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In search of Vygotsky's blocks : Exploring CEV, BIK, MUR, and LAG in South Africa

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Chapter Seven: Conclusions

There are five core issues which will be discussed in conclusion to this research report: the status of this study as a replication; the question of the validity of Vygotsky's Blocks as a procedure for 21st century cognitive psychology and psychology in education; the intention to draw renewed attention to the thinking strategies described by Vygotsky with this procedure; whether children and adults today demonstrate similar patterns to those described by Vygotsky; and the overall intention of the research exercise. Before the final conclusion, I offer a personal response of my engagement with the people in this research exercise.

Firstly, the intention of this research was to conduct a meticulous replication of the (1928-1934) Vygotsky and Sakharov functional method of double stimulation for the study of new concept formation (Vygotsky's Blocks) using the 22 wooden blocks and a combination of the scoring and methodological techniques of Hanfmann and Kasanin (1937; 1942), as translated and adapted by them from this earlier work of Vygotsky and Sakharov.

In my search for Vygotsky's Blocks – in my literature search; in finding and sourcing the blocks themselves; in conducting each session; and in analysing each of the 60 participant's responses – I strove to conduct this research in a manner as close to the writings of both sets of authors as was possible. I believe that the theoretically derived method, which I had painstakingly combed through, as well as the later studies discussed in the literature survey and the experience of my pilot studies enabled me to appreciate the exacting requirements for undertaking a study of this nature.

Further, as none of the studies I consulted were cross-sectional ones, I agonised over the scoring method of Hanfmann and Kasanin, for two main reasons. Firstly, Vygotsky (1986) did not appear to have 'scored' any of the responses of the subjects he writes about, and his references to "the preschool child" (eg, 1986, p. 119), or "the child" were obviously made in reference to the age at which children entered school in Russia at the time of Vygotsky's writing. Secondly, as has also been discussed, the scoring method developed by Hanfmann and Kasanin (1937; 1942) was developed for use with adult subjects and not for cross-sectional studies. The adapted scoring used by me in this study did not, I believe, depart significantly from the Hanfmann and Kasanin scoring, but I do consider it necessary for further research to establish the validity and usability of my adaptations.

In conducting the study itself, it was on many occasions awe-inspiring for me to see Vygotskian theory take place before my eyes: it was also elating, as Vygotsky noted over 70 years ago, for me to 'be there' as "the development of concepts unfolds in front of us" (Vygotsky, 1986, p. 97). However, it was not always so easy for me to analyse subjects' responses in terms of Vygotsky's writings, and in some cases it required my continuing to go back to the theory and watch the tapes and read the transcripts again and again to ensure that my interpretation of these responses was what I believed to be accurate in relation to the theory itself. In this respect, it was of great assistance to have the DVD recordings to refer to alongside the annotations made by my research assistants. The scoring sheets that I developed for this research exercise were of value; however, in many cases, after the first few pages, the research assistants recorded what was happening on the back of the sheets because they found a blank sheet easier to write on when speedily transcribing what the respondents were saying and doing. For those who would be interested in conducting research exercises with Vygotsky's Blocks, I highly recommend having both a research assistant (fully briefed for what to look for, note, and record) together with audio/visual recordings of the proceedings (because tiny and very

important details can be overlooked at the time, as demonstrated by my discussion of the subject S1101F regarding the number of semi-circles which led me to see the pseudoconceptual nature of her approach).

In respect of the first core issue, I believe that the status of this study as a meticulous replication represented the best I could achieve, given the difficulties I experienced and the attention to detail that I paid in tracing the history of this procedure, as well as my attempts to reconcile the differences in Vygotskian theory and Hanfmann and Kasanin's approaches to the procedure itself. It is my sincere wish that further studies using this procedure will validate my attempts to reconcile the differences between Vygotskian theory and that of the scoring method of Hanfmann and Kasanin (1937; 1942) for the purposes of cross-sectional use.

Secondly, this replication, as a cross-sectional study from early childhood to adulthood, aimed to demonstrate that this more than 70-year-old procedure continues to have validity for contemporary cognitive psychology and psychology in education. For both contemporary cognitive psychology and psychology in education the developmental trend that this study found with a small group of respondents from each age group speaks far more eloquently for the value of Vygotsky's Blocks than does my passion for them. It was pointed out to me (Macdonald, pers. comm., 2006) that the findings are all the more significant for being obtained on so small a set of subjects. She goes on to say that it probably takes a great deal of understanding of this aspect of Vygotskian theory, not only to conduct research with this more than 70-year-old procedure, but also to appreciate the import of the developmental set of results which this research has revealed, and that the study may therefore not readily be replicated. I believe these results are testament to the value of the procedure developed by Leonid Sakharov under Vygotsky's leadership and the findings yielded from it, which Vygotsky writes of such a long time ago, as theoretical and empirical constructs, demonstrated themselves to be alive in the minds of people in 2006, from a subject who turned three the day after her session all the way though to a 76-year-old grandfather.

A very important element of the procedure of Vygotsky's Blocks, which has, I believe, value for contemporary cognitive psychology and psychology in education emerged in this study in the *movement* between establishing the parameters of the problem, and then focusing on the individual elements in working out the solution for one's self. Put another way, whether one is confronted with the demands of the socio-cultural milieu in "the cultural, professional, and civic world of adults" (Vygotsky, 1986, p. 108), or in a learning of a new concept at school (eg, why the moon always shows the same face to the inhabitants of planet Earth), or in solving newly confronted day-to-day problems, establishing the parameters of the problem or the new concept upfront is essential to delineating the extent of the problem or the boundaries of the new concept. It is then up to the individual, guided by 'the word' – language, to use whatever (language formed) cognitive means they have at their disposal to construct an understanding of what the new concept involves or to solve the problem facing them. If the points I make here are obvious to my readers (or indeed if these are well-known, empirically established facts in other areas of psychology), the fact remains that, for me, the importance of these factors was brought home to me through conducting research with Vygotsky's Blocks, and made me appreciate anew that:

> Only the mastery of abstraction, combined with advanced complex thinking, enables the child to progress to the formation of genuine concepts. A concept emerges 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)

In terms of this study's implication for psychology in education, the findings indicated to me that it would be very important for those involved in education to focus with renewed effort on how the syncretic, the concrete and the factual, and the intermediate phase before true conceptual thought becomes possible, could affect educationalists' approaches to the education of children from three years old to fifteen years old. Further, the method of double stimulation was designed to allow for the development of concepts to take place according to each individual's level of cognitive growth (and their particular individualised approaches). The findings of this study demonstrated for me – and for the adolescents who made this observation after their sessions – that constructing one's own understanding of a particular given task is likely to be most effective in terms of teaching-and-learning strategies. However, the long-term impact of such an approach was not within the scope of this study to establish: further research in this area would be required to do so.

In respect of the second core issue, I believe this research exercise and this research report have demonstrated very clearly that the use of Vygotsky's Blocks – the functional method of double stimulation in new concept formation – continues to have relevance for 21st century cognitive psychology and psychology in education, and that further research would be required to confirm the trends found by this study.

Thirdly, this study sought to draw renewed attention to the strategies that human beings employ in the formation of new concepts as first described by Vygotsky in Leningrad in January 1930 and elaborated on elsewhere in his works. In this respect, with a group of 60 respondents, I believe this study yielded very clear confirmations of the thinking strategies described by Vygotsky (1930; 1986). It is my sincere wish that this study, limited as it was by the small number of respondents, will encourage other researchers to conduct further research with Vygotsky's Blocks to confirm the trends in cognitive growth found by this cross-sectional study. For those interested, the total set of data in which all 60 subjects were analysed (with photographs), can be made available. I am fully aware that the children and adolescents who participated in this study came from privileged, urbanised environments, and that the adults who participated shared a mindset essentially mathematical and analytical in terms of underwriting risks, and that these factors would have had an effect on the results of this study, in terms of their socio-cultural and professional influences and interactions. Studies in rural environments, and in less privileged ones, could, I believe, add much to a database of the types of cognitive structures formed by our people, in schools and in working environments.

Fourthly, this study intended to find out whether contemporary children and adults produced the same or similar patterns described by Vygotsky (1986), as well as those findings of a selection of researchers who used the adapted procedure of Hanfmann and Kasanin (1937; 1942). None of the studies I consulted included groups of three- or five-year-old subjects, and the studies of Stones and Heslop (1968, and Stones 1970) started with six-year-old subjects. Further, although these studies (and Cameron & Davidson, 1981) did find evidence of 'complexive' and pseudoconceptual thinking, the authors did not specify their findings in terms of syncretic images, associations, collections, chains, diffuse complexes, or describe what types of pseudoconceptual reasoning their subjects were using. Subsequently, it was surprising for me to find that the words *cev*, *bik*, *mur*, and *lag* did not serve to direct, in any meaningful way, the responses of the three-year-olds and a number of the five-year-olds. Although, as mentioned earlier, Vygotsky (and Kozulin) does note that the types of thinking

approaches evident in conceptual development co-exist and continue to be used by subjects of all ages, it was most rewarding to find evidence of these in the responses of the subjects as discussed in this research report.

In addition, this research report found the same and similar patterns as those described by Vygotsky (1986), although the findings of chain-like reasoning and diffuse complexive reasoning across the four groups were not something which Vygotsky specifically refers to. However, I did not consider these as new or different from Vygotsky's writings as I viewed these responses as elaborations of what Vygotsky perhaps did not find it necessary to report on, as they did not depart very far from the chains and diffuse complexes which Vygotsky does describe.

The findings of what I referred to as representative allocation of shape, colour, or other combinations across the four groups were not described by Vygotsky (1986) or by Hanfmann and Kasanin (1942). Once again, I do not believe that attempts at representative allocation were 'new' or different, but merely elaborations of what began with diffuse complexive reasoning (inconsistently applied), and which culminated in the adolescent and adult subjects' awareness of the implications of these attempts in relation to the totality and the need for consistency of sorting principle across the four groups.

And then there was the element of my interaction with the people in this study that is difficult to communicate to my readers, other than through an attempt to convey what it was like for me 'to be there'.

This study allowed me to witness the syncretic responses from the three-year-olds, who weren't interested in *cev*, *bik*, *mur*, and *lag*, but who revealed to me different ways of looking at things, like the "green moon", the "rainbow", the "mummy and the daddy blocks" (and the babies too); things like towers about to go "crash bang boom", like thunder and lightning do; things like the house of the Big Bad Wolf and what fun it is to get the round blocks to roll off the table, again and again.

This study also enabled me to see the hesitancy and random movements, the need to turn over blocks immediately of the five-year-olds who were unsure about what the game entailed. It gave me insight into their fluid reasoning that these blocks in this group were there because some were the same colour, and some the same shape, and some because they looked like a microwave or a Jack-in-a-box. I also observed, with amazement, that if you notice size upfront, you can, with remarkable consistency, group blocks together and find increasingly that you can read the names that they have. The study showed me an earth and a desert, and a tendency to provide post hoc explanations for things that just happen to come into your mind because now you focus on colour, now on shape, now on size, and aren't bothered about the bigger picture. It also allowed me to appreciate what it's like to be an outsider to a game with enigmatic rules of such complexity that it's almost impossible to keep track of what was happening and why.

I was able to witness the concrete and factual nature of eight-year-old thinking, the descriptions of real attributes about the blocks, and how even measuring them when you think you've got the solution can let you down. You can be let down because, without your being aware of it, your thinking doesn't allow you to hold two things together consistently in your mind, and then you are surprised and puzzled at the outcome of your concrete, factual and 'logical' approach. The study also demonstrated to me that, if you have only one approach that is most obvious to you (colour), and you can't come up with any other approach, that you can remain puzzled and, with much finger-drumming on the table, you keep trying to work out what the answer is and you don't understand *how* it could be so different to the one you believed was so obvious. I came to appreciate that reading

about chain complexes and seeing them actually happen before your eyes are very different experiences for a researcher. When blocks are hastily and randomly put together, and a post hoc explanation given, this study has led me to see that even though some of the blocks appear to have been put together with some form of guiding principle this is in fact not the case. What is happening is, at best, a random and fluid form of associations and collections, rather than a chain, which is a far more particular thing. The eight-year-olds – and the eleven-year-olds – who constructed chains did so with deliberate care or with a fluidity which meandered along, and even if they didn't provide a running commentary, their explanations afterwards did show the fluidity and instability of the chain reasoning that would lead to the diffuse complexes to come.

This study enabled me to see the surprise on faces and genuine puzzlement about why a big yellow block and a big orange one have the same name. I was able to see the process of being guided by labels and your own observations until, after overcoming the bewildering complexities of so many different shapes, colours, heights and sizes, you arrive at the "Ah-ha!" moment, and the smiles and increasingly confident moves that follow. I also saw the puzzlement on the faces and in the increasingly frenetic movements of the subjects who were trying to work out which combinations went with which, and the difficulty in keeping track of ground they'd covered before.

I had the opportunity to see and hear about increasingly sophisticated diffuse reasoning and more and more intricate elaborations in exploring and finding out what could possibly link these confounding little blocks into groups. I was genuinely moved by the subjects who were brave enough to admit that they 'didn't have a clue' after they'd exhausted their repertoire of possible reasons.

This study gave me insight into the realisation that the pseudoconcept doesn't only manifest itself through an insistence on shape or colour; that it can be far more subtle than that. Pseudoconcepts can take the more obvious form of an orange circle not being the same as two blue ones: this is because the associations and connections you're making are different to mine; because you haven't abstracted the circle and I have. Yet pseudoconcepts can also be manifest in disregarding the moves you're making in relation to the totality: in some cases because you haven't applied the same principle to all four groups; in other cases because you haven't even taken in the bigger picture – the totality – into consideration. A pseudoconcept can also be revealed when you happily move and swap the triangles and the trapezoids between the same two groups, again and again, and you aren't bothered by this or by your changeable line of reasoning about why you're doing this in relation to the sample blocks which haven't moved at all. These "wolves in sheep's clothing" can become apparent in cases where even when you notice the small matter that there are only two semi-circles, yet you will continue with your approach of putting one block of each different shape into each of the four groups. The "wolves in sheep's clothing" can be disguised in eloquent expressions like wanting to see "in which areas the *bik* are differentiated", where, accurate enough as these observations are, you are not evaluating the underlying principles you're applying to sorting your groups.

This study put me into the position of having to respond to a very genuine and determined effort to demonstrate a factual and concrete notion of proportion, where, because the difference in sizes in the *lag* group of blocks is bigger than those of the *cev* and *mur* blocks, this greater difference makes it a different principle. I was also taxed by arguments about volume; grouping blocks according to classical and non-classical shapes; stacking blocks of the same shape to see if a consistent pattern emerged of two stacked blocks of the same diameter, coupled with two which were not; and creating sub-divisions within each group of pairs of blocks based on size.

I witnessed levels of frustration; expressions of delight; careful and deliberate explanations for each and every single move; outright laughter; and genuine joy at arriving at the correct solution. I was also awed by statistical analysis of the possible relationships between blocks, which, when extrapolated out to the other shapes, yielded the correct solution.

In a nutshell, I was privileged to observe the human side of human beings solving problems, learning new concepts, using their amazing "natural biologically grounded intelligence" sculpted by culture, by language, by the language we speak every day at school and at home, by the language of mathematics, by 'the word', into what Vygotsky so aptly describes as "historically developed human intelligence" (1986, p. 139).

The fifth core issue concerns the overall aim of this research exercise and this research report which was to contribute to a renewed understanding of how people of all ages form new concepts; to resituate the value for educationalists and others involved in cooperative enterprises of understanding the paths from preconceptual to truly conceptual thinking; and to highlight the importance for constructivist educators and key personnel to be conversant with these specific theoretical and empirical constructs of Vygotsky's. The results of this study in relation to educationalists have been discussed above. In respect of the findings of adult subjects, I believe these findings were a valuable indication of how the adults in this study formed new concepts: the levels of frustration they were likely to experience; the degree to which these interfered with their otherwise more logical approaches; the reversion by some subjects to less sophisticated levels of thinking; and the time it took for people to build up their own understandings of what these new concepts meant. Further research in private companies and other cooperative enterprises would need to be conducted to establish the trends found by this study, as well as, I believe, to provide key personnel with a clearer understanding of how the people in their companies use a variety of cognitive strategies. Both of these indications, could, I believe, have a bearing on communication procedures within companies, as well as how people understand their own work areas in relation to other work areas and the overall operation of the company or enterprise itself.

Finally, I have to admit that conducting this study was extremely demanding for me, as were the learning curves which I went through at each stage of the study itself, from the initial literature survey right through to writing these final words. If asked whether the time, effort, resources, and soul-searching that went into this study were worth it, my answer would be – and is – "Without any doubt!"

