Chapter 5
The Experimental Methodology of Constructive Microgenesis

Brady Wagoner

> *(T)he search for method becomes one of the most important problems of the entire enterprise of understanding the uniquely human forms of psychological activity. In this case, the method is simultaneously prerequisite and product, the tool and the result of the study.*
>
> Vygotsky (*1987, p. 27*)

Psychologists congratulate themselves in telling their discipline's history as a linear progression to its present state, as if psychology was purely rational and free from all historical contingency. In so doing we close ourselves to past ideas that were unjustly left behind and which can make a significant contribution to psychology today. The word 'experiment', for example, has taken on a very narrow meaning in contemporary psychology. We are told that for something to be an experiment there must be an independent and dependent variable, a large random sample of participants, and a statistical analysis of scores. These requirements were foreign to psychology in the first half of this last century and only became social norms through influences *outside* of psychology, such as the military and education (Danziger, 1990).

Let us travel back to the pre-WWII era of psychology, where associations to 'experiment' were quite different (Danziger & Ballantyne, 1997). The word was used broadly, at this time, to describe, for example, research that was both qualitative and idiographic, as illustrated by the work of Bartlett, Luria, Piaget, Vygotsky, and Werner, to name but a few eminent psychologists. These early pioneers invented their own methods of experimentation to best explore their particular research interests and did so systematically, transparently and with analytic rigor. Here I adopt the older, more inclusive meaning of 'experiment,' used by these methodologists, as a *purposeful distortion of ordinary reality* carried out to systematically provoke, access, and analyze some generic aspect(s) of reality

B. Wagoner (✉)
Department of Social and Development Psychology
University of Cambridge
Cambridge CB2 3RQ, UK
e-mail: bw249@cam.ac.uk

(Valsiner, 1998, p. 317).[1] By (re)opening the definition I hope to also open new pathways to innovation in *experimental* methodology.

I concentrate in this chapter on exploring and developing one particular pre-WWII methodology, which has come to be called "the microgenetic method". My aim is to use this method as a starting point in developing a methodology that is sensitive to complex individual functioning, constructive and imaginative processes, systemic and qualitative changes, inter- and intra-individual variation, and the analysis of deviance. My focus will be on using the method to study remembering but it can just as well be applied to other higher psychological functions. I will review some of the longstanding methodological questions in psychology, such us "what sources of data are valid?", "how should experimenters relate to their participants?", "how do we generalize from the data?", offering reasoned answers to them, in order to re-evaluate, re-invigorate and re-invent experimental methodology.

The Microgenetic Method: Three Case Studies

The microgenetic method is "any empirical strategy that triggers, records and analyses the immediate process of emergence of new phenomena" (Valsiner, 2000, p. 78). A wide range of experimental strategies fit this definition. In this section, we will compare and contrast the work of three classic examples, each quite different from the others, to show concretely the method's principles, power and versatility.[2] They are: (1) Heinz Werner's simulation of aphasic processes, (2) Vygotsky's method of double stimulation in his study of memory and (3) Frederic Bartlett's method of repeated reproduction.[3]

Heinz Werner's Microgenetic Method

The word "microgenesis" was first introduced, in English, in a 1956 article by Werner, titled "Microgenesis and aphasia". His method was a further development of *Aktualgenese* used by the second Leipzig school to study perception (see Diriwächter, 2009). Perception is a seemingly instantaneous process. To access it

---

[1] One could also call this approach an "Einsteinian" experimental methodology (see Holton, 1988).

[2] A general history of the microgenetic method is not our focus here. It can be found in Catán (1986) and Valsiner and van der Veer (2000, Chapter 7).

[3] I chose these three because they are classic studies in the microgenetic tradition which are different enough to allow for broad comparisons. Additionally, Vygotsky and Bartlett's experiments are milestones in the socio-cultural study of remembering, while Werner's helps us to conceptualize the process by which we struggle to articulate a memory that we are feeling but cannot yet precisely describe (i.e. the 'tip-of-the-tongue' phenomenon).

one has to find ways of slowing it down in order to catch its intermediate stages. The technique innovated for this task was *Aktualgenese*, in which participants were presented with a series of stimuli beginning in suboptimal conditions (blurry, small, at a distance, for a short time, at the edge of one's peripheral field, etc.) and progressively moving toward greater stimulus clarity, recording participants' percepts at each step. Thus, the researcher had both a rich record of the process through its various stages and of the participant's creative adaptations to perceptual ambiguity.

Werner's innovation was to adapt the method to simulate more complex social processes, such as the development of word meaning in ontogeny (Werner & Kaplan, 1954), the development of language syntax in sociogenesis (Werner & Kaplan, 1957) and to model aphasic speech comprehension (Werner, 1956). Here we will limit our focus to this last experiment on aphasia, in which a tachistoscope was used to flash phrases in front of participants at short intervals. Participants had to report what they saw and their accompanying thoughts and feelings at each stimulus exposure. Consider the following example of a participant who read the tachistoscopically presented phrase "*sanfter Wind*" (gentle wind):

1. "—? Wind." What stood before "wind" feels like an adjective specifying something similar. Definitely not a word defining direction.
2. "—ter Wind." Know now that the word is "heavier" than "warm"… somehow more abstract.
3. "—cher Wind." Now it looks more like an adjective-of-direction.
4. "—ter Wind." Now again somehow more concrete, it faces me and looks somewhat like "*weicher Wind*" (soft Wind), but "*ter*" is in my way.
5. Now very clearly: "sanfter Wind." Not at all surprised. I had this actually before in the characteristic feel of the word and the looks of it.

(Werner, 1956, p. 348)

Through this series we can make inferences about the relationship between fully articulated meanings of words (on the left in quotation marks) and "spherical cognition" (on the right). The participant seems to get a feeling of the word—i.e. an "inner experience of the semantic sphere of the linguistic forms" (p. 348)—before they can articulate precisely what it is. This can be seen by reading *between* one step in the series and the next, comparing what is articulated to what the participant felt at an earlier stage. Werner concludes from this analysis that spherical cognition is developmentally earlier than articulation of discrete words (we have a sense of this when something is on "the tip-of-our-tongue", such as a vague memory).

It should also be noted that these earlier phases in the process can be much richer than the final product (i.e., the fully articulated phrase); they are full of tension, in a state of becoming. At these early points the participant must imaginatively overcome the ambiguity presented by the experimenter, and do so full of intense emotional involvement (Rosenthal, 2004). This *constructive* aspect of the methodology is lost in contemporary commentaries on it, which tend to emphasize the aim of displaying the different fixed *steps* in a process (see Valsiner & van der Veer, 2000, pp. 312–320).

A comparison is made with aphasic patients on the assumption that "the functions underlying abnormal behavior are in their essence not different from those

underlying normal behavior" (p. 347). In other words, aphasics go through the same process as normally functioning individuals in speech comprehension but for them this process is cut short so that they are left with a feeling of a word but are unable to articulate it in its discrete form; the final product of the process is for them unfinished. The method could thus *model* speech comprehension of aphasics in normally functioning individuals.

In sum, Werner modified the method of *Aktualgenese* to capture constructive steps in the process of speech comprehension and then pieced the series of steps together again in his analysis to develop a model of the process applicable to both normally functioning individuals and aphasics. The analysis was entirely idiographic and qualitative—only as such was he able to adequately show *transformations* from spherical cognition to discrete articulation in the process of speech comprehension.

Vygotsky's Method of Double Stimulation[4]

Vygotsky posits the existence of two interdependent lines of development in ontogeny, the natural and the cultural. The cultural line develops as the child participates with others in their social world. Vygotsky (1978) famously said that all higher psychological functions begin externally with others (inter-mentally) and are only gradually internalized so as to function for-one-self (intra-mentally).[5] Development proceeds dialectically as the cultural line feeds into the natural and the natural feeds back into the cultural: For example, Vygotsky (1986) shows the step-by-step changes that ensue when thought and speech intersect.

The methods developed by Vygotsky were attempts to capture the *structure* of the relationship between the two lines at various stages in child development. To do this he created an experimental situation in which the child could use some "external mediator" (e.g., an image, a card, a rope, an abacus, etc.) to help them complete a task, which represented the development of the cultural line. Results of this mediated task were often compared with child's performance on a task without the external mediator (approximating the natural line), so as to separate and compare the two lines of development—cultural, mediated; and the natural, unmediated (Vygotsky & Luria, 1994).

One of Vygotsky's favorite examples to illustrate his theory and method was his studies on memory. In an experiment conducted by Leontiev, under Vygotsky's guidance, they adopted the standard memory procedure in which a child had to remember a list of words but with a major innovation. Children were given picture

---

[4] Vygotsky also refers to his method as the "experimental genetic method," "instrumental method" and "historical-genetic method" (Engeström, 2007).

[5] Not everything on the inter-mental plan is internalized, only that for which there is dramatic conflict, i.e. a problem that creates inner tension. Similarly, when the child later encounters a problem intra-mentally he or she will utilize means borrowed from an inter-mental drama to overcome it (see Veresov, 2008).

cards (in other words, external mediators) to aid them in recall. They created three experimental conditions for remembering a list of words: (1) standard memory task, (2) task with picture card already conventionally paired with word by the experimenter, and (3) the child is allowed to make their own combinations between words and picture cards. At first they simply compared the scores of children at different ages for mediated (conditions 2 and 3) and unmediated (condition 1) memory, in order to validate Vygotsky's theory of the developing relationship between the two lines.

However, it was Vygotsky's careful look at the *microgenetic process* by which children used the picture cards in remembering that led him to alter his theory of mediation (Bakhurst, 1990). This process is experimentally triggered by the experimenter by giving the child a task beyond their capacity and providing them with neutral objects that the child can give significance to (i.e., transform them into external mediators) in order to help them solve the task. It must be noted that the resultant process is produced by the child's own agency, not the experimenter's; the experimenter may *guide* the child toward a particular "means" but cannot *determine* how the child will use them if they do at all (van der Veer & Valsiner, 1991). Unlike the maximum control of contemporary experiments, which must create easily quantifiable data for statistical comparison, the method of double stimulation profits from the participant's construction of novelty, the active creation of new means to solve a problem.

One might expect children to make links between picture card and target word through strong associations between them, for example using the picture of a 'horse' to remember 'sled'. But children often also made non-obvious links between picture and word. For example, one child used a picture of a crab at the beach to remember 'theatre', explaining "The crab is looking at the stones on the bottom, it is beautiful, it is a theatre" (Vygotsky, 1987, p. 181). Structures, such as these, were created for the first time by the child and could not be explained within the framework of associative psychology—they were more narrative than associative bond. A more complex explanation would have to be sought that captured the nuances of child's reasoning.

Vygotsky (1987) experimentally isolated the components of the process by which children successfully or unsuccessfully arrived at the target word. The first component resembles Vygotsky's original theory of mediation, whereby the child uses a sign in the act of remembering. The child does use the picture card to help them remember but the process is not yet integrated with the operations of imagining, thinking, abstracting, etc. With only this component functioning children sometimes create absurd structures, such as "I remember this like a *fish* at a *funeral*" (p. 183, my emphasis). Experimenters can facilitate the child's creation of new structures by simply drawing their attention away from the target word to related words or a part of the object itself, and thus providing the scaffolding required for the child to successfully complete the task by opening up meaningful elaboration of the stimulus.

The second component is the child's (unaided) ability to create their own novel structure, as we saw with the child's narrative connecting "crab" to "theatre". This component may be present while the first is not. In that case the child is unable to

use the structure for remembering. The child does not realize that one item can be used to bring to mind the other.

The third component is the child's ability to select and direct the mass of emerging images toward the target word, which is placed at the center of the child's attention, as if marked by an X. One child, for example, selected a picture of a lion to remember the verb "to shoot," saying "they shot the lion". However, when the child recalled the word he remembered instead the word "gun" (p. 182). Children without this component could often reproduce the entire structure without arriving at the target word.

In these three components the different psychological functions involved in remembering—interpreted from children's errors—have been experimentally isolated. Each can exist without the others. Furthermore, this analysis provides evidence for Vygotsky's claim that psychological functions gradually become integrated in development, transforming each other in the process. Here we see the gradual integration of instrumental action (component 1), imagination (component 2), and attention (component 3).

In sum, it was Vygotsky's interest and analysis of the *means* and *process* of remembering that lead him to revise his theory of mediation. Through this analysis he was able to explain the various *outcomes*, including both accurate recall and different kinds of errors, as well as experimentally isolating different components active in remembering. He was successful in working between the analysis of individual cases and general developmental trends across an enormous sample by using idiographic qualitative data to understand the structure of the process at various stages of development.

Bartlett's Method of Repeated Reproduction

Bartlett developed his method for studying remembering in contradistinction to Ebbinghaus' method of non-sense syllables. Ebbinghaus understood memories to be like imprints left on the mind; he explicitly uses the metaphor of inscription (dating back to Plato's *Theaetetus*). As such Ebbinghaus felt justified using meaningless material that would remain isolated from other material (i.e., not combine into wholes) and could be analyzed by the number of non-sense syllables remembered under a variety of conditions (time between exposure and recall, order in a series, amount of exposure, etc.). Bartlett rejected these assumptions arguing that remembering studied by Ebbinghaus had little to do with the remembering in everyday life, and as such he developed methods that could capture and analyze remembering as a holistic, dynamic and meaningful process.

One of the first methods he used to study remembering was the method of repeated reproduction. Bartlett was not the first to use the method [both Philippe (1897) and Henderson (1903) had used it earlier] although he used it more productively than those who came before and after (Wagoner, 2007). The procedure was simple: participants were presented with a stimulus (e.g., a folk-story, newspaper

article, or image) and later asked to reproduce it at a number of intervals (e.g., after 20 minutes, a week, several months). In this way, a *series* of reproductions was produced, which could then be analyzed for what was *added*, *deleted*, and *transformed* from the original to the first reproduction and from a reproduction to the next. The following is an example of a portion of data produced using the method of repeated reproduction for the Native American story *War of the Ghosts* (Bartlett includes the full reproductions):

> *The original*
> 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.
> *First Reproduction (time after reading story not given)*
> It was nearly dawn when the man became very ill; and at sunrise a **black substance** rushed out of his mouth, and the natives said one to another: "He is dead".
> *Second Reproduction (nearly 4 months later)*
> Then, I think it is, the natives describe what happened, and they seem to have imagined seeing **a ghost** coming out of his mouth. Really it was a kind of **materialization of his breath**. I know this phrase was not in the story, but that is the idea that I have. Ultimately the man died at dawn the next day.
>
> (Bartlett, 1932, pp. 70–71, added emphases in boldface)

To take just one example of Bartlett's analysis, of reading *between* the reproductions, look at what happens to the mysterious "something black" in the original through the two reproductions. First, it is transformed into a 'black substance' already attributing volition to the entity that '*rushed out* of his mouth'. In the second reproduction the 'black substance' becomes 'a ghost' *and* 'a materialization of his breath'—the former being from the native's perspective, whereas the latter is from his own. Bartlett (1932) found this 'double meaning' would frequently be transformed into a single rationalized meaning in the participant's next reproduction. It was also common, across his sample, to see participants rationalize out the supernatural portions of the story, either by simply omitting them or explaining them away, as this participant did.

This analytic strategy of attending to qualitative transformations in single cases is radically different from contemporary 'reproductions' of Bartlett's experiment (Gauld & Stephenson, 1967; Roediger, Bergman, & Meade, 2000), which create 'average participants' by meaning the number of distortions, omissions and accurate units recalled for all participants in each time condition. This later approach completely misses Bartlett's interest in the *systemic* functioning of specific individuals. By analyzing reproductions only at the level of aggregates contemporary researchers have lost sight of the constructive qualitative changes occurring within a single participant and their relationship to the participant's personal history (Wagoner, 2007). Deviations from the original experience are simply quantified as "distortions" without attending to the nature of the change. In the place of "distortion", Bartlett uses the functional terminology of "elaboration," "construction," "conventionalization," etc., thus emphasizing the mechanisms constraining and driving the holistic and creative *process* of remembering over its static *products*.

Bartlett's (1932) analytic strategy began with single cases and their transformations through time, but did not end there. He proceeds to analyze the general trends found across his entire sample (e.g., 'canoes' become 'boats' in over half his participants by the second reproduction) and compares the results to that of other experiments he has conducted in perceiving, imagining and remembering.[6] Similarly, when only one participant out of twenty remembers the two proper names in the story *War of the Ghosts* he does not ignore it but instead devotes considerable space, in a later chapter, towards integrating it into his general theory of remembering (see pp. 208–209). Thus his methodological movement to develop theory is from single case to general model, and back to single case.

In sum, only by using rich cultural material and analyzing *individual cases* and their *qualitative transformations* through time (e.g., 'something black' changing into 'breath') did Bartlett access the *constructive*, *imaginative* and *active* processes of remembering, as we use it in everyday life.

Comparison of the Methods

Common Origins: A Brief Sketch of the Würzburg School

All three methodologists developed their approach out of early continental psychology with its emphasis on holism, development and the creative side of human life. A particularly clear example of the early continental *Zeitgeist* is the Würzburg School, active in the first decade of the last century, which Vygotsky,[7] Bartlett,[8] and Werner[9] all borrow from. It will therefore be helpful to sketch out some general methodological features of this school to create a background in which to assess similarities and differences among the three.

The Würzburg School was the first movement to experimentally investigate the mechanisms of thinking. Breaking with Wundt's doctrine that higher psychological functions could not be studied through experimental methods, they invented a new methodology of *guided introspection* (Wagoner, 2008b) or *retrospective self-observation* (Kusch, 1999). Participants were given questions, such as "do you understand x?" They were to work out an answer silently and then give their answer aloud. This was immediately followed by their description of the process through which they arrived at the answer, which was believed to persist in memory for this short interval of time. The following is an example:

---

[6] Bartlett, as well as Werner and Vygotsky, clearly believed in "the unity of mentality" (Edwards & Middleton, 1987): Any demarcation between the mind's processes will be arbitrary because the mind is a systemically functioning totality.

[7] See van der Veer and Valsiner (1991).

[8] This influence is particularly evident in Bartlett's *St. Johns fellowship dissertation* (1916). Later in his life he is more dismissive of the Würzburg School's accomplishments (see Bartlett, 1951).

[9] See Diriwätcher (this volume) for the Würzburger's influence on the second Leipzig school.

Experimenter (Karl Bühler): "Do you understand: *when the minds begin to moralize, the devils are set loose"?*
Observer (Ernst Dürr): <9 s> "Yes"—"…comprehension came with the word: Nietzsche. This stood for the thought: Nietzsche is an example that one wants both to be witty and treat of ethics, one is shadow-boxing".

(From Diriwächter & Valsiner, 2005, p. 20)

Through the analysis of retrospective reports, guided by their reading of the philosopher Brentano, the Würzburgers elaborated a theory of consciousness that emphasized its *intentional* character, in opposition to Wundt's passive theory of images and sensations. Above and beyond Wundt's contents of consciousness they added characteristics relating to purpose and motivation.[10] Participants often reported consciousness of task orientation, directedness toward a goal, monitoring of progress, and related feelings. These were often unconscious but would become conscious under specifiable conditions, such as spontaneously asking for introspective reports *before* the task had begun.

In brief, this methodology emphasizes (1) attending to the active *process* of thinking over the *product* (in the above case, the "yes"), (2) the analysis of rich qualitative data containing components irreducible to simply sensation and imagery, and (3) a close interdependent relationship between experimenter and participant. In what follows I will expand on each one of these points, showing how they were developed by Werner, Vygotsky and Bartlett.

Process and Product

A process approach is concerned with "becoming" (i.e., unfolding events, transformation, and synthesis), whereas a product approach is concerned with "being" (i.e., comparing and contrasting static objects; Wagoner, 2008a). Table 5.1 contrasts the two in logical form:

Table 5.1 A contrast between product and process approaches (Wagoner, 2008a, a modification of Valsiner, 2003)

Product approach	Process approach
X = [is] = X	X —[remains]→ X
or	or
X ≠ [is not] ≠ Y	X —[becomes]→ Y

---

[10] It should be noted that Bartlett's own concept of 'attitude' is extremely close to the Würzburger's early concept of *Bewusstseinslage*, literally "position of consciousness". It was first mistranslated by Titchener (1909) as "attitude" and later by Boring (1950) as 'conscious attitude' (see Danziger, 1997, Chapter 8). Kusch's (1999) recent translation as 'situation of consciousness' comes closer to the original though perhaps misses its *directed* character. The concept encompassed a whole range of phenomena from feelings of surprise, excitement and familiarity to expectation, coercion, contrast and agreement (see Larsen & Bernsten, 2000, for comparison with Bartlett).

In all the methodologies mentioned above we find a process approach, i.e. a focus on capturing processes and the general analytic strategy of reading *between* moments in their evolution; however, there are important differences between them.

First, there is the question of a process's *direction*. Werner (1957, p. 126) famously defined development as "proceed(ing) from a state of relative globality and lack of differentiation to a state of increasing *differentiation*, *articulation*, and *hierarchical integration*". For example, an embryo develops from a bundle of *undifferentiated* cells to *articulated* cell types of *differentiated* cell systems (organs), which are in turn *hierarchically integrated*, such that one organ regulates the functioning of another. This explicitly biological metaphor captures the dynamics of some processes (e.g., basic perceptual processes—see Rosenthal, 2004) or Vygotsky's focus on remembering a target word, but misses some important aspects of others. Bartlett's experiments, by contrast, show how we increasingly remember the *gist* of an event rather than the particular details: Events blend together with other events in the process of generalizing out of specific encounters toward conventional schema. This tendency of remembering is highly functional for the organism and should not be treated as a kind of 'distortion,' as contemporary memory theorists often do. Luria's (1987) portrayal of the mnemonist Schereshevskii provides evidence that exceptional memory for details can be highly problematic to overall functioning (see below). As such, we could consider this type of generalization—into forms that are *less* easily articulated—a developmental advance rather than a regression (see Valsiner, 2007, Chapter 7). For example, most of Bartlett's participants failed to reproduce the phrase "a calm and foggy night" but retained a *feeling* of "sympathetic weather". One participant commented, "I formed some sort of association, I do not know what, in connection with the *thick, still evening* on the river…" (Bartlett, 1932, p. 80, italics added).

Second, we need to make a distinction between two different kinds of microgenetic methods: one in which the end product is fixed (e.g. "sanfter wind" in Werner's experiment) and another in which something novel emerges at the end of the process. Bartlett's method of repeated reproduction clearly fits into the second category. Werner increased the constraints on novelty in the course of the experiment (the full articulation of the phrase is the same for all participants), while in Bartlett's experiment the stimulus moves toward increasing *un*clarity, such that the constructive (imaginative) side of remembering takes a greater role over instantaneous remembering. For example, the above participant transforms "black substance" into "a ghost"—the participant was clearly mediating their remembering through their (dis)beliefs about the supernatural. Vygotsky's method is similar to Werner in its focus on the movement from diffuse to articulate, however like Bartlett it was possible for the end product to be a novel structure, particularly in his third condition in which the child paired word with image—for example, the child who remembered 'theatre' through a picture card of a crab at the beach. Following our aim to create a 'constructive' method it is important to keep in mind the need to allow a degree of openness in the participant's constructions.

Third, in regards to *timescale*, Werner deals with a process that happens so quickly it must be experimentally slowed down (see parallels with *Aktualgenese*, Diriwächter, 2009; Rosenthal, 2004); Vygotsky observes remembering *in vivo* within

a single experimental session; while Bartlett analyzed remembering as a process occurring over weeks, months and years. The fact that Bartlett did not systematically capture the moment-to-moment experiencing of his research participants, as did Werner and Vygotsky, is a weakness of his methodology. Bartlett makes claims about this micro-level process but only systematically accesses its outcomes.[11] He relies on observations and participants' introspective reports rather than accessing the micro-level process directly. In the next section we will explore Vygotsky and Werner's strategy for capturing micro-level processes *in vivo*.

What Counts as Data?

Perhaps, the most widely known debate in the history of psychology was that between the Würzburgers and Wundt over the interpretation of introspective data, and more superficially the contents of consciousness (see Humphery, 1951; Kusch, 1999). Wundt had claimed that only lower psychological processes (e.g. those in psychophysics) could be studied experimentally. In his laboratory the introspective report occurred immediately after stimulus presentation, which gave participants less space for memory distortions and alternative constructions of the task.[12] In contrast, the Würzburg School explicitly set out to study higher psychological processes through a *retrospective* report on their process of thinking. They found contents (i.e. imageless thought) that contradicted Wundt's theory of consciousness. Wundt unsurprisingly attacked them on the basis of their methodology, while Titchener (one of Wundt's students and misunderstanding followers) used Würzburg methods to defend Wundt's theory.

How then can we experimentally access mind? Or is the task hopeless? Are we confined to a study of its cultural products—such as art, language, folk-lore—i.e. to indirectly observe mind, as Wundt believed? Or would it be advantageous to replace 'mind' with the 'directly observable,' i.e. behavior or a brain scan? Fortunately, the methodologies of Werner and Vygotsky offer us an innovative alternative to 'observe mind'. For them *mind is mediation*, i.e. the embodiment of thoughts and experience within a *cultural medium*. It is not tenable to talk of unmediated verses mediated thought; all thinking must be viewed as "coming-into-being and formed in terms of different material media, such as verbal code, gesture language, linear expressions, etc" (Werner & Kaplan, 1957, p. 4). For example, Catán (1989) shows how children's experience of musical melodies is transformed in dialectical fashion as they develop more sophisticated notational systems to record the music. More

---

[11] Edwards and Middleton (1987) point out that Bartlett conversed with his participants during his experiments and used this data to interpret their reproductions. This, however, is not "systematic" access to their moment-to-moment remembering.

[12] The role of interpretation was not even eliminated in Wundt's strict experimental setup. For example, concerning the two-point threshold, Binet (1903) showed participant's interpretation of "two-points" differed depending on their interpretation of the task. Some participants interpreted "two-points" from a broader heavier single point or a bell shaped point. In short, describing in more detail the qualitative character of the sensation changed the results of Wundt's experiment (Danziger, 1990).

complex media for representing the melodies allowed for more complex experience of the music, which in turn feedback into the development of their notation.

Thus, we have direct access to mind when some external media is used to solve a task, e.g. a notational system, knots on a rope, pictures, writing, external speech, etc. The genius of Vygotsky's method of double stimulation was to provide participants with an *external mediator* (i.e. a picture card) to help them solve the task, so that their thinking would "come-into-being" through this visible medium, thus *objectifying* psychological operations: By slightly altering the memory task he shifted the boundary between what psychological processes were visible and which were invisible. In short, the *demands of the task* and *availability of tools* determine whether thinking processes are observable to the researcher.

But the picture card is still only one component of thought in Vygotsky's experiment (the instrumental component). To complete the task successfully the child must also create a meaningful *narration* that links the picture card to the target word; the child must form a *structure* (with the imaginative component) and navigate it (with attention component). For this, thinking must pass through the medium of speech. We saw how Werner (1956) used this shaping power of speech to access participant's imposition of order onto the unclear (diffuse) phrase.[13] The participant was giving meaning to the word-image in speech and at the same time elaborating its form (like reporting images in an inkblot). With this method we overcome the Würzburg School's problem of separating out *description* of what happened from a *representation*, *expression* or *announcement* (*Kundgabe*) of it. Speech is not taken as describing a process of thought (as in the Würzburg School) but is a form of thinking itself, whose temporal unfolding is directly accessible to the researcher. It can thus function in analysis as both process and product of some experimental manipulation.

Before closing this section I should say that we need not completely avoid using complex retrospective data—not even Wundt went that far in his criticisms and experimental work. Rather we must simply limit its use in our analysis: It cannot be treated as the primary source of data when dealing with higher psychological functions as in the Würzburg School, but might be used as a secondary data source to reveal something interesting about the primary data, as Bartlett uses it to comment on his primary data of story reproductions, visual reconstructions of images, etc. Also, retrospective data can give us an accurate account of the *general impressions* of doing a task or of the stimuli involved, but cannot be used as evidence for the details.

The Relationship Between Experimenter and Participant

Another major topic of controversy in the early years of psychology was how the experimenter and participant were to be related (see Danziger, 1990; Kusch, 1999). For the Würzburgers the relationship could best be described as a 'dialogue' or even an 'interrogation', whereas Wundt emphasized a need to isolate the experimental

---

[13] For another example of this 'think-aloud' research strategy see Diriwächter, this volume.

participant, recommending that where possible the experimenter and participant be in separate rooms. All three methodologists were probably closer to the Würzburgers in that the experimenter was an essential part of the experimental situation (as a *guide* to thinking and as an interlocutor for the communication of complex subjective experiences) and also that they focused on 'higher psychological processes,' which Wundt would have preferred to relegate to his non-experimental *Völkerpsychologie*. Let us briefly consider the relationship between experimenter and participant for each methodologist.

Werner retained aspects of Wundt's approach: For example, his participants' constructions occurred in relationship to a fixed objective stimulus, like in Wundt's approach but not the Würzburgers'. Secondly, he accesses their constructions as they occur in speech, not after there is a delay. What brings Werner closer to the Würzburgers is his active role as experimenter *guiding* participants from one sub-trail to the next, although not within the sub-trail as we saw in the Würzburg example, and as an interlocutor for his participants' feelings and thoughts.

As in the Würzburgers' experiments, many of Bartlett's research participants were friends—thus, he knew their interests and backgrounds. Bartlett saw this as a potential source of insight into their responses, not an interpretive bias or confounding variable—he saw Ebbinghaus' attempt to exorcise personal history from the laboratory as a failure. He comments,

> 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, 1932, p. 15).

In the course of the experiment we have the sense that Bartlett sits near to his participants, taking notes on their responses, even discussing with them at various points about their experience (Edwards & Middleton, 1987). He attends to his participants' psychological realities—e.g. how they understand and approach the task—just as much as the 'objective' features of the situation.

Vygotsky would occasionally change roles slightly within the experiment, using the closeness between child and researcher to further investigate the abilities of individual children. He tested his interpretation of children's functioning by providing support to the child who was missing one component of the remembering process. In scaffolding the missing component Vygotsky's theory would predict the child would be able to complete the task. Thus, like the Würzburgers and Bartlett, his method was not completely standardized, making for a flexible situation to both generate and test hypotheses.

This technique of experimentation was further developed by Luria (1970) in his idiographic studies of brain damaged patients: If his diagnosis of psychic malfunctioning was correct, a particular kind of intervention would prove successful (see also Wagoner, 2007). Piaget's clinical interview method fits this conception of hypothesis equally well. The experimenter asks questions to the child in order to ask further questions. There is no fixed set or sequence of questions: the experiment evolves as a *conversation* between experimenter and child, in which the experimenter frames hypotheses about the child in the course of the experiment and tests them against the child's responses (Duveen, 2000).

In sum, the experimenter and the research participant do not necessarily have to have fixed roles and rigidly controlled procedures. Nor does an experiment have to be purely deductive (i.e., about proving or disproving a hypothesis). Such approaches often cut out the most interesting characteristics of the phenomena, such as participant's unique personal history and novel constructions. Instead, experiments can be conceived as situations to generate hypotheses and "explore" the complexities of some phenomena through the participant's constructive responses to the experimenter's manipulations. This is particularly true in the study of processes and development.

Two Pathways to Generalization and Their Synthesis

To broadly compare different microgenetic methods, we have reviewed some of the procedural controversies of early experimental psychology—mainly process versus product orientated methods, retrospective versus visible access to thinking, familiarity versus anonymity between experimenter and participant, and standardized versus non-standardized procedures. In this section, we will broaden our focus still further to explore *different interpretive strategies by which researches arrive at general knowledge of some phenomena*. Our general comparison shifts at this point from different Continental methodologies, e.g. between the Würzburgers and Wundt, to a broader contrast between American and Continental research styles.[14]

Our goal in this section is to work toward a strategy of generalization that (1) produces complex theory by way of a rigorous interpretive approach, that (2) takes account of multiple sources of data and (3) explains cases deviant to the norm (e.g., in a standard distribution of scores). Of the two strategies of generalization, aggregate and single case analysis, neither alone can accomplish these aims. But if used together in a certain fashion they can complement each other and work toward our goal. It will be helpful to sketch out the general features of both, to bring to light what each can and cannot do, first in separation and then together. In the last portion of this section we will synthesis the two to incorporate the advantages of each, while best avoiding their limitations.

Aggregate Analysis

Aggregate analysis was invented as a means to analyze questionnaire data aimed at uncovering the distribution of inter-individual difference variables within a large population. During this same period experimental research was highly idiographic, to the extent that individual participants were commonly referred to by name (Danziger, 1990). At the time only the latter approach was a conventionally

---

[14] For a general outline of this contrast see Toomela (2007 and in this book).

accepted scientific practice. Early aggregates studies were forced to establish the value of their knowledge by pointing to its "social relevance" (e.g., in grading individuals in the newly rationalized institutions, such as education) *not* its scientific merit, and by appealing to the lay public *not* expert scientists. European statisticians argued against the attribution of any isomorphism between collective and individual, between the 'average subject' and the 'specific subject'.[15] For the inference from collectives to individual members to be made it would have to be assumed that "not only individual members were freely composable into aggregates […] but, conversely, group attributions were to be regarded as nothing but summations of individual attributions" (p. 77). If this assumption is accepted one must then deny that individuals are in any way integrated (systemically functioning) wholes.

But how then, given these theoretical and institutional difficulties, did aggregate analysis find its way into the laboratory? Danziger (1990) argues that experimental psychology was increasingly pressured to provide knowledge serviceable for 'large scale social control' (p. 129) by way of statistically significant predictions of aggregates. Assessing the complexities of individual psychological systems was seen to offer very little toward these goals. One did not need to understand single cases but to find variables that would have effects on the level of whole populations. It is interesting to note that this convergence between applied and experimental psychology was much less pronounced in Germany than in America. Two factors account for this difference: First, it was the result of different social role structures in the two countries. German psychologists collaborated directly with teachers; in contrast, American psychologists tended to be involved with school administrators. Teachers were much more interested in psychological processes in the minds of individual children than school administrators, who oriented toward institutional rationalization and bureaucratic efficiency. Second, German academics continued their pursuit of philosophical questions even if they were also involved in applied research, while American psychologists had a "single-minded devotion to the ideal of calculated efficiency and rationalized performance" (p. 133).

I do not want to suggest by this historical analysis that aggregate analysis is unreliable as a scientific instrument but simply to limit its scope. What I am against is what Danziger (1990) calls "methodolatry," the mechanical and automatic use of *one* single method without careful interpretation and observation. Aggregate analysis can be powerful in revealing certain *general trends* evident across participants but can tell us very little about individual psychological functioning on its own. Let us now consider what the skillful use of aggregate analysis can reveal by way of Vygotsky and Leontiev's experiment reviewed above.

In their first analysis, they compare the scores (number of words remembered) of children at different ages in the mediated and unmediated conditions. Plotting the relationship between age and number of words remembered for the two conditions onto a graph (see Fig. 5.1[16]) we see the mediated remembering improving much more quickly over unmediated. At 10–14 years of age the difference begins to decrease

---

[15] Recently, Molenaar (2004a,b) has forcefully made the same argument.

[16] These results have been recently reproduced with minor modifications (Meshcheryakov, 2008).

Fig. 5.1 Showing the relationship between unmediated (B) and mediated memory in condition where cards are pre-paired with words (C). From van der Veer and Valsiner (1991), p. 232
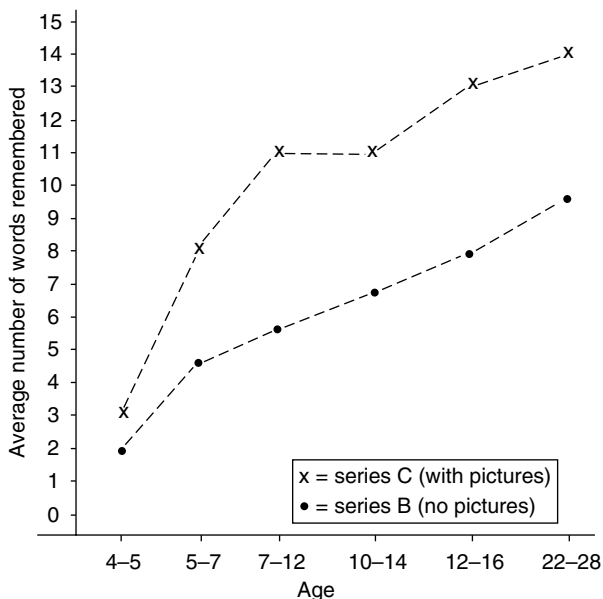
once again. Vygotsky explained this as the child's increasing ability to use external mediated means. The narrowing of the gap between unmediated and mediated again at a later age was understood within his famous law of development in which external means became internal, making their external counterpart redundant.

Nowhere in this analysis do we see a single child's performance improve through time—this would have taken many years to complete and is unnecessary for answering Vygotsky's general question here. He was simply looking for *general trends* across these age groups for the two conditions; he was not claiming that *any* 3-year-old remembers x amount and any 5-year-old y for either mediated or unmediated conditions, nor simply that 3- and 5-year-old are different. His interpretation of the data tells a general theoretical story about the intertwining of natural (no external means) and cultural (external means) developmental lines, but does not reveal how they are coordinated within the individual child's holistic functioning.

In summary, aggregate analysis can be a powerful tool in uncovering general trends within a sample, although it also comes with a number of limitations:

(1) We cannot treat variations occurring within a population as if they applied to individuals (Molenaar, 2004a,b; Molenaar & Valsiner, 2005). An average score does not apply to *any* individual within the sample, and the distribution of scores for the two conditions might overlap to a high degree. Therefore, it is unjustified to say that all those in condition a are x, because some may in fact tend toward y and thus be closer to the general trend in condition b. Lewin (1933, p. 559) comments, "The laws of falling bodies in physics cannot be discovered by taking the average of actual falling movements, say of leaves, stones, and other objects, but only be proceeding from so-called 'pure' cases".

(2) In homogenizing each condition, we ignore cases that might contradict our general analysis. Furthermore, this constrains the possibilities for innovation by restricting analysis to confirmation or disconfirmation of one's hypothesis. Alternatively, by looking at deviance we see that the situation is often more complicated than our model allows, like when multiple variables are operating together. Vygotsky, for example, found when exploring the qualitative structures of individual children that three components must be simultaneously present if the child is to master the memory task.

(3) This brings us to the often acknowledged, but seldom applied (to methods), truism that *individuals are not just the sum of their parts/variables*. Variables combine into wholes which change the meaning of each variable in relation to the others—as with Vygotsky's three components. To see how variables are *systemically* related we must look at how they are functioning together in particular individuals. It is only through the analysis of wholes and their variations in time that we access *qualitative transformations*, which is the focus of the microgenetic method. It is to single case analysis we must go if we are to understand these systemic relationships and their development through time.

Single Case Analysis

As already mentioned, earlier experimental psychology (into the 20s) was highly idiographic. In Ebbinghaus' (1885/1913) studies, for example, there was only one participant and it was himself! A typical experiment could involve between one and twelve participants, all of which would be accounted for in the analysis—when quantitative data was used scores were given for *all* participants. Multiple participants were only needed to reproduce the results obtained with the first participant. Thus, here generalization moves from single cases to general models and back to single cases; rather than from group averages to individuals, as is the case in aggregate analysis. Bartlett's presentation of several whole reproductions produced by a single participant and their analysis in terms of holistic qualitative transformation is a good example of a single case analysis; while his attention to how many of his participants changed boat to canoe (over half by the second reproduction) is a form of aggregate analysis intended to reveal *general trends*. Similarly, Werner makes his argument entirely from the qualitative description and analysis of single participants; at the aggregate level he merely mentions how many participants did *not* produce an analyzable series. In this section, I will first consider Bartlett in relation to single case analysis; then compare and extend his findings with Luria's (1987) idiographic study of the famous mnemonist Schereshevskii.

In Bartlett's book *Remembering* (1932) there is no sophisticated statistical analysis and his sample sizes are relatively small by today's norms. The current social norm for sample sizes was established in the 1950s (Danziger, 1987), long after Bartlett conducted his experiments. Instead, the book draws us in by its closeness to the phenomena, through its simple and rich material, which we can try out for ourselves,

and his holistic analysis, which integrates participants' reproductions, comments, affects, behavior, etc., for the development of complex theory. His criteria of what counts as good evidence is rather different from today's criteria but not necessarily less rigorous. Contemporary experiments legitimize themselves by having large samples, highly standardized procedures and statistically significant differences between scores. Bartlett, on the other hand, might offer us several whole unprocessed reproductions of a single participant, which allow us to transparently compare our own interpretation with his as a means of quality control (whereas with most contemporary experiments we loose this ability). As a second strategy of quality control he attends to cases deviant from the norm that do not quite fit his theory and works them into it (whereas for most contemporary experiments deviant cases are ignored as mere noise—what matters is statistical significance). Thus, when only one out of twenty of participants remembers the two bizarre proper names in the story *War of the Ghosts* he devotes two pages (pp. 208–209) to working through this case.

This deviant case seems to contradict Bartlett's theory of *constructive* remembering in that the participant immediately remembers two details (the proper names *egulac* and *kamala* which no one else remembers) but cannot recall the rest of the story. With time the participant is able to reconstruct the general story but only slowly. Bartlett uses this example to elaborate his concept of *image* in his general theory of remembering: Images function to restrict the generalizing character of schemas by picking out details in a schema—schemas *generalize* while images counterbalance this tendency by *particularizing*.[17] It should be noted that images here are not like *traces* left on the mind; instead they are actively formed and maintained by a participant with particular interests and a history. Thus, the participant's memory of *egulac* and *kamala* can be understood as a case of the skillful use of imagery to select and maintain these elements.

We can further test the limits of Bartlett's theory by seeking out cases in which *no* reconstructive remembering seems to be taking place. The famous mnemonist Schereshevskii, for example, could remember lines of Dante in Italian (though he did not speak Italian) 15 years after he was exposed to them, without intermittent rehearsal or forewarning (Luria, 1987, p. 45). We might ask, "What could this bizarre and extraordinary mind teach us about our own? How can we work toward a general model of mind from such abnormal cases?" From a single case analysis it is precisely deviance from the norm that can be most useful in developing a theory. Schereshevskii's exceptional memory abilities were largely the result of his powerful mental imagery and synesthesia (Luria, 1987). We all use imagery and have some degree of synesthesia (e.g. we understand cross-modal expressions like "the cheese is *sharp*") but they are rather weaker for us and do not have the overwhelming influence over our life that they did for Schereshevskii.

From Luria's (1987) analysis of Schereshevskii's total functioning[18] we see that his abilities are also handicaps: What allows him to remember concrete details with

---

[17] Bartlett's third major concept is *attitude* which has already been mentioned in connection with the Würzburgers in Section 3.1.

[18] Single case analysis allows one to explore functioning on particular tasks in light of more general functioning. A participant's history can be used in the analysis.

incredible precision, constrains him from moving beyond particulars to generalizations, i.e. schematizations. His world is a flood of instances and details, not a coherent account of them. Thus, we can infer the *particularizing* character of imagery, which is normally counterbalanced with the *generalizing* character of social schemas that assimilate any particular object to a framework of meaning—Bartlett's participants would, for example, get a *gist* of the story, as similar to a kind of story they were familiar with, but would forget many of the details. The reconstructive processes that Bartlett highlights in his theory are minimized for Schereshevskii—there are no gaps in his memory in need of filling in because imagery and feeling work so flawlessly. Thus, a pathological case that seems to contradict Bartlett's theory actually compliments it and might be useful in developing it in powerful directions: for example, by looking at the role played by *mnemotechnics*—such as "the method of loci" (Yates, 1966)—to extend the possibilities of his visual imagery.

In sum, a single case analysis is the only option to explore the systemic functioning of participants because the system works within the individual case. It is more inclusive of a broad array of data, including observations, knowledge of a participant's biography, his or her comments, etc. and proceeds to integrate them through an interpretive approach—thus, it is open to novelty. In contrast to aggregate analysis its means of quality control are (1) the presentation of full unprocessed cases, and (2) attending to *all* participants in the sample, especially deviant cases. One might argue, at this point, however, that deviance is not always as apparent as was Schereshevskii—we need a way of moving between aggregate and single case data. It is to this question that we now turn.

Synthesis

In the above, an argument for the strength and potential benefits of single case analysis has been developed. Focusing on single cases is the only way to access systemic psychological functioning. It is the only strategy compatible with the microgenetic method for it is at the single case that we can see qualitative transformations, i.e. systemic re-organization in time. There is, however, still an important place for aggregate analysis within our methodological framework. A way of conceptualizing the sample as a whole is needed. Aggregate analysis can be productively employed to identify both average and out layer cases; it provides a mechanism for outlining the diversity of a sample along specified parameters and situating individual cases in it. Bartlett uses it effectively when he recognizes and then analyzes the one participant out of twenty that remembered the bizarre proper names *Egulac* and *Kamala*. Although this (unusual) case would not be a good case to begin to construct his theory of remembering from, it is still essential for developing it, since it reveals a very different organization based on the similar mechanisms. To take a more extreme example, one's theory of remembering would be quite strange if it was built on an unusual case such as that of Schereshevski.

Also, recognizing *general trends* can be helpful in interpreting individual cases. In Bartlett's experiments some changes to the story occurred in the majority of his

participants—for example, 'canoes' become 'boats' in over half the participants by the second reproduction—while others were more idiosyncratic. Remembering can thus be conceptualized as involving both social frameworks and personal interests. In teasing these two factors apart we can begin to look for their interrelation: For example, it was common for participants to leave out the supernatural elements of the story; however, this could be accomplished in idiosyncratic ways, such as interpreting what comes out of the Indian's mouth as merely "a materialization of his breath". In this case, conventionalization is accomplished through personal imagery.

In sum, working between single cases and the aggregates can provide invaluable resources for both interpreting single cases and understanding the nature of the variation found at the aggregate level. In doing this we overcome the weaknesses of aggregate analysis—i.e. their inability to explore deviance, and make claims about individual cases and their systemic functioning—and situate single cases within the sample, so as to treat them as 'normal' or 'outlayer' cases on specified dimensions.[19]

Conclusion: Microgenesis in the Making

In this chapter, I have *not* advocated turning back the clock to an earlier era of experimentation but rather for an open dialogue with it in order to deepen our present methodological resources. For my purposes I have attempted to develop an experimental methodology that can access and analyze *constructive processes*, which must be approached through *individuals as wholes and their qualitative transformations in time* (though this analysis can be strengthened with an aggregate analysis). These are features which contemporary methodology is rather weak on but for which the microgenetic method (which belongs to this earlier tradition) was designed for. In short, I have explored the history of methodology and offered a direction in which different approaches can be integrated to create an *experimental methodology of constructive microgenesis*.

References

Bakhurst, D. (1990). Social memory in soviet thought. In D. Middleton & D. Edwards (Eds.), *Collective remembering* (pp. 203–226). London: Sage.

Bartlett, F. C. (1916). *Transformations arising from repeated representation: A contribution towards an experimental study of the process of conventionalisation*, Fellowship Dissertation, St. John's College, Cambridge.

---

[19] For a recent empirical example of the proposed methodological synthesis (see Wagoner, in press).

Bartlett, F. C. (1932). *Remembering: A study in experimental and social psychology*. Cambridge, Cambridge University Press.

Bartlett, F. C. (1951). Review of thinking: An introduction to its experimental psychology by George Humphrey (1951). *Quarterly Journal of Experimental Psychology*, *4*(1), 87–90.

Binet, A. (1903). *L'etude expérimentale de l'intelligence*. Paris: Schleicher.

Boring, E. G. (1950). *A history of experimental psychology*. New York. Appleton-Century-Crofts.

Catán, L. (1986). The dynamic display of process: Historical development and contemporary uses of the microgenetic method. *Human Development*, *29*, 252–263.

Catán, L. (1989). Musical literacy and the development of rhythm representation: Cognitive change and material media. In A. Gellatly, D. Rogers, & J. Sloboda (Eds.), *Cognition and social worlds* (pp. 144–167). Oxford, Clarendon Press.

Danziger, K. (1987). Statistical method and the historical development of research practice in American psychology. In G. Gigerenzer, M. Morgan, L. Kruger (Eds.), *The probabilistic revolution: Ideas in modern science, Vol. 2*. Cambridge, MA: MIT Press.

Danziger, K. (1990). *Constructing the subject: Historical origins of psychological research*. New York: Cambridge University Press.

Danziger, K. (1997). *Naming the mind: How psychology found its language*. London: Sage.

Danziger, K., & Ballantyne, P. F. (1997). Psychological experiments. In W. Bringmann, et al. (Eds.), *Pictorial history of psychology* (pp. 233–239). New York: Oxford University Press.

Diriwächter, R. (2009). Idiographic microgenesis: Re-visiting the experimental tradition of Aktualgenese. In J. Valsiner, P. C. M. Molenaar, M. C. D. P. Lyra, & N. Chaudhary (Eds.), *Dynamic process methodology in the social and developmental sciences* (pp. 319–352). New York: Springer.

Diriwächter, R., & Valsiner, J. (2005, December). Qualitative developmental research methods in their historical and epistemological contexts [53 paragraphs]. *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* [On-line Journal], *7*(1), Art 8. Available at: http://www.qualitative-research.net/fqs-texte/1-06/06-1-8-e.htm. Accessed 25 Feb, 2008.

Duveen, G. (2000). Piaget as ethnographer. *Social Science Information*, *39*, 79–97.

Ebbinghaus, H. (1885/1913). *Memory: A contribution to experimental psychology*. New York: Dover.

Edwards, D., & Middleton, D. (1987). Conversation and remembering: Bartlett revisited. *Applied Cognitive Psychology*, *1*, 77–92.

Engeström, Y. (2007). Putting Vygotsky to work: The change laboratory as an application of double stimulation. In H. Daniels, M. Cole, & J. V. Wertsch (Eds.), *The Cambridge companion to Vygotsky*. Cambridge: Cambridge University Press.

Gauld, A., & Stephenson, G. M. (1967). Some experiments related to Bartlett's theory of remembering. *British Journal of Psychology*, *58*, 39–49.

Henderson, E. N. (1903). A study of remembering and connected trains of thought. *Psychological Review Monograph Supplements*, *5* (Whole No. 23), 1–94.

Holton, G. (1988). *Thematic origins of scientific thought: Kepler to Einstein*. Cambridge, MA: Harvard University Press.

Humphery, G. (1951). *Thinking: An introduction to its experimental psychology*. London: Methuen.

Kusch, M. (1999). *Psychological knowledge: A social history and philosophy*. London: Routledge.

Larsen, S., & Berntsen, D. (2000). Bartlett's trilogy of memory: Reconstructing the concept of attitude. In A. Saito (Ed.), *Bartlett, culture and cognition* (pp. 115–134). UK: Psychology Press.

Lewin, K. (1933). Environmental forces in child behavior and development. In C. Murchinson (Ed.), *A handbook of child psychology* (pp. 590–625). Worcester: Clark University Press.

Luria, A. R. (1970). *Traumatic aphasia: Its syndromes, psychology and treatment*. Paris: Mouton.

Luria, A. R. (1987). *The mind of a mnemonist: A little book about a vast memory*. Cambridge, MA: Harvard University Press.

Meshcheryakov, B. (2008). *The parallelogram of memory development: Not a myth, but requires specification*. Paper presented at the International Society for Culture and Activity Research, San Diego, USA.

Molenaar, P. (2004a). A manifesto on psychology as idiographic science: Bringing the person back into scientific psychology,this time forever. *Measurement*, *2*(4), 201–218.

Molenaar, P. (2004b). Forum discussion of the manifesto's aggregation act. *Measurement*, *2*(4), 248–254.

Molenaar, P., & Valsiner, J. (2005). How generalization works through the single case: A simple idiographic process analysis of an individual psychotherapy. *International Journal of Idiographic Science*, *1*(1) [92 paragraphs]. (Reprinted in S. Salvatore et al. (2009). *Yearbook of idiographic science 2008* (Vol. 1). Rome: G Fireira Group)

Philippe, J. (1897). Sur les transformations de nos images mentales. *Revue de Philosoque*, *43*, 481–493.

Roediger, H. L., Bergman, E. T., & Meade, M. L. (2000). Repeated reproduction from memory. In A. Saito (Ed.), *Bartlett, culture and cognition* (pp. 115–134). London: Psychology Press.

Rosenthal, V. (2004). Microgenesis, immediate experience and visual processes in reading. In A. Carsetti (Ed.), *Seeing, thinking and knowing: Meaning and self-organization in visual cognition and thought*. Rome: Kluwer Academic Publishers.

Titchener, E. B. (1909). *Lectures on the experimental psychology of the thought-processes*. New York: Macmillan.

Toomela, A. (2007). Culture of science: Strange history of the methodological thinking in psychology. *Integrative Psychological and Behavioral Science*, *41*, 6–20.

van der Veer, R., & Valsiner, J. (1991). *Understanding Vygotsky: A quest for synthesis*. Oxford: Blackwell.

Valsiner, J. (1998). *The guided mind*. Cambridge, MA: Harvard University Press.

Valsiner, J. (2000). *Culture and human development*. London: Sage.

Valsiner, J. (2003). Culture and its transfer: Ways of creating general knowledge through the study of cultural particulars. In W. J. Lonner, D. L. Dinnel, S. A. Hayes, & D. N. Sattler (Eds.), *Online readings in psychology and culture* http:/www.wwu.edu/~culture. Accessed 15 June, 2006.

Valsiner, J. (2007). *Culture in minds and societies: Foundations of cultural psychology*. New Delhi: Sage.

Valsiner, J., & van der Veer, R. (2000). *The social mind: Construction of the idea*. Cambridge: Cambridge University Press.

Veresov, N. (2008). *CHAT in retrospective: Bridging the gap or fixing the hole?* Paper presented at the International Society for Culture and Activity Research, San Diego, USA.

Vygotsky, L. (1978). *Mind in society*. Cambridge, MA: Harvard.

Vygotsky, L. (1986). *Thought and language*. Cambridge, MA: MIT.

Vygotsky, L. (1987). *The collected works of L.S. Vygotsky. Vol. 4: The history of the development of higher mental functions*. New York: Plenum Press.

Vygotsky, L., & Luria, A. (1994). Tool and symbol in child development. In J. Valsiner & R. van der Veer (Eds.), *The Vygotsky reader* (pp. 99–172). Oxford: Blackwell.

Wagoner, B. (2007). Overcoming psychology's methodology: Finding synthesis beyond the American and German-Austrian division. *Integrative Psychological and Behavioral Science*, *41*(1), 6–74.

Wagoner, B. (2008a). Developing "development" in theory and method: Commentary on Kleine-Horst. In E. Abbey & R. Diriwätcher (Eds.), *Innovating genesis* (pp. 39–61). Charlotte, NC: Information Age Publishers.

Wagoner, B. (2008b). The microgenetic method: A history of transformations. *BPS: History and philosophy of psychology section conference*. March 25–27, Oxford.

Wagoner, B. (in press). Narrative in the recall of apparent behavior. In S. Salvatore & T. Zittoun (Eds.), *Cultural psychology and psychoanalysis in dialogue*. Charlotte, NC: Information Age Publishers.

Werner, H. (1956). Microgenesis and aphasia. *Journal of Abnormal Social Psychology*, *52*, 347–353.

Werner, H. (1957). The concept of development from a comparative and organismic view. In D. B. Harris (Ed.), *The concept of development*. Minneapolis: University of Minnesota Press.

Werner, H., & Kaplan, B. (1957). Symbolic mediation and organization of thought: An experimental approach by means of the line schematization technique. *The Journal of Psychology*, *43*, 3–25.

Werner, H., & Kaplan, B. (1963). *Symbol formation*. Hillsdale: Lawerance Erlbaum Associates.

Werner, H., & Kaplan, E. (1954). Change of meaning: A study of semantic processes through the experimental method. *Journal of General Psychology*, *50*, 181–208.

Yates, F. (1966). *The art of memory*. Chicago: University of Chicago.