Chapter Two: Theoretical Framework

Because ‘knowledge’ is socially constructed, and because of the way a number of people, in person and in text, assisted me in my search for Vygotsky’s Blocks, I have chosen to present this framework along the lines of how my own knowledge construction process in this field unfolded: how it progressed from unclearly formed associations, to pseudo- and potential concepts; and how it took a circuitous route in search of these blocks, to the point where my understanding of Vygotsky’s work on new concept formation remained tentative, until I turned another page to read more about his ideas and continued to construct more comprehensive understandings of the intricacies involved.

Where it started for me

My fascination with ‘Vygotsky’s Blocks’ and the different types of perceptually dominated preconceptual thinking, and subsequent logical, abstract and generalisation-based conceptual strategies that people employ in coming to understand new concepts began with my first reading of Kozulin’s (1990) work *Language and Thought*. Kozulin (1990, p. 213) writes that this procedure, “originally known as the “method of double stimulation””, became known in the West as “Vygotsky’s blocks test” when this work was translated into English by Eugenia Hanfmann and Jacob Kasanin in 1937.

At first, my understanding was that the preconceptual representations revealed by Vygotsky’s work were restricted to ontogenetic development. I dashed between Vygotsky himself in *Thought and Language* (1986) and back to Kozulin (1990). In my excitement I had overlooked Kozulin’s specific statement that thinking in complexes and pseudoconcepts shouldn’t be viewed as purely developmental phases, but as “methodological devices” that people employ, revert to, and retain in their quest for understanding and interpreting the demands of a particular task – and that these representations can affect the strategy they are likely to use (1990, p. 213). I went back to Vygotsky (1986), and, combing through Chapter 5, found that he had makes this point a number of times – to cite but a few examples:

- p. 113 (in adult language);
- p. 115 (adult’s ideas of dishes or clothes);
- pp. 124-126 (regarding the value of the genetic (developmental) and functional analysis);
- p. 130 (thinking in complexes as the foundation of linguistic development); and
- p. 140 (the continued thinking in complexes and pseudoconcepts by adults in everyday life).

I moved back and forth between the two authors, and, as I continued to construct my understanding from the intricacies discussed by each, I wondered what Vygotsky’s Blocks looked like; what it would be like to work with them; and what it would be like to ‘be there’ as “the development of concepts unfolds in front of us” (Vygotsky, 1986, p. 97).

Kozulin (1986) provides a description of the functional method of double stimulation developed by Sakharov and Vygotsky on pages 103 to 104 of *Thought and Language*. The description he cites is from Hanfmann and Kasanin’s 1942 monograph of this procedure. The subjects in this experiment are confronted with 22 wooden blocks, which they are told can be put together in four
groups, and each group has a different name. The researcher turns over a sample block, and says, by reading its name, “This one is called *mur*”. The block is put into a corner, and the subject is asked to pick out all those blocks which they think are of the same kind and put them into the corner with the *mur* block. This word “*mur*” means nothing to the subjects to begin with. What they also don’t know to begin with, and what makes this method, for me, most elegant in its design, is that the nonsense words are artificial concepts that embody a combination of real attributes of the blocks for which there is no readily available word and concept in the given language (Russian or English). The subjects in the experiment have to construct their own understanding of these words and concepts correctly in the process of solving the problem of why each of the blocks belongs together in a group. What the 22 wooden blocks have written underneath them are four ‘nonsense’ words – *cev*, *bik*, *mur* and *lag* – and, regardless of colour or shape, the blocks are labelled as follows:

- *lag* is written underneath each large, tall block;
- *mur* underneath each small, tall block;
- *cev* underneath each small, flat block; and
- *bik* underneath each large, flat block.

Now, as you are an adult capable of true conceptual thinking, and you have been given insight into what this experiment involves, try something. Close this manuscript right now and go and find something around you that you would describe as *mur*, something as *bik*, as *cev*, and as *lag*.

How did you do it? Did you walk around thinking to yourself, “Okay, small and tall; large and flat; um, there are four groups, what were their names again?” Or did you walk around thinking “Okay, *cev*, *bik*, *mur*, and *lag* – what was *cev* again?” It’s not easy, is it? Did you have to come back to the text to check which of the words means what?

What I did was associate the nonsense words with memory-jogging connections: *lag* was obviously large; *bik* was obviously big, but I had to remember that it was flat too. *Mur* I associated with the Afrikaans word “muur”, which means “wall”, and walls are tall and thin. *Cev* I related to “me”, because it has an “e” in it, and because I am small and flat-chested.

Even so, I still had difficulty in remembering what the words meant until I was later able to make plasticene models of the blocks from a colour photograph I sourced in Fuad Topi’s (2001/5) paper (Jussi Silvonen’s ‘work in progress’ with the “Ach-Saharov-Vygotski testi” (2001/5, p. 11)). Making the plasticene models underscored the constructivist nature of this experimental procedure in the formation of new concepts, something you were not perhaps able to do in a constructivist way in the ‘experiment’ above, and neither was I, even though both of us had insider knowledge about the combinations of height and size.

But I am getting ahead of the story. If you read the Hanfmann-Kasanin description of the blocks in *Thought and Language*, you will see that, other than describing the blocks as having five different colours, six different shapes, two heights, and two sizes, this description is brief. Which shapes? What colours? How big and how small? The blocks obviously have to be made in such a way that it would not be possible for subjects to group them according to shape or colour, and thus be led to the wrong conclusions. But what are the combinations of the original Sakharov and Vygotsky Blocks?
Some excerpts from the journey

Armed with my own copy of *Thought and Language* (1986) and Kozulin’s *Language and Thought* (1990), I began my search. There is an approach of immense value that is stressed by our university and that is to consult the original authors, wherever possible, in any particular field. With this approach in mind, after searching in our library’s archives and on the Internet, I discovered a number of important documents that would give me clues about these blocks. Eugenia Hanfmann and Jacob Kasanin translated Vygotsky’s work on this procedure in 1937, and wrote further about it in a monograph in 1942. But there was also Jacob Kasanin’s translation of Vygotsky’s work in 1934. Sakharov himself had presented a talk on this method of exploring concept formation in 1928 and his paper was first published in 1930.

I was fortunate to find that the Wits library archives for *The Journal of Psychology* do start at 1937 (and not at 1940 as listed in the database), so I was able to get a description of the blocks (their dimensions) and see, for the first time, a black-and-white photograph of them (Hanfmann & Kasanin, 1937, p. 523). But, frustratingly, this article doesn’t itemise the blocks, ie, one small flat red triangle; one tall large blue square and so on, and it’s not possible to work these out from the photograph. This 1937 paper has a footnote that reads “The sets can be obtained from Dr. J. Kasanin, Michael Reese Hospital, Chicago, Illinois” (p. 522), but the hospital archives weren’t able to help me. Other, more recent papers I’d come across that cited Hanfmann and Kasanin’s 1937 paper didn’t itemise the blocks either, so my search for them continued.

Professor Alex Kozulin sent me a copy of the 1942 Hanfmann-Kasanin paper which refers (intriguingly) to Figures One and Two as “colored” plates (Hanfmann & Kasanin, 1942, p. 9). He also pointed me to *The Vygotsky Reader* (Van der Veer & Valsiner, 1994), which contains the Sakharov paper, newly translated. I combed through this 1928/30 Sakharov paper and, in it, Sakharov (1994) refers to at least six ‘procedures’:

1. “about 20 – 30 wooden figures resembling draughtsmen... “bat”, “dek”, “rots”, and “mup”” (pp. 94-95);
2. “a preliminary study of the process of concept formation in adults using a similar method” (p. 95);
3. “at present are completing an analogous study of children” (p. 95);
4. “In a similar procedure, we carried out a study of concept formation in adults and ascertained its productiveness” (p. 96);
5. “We are now completing a study of concept formation in schoolchildren and are beginning to work with pre-school children, for whom verbal signs are replaced by arbitrary colour tokens” (p. 96); and
6. “We are also in the process of developing and testing a new test.” (p. 96).

Yet, other than describing, for example, Ach’s (1921) experiments at length, and his and Vygotsky’s procedure with “bat”, “dek”, “rots”, and “mup” (1994, pp. 94-96), which are clearly not the same as the Hanfmann-Kasanin blocks, Sakharov restricts his description of his other tests to the five vaguely referred to ones above. (What he does do, however, is provide a very clear theoretical framework for the functional method of double stimulation in the study of concept formation – but more about this later.)

Although I had managed to obtain a colour photograph of Jussi Silvonen’s ‘work in progress’ with the “Ach-Saharov-Vygotski testi” (Fuad Topić, 2001/5, p. 11), I had to be sure that they matched with the original blocks designed by Sakharov and Vygotsky (Silvonen’s photograph has 23
blocks and I wasn’t sure why two \textit{cev} triangles were duplicated). Also, I hadn’t had much luck in tracing the blocks from the Michael Reese Hospital, or, at the time, from the manufacturers of the blocks (“C. H. Stoeleting Co., Chicago, Illinois” (Hanfmann & Kasanin, 1942, p. 103)), or from the Archives of the History of American Psychology. The 1942 colour plates were crucial, but none of the documents I had traced in South Africa had coloured photographs of these blocks.

From various references to the blocks in later studies (for example, Cameron & Davidson, 1981), it became obvious that there are discrepancies in the sizes and colours of the blocks used by these researchers. Further, as the Kasanin-translated paper of Vygotsky’s work in 1934 doesn’t describe the blocks in detail, I wondered what clues might be contained in end-note 20 from Sakharov’s (1928/30/94) paper, which reads:

\begin{quote}
At present, the study, begun and for the most part carried out by L. S. Sakharov at the State Institute for Experimental Psychology (Moscow), and completed by L. S. Vygotsky, Yu. V. Kotelova and E. I. Pashkovskaya, is being prepared for the press in the form of a monograph. The principal results of this investigation were presented by Vygotsky at the First Congress on the Study of Human Behaviour, in Leningrad in January 1930 (Section on Psychology, Reflexology and Physiology of the Nervous System). See Vygotsky, L. S. 1930: Eksperimental’noe issledovanie vysshikh processov povedenija [The experimental study of higher behavioural processes]. In A. B. Zalkind (ed.) Psikhonevrologicheskie nauki v SSSR [Psychoneurological sciences in the USSR: Materials of the 1st All-Union Congress on the Study of Human Behaviour] (pp. 70-1). Moscow: Gosmedizdat [original footnote].
\end{quote}

Professor René van der Veer, who sent me a copy of this paper when all other avenues to trace it had been exhausted, wrote that he wasn’t aware of an English translation of this paper. Dr Judith Inggs at Wits University was able to translate the paper from Russian (and Cyrillic) into English: it is a five-point summary of Vygotsky’s 1930 presentation but it does not offer any further clues to these elusive blocks.

Frustrated with the attempts to find documents which detailed the Sakharov / Vygotsky Blocks, I decided that I had little alternative but to be faithful to the spirit if not the letter of the law. A meticulous replication of this experiment has to be faithful to the functional method of double stimulation worked out by Sakharov and Vygotsky, even if there are insufficient details about the blocks apart from those provided by Hanfmann and Kasanin (1937; 1942). For example, in Sakharov’s (1928/1994) paper, the colours of ‘bat’, ‘dek’, ‘rots’, and ‘mup’ are described as having the colours yellow, red, green, black, and white (p. 94). In \textit{Thought and Language} (1986), although Vygotsky refers to sample blocks having their names “visible” (p. 113), he does not refer to them by the names \textit{cev}, \textit{bik}, \textit{mur}, and \textit{lag} in the text. He does, however, refer to \textit{bik} and \textit{lag} (p. 1065) in \textit{Thought in Schizophrenia}, published in English in 1934, but which Kasanin reports was written “over three years ago” (1934, p. 1063). Back in \textit{Thought and Language} (1986), however, Vygotsky describes chain complexes with an example that reads: “Yellow objects are apt to be followed by green ones; then green may change to blue, and blue to black” (1986, p. 118), and in discussing abstraction “red and flat” (p. 136).

So what we have looks like this:
Vygotsky (1931?/34) ‘lag’ and ‘bik’
Vygotsky (1986) no in-text use of names Colours: yellow, (red), green, blue, black
Hanfmann & Kasanin (1937/42) cev, bik, mur, lag Colours: yellow, red, green, blue, white

Hanfmann and Kasanin write that they “adapted the test from Sakharov and Vygotsky”, and
other than noting that “some changes in the technique were introduced”, providing rules and
instructions for administering it, they do not specify whether the adaptations they made were also to
the blocks in any way (1937, p. 522). And because Sakharov’s 1928/30/94 paper doesn’t describe
these 22 blocks in detail either, one is left with little alternative but to use the blocks, their colours,
shapes, and dimensions as described in detail by Hanfmann and Kasanin (1937; 1942).

Circuitous routes

It does, in hindsight, become very obvious that if one doesn’t restrict an Internet search by using
double quotation marks (as some might advise to avoid excessive, invalid information), one’s search is
likely to open up a range of possibilities that aren’t so restrictive. For example, searching for “C.H.
Stoelting, Co.,” guides one to about three options, these being mainly to historical sites dealing with
psychological apparatus. Without the parentheses, however, one is led directly to Stoelting Co.’s
website which, when clicking on Other Divisions and then the search engine (but not before this), leads
one to the “Kasanin-Hanfmann concept formation (Vigotsky test)” in full colour, bright as daylight,
and still being manufactured in 2006!

However, other than the spellings of names involved or the order in which they appear, a
search on PsychINFO for “Hanfmann”, leads to, among other results, result number four:
“Hanfmann-Kasanin concept formation or Vygotsky Test: History of the test / Test formiranja
pojmova Hanfmann-Kasanina ili test Vigotskog: Povijest testa. Ibrahimpasic,-Fuad-Topic, Suvremena-

The work presents the historical chain of events which preceded the test of
concept formation and which influenced its development. An attempt was
made to enlighten certain details about persons who are often forgotten but
whose research has contributed to the development of conceptual thinking
tests, in both the theoretical and practical sense. A short review of possible
applications of the test of concept formation is presented, which has
unfortunately, in the wave of more modern tests, been almost forgotten and
resigned to the history of psychology. (PsychINFO AN: 2005-00261-009)

These factors contributed to my rather circuitous route in my search for Vygotsky’s Blocks.
The first search (with parentheses) led me to understand that these blocks were very difficult to
obtain, and had, in fact, become obsolete. This understanding was confirmed by the title and abstract
of the Croatian paper, which, only once it was translated into English (commissioned by me
privately), was able to lead me to Stoelting Co (without the “C. H.”), the company that continues to
manufacture the “Kasanin-Hanfmann concept formation (Vigotsky test)”, and which also has an

The political – and more broad-spectrum – isolation of one’s country from the rest of
the world doesn’t help either: the only copy of Hanfmann and Kasanin’s 1942 monograph available in
South Africa is a photocopied version with black-and-white photographs.
However, I am not unsatisfied with the direction and circuitous route that my search for these apparently elusive blocks took: the road less travelled, whether by choice or otherwise, led me to construct my own unique understanding of and passion for what these blocks mean for current cognitive and educational psychology; it enabled me to contact real, living (and legendary) figures in the field of psychology; it led me to having several papers translated into English for the first time; and it enabled me to build, from the original authors, an understanding of the (exacting) measures needed in undertaking an investigation of this kind, without having to rely on what subsequent researchers have to say about how the functional method of double stimulation in new concept formation can and should be used. But now, to return to a more appropriate academic mindset…

Vygotsky on concepts and concept formation

In arguing for a movement away from “the usual error relative to the break between form and content” in the study of conceptual development; from the “dry, empty, gray abstraction” that “inevitably strives to reduce content to zero”, Vygotsky (1998) argues for a view of a concept as follows:

A real concept is an image of an objective thing in its complexity. Only when we recognize the thing in all its connections and relations, only when this diversity is synthesized in a word, in an integral image through a multitude of determinations, do we develop a concept. (1998, p. 53)

Further, he writes that, at the time, psychology began to understand a concept “not as a thing, but as a process, not as an empty abstraction, but as a thorough and penetrating reflection of an object of reality in all its complexity and diversity, in connections and relations to all the rest of reality” (1998, p. 55). The psychological processes involved – reflecting on the nature of things and their diversity; applying rational representations to and about things; and making connections and establishing relationships between things – “turns out to be a long activity that includes in itself a series of acts of thinking” (1998, p. 56).

The structure of a concept, Vygotsky writes, is revealed within an arrangement of judgments and interrelated cognitive actions that come together as a whole, and which has its own set of principles. It is by viewing a concept in this way that “we find the main idea on the unity of form and content as the basis of the concept realized” (1998, p. 56).

Vygotsky goes on to make the point that when taken together, the judgments involved in forming a concept are in themselves a form of content which order and connect both the content and the form of the cognitive vehicle. This ‘totality’ “acting as a single whole, is constructed as a special intellectual mechanism, as a special psychological structure, and is made up of a system or of a complex of judgments” (1998, p. 57). In this way, the combinations of cognitive actions which act in concert become a specific form of cognitive behaviour, an intellectual mode of behaviour. This mode of behaviour is evident in the changes in both content and form in the development of cognition in adolescents. Vygotsky’s eloquent analysis of form and content concludes that:

We can assert that all changes in the content, as we have pointed out repeatedly, necessarily also presuppose a change in the form of thinking. Here we come as close as possible to the general psychological law which states that a new content does not mechanically fill an empty form, but content and form are factors in a single process of intellectual development. It is impossible to pour new wine into old skins.
This applies completely also to thinking during the transitional age. (Vygotsky, 1998, p. 57)

This discourse conveys very clearly that a concept cannot be divorced from its content or its form or from the processes that are involved within, through, and because of it. In the same way as other forms of ‘higher’ intellectual activity develop, Vygotsky is adamant that the process of concept formation is not merely a ‘quantitative overgrowth’ of less sophisticated actions because it is a qualitatively new type of behaviour: “Unlike the lower forms, which are characterized by the immediacy of intellectual processes, this new activity is mediated by signs” (Vygotsky, 1986, p. 109).

The second point of the summary of Vygotsky’s presentation to the First Congress on the Study of Human Behaviour in Leningrad in January 1930 illustrates this central position as follows:

Experimental research into concept formation processes has shown that the functional use of a word or another sign, as a tool for actively directing attention to specific characteristics, separating and isolating them, and then abstracting and synthesising these characteristics, is a fundamental and essential part of the entire process; the formation of a concept (or the acquisition of meaning through a word) is the result of a complex activity (an operation using a word or a sign) in which all the fundamental intellectual functions are involved in a specific combination. (Zalkind, 1930, pp. 70-71 / Inggs & Van der Veer, 2006)

“The development of the processes that eventually result in concept formation”, writes Vygotsky, “begins in earliest childhood, but the intellectual functions that in a specific combination form the psychological basis of the process of concept formation ripen, take shape, and develop only at puberty” (1986, p. 106). Throughout childhood, however, several kinds of precognitive structures function similarly to the way in which true concepts function, and it is this ‘functional similarity’ in the thinking processes and the use of words by children that is crucial. Compare the (1930) quotation above with the one below:

Our experimental study proved that it is a functional use of the word, or any other sign, as a means of focusing one’s attention, selecting distinctive features and analyzing and synthesizing them, that plays a central role in concept formation.

Concept formation is the result of such a complex activity, in which all basic intellectual functions take part. (Vygotsky, 1986, p. 106)

The developmental – or genetic – aspects of thinking that result in the ability to generalise and to abstract and to synthesise these two should not be overlooked because they are crucial in this ‘complex activity’. (To avoid confusion, please note that Vygotsky’s use of ‘complex’ above refers to ‘intricate’ and is not the same as the “thinking in complexes” of children.) Children’s manner of “thinking in complexes” serves to put together, to unite, discrete elements, which creates the basis for later generalisations. However, advanced concepts depend on the ability to do more than put things together or unify them: advanced concepts also depend on abstraction, on the ability to isolate elements and to look at them as separate from the whole or total concrete experiences in which they are rooted. “In genuine concept formation, it is equally important to unite and to separate: Synthesis and analysis presuppose each other as inhalation presupposes exhalation (Goethe)” (Vygotsky, 1986, pp. 135-136). In the development of children’s thinking, thinking in complexes is the early form of generalisation, and the use of potential concepts is the early form of abstraction. When children are able to hold together these two elements and not lose sight of them, when they are able to synthesise them in a way where the one does not destroy the other, then a fully mature concept will emerge, but
only when the abstracted traits are synthesized anew and the resulting abstract synthesis becomes the main instrument of thought. The decisive role in this process, as our experiments have shown, is played by the word, deliberately used to direct all the subprocesses of advanced concept formation. (Vygotsky, 1986, p. 139)

(An explanation regarding the translation of Vygotsky’s work from Russian into English needs, I believe, to be made here, with the intention of providing further clarification. This explanation, from Kozulin (1990, p. 205), provides insight into Vygotsky’s use of “the word”, in terms of the overlap and subtleties in meaning in Russian compared to English. Whereas the Russian word rech can mean “speech”, it can also mean “language” or “discourse” and need not be restricted to “speech”. In addition to these subtleties of semantics, Kozulin points also to Vygotsky’s use of the word “slovo” (“word”) and maintains that “more often than not “word” is used as a synecdoche and stands for any form of verbal discourse” (Kozulin, 1990, p. 205). In this respect, Kozulin also points out that Vygotsky “wanted to understand how a concept – and intellectual idea – is related to its meaning and the latter to its various verbal embodiments” (emphasis in original, Kozulin, 1990, pp. 205-206). In this way, Kozulin puts these “translator’s headaches” into perspective regarding the centrality of Vygotsky’s work and research, and makes it clearer for English readers to appreciate the meaning of Vygotsky’s use of ‘the word’.)

In returning to Vygotsky’s argument above, he goes on to discuss a further difficulty which is to be found in the cognitive movement from the abstract to the concrete and back again. In adolescents, for example, applying a newly learnt concept to a new and different situation relies on the ability to move from the abstract back to the concrete. This transition (usually only mastered towards the end of adolescence, according to Vygotsky) “from the abstract to the concrete proves just as arduous for the youth as the earlier transition from the concrete to the abstract” (1986, p. 142).

Vygotsky argues that this process does not take place according to the schema of formal logic, nor to the superimposition and intensification of some characteristics and the blurring of others as in ‘Galston’s composite photographs’ in which it is assumed that “the sum of these traits is the concept”: the reality, he argues, from the observation of other psychologists (long ago) and from his own experimental study, is different.

When the process of concept formation is seen in all its complexity, it appears as a movement of thought within the pyramid of concepts, constantly alternating between two directions: from the particular to the general, and from the general to the particular (Peter Vogel) [emphasis in original]. (Vygotsky, 1986, pp.142-143.)

Why go to all the trouble in search of the blocks? Situating the blocks experiment

In preparing Myshlenie i Rech some time during or before 1934, Vygotsky wrote that he and his colleagues had been exploring that most complex of psychological interrelationships, the one between thought and speech, for almost ten years. Kozulin notes that Vygotsky’s interest lay primarily in the development of language in relation to thought, and that speech and language have a special place in Vygotskian theory because they have a double role:

On the one hand, they are a psychological tool that helps to form other mental functions; on the other hand, they are one of these functions, which means that they also undergo a cultural development. Vygotsky’s work in this field became his most popular book: Myshlenie i Rech – Thought and Language (1986, p. xxx).
So where in Vygotskian theory – among the zone of proximal development, the interrelationship between ‘scientific’ and ‘spontaneous’ concepts, the exploration of the relationship between language and thought – do ‘Vygotsky’s Blocks’ fit in? Some clues to the value of this procedure are to be found in Bruner’s introduction to the 1962 version of *Thought and Language*:

It is when Vygotsky comes to the discussion of the development of conceptual grouping in children – from heaps to complexes to pseudo-concepts to true concepts – that one recognizes his power and ingenuity as an empiricist. Using the Vygotsky blocks, perhaps the only thing for which the author had been known in this country, he traces the manner in which the intellectual development of the child is given a classificatory structure that makes possible the use of language as a logical and analytic tool in thinking. (1962, p. viii)

The functional method of double stimulation for studying concept formation – Vygotsky’s Blocks – is presented in Chapter 5 of *Myslenie i Rech*, concisely described in a couple of hundred words. It stands side by side with what is presented in Chapter 6, the more familiar zone of proximal development and its intricate involvement in the movement from ‘above’ and ‘below’ where ‘scientific’ and ‘spontaneous’ concepts meet and enrich each other. However, even though the blocks experiment itself is only described in brief, the data that it yielded on the paths from syncretic thinking or ‘incoherent coherence’ to fully mature conceptual thinking is extensive.

But how could 22 little wooden blocks, with nonsense three-letter words written underneath them, reveal so much about how people of all ages use language to help them think? And where do adolescents and schizophrenics have a place in all of this? Vygotsky (1934) examined, for example, the capacity for new concept formation in his schizophrenic patients, using the *bik* and *lag* procedure “developed by my collaborator, L. S. Sacharov” (p. 1066) and the literal and figurative meanings of proverbs and figures of speech (p. 1073). By combining the studies of children’s preconceptual modes of thinking (“Pseudoconcepts are wolves in sheep’s clothing” (Vygotsky, 1934, p. 1074)) and explaining them in relation to the regression to pseudoconceptual use of words in schizophrenic patients, Vygotsky was able to shed a different light on the types of thinking which result in coincidences of meaning where the associative nature of children’s and schizophrenic patients’ modes of thinking are different to those of ‘normal’ adults. Key to this was the functional use of similar kinds of word meaning, and the genetic structure of conceptual abilities which “is accomplished by the formation of new layers over the old ones, with the preservation of the older layer of thought in a subordinate function” (1934, p. 1070).

Elkonin (1998) writes further of how Vygotsky constructed his methodology and what it aimed to investigate: “The strategy of [Vygotsky’s] studies was constructed in such a way that purely methodological problems of psychology and problems of the historical origin of human consciousness – its structure, ontogenetic development, and anomalies in the process of development – were combined into one whole. Vygotsky himself frequently called this combination the unity of genetic, structural, and functional analysis of consciousness” (1998, p. 298). Elkonin goes on to note:

The study of the formation of concepts was undertaken under the direction of Vygotsky by his closest student, L. S. Sakharov, and after his untimely death, was concluded by Yu. V. Kotelova and E. I. Pashkovskaya. This study showed, first, that the formation of concepts is a process mediated by the word, and, second (and no less important), that the meanings of words (generalizations) develop... This work provided the lacking link in the study of higher mental functions. (Elkonin, 1998, p. 305).
Elkonin (1998) links this avenue of research of Vygotsky’s as follows:

Even in early experimental studies on the problem of mediation, he proposed as a hypothetical conception that, taken in isolation, mental function has no history and that the development of each separate function is determined by the development of the whole system and the place that the separate function occupies in this system. Experimental-genetic studies could not give an unequivocal answer to the question that interested Vygotsky. The answer to it was obtained in a consideration of development in ontogenesis. However, the evidence obtained in an ontogenetic consideration of development of the systemic organization of mental processes seemed to Vygotsky to be insufficient, and he brought in material from various areas of neurology and psychiatry to consider the processes of disintegration of systemic relations between mental functions.

For a comparative study, Vygotsky selected three diseases: hysteria, aphasia, and schizophrenia, made a detailed analysis of the process of disintegration in these diseases, and found the required evidence. (Elkonin, 1998, pp. 305-306)

When Jacob Kasanin translated Vygotsky’s *Thought in Schizophrenia* in 1934, he noted that ‘Vigotsky’ and Professor Luria had conducted work in this field for five years, and that the article was written at his (Kasanin’s) request more than three years before the current publication. In this paper Vygotsky writes of the growing tendency of the time to bring together investigations from a variety of fields to establish common principles and to compare results. He reports that, unlike other investigations which only compared the results of their studies at the conclusion of these, his approach was to make comparative studies right from the beginning: “It did not take long to find out that many problems, so conceived, appeared in a totally different light” (Vygotsky, 1934, p. 1064).

Vygotsky’s twofold investigations focused on the development of thought in children up to puberty and the deterioration of thought in schizophrenic patients. What provided pivotal information on the difference between the forms of cognition in ‘normal’ adults and children was to be found in the qualitative changes in the modes of thinking of adolescents.

Even though this more ‘dynamic’ approach of Vygotsky’s revealed that psychological processes in adolescents and schizophrenic patients “have a converse relationship to each other and that they are connected more by differences than by similarities”, what was clear was that adolescents represented psychic growth and development, whereas schizophrenic patients represented, in some degree or another, deterioration and decay (1934, p. 1065). Both these avenues of study lead to a clearer understanding of the functional, structural, and genetic processes of conceptual formation.

Another factor which I believe is necessary to appreciating the importance of Vygotsky’s Blocks is to be found in Van der Veer and Valsiner (1994). In the introduction to their (1994) *Vygotsky Reader*, editors Van der Veer and Valsiner discuss some of the factors leading to Vygotsky’s popularity in educational psychology in countries outside of the Soviet Union. They note that in the United States, for example, the selective use of some of Piaget’s ideas was in decline and that approaches which stressed cooperation between teachers and children (‘more experienced others’) were more helpful than those which undermined teacher authority because of the focus on individual development and learning. What was also attractive about Vygotsky’s ideas was that they provided for a more optimistic view of learning potential in contrast to the more “pessimistic” ideas ventured by Piaget” (1994, p. 5).

What further compounded the schism between Vygotskian and Piagetian theories, according to these authors, which led to Vygotsky being “presented as an irreconcilable opponent to Piaget” was
the repeated failure by many to understand the focus which Vygotsky had “on the individual developing person” (emphasis in original) (Van der Veer & Valsiner, 1994, p. 6). Apart from the differences held by Piaget and Vygotsky in their evaluation of egocentric speech, what many seemed to overlook was the fact that both Piaget and Vygotsky focused on developmental stages in cognitive growth. It seems as if Piaget was portrayed as the ‘stages of development’ protagonist, whereas Vygotsky was quite the opposite. The zeal with which the zone of proximal development has been adopted by some seems to have been interpreted as suggesting that anything can be learnt under the guidance of a ‘more capable other’, irrespective of the learner’s intellectual mode of development. However, Vygotsky’s work with the functional method of double stimulation clearly indicates three major phases of cognitive development: syncretic, complexive, and true conceptual modes, and that these have an influence on the interaction between ‘scientific’ and ‘spontaneous’ conceptual formations.

So what was this ‘experimental study’ that was developed by Sakharov and Vygotsky in the late 1920s, relatively early in the history of psychology? What was unique or different about it compared to other studies at the time? There has to be something very powerful about it that compels psychologists in the 21st century to refer to it, to use aspects derived from it, and to go to the trouble of making sets of the blocks.

Fuad Topić (2006, p. 22) notes that this “concept formation test is one of very few examples in the history of psychology where experimental procedure derived from studying complex thinking processes is used in psychological practice in its original form” (emphasis added). He also makes the rather poignant observation that “this test has unfortunately been almost forgotten and relegated to the history of psychology by a wave of more modern tests” (Fuad Topić, 2006, p. 1). I also found this to be true in my search for these blocks, to cite one small example: the “Hanfmann-Kasanin Concept Formation Test” is briefly described (and a black-and-white photograph of it provided) in Anastasi’s (1968) Third Edition of Psychological Testing (pp. 310-311). Tellingly, it is omitted from the later (1982) Fifth Edition.

Further, Dr Jamie Martin of Stoelting Co., writes that, although he is not an expert in this field, he finds that there has been “a significant decline in the use of the blocks”, even though they are listed on page 63 of the company’s 2006/2007 catalogue.

Vygotsky on the functional method of double stimulation: tracing the provenance

In 1930, the opening discussion of Vygotsky’s presentation at the First Congress on the Study of Human Behaviour in Leningrad was summarised as follows:

The study of higher behavioural processes, which involves finding a method of analysis appropriate to their psychological nature, and seeking to discover the specific functional structure of higher forms of human behaviour, has to be grounded in a special method of experimental investigation corresponding to the object and aims of the research. The functional method of double stimulation is an attempt to create such an experimental analysis of higher behavioural processes [emphasis added]. (Zalkind, 1930, p. 70 / Inggs & Van der Veer, 2006)

Four years later, Vygotsky discusses how this new functional method of studying concepts overcomes the shortcomings of several other kinds of investigative techniques which had been developed and used in a variety of studies at the time (Kozulin’s (1986) translation is “based on the 1934 edition of Myslenie i rech, the only one prepared… by Vygotsky himself” (1986, p. lx)). Vygotsky presents the “new method” by comparing it with contemporary studies and traces the
history of those elements which are included or adapted for use in the new method.

Vygotsky maintains that the major limitations of the methods of abstraction and of definitions which were widely used at the time are that they separate the word from the perceptual material and that each one focuses on either one aspect or the other – the word on its own or the objects on their own. However, Vygotsky maintains that a “great step forward” was made when a new method for studying concepts was developed, which combines elements of these two methods (1986, p. 97). It also introduces a number of finely tuned facets designed to allow the development of concepts to unfold “in front of us” during the course of the experiment (1986, p. 97).

In tracing the provenance of this ‘new method’, Vygotsky notes that Uznadze pays attention to an important “functional moment” shown by Ach (1921) and that is the “communicative aspect of speech” (Vygotsky, 1986, p. 100). He quotes Uznadze in that the word is a tool of human understanding and that the communicative aspect of speech is a “moment” that plays an important role in the formation of concepts. In the normal course of (human) events of mutual understanding, some sounds acquire particular meanings and, in this way, become a word or a concept.

Children are born into and grow up in a verbally enriched environment, and, as they grow, the words or articulated sounds they hear and use obtain more and more distinctive meanings.

However, Vygotsky (1986) maintains that the development of mature concepts by a child is possible at a later stage when the child’s thinking has become increasingly socialised. He cites Uznadze as follows:

“Thus, we see that the real concept corresponding to the upper level in the socialization of thought appears relatively late. At the same time, children start using words and establish a mutual understanding with adults rather early. This implies that words take over the function of concepts and may serve as means of communication long before they reach the level of concepts characteristic of fully developed thought. A special study should reveal the development of such forms of thinking, which are not conceptual, but which provide a functional equivalent of concepts. (Uznadze, 1966, p. 77)”. (Cited in Vygotsky, 1986, p. 101.)

It is these “functional equivalents” of Uznadze’s that are different in essential structure and quality compared to those of the fully mature concepts of adults and adolescents. This ‘functional equivalence’ is not restricted to a functional role only, as posited by Ach, but rather to the functional similarity that these forms of thought have in common with mature, fully developed concepts. The functional similarity belies the true nature of these preconceptual modes, precisely because they are so similar to real concepts.

The functional method of double stimulation in the study of concept formation begins by introducing nonsense words that from the beginning have no meaning for the subject. According to Vygotsky, the introduction of nonsense words was adapted from Ach’s (1921) use of nonsense words in his experimental procedures. These nonsense words are artificial concepts that actually mean a combination of characteristics, of real attributes, but “for which no ready concept and word exist” in the given language (1986, p. 97). This experimental method is designed to reveal the processes involved in the subject’s coming to understand the nonsense words and, at the same time, to reveal the development of these concepts. The procedure can be used with adults and children because solving the problem doesn’t depend on or presuppose prior experience or knowledge of the words and concepts in the experiment: the experiment doesn’t use ‘tall’, ‘short’, ‘large’ or ‘small’ on their own, but combines these into new relationships exemplified in the words cev, bik, mur, and lag.
The two sets of stimuli presented to the subject in this experiment geared to engender the development of new concepts are the objects themselves (the blocks!), and the words (cev, bik, mnr, lag): the blocks are the objects of the activity, and the words are the signs that help to organise the activity.

In a reversal of Ach’s procedure, subjects are not given the opportunity to handle the blocks or to read their names before being told what the task involves. In the Vygotsky and Sakharov approach, the ‘problem’ – what is to be done with the blocks – is put to the subject upfront, and this ‘problem’ remains the same throughout the experiment. However, each time an incorrectly placed block is turned up, a new clue is introduced. Vygotsky writes that he and Sakharov decided to use this sequence because facing the subject with the task requirements upfront was necessary to start the process, and that introducing the means of the solution gradually (with the turning up of the blocks) “permits us to study the total process of concept formation in all its dynamic phases” (1986, p. 104).

In this process subjects are invited to ‘think aloud’ while sorting the blocks, and their reactions to the incorrectly placed blocks also give a very clear indication of how they are thinking and what conceptual (or preconceptual) modes they are using.

Once the concepts have been formed, the subjects are asked to apply these to describing objects other than the blocks, and, finally, to define what each of the words means. In this way, the experiment is organised in a way that turns the “pyramid of concepts “upside down””:

The problem solving in our experiments follows the same path as it takes in real life, where the movement from the top of the pyramid to its bottom is no less important than the ascension from the concrete to the most abstract. (Vygotsky, 1986, p. 105)

The ‘functional moment’ of Ach, writes Vygotsky, the ‘communicative aspect of speech’, is also crucial in this procedure: instead of treating a concept as a solitary and inert unit, it is “studied in a live thinking process. The whole experiment can be broken down into a number of stages, each featuring a specific functional use of the concept” (1986, p. 105).

In this way, then, it can be seen that Vygotsky’s investigations with the functional method of double stimulation demonstrate how language and thought and concepts and meanings are all interlinked, mediated processes that evolve and change over time, that influence each other, and that co-exist like layers in geology (Vygotsky’s analogy).

Vygotsky on the limitations of the functional method of double stimulation: a show-stopper?

Perhaps those readers who are conversant with this aspect of Vygotsky’s work have been wondering when I would raise the issue of Vygotsky’s awareness of the “built-in limitations” of the method of double stimulation.

Kozulin (1990) writes that a study which complemented the double stimulation investigations needed to be conducted to complete the picture of children’s spontaneously acquired, everyday concepts in relation to those which they learnt in school (the ‘scientific’ concepts). A shift in focus would allow such an investigation to “make the study of concept formation relevant to the problems of education” and would also fill in the “scientific gaps left by the experimental study of artificial concepts” (Kozulin, 1990, p. 221).

Kozulin reports that Vygotsky was aware that, despite its importance, the study of artificial concepts did not allow for a hierarchy of concepts to be formed, and neither did it allow for generalisations to be made which were built on previously formed generalisations: both of these
“turned out to be essential in the development of real concepts” (1990, p. 221).

In both the 1962 and 1986 versions of *Thought and Language*, Vygotsky’s wording is identical:

Furthermore, the investigation of real concepts complemented the experimental study by making it clear that every new stage in the development of generalization is built on generalizations of the preceding level; the products of the intellectual activity of the earlier phases are not lost. The inner bond between the consecutive phases could not be uncovered in our experiments because the subject had to discard, after each wrong solution, the generalizations he had formed and start all over again. Also, the nature of the experimental objects did not permit their conceptualization in hierarchical terms. (Vygotsky, 1962, p. 114; 1986, p. 202)

Vygotsky (1986, p. 201) notes that investigations into real concepts complemented the experimental study by providing reliable indices of concepts’ measures of generality, which varied “on the different levels of development, from syncretic formations to concepts proper”. I suggest that the factors of generalisations built on previous ones and hierarchy in thinking, whilst not, according to Vygotsky, revealed by the method of double stimulation, can be found in the Blocks experiment if one is guided by hindsight regarding the importance of these two factors and if one views the experiment from a slightly different perspective.

Firstly, regarding generalisations, while it is true that one has to ‘discard’ the generalisations one has made with regard to, say, colour or shape, one does not abandon the knowledge or experience that one’s hypothesis is incorrect. The generalisation that informs one’s hypothesis together with the experience that this generalisation is ‘incorrect’ become the foundation which informs the next generalisation.

![Figure 1: Schematic Depiction of Generalisations Combining Knowledge and Hypotheses](image)

As depicted schematically in Figure 1 above, one is building upon the experience that one has gained when one’s hypothesis/generalisation is proven incorrect – one is not abandoning the knowledge one has had from the experience.

In this way, then, further generalisations could be informed by this knowledge that previous generalisations are ‘incorrect’ or are ‘partial solutions’: as Vygotsky puts it “the products of the
intellectual activity of the earlier phases are not lost” (as cited above).

Secondly, with regard to hierarchical organisation, it is true that the blocks themselves do not allow for them to be conceptualised in hierarchical form; however, although no single attribute of the blocks is more important than any other, it is the combination of two of these attributes that has hierarchical prominence. It is not until one unites these two elements – height and size – into one hierarchical level that the problem posed by the blocks can be solved (as depicted in Figure 2 below).

![Figure 2: Hierarchical Prominence in Finding the Solution to the Vygotsky’s Blocks Experiment](image)

I do not believe that my suggestions of viewing the study of artificial concepts from this perspective are unreasonable: in the process of hypothesis-forming, and in coming to establish the hierarchical importance of the combination of two (not immediately apparent) characteristics of the blocks, Kozulin’s explanation in end-note 6 (Thought and Language, 1986, pp. 267-268) makes this point clearly regarding the reaction of the subject to an incorrectly placed block. This crucial moment is an indication of the mode of thought of the subject, and, in my opinion, whether the subject is capable of including the newly acquired knowledge in further generalisations or not, as part and parcel of their next generalisations and abstractions, is a further indication of their ability to operate in a truly conceptual mode.

**Sakharov on methods for investigating concepts: the talent behind the blocks**

Fuad Topić writes that Leonid (Lev) Solomonovich Sakharov was one of Vygotsky’s closest and most precociously talented associates (2006, p. 12). Reading Sakharov’s newly translated paper (in Van der Veer & Valsiner, 1994), which was originally based on a presentation he gave in 1928 and first published in 1930, I have to agree. Vygotsky himself gives full credit to Sakharov: “we used the method worked out by one of our collaborators, Lev Sakharov” (Vygotsky, 1986, p. 103). I also have to state upfront that what I found and what Macdonald (pers. comm., 2006) describes as “the sheer brilliance” of the method of double stimulation is in the design of the blocks themselves. A clue to this ‘sheer brilliance’ – and a clue to would-be researchers who want to reproduce sets of the blocks – is (casually) mentioned by Vygotsky on page 136 of Thought and Language: “Since the test material contains no identical objects, even the maximally similar are dissimilar in some respects”.

It may seem like a small thing on the surface of it, that the very special design of the blocks doesn’t appear significant at first glance, yet in my pilot studies and in the research exercise itself, I came to appreciate that this crucial detail is vital to guiding subjects towards a satisfactory solving of the problem, regardless of the varieties of hypotheses the subjects use in the course of the experiment.

Without ‘prolonging the agony’ about these elusive (and brilliant) blocks, and because none of the researchers I have consulted in the course of my search actually itemises these blocks, I have done
so below (these descriptions are derived from Hanfmann & Kasanin (1937; 1942) and Jussi Silvonen’s 2005 photograph).

**Mur blocks (tall and small)**
- one red equilateral triangle
- one blue circle
- one yellow square
- one white hexagon
- one white circle

**Cev blocks (flat and small)**
- one blue equilateral triangle
- one green semi-circle
- one white hexagon
- one yellow circle
- one red trapezoid

**Bik blocks (flat and large)**
- one green square
- one green trapezoid
- one blue circle
- one yellow semi-circle
- one red trapezoid

**Lag blocks (tall and large)**
- one red square
- one blue square
- one green equilateral triangle
- one red circle
- one yellow trapezoid

I found Sakharov’s reporting of Katz’s (1913) and Tobie’s (1924) studies on preschool children’s abilities to abstract characteristics from geometric figures of interest. Tobie, who confirmed and extended Katz’s study, found that children up to the age of about three-and-a-half will select colour or shape equally, depending on the particular situation (which Tobie called the zone of suggestibility). After that, children to about five years old will choose colour first, and, after that, shape first, and that the ability to abstract positively either shape or colour appears even later still.

Sakharov further elaborates, with regard to development, that the abstractionists “ran up against the fact that the level of development of processes of abstraction and the role of speech in the child’s behaviour depend on the extent of his verbal resources” (Sakharov, 1994, p. 79). Sakharov points to the work of Heffler who found that when hard-of-hearing/speech-impaired children learn to ‘speak’, an ‘intellectual revolution’ takes place similar to that of typically developing three- to six-year-old children. Sakharov notes the results of Eliasberg in that children who are less adept at language than their peers also tend to be more perceptually bound to concrete sensory situations, but that the method of abstraction does not enable the study of abstraction under the guidance of words.

In 1928, Sakharov explains that, in tracing the contours of the environment that led to the birth and development of the method of double stimulation, “We have found the sources of it in old experimental psychology” (1994, p. 81). This ‘old psychology’ turns out to be all the way back to 1912 – I wonder what Sakharov would be thinking today! However, this ‘old psychology’ was about a study by a subjectivist psychologist called Aveling, who introduced nonsense words into his experiments to avoid the problem of the immediate connection we make when we hear words in our native language (“without its meaning surging up into our heads, so closely are they related” (Sakharov, 1994, p. 82)). These nonsense words, however, were substitutes for ideas and concepts that subjects already possessed. The combination of the nonsense words with pictures of these objects had a “future” role to play in the study of concept formation “— of course, with rejection of Aveling’s purely phenomenological, subjective position” (1994, p. 82).

It was Ach (1921) whose work advanced the inclusion of nonsense words in concept formation studies: Sakharov provides a lengthy description of Ach’s and Rimat’s experiments, and there are two things I need to confess about this: firstly, if I’d felt sympathy for the children in Eliasberg’s studies, I...
was positively filled with admiration for the poor little souls in Ach’s and Rimat’s lengthy, exacting, and protracted experiments; and, secondly, how I wish that Sakharov had devoted an equal number of pages to describing the 22 wooden blocks in such detail(!).

Sakharov then introduces the last phase that “under the influence of Vygotsky’s idea of the development of higher forms of behaviour” led to a new use of the method of double stimulation which had been used by Aveling and later by Ach and the Determinations-psychologie school (but who used it in different ways and for different reasons (Sakharov, 1994, pp. 91-92)). Unlike Ach’s focus on the determining role of the task, Sakharov and Vygotsky were interested in the functional importance of verbal signs in relation to the test material, and in uncovering the free reaction descriptions and movements that subjects made during the procedure: these would make it possible to document the functional use of verbal stimuli by the subject, as well as chart the dynamics of the developmental process. It was crucial to do this because Ach’s method imposed on the subjects “a specific, stereotyped reaction, whose symptomatic value is equal to zero” because it focused on problem solving through association and the determining tendency, and because “Ach’s description of the stages traversed by the process of concept formation is based mainly on self-observation of his adult subjects, which of course is totally inapplicable to an objective psychological procedure” (Sakharov, 1994, p. 93).

In introducing the procedure that “was developed under Vygotsky’s leadership” (Sakharov, 1994, p. 94), Sakharov describes the most important principles of the new method of functional double stimulation in concept formation. The Sakharov and Vygotsky board game with ‘bat’, ‘dek’, ‘rots’, and ‘mup’ is in essence the same as that handed down to us by Hanfmann and Kasanin: different geometric shapes, different colours, short and tall, and small and large. There is a difference in the way Sakharov introduces this procedure to children compared to the approach of Hanfmann and Kasanin with adults in a way which makes the test material more familiar to children. The procedure is presented to children as a game of toys belonging to children from a foreign country where they speak a different language. Some of the toys are called “bat” in the language of these foreign people, and there are other toys on the board that have the same name, and yet others have different names. It is the child’s task to find, after ‘thinking carefully’, all the toys that are called ‘bat’ in this language: “The game continues until the child picks up all the figures correctly and gives a correct definition of the concept ‘bat’” (1994, pp. 94-95).

I have noted the basic features of this ‘new procedure’, which Sakharov itemises in his paper (1994, pp. 95-96), and which I list as numbered points below.

1. There is a collection of figures of different shapes, colours, height and planar dimensions.
2. Unlike Ach’s set of figures, this collection is a motley, unorganized whole: it is irregular and unsymmetric.
3. Different attributes occur an unequal number of times.
4. The collection is based on four experimental concepts associated with test words, which are written on the bottoms of the figures, not visible to the child.
5. Each concept contains two attributes, e.g. height and planar dimensions.
6. One concept embraces all tall and large figures; the other, all tall and small; the third, all short and small; and the fourth, all short and large.
7. The experiment is done as a game.
8. The figures are arranged on a game board at random, without any pattern.
9. These are toys of a foreign nation.
10. One of them is turned upside down, and its name in the language of this people is read aloud.
11. According to the rules of the game, the child must remove all the toys that have the same name as the up-ended model and place them in a special field on the board without turning them over and looking at the inscription.
12. He obtains in exchange for these toys a sweet, a pencil or something else of the sort from the experimenter as a prize.
13. The entire game consists of the child’s attempts to place correctly all the figures with the same inscription as the model.
14. After each such attempt, the experimenter turns over the new figure, revealing the child’s mistake, which is either that [from] among the removed figures[,] there is one figure with a different name from that which is on the model, or that [from] among the figures not removed[,] there is one with the same name as the model and hence belongs to the field.
15. Since after each placement of the figures the child discovers the name of a new figure (which the experimenter has up-ended), every new attempt of the child to solve the problem is done on the basis of a larger number of models.
16. Thus, the principle of the experiment is that the series of objects is given to the child immediately as a whole but the series of words is given gradually, and the nature of the double stimulation continually varies.
17. After each such change we obtain the child’s free response, which enables us to assess the changes that have taken place in the child’s psychological operations as a consequence of the fact that the series of objects now contains a new element from the verbal series.
18. This enables us to assess the degree to which a child makes use of words.
19. Of course, the task can be accomplished correctly only if the experimental concepts that underlie the test words have been formed.

In conclusion to his paper, Sakharov sums up the results of the functional method of double stimulation for investigating concepts most succinctly:

An illustration of the nature of the data that can be obtained on the basis of this procedure can be seen in the fact that a word in our experiments passes through three stages that are present in outline in the ontogeny of children’s concepts. Initially, it is an individual sign with its own name; then it becomes a family sign with its own name associated with a series of concrete objects (complex concept); finally, it becomes a general abstraction. Some children pass through all these three stages; others remain at the middle stage. Thus, we have an experimentally organized picture of the ontogeny of concepts and are able to carry out analytical studies of the functional role of words in all stages of this ontogeny. (Sakharov, 1994, p. 96)

Now, since Sakharov does not describe the blocks which Hanfmann and Kasanin presented in 1937; and since he mentions at least five other ‘procedures’ or ‘tests’ in his 1928 paper; and since Vygotsky gives credit to the method worked out to Sakharov; and since I have been unable to trace any documentation from this time that describes the blocks in detail, I could assume that the 22 wooden blocks, of different shapes, colours, sizes, and heights, were the ones developed by Sakharov in the process of the five other procedures mentioned by him in 1928. Without hard evidence to the contrary, and by applying the logic of Occam’s Razor, I believe it would not be unreasonable to credit Sakharov with the ‘sheer brilliance’ of designing a set of wooden blocks in which none of them is identical to the other. It is, however, also possible that the 22 wooden blocks that we have today from Hanfmann and Kasanin (1937) could have been refined by Vygotsky, Kotelova and Pashkovskaya in the years from 1928 to the time before Vygotsky died in 1934. Sakharov’s paper was based on a presentation he made on the 1st of January 1928, and he died “under unknown circumstances” (End-note 1, 1994, p. 96) on the 10th of May that year: he was twenty-eight years old.
Hanfmann and Kasanin’s translation and adaptation of “A Method for the Study of Concept Formation” (1937) and their framework for scoring from “Conceptual Thinking in Schizophrenia” (1942)

Hanfmann and Kasanin’s 1937 (and 1942) works are detailed and extremely thorough in providing guidelines for researchers; in describing the reactions of some of their subjects by way of illustrating what researchers can expect and how to react in these instances; in establishing techniques for scoring; and in providing structures for qualitative reporting for this method of double stimulation.

These authors introduce their (1937) paper by stating that the formation and development of concepts has been of longstanding interest in the fields of the psychology of thinking and genetic (developmental) psychology. They report that they adapted the procedure of ‘Vigotsky’ and Sakharov and used it to explore thinking processes in schizophrenic patients, and that, in the course of their investigations “some changes in the technique were introduced and detailed instructions and rules for administering the test were devised” (Hanfmann & Kasanin, 1937, p. 522). The purpose of their 1937 paper was to present an analysis of the procedure together with comprehensive descriptions for how to conduct it to enable other researchers to use the test: one of the main reasons for this separate paper was because “the test proved extremely informative as a qualitative test of conceptual thinking” (1937, p. 522). They also note that the form in which the procedure is presented can be used with children and with adults with differing levels of education.

Hanfmann and Kasanin (1937) report on some of the reactions of subjects as further illustrations of how the researcher is to react to questions and so on as the procedure unfolds. Their method for scoring (elaborated on in their 1942 work), rests on the premise that this procedure is first and foremost a tool for qualitative analysis, and at the same time, because a need for quantitative analysis was also required, Hanfmann and Kasanin developed one as follows (1937, pp. 533-535): time in minutes equals one point per minute; number of incorrectly turned-up blocks is multiplied by five; and number of correctly turned-up blocks is multiplied by three. These three scores are then added together to give a total score.

Hanfmann and Kasanin are, however, at pains to point out that subjects arrive at the solution in a wide variety of ways, and that even though some subjects who are obviously capable of truly
conceptual thought can react differently (even ‘more primitively’ because of a range of immediate responses to the experimental situation), when researchers are evaluating the achievement of each individual participant, the quantitative score should always be based on the qualitative data of how each subject actually proceeded. Hanfmann and Kasanin’s argument in this respect is worth citing in full:

His [the subject’s] manipulation of the blocks reflect nearly every step in his reasoning, forming hypotheses, testing and discarding them, and his comments add to the information. The whole course of the experiment: interpretation of the task, of the function of the words, handling of sample, response to correction, finding of the solution – provides a large number of items which can serve as indicators of conceptual thinking or of lack of it. The character of the produced grouping of blocks is especially important. In the same way as the classes which are made by superior subjects represent concepts, the groups created by children reflect the peculiarities of the predecessors of concepts. By these latter we mean the units with which the primitive thinking operates instead of concepts. Thus, the experiment is not only a test of presence or absence of conceptual thinking but also an excellent tool for the investigation of the structure of preconceptual thinking on different levels of its development. (Hanfmann & Kasanin, 1937, pp. 528-529)

Hanfmann and Kasanin (1937) report on three key features: the “categorical attitude”, “insight into the multiple possibilities of the choice”, and the third key feature (“probably the highest stage in the development of conceptual thinking”) is when the subject is able to consider the “total system” represented by the task – that four categories are necessary – and may approach the task by attempting to sort all four categories at the same time. These subjects will consistently discount any possible combinations that do not lead to four classes or groups (1937, p. 527). An additional feature is the need for subjects to combine two characteristics “to form a new and less easily defined one, which is meant when the test is described as a “concept formation test”” (Hanfmann & Kasanin, 1937, p. 527).

In their 1942 work, Hanfmann and Kasanin further elaborate on these key features, and develop a framework for scoring subjects’ responses which comprises, firstly, the interpretation of the task; secondly, the levels of performance; and, thirdly, the finding and mastering of the correct solution. This scoring method can also be used in conjunction with the supplementary scoring (the overall time and number of turned-up blocks as above), and, as advised in their 1937 paper, should be viewed alongside the qualitative observations of how each subject responds in their engagement with the blocks. (This information has been included in the first the three attached Appendices and is further discussed in the section on Research Method.)

Below is an abbreviated list of the kinds of thinking that Hanfmann and Kasanin (1942) found in the modes of subjects of a wide variety of abilities, including schizophrenic and other disabled patients. Their work provides scoring for each of the items which I have précised below.

**The interpretation of the instructions**

1. Task seen as a classification problem – essentially holding onto the idea that four groups are required.
2. The names are not related to the properties of the blocks – the lettering is simply another characteristic of the blocks with no hierarchical significance.
   
   2.1 Task seen as solvable only by trial and error – a guessing game
   2.2 Names of blocks disregarded – names do not serve as criteria
3. The nature of the required grouping is not grasped – lack of insight for reasons as to why the blocks belong together.
   
   3.1 Task seen as a game with rules – this is different from the way in which children react to the
game as presented to them as a ‘foreign game’ – the hesitancy and uncertainty are a mixture of hypothesis and trial and error (trying to ‘second guess’ the rules rather than conceptually solving the problem)

3.2 Only one possibility of grouping seen – for example, shape, and when this proves incorrect, the subject is lost because groupings are restricted to physical properties and the subject lacks the insight for the reason the blocks belong together

4. The effect of additional instructions on the interpretation of the task – the interpretation of the task is as dependent on the subject’s level of thinking as it is in solving the problem – and some subjects are able to use additional information from the researcher, and others are not.

**The attempts at the solution (Levels of Performance)**

1. Types of groups
   1.1 Classes – consistent and thorough classification
   1.2 Random groups – the opposite of the above; purely random or vague
   1.3 Individual placements – arbitrary selection of individual reasons for individual blocks
   1.4 Physiognomic groups – ascribing subjective or anthropomorphic characteristics to the blocks
   1.5 Primitive complexes – similarities between individual blocks and not the group as a whole, including pairs, chains, associations, families and arbitrary strings leading to one all-inclusive group or diametrically opposed ones
   1.6 Constructions – putting blocks together to form a configuration (large trapezoid with a small triangle at the top to make a larger triangle) – where the blocks are used to physically construct a concrete structure rather than being grouped into classes
   1.7 Collections – groupings according to dissimilarity of colour or shape, sometimes combined with similarities but where the subject is confounded when this approach does not solve the problem
   1.8 Pseudo-classes – based on similarities but lacking in consistency and most evident in the reaction by the subject to incorrectly placed blocks

2. Levels of performance
   2.1 Primitive level – essentially, thinking in complexes, concrete bonds with no hierarchical organisation and passivity on the part of the subject
   2.2 Intermediate level – including collections and pseudo-classifications that use certain rules of procedure and with more spontaneity than primitive complexive levels, but still lacking in hierarchical structure or consistent guiding principles
   2.3 Highest level – involving connections between blocks established as a result of a generalised concept with hierarchical levels and a great level of spontaneity, and where individuals may respond more strongly to colour and/or size, whilst others respond more so to shape. Those who start by favouring colour and/or size are generally content with the solution, whereas those who start with shape are less so. These groups, as well as those who either hypothesise without touching the blocks compared to those who touch and move the blocks indicate not only levels of thinking but types of thinking regarding content

3. Course of performance, from primitive (inconsistent attempts at solution), to intermediate (oscillating between the primitive and the highest), to highest (based on testing a definite hypothesis)

**Finding and mastering the correct solution**

1. Lowest level, purely mechanical
2. Intermediate level – partial insight, where some subjects can be led by the up-turned blocks to the solution, and wonder why they hadn’t thought about it, but where others require longer and more protracted turnings-over of the blocks before they arrive at the solution
3. Genuine solution – which may be different in forms and occur at different points during the process, and where the solution could be found by hypothesis testing or by chance, fortuitous noticing of the blocks as they happen to be on the board, but where the subject is able to use this insight into arriving at the correct solution
Vygotsky’s (1986) findings using the functional method of double stimulation

In this section, I have summarised Vygotsky’s discussion of the findings yielded from his and his colleagues’ research using the functional method of double stimulation (from Chapter 5 of Thought and Language (1986)).

Summary of Phase One: Syncretic Images (from Vygotsky, 1986, pp. 110-112)
There are three distinctive ‘stages’ of this phase: ‘trial-and-error’/subjective actions; grouping by spatial or subjective relations of the objects in the subject’s visual field; and a combination of the first two.

This phase is also known as the phase of ‘incoherent coherence’, where the subjective relationships which the subject ascribes to objects are taken to be the actual relations between objects: this is the mode of the by-now-famous “unorganized congeries” or ‘heaps’. The subject does this unorganised heaping to solve a problem that, in adults, would be done by forming a new concept. Disparate objects are heaped without any (logical) basis: objects are linked by chance in the subject’s perception – they are “unrelated”. The meaning of the sign/word is revealed as undirected and diffuse: the meaning of words “denotes nothing more to the child than a vague syncretic conglomeration of individual objects” that have, for whatever reason, come together as an image in the subject’s mind. Because the images are syncretic in origin, the image in the subject’s mind is unstable.

In perceiving, thinking, and acting, the subject merges diverse elements into an “unarticulated image” by a chance impression of some kind (Claparède gave this the name “syncretism” and Pavel Blonksy called it “incoherent coherence”). This stage seems to result from a compensation: because there are few objective relations, an excess of more subjective connections is made and the subject makes the mistake or operates on the principle that these subjective relations are real ones. The syncretic connections and heaps put together as representing a word’s meaning are objective “reflections” because the meaning of the word coincides (for the subject) with the connections that the subject herself has made. These connections occur with words in the subject’s and adults’ “habitual” environments, where in reference to concrete objects, adults’ and children’s word meanings meet sufficiently for mutual understanding.

Summary of Phase Two: Thinking in Complexes (from Vygotsky, 1986, pp. 112-124)
Thinking in complexes unites objects in a subject’s mind by subjective impressions and by bonds that actually exist between these objects: this mode of thinking represents a newer, higher level or achievement. Whereas in Phase One, syncretic images play the role of concepts, in Phase Two, complexes emerge that have a “functional equivalence” with true concepts.

Incoherent coherence is replaced by grouping objects that have actual relations to each other. The subject (child) has now reached a level of partially overcoming her egocentrism. The subject doesn’t make the mistake of assuming his own impressions (subjective) are the same as the actual bonds between things: this realisation marks a step towards objective thinking.

Thought in complexes is objective and coherent, yet, even so, it still doesn’t reflect the bonds between objects in the same way as in true conceptual thinking. The difference between Phase Two thinking and Phase Three (where Phase Three “concludes the ontogenesis of concept formation”) is a ‘peculiarity’ of thinking in complexes: complexes are formed according to different rules compared
to the rules that govern true concept formation. This type of thinking groups objects as by way of ‘family names’, where these might be mutually related, but are families of things, like the Smiths and the Joneses.

The bonds in thinking in complexes are that these components are “concrete and factual rather than abstract and logical”. For example, there is no logical reason for diverse family members to be grouped together, other than by their biological relationship. Factual bonds in thinking in complexes are discovered by the subject’s direct experience: this makes the groupings concrete and connected by factual bonds.

Because groupings formed by thinking in complexes do not take place at the level of abstract and logical thinking, the bonds which create complexive groupings and the relationships by which thinking in complexes are created do not have logical unity. This means that there may be many kinds of relationships which are established to link things into groups.

Connections made by thinking in complexes can be so because of “any factually present” connection and this leads to that particular element’s inclusion into a group: this connection of any factually present element is “the main difference between a complex and a concept”. Whereas a concept will groups objects by one (or more) logically abstracted characteristic, the bonds that relate elements in a complex to the complex as a whole, as well as the bonds between elements within the group, may be as diverse as they are in the reality of the moment. In other words, there could be a multiplicity of possible actual relations between things that are concrete and present in the moment, but there is no single or consistent, logically abstracted guiding principle.

Vygotsky notes that the conceptual modes in this phase comprise a wide variety of types of thinking that can collectively be referred to as ‘thinking in complexes’. Vygotsky reports that five basic kinds of thinking in complexes were found: associative complexes, collections, chain complexes, diffuse complexes, and pseudoconcepts.

**Phase Two, Stage One – the Associative Complex – similarity to the nucleus**

The associative complex can be based on any relation that the subject notes between the sample and any other block. The sample block with its name visible becomes the nucleus of the group. The subject could add a block because it is the same colour as the sample, and may then add another because of similarity in shape or size to the nucleus block. The subject might add a block to the group because of any characteristic that strikes her as related to the nucleus block.

In the associative complex, then, any link between the nucleus and another block is sufficient for the subject to include it and to call it by its ‘family name’. The bonds between nucleus and member blocks do not need to be a common trait – the bonds could be similarities, contrasts, or proximities in space and so on. The subject in this phase who makes associative types of connections uses the word (for example, *mur*) not as the ‘proper name’ for one individual object, but as a ‘family name’ for a whole group of objects that are related to one another in many different ways, “just as the relationships in human families are many and different”.

**Phase Two, Stage Two – Collections – contrast & therefore complementarity to the nucleus**

Groupings in this stage are combinations of objects perhaps based on impressions they have for the subject which result in collections: the blocks may be put together according to characteristics which differ and therefore complement one another. The subject may pick out blocks of different colours or shapes, for example, because they contrast and complement one aspect of the sample block that
the subject takes to be the basis for grouping the blocks. What results is a collection of colours, or shapes, that are in the blocks themselves: for example, a group of blocks that is each a different colour.

Collections are made by associative contrast rather than by similarity. This approach is sometimes combined with the associative complex and results in collections in which the basis is one of mixed principles. However, the subject does not stay consistently throughout the process with the first principle that she selected as the basis for the sorting. The subject falls into considering a different characteristic and what results is a mixed collection of, for example, colours and shapes.

According to Vygotsky, this is a long and persistent stage in a subject’s (child’s) thinking because it is based on the subject’s practical experience where complementary and different objects are grouped together (for example, knives, forks, and spoons). Collection-type complexes also occur in ‘verbal thinking’ in grouping objects according to functional complementarity. Even when adults speak of clothes or cutlery, they usually have in mind concrete sets of objects as opposed to generalised concepts.

Phase Two, Stage Three – the Chain Complex – the decisive attribute keeps changing

This stage is a “dynamic, consecutive joining” of individual links into one chain, where the meaning or characteristic is carried over from one bond to the next. For example, if the sample is a yellow triangle, the subject picks out a few triangles and then, if the last one was blue, would change to picking out all the blue blocks regardless of shape. Then, she might change again, and pick out all the circles. Vygotsky notes: “The decisive attribute keeps changing during the entire process” (1986, p. 116). The links between each successive bond, or numbers of bonds, have no consistency as they move along, and the original sample block doesn’t have central significance. Each link in succession is as important as the one which went before, even though it has changed, but each new link could become the ‘magnet’ for the next move or next few moves.

Chain complexes are those which demonstrate the “perceptually concrete, factual nature of complex thinking” (p.116). A block is put into the chain not only because it represents that one particular characteristic, but as an individual block with all of its characteristics – whichever single characteristic is focused on by the subject is not abstracted from it, as it would be in a true concept because a true concept would give that specific trait a ‘special role’. Perhaps what is suggested here is that any trait will do – it is arbitrarily picked up on even though the subject is aware that the block has a number of other traits: it is just that the subject doesn’t abstract it and use that one as a guiding principle or generalisation consistently.

Chain complexes show up the essential difference between thinking in complexes and true conceptual thought because complexes have no hierarchy organising different traits and because all the traits, attributes, or links are ‘functionally equal’. There is a fundamental difference between complexes and concepts in relation to the relationships of the parts to the whole, and in the relationships of one part to another.

In chain complexes, there can be an absence completely of a structural centre. Two blocks in the chain may have nothing in common and yet they are included as part of the chain because they share a characteristic with some other block in the chain. This makes chain complexes “the purest form of thinking in complexes” (1986, p. 117). For example, where associative complexes interconnect objects to one element – the nucleus – chains have no nucleus: the end of the chain could have nothing in common with the beginning because what is acceptable is the intermediate
characteristic which ‘glues’ one element to the next.

An association made by thinking in complexes doesn’t ‘rise above’ its individual elements the way it would in true conceptual thinking. This is because complexes are inextricably bound to the concrete objects in the complex, and because this type of merging ‘the general and the particular’ which takes place between the complex and its elements “is a distinctive feature of all complex thinking and of the chain complex in particular” (1986, p. 117). (Heinz Werner apparently called it a “psychic amalgam”.)

The chain complex is directly and factually bound to the diverse traits that form it, so this type of thinking can have a vague and drifting quality. Traits are considered by the subject to be similar, not necessarily because there is a real similarity, but because the subject has a vague kind of impression that these traits have something in common.

**Phase Two, Stage Four – the Diffuse Complex – almost endless possibilities**

There is a fluidity to the particular characteristic that is formed in a diffuse complex. Groups or images that are perceptually concrete are linked by bonds that are diffuse. For example, if the sample block is a yellow triangle, the subject will also pick out all the trapezoids because they might have made her think of them as triangles with the tops cut off. Trapezoids then perhaps lead to squares, then squares to hexagons, hexagons to semi-circles and finally to circles. If colour is the basis of the selection the subject makes, it is also fluid and changeable in the same way (yellow to green to blue to black).

The diffuse complex can have almost limitless inclusions. It is a “real-life parallel” of children’s thinking at this age in areas that are “nonpractical and nonperceptual” because these kinds of thoughts can’t easily be “verified” via practical or perceptual means (p. 118).

In this type of complex, children can make associations or transitions or generalisations of things beyond their tangible experiential worlds in ways that adults view as surprising and perhaps even original. To me, this suggests that they put things beyond their immediate experience into interesting combinations that adults would not perhaps have thought of: this could be what adults label as childlike imagination.

Outside of the child’s immediate concrete and practical sphere, she is capable of coming up with “limitless complexes amazing in the universality of the bonds they encompass” (p. 118). The same principles guide both the concrete, practical, factual associations and the ones that children make about the realms beyond their experiences. In both, the concrete and the nonpractical/nonperceptual areas, the child is confined by the limits of the concrete – and in the case of areas “outside the sphere of his practical cognition” the associations are “naturally based on dim, unreal, unstable attributes” (p. 118).

It appears to me that this is an emerging kind of logic based on the manipulation and exploration of almost endless possibilities that could exist between the actual, concrete, perceived physical attributes. The child is dealing with real concrete traits and is trying to work out what possible explanations there could be that would make things fit together. It is diffuse, perhaps because of the endless variety of possible combinations, but also because the child is taking his first baby steps towards a way of thinking not restricted to the perceptually bound. He has hit on the idea of these types of generalisations, and, like learning to walk, is taking wobbly steps: when the child falls, he may still crawl or slide on his bottom and then walk again, but in a definite direction, with guiding principles emerging and being tried on for size. Hence, the fluidity. What could also be spurring this
process on is an increasing verbal ability.

**Phase Two, Stage Five – the Pseudoconcept – functional similarity in structure and role**

The pseudoconcept is a bridge between thinking in complexes and the final stage before true conceptual thinking. The type of generalisation that forms a pseudoconcept is still essentially a complex even though a pseudoconcept looks very much like a true concept – there is a phenotypical resemblance. The kind of causal-dynamic relationships that form a pseudoconcept are in essence different to the types of relationships that give rise to true concepts.

In experiments, subject could group objects in a way that looks like they are guided by an abstract concept, i.e., triangles, but analysis reveals that subjects are only forming associative complexes restricted to a perceptual bond, a visible likeness that is concrete. The subject appears to be guided by conceptual thinking, but her reaction to correction “is one of the critical points of the experiment” (Kozulin’s end-note 6, 1986, p. 267, citing from Hanfmann & Kasanin, 1942, pp. 30-31). The subject who says “Ah, so it is not colour (or shape)” will remove all of the blocks placed there (or will give some indication that an alternative hypothesis is needed). The pseudoconceptual subject will remove the block with the different name and leave the ones already placed and continue looking around. When asked if she still thinks those belong together because they are *mur* blocks, the subject will say yes because they all have the same colour or shape or whatever. This suggests to me that it is going to be very difficult to distinguish this type of thinking from associative thinking, except that the subject might say “They are all red”, referring to the group as a whole, whereas the associative-thinking subject will enumerate them one by one in relation to the sample block and not to the group as a whole.

Vygotsky claims that pseudoconceptual thinking dominates the thinking modes of preschool-aged children because, in their day-to-day experience, the complexes they use that correspond with the meanings of words are not spontaneously developed by the child – words have meanings in the language of the adults around them, and children grow into this verbally enriched world. In the experiment of engendering the development of artificial concepts, children are freed from these well-established verbal connections and therefore demonstrate the way they construct new concepts spontaneously. This aspect of the experimental procedure brings to light how children learn to ‘master’ the language of the adult world, and what children’s language and concept formation look like without the mediation and influence of ready-made meanings in the language of adults around them. (As a teacher in my pilot studies exclaimed: “My goodness! Is this what children do every time they learn a new concept?”)

The functional equivalence in *structure* and the functional equivalence in the *role* of the pseudoconcept enable communication between children and adults, and the pseudoconcept is the ‘germinating seed’ of a true concept. The pseudoconcept allows a child to participate in the language of the adults around her, and the transition to true conceptual thinking is not noticed by the child because she begins to operate with word meanings and to practice conceptual thinking long before she is clear about what these true concepts actually entail. Vygotsky notes that the genetic preconditions of the ‘concept-for-myself’ are already present in the pseudoconcept in the form of the ‘concept-in-itself’ and the ‘concept-for-others’ as a “rule rather than the exception in the intellectual development of the child” (p. 124).
Descriptions of Phase Three: the Potential Concept (from Vygotsky, 1986, pp. 135-140)
Potential concepts are, like pseudoconcepts, precursors to true concepts, but potential concepts involve abstraction, whereas complexive thinking involves generalisation. In other words, in the way that thinking in complexes is a preconceptual mode of forming and ordering generalisations, potential concepts contain the precursors of the ability to abstract characteristics from objects. (See Kozulin, 1990, p. 215, for further discussion.)

Even though very young children are able, to some degree, to abstract characteristics from objects, in potential conceptual thinking they are unlikely to use the abstracted characteristic as a consistent principle in sorting the blocks.

The first type of potential conceptual abstraction is likely to be that of grouping objects according to maximum similarity, combining two elements – small and round, or red and flat, although this type of abstraction is generally a vague, unclearly defined ‘general impression’. Objects will be allowed into the group because of two ‘unequally attended to’ characteristics, while other traits may deny other objects from being included.

The second kind of potential conceptual thinking is followed by grouping objects according to one apparently abstracted characteristic – shape or height – on practical or perceptual considerations. These characteristics are not truly abstracted out of the objects and applied as an abstract guiding principle across the possibilities of the blocks: as potential concepts they are perceptual or ‘action-bound’ selections.

Potential concepts are involved in the abstraction processes in complexive thinking; however, the abstracted characteristics are unstable and have no privileged or hierarchical positions. As Vygotsky notes, in a potential concept proper, once a trait is abstracted, it is seldom “lost again among the other traits. The concrete totality of traits has been destroyed through its abstraction, and the possibility of unifying the traits on a different basis opens up. Only the mastery of abstraction, combined with advanced complex thinking, enables the children to progress to the formation of genuine concepts” (p. 139).

Descriptions of true conceptual thinking
In this section, some discussion is taken from Vygotsky (1986) and some from my pilot studies.

The “essential difference between natural biologically grounded intelligence and historically developed human intelligence” is language (“the word”) “deliberately used to direct all the subprocesses of advanced concept formation” (Vygotsky, 1986, p. 139).

When the pseudoconceptual complexive type of thinking in generalisations is combined with an emerging ability to hold stable abstracted qualities in mind, the subject is moving towards true conceptual thinking. The synthesis of generalised attributes and abstracted ones, removed from the perceptually embedded characteristics into hierarchical prominence characterises true conceptual thinking. In my pilot studies, once some of the subjects had sorted the blocks according to size, they could then usually see that the remaining blocks were all large. However, this concrete and factual observation did not always lead to the subject being able to find the next part of the ‘double dichotomy’ – height – and this was where ‘the word’ guided the subjects to finding the complete solution.

Even once the subjects had managed to sort the four groups correctly, and turn over the remaining blocks as ‘verbal’ confirmation that they were correct, they were not always able to describe or verbally conceptualise the groups in terms of both characteristics. They could ‘see’ that the blocks
belonged together because of their physical characteristics, and they could confirm this by ‘seeing’ that the labels were the same in each group, but only those capable of true, fully mature conceptual thinking would use the words *cev, bik, mur,* and *lag* to describe other objects – and also described these words in terms of the double dichotomy.

The preceding sections from Vygotsky describe the ontogenesis of intellectual development, and, as to the variety of methods used by adult subject is concerned, this is where the framework provided by Hanfmann and Kasanin is most useful.

**Differences in approach – and a caveat emptor or two**

In this section, I report on several aspects of Hanfmann and Kasanin’s 1937 and 1942 work with this procedure and complement it with brief illustrations (and misunderstandings) from my pilot studies in relation to the differences in approach between the Hanfmann-Kasanin method and that of Sakharov and Vygotsky. I believe it is important for this discussion to take place here, because it relates to the structure of the procedures of both sets of authors.

To begin with, *caveat emptor* number one was something which became obvious in my literature search for studies using the functional method of double stimulation. In Hanfmann and Kasanin’s 1937 paper, a tally in passing reveals that these authors make reference to “conceptual” or “concept formation” twenty-six times and to “classification” fifteen times. To the unwary reader, these two terms could appear as substitutes for one another, yet very clearly, they are not. Some of the studies that I came across did not make this distinction and, as I mention in my discussion of the Cameron and Davidson study below, classification of the blocks is the vehicle used to reveal the conceptual processes in coming to understand what the labels mean and being guided by them; the ‘object’ of the exercise is not that the subjects sort or categorise the blocks into four groups, but *how* they go about doing this and the *reasons* for their doing so.

And *caveat emptor* number two surfaced in my first pilot attempts, which were based on the description of the procedure as it is given in *Thought and Language* (1986, pp. 103-104). My incomplete (pseudoconceptual?) understanding of the exacting nature of the ‘script’ led me in the wrong direction. At first reading of this description, it appeared to me that the phrase “nonsense words” should be used. In my first four pilot studies with adults, I used this exact phrase, and found, to my dismay, that because the word “nonsense” was used, the subjects disregarded the names almost entirely, and used them mainly to confirm their hypotheses (by turning over the blocks) once they had correctly solved the problem of the blocks. They were also then unable – or found it extremely difficult – to use the words *cev, bik, mur,* and *lag* to talk about and describe other objects.

This misinterpretation by me underscores the delicate nature of how this task is to be introduced to subjects: a specific reading of the instructions in Hanfmann and Kasanin’s (1937) Appendix gives an indication of what the researcher “in effect” should say:

> These are four different kinds of blocks. Each kind has a name. This kind of block, for instance (turning up the triangular *mur*), is called *mur*. Your task is to find these four kinds and to put them into those four spaces (showing the four corner fields of the board). You might start by picking out all the blocks that you think might belong to this kind, *mur,* and putting them in this space. (Hanfmann & Kasanin, 1937, p. 535)

In their 1937 paper, Hanfmann and Kasanin note that “a description of the technique is not easily available” (1937, p. 522) and in their (1942) work, the standard instructions (p. 103) are exactly
the same as the 1937 version: page 9 of the (1942) text reads that the subject “is told that four
different kinds of blocks are before him, that each kind has a name and that his task is to find and to
separate these four kinds”.

In end-note 2 of Thought and Language, Kozulin (1986, p. 267) writes that “Since Vygotsky does
not describe the test in detail, referring instead to Lev Sakharov’s work, I take the liberty of inserting
here the description given in E. Hanfmann and J. Kasanin (1942, pp. 9-10).” A note from the editor
of the 1962 translation of Thought and Language reads practically identically: “Vygotsky does not
describe the test in detail. The following description is taken from Conceptual Thinking in
Schizophrenia, by E. Hanfmann and J. Kasanin [16, pp. 9-10].”

The reason I am at pains to point to these issues regarding descriptions of the test is twofold:
firstly, these authors maintain that descriptions of the technique are not easily available or not
described in detail by Vygotsky. Secondly, the 1937 and 1942 works of Hanfmann and Kasanin do
not require the subjects to apply the words cec, bik, mur, and lag to describe objects other than the
blocks, on completion of the problem-solving procedure.

This difficulty in obtaining descriptions from Vygotsky could have contributed to Hanfmann
and Kasanin’s not requiring their subjects to demonstrate that they have indeed formed a new
number of concepts to the extent where they are able or expected to apply these words to talking
about and describing different objects other than the blocks. However, Vygotsky is most specific on
this point (below I have repeated his line of reasoning cited earlier):

“Once the concepts have been formed, the subjects are asked to apply these
to describing objects other than the blocks, and finally, to define what each of
the words means. In this way, the experiment is organised in a way that
turns the “pyramid of concepts “upside down”. (Vygotsky, 1986, p. 105)”

In the 1962 translation of Thought and Language, Vygotsky makes this point too: “The formation
of the concept is followed by its transfer to other objects: the subject is induced to use the new terms
in talking about objects other than the experimental blocks, and to define their meaning in a
generalized fashion” (1962, p. 57).

However, in both Hanfmann and Kasanin’s 1937 and 1942 works, the subjects are merely
asked “for the principle of classification… If the subject shows all signs of complete and easy mastery
of the system, [the final] repetition of the task may be dispensed with” (Hanfmann & Kasanin, 1937,
p. 536).

I believe this difference in procedure is important (as I mentioned in the section on Sakharov
above), not only for transference, but also because of the way Sakharov and Vygotsky introduced this
procedure to children: their introduction is that this is a game belonging to children from a foreign
country where the names mean something in the foreign language.

This way of introduction does not, I believe, only make the material more familiar to children
(because it is a game belonging to other children), but it establishes the need to sort the blocks into
four groups by abstracting certain characteristics, to use the names as a guide along the way, and from
the outset, for the children approach the task as one where the words have a specific meaning in this
foreign language. In this respect, Hanfmann and Kasanin do advise that “with younger children it is
advisable to use a somewhat modified procedure. Such a procedure has been described by Sakharov
[Sakharov, L. (Methods of investigating concepts). Psikologia, 1930, 3, 3-33]” (Hanfmann & Kasanin,
1937, p. 536; 540).

Hanfmann and Kasanin advise that in cases with uneducated adults and special groups of
patients, additional information can be used (“Additional Instructions” (points 1 (b) and (c)), but only once the standard instructions have been given and if it becomes clear that “the subject does not understand the meaning of the task” (1937, p. 536). These points refer to the meanings of the words, as follows (1937, p. 537):

“Yes, but the names stand for something... There is some reason why the blocks have the same name and you have to find it out.” [the names mean something]

and then, if required

“The blocks have the same name because they are alike in some way.” [the reason that the names mean something]

Further, in their 1942 Appendix on additional instructions, Hanfmann and Kasanin describe 17 additional explanations, but do not indicate whether such additional information affects the scoring for these subjects in any way. However, although I took note of these additional instructions, I did not score the subjects in this study if they did require additional instructions, but noted these where relevant in the detailed analysis of each subject. I have also attached Appendix Three which describes how the procedure in this study was introduced to subjects of different ages.