1932], p.65). [38]

BARTLETT had Cambridge students, colleagues and other residents of Cambridge read the story twice at regular reading speed.[17] After a period of approximately 15 minutes, participants wrote out the story down by hand on a sheet of paper as best they could remember it. This was repeated several times at increasing time intervals—in one case ten years later. The reproductions produced by each participant were analyzed as a series or chain, exploring what was added, deleted, and transformed from the original to first reproduction and from one reproduction to the next. In his analysis, BARTLETT provides readers with a full series of reproductions for particularly illustrative cases and a detailed analysis of the changes introduced, and then elaborates on the general trends

16 See BEALS (1998, pp.19-24) for a comparison of BARTLETT's and BOAS' versions of the story.

17 BARTLETT also tried presenting the story orally to subjects.

found across his sample. As mentioned above, his analysis incorporates participants' introspective reports in order to understand the interpretive and affective processes that lead to the transformations introduced into their reproductions. One participant provided the following detailed account (abbreviated here) at the first reproduction:

> "When I read the story ... I thought the main point was the reference to the ghosts who were went off to fight the people further on ... I wrote out the story mainly by following my own images. I had a vague feeling of the style. There was a sort of rhythm about it I tried to imitate. I can't understand the contradiction about somebody being killed, and the man's being wounded, but feeling nothing. At first I thought there was something supernatural about the story. Then I saw that Ghosts must be a class, or clan name. That made the whole thing more comprehensible" (p.68). [39]

This participant is typical with regards to the changes BARTLETT identified within his sample—namely, missing the point of the story, moving the ghosts up earlier in the story, remembering the story based on visual images, the attempt to reproduce the style and rationalize the incomprehensible (here the meaning of "Ghosts"). [40]

BARTLETT notes that strict accuracy of reproduction is the exception rather than the rule. The most significant changes to the story were made on the first reproduction, which set the form, scheme, order, and arrangement of material for subsequent reproductions.[18] However, as more time went by there was a progressive omission of details, simplification of events and transformation of items into the familiar. Some of the most common and persistent changes were "hunting seals" into "fishing," "canoes" into "boats," the omission of the excuse that "we have no arrows," transformations of the proper names (i.e., Egulac and Kalama) before they disappeared completely, and the precise meaning of the "ghosts." Whenever something seemed strange or incomprehensible it was either omitted completely or rationalized. For example, the "something black" that comes out of the Indian's mouth was frequently understood as the materialization of his breath and in at least one case as "his soul" leaving his body. The second meaning given to an item often appeared only in participants' introspective reports on the first reproduction but in subsequent reproductions it took the place of the original. In other cases, rationalization happened without the person's awareness, as when "hunting seals" became "fishing." [41]

Rationalization operates by giving the material in question a setting and an explanation within one's own frame of reference, and thereby rendering it "acceptable, understandable, comfortable, straightforward; robb[ing] it of all puzzling elements" (p.89). It is directly related to the "effort after meaning," whereby the presenting material is connected to something else the person is already familiar with. This happened for both the particular details of the story and the story as a whole. Rarely was there ready acceptance of the story as it was

18 KAY (1955) later tested whether participants could correct their mistakes by allowing them to see the original after their reproductions. He found that even under these conditions participants continue to reproduce the story as they had on the first reproduction.

first presented. BARTLETT noted that participants needed to first label the story —for example, as a "dream," "like what I read when I was a boy" or simply "not English" (p.207). He stresses that the unfamiliar makes us uneasy and that rationalization helps us to cope with this. The process of remembering starts with an attitude or general impression of the story (e.g. "not English") and proceeds in order to justify it. The end of the process is primarily affective in that it produces an attitude in which "no further questions are asked." Furthermore, rationalization was at work in participants' efforts to link together the disjointed events of the story. BARTLETT made an analogy with a silent film in which the explanatory tags connecting one sequence of events with another was removed. In making sense of the story, participants supplied the tags themselves without realizing they were doing so. [42]

The method of serial reproduction followed the same procedure as that of repeated reproduction, except that the first reproduction was shown to another participant to read and reproduce after 15 to 30 minutes, similar to the party games "Telephone" and "Chinese Whispers."[19] This was then repeated such that each link in the chain of reproductions was made by a different participant. BARTLETT got the idea for this method from Norbert WIENER, the inventor of cybernetics, on one of their walks in Cambridge together (BARTLETT, 1958, p.144). In his dissertation (1917) and in "Remembering" (1995 [1932]), BARTLETT devotes as much space to the method of serial reproduction as he does to the other three methods combined. Thus, we can assume that he saw it as particularly important and certainly the closest analogue to the process by which popular stories, designs and rumors circulate within and between groups. Furthermore, he notes that many of the same changes seen in the method of repeated reproduction appear in even more dramatic form using this method. His analysis follows the same logic as that of the method of repeated reproduction, which involved providing full reproductions for the reader to scrutinize. The major difference is that he presents data from a much wider range of material, including folk stories, newspaper clippings, argumentative passages and picture material. [43]

Let us begin by further illustrating his analytic strategy by presenting a chain of reproductions for the ending of *War of the Ghosts*. The original reads, "When the sun rose he fell down. Something black came out of his mouth. His face became contorted." Here is a striking example of progressive changes in a serial reproduction chain:

> "When the sun rose he fell down. And he gave a cry, and as he opened his mouth a black thing rushed from it.
>
> When the sun rose he suddenly felt faint, and when he would have risen he fell down, and a black thing rushed out of his mouth.
>
> He felt no pain until sunrise the next day, when, on trying to rise, a great black thing flew out of his mouth.

19 The game has been given different names in different countries, which itself illustrates the process of conventionalization. It has colloquially been called "Chinese Whispers," "Telephone," "Broken Telephone," and "Russian Scandal."

> He lived that night, and the next day, but at sunset his soul fled black from his mouth.
>
> He lived through the night and the following day, but died at sunset, and his soul passed out from his mouth.
>
> Before the boat got clear of the conflict the Indian died, and his spirit fled.
>
> Before he could be carried back to the boat, his spirit had left this world.
>
> His spirit left the world.
>
> ('Nonsense,' said one of the others, 'you will not die.') But he did" (1995 [1932], p.127). [44]

Through the chain the vague but vivid "something black" becomes an increasingly more concrete entity, before it finally disappears. To understand this transformation we must read it as an unfolding process toward a stable conventional form. First, something black becomes the slightly more tangible "black thing." This image is eventually linked with "flew" from his mouth, which is a transformation from the original "came out of his mouth." This change in turn facilitates the shift from the ambiguous "thing" to "soul" and later to the "spirit." At this point the story is still supernatural but in the conventional and familiar form of "His spirit left this world." However, by the end of the series there is no mention of spirit or even the "ghosts," which were left at the heading of the story by BARTLETT in an attempt to keep these supernatural elements in the story. [45]

The analysis of changes was done holistically. BARTLETT noted how the story is simplified through omitting parts of it that seem irrelevant to the whole. Omissions and later transformations of the story are intertwined: "In a story series of this type, any omission from an individual version is liable to become significant and to account for a succession of connected changes in subsequent versions" (p.125).[20] There was also a tendency for some incident or incidents to become dominant, such that all the details of the story are grouped around it. This "unwitting selection of central facts" could be frequently seen in events connected with the wound and death of the Indian in *War of the Ghosts*. When elements do not fit the central grouping they are omitted or rationalized, the latter leads to an elaboration of the story. The combined effects of these changes fashion "a more coherent, concise and undecorated tale" (p.127), which becomes a conventional form within the group of subjects concerned. BARTLETT also compared a chain of reproductions from an Indian and English group. In both cases he found the story takes on a distinctive "group stamp or character" (p.173), but notes a stronger tendency to elaborate in the Indian group. [46]

Speaking of general trends seen across the serial reproduction experiments with a variety of texts, BARTLETT highlights that proper names and titles tend to be omitted; the concrete tends to be preserved and emphasized; many stories tend to be given a "moral"; argumentative passages "tend to be reduced to bald expression on conventional option" (ibid.); and while stories tend to gain explanatory links through rationalization, argumentative texts lose them.[21] He further emphasizes the "radical nature of changes" in the serial reproduction

20 This principle also partly explains how his own experimental work was transformed by others after him (see Section 6).

chains: "Epithets are changed into opposites; incidents and events are transposed; names and numbers rarely survive intact for more than a few reproductions; opinions and conclusions are reversed—nearly every possible variation seems as if it can take place" (p.175). BARTLETT also is at pains to point out that EBBINGHAUS' approach is wholly inadequate to understand these changes. For example, material is not preserved based on its position within a text—according to EBBINGHAUS (1913 [1885]), items coming at the beginning or end of a list are remembered at a higher frequency—but rather what is deemed meaningful to the subject or group of subjects. Furthermore, "preservation is in no way a guarantee of accuracy" (BARTLETT, 1995 [1932], p.175). [47]

As a final illustration of the versatility of the method of serial reproduction, consider a reproduction chain using visual material, which according to BARTLETT affords elaboration and invention. In the following series an Egyptian hieroglyph, conventionally representing an owl, was used as a stimulus to begin the chain:

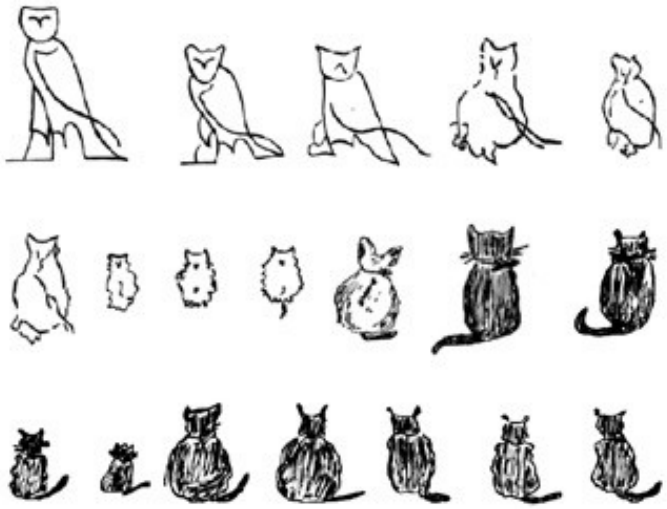

Figure 2: Serial reproduction chain with images (pp.180-181) [48]

BARTLETT highlights the progressive elaboration occurring through the chain of reproduction until the figure reaches a conventional English form:

> "The reversal of the direction of the wing curve by subject 3, and its doubling, at once suggested a tail, and thereafter the tail drops lower and lower until it assumes its proper tail position, and is greatly emphasized, in which process it is reversed twice more. The apparently disconnected lines in the original drawing are all worked into the figure, and the original beak mark is elaborated into a ribbon with a bow. Whiskers are introduced in due course, and the small lines of the back are multiplied and become shading ... A rather unusual figure, carrying a fairly strong suggestion of a realistic representation, becomes greatly elaborated into a familiar whole" (p.181). [49]

21 Social representations theory has also described how when expert theories are introduced to the lay public they are transformed in such a way that they lose connections they had in the original (MOSCOVICI, 2008 [1976]).

Two kinds of "elaboration" are mentioned here, and were also pointed out in BARTLETT's experiments on perceiving: First there is the elaboration of individual details into recognizable features—for example, the elaboration of certain items into a tail, whiskers and ribbons; second, there is elaboration by multiplication of different parts. This happens with the duplication of the wing in the third reproduction and the inner shading in the ninth. The Cambridge anthropologist HADDON had described this second type of elaboration as the "characteristic device of the decorative mind" (quoted in BARTLETT, 1995 [1932], p.182). As with the textual material, elaboration goes hand in hand with simplification, in which disconnected details tend to be either omitted or worked into the general pattern. Often unfamiliar material will be elaborated until it is recognizable to the group it enters, at which point it will be simplified to a conventional form—a black cat in the above chain of reproductions. If simplification goes too far, elaboration may take over again, leading to the development of a new figure or of a decorative motif without representational character. One can also see the importance of naming or labeling in this process, which may be applied to the figure as a whole or to its different parts. In either case, the figure(s) will be transformed towards a conventional representation, as BARTLETT had also found in the method of picture writing. [50]

5. Reflections on Methodology

Having described BARTLETT's early experimental studies, we will now take a step back to consider the methodological assumptions that guided them. These assumptions were key to the German-Austrian tradition of the time, as described by WATSON (1934) and TOOMELA (2007). As we will see, BARTLETT (an Englishman) fits squarely within this methodological tradition. This is not entirely surprising given that BARTLETT's Cambridge mentors were all highly influenced by this tradition, several of them even studied in Germany. In what follows, I will describe the methodological assumptions coming out of the German-Austrian tradition of the time in relation to BARTLETT's experimental studies, namely the focus on 1. psychological qualities over quantities, 2. psychological controls over physical controls, 3. treating human reactions holistically, 4. single cases over group probabilities , 5. type over trait differences, 6. insight over prediction, 7. a systemic approach to theory building, and 8. thinking over the accumulation of facts. [51]

One of the most surprising features of BARTLETT's methodology, from the standpoint of contemporary experimental psychology, is the scarcity of quantitative scores. He does not simply count how many items were remembered, forgotten, or changed, as is routinely done in memory experiments today (see Section 6). This is not to say that BARTLETT never used quantitative scores, rather he used them to further illustrate a qualitative tendency—for example, he reported over half his subjects changed "canoes" to "boats" by the second reproduction of *War of the Ghosts*. BARTLETT's main strategy is to bring his readers close to the phenomena under investigation by offering individual subject's full reproductions and his detailed qualitative analysis of them. Readers use the "raw data" to decide for themselves whether they agree with his

interpretation, which becomes impossible once the data have been coded, quantified, and aggregated. A focus on concrete qualitative processes also helps guard against the abstractions of many quantitative analyses, which tend to lose the phenomena under consideration (e.g. an average score actually applies to zero cases in the sample). GASKELL and BAUER (2000) call this strategy of assuring data quality "thick description." According to it, the context, meanings, and interpretations that illuminate the research process should be made available for greater transparency. [52]

For BARTLETT "thick description" also involved describing the subjective conditions of response, which his concept of attitude highlighted. "Subjective attitudes and orientations are an important part of every response at the psychological level" (BARTLETT, 1936, p.43). Attitude, in BARTLETT's sense, is a dynamic and holistic orientation and thus an unquantifiable psychological quality. As such it contrasts sharply with contemporary psychology's notion which is easily quantified using a Likert scale. His concept sensitizes us to the fact that participants interpret the "same" situation and experimental materials in a variety of ways, and these interpretations have real effects on the way in which they respond to it. Therefore, the experimenter needs to carefully attend to participants' attitudes as they enter the laboratory and perform the experimental task. For BARTLETT, this involved both observation and conversation with his participants. BARTLETT's experimental reports are in fact filled with participants' comments on the task and material. This is even more evident in his dissertation (1917), where he often includes introspective protocols over a page in length. One has the feeling that the experimenter-participant relationship is close and dynamic, as it was in the Würzburg School.[22] BARTLETT (1936) said "very often the most valuable information can be given in terms possible only to the person himself who responds" (p.42). [53]

The concept of attitude points to BARTLETT's (1995 [1932]) treatment of human responses as wholes rather than as isolated reactions. It is the whole active person embedded in a particular context that makes a response. As described above, this contrasts sharply with EBBINGHAUS' (1913 [1885]) approach, which aimed to isolate and itemize a response by striping it down to its simplest elements, and studying it without regard to context or meaning. BARTLETT is emphatic that a simplified stimulus does not necessarily lead to a simplified response. In addition, by attending to subject's holistic attitudes, BARTLETT also embraces holism in his efforts to make the experiment closer to everyday life conditions. In contemporary parlance he was concerned to retain "ecological validity" (NEISSER, 1976). This is done by using meaningful material, such as images and narratives (rather than nonsense syllables), which subjects can engage with through their interests, personal history and social conventions, by making the experimental situation itself more like an everyday activity. [54]

22 BARTLETT saw friends as more preferable subjects than strangers: "Many of the subjects who submitted to the tests were personal friends, with whose manner of life, and general outlook I was pretty well acquainted. This I consider to be not unimportant, for it frequently helped me to interpret results with fair certainty of accuracy ... Often a few trials with well-known subjects afford more suggestive and reliable material than a great deal of indiscriminate experimentation upon strangers" (1917, p.32).

An experiment is a social situation that tends to create a guarded and analytic attitude in those that enter it. BARTLETT considers this a problem and invents strategies to mitigate it; he always justifies his methods in relation to everyday life conditions (even if remembering a strange Native American story is far from the everyday life of his subjects). From his perspective, attempts to isolate "pure memory" from other factors are pure fiction. There are no "experiments in a vacuum" (TAJFEL, 1972, p.69), where the context can be striped of meaning so as to neutralize its effect. There is no escaping the fact that participants make guesses about what the experimenter is up to and what he or she wants them to do. For the experiment to work the participant has to "play along." Context is then part of the subject's normative framework of action and understanding, not another causal variable that can be externally controlled. This prohibits the inference of a direct causal relationship between independent and dependent variables; instead, context normatively regulates the meaning of both, being constitutive of psychological processes themselves (BRINKMANN, 2010). This holistic approach to experimentation runs counter to psychology's Platonic search for a central processing mechanism that is presumed to be a transcendent, abstract, fixed, content-free, and universal property of the mind (SHWEDER, 1991). This search has often lead experimentalists to consider processes taking place in the laboratory as somehow more real than what goes on outside. By contrast, BARTLETT is clear that psychological processes cannot be isolated from the context in which they occur and the material they work on. [55]

Another part of BARTLETT's holistic methodology is his analysis of single cases over group probabilities. He is especially critical of the analysis of aggregates by inferential statistics, which he refers to as "scientific makeshifts" (1995 [1932], p.7). According to him, they have the opposite problem to EBBINGHAUS's method that aims to identify direct causal relationships, in that they show there is some relationship between variables without shedding any light on what it is.[23] BARTLETT's critique is a particularly controversial aspect of his methodology for many contemporary experimental psychologists, as it runs directly counter to their research norms. For example, KINTSCH (1995) says in his introduction to the latest edition of "Remembering": "There are no statistics, and little data aggregation. What we get are selected examples. In my opinion, this is the weakest aspect of the book" (p.xiv). ROEDIGER (1997, p.489) is even more critical in his review:

> "Not one true experiment appears in the book; he never systematically manipulated an independent variable to determine the behavior of a dependent variable, with extraneous sources of variation held constant or randomized. Bartlett attempts a defense of his methods in Chapter 1, noting that in passing 'In this book there will be no statistics whatever' (p.9), but to modern eyes the defense falls flat." [56]

One must remember that when these experiments were conducted (in the 1910s), the application of inferential statistics to populations of subjects was still fighting for its legitimacy; it only became the dominant approach in the 1950s

23 Later BARTLETT (2010 [1959]) says statistics may provide a *structural description* but do not address problems of *process*.

through an appeal to the general public and applied areas of psychology, not to research scientists (DANZIGER, 1990). Statisticians in the first decades of the twentieth century were careful to point out that one cannot make claims about individual processes from group averages.[24] A "scientific" methodology at this time worked with single cases; the second, third and fourth subject in an experiment served only to validate what was found with the first subject. In EBBINGHAUS's (1913 [1885]) study there was only one subject, himself. Generalized models were developed through one single case being tested against other single cases. An idiographic methodology thus allows one to explore the complexity of single cases and to attend not only to normal but also outlier cases, which an aggregate approach is blind to (SALVATORE & VALSINER, 2010). For example, only one out of twenty subjects remembered the proper names in the story *War of the Ghosts*, and was able to do so after ten years. Rather than ignore the bizarre case as an outlier, BARTLETT (1995 [1932]) not only acknowledges it in the discussion of his results (p.82), but also explores and uses it to elaborate his theory (pp.208ff.). This methodological strategy has been called "deviant case analysis" (GILL, 2000, p.187) by qualitative researchers. [57]

BARTLETT (1995 [1932]) also explored and systematized the variability of responses by creating typologies of subjects in his analysis. For example, in his study of imagining he identifies "particularizers" and "generalizers," and in his method of description he distinguishes "visualizers" and "vocalizers." According to his approach, a person is of a particular type if he or she has a persistent and preferred tendency to respond in a certain way. Because BARTLETT used some of the same subject across different experiments, he could often say that these persisted beyond a single situation. Types are different from traits in that they are concerned with the whole person and acknowledge that the same outcome might be reached by different processes. They are also visible processes rather than abstract properties projected into people by psychologists—a tendency William JAMES (1890) called "the psychologist's fallacy" (p.196). BARTLETT's interest in identifying the "methods" used by subjects is consonant with a type focus. Traits, by contrast, are treated as sets of static and isolated variables a person has. They are typically analyzed through inferential statistics at the level of the population, and are thus blind to how they actually operate as a system at the level of the single case (TOOMELA, 2008). [58]

In all this, we see BARTLETT's methodology is aimed at insight over prediction, the systemic development of complex theory and thinking over the accumulation of facts. By contrast, psychologists today tend to think of experiments as a strict sequence of procedures for research design and analysis that if carefully followed will lead to objective knowledge. These procedures have generally been statistical exercises in null hypothesis testing. The statistician Gerd GIGERENZER (2004) has referred to them as "mindless statistics" and argued they have more in common with ritual than scientific thinking. Within this approach, who the experimentalist is makes no difference as long as the proper

24 MOLENAAR (2004) has recently made the same arguments.

steps are taken; the subjectivity and expertise of the researcher are given no role. DASTON (1992) has pointed out that the earlier notion of objectivity was precisely the opposite of this aperspectival understanding in currency today; it stressed the scientist's accumulation of experience in research and thereby the refinement of his or her methodological perspective over time. Likewise, BARTLETT (2010 [1959]) is clear that "to separate psychology from the psychologist is an entirely artificial procedure" (p.988). He goes on to outline a number of characteristics that make a good experimental psychologist, including "having a number of lively interests outside of psychology," "loyalty to evidence," "know[ing] where and how to look for evidence" (pp.988-989), recognizing the limits of statistics particularly with regard to the study of process, and effective collaboration with different disciplines. [59]

For BARTLETT, the experimenter's own subjectivity plays a key role in the research process (BRANCO & VALSINER, 1997). He practices a more open interpretive process, in which the experimenter is likened to a clinician.

> "If the experimentalist in psychology once recognizes that he remains to a great extent a clinician, he is forced to realize that the study of any well-developed psychological function is possible only in the light of consideration of its history" (BARTLETT, 1995 [1932], p.15). [60]

This is why BARTLETT (1917, p.32) makes a virtue out of knowing his subjects prior to the experiment. If he had not known their background, he would have missed many important insights about their reactions in the course of the experiment. The clinical perspective thus cannot be removed from rigorous experimentation (BARTLETT, 2010 [1959]). A clinician must attend to subjects' history, as well as develop sensitivity to knowing where and how to look for evidence in the clinical encounter. The latter requires an open conversation with the patient. Along these lines, EDWARDS and MIDDLETON (1987) point out BARTLETT engaged his subjects in a "task-oriented dialogue" in which they answered questions, explicated and explained their mental processes to him. This data was essential to constructing a holistic picture of the processes involved. [61]

Thus, rather than gathering a collection of isolated facts, BARTLETT's focus was on building a general picture of psychological processes through a consideration of a range of different sources of evidence. This range was found in attending to different sides of an experiment as well as by finding common patterns across partially-overlapping studies on what would often be considered entirely different areas of research today, such as perceiving, imagining, thinking, and remembering; these are research strategies that define "qualitative experiments," as described by KLEINING (1986). BARTLETT is clear that the boundaries between psychological processes differ in degree not kind. A study of perceiving is a necessary complement to one on remembering and vice versa. BARTLETT's goal was to develop general theory to describe and explain the mind as a whole, rather than a mental process taken in isolation. This requires a more open approach to research that weaves together insights from different studies, rather

than one bound to rigid procedures that produce isolated "facts." Although the method is more open, we should not assume that these studies lack research standards. BARTLETT (2010 [1959], p.989) was clear that the experimenter must be "loyal to evidence," "honest about his assumptions" and "willing to give and to take incisive criticism." I have also discussed strategies he used for assuring quality in qualitative research, such as "thick description" and "deviant case analysis," which differ from a purely quantitative approach. [62]

6. Replications and Extensions

Since the publication of "Remembering," BARTLETT's experiments have inspired innumerable other studies. In what follows we will focus on those that have reported to replicate and extend his experiments using the methods he developed. Within this corpus of studies, his methods of repeated and serial reproduction have been widely used, while to my knowledge no one has taken up the methods of description or picture writing. In the history of appropriations of his experiments from the 1930s to today, there has been a general shift in the understanding of what it means to replicate these experiments, which in large part corresponds to a move away from the methodological assumptions outlined above. Many of the earliest replications and extensions had some direct personal contact with BARTLETT and focused on the function of social group membership in remembering.[25] For example, NORTHWAY (1936) explores how "social background" of the children in different Toronto schools shapes their remembering (see also WAGONER, 2013); NADEL (1937) contrasts how children in two Northern Nigerian tribes remember a story based on their groups' distinctive cultural patterns; and MAXWELL (1936) compares the memories of priests, soldiers, students, boy scouts, among others. Moreover, these three researchers constructed a novel story tailored to their research site, presented single cases in discussing their results, and focused on qualitative changes introduced into the story in their analyses. [63]

A transition away from this early focus on how membership in distinct social groups conditions remembering can already be seen in the 1940s. Participants in most BARTLETT-inspired studies became mostly undergraduate students, though there is still an acknowledgment of "cultural influences" on the process. For example, TAYLOR (1947) compares Indian and English students' reconstructions of the “War of the Ghosts” and is also the first study to only provide aggregated data. By contrast, the serial reproduction studies of ALLPORT and POSTMAN (1947) and WARD (1949) focused on qualitative changes in single cases, as BARTLETT had done. In fact, both ALLPORT and WARD had direct contact with BARTLETT.[26] WARD's (1949) experiment is

25 The extent of BARTLETT's (1995 [1932]) systematic social group comparisons is confined to two reproduction chains of Indian participants, which he analyzes in light of what he has found with English participants (pp.138-146). He finds that the Hindu subjects are more likely to adorn and elaborate the story as well as give it a characteristic moral as found in Hindu tales. Although this cultural comparison is limited, BARTLETT is constantly stressing the influence of group membership and conventions on reproductions.

26 As part of a two year traveling scholarship received upon finishing his Ph.D. in 1922, ALLPORT worked with BARTLETT in Cambridge, as well as STERN and KOFFKA in Germany. His

interesting in that it is the only study conducted until recently that has aimed to reproduce changes of some material that could be observed historically in the laboratory. He finds similar changes in the serial reproduction of coin designs to those that actually occurred in Macedonia between the fourth and first centuries B.C. This result probably involved a bit of luck; at least BARTLETT (1995 [1932]) thought so. [64]

ALLPORT and POSTMAN's (1947) classic study was aimed at exploring the conditions leading to the transmission and transformation of rumors, which was a major topic of interest after the Second World War. To do this they showed a picture to a subject, who then had to orally describe it to another. The second subject then described it to a third and so on. Figure 3 is one of the most famous images used in their study. In one chain the last reproduction reads:

> "This is a subway train in New York headed for Portland Street. There is a Jewish woman and a Negro who has a razor in his hand. The woman has a baby or a dog. The train is going to Deyer Street, and nothing much happens" (pp.65-73). [65]

Their analysis is faithful to that of BARTLETT's focus on qualitative transformations; however, to describe the nature of changes they use the gestalt terms of *leveling, sharping* and *assimilation*. Similar to BARTLETT's notion of simplification, *leveling* refers to the tendency to change the story towards a version that is shorter, more concise, more easily grasped and told. The complementary process of *sharpening* describes how certain items are selected and emphasized, and thus it overlaps with BARTLETT's notions of dominant details and elaboration. In the chain of reproductions for the image below "the Negro," whose size and unusual appearance invites attention, often became "four" or "several," or of a "gigantic statue." Also, the razor was always retained and sharpened. Furthermore, in more than half of the experiments, the razor moved from the white man's hand to the African American's hand. This is a striking example of *assimilation* to conventional prejudices.

Figure 3: Subway scene used in ALLPORT and POSTMAN's (1947, p.71) study [66]

research on rumors clearly synthesizes BARTLETT's approach and Gestalt psychology. WARD on the other hand was a member of BARTLETT's laboratory.

The BARTLETT inspired studies of the 1950s and 1960s aimed at testing his theory of remembering through the use of strictly controlled procedures for data collection and analysis. These studies were critical of BARTLETT's flexible style of experimentation, preferring instead what they considered "definitive experiments (those that yield a yes-no answer)" (PAUL, 1959, p.5). This led to a number of interesting shifts in the studies during this time. First, BARTLETT's focus on how social and cultural processes shape remembering completely disappears as a topic of investigation. Second, an attempt to code replications for kinds of changes (e.g., simplification, elaboration, condensation, sharpening, normalizing) or different levels of change (e.g., individual words, information units, themes) is gradually replaced by coding simply for accuracy and distortion at one level of analysis. I write "gradually" because there is an intermediate period in which particular kinds of changes are coded for but they are used as indicators of distortion. Third, there is an increasing reliance on inferential statistics, at the expense of qualitative analyses of story reproductions. Finally, the idea that memory is reconstructive is progressively taken to mean that it is distorted or inaccurate. I will consider each of the major studies at this time to trace the shifts in theoretical focus and mode of analysis more clearly. [67]

KAY's (1955) repeated reproduction study aimed to better understand why the "general form" of the first reproduction persisted in later reproductions,[27] and by extension whether subjects would be able to amend errors after the story had been changed. To test this, he re-read the original story to his participants after each time they had reproduced it (over six reproduction sessions), so that they could see their mistakes. KAY coded reproductions for both general content and specific verbal phrasing, as well as included a qualitative analysis of general changes found across his sample. In all cases, he found that once the first reproduction had been made it was not easily modified; in other words, despite the repeated rereading of the story, each subsequent reproduction of it remained strikingly similar to the first reproduction. This lead KAY to argue that the constructive nature of memory emphasized by BARTLETT applies mainly to the initial perception and reproduction—where the person's stable tendencies of interpretation and the story material first establish a relationship—and less to subsequent reproductions.[28] However, KAY says nothing more about the specific nature of the changes in question. [68]

Whereas KAY (1955) explicitly ignored interests, attitudes, affects, and goals in his investigation, PAUL (1959) gave them a central place. This is a result of KAY's interest in learning processes versus PAUL's background in personality psychology and psychoanalysis—PAUL was a student of the psychoanalyst David RAPAPORT, author of the classic book "Emotion and Memory" (RAPAPORT, 1942). PAUL's (1959) study is one of the most extensive

27 BARTLETT (1995 [1932], p.83) earlier said: "The most general characteristic of the whole of this group of experiments was the persistence, for any given subject, of the 'form' of his first reproduction."

28 This is in line with GOMULICKI's (1956) study of the immediate reproduction of short passages, which was being done at the same time in the Cambridge laboratory under the supervision of ZANGWILL. Contra BARTLETT's theory, GOMULICKI argued that abstractive processes could explain selective omissions.

replications of BARTLETT's serial reproduction experiments to date—it is also only after it that *War of the Ghosts* became the choice text for replications of BARTLETT's experiments. The aim of the study was to understand to what extend "the distortions and fragmentations in recall" (PAUL 1959, p.6) that BARTLETT had found could be explained by "gaps and ambiguities" (ibid.) in a story, on the one hand, and unfamiliarity of the material, on the other. To test the role played by gaps, he prepared an explicated version of *War of the Ghosts*, adding links to make the story less disjunctive, and found it was more easily and accurately remembered than the original. With regards to familiarity, he created a story about secretaries with familiar actors and actions, which fared better in reproduction than both versions of *War of the Ghosts*. Following his training in personality psychology, PAUL (1959) also identified two general types of remembers which he called *importers* and *skeletonizers*. While importers added material for purposes of integration, skeletonizers stripped, fragmented, and segregated the material. These types turned out to be "stable and general individual difference parameters" (p.7), as they were able to predict the direction of story change in an additional serial reproduction experiment, in which the groups were composed of people belonging to either solely importers or skeletonizers. [69]

Much like KAY (1955), JOHNSON (1962) adopted a more restricted focus with the aim of determining "whether learned material which is qualitatively changed [in memory] from the original material is retained better than learned material which is not qualitatively changed" (p.218). Using the method repeated reproduction and *War of the Ghosts*, he compared the retention of items between the first and second reproduction. Items were coded as "duplicates" (of those in the original text), "omissions" (items absent in recall), "sharpenings" (where an item is given greater emphasis) and "normalizations" (where an item was changed towards existing conventions). According to JOHNSON, if BARTLETT's theory was correct then we would expect items qualitatively changed on the first reproduction—by being sharpened or normalized—would be better retained on the second reproduction than those that were duplicates of the original on the first reproduction. This is because items that better fit existing schema were thought to be better retained (WAGONER, 2013). JOHNSON, however, does not account for the fact that items might also be retained on the first reproduction because they fit existing schema. In any case, he found that duplications were better remembered than modified items. [70]

Following this general trend of studies, GAULD and STEPHENSON (1967) set out to show that the "distortion" in remembering found by BARTLETT could be explained by his lenient experimental instructions. This study is particularly interesting for our purposes because it clearly demonstrates how the assumptions about remembering and how to study it had completely shifted by this time: first, memory is now seen as a mental faculty which can be isolated from other processes, and second, reconstruction now means that memory is distorted. GAULD and STEPHENSON's (1967, p.1) description of BARTLETT's experiments is revealing:

> "Bartlett's theory that remembering is a 'reconstructive' process is based largely upon the ways in which subjects change and distort prose passages when reproducing them from memory. If such changes and distortions are to serve as the foundation for a theory of remembering it is clearly desirable to be quite certain that the persons who make them really are trying to remember, and are not deliberately inventing material to fill in gaps in their memories." [71]

As described above, BARTLETT deliberately under stressed accuracy in order to bring the experiment closer to everyday life conditions. In contrast, GAULD and STEPHENSON (1967) thought that "the memory" functions to reproduce facts and could be separated from context. They aimed to show that reconstruction of the material only entered under the pressure to create a more convincing narrative through guesses, inventions, and inferences. They hypothesized that memory would not be prone to error if in place of BARTLETT's "loose instructions" participants were told to only write down what they were sure they remembered "fact for fact" (GAULD & STEPHENSON, 1967, p.41). [72]

They used BARTLETT's method of serial reproduction and *War of the Ghosts* as their stimulus but had the participant reproduce the story immediately after they heard it. Given their interest in showing that reconstruction is not characteristic of remembering, it would have been worthwhile to provide a longer interval before reproduction or preferably they could have used the method of repeated reproduction to see changes after increasing time intervals. Moreover, GAULD and STEPHENSON (1967) operationalized "reconstruction" by counting only extreme deviations from the original—what they called "errors." These did not include many of the changes that BARTLETT attended to, such as omissions, word substitutions (e.g. "boats" to "canoes"), time order changes and place name mistakes. With their strict instructions, the limited time interval before reproduction and the narrow definition of "errors" as a mark of reconstruction, it is little surprise that they found few "errors." Yet errors were produced in their study. To account for this, they showed that there was an inverse correlation between a person's conscientiousness and their production of errors. Again, the assumption is that memory is pure until contaminated by other influences; where the loose instructions do not explain errors, it was assumed to be the fault of an unconscientious personality. Unfortunately, the results are only presented as aggregate data and thus we have no way of knowing the kinds of the errors that did occur (see "think description" as a method of quality assurance, above). [73]

GAULD and STEPHENSON (1967) concluded: "We feel that our experiments to some extent undermine Bartlett's theory of the reconstructive nature of remembering" (p.48). They propose that "errors" in remembering are mainly the result of "pressure to produce something completed and coherent" (ibid.). Their study shows that under particular social conditions—in this case, strict task instructions—remembering can be done with high accuracy. However, these results can be seen to further confirm BARTLETT's theory of remembering, rather than disproof it. In an unpublished reply to GAULD and STEPHENSON (1967), BARTLETT commented, "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 (1968, p.x). In fact, BARTLETT gives several examples in "Remembering" (1995 [1932]) of exceptional memory for details, such as the "prodigiously retentive capacity" of Swazi herdsman for their cattle (see OST and COSTALL, 2002). Rather than understanding memory as an isolated mental faculty, he saw it as a domain specific process that was socialized by the group. Social and contextual conditions are always present, some of which promote literal recall and others construction. Furthermore, BARTLETT positively valued the "construction" as demonstrating flexibility and creativity in remembering, while GAULD and STEPHENSON (1967) saw it only as "error." [74]

GAULD and STEPHENSON's (1967) experiment had the effect of putting an end to replications of BARTLETT's experiments for over two decades.[29] It also led memory researchers in the 1990's to believe that BARTLETT's experiments had never been replicated (see e.g., BERGMAN & ROEDIGER, 1999; SCHACTER, 1997).[30] All the earlier replications, discussed in this section, had apparently been forgotten. Furthermore, a study by WYNN and LOGIE (1998) seemed to also disconfirm BARTLETT's theory in relation to remembering "real life" situations rather than folk stories. They had first year undergraduate students repeatedly reproduce events from the first few days of orientation and found little forgetting over time and very few errors. Within this context, BERGMAN and ROEDIGER (1999) aimed to provide a demonstration that BARTLETT's repeated reproduction studies could be replicated. Their study is much more convincing than GAULD and STEPHENSON (1967) in two respects: first, they used the method of repeated reproduction (with reproduction intervals after fifteen minutes, a week and six months). Second, they adopted a more refined coding scheme that classified items as accurate, omitted, major distortion or minor distortion (i.e., surface level changes that do not change the meaning of phrase). They also had experimental conditions for loose and strict task instructions. While the loose instructions did seem to have an effect on the first reproduction, by the second reproduction, a week later, there was no difference when compared to the strict instructions. In both conditions, they found that over time significantly less was remembered and of what was remembered a growing percentage was majorly distorted. Thus, they could not find support for GAULD and STEPHENSON's (1967) general claim that loose instructions were the cause of reconstruction. At the same time, they demonstrated that BARTLETT's experiments could be replicated within contemporary quantitative conventions of experimentation.[31] [75]

Although more convincing, BERGMAN and ROEDIGER's (1999) study continues to follow GAULD and STEPHENSON (1967) in the assumption that reconstruction means distortion and that it should be studied through a comparison of group averages. A study of accuracy and distortion can lead to

29 The one exception to this was HABQUE and SABIR's (1975) serial reproduction study of national stereotypes in the context of the Indo-Pakastani conflict (see below).

30 GAULD and STEPHENSON (1967) themselves had made the much more modest argument that no one had reproduced BARTLETT's experiments in such a way to eliminate the production of "errors" through guesswork.

31 Other studies have since been done along the same lines: For example, AHLBERG and SHARPS (2002) used the method or repeated reproduction to compare long-term memory in young and older adults.

conclusions about failures of memory against the standard of strict reproduction —that is, about what memory is not—but not what it is. Likewise, the methodological problem with simply comparing aggregate scores across the three time conditions is that one cannot see holistic changes occurring in the series. This requires attending to a particular participant's series of reproductions as BARTLETT had done, and is a strategy of flexible variation used in qualitative experiments (see KLEINING, 1986). A recent study by WAGONER and GILLESPIE (2014) brought back the focus on qualitative transformations and took it a step beyond BARTLETT by not only comparing qualitative changes through a series of reproductions but also exploring the process by which reproductions were produced at each reproduction. They had dyads remember *War of the Ghosts* together so as to externalize some of the spontaneous processes of remembering. Participants did not simply output fully formed memories but constructed them through an extended process of making suggestions and evaluating them, poising questions and answering them. Importantly, this constructive process need not lead to inaccuracy. Consider the following example:

> "Henry: Ok, so, there were two guys hunting
>
> Bill: No, no, no. There were two guys looking for seals
>
> Henry: They were hunting seals." [76]

It is only through disagreement and mutual suggestion that the dyad arrives at what was in the original. The participants do not passively take over the other's suggestion but rather use it to construct a counterpoint. The process is constructive because it involves actively cajoling and managing remembering as it unfolds. The study also found new ideas being added to the story, but importantly these were not coded simply as errors; rather they were analyzed as revealing something about the process of remembering. For example, several participants added the idea that the protagonist of the story was himself a ghost. There is nothing to directly suggest this in the original and it does not show up in BARTLETT's (1995 [1932]) data. The authors conjecture that participants remembered using a narrative template taken from recent Hollywood films about ghosts (such as the *Sixth Sense* and *The Others*[32]), in which there is a surprise ending the main character realizes s/he is a ghost. Applying this narrative template to *War of the Ghosts* helps rationalize and explain some of the puzzling elements of the story. Thus, ninety years after BARTLETT's studies we find participants using different cultural resources to help them remember the story, and in so doing change it in a new direction. This points to the importance of situating an experiment within the broader social and cultural world to which the participants belong. [77]

The 21st century also brought renewed interest in BARTLETT's method of serial reproduction as a powerful tool to study cultural transmission and transformation. KASHIMA (2000) used a story of a man and a woman to explore gender

32 Find descriptions of the films on Wikipedia: https://en.wikipedia.org/wiki/The_Sixth_Sense and https://en.wikipedia.org/wiki/The_Others_(2001_film [Accessed: July 23, 2015].

stereotypes in a five-person reproduction chain. He found that participants in earlier positions of the chain tended to reproduce stereotype-inconsistent information, but toward the end of the chain stereotype-consistent information was retained better. This shows important differences between individual and collective remembering (where information is transmitted through several individuals). Similarly, BANGERTER (2000) used a description of a scientific description of sexual reproduction to explore how science is transformed into commonsense—a central topic for the social representations theory, which was itself inspired by BARTLETT's work (WAGONER, 2012, 2015). Through the chain sperm and egg cells became increasingly anthropomorphized, sperm were described as active and the ovum as passive. In other words, the text was transformed to conform to gender stereotypes of male and female roles in courtship. This study brings back an analytic focus on the *direction* of change introduced into reproductions rather than simply coding for accuracy and distortion. MESOUDI and WHITEN (2004) also used the method to show how everyday events tend to be described at higher levels of abstraction as they were transmitted through the chain. Finally, NAHARI, SHEINFELD, GLICKSOHN and NACHSON (2015) set out to answer whether there was a qualitative difference in chains starting off with low accuracy versus those starting off with high accuracy. They found the first reproductions influence inter-chain trends but not their end points. Their study is also interesting in that they aimed to develop an integrative methodology (i.e., "trend analysis"), which was quantitative but at the same time sensitive to holistic, dynamic, and process changes. [78]

7. Conclusion: Rethinking the Experiment

BARTLETT's experimental methodology started from the principle of complexity: we cannot adequately study human responses by striping them down to the simplest possible elements, as EBBINGHAUS (1913 [1885]) had done in his method of non-sense syllables. Instead, the experimentalist must work with whole complex human beings, which includes their history, interests, feelings, group affiliations, aspirations for the future, etc. BARTLETT’s metaphor of the experimentalist as a clinician nicely highlights this orientation to the whole human being. Moreover, he wanted to capture qualitative changes in reactions over time as a result of new experiences and to account for how social context shaped the results. In contrast, much of contemporary experimental psychology has lost this holistic focus by itemizing and aggregating responses in order to discover relationships between variables in a large sample of subjects.[33] BARTLETT (1923) distinguishes his own approach from this when he says, "[t]he man who knows intimately but one mental life will the sooner enter others, than the man whose observation has grasped the external form and movements of thousands of people, but has gone no further" (p.23) According to the earlier assumptions about experimentation, the road to general knowledge about human beings is through the detailed analysis of contextualized single cases rather than group averages (SALVATORE & VALSINER, 2010). Given the differing assumptions

33 DANZIGER (1997) describes in detail how the notion of "variable" became the new "meta-language" for psychology around the 1950s, at which time aggregate scores were shown in the majority of research reports in psychology.

about methodology, it is not entirely surprising that contemporary experimentalists have seen BARTLETT's studies as pseudo-experiments (e.g., KINTSCH, 1995; ROEDIGER, 1997). In the first decades of the twentieth century whether these were experiments would not have been doubted. To turn the issue around, early twentieth century psychologists would have found contemporary experimental methods nonsensical because they doubted the value of applying inferential statistics to large sample to learn anything about individual functioning (DANZIGER, 1990). [79]

The progressive transformation of BARTLETT's (1995 [1932]) experimental methodology (and by implication many other early experimental studies) can be clearly seen in the replications and extensions of his studies. These changes can themselves be analyzed as a serial reproduction study which powerfully illustrates BARTLETT's theory of reconstruction: each replication assimilates BARTLETT's studies to their own pre-existing understandings and highlights a particular aspect of the original, which leads to major omissions and transforms of the whole when it is reproduced. While early replications and extensions focused on the role of group membership in remembering, by the 1950s the focus shifted to individual memory as a cognitive process. Moreover, aggregate statistics replaced the presentation of the particular qualitative changes introduced into reproductions. Although the initial studies at this period coded for a number of different kinds of qualitative changes (e.g. leveling and sharpening), these became subsumed under the more general and abstract category of "distortion" or simply "error." Around the same time this was also happening in research on thinking (see GIGERENZER et al., 1990). This change coincided with a reinterpretation of "reconstruction" to mean that memory was prone to error. As such it became negatively valued, whereas for BARTLETT it was linked with flexibility and creativity. At a methodological level BARTLETT's notion of "reconstruction" implies the need to study the process of remembering rather than simply its outcomes, as is typically done in experiments today. Similarly, a study of error and distortion, against the standard of literal reproduction, can tell us what memory is not, but not what it is. [80]

Contemporary experimental psychology need not exclude studies like BARTLETT's from its remit. The automatic labeling of BARTLETT's experiments as "pseudo-experiments" is what BARTLETT (1918) called "conventional criticism," whereby something is rejected simply because it does not fit familiar conventions. Qualitative and idiographic experiments in fact have a rich history in psychology, and as such can offer valuable methodological insights today (see also WAGONER, 2009). What these approaches provide and aggregate studies lack is the possibility of systematically probing the different sides of a contextualized and concrete phenomenon in order to reveal its structure. BARTLETT did this by varying the conditions and tasks of his experiments (e.g., drawing, interrogation, written or oral recall), employed a diversity of materials (e.g., abstract shapes, concrete objects, ambiguous material, faces, representative signs, folk-stories and newspaper texts) and by using different data sources (KLEINING, 1986). BARTLETT's task oriented dialogues with his participants provided him with their affective-interpretive background against

which their written reproductions were made. Frequently he was able to anticipate a change that would happen in the next reproduction based on their comments. Furthermore, his open analysis of reproductions enables him to explore a range of different kinds of transformations and what conditions them. The analysis becomes an *abductive* process (PEIRCE, 1934), whereby data and theory continually enrich one another through the insight of the researcher. Rather than simply confirming or disconfirming some hypothesis, this research strategy allows novelties to emerge in the analysis. [81]

To include an approach like BARTLETT's (1995 [1932]), an experiment can be defined in an open way, as a social intervention into a person's life for the purposes of systematic exploration of an underlining structure. We can then distinguish between qualitative and quantitative experiments. In contrast to quantitative experiment, a qualitative experiment need not involve manipulation or strict control of conditions to uncover causal relations. In fact, VYGOTSKY (1997 [1931]; see also VALSINER, 2000) among others have observed that the experimenter can only control some aspects of the situation. Participants arrive in the experimental situation with a certain history, mood, and character, and are themselves constructive in making sense of the experiment and deciding how to be involved in it. A qualitative experiment attempts to explore the role of all of these kinds of factors by structurally varying them and observing the results on the research object (KLEINING, 1986). In this way, it combines the systematic setting variation of quantitative studies with the observation and near-to-subject insights typical of qualitative research. This approach has informed some of the classic experiments in psychology, such as by the Würzburg School, Gestalt psychology, PIAGET and BARTLETT; its rediscovery by contemporary psychology is long overdue. [82]

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