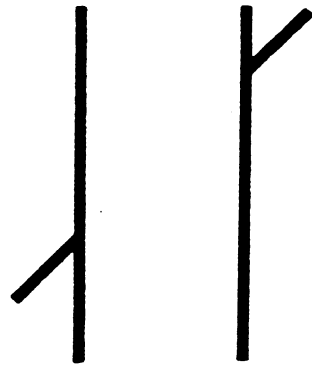


PIOTR GAL'PERIN

His lifelong quest for the content of psychology



JACQUES HAENEN

PIOTR GAL'PERIN

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As early as the end of the 1960s, the Dutch psychologists Carel van Parreren (1920-1991) and Jacques Carpay (1933) recognized the significance of the work of the Soviet psychologist Piotr Gal'perin. Together they introduced it to psychologists and educators in Belgium and the Netherlands. They kindled my interest in Soviet psychology as an undergraduate at Utrecht University, and moreover, it was through their efforts that I was able to study as an exchange student at Moscow University where I heard Gal'perin lecture on his new approach to psychology.

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INTRODUCTION

This study contains a survey and critical analysis of the life and work of the Soviet physician and psychologist Piotr Iakovlevich Gal'perin (1902-1988) who was one of the leading figures in Soviet psychology. Gal'perin played an important role in the grounding and extension of the so-called activity approach to psychology and in this capacity he gained an influential position within a relatively small scientific community about which only a few people in the West are informed. This community is defined by Soviet psychology and especially by one of the dominant theories within this framework, namely the cultural-historical theory.

Gal'perin was the last representative of the generation of psychologists who had personal contact with Lev Vygotsky (1896-1934), the founder of the cultural-historical school in Soviet psychology. Recently, the popularity of this theory has been growing and several textbooks are now available with comprehensive and/or original receptions and extensions of Vygotsky's position (cf. Daniels, 1993; Iaroshevski, 1989; Kozulin, 1990; A.A. Leont'ev, 1990; Moll, 1990; Newman & Holzman, 1993; Van der Veer & Valsiner, 1991; Wertsch, 1985, 1991). Furthermore Vygotsky's collected works have been published in Russian (Vygotsky, 1982a,b, 1983a,b, 1984a,b), and English, German and Spanish translations or selections from it have been published or are underway (cf. Vygotsky, 1985, 1987, 1993). The fact that his works are now available in these languages will make him unquestionably one of the influential figures of twentieth-century psychology. However, we should bear in mind that Vygotsky's theory already belongs to the history of the social sciences. Consequently, there is a need for a thoroughly analysis of the vicissitudes of the hypotheses which came up in the context of the cultural-historical theory. Following Cassirer (1944, p. 180), one could argue that the full elaboration of a theory is very rarely the work of the individual (in this case Vygotsky) who first introduced it. Its full impact cannot be appreciated as long as it is still in its first implicit state. Gal'perin can be considered as one of those who elaborated the cultural-historical theory and gave rise to further theoretical and empirical research within its framework. So, he contributed to the transition of the cultural-historical theory from an implicit to an explicit state.

This argument is corroborated in this study. The point of departure is the assertion that Vygotsky's cultural-historical theory laid the basis for the development of Gal'perin's psychological thoughts. In my view, however, other influences can also be identified. The first is Leont'ev's theory of activity. Both Vygotsky's and Leont'ev's theory had an important influence on the way Gal'perin formulated his research questions. But two other influences can be identified, which came more to the foreground from the early 1950s onwards, viz. Il'enkov's understanding of Marx's concept of the 'ideal,' and especially Pavlov's concept of the 'orienting reflex' as elaborated by Sokolov. Thus, in my view, the works by Vygotsky, Leont'ev, Marx/Il'enkov, and Pavlov/Sokolov, are the cornerstones of Gal'perin's concept of psychology. The latter must be understood as an attempt to solve psychological problems raised by the works of these Russian scholars.

Gal'perin (1986a) avoided the term 'theory' in referring to his approach to psychological issues, because it is not a scientific theory in the conventional sense. He was concerned about solving specific psychological problems and conducting certain investigations which he saw as relevant and fruitful. Gal'perin (1978a/1992c, p. 60) conceived his approach as a specific way of tackling psychological problems and in this sense, he undertook a research program. Lakatos (1974) introduced the notion of 'research program' in the philosophy of science and I borrowed the term from him. It should be clear, however, that what Lakatos considers as a 'research program' has only a remote resemblance to Gal'perin's concept of research program. Nevertheless, I will use Lakatos's notion of the 'hard core' of a research program to describe Gal'perin's approach to psychology.

Based on the above mentioned influences Gal'perin formulated four assumptions. For reasons which are given in Chapter 7, I consider these assumptions to be the 'hard core' of Gal'perin's research program. The four assumptions can be summarized in one phrase as follows: psychology is concerned with mental (ideal) orienting activity which has its origin in material (practical) activity and can be conceived as the final product of the process of internalization. As we will see, it is the way that the notions of mental orienting activity and internalization are conceptualized which makes Gal'perin's research program both theoretically and practically appealing.

To summarize. In this study Gal'perin's life and work will be critically analyzed within the context of the historical development of Soviet psychology. This analysis will be executed from the point of view that (1) Gal'perin could rightly be called a 'Vygotskian' who (2) has been influenced by Vygotsky, Leont'ev, Marx/Il'enkov, and Pavlov/Sokolov in (3) formulating the hard core of his research program concerning the 'systematic formation of mental actions and concepts.'

In presenting an overview of the life and work of Gal'perin, I will use materials from various sources. Gal'perin was a versatile thinker and scientist, who published articles on such diverse disciplines as physiology, special education, psychotherapy, treatment of functional disorders, instructional psychology, and theory and history of psychology. His bibliography includes some 110 publications, of which two-thirds relate to psychology. Although Gal'perin is mainly known in Russia and abroad as an instructional psychologist, he was also a physician and psychoneurologist. He obtained degrees in medicine (Gal'perin, 1936a) and psychology (Gal'perin, 1965a). Because of this double profession, he was well equipped for a professional attempt to tackle problems on both sides of the mind-brain distinction.

As we will see, this double competence, which he had in common with other Soviet psychologists, among them Vygotsky and Luria, had a distinct effect on his concept of psychology. As a leading psychologist of his day, he participated in almost all the major disputes within Soviet psychology and played an important role in its development. Now, after the collapse of the Soviet Union, it can be said that Gal'perin's life encompassed the great changes in Soviet psychological thought. In this book I will survey the aims and outcomes of Gal'perin's research. I hope to achieve this goal by providing thirteen chapters spread over three parts.

Part One

In Part One I will introduce 'the man and his theory.' I will give a biographical sketch of Gal'perin's life and scientific career, and mention some facts and events which will illuminate his scientific urge right from the outset. I will depict Gal'perin as a man who has dedicated his life to science, always searching for the 'bluebird' of psychology. His life was remarkable for its orderliness of purpose. Already at the age of 15-16 he had envisaged a 'mental map' of his intellectual quest for the foundation of psychology. Never doubting, he pursued his course till the day of his death.

What kind of research did he undertake and in what kinds of discussions was he involved? The answers will emerge as I reconstruct his scientific career. To follow the development of his work I will divide it into four periods described in four subsequent chapters. The first period runs to 1930 and encompasses his youth and education; the second period runs from 1930 to 1936 and is related to the existence of the so-called Khar'kov-school; the third period runs from 1936 until 1943 and describes the period before and during the Second World War; the fourth period begins with Gal'perin's coming to Moscow and ends with his death in 1988. As we will see, each period is marked by its own distinctive features, events and research topics.

Most of the biographical information given in Part One stems from personal communication with Gal'perin. In February 1986, I had the opportunity to have a number of conversations with him in his apartment in Moscow (see Haenen, 1988a, 1989c). During these conversations I was impressed by Gal'perin's phenomenal memory; dates, publications and names were at his fingertips. Moreover, he was a lively narrator, with a great feeling for details, anecdotes and

examples. The information contained in this and other part of this book having no bibliographical references, is derived from these conversations and is indicated as 'Gal'perin, 1986a.'

Part Two

Gal'perin not only contributed to the first steps of the cultural-historical school, but in later life he also acquired an independent and influential position. Part Two is devoted to an overview of Gal'perin's orientation in psychology. El'konin (1989b, p.503) has written in his personal notebooks that Gal'perin's psychological thought has become one of the key trends in modern Soviet psychology. This personal remark of El'konin underlines Gal'perin's essential contribution to it.

The information given in Part Two was partly gathered during my stay as an exchange student (*stazhor*) at Moscow University in the years 1973-1976. I was privileged to hear Gal'perin lecture on the new approach to psychology put forward by him, as well as on the foundations and history of psychology in general. Due to his teaching and communication skills, his lectures and seminars were renowned and well attended. He had the gift of explaining psychological theories not only with authority but also with humor and enthusiasm.

Gal'perin gained a following and established his 'own' influential school. His name is especially associated with the research program of the so-called 'systematic formation of mental actions and concepts.' I will dwell upon the 'Gal'perinian school' in Part Two.

Part Three.

Gal'perin's orientation in psychology is accepted and extended by some Soviet psychologists (e.g. A.V. Zaporozhets, D.B. El'konin), but on the other hand is rejected by others as limited or even wrong (e.g., N.A. Menchinskaia, I.S. Iakimanskaia, A.A. Smirnov, E.A. Budilova). The theoretical and practical propositions arising from Gal'perin's work underwent extensive criticism in the former Soviet Union as well as abroad. I will cover some of the main objections raised by Gal'perin's critics in Part Three. In summing up, I will touch upon the merits of Gal'perin's research program. I will draw attention to a few themes in his work which I consider to be original contributions to the study of cognitive processes during teaching-learning processes. In my view, these themes are both seminal for Gal'perin's work and at the same time practically relevant for teachers and educators.

PART ONE

GAL'PERIN'S SCIENTIFIC CAREER

CHAPTER 1

FIRST PERIOD (1902-1930): YOUTH, EDUCATION AND EARLY RESEARCH

In my overview of Gal'perin's scientific career, I will delineate four main periods. This chapter covers the first period, and begins with Gal'perin's birth in 1902 and ends in 1930 with the foundation of the so-called Khar'kov school.

Gal'perin grew up in the Russian town of Tambov and the Ukrainian town Khar'kov. After his youth and early education he had to consider how he would support himself. There was an inclination to study psychology and philosophy, but due to his father's influence, he decided to become a physician. It would enable him to earn a living and to study these sciences simultaneously.

As we will see, Gal'perin was a psychologist by predilection and for many years a psychoneurologist by training and occupation. During the years until 1930 he tried to lead a double life, but gradually he moved from psychoneurology to psychology. He made this move through investigations that were physiologically oriented. Gal'perin was an inventive and productive experimenter and the description of his early research dominates this chapter.

Early years

Piotr Iakovlevich Gal'perin was born of Jewish parents on 2 October 1902. He grew up in the Jewish community of the Russian town of Tambov. At that time Tambov was a large governmental city in the European part of Tsarist Russia, approximately 260 miles south-east of Moscow. It was a provincial and undeveloped place in the Russian heartland, seemingly unchanged for centuries. In this place, where Jews were allowed to practice medicine under the Tsarist regime, Gal'perin's father was an Ear, Nose and Throat Specialist. He had in this region some fame as a medical practitioner. Clients from the whole region came to him for medical treatment. When his father visited clients upon request, his son Piotr often accompanied him. Piotr retained vivid memories of these medical rounds through the region, where according to a Russian saying "the Tambov wolf is your comrade." When an old man in his 80's, Gal'perin (1986a) liked to relate memories of these rounds, which he described as rather adventurous.

Gal'perin spent the first decade of his life in Tambov. In 1911, his father became a professor of medicine in Khar'kov, then the capital of the Ukraine. The Gal'perin family moved house to Khar'kov, where the mother's parents were also living. In Khar'kov, Piotr entered grammar school, in fact the only co-educational one in the whole of Tsarist Russia. Tamara Izrail'evna Meerzon, whom he later married, in 1925, was in the same grade.

Gal'perin (1986a) described himself in this period as a passionate and studious young adolescent, who was often seriously ill. This fact overshadowed his early years. In 1919, when he was 17, he contracted tuberculosis. In the same period he was also suffering from an obscure illness, which was variously diagnosed. These diagnoses appeared incorrect in a second opinion and in the end Gal'perin was told that it was all nerves.

Gal'perin's purpose in life

Both the 1917 Revolution and his frequent illnesses interrupted his formal education. Despite long absences from school, however, he managed to compensate for the gaps in his schooling by reading books from his father's library. According to Gal'perin, this home library did not contain merely medical literature, but was also well-stocked with books on philosophy and psychology. This reading had a distinct effect on Gal'perin's later development because, as an

adolescent, it struck him that the human studies had apparently not yet developed a generally accepted scientific method for investigating the human mind in objective terms. Reading this kind of literature aroused a deep desire in the young Gal'perin to invent such a method. Although at that time he still had only a vague idea, he wanted to set himself the goal of searching for it. Setting such a goal in life is of course characteristic of that period in life, in which an adolescent thinks that he or she can achieve something that others never will. Gal'perin remembered at 85 that as an adolescent he decided always to retain this idea as a guiding principle.

Gal'perin's life was remarkable for its single-mindedness and orderliness of purpose. Already at the age of 15-16 he had planned the intellectual road that he would travel. Never doubting, he pursued this road to the day of his death. To understand this urge, one must consider the state of the art in the human studies in the years following the 1917 Revolution in which Gal'perin became familiar with the prevailing literature. This overview is limited to the context of Gal'perin's first thoughts on psychology and his first contribution to the debates on psychological theory of the 1920s.

In the first quarter of this century, the scene of the human studies, which encompasses both the humanities and the social sciences, was characterized by a large variety of schools competing with each other in their attempts to find a universal principle that would explain mental phenomena. Several leading psychologists of the time (e.g., K. Bühler, E. Spranger, L.S. Vygotsky) expressed the opinion that this situation, as far as psychology was concerned, amounted to a crisis.

Much later, in 1980, Gal'perin (with Zhdan as co-editor) compiled an anthology about this "period of overt crisis" with original texts by western psychologists. According to the compilers of the anthology, the crisis runs from about 1912 to 1935. In his preface, Gal'perin (1980a, p. 3) expressed his view that the "period of overt crisis" had been transformed into a "chronic depression," which, until then, had constituted a serious threat to the development of psychology as a science. He saw the ongoing crisis historically and logically linked to the Cartesian mind-body dualism.

Due to this dualism, psychology, at the beginning of the twentieth century, was characterized by a rupture between a strictly objective approach on the one hand and a more subjective approach on the other. As a result of this rupture there was a separation of psychology into objective, causal or explanatory psychology, on the one hand, and subjective, descriptive or hermeneutic psychology, on the other hand (Dilthey, 1894/1977, pp. 37-41; Van der Veer & Valsiner, 1991, p. 151-153). Each of these approaches had its own research domain, characterized by its own issues and methodology. The adherents of the objective approach regarded psychology as a natural science and limited themselves to the study of relatively simple and lower forms of human behavior. This approach was modelled on the natural sciences and failed to do justice to the fullness and continuity of human experience. The subjective approach, on the other hand, by unfolding the inner experience, allows us to describe and understand the higher psychological processes. However, according to the critics of this approach, the hypotheses based on it have remained largely untestable.

In sum, in the history of psychology two complementary approaches have been developed. In view of this, the subject matter of psychology may be 'explained' by natural science, but 'understood' by intuitive self-analysis. In fact, under the circumstances of this separation psychology could never be a consistent and experimental science, a proposition already expressed by Kant (Bruno, 1972, p. 57). It had led to an invidious partition, which continues until the present day (see Still & Costall, 1991).

Vygotsky has also made an attempt to analyse the crisis in psychology. This analysis resulted in his famous essay on "The historical meaning of the psychological crisis" (Vygotsky, 1982a, pp. 291-436). According to Joravsky (1989, p. 262), this essay was Vygotsky's major work showing his "exceptional intellectual breadth and seriousness of purpose." Vygotsky argued that for the proper study of the human mind psychology must avoid the metaphysical speculation of the subjective approach while at the same time keeping clear of the atomistic reduction of the objective approach. This statement bears resemblance to Dilthey's (1894/1977), but the conclusions he reached were different. Dilthey (see Makreel, 1977) considered human nature qualitatively the same in all men, and individual differences as merely a matter of

degree. Therefore a subjective and objective approach is both possible and desirable. His methodological viewpoint and his emphasis on the total structure of mind made Dilthey the 'godfather' of the hermeneutic approach in psychology.

Vygotsky shared Dilthey's programmatic viewpoints, but attempted to overcome the partition of psychology from a Marxist point of view. It is this attempt which made him one of the founders of Soviet psychology. Vygotsky (1982a) rejected the accepted reasoning that the higher psychological functions could never be explained by an objective and experimental science. He analysed the state of psychology and searched for a new way along Marxist lines. It fell to him to make the first step in translating the Marxist-Leninist concept of man into a psychological theory: the so-called cultural-historical theory. The central tenet of this theory that higher psychological processes are mediated by their own tools and are first constructed as forms of interpersonal communication, has broad implications for the method and content of human studies (cf. Gal'perin, 1972b, p. 363).

In Vygotsky's footsteps, Soviet psychologists (among them Gal'perin) were motivated by the belief that the creation of a Marxist psychology would eventually replace the disgraceful dualism which had caused the partition of psychology. Vygotsky claimed that "Marxist psychology is not a school among schools, but the only true psychology as a science" (1982a, p. 435). During the following years several attempts were made to construct Marxist psychology. Notwithstanding the achievements, Gal'perin (1987) argued in his last, posthumously published article, that these attempts were ultimately unsuccessful in terms of the problem of dualism: "psychology up till now has not managed to free herself of Cartesian dualism of mind and body" (p. 174). Although Soviet psychology had been bolstered by dialectical materialism, dualism still dominated the field. Gal'perin's interesting, though controversial, view deserves attention, especially now that Soviet psychology is being subjected to attack (cf. Radzikhovskii, 1991).

It is reasonable to suppose that Gal'perin was acquainted with Vygotsky's penetrating essay on the psychological crisis. According to Van der Veer & Valsiner (1991, p. 142), this essay was written by Vygotsky in the summer of 1926. The manuscript was only published in 1982 and during Vygotsky's life it was only known by few people. However, as one of the chief organizers of the Khar'kov School in Soviet psychology (see Chapter 2), Gal'perin met Vygotsky in the early 1930s and worked together with Vygotsky's close co-workers on a regular basis. Therefore, it is plainly possible that Gal'perin had an opportunity to read Vygotsky's manuscript already at the time.

There is still another argument to suppose that Gal'perin at the time was familiar with Vygotsky's views on the psychological crisis. In the early 1930s, Vygotsky wrote a study on emotions which was only published in its entirety in 1984 (Vygotsky, 1984b, pp. 91-318). This study can be considered a sequel to Vygotsky's crisis analysis. In the latter essay Vygotsky left the question of the origin of the separation into two approaches in psychology unanswered. In the study on emotions, however, he made the step of linking the crisis with the issue of mind-body dualism (cf. Van der Veer & Valsiner, 1991, p. 152). In 1970, a short excerpt of this manuscript was published by the prestigious Soviet journal *Voprosy filosofii*. This excerpt was accompanied by a preface by Gal'perin, which suggests that he was well acquainted with Vygotsky's work through the original manuscripts. Apparently, the editors of the journal considered him well equipped to write a preface to Vygotsky's elaboration of the mind-body dualism. But whether or not Gal'perin was acquainted with both Vygotsky's manuscripts at the time, remains a speculative matter.

This ends the limited overview of the psychology scene when Gal'perin first read some of the prevailing literature on the 'psychological crisis.' I mentioned Gal'perin's apparent knowledge of the epistemological and methodological assumptions, which Vygotsky had set forth in his manuscripts on the psychological crisis and on emotions. Gal'perin supported these assumptions because Vygotsky provided a new basis for overcoming the mind-body dualism. From his own reading Gal'perin was already familiar with this issue and maybe reading Vygotsky's manuscripts gave him ideas as to how to contribute to it. His quest for an objective method of overcoming the mind-body dualism has its roots in these early years. Gal'perin has tried during his lifetime to overcome it along different lines. And, as we will see at the end of this chapter, he undertook his first attempt to create such a method in about 1930. But first he had to complete a university study.

Medical studies

Despite his expressed interest in psychology and philosophy, Gal'perin's father strongly advised him against taking up such an 'obscure' study. It was still the first years after the revolution and what prospects could you have as a psychologist at that time? His father was by then Professor of Medicine at Khar'kov University and hence he advised him to take up that study. In 1986, Gal'perin (1986a) still remembered the words of his father at that time: "Then at least you have enough to eat. As a doctor you can still occupy yourself with psychology but at least you have something to fall back on." With these words Gal'perin's father successfully persuaded him to study medicine. Poline Slobodskaja (1992, p. 67), Gal'perin's younger sister, also remembered her father's successful attempt to persuade Piotr to study medicine.

Gal'perin studied at the Khar'kov Medical Institute, from 1921 until 1926. He found an outlet for his own interests in studying neurology, with the idea that via the brain and its functioning he could find the way to mental phenomena. He graduated as a psychoneurologist, a specialization in medicine that does not currently exist in Russian medical science. Psychoneurology was viewed as a combination specialty in medicine that dealt with both organic and functional nervous and mental disorders. An adequate translation in current terminology might be neuropsychiatry. In the Editorial (1925) of the journal *Soviet Psychoneurology*, to which Gal'perin regularly contributed in the 1930s, psychoneurology is presented as an all-embracing and applied discipline unifying medical and behavioral scientists and practitioners.

From the third year of medical school, Gal'perin went to work at the Clinic of Nervous Diseases of the Khar'kov Medical Institute, headed by Professor K.I. Platonov. Platonov was passionately involved in the study of hypnotic suggestion and the possibilities of using this technique in widely divergent cases, e.g., in the treatment of neuroses, and as a substitute for anaesthetics in operations and in childbirth. He contributed, for example, on this issue to a manual for obstetricians on painless childbirth (Velvovski et al, 1960; see Valsiner, 1989, p. 143). Platonov appeared to be an influential agent in Gal'perin's scientific development.

The physician and hypnotist K.I. Platonov

Konstantin Ivanovich Platonov was in his time an internationally well-known physician and specialist in the field of hypnosis. He studied medicine in Petrograd and became a professor in Khar'kov in 1923. V.M. Bekhterev, who studied hypnosis within the conceptual framework of his research on suggestion (*vnushenie*), advised Platonov (1912) to devote a substantial part of his dissertation to the mechanisms of verbal suggestion in hypnotic sleep. In this study Platonov found empirical evidence for the possibility of influencing conditional reflex activity by a verbal stimulus both in the waking state and during suggested sleep.

Platonov (1959, p. 420) corroborated the idea that all physiological processes which are going on within the organism are virtually reflected in man's cerebral cortex. The internal environment of the organism can therefore be influenced through the cerebral cortex. Under certain conditions, a verbal stimulus may give rise to a series of physiological reactions. In accordance with Pavlov's proposition, Platonov conceived the word as a real conditional stimulus, which by virtue of its physiological and societal significance plays a unique part in man's higher nervous activity. Platonov's research was concerned with the concept of verbal suggestion as a factor affecting the activity of the cerebral cortex and the subcortical functions, and with the hypnotherapy based on this concept.

This approach attracted Gal'perin, because it points to the relationships between the psychological and physiological aspects of hypnosis. He studied and worked at Platonov's clinic until 1929. Moreover, as we will see, Platonov's conceptual framework influenced Gal'perin in the development of his own psychological thoughts. To illustrate his observations and 'hypnosuggestive' treatment, let me cite one of Platonov's cases. This case is one of a series of studies conducted as early as 1910 in Bekhterev's laboratory in Petrograd (cf. Platonov, 1959, Ch. 5). Gal'perin himself administered this kind of treatment to a whole range of patients. So, this case gives a concrete idea of Gal'perin's work as a medical practitioner in the second half of the 1920s.

A patient, a barber in a military unit, complained that he had been obsessed with fear which made it impossible for him to serve high-ranking officers. The moment these clients appeared in his barbershop, he became nervous and was so frightened of cutting these officers by mistake that he trembled. An anamnestic interview with the patient revealed the reason for the genesis of this specific neurotic syndrome. One day he was shaving a high-ranking officer when the manager of the barbershop warned him anxiously to be careful, because "He is the commander of our unit." The patient was struck dumb at the word 'commander' and was obsessed with the idea that he might cut him. Since then it was impossible for him to shave clients with stars on their epaulets. In this case a conditional reflex was formed and firmly fixed. The 'signature' of the client, namely his rank insignia, provokes the emergence of the reflex in question. When the patient had to shave the same commander dressed in civilian clothes, the syndrome did not appear.

Platonov propagated a mix of several treatments to cure such a patient. These treatments are usually applied in a certain sequence (cf. Brozhek, 1962, pp. 532-533). The sequence begins with an extensive anamnestic analysis, designed to ascertain the nature of the coupling of the conditional reflex bond with the emergence of a corresponding neurotic syndrome. This anamnestic analysis is an integral part of the treatment and is followed by a psychotherapy consisting of explanation and affirmative suggestion with the patient in a waking state. Then, Platonov (1959, p. 83) made a suggestion to the patient while he was in a hypnotic state, having as its purpose the consolidation of what had been achieved on the conscious level. The suggestion under hypnosis runs as follows: "The excitement you have experienced in connection with serving high-ranking officers is gone and forgotten. You are absolutely free of the fear connected with these cases, you are always composed, you meet this category of client calmly and shave them confidently." This hypnotherapy is followed by suggestive rest during the hypnotic state, which is to ensure a rapid restoration of the normal activity of the cortex. In this particular case, it took three therapeutic sessions with a one-hour session of suggested rest in hypnotic sleep to extinguish the conditional reaction. Finally, the treatment is closed by a prophylactic verbal suggestion under hypnosis preventing the recurrence of such reactions in the future.

The overall goal of the treatment is defined by Platonov as an active intervention by the physician in the patient's cortical and subcortical make-up. His concept of verbal suggestion in combination with hypnotherapy was published by Platonov in 1930, entitled "The word as a physiological and a therapeutic factor." A second and revised edition was published in 1955, bearing the subtitle "The theory and practice of psychotherapy according to I.P. Pavlov." In 1959, this edition was published in English by the Foreign Languages Publishing House in Moscow, which is an indication of the high esteem given to this monograph in the Soviet Union. Platonov's book, which is essentially a collection of case studies in hypnotherapy, was reviewed by Hilgard (1965, p. 167) as a useful introduction to a Pavlovian interpretation of hypnosis.

Platonov stresses in the Preface (p. 7) to the English translation of the second edition, that since the publication of the first edition very little new experimental data has been found. Consequently, most of the research, on which Platonov's monograph is based, was done in Khar'kov in the mid 1920s when Gal'perin was studying medicine. Platonov thought it necessary, however, to publish a renewed edition because of the necessity to introduce his findings in the framework of Pavlov's physiology. Running somewhat ahead, let me note that Platonov in this sense reflected the implications of the so-called Pavlov-conference, which was held in 1950. This conference included the decision to reconstruct psychology according to Pavlovian physiological lines.

Gal'perin made a certain contribution to Platonov's book, first as a student and later as a co-worker at Platonov's clinic. His name is mentioned by Platonov in his Preface (p. 9) as one of his closest co-workers. Gal'perin's first research was done within Platonov's research program. This piece of work is of historical value, because Gal'perin and his colleague were among the first to establish a form of interoceptive conditioning using the method of hypnotic verbal suggestion.

Gal'perin's first research

During his medical studies, Gal'perin was inspired and even captivated by the study of the physiological mechanisms underlying emotionally influenced behavior. His first published research was carried out as a student's piece of work in conjunction with P. Istomin (Istomin & Gal'perin, 1926). Istomin was a research assistant at Platonov's clinic and as such supervisor of Gal'perin's research as a medical student. The research was concerned with the influence of verbal suggestion under hypnosis on digestive leukocytosis, i.e. the production of white blood corpuscles (leucocytes) connected with digestion. It was done at the Physiological Laboratory of the Clinic of Nervous Diseases in Khar'kov.

Istomin and Gal'perin investigated the influence of verbal suggestions on subcortical functions, namely reactions under hypnosis connected with digestion. They wanted to investigate how deeply hypnosis affected physiological processes. This line of research began in the 1920s and is closely linked with Pavlov's discoveries regarding interoceptive conditioning. Interoceptive conditioning may best be defined as a case of classical conditioning in which either the conditional stimulus (CS) or the unconditional stimulus (US) or both are delivered directly to the viscera, i.e. the internal organs, such as the kidney, liver, and stomach. Pavlov's classical studies of the dog's salivation to the sound of a tone are examples of interoceptive conditioning. In fact, Istomin and Gal'perin were ahead of their time, because studies on the conditioning of internal organs, though they had been begun in the Soviet Union by Bykov in the 1920s, did not gain much empirical momentum until the late 1940s (cf. Bykov, 1959, p. 11; Razran, 1961, p. 81).

According to Platonov (1959, p. 170), the conditioning of digestive leukocytosis was first established by Zavadski (1924), one of Pavlov's co-workers. Zavadski's study was published in a collection of papers presented to I.P. Pavlov on his 75th birthday. Zavadski's research indicated that digestive leukocytosis is a reaction not only to food intake, but also to such stimuli as the presence of food and the timetable of meals. He observed that the rise in the curve of white blood corpuscles (leucocytes) occurs both at the scheduled time for meals and at the highest point of digestion.

The correctness of Zavadski's observations was confirmed by Istomin & Gal'perin. Using the method of hypnotic verbal suggestion, they found an increase in the number of leucocytes in two subjects under conditions of starvation after the intake of various kinds of foodstuffs had been suggested. Subsequently, by suppressing the sense of natural hunger by suggestion, the authors succeeded in preventing the usual increase of leucocytes at the scheduled time for meals. Suggesting increased appetite, the number of leucocytes rose and a feeling of hunger appeared.

The account of this research was published during Gal'perin's years of medical study and this was therefore his first publication. It appeared in 1926 in Russian in the 'Ukrainian Bulletin of Reflexology.' On the basis of their data the authors (pp. 168-169) concluded that the feeling of hunger and satiation can be influenced by suggestion, and that digestive leukocytosis can be considered a conditional reflex. In a note to the article, the authors mention that they carried out their research before they became acquainted with Zavadski's article, published in 1924. They gathered their data during Gal'perin's third year (1923/24) of medical school and reached their conclusions independently from Zavadski. So both studies came to the same conclusion, although the methods used were rather different.

In the 1920s, research findings such as those of Istomin & Gal'perin lead to a certain optimism concerning a supposed physiological basis for the phenomena of hypnosis. According to Hilgard (1965, p. 167) and Kelly & Kelly (1985, p. 83) we know that the claim of an actual physiological mechanism behind the hypnotic state has not been solidly established by further research. How hypnosis actually 'works' still seems to be largely unknown.

The 'pseudo Babinski' reflex

In his last year in medical school Gal'perin did some research work at the same Clinic of Nervous Diseases. He studied the pathogenesis and diagnostic significance of the 'extensor hallucis phenomenon' (Gal'perin, 1928). This phenomenon resembles the Babinski reflex and is therefore sometimes called the 'pseudo Babinski' reflex. The Babinski reflex refers to an

upward extension followed by curling of the toes, when the baby's sole is lightly stroked. This response is present at birth and disappears in 8 to 12 months. Manifestation and decline of the reflex are a basic index of a normal neurological condition (Cole & Cole, 1989, p. 128).

In 1926, Fränkel, a co-worker of the clinic, was one of the first medical researchers to observe a variation of the Babinski reflex. With this variation, which he called the 'extensor hallucis phenomenon,' only the big toe is flexed upward. Gal'perin made observations to illustrate the extrapyramidal genesis of this phenomenon. He found that the presence of this phenomenon could be considered an early symptom of Sydenham's chorea or chorea minor. This neurological disorder, popularly called St. Vitus' dance, is caused by infection and is characterized by jerky involuntary movements, or spasms of short duration, involving a considerable set of muscles.

According to Gal'perin (p. 35), the 'extensor hallucis phenomenon' can be used as a valuable index for the physician's intuition that an infectious chorea could be the culprit. This may lead to further medical investigations in order to locate the abscess and to remove it by surgery. In his article, Gal'perin (p. 26-27) reported of two patients in whose cases the 'phenomenon' had the mentioned diagnostic value.

Gal'perin's study on this phenomenon retains value for the psychophysiology of motion. It laid the basis for his interest in medical gymnastics and occupational therapy. In the beginning of the forties, Gal'perin again picked up this kind of research and did some penetrating studies on the psychological and physiological aspects of the peripheral motor apparatus (see Chapter 3).

Treatment of addicts

After completing his medical studies in 1926, Gal'perin continued to work as a volunteer at the Clinic of Nervous Diseases of the Khar'kov Medical Institute, headed by Professor Platonov. He obtained a position in an evening outpatient clinic and reception center for addicts, especially alcoholics, but also morphine, cocaine and nicotine addicts. He worked at night at the outpatient clinic while in the morning he worked at the Clinic of Nervous Diseases. According to Gal'perin (1986a), it was an extremely hard time and in the evening he often sat in the outpatient clinic dead-beat. He used hypnosis in the treatment of addicts and he remembered that this sometimes led to the situation that both he and the patient had fallen asleep after inducing hypnosis.

The outpatient clinic for addicts was part of the psychotherapeutic department of the Ukrainian Psychoneurological Institute in Khar'kov. Members of this department conducted research on the ambulatory treatment of addicts. The principal method of treatment was hypnotherapy (cf. Platonov, 1959, pp. 397-385). According to Platonov (p. 380), this research demonstrated that ambulatory aid of addicts is quite real, and that verbal suggestion could be administered with some measure of success. He reports (pp. 382-383), for example, on a patient treated by Istomin, who also was a staff member of the clinic at that time. This patient fought insomnia with morphine injections. He received hypnotherapy and it was suggested under hypnosis that he "hated morphine and could give it up," and that he "would take the dose of morphine indicated by the physician." This was followed by a 20-minute suggested rest. Before waking up, an aversion to morphine and a complete absence of abstinence symptoms were suggested to him.

When the patient awakened, he was very much surprised that the abstinence symptoms, which formerly disturbed him and never disappeared without morphine, had gone. Following the physician's instruction, he injected a small dose of morphine and perceived no difference between this and the former higher doses. Each day a comparable treatment was administered with other suggestions like "You do not need any more injections", "You feel physically alert" and "You have taken an active part in the treatment." After discharge the patient was under observation for two years without a single relapse. In this case verbal suggestion played an organizing role and contributed to the attenuation and termination of the abstinence symptoms.

Thus, Gal'perin administered hypnotherapy to a whole range of patients in the late 1920s. He became a skilled hypnotist who firmly believed in the hypnotherapy for both mental and physical symptoms. Although its theoretical basis is not very strong, the most popularly known use of hypnosis is for habit control. Hypnosis can be particularly useful in unlearning and

modifying behavior patterns, such as nail-biting and alcohol and drug abuse. An important factor in changing habit is motivation and hypnosis may be most useful in increasing and strengthening a patient's motivation (see Kelly & Kelly, 1985, p. 154). For several years, Gal'perin agreed with this line of reasoning and he wrote a booklet on the hypnotherapy of alcoholism. This booklet was entitled "How to cure alcoholism" and was published in a popular series on the struggle against alcoholism (Gal'perin, 1930a).

From this period Gal'perin kept a life-long scientific interest in addiction and connected aspects. On several occasions he published on this matter (e.g. Gal'perin 1930a, 1930b, 1985b). Gradually, however, Gal'perin became less satisfied with the results of hypnotherapy of alcoholism. He saw a great many addicts, who differed considerably in their degree of addiction. It struck him that addicts were very selective; they surrendered themselves to only one sort of poison and never got enough of it; no other single poison satisfies them. Once he treated a woman, a chain smoker, who was addicted to nicotine. She tried to stop smoking by going onto heavier substances such as vodka, hashish and cocaine. But only nicotine was successful!

He began to understand that at the basis of addiction lay a real illness. He got the impression that addicts had a sort of weak link in their metabolism, which could be compensated for, as it were, by poison. For one person, this poison is vodka and for another person, for example, nicotine or cocaine. If such a compensation actually occurred and the person began to feel better because of it, the link totally died. Then, intake of the poison became an objective necessity in order to maintain the condition of well-being. Gal'perin wanted to study this further, and he translated a small German book on addiction into Russian. He wrote a preface on "The ambulatory treatment of alcoholism" to it, in which he also considered the physiological side of addiction (Gal'perin, 1930b).

Currently, new perspectives in addiction research are supporting Gal'perin's view that the physiological, and particularly the neurobiological, side is an important factor in addiction (see Kornet, 1991). Although Gal'perin found his hypothesis an interesting and promising one, he conducted no further research on it, because he moved on to another job.

The Poggendorff illusion

After Gal'perin had worked for two years in the outpatient clinic for addicts of the Ukrainian Psychoneurological Institute, he was asked, in 1928, to come and work at the psychophysiological laboratory that was part of the same institute. As a co-worker of this laboratory Gal'perin did some interesting research on geometrical illusions.

As I have already mentioned at the beginning of this chapter, Gal'perin longed to find a method of investigating the human mind objectively. At the end of the twenties he tried for the first time to realize this idea as follows. He then thought that geometrical illusions, like those of Müller-Lyer, Poggendorff, and Zöllner, formed suitable material to investigate a particular sort of mental activity. Characteristic of these phenomena is that the mental perceptions deviate strongly from the geometrical features of the relevant figure. In itself the figure is clear, but what happens in the psychological interpretation of the representation on the retina is less clear.

For a short period, Gal'perin had been electrified by the pregnancy of the Poggendorff illusion and conducted a small empirical study of it. He shared this early enthusiasm with contemporary scientists, who hoped that, by explaining them, all other 'normal' visual perceptual phenomena would also be explained. This hope failed to materialize, despite a huge psychological literature on this subject (see Zusne, 1970, p. 151). More than 200 geometrical illusions have been recorded and the Poggendorff figure is the first of the illusions of direction. A historical account of how interest in the geometrical illusions developed is given by Boring (1942, pp. 238-252).

In the original version of the Poggendorff illusion, an upward acutely oblique line is broken by two parallel vertical lines. In the figure the oblique lines are collinear. However, due to the illusion, it is as if the right-hand part of the oblique line has been pushed upwards and the left-hand part downwards. At that time Gal'perin had a bright idea and invented a variation of the Poggendorff illusion by which this phenomenon was demonstrated even more strongly.

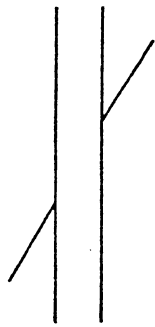


Figure 1-1a



Figure 1-1b

Figure 1-1. The Poggendorff illusion. Figure 1a represents the original figure and 1b a stronger variation designed by Gal'perin (1931).

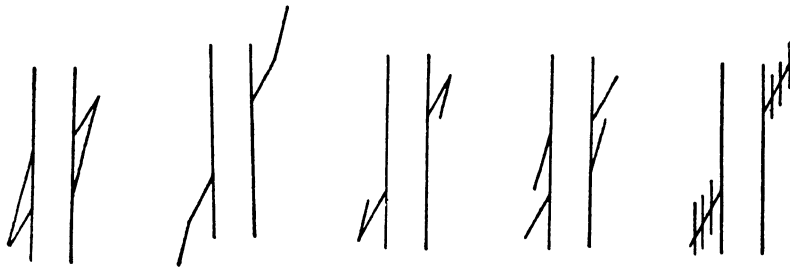
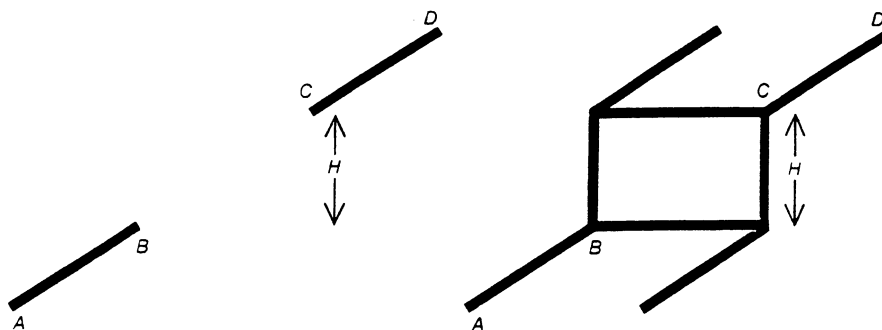


Figure 1-2. Examples from the series of variations of the Poggendorff illusion used by Gal'perin (1931) for his study of it.



COLLINEAR LINES ON THE RETINA need not necessarily represent collinear lines in three-dimensional space. The points *B* and *C* at the left could represent an interruption in a continuous receding horizontal dimension, in which case the line *ABCD* would lie on a single horizontal plane in three-dimensional space. The other possibility (*right*) is that *B* and *C* represent points that are separated both horizontally and vertically, in which case *AB* and *CD* would lie on different horizontal planes and would therefore be noncollinear in three-dimensional space. The presence of parallel vertical lines in the Poggendorff figure favors the arrangement at the right, and so the visual system interprets the lines *AB* and *CD* as having different heights.

Figure 1-3. From Gillam, 1986, p. 93.

When the line segments 'a' and 'b' are added, the shift of the oblique line appears even stronger than in the original illusion (see Figure 1-1a en 1-1b). According to Gal'perin, the illusion is greatest when the line segments 'a' and 'b' are added to the original figure.

The German physicist Poggendorff first told Zöllner about the illusion, which Zöllner then described in 1860. Helmholtz, Hering and Wundt all discussed it without naming it, and it was not given its originator's name until 1896 in an article by Burmester. According to Pierce (1901, p. 242), Zöllner remarked to Poggendorff that the illusion was probably due to astigmatism, a defect in the curvature of the cornea of the eye. This explanation of the cause of the illusion falls into the category of physiological theories and possesses only historical interest to-day.

In the more than 100 years that the Poggendorff and other geometrical illusions have been studied, plenty of explanations have been offered. The explanations can be classified as being either physiological, judgmental, or based on information-sampling notions (cf. Zusne, 1970, p. 153). Thus, all the explanatory attempts that the extensive literature on illusions contains, can be subsumed under one of the three categories.

Gal'perin's article on the subject, however, appears to be different, because he did not himself offer an explanation. Given the references in his article, he was familiar with the literature published on this subject until 1930. He did a carefully executed investigation to criticize a merely judgmental explanation in terms of the overestimation of acute angles. This explanation, and its variation in terms of underestimation of obtuse angles, was for a long time the most widely held explanation (cf. Luckiesh, 1965, p. 76). Hering, Helmholtz and Wundt mentioned the overestimation as the chief cause of the illusion.

It cannot be denied that the Poggendorff illusion is due at least to the presence of angles. But, an explanation of its cause merely on this basis has often been found to be inadequate. Although no other theory is widely accepted, explanations involving angles have been discredited by several investigators, among them Gal'perin. Gal'perin attempted to study the case as thoroughly as possible, because he considered an objective investigation the best condition for testing the 'angle' explanation. He designed a series of graphical variations of the Poggendorff illusion. Figure 1-2 presents a sample of this series.

Depending on the added lines the strength of the illusion is decreased or increased. Analyzing these variations, he reached the conclusion that an explanation in terms of the overestimation of acute angles could be considered inadequate. In his article, he mentioned no participation of other observers, so apparently he conducted this study using his own testimony as the unit of measurement. Despite this restraint, the study is carefully and ingeniously devised and was published in German in *Zeitschrift für Psychologie* (Gal'perin, 1931).

Finally, at the end of his article, Gal'perin (p.96) discarded all 'angle explanations.' He concluded that an "unknown factor" caused the effect and that further investigation remained to be done. According to him, it would be rash to propound an alternative line of explanation which is not based on "an objective investigation." However, he does take a first step toward an explanation by mentioning that the illusion is attributed to the mentally picturing of collineation or, in his own words, "the 'mental' continuation (der 'gedankliche' Fortsetzung) of the two detached portions of the oblique line" (p. 95). (In the German original the incorrect term 'gedachte Verfolgung' is used. Instead of this term, Westhoff (pers. comm.) suggested the adoption of the term 'der gedankliche Fortsetzung'.')

Gal'perin's conclusion that there was no empirical support for an 'angle' explanation, has been contingent on current research. Recent research also presents evidence for Gal'perin's general remark referring to a possible explanation. In modern terminology, 'gedankliche Fortsetzung' ('mentally picturing') could be translated as 'depth processing.' Following Gregory, Gillam (1971, 1986) outlines a depth processing theory of the Poggendorff illusion. Gregory (1963) has shown that most illusory figures can be found in two-dimensional representations of three-dimensional scenes. Gillam (1971, p. 211), who signals a resurgence of interest in the Poggendorff illusion, proposes an explanation based on three-dimensional processing. She argues that the illusion is attributed to the processing of the oblique lines as receding horizontal lines with their inner ends equidistant because of attachment to a frontal plane. This frontal plane is defined by the two parallel vertical lines. Figure 1-3 illustrates Gillam's explanation.

According to Gal'perin's own words (1986a), his empirical research was no more than a naive attempt to find a method of investigating a particular mode of mental activity. Naturally, he could never prove objectively by this method to what extent the mental perception of an illusion deviates from the geometrical figure itself. He considered his study nevertheless a symptom of his lifelong striving to find an objective method.

Summary

In summing up, I would like to draw attention to some general features which characterize the main trends of Gal'perin's work in the period until 1930. First, he drew up his 'life-plan' to invent an objective method. Second, he laid the basis for a dual profession as psychoneurologist and psychologist. And third, he appeared to be an inventive experimenter, who dealt with a wide range of research topics.

The first trend emerged in his adolescence. Although at that time he still only had a vague idea, he wanted to set himself the goal of searching for a scientific method of investigating the human mind in objective terms. In his 80's, Gal'perin remembered that, as an adolescent, he had decided always to retain this idea as a guiding principle. Already at the age of 15-16 he had planned the intellectual road that he would travel. Never doubting, he pursued this road to the day of his death.

The second trend may be traced back to his father's influence. Despite his son's marked preference for studying psychology and philosophy, Gal'perin's father, a prominent physician and professor of medicine, successfully persuaded him to choose medicine. In studying neurology, Gal'perin's own interests led him to the idea that, through the brain and its functioning, he could find the way back to mental phenomena. The path he pursued took him from psychoneurology to psychology. He made the gradual move to psychology through investigations, that were physiologically oriented. He evolved as such gradually, but the basis for his dual competence was laid in the period until 1930. As we will see, in later years he obtained degrees in both medicine and psychology.

The third trend is reflected in his research work. The description of it has dominated this chapter. Gal'perin has been introduced as an inventive and productive thinker and experimenter, who was versatile in choosing his research topics. They ranged from digestion to hypnosis and from addiction to perception. According to Asmolov (pers. comm.), in Soviet psychology, Gal'perin became known for his enquiring attitude and his creative faculty for imaginative investigation.

Through his research, Gal'perin became familiar with physiological reasoning related to key questions in psychology. This is important, because one of the distinguishing features of Soviet psychology is the everlasting issue of psychophysical parallelism. There had always been a strong impetus to substitute physiology for psychology (see Bauer, 1952; Payne, 1968). Gal'perin disagreed with this and wrote various articles against such attempts (e.g., Gal'perin, 1935, 1953a).

The so-called 'psychophysical problem' had often been considered (e.g., by Rubinshtein) one of the main topics of Soviet psychology. It is the problem of the mind-matter relationship, which refers not only to the relation of mind to brain (inner matter) but also to the relation of mind to the external physical world (outer material world). According to Gal'perin (1935, p. 103), it was possible to get access to this problem by studying concrete and actually ongoing human activity. Such an approach was developed in the early 1930s, and Gal'perin was one of the initiators. The main theme of Chapter 2 will be this new development in Soviet psychology and Gal'perin's contribution to it.

CHAPTER 2

SECOND PERIOD (1930-1936): KHAR'KOV SCHOOL

The period described in this chapter runs from 1930 to 1936. One might say that Gal'perin became a psychologist in this second period of his scientific career. Thus, the main theme of this chapter is Gal'perin's becoming a psychologist. The short period from 1930 to 1936 is mainly associated with the existence of the so-called Khar'kov school, headed by A.N. Leont'ev. Historically the members of the Khar'kov school were the first in Soviet psychology to draw attention to the concept of activity. Their research became part of the foundation of Soviet psychology.

Relatively little is known about the Khar'kov school because almost no printed testimony has been preserved. According to A.A. Leont'ev (1984, p. 15), "The publications of its members can be counted literally on one's fingers" In this period Gal'perin (1936) carried out his well-known experiments on the differences in tool use between human beings and animals, and on the development of human tool-mediated activity.

In the early 1930s Gal'perin made the acquaintance of L.S Vygotsky. What is said in this chapter about the impact of this acquaintance is based on personal communication with Gal'perin (1986a). Although Vygotsky was invited to join the activities of the Academy, his actual transfer never took place. He frequently travelled to Khar'kov, but his contribution to the psychological debates within the framework of the 'school' is difficult to reconstruct. In fact, there has been a recurrent discussion throughout the chronicles of the history of Soviet psychology concerning the relation between Vygotsky and the Khar'kov school. Vygotsky had a profound influence on this school, but they differed in their views on the inner psychological content of human activity.

The school's short existence

In 1930, together with a number of colleagues who still knew each other from medical school, Gal'perin was involved in an interesting experiment with substantial implications for the further development of Soviet psychology. He and some of his colleagues attempted to combine two large, but totally different psychoneurological institutions. In Chapter 1, I mentioned that, from 1928 on, Gal'perin was a co-worker of the psychophysiological laboratory of the Ukrainian Psychoneurological Institute. Besides this institute, there was another large psychiatric clinic in Khar'kov, the Central Clinical Psychoneurological Hospital of the Ministry of Railways. Gal'perin and some of his colleagues attempted to combine both these institutions together in order to found the All-Ukrainian Psychoneurological Academy. They had official budgetary support to create such an academy and a pledge from government officials towards its future expansion.

Within the framework of the organization of this academy, they began to invite a wide variety of specialists from other towns to come to Khar'kov. The invited specialists were prominent scientists at the time. Apparently, the founders succeeded in persuading these specialists to participate in the activities of the academy. Several reasons for this success can be mentioned. First, Khar'kov was at that time still the center, the capital, of the Ukraine. It had a recognized scientific reputation. Already in the 1880s a laboratory of experimental psychology was established in Khar'kov. The founder of this laboratory was the psychiatrist P.I. Kovalevski

who also takes credit for establishing the first Russian neuropsychiatric journal, in 1883, *Archives of Psychiatry, Neurology and Legal Psychopathology* (see Wortis, 1950, p. 15; Yakunin, 1984, p. 146).

The second reason, however, was probably more important. This reason was mentioned by Luria (cited by Cole, 1979-80, p.3), who accepted an invitation to set up a psychology department in the academy. Khar'kov was somewhat away from the hub of hectic Soviet affairs during the early 1930s, and the invited scientists considered it a place where they could develop their ideas. At that time, Soviet psychology was marked by a diversity of several conflicting schools, dominated by Pavlov's physiology, Bekhterev's reflexology, Kornilov's reactology, and Vygotsky's cultural-historical theory. The academy was a safe harbour for all the scientists who were trying to avoid making a choice between the conflicting schools.

Anyway, some leading Soviet scientists came to the academy and appeared to be productive during the five years of its existence. For example, from Kazan' came the psychiatrist Tikhon Ivanovich Yudin, with whom Gal'perin collaborated for a while; and from Moscow came the psychiatrist and neurologist Grunia Efimovna Sukhareva. Both were among the leading psychiatrists of the 1930s, and both contributed to the upsurge in child psychiatry in the Soviet Union by outlining new approaches. Sukhareva published on this subject a standard work that was first published in Khar'kov, in 1937, and went through many reprints (see Ushakova, 1973, pp. 29-30 and p. 376).

Gal'perin and his colleagues also carried on negotiations with L.S. Vygotsky, A.R. Luria, A.N. Leont'ev, and their younger co-workers L.I. Bozhovich and A.V. Zaporozhets. The founders of the academy were impressed by the new approaches outlined by the Vygotsky group. According to Gal'perin (1986a), the papers presented by the group's members at the First All-Union Congress on the Study of Human Behavior held in Leningrad in 1930 (Jan. 25 - Febr. 1) particularly convinced him that this group "had the future" (Gal'perin, 1986a). This congress, known as The Behavioral Congress, was one of the most representative congresses in the history of early Soviet psychology and was convened to discuss the theoretical unification of the behavioral sciences (Petrovsky, 1990, p. 291). The Vygotsky group, except Vygotsky himself, went to Khar'kov. Vygotsky was in the process of arranging the move, but it never materialized. He was offered only one room, because of which he was unable to bring his family with him. He did, however, frequently travel to Khar'kov. Leont'ev and Luria were each given a room of their own in a communal house and came to Khar'kov every month for 20 days. Their families stayed in Moscow.

According to Luria (cited by Cole, 1979, 212-213), he himself commuted between Khar'kov and Moscow for about a year, while Vygotsky commuted on a triangular route between Moscow, Leningrad and Khar'kov up to the time of his death, in 1934. Luria formed and headed a new department of psychology at the academy. Gal'perin was directly involved with this department and initially he worked with him. But from the spring of 1931, Luria (1976) was involved in his new and well-known project of investigating various psychological processes of the people living in remote areas of Uzbekistan. According to Gal'perin (1986a), from that time on, he rarely turned up in Khar'kov.

For a brief period, Gal'perin was the head of the department to replace Luria. In 1932, Gal'perin went into the army, and was a conscript for a year. Upon his return, he again worked in the psychology department of the academy, then headed by A.N. Leont'ev. Thus, in the early 1930s, the principal group of psychologists that formed the Khar'kov school, consisted of A.N. Leont'ev (head of the group), L.I. Bozhovich, P.Ia. Gal'perin, and A.V. Zaporozhets, and some graduate students, in particular, V.I. Asnin, O.M. Kontsevaia, G.D. Lukov and P.I. Zinchenko (see Gal'perin, 1984, p. 57; A.A. Leont'ev, 1984, pp. 14-15).

The academy provided, among other things, an institutional basis for the Khar'kov School, which turned out to have played an important role in the evolution of the 'activity approach' in Soviet psychology. When in 1935 Kiev instead of Khar'kov became the capital of the Ukraine, the academy lost its direct contact with government officials. It did not receive any more additional budgetary support and, in fact, ceased to exist.

In 1936, what was still left of the academy, just faded away. In that year a decree was proclaimed by the Central Committee regarding abuses in pedology. Through this decree pedology was definitely abolished as a discipline and in extension this led to an altered attitude toward psychology in general. As a result of this decree the psychology department of the academy was substantially reduced and this was in fact the end of the Khar'kov School.

Gal'perin had to go and work in the department for the chronically ill within the psychiatric clinic. Consequently, from the middle of 1936 to the beginning of the Second World War he worked mainly in psychiatry.

Gal'perin's memories of L.S. Vygotsky

In Khar'kov Gal'perin met Vygotsky casually several times at the beginning of the thirties. He remembered Vygotsky as an exceptional person, especially concerning his influence on others. During my conversations with him, Gal'perin (1986a) told me of a few remarkable events which illustrate the exceptionality of Vygotsky.

The first one: at the start of the thirties, on Stalin's orders, so-called free public discussions were organized. These discussions were set up to criticize authorities prominent in a particular area for their alleged anti-Marxist views, to damage their reputation, and to silence them. The routine of the order of the procedure was as follows. The person in question was given the opportunity to be the first to expound his scientific stance. Subsequently others were called upon to speak who had prepared themselves beforehand and whose task it was to crush the victim. That was then the end of his scientific authority.

Gal'perin remembered that such a discussion was also announced concerning the views of Vygotsky. However, things went differently. Vygotsky delivered his lecture and held the whole hall under his spell. Everybody was literally disconcerted and, consequently, nobody knew how to proceed. An announcement was given that there would be no more lectures that day and that the proceedings were postponed. These proceedings, however, never took place. According to Gal'perin, who did not himself attend the meeting, such a thing had never happened before. He was very sure about the occurrence of such a public meeting exclusively devoted to Vygotsky. Unfortunately, Gal'perin (1986a) could not give concrete details of the meeting. Van der Veer & Valsiner (1991, p. 388), who tried to verify this fact, have been unable to find evidence for its actual occurrence. So, up till now, it has been impossible to document this meeting.

Gal'perin remembered a second minor event which was recounted to him by A.N. Leont'ev. Leont'ev and Luria had at a given moment a dispute on Vygotsky's theory. Emotions were running quite high and so they decided to put the problem to Vygotsky himself, so that he could cut the Gordian knot. Vygotsky received them and the three men sat talking for several hours. When Leont'ev and Luria again stood outside Vygotsky's apartment they realized that they had forgotten to bring up the problem and had talked about something quite different. They had been totally absorbed by him, but to return to Vygotsky with the same problem would be unpleasant.

Another comparable incident Gal'perin remembered from his own personal conversations with Leont'ev. One evening they had been sitting and talking and decided to take a short walk. Outside they got into a long discussion on the question of whether or not Vygotsky was, in all respects, a genius. As Gal'perin (1986a) told me, with hindsight, it was of course, ridiculous that two adult men were carrying on a heated argument, outside in the street, on the degree of Vygotsky's genius. But from this incident it is very apparent that Vygotsky made a great impression on almost everybody who met him.

A last example illustrates Gal'perin's own impression of Vygotsky. On one occasion, Vygotsky gave a lecture on one of Luria's patients. This lecture took place in Khar'kov and Gal'perin was also present. Afterwards everybody left the hall and by the door he met Luria who remarked that it was a "fantastic lecture." To Gal'perin's own surprise he noted that he himself did not experience that sort of enthusiasm at all. In 1986, when I talked with Gal'perin, he was still disappointed on this subject and was still wondering what the matter was with him at that time. Or, in his own words: "By that time I had started to work officially as a psychologist, and of course it would have been good if I had experienced such a stimulating influence from an undeniable man of genius. (...) You can simply say that Vygotsky enchanted everybody; but I - regrettable as it may be - did not have that experience..." (quoted in Haenen, 1989c, p. 17).

In spite of his personal impressions and feelings of disappointment, Gal'perin held the view, that Vygotsky was the only real man of genius in the history of Russian and Soviet psychology. He stressed that Vygotsky was a child of his time, who provided a new principled basis for Soviet psychology. Introducing Vygotsky's article on emotions, Gal'perin (1972, p. 362)

remarked that Vygotsky was instrumental in the development of Soviet psychology in the portentous period of the mid-1920s to the mid-1930s. We have to keep in mind that Vygotsky's theory is a product not only of an author but of times and places, and that it belongs to the history of psychology. Now, there is a need of further examination of the vicissitudes of the conceptual problems that Vygotsky outlined at his time. Or, to put it in Gal'perin's words, "...we have made some progress, not so much from a theoretical point of view, but, I should rather say, from a historical one" (quoted in Haenen, *ibid.*, p. 15).

There is a point concerning Vygotsky's personality that needs special mention. Being a psychoneurologist and a medical practitioner, Gal'perin (1986a) got the impression, that in a certain respect there was something pathological about Vygotsky. He was in an unusual way, exceptionally verbally gifted. If, for example, he had dictated some texts, they could be published straight away, after minimum correction. This explained why he published such a large list of titles in just one decade of being a psychologist. That was only possible because he dictated so much and these manuscripts could directly be sent to the publishers. From this it is evident that he had an exceptional command of intellectual speech.

However, according to Gal'perin (1986a), there was something curious about Vygotsky's verbal giftedness. Gal'perin had once read at Luria's a note written by Vygotsky himself in which he wonders from what kind of primitivism he is suffering and what is happening to his senses. At the end of the 1920s, Vygotsky used the term 'primitivism' in his defectological writings, in which he first gave a general outline of the cultural-historical approach. He considered primitivism the inability to use certain cultural tools (see Van der Veer & Valsiner, 1991, p. 73). Apparently, Vygotsky felt himself somehow blocked in his cultural development, because the following occurred. When he saw a depicted or displayed representation of something, he didn't understand anything about it. He could say what he saw, but he had no grasp of the reference, the meaning or the quality of it. On the other hand, if he had to tell somebody else about this very representation, he came up with more than that person could see in it. With him, everything emerged in speech!

The same happened with music. Music meant nothing to Vygotsky on hearing it. On the contrary when he read something about works of music, the words he spoke sounded better than the works on paper. According to Gal'perin (1986a), this aspect of Vygotsky's personality bordered on pathology, because it was not explainable as merely one-sidedness. You speak of one-sidedness, when one personality trait is more strongly developed than another. With Vygotsky, however, it was more a question of the complete absence of something. In Gal'perin's view, it was something like agnosia, but that wasn't really it either. Vygotsky knew, for example, that a particular object was a chair. But that chair held no meaning for him; if he put it into words, then he could tell you everything about that chair: the history of it, the part it played in the life of the man who sat on it, etc...

It is tempting to relate Vygotsky's verbal giftedness to the fact that speech functions as a key notion in his psychological theory. Vygotsky was particularly concerned with the relationship between thought and speech and the importance of this relationship in the development of consciousness. If Gal'perin was right and if Vygotsky did in fact suffer from a speech disorder, it seems reasonable to believe this played a role in Vygotsky's theorizing. According to Gal'perin, it could explain Vygotsky's overrating of the importance of speech and of linguistic and communicative practices. For Vygotsky, language became the "basic system of auxiliary means of psychic activity" (Gal'perin, 1959a, p. 442). As we will see further on, in the early 1930s, the members of the Kar'kov school, disagreed with Vygotsky's limitation to this type of means. They dismissed Vygotsky's neglect of external practical activity.

Apart from this, Gal'perin (1986a) remembered Vygotsky as a socially extrovert person, active, but detached in human relationships. He always stayed at some distance from people and that applied not only to outsiders. According to Gal'perin it was also perceptible within the family. Vygotsky was well-liked but he always remained somewhat aside. This aspect is mentioned by Van der Veer & Valsiner (1991, p. 15) as well, who called Vygotsky an "observer at the sideline of an on-going situation," and a person with a personal attitude "to control one's emotions and to subject them to the control of the intellect." This juxtaposition of cognition and emotion, of intellect and affect is typical of Vygotsky and his thoughts on psychology. He turned out to be "a rationalist in psychology," as Gal'perin (1972b, p. 365) put it.

Anyway, Vygotsky was an exceptional, verbally gifted person, who made a great impression on Gal'perin as well. Gal'perin was, however, less impressed by Vygotsky than his contemporaries, having also personal contact with him. In retrospect, in 1986, he still regretted that Vygotsky had not enchanted him. Maybe, in the early 1930s, at the time Gal'perin first met Vygotsky, he was still more a physician than a psychologist. He was still unable to acknowledge Vygotsky's instrumental position in Soviet psychology and could not at that time appreciate Vygotsky's project sufficiently to join it. First, Gal'perin had to become a psychologist himself. However, as we will see further on, he soon disagreed with Vygotsky's theoretical assumptions on the basis of his own research, and went his own way. Apparently, Aleksei Nikolaevich Leont'ev was more instrumental to Gal'perin's development as a psychologist than Vygotsky.

Gal'perin's critique of Pavlov

In the early 1930s, Gal'perin worked mainly in close cooperation with Aleksei Nikolaevich Leont'ev. He carried out his well-known experiments on the differences in tool use between human beings and animals, and on the appropriation of tool-mediated activity (Gal'perin, 1936). He was also especially concerned with questions arising from Pavlov's theory. He conducted polemics with the Pavlovians and others who wanted to put Pavlov's theory of higher nervous activity in the place of psychology. He insisted on keeping physiology and psychology sharply distinguished, though constantly interacting with each other. In the thirties he wrote various articles concerning this subject (e.g., Gal'perin, 1935). Due to his dual profession as a psychoneurologist and a psychologist, the discourse between physiology and psychology might have been pursued within his own mind (see also Chapter 7).

The first experimental attempt to get into such a discourse undertook Gal'perin in cooperation with R.A. Golubova in the early 1930s, during the period when Luria still headed the department of psychology (Gal'perin & Golubova, 1933). According to Luria (1979, p. 131), it was in Khar'kov that he "first began to create new methods for the psychological analysis of the consequences of local brain lesions." It is tempting to suggest that Gal'perin's research in this domain triggered Luria's initial interest. There is a footnote in the article on this research, in which Gal'perin & Golubova (p. 44) mentioned that Luria contributed some observations to their research. What was this research about?

Gal'perin & Golubova carried out a small-scale investigation on an unusual form of paraphasia, a speech disorder in which a patient mixes wordforms as a consequence of brain damage. The phenomenon which the authors discussed occurs in a patient who does not utter the intended words but only the words that are connected by way of association. Gal'perin (1986a) illustrated this type of disorder with the case of a patient whom he encountered much later, soon after the war. This patient had been a political official in the army and had been severely wounded at the front. When ever he became delirious, he started to utter fascist language. And that at the time when the war was only just over... The judgement was passed on him quickly. He was found guilty of being a real fascist, which he could conceal when he was healthy. Now, the mask was ripped away and the truth came out. According to Gal'perin, such an explanation of the patient's behavior originated from the assumption that the mind is constructed in layers. If the top layer, for whatever reason, is impaired the layer underneath begins to predominate. There are facts which support this interpretation but Gal'perin considered it not the complete truth.

About this complex form of paraphasia Gal'perin (1945) wrote in an article entitled "Schemes giving meaning to behavior that form the basis for higher nervous activity." This form of paraphasia can be explained on the basis of the desintegration of meaningful functional systems. These systems, which form the basis for higher nervous activity, evolve due to daily practice. Under normal circumstances, differentiation is organized according to the positive and negative poles, according to 'this is allowed' and 'that is not allowed.' One learns to respond to positive stimuli with positive reactions and to negative stimuli with negative reactions. Under pathological circumstances, these behavioral patterns are disturbed. The neural processes of excitation and inhibition, according to Pavlov's distinction, therefore take place against a background of relationships and representations that 'life teaches.' These neural processes are subordinate to the meaningful systems which are extracted from the daily practice of life. Vygotsky (1965, p. 385) called these meaningful systems "extracerebral connections" because

they are intrinsically connected with external tools and signs. In this framework Gal'perin explained the condition of the army official, who was certainly not confused: on the contrary, he was a person who made a sharp distinction between fascist and Soviet ideas. Only the conceptual inventory of Soviet ideas was inhibited, causing the fascist ideas to be invoked via induction.

Thus, Gal'perin used Pavlov's distinction between excitatory and inhibitory processes in the brain as a point of departure for his explanation of this patient's behavior. In extreme cases or under certain conditions, for example, when a person is severely wounded, normally excitatory stimuli may lead to inhibition, and inhibitory processes to excitation. This substitution of inhibition for excitation when stimulation becomes too strong protects the brain from excess excitation. Pavlov (1932) viewed both excitation and inhibition as aspects of the maintenance of equilibrium by the organism. He coined the term 'systemness' in order to characterize the integrated nature of brain functioning and the unity of the organism. According to Mintz (1959, p. 459), Pavlov's approach to brain functioning bears a great resemblance to Gestalt theory.

However, using a Pavlovian framework to explain a complex form of paraphasia, does not mean that Gal'perin advocated the use of this framework to investigate psychological phenomena. As already mentioned, Pavlov considered excitation and inhibition the two basic processes of the cerebral cortex. Conditional reflexes are the expression and product of these two processes. His ideas about these processes spreading across the cerebral tissue and mutually interacting led Pavlov to develop a whole series of assumptions about both animal and human behavior. Gal'perin (1935) argued that Pavlov pushed his conception too far and that he overextended it by applying it indiscriminately to all human behavior. According to Gray (1979) most authorities nowadays are of the opinion that Pavlov "overstepped the bound between a testable theory (...) and a catchall that can explain anything" (p. 100). Pavlov's predictions about language as a 'second signalling system' are used by Gray as an example of such an illegitimate extrapolation.

Gal'perin was an active participant in the discussions which occurred within Soviet psychology in the early 1930s (e.g. Gal'perin, 1930, 1932, 1935). He devoted considerable and critical attention to the relevance of Pavlov's work for psychology. This early discussion about Pavlov foreshadowed the heated dispute in the early 1950s with more consequences for Soviet psychology. It was only after the famous Pavlov conference in 1950, that Pavlov's work was added as a new element in Soviet psychology. Soviet psychologists, particularly since that conference, had made extravagant claims for Pavlov's relevance (see Payne, 1968, p. 16). According to Gal'perin, it is clear that Pavlov attempted to investigate psychological phenomena using the method and terminology of physiology. Pavlov (1926/1960, p. 3) was openly sceptical of the scientific status of psychology, "which has no claim to exactness as compared even with physiology."

Pavlov considered it his scientific task to identify "the physiological with the psychological, the subjective with the objective, which, I am convinced, is the most important scientific task of our time." This quotation comes from Pavlov's famous article containing his 'Reply of a physiologist to psychologists' (1932/1955, p. 409). Gal'perin (1935) reviewed this article and argued that Pavlov's attitude to psychic phenomena easily lent itself to a disregard of any essential distinction between psychological and physiological events. Commenting on Pavlov's attitude, Gal'perin (p. 102) remarked that both events do not obey the same laws and that it is impossible to identify them. Such an attempt arose because Pavlov drew largely on Descartes' scheme of the reflex arc. Therefore, according to Gal'perin (pp. 103-104), Pavlov's theory is ultimately based on an S-R conception of psychological processes. This leads inexorably to Pavlov's subscription of dualism and reductionism.

Thus, already in 1935, Gal'perin made it quite clear that he did not wish to follow Pavlov. In the early 1950s, at the height of the 'Pavlovization', Gal'perin (1953) repeated his critical analysis of the relevance of Pavlov's work for psychology. In 1935, he ended his article with the formulation of his own programmatic and methodological view that the relationship of the psychological and the physiological becomes open to study by defining consciousness as "external activity transformed from the outside inward" (p. 103). This phrase contains in a nutshell the methodological and epistemological approach of consciousness as proposed by the members of the Khar'kov school in the 1930s. Gal'perin contributed to the development of this

conception by research described in his so-called candidate's dissertation. (In Russian higher education, the candidate's dissertation is the first degree on the graduate level and is roughly comparable to a master's thesis.)

Candidate's dissertation (Master's thesis)

In the period of the Khar'kov school, Gal'perin wrote his candidate's dissertation on the differences in tool use between human beings and animals. He completed it in 1934-35 and he was allowed to defend it before the Medical Scientific Council of the Psychoneurological Institute in 1936. His dissertation caused a stir because it contained general psychological phrasing and was highly theoretical in nature. It was not judged unfavorably, but its subject matter was too far removed from the medical sciences and that caused problems. For two years it was unclear what should be done with it, but in the end the issue was apparently dismissed with a shrug of the shoulders and the dissertation was finally accepted. In 1938, Gal'perin obtained the degree of Candidate (Master's degree) in Medical Sciences.

Gal'perin's dissertation is an illustrative example of the kind of research done within the Khar'kov school. Unfortunately, it exists solely in manuscript form. In 1980, only a small part of the first section had been published in an anthology with abridged texts on developmental and pedagogical psychology, written by Soviet authors in the period from 1918 till 1945 (Gal'perin, 1980). According to Gal'perin (1986), there were possibilities to publish the manuscript, but over and over again nothing came of it.

The dissertation consists of two parts. The first part addresses the problem of practical intelligence and the use of tools by animals and children. Köhler's (1925) and Bühler's (1930) classic research in this field was criticized by Vygotsky (1930/1978, pp. 20-30). According to Vygotsky, they drew questionable conclusions about a direct analogy between practical intelligence in the child and particular kinds of responses by apes. They established similarities in the use of tools between child and ape whereas the differences are more significant. Vygotsky analyzed the limited use of auxiliary means by the higher animals and compared it with the specifically human use of tools. He attributed an important role to speech, signs and symbols as the unique human tools in the child's practical activity. He demonstrated that their incorporation into any action "gives birth to the purely human forms of practical and abstract intelligence" (ibid., p. 24). For Vygotsky, speech particularly was the most unique human tool.

Like Vygotsky, Gal'perin proceeds from the differences between the use of tools by animals and humans. However, he did not attribute the crucial role to speech, but to the specific content of practical activity. He raised the question in which sense the use of human tools by children exerted its influence on their practical activity. He investigated the practical familiarization of children with simple household tools (spoon, comb, hammer, etc.). At a very young age children begin to learn to utilize these common tools. According to Gal'perin, these human tools play their role insofar as they have meaning for the child in the context of practical activity. Initially, human tools do not have a specific meaning for the child. An inexperienced child, for instance, frequently grasps a spoon at the wrong end or holds a saucer totally skew. These tools enter into the composition of the child's practical activity without changing its structure. Only later, under the influence of experience in their use, do tools appear to reconstruct the child's practical activity. Using this assumption of reconstruction as a starting point, Gal'perin studied the development of "tool-mediated" activity.

In his candidate's dissertation, Gal'perin used the term manual operations (*ruchnye operatsii*) to designate the initial inexperienced use of tools by the child, and the term instrumental or tool-mediated operations (*orudiinye operatsii*) to designate the experienced use. Proceeding from the differences between these terms he showed, on the basis of simple examples, that an animal uses tools as an extension of a natural part of the body. The animal utilizes a reservoir of manual operations. On the one hand, this is an improvement because that very part of the body is extended by the tool; on the other hand, it represents a deterioration because the tool does not add other qualities to that part of the body. Conversely, a human tool has its own logic, to which the natural capacity and make-up of the hand must adapt. One grasps a hammer, for instance, by the handle so that one can strike with its head. A child learns to make use of a reservoir of instrumental operations.

The development from a manual to an instrumental operation is clearly illustrated by Leont'ev (e.g., 1989, p. 33) using as an example the child's use of a spoon. The spoon is initially used as a cupped hand and is nothing more than an extension of his hand. The child acts as if he were raising to his mouth not a spoon but his fist. And then, as a result of prolonged training, the spoon in the hand is used in accordance with the logic and the requirements dictated by the tool itself. This fact is commonly known, but its psychological significance was first demonstrated and investigated by the members of the Khar'kov school (cf. Zaporozhets et al., 1971, pp. 220-226, 312-315).

Thus, Gal'perin concluded in the first part of his candidate's dissertation that there is a fundamental psychological difference between human tools and the auxiliary devices of animals. He argued that a metamorphosis is effected in external practical activity in connection with the use of human tools. A simple example can make the psychological significance of such theorizing clear. In shops one can buy a special spoon for children having not yet acquired the proper use of a normal spoon. In Gal'perin's terms, such a special spoon can not be considered a human tool, because it does not add new qualities to the child's hand. It does not develop the motor skill of the use of a spoon. On the contrary, it delays or fixates the development of this motor skill. From this point of view, the use of these specially designed spoons should not be recommended.

The development of tool-mediated operations

In the second part of his candidate's dissertation, Gal'perin describes an investigation on the development of motor skills, specifically, the use of a spade by children. The idea for this study was suggested to him by Zaporozhets. During a lecture, A.N. Leont'ev (2 March 1976) mentioned that this investigation had been filmed. He remembered that he had taken the film with him in June 1941, when he travelled to Leningrad to give a talk. After the German invasion on 22 June, Leont'ev went to Moscow and left the film in Leningrad. Unfortunately, it got lost.

The investigation was carried out with the aid of a special spade, a kind of hoe, and a box of toys. With the help of a spade, the blade (9 x 11 cm.) of which was placed at an angle of 90 degrees to the handle (40 cm.), children of different ages had to retrieve all sorts of lovely, shiny toys from the bottom of a deep box. The experimenter said to the children that the toys were lying on the bottom of "a well." In order to get a toy, the child had to put the blade under it, to secure it on the blade, and then to lift the spade. This complex coordination of movements created considerable difficulties for the children aging from two till five years of age.

The two-year-old children used the spade as an auxiliary device and carried out manual operations. When they had picked up a toy with the spade, they bent their arms at the elbows as if the spade were actually an extension of their arms. When the spade was lifted in this matter, the toy immediately rolled off the blade with a wrong movement. Finally, they somehow succeeded in completing the task. The five-year-old children, however, mastered the tool-mediated operations entirely. At first, when a child, with difficulty and by trial-and-error, had picked up a toy, with a wrong movement it immediately rolled off the spade once again. After a great number of trials, a toy was successfully retrieved. The movements of the hand and even the entire body followed the logic and the requirements of the spade. The child moved around the spade, as it were, to secure the vertical lifting of the spade so as not to drop the toy.

According to Gal'perin, of special interest in the development of this motor skill are the intermediate stages between the probing movements with the spade and the skillful picking up of objects. These intermediate stages between manual operations and tool-mediated operations, are of essential importance in explaining trial-and-error learning but are never recognized as such. It is generally alleged that trial-and-error learning can be considered gradual learning which proceeds along a series of small, partial insights. The term trial-and-error learning is broadly used for the type of learning in which the learner tries a solution or action, sees where errors lie, corrects them in trying again, and continues until successful (see Hill, 1972, p. 98; Hawes & Hawes, 1982, p. 235).

Thus, the gradual decrease of random attempts is considered the general feature of this type of learning. According to Gal'perin, this assumption is correct as long as one looks at it without any other aim than the assessment of the results of the attempts. But, if the pace of execution is

also included, a totally different picture of trial-and-error learning arises. Then it is apparent that the development of tool-mediated operations runs through several stages. Gal'perin distinguishes four stages in the development from inexperienced manual operations to skillful tool-mediated operations. Between the two extreme initial and end points of this development Gal'perin found two intermediate stages. What precisely is happening?

Stage 1. Trial-and-error stage (*stadiia 'prob i oshibok'*).

This is the initial stage when the child makes random attempts with the spade used as an extension of the arm in order to rake the objects together. While lifting the toy, the child thoughtlessly lifts the spade into different directions. The child makes attempts without special consideration for the properties of the tool. Pure manual operations are quite frequent in this stage.

Stage 2. Stage of alertness (*stadiia podstereganiia*).

After the initial stage comes the stage when the movements are still random but much slower: the pace of execution decreases. In this stage it is not a case of attempts being made at random, but of assessing the results of each attempt before a new attempt is made. The child is quickly attentive to changes and begins to identify accidentally occurring, favorable positions of the spade and to preserve them. She keeps watch on the spade and the events on the blade, so as to take action at the right moment. However, she is still not able to produce successful attempts herself.

Stage 3. Stage of persistent intervention (*stadiia naviazchivogo vmeshatel'stva*).

Based on the acquired experience in the previous stage the child acts with care while lifting the toy. She makes an effort not to change the position of her hand in order to keep the toy on the blade. She isolates and employs successful movements. The movements are skillful but the pace of their execution is very slow.

Stage 4. Stage of object-bound regulation (*stadiia ob'ektivnoi reguliatsii*).

The child succeeds with the task presented to it. Movements of hand and body follow the objective logic of the spade. Varied movements are called upon to secure the raising of the spade with the toy on its blade. The child moves around the tool, sees erroneous movements, corrects them immediately, and continues. She takes into account the objective properties of the tool. Thus, tool-mediated operations characterize this stage.

According to Gal'perin, the two intermediate stages 2 and 3 are of utmost importance in trial-and-error learning of motor skills. These stages were until then not well-defined and investigated, but they lead us to the very essence of this type of learning. Without these intermediate stages in which the results of the succeeding attempts are checked and explored, there can be no improvement in the trial-and-error learning of motor skills.

As argued before, Gal'perin's dissertation is an illustrative example of the kind of research done within the Khar'kov school. The members of this school did not study the genesis of a particular mode of operational thinking separately from the child's ongoing practical activity. The first thinking processes of the child, so-called sensori-motor thinking, becomes available to the child as a result of such activity. According to El'konin (1969, p. 170), Gal'perin's research in the 1930s showed the genetic roots of thinking and the dependence of its development on practical activity. Within the domain of sensori-motor thinking, tool-mediated operations arise on the basis of manual operations.

In further research, beginning in the early 1950s, Gal'perin (e.g., 1959a, p. 442) extended this principle to the whole domain of psychic activity. As we will see in further chapters, this research is based on his theoretical assumption that no separation exists between external, practical activity and internal, psychic activity. But, as we have seen, he had already developed this assumption as a member of the Khar'kov school, in the mid 1930s.

Summary

One might say, that Gal'perin became a psychologist in the years 1930 - 1936. These few years, which covered the existence of the Khar'kov school in Soviet psychology, had an important and lasting influence on his scientific career. These years were formative in several respects. First, he underwent passing influence of Vygotsky. Gal'perin proceeded from Vygotsky's general

position, but soon went his own way. Secondly, he expressed his critical view on the relevance of Pavlov's work for psychology. In the early 1950s, at the height of the 'Pavlovization', he reiterated this view.

Thirdly, in that period he worked especially with A.N. Leont'ev and he actively participated in the foundation and development of the concept of activity in Soviet psychology. This concept was first outlined by the members of the Khar'kov school. This school, of which Gal'perin was one of the chief organizers, produced a series of experiments on the development of the child's practical activity and on the unity of external practical and internal psychic activity. These experiments were influential in that they gave rise to further research and became part of the foundation of Soviet psychology. The activity approach in particular can be considered a product of the Khar'kov school in the 1930s (see Valsiner, 1988, p. 208-216).

At that time Leont'ev formed the framework of his activity theory with a set of key concepts like action, operation, goal and motive. Initially, the Khar'kovites used the expression meaningful activity (*osmyslennaia deiatel'nost*), but later Leont'ev (1989, p. 33) dropped the term 'meaningful' leaving only 'activity'. Gal'perin (1992b) did not agree with Leont'ev's abandoning of this term. From the very outset Gal'perin considered the core of the content of human activity to be its meaningfulness and insisted on the use of the expression 'meaningful (or personalized) activity.' I shall return to this conceptual difference between Leont'ev and Gal'perin, when I devote special attention to the concept of activity and Gal'perin's elaboration of it (see Chapter 5).

During the period of the existence of the Khar'kov school, Gal'perin's main research activities concerned the development of the use of tools by a human being, particularly children of preschool age. He demonstrated that the use of various human tools by a child yielded a qualitative reconstruction of the child's practical activity. The skillful use of human tools was not merely an accumulation of new motor skills, but determined the whole structure of an action. He found that the development of such skills passed through four stages. The first stage is characterized by pure manual operations. The second and third stage are intermediate stages in which the conditions of the use of tools are explored. In the fourth stage tool-mediated operations are achieved.

Gal'perin's theoretical assumptions and research in the first half of the 1930s were a forerunner of the line of thinking that he would expound in the 1950s. Three features of that early research stand out clearly. First, he studied the development of tool-mediated operations and emphasized its genetic aspects. Secondly, he demonstrated that the origins of tool-mediated operations had to be found in external manual operations. Thirdly, Gal'perin considered the execution of tool-mediated operations to be a mode of thinking. He actually studied the development of operational thinking in connection with the use of tools. Thus, he showed that the development of thinking (of 'mental actions' as he called it later) is dependent on practical activity (see Part Two).

In the 1950s, these features found their full development in Gal'perin's psychological thought. But before outlining his concept of psychology, he practiced medicine and did other research, which I will discuss in the next chapter.

CHAPTER 3

THIRD PERIOD (1936-1943): BEFORE AND DURING THE SECOND WORLD WAR

The period described in this chapter runs from 1936 to 1943. It marks an intermediate phase in Gal'perin's scientific career. The start and finish of this phase are marked by two dates, the former of which had a tremendous and ominous influence on the development of Soviet psychology. In 1936, the decree against pedology was promulgated. In fact, this decree led to the end of the Khar'kov school. The end of this phase is marked by the year 1943, when Gal'perin went to Moscow and started his work at Moscow University.

Both dates brought serious changes in Gal'perin's scientific career. The first date brought to a close the period in which Gal'perin had become a psychologist (see Chapter 2). The second date marked the start of the emergence of Gal'perin's own concept of psychology (see Part Two). The period between both dates is dominated by the Second World War and Gal'perin's main activities in this period are related to the war. In this period, one might say he worked mainly as a medical practitioner and neuropsychiatrist. In the 1940s, besides his medical activities, he also carried on research on the rehabilitation of upper limb movement damaged by bullet wounds. On the basis of the findings obtained, Gal'perin, together with two colleagues, worked out a new and promising rehabilitation method.

However, I will start this chapter with events of the second half of the 1930s, shortly before the Second World War.

The 1936 decree on pedology

In the preceding chapter, I touched upon the often challenged 1936 decree against pedology, the so-called ped-decree. In that year, a decree was promulgated by the Central Committee 'On Pedological Distortions in the Soviet School Administration.' This decree referred to 'abuses' in pedology and it particularly condemned pedologists, officially appointed by the Commissariat of Education, who worked in the Soviet school system. Pedology is originally considered a multidisciplinary science which deals with the somatic, psychological and social aspects of child development. In Soviet science, pedology was viewed as closely linked to psychology. The main pedological dogma was the so-called 'two-factor theory' which stated that the individual's personality was determined by both genetic inheritance and environment. Therefore, many pedologists were in favour of testing children's mental, physical and emotional development as a means of assessing them with regard to selection, career planning, etc. Although it was the subject of heated controversy, the main theoretical and practical activity of pedologists concerned the theory and practice of testing.

One might say, that in the early 1930s, the ideas of pedologists dominated the Soviet education. Though without practical teaching experience, they controlled admission to classes and the grouping of children into streams on the basis of tests designed to determine the level of intelligence and ability of the child. Pedologists were trained as 'testers' with general responsibility regarding the administration of the schools and the education of pupils. With the aid of tests, they diagnosed children who were somehow delayed in their development and referred them to schools for children with learning disabilities. According to Gal'perin (1986a), this was an evident case of misuse, taking place under the flag of pedology as an independent discipline. In this situation, pedologists could only bring harm to the Soviet school system. The

1936 decree put an end to the positions and responsibilities of pedologists in the schools and abolished pedology as a discipline (see Bauer, 1952, Ch. 8; Payne, 1968, pp. 47-49; Rahmani, 1973, pp. 53-60; Wortis, 1950, pp. 242-245 for an English translation of the 'ped-decree').

By virtue of the fact that pedology was viewed as closely linked to psychology, the latter suffered from the 1936 decree as well. The decree forced the new line on the psychologists. Basically the new line in Soviet psychology had already been laid down in 1930, during the Behavioral Congress. As mentioned in Chapter 2, this congress had been convened to discuss the theoretical unification of the behavioral sciences. Such a unification, of course, had to be found within the Marxist-Leninist framework. The about 3000 participants represented all the schools of that time and their papers reflected the diversity in the behavioral sciences. Due to this diversity the congress did not lead to the desired unification. Another congress was needed to formally lay down the new line.

The First All-Union Psychotechnical Congress was held in Leningrad, 20-25 May, 1931. According to Gal'perin (1932, p. 97), this congress, after some delay, marked the new line in Soviet psychology. Thus, the border between the old and the new line had been laid down during this congress. However, it took several years to actually implement the Marxist-Leninist revisions into science. Obviously, the Party was not satisfied with the rate of change in psychology. The editors of the central Soviet Journal of Philosophy *Pod Znamenem Marksizma* (PZM - Under the Banner of Marxism) convened a sort of round table discussion 'On the present state of psychology in the USSR and the tasks with which it is faced.' The discussion was held before the proclamation of the decree on pedology on June 4, 1936, but the report was published afterwards by one of the journal editors who undersigned with 'G.F.' (1936). The editor mentioned (p. 98) in his report how timely the discussion was.

According to this editor (p. 87), it was necessary to explain why it was that psychology was lagging behind in its implementation of Party decisions and its endeavours to contribute to the demands of Soviet society. The participants in this discussion full of criticism against anti-Marxist schools were leading psychologists and scientists such as V.N. Kolbanovskii, A.N. Leont'ev, A.R. Luria, B.M. Teplov, P.Ia. Gal'perin, D.B. El'konin, P.P. Blonski, and M.B. Mitin. Mitin, then the most authoritative philosopher of Stalinist ideology, summarized the round table discussion and was discontented with its results. According to the editor's report (p. 97), Mitin stipulated that the initial questions were not answered and that the expressed criticism and self-criticism remained much too abstract. In his opinion no serious marxist psychological literature had been published until then and he thought that it remained to be seen if psychology could have scientific value for the nascent Soviet society.

It needs no further explanation how the psychologists, gathered together in this discussion, felt after Mitin's critical assessment. Payne (1968, p. 52), referring to the report of the discussion in the journal PZM, remarked with an understatement that "one gets the impression that the psychologists taking part in the discussion were none too happy with the task imposed on them of criticizing the so-called anti-Marxist schools." Memorizing this event and his participation in the discussion, Gal'perin (1986a) kept silence for a while and then uttered the short phrase: "It was awful ..."

The discussion took place a few months before the proclamation of the 1936 decree. The Party seemed to have decided that the revisions made in 1930 and 1931 had to be reaffirmed to increase the pressure on the sciences concerned. To some extent this explained the unusual violence of the criticism towards pedology and psychology in the 1936 decree. The decree was "one of the major effects of Stalinism on psychology" (Van der Veer & Valsiner, 1991, p. 293). The discussions, which followed this decree, were violent repetitions of the discussions in the early 1930s.

According to Bauer (1952, p. 122-123), the problems of Soviet society were sharply aggravated by the repercussions and social upheaval of the industrialization and collectivization. The Party started to pay serious attention to the solving of 'human problems' resulting from the tremendous changes in society. All possible facilities were focussed on the solution of problems concerned with training and controlling Soviet citizens. The Party issued the 1936 decree to force education, pedology and psychology into the new line. Because of this political and social context, the consequences of the decree went far beyond its ostensible concern. It meant a watershed for Soviet psychology. It marked the end of lively discussions and the final definition of the new 'correct' Marxist-Leninist position for psychology. In the period from 1936 till 1950 no new and major discussions on psychology took place.

Gal'perin's critique of pedology

As we have seen, besides the pedologists, psychologists came under violent attack as well as a result of the 1936 decree. Vygotsky's work, for example, was seriously affected by it. Although Vygotsky was at that time already dead - he had died in 1934 - his work was heavily criticized, because he was regarded as one of the most important pedologists (see Van der Veer & Valsiner, 1991, Ch. 12 on 'Vygotsky the Paedologist'). According to Gal'perin (1986a), Vygotsky had adopted his own very distinctive stance but nobody was sensitive anymore to that sort of nuance. For a long time, about twenty years, his work was banned. It was preserved but special permission was necessary to borrow it from a library.

As a result of the decree the psychology department of the academy was substantially reduced. In fact (see Chapter 2), the decree marked the end of the Khar'kov school. Although the school ceased to exist, its members suffered less. This is rather surprising, because they were closely associated with Vygotsky's line in Soviet psychology. It could be expected that they, like Vygotsky, would be under attack as well. However, this is not what happened.

According to Gal'perin (1986a), Leont'ev and himself, and in general the whole group of psychologists of the Khar'kov school suffered less under this ban, because from the start they had been opposed to Vygotsky and his interpretation of pedology. A long time before the decree, they had already expressed their disagreement on this issue. Vygotsky considered pedology a sort of synthetic science, a 'super-science' of the child, embracing physiology, defectology, psychology and pedagogy. Pedology is then the synthesis of all these sciences. Gal'perin was the one who on this point totally disagreed with Vygotsky.

In 1936, Gal'perin published a critical review 'On pedological distortions in psychoneurology.' He wrote this review under the pseudonym G.P. Iakubovich. The pseudonym is rather transparent, because Gal'perin had slightly changed the order of the capitals: P.Ia.G. became G.P.Ia. Moreover, the review was published in the journal *Soviet Psychoneurology*, to which Gal'perin regularly contributed in the 1930s. Therefore, it is quite reasonable to suppose that it was clear within the circle of persons concerned, who had written the review. In it, Gal'perin (1936b) elaborated on the implications of the 1936 decree in relation to two collections of the work of L.A. Kvint and his co-workers. It may seem that Gal'perin's review was somewhat outdated, because the collections had already been published in 1928 and 1931. However, according to the first paragraphs of the review (p.8), Kvint was at that time still an influential physician and pedologist, who headed medical institutions in both Khar'kov and Smolensk.

Following the phrasing of the 1936 decree, Gal'perin pointed out that Kvint's work and that of his associates work was based on the socio-biological point of view of contemporary pedology disclosing that human abilities are determined by two factors: genetic and socio-cultural inheritance. Gal'perin condemned this so-called 'two-factor theory' as pseudo-scientific and anti-Marxist. He charged Kvint and his co-workers with their senseless use of tests, 'profiles', schedules and questionnaires. In order to indicate his opinion, Gal'perin puts the word investigation between inverted commas; throughout the article he referred to 'investigation' instead of investigation. The sharp tone of Gal'perin's critique was no doubt shocking to the individuals concerned. However, he conducted his arguments against their work in strict scientific terms and he remained in the ostensible concern of the decree.

At the end of his review (p. 13), Gal'perin rejected pedology in general on the ground of its alleged 'synthetic' character. This final part differed from the preceding parts mainly, because it did not contain direct references to the collections under review. There, Gal'perin espoused some of his own thoughts on pedology. Particularly, it echoed, without naming, Gal'perin's disagreement with Vygotsky's 'synthetic' concept of pedology. Gal'perin stated that a 'synthetic' science is out of the question. Scientific development is characterized precisely by the differentiation of the disciplines involved and the internal development of them respectively. If a need arises to synthesize the particular bodies of knowledge, this means merely a strengthening of efforts. Each science remains in fact independent and delivers its own contribution to the collective characterization of the object of study.

In Gal'perin's view, this is a proper starting point, because a collective approach to a problem is still very different from a 'mix' of sciences. Apart from his emphasis on the independence of each science, Gal'perin had yet another argument to reject Vygotsky's concept of pedology. If pedology is viewed as a coming together of compatible fields, a pedologist needs

to be a specialist in all those fields. This is impossible and as a result a pedologist pays lip service to all these fields. He collects data which, in his opinion, is evident and indisputable and uses them like building blocks for his own pedology. However, this data is, to a large extent, not always definitive; it only represents the facts of the moment, because each science is in a state of continuous change. As Gal'perin has remarked, this situation had led to a false consensus among pedologists which rapidly dissolved with further development of the parent disciplines. Given the rates of change of its parent disciplines, it is small wonder that pedology was in violent disorder.

These were the two particular points (the independence of each science and the impossibility of being a specialist in all the fields concerned) on which Gal'perin disagreed with Vygotsky's concept of pedology. To some extent these points echoed several of the earlier criticisms concerning Vygotsky's 'eclecticism' (cf. Van der Veer & Valsiner, 1991, pp. 378-379). Unfortunately, Gal'perin (1986a) never brought up this issue with Vygotsky himself. He merely brought it as a point into the discussions with Leont'ev and the other members of the group. Apparently, however, the Khar'kov school as a whole was in agreement in opposing Vygotsky on his concept of pedology. One could argue that this view, held at that critical moment in 1936 and explicitly expressed by Gal'perin (1936b), saved the group; they had, from the beginning, stated that they were not pedologists and that psychology was not pedology. When pedology was banned they were therefore not affected by it. They had of course to suffer from the altered attitude towards psychology in general. Or, to put it in Gal'perin's words: "This attitude became - How shall I say it? - one of vigilance" (see Haenen, 1989c, p. 14).

Rehabilitation of the motor functions of upper limbs

In 1936, after the closing down of the Khar'kov school (see Chapter 2), Gal'perin had to go and work in the department for the chronically ill within the psychiatric clinic of the Psychoneurological Institute. From the middle of 1936 to the beginning of the Second World War he worked therefore mainly in psychiatry. When Khar'kov was occupied by the Germans, the Psychoneurological Institute was converted into a psychoneurological hospital and evacuated to Tyumen', in West Siberia. Gal'perin worked as a doctor in that hospital until the beginning of 1943.

During the Great Patriotic War (as the Second World War was commonly called by the Soviet people) the rehabilitation of the injured was declared one of the most urgent tasks. A decree of 5 February 1943, issued by the People's Commissariat for the Defence of the USSR, established the official framework for all the rehabilitation work. In accordance with this decree, it was forbidden to discharge wounded soldiers and officers who were capable of rehabilitation. This work was evolved in specially established hospitals mainly in the southern Urals. Two of these hospitals should be mentioned here, because they became well-known in Soviet psychology.

One rehabilitation hospital was set up under the direction of A.R. Luria, to whom the credit belongs for initiating this rehabilitation work and the participation of psychologists in it (see Luria, 1979, Ch. 8; Rubinshtein, 1944; Zeigarnik & Rubinshtein, 1986). Together with the neurosurgeon N.I. Grashenkov, director of the All-Union Institute of Experimental Medicine and later deputy minister of health of the USSR, Luria assembled a team of scientists for a hospital in the small vilage of Kisegach near Cheliabinsk. Apart from being its organizer, Luria was also the inspiration for the team of thirty researchers, among them renowned psychologists such as A.S. Bein, O.P. Kaufman and B.V. Zeigarnik.

The main task of Luria's hospital was the restoration of the higher cortical functions after local brain lesions. It was a center for the restoration of speech activity and thought processes disturbed by brain injury inflicted by fire-arms. The findings of this research and the forms of rehabilitation therapy, in particular, provided the material for Luria's (1970) book on Traumatic Aphasia, which was first published in 1947 and was based in part on Luria's work on sensory aphasia for his second medical degree, Doctor of Medicine (see Vocate, 1987, pp. 97-99 for a summary of Luria's book).

A second hospital was set up by A.N. Leont'ev. Leont'ev was then the head of a section of the Psychological Institute that was first transferred in its entirety from Moscow to Aschabad, on the Iranian border. After that, a part was again transferred to Yekaterinburg (known as

Sverdlovsk until 1991). Leont'ev set up a rehabilitation center at Kaurovka, near Yekaterinburg, in a small and abandoned sanatorium of the All-Union Central Committee of Trade Unions. He invited Gal'perin, T.O. Ginevskaia, A.G Komm, V.S. Merlin, Ia.Z. Neverovich, A.V. Zaporozhets, and some local psychologists and hospital workers to come and work there. Apart from being involved in the rehabilitation work, Gal'perin became head of the medical section of this center. In March 1943, he moved to Kaurovka.

The main task of Leontev's rehabilitation hospital was the restoration of the motor functions of limbs impaired as the result of central or peripheral bullet wounds. The center was, in particular, set up for the treatment of motor disorders resulting from stiffness and immobility of the arms and legs following injuries that had been set in plaster for a long time. Leont'ev & Zaporozhets (1960) reported on the results of the research carried on in Kaurovka from spring till autumn, and continued in Moscow from the autumn of 1943 onwards.

Gal'perin was actively involved in the rehabilitation work. As early as 1943, he published research on the psychological aspects of arm movements. According to Gal'perin (1943, p. 321), it was the Khar'kov physician and psychiatrist M.S. Lebedinskii, who first mentioned to him a striking phenomenon, which became a point of departure for Gal'perin's further research. Gal'perin demonstrated experimentally that a movement which a disabled veteran was unable to perform could be accomplished when the movement became object-bound. For example, a disabled man who could not lift his hand to his head upon request could comb his hair if necessary. Such functions are performed in the course of object-bound and meaningful activity. The rehabilitation of these functions will therefore be most successful if, in addition to isolated exercises, object-bound activity is performed. In further research (Gal'perin & Ginevskaia, 1947) this approach to rehabilitation work was subjected to detailed analysis.

According to Leont'ev (1945/1983, p. 32), Gal'perin was the first researcher in the Soviet Union to study the object-bound nature of activity experimentally. The experiments in Kaurovka were a sequel to Gal'perin's work done in Khar'kov and a further step in developing the activity approach. Asmolov (1986-87, p. 79) and Davydov (1990, p. 78) regard the assumption of the 'object-boundedness' (*predmetnost'* - see Ch. 6) as the core of the psychological theory of activity. There is no doubt that Gal'perin's pioneering studies in the 1930s and 1940s derive their importance from the closing of some of the gaps in the understanding of the complex notion of the object-bound nature of activity.

Gal'perin worked in the rehabilitation centre until the autumn of 1943. After that, Leont'ev and his co-workers went to Moscow, where they continued this research at the psychophysiological laboratory of the psychology section of the Philosophical Faculty of Moscow University. Rubinshtein, who at that time was head of this section, undertook attempts to collect and publish the experience of the rehabilitation work of psychologists during the war. A conference was held as a joint meeting of the psychology section of the Moscow university, the Institute of Psychology of the RSFSR Academy of Pedagogical Sciences, and the Hospital of Nervous Diseases of the All-Union Institute of Experimental Medicine.

It appeared that many of the scientists involved in rehabilitation work during the war, contributed to the conference (see Zeigarnik & Rubinshtein, 1986, pp. 18-20). Apart from the above mentioned psychologists who worked in the rehabilitation hospitals at Kisegach and Kaurovka, B.G. Anan'ev and D.N. Uznadze participated as well. The conference was also attended by the physiologists L.A. Orbeli, P.K. Anokhin, E.A. Asratian, and N.A. Bernshtein, and the neurologist and surgeons N.I. Grashchenkov, V.A. Giliarovski and N.N. Priorov. At the conference Gal'perin and Ginevskaia presented a paper on their research on the relationship between the effectiveness of a movement and the nature of the task. The paper was published in the proceedings of the conference, edited by S.L. Rubinshtein (1947, pp. 75-79). The paper was also extensively summarized in the well-known monograph (Leont'ev & Zaporozhets (1945/1960, Ch.1) on 'The rehabilitation of hand function.'

The analysis of motor disorders

Gal'perin & Ginevskaia wanted to compare the execution of movements, which were as identical as possible in their overt motor pattern, but differed in the nature and the object of the task placed before the subject. Their subjects were 41 patients, admitted to the hospital in the period from April till August 1943, with impaired movements of the shoulder or elbow joints.

Two simple movements of the arm were studied. The subjects with impaired movement of the shoulder joint were instructed by the experimenters to raise the arm upwards and forwards, with the shoulder blade immobile. The subjects with restricted movement of the elbow were instructed to flex the forearm, with the arm down and pressed against the trunk of the own body.

A special device had been designed and constructed for measuring the performance of the movement (see Figure 3-1). The device consisted of a flat, vertical cinematic screen on which two "kinematometers" are fastened; with the moving arrows of the meters, angles can be measured and recorded in degrees. In response to instructions from the experimenter, the subject raises or flexes the arm while holding the handle of the device. The handle is attached to a string ensuring that the moving arrows indicate the amplitude of the arm movement measured in degrees on the screen.

Each subject in turn was given five tasks:

- 1 Task A1. "Close your eyes. Raise your arm as high as you can higher still."
- 2 Task A2. The same as A1 but with eyes open and the screen in front of the subject.
- 3 Task B. "Raise your arm to number ..." (the experimenter calls out a number on the screen).
- 4 Task C. "Take this ..." (the experimenter shows an object).
- 5 Task A3. The same as A1.

All the instructions required the subjects to reach the limits of their amplitude of arm movement. Moreover, the technical arrangement of the experiment made it impossible for the subjects to exceed these limits by movements of other parts of the limb or movements of the trunk. The experimenters ensured that only the amplitude of arm movements were measured.

Table 3-1 presents the experimental results when the tasks are compared. It shows the arithmetic mean of the differences in the angular amplitude of movements performed by the same subjects. Example: Subject Akh. gives maximum flexion of the elbow during Task A1 of 65 degrees, and during Task C of 85 degrees. The increase in amplitude when both tasks are compared: $C - A1 = 20$ degrees. Table 3-1 summarizes the increase or decline in amplitude (in degrees), when the tasks are compared. The figures express the sum of the differences, when the mentioned two tasks are compared, divided by the total number of 41 subjects.

In assessing the results Gal'perin & Ginevskaia (p. 76) emphasized the fact that an increase in the amplitude of movement during change from task A1 to task C takes place in all the subjects without exception. There is a particularly noticeable increase when the tasks "raise your arm as high as possible" and "take the object" ($C - A1$) are compared. In individual subjects this difference is very pronounced. The experimenters even reported a value of $C - A1 = 30$ degrees (subject Ab.), which means an increase of almost twice the average. Given the considerable amount of variability between the subjects' performances of the tasks, the experimenters should have analyzed statistically the amount of spread among the scores. It is not clear if the results represent a significant difference.

How may the increase in the amplitude of movement be explained? According to the authors, Task A1 puts the greatest emotional pressure on the subject, because the only possible basis for the execution of the task is the will-power of the subject himself. However, under this condition the angular measurement is smallest. This leads to the conclusion, that there is an objective relation between the amplitude of movement and the nature of the task. This relation is not determined by the limits of motor activity of the affected organ, but by the limits of its function under the given conditions. The measured increase in the amplitude of arm movements is caused by "extra-motor" (i.e., psychological) factors, as Leont'ev & Zaporozhets (1960, p. 13) have called it. Executing the task, the subject investigates and interprets its objectives variously (for example, lifting the hand to the head upon request versus combing hair if necessary). The subject's dynamic interpretation, which largely determines the actual performance, is guided by his motives and orientations, or, to put it more psychologically: his attitude towards the task. The subject's attempts to execute the tasks are clearly organized towards a goal. Therefore, the study of the psychological conditions is crucial for the rehabilitation of impaired arm movements.

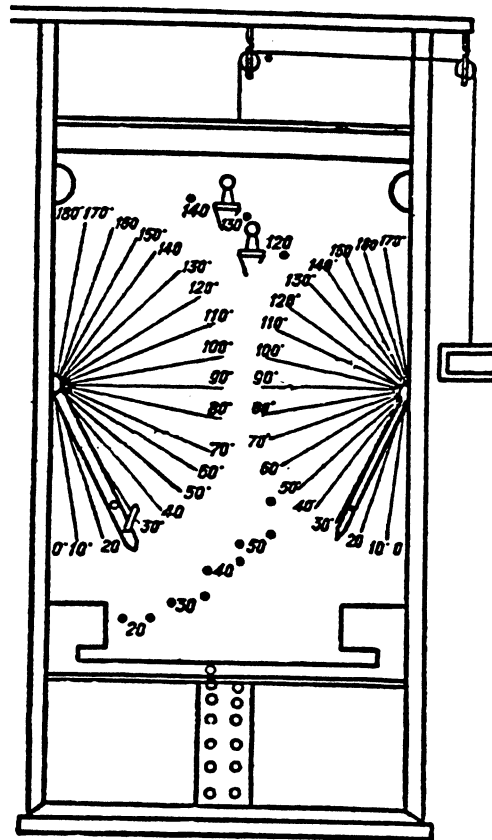


Figure 3-1.

The device, used by Gal'perin and Ginevskaia, for measuring the arm movement (from Leont'ev & Zaporozhets, 1960, p. 4).

Tasks compared	Mean of the differences in the angles (in degrees)
A2 - A1	+ 4.5
B - A2	+ 8
C - B	+ 4
A3 - C	- 10
B - A1	+ 12.5
C - A1	+ 16.5
A3 - A1	+ 6.5

Table 3-1.

The increase or decline in amplitude (in degrees), when the tasks are compared. The figures signify the arithmetic mean of the differences in the angles (the sum of the differences in the angles of the two tasks compared, divided by the number of 41 subjects). (Adapted from Gal'perin & Ginevskaia, 1947, p. 76, and Leont'ev & Zaporozhets, 1960, p. 6.)

Besides this, there is another important aspect which can also be considered a psychological, 'extra-motor,' component of the movement. Gal'perin & Ginevskaja examined the qualitative and genetic features of the movements as well. During the performance of Task A1 the movements took place relatively slowly and sluggishly, while in the limiting position a tremor often appeared. The subject's attitude is tense and 'inward,' and pain arose during the movement. On the contrary, the picture during Task C ("take this") is fundamentally different. The subject's movements are more energetic and coordinated. Evidently the pain which arose in some subjects was far more easily overcome. On the basis of the qualitative study of the movements, the experimenters (p. 77) drew the conclusion that there is not only variation in the effectiveness of movement (measured as the amplitude) but also in the very process of its realization.

The aimless gesture corresponding to Task 1A differed significantly from the purposeful grasping of an object corresponding to Task C. The clear-cut differences suggested that the execution of both types of movements belonged to different levels of sensori-motor coordination. Gal'perin & Ginevskaja (p. 78) used the terms 'abstract' ('abstraktnoe') versus 'object-bound' or 'purposeful' ('predmetnotselevoe') to designate both movements. To clarify the differences they referred to Bernstein's (1947) model of the formation of movements. Bernstein elaborated five levels of movements in relation to the neurological basis on which the movement is coordinated (see Kozulin, 1984, pp. 68-69; Mecacci, 1979, pp. 89-93).

According to Bernstein's hierarchical five-level model, the abstract, aimless gesture (Task 1A) belongs to the level of proprioceptive corrections (level B). The coordination of this movement occurs on the basis of merely feedback impulses flowing from the moving parts of the human body. The movement is 'inwardly' oriented. The movement of grasping an object (Task C), on the contrary, requires orientation in the problem space and object-bound corrections. This movement belongs to the level of objective coordination (level D). Thus, although both movements were identical in their external geometrical pattern and anatomical components, they differed in their psychological content. When the movement became object-bound, and the subject's attitude to the task changed, the neurological basis and mechanisms of the movements changed accordingly.

Gal'perin & Ginevskaja's psychological analysis of arm movements revealed the relationship between the effectiveness of the movement and the nature of the task. They showed that motor disorders following limb injuries had a complex character determined not only by the damage of muscles and bones, but also by the damage in the coordination system of movements and by the subject's attitude to the impaired movements.

On the basis of the obtained findings, Gal'perin together with two colleagues, the physiotherapist L.L. Meilaks and the physician E.D. Polykovskii, worked out a new method for rehabilitation. They designed a system of specially organized and thought-out movements in order to compensate and restore the damaged motor coordination and to change the subject's attitude to the movement. According to Gal'perin & Ginevskaja (p. 78), the preliminary results of the new method were promising. They achieved up to 30 percent improvement in the experimental group as compared to the control group.

Gal'perin's (1943) and Gal'perin & Ginevskaja's (1947) experimental results had been used as building blocks of the rehabilitation work of Leont'ev's group, first at Kaurovka and later in Moscow. Brozek (1964, p. 537) reviewed the monograph of Leont'ev & Zaporozhets (1960) with an account of the intentions and results of this work. According to him, the work of Leont'ev's group as a whole represented "a unique contribution of psychologists" to the theory and practice of the rehabilitation of arm movements.

Summary

The period from 1936 till 1943 represents an intermediate phase in Gal'perin's scientific career. The 1936 decree outlawed pedology as a discipline, and because of its close link with psychology, the latter suffered as well. Although the decree marked the end of the Khar'kov school, the whole group of psychologists of the school suffered less under the ban on pedology and psychology. The reason was that, already in the early 1930s, they had explicitly distanced themselves from pedology.

The issue of the interpretation of pedology as a discipline presents a point of disagreement between Vygotsky and the Khar'kov group. Gal'perin was the one among its members who expressed the group's disagreement with Vygotsky. Vygotsky considered pedology an 'integrative' or 'synthetic' science of the child, embracing physiology, defectology, psychology and pedagogy. Pedology is then the synthesis of all these sciences. Due to its alleged 'synthetic' character, Gal'perin rejected pedology. He emphasized the independence of each science and the impossibility to be a specialist in all the fields concerned. His attitude to this issue reflected his long-life resistance to every attempt to insert psychology into a multidisciplinary approach of scientific problems.

For a long time, within the context of Soviet science, psychology did not represent a strong science. In fact, not until 1966 did psychology become an independent science and receive its own faculty at the Moscow university, and in extension at other universities as well. Throughout the previous decades, there had always been a strong movement in Soviet science to substitute other sciences (mostly physiology, but in the early 1930s, pedology as well) for psychology. Gal'perin took it to be his mission to define psychology and to describe what its proper subject matter and method should be. This explained why he opposed Vygotsky's interpretation of pedology as a synthetic science.

Until the beginning of the Second World War Gal'perin mainly worked as a medical practitioner and neuropsychiatrist. During the war and shortly after it, he was involved in the rehabilitation of upper limb movements damaged by bullet wounds. His findings had been used to further investigate the most effective methods for rehabilitation work. His studies of impaired arm movements revealed the importance of the psychological content of movements. Generally speaking, three conclusions can be drawn from this and other research on the rehabilitation of arm movements (see Gal'perin & Ginevskaia, 1947, pp. 78-79; A.A. Leont'ev, 1984, p. 30); Leont'ev & Zaporozhets, 1960, Ch. 1; Rubinshtein, 1944, p. 192).

First, the object-bound nature of arm movements is fundamental for the understanding of the effectiveness of movements. Secondly, rehabilitation requires a systematic approach of gradual compensation and restoration of the coordinational, neurological as well as psychological aspects of the impaired movement. Thirdly, this approach is genetic in the sense that rehabilitation passes through several stages to ensure a gradual restoration of the impaired function.

Gal'perin's research in this period was a sequel to his research in Khar'kov. Particularly, the further elaboration of the notion of the object-bound nature of activity needs special mentioning. Without a clear picture of this key notion it is impossible to develop a psychological theory of activity. Gal'perin needed this picture to develop his own concept of psychology in the beginning of the 1950s. Then, as shown in the next chapter, Gal'perin's creative and scientific activity underwent an upsurge. This subsequent phase in Gal'perin's scientific career started in 1943, when Gal'perin moved to Moscow.

CHAPTER 4

FOURTH PERIOD (1943-1988): MOSCOW UNIVERSITY

In 1943, Gal'perin went to Moscow and started his work at Moscow University. For several years, he carried out various research projects. On the basis of theoretical and empirical assumptions developed in this and previous researches, he started to look for his own approach to the problem of the method and subject matter of psychology. In 1952, at the height of the 'Pavlovization' of Soviet psychology, Gal'perin formulated his theoretical stance in psychology. The period from 1943 till 1952 can be considered an interlude, in which Gal'perin attempted various approaches in order to find his own perspective. A good case can be made for saying that he actually used the 'Pavlovization' to take his position in Soviet psychology.

Gal'perin continued to work at Moscow University until his retirement in 1984, at the age of 82. He died on 25 March 1988, at the age of 85. During the nearly four decades from 1952 till 1988 he explored and modified his research program. He opted for a somewhat speculative and broad theoretical framework in psychology. He claimed that his approach, which became known as the 'systematic formation of mental actions and concepts,' made it easier to clarify the development and functions of psychological processes.

Throughout all his years at Moscow University, Gal'perin's devotion to and extension of the activity approach in Soviet psychology has been outstanding. In this chapter I shall outline the historical context of Gal'perin's years as a lecturer and a professor of developmental psychology at Moscow University. The chapter begins with his coming to Moscow in 1943 and ends with his death in 1988. During this period he became a well-known and distinguished psychologist. He acquired an independent and influential position and gained a following. Consequently, I will argue that a 'Gal'perinian school' can actually be distinguished within Soviet psychology.

First years at Moscow University

As described in Chapter 3, Gal'perin worked, together with Leont'ev, in the rehabilitation centre nearby Ekaterinburg until the autumn of 1943. Thereafter, they went to Moscow. According to Abul'chanova-Slavskaja & Brushlinskii (1989, p. 12), it was Rubinshtein who invited the members of the Khar'kov school to come and work in Moscow. Rubinshtein, who from 1930 to 1943 headed the Psychology Department at the Leningrad (St. Petersburg) Institute of Pedagogy, had been appointed head of the newly established psychology section of the Philosophical Faculty of Moscow University in 1943. Until his death in 1960, Rubinshtein headed the section (cf. Payne, 1968, p. 71). A.N. Leont'ev succeeded him as head of the section.

Rubinshtein was well-acquainted with the work of the Khar'kov school and with the rehabilitation work done by its members at Kaurovka. In his second edition of the *Osnovy Obshchei Psikhologii* (Fundamentals of General Psychology), published in 1946, he devoted due attention to this work and to Gal'perin's contributions to it both in Khar'kov and Kaurovka (Rubinshtein, 1989, vol. I, p. 403; vol. II, p. 26). One of Rubinshtein's activities as head of the psychology section was an attempt to collect and publish the experiences of the rehabilitation work done by the Russian psychologists during the war. A conference on this issue was convened, at which Gal'perin & Ginevskaia presented their research on motor disorders after war injuries (see Ch. 3). Their paper was published in the proceedings of the conference, edited by Rubinshtein (1947, pp. 75-79).

During their first years in Moscow, the members of the Khar'kov group still considered themselves a group, staying for a short while (somewhat reluctantly, as we will see) in Moscow and planning to go back to the Ukraine to continue their previous work in Khar'kov and Kaurovka. After these two places, they were called the 'Kharkovian Kaurovtsians'. The group consisted of P.Ia. Gal'perin, T.O. Ginevskaia, P.L. Verlinskaia, A.V. Zaporozhets, P.I. Zinchenko and A.N. Leont'ev, who acted as the leader.

El'konin (1983, pp. 247-248; 1984, pp. 68-69), who, during the war had been at the front in Leningrad, made mention of a letter dated 24 October 1943, which he received from A.N. Leont'ev. The latter wrote to him that the group had arrived in Moscow and that he was dreaming about a new future for the group in the Ukraine:

"All of us (...) are in Moscow. Zinchenko is near Moscow in the reserves; he's a lieutenant. I brought with me the kharkovian kaurovtsians; they have begun, somehow, to settle down here already (residence permit, permission to travel, etc.). I am giving a lot of lectures at the university, but feel somewhat unsatisfied with the situation. I'll go into this in more detail since, feeling unsatisfied, I daydream. (...) I am dreaming that within some time we will be able, together, to really establish science in the Ukraine, on a new, higher foundation. There will be the main centre of our science. Do you think this is bold? No, it is only consistent." (underlining in the original.)

Of course, as El'konin (*ibid.*, p. 69) remarked, nothing ever came of Leont'ev's dreams. The whole group stayed in Moscow and all they were able to organize was a section of child psychology at the Institute of Psychology of the RSFSR Academy of Pedagogical Sciences. Leont'ev became head of the section (cf. A.A. Leont'ev, 1984, p. 31).

Dembo's study on emotions

In his first years in Moscow, as mentioned above, Gal'perin was still involved in the research on rehabilitation. Apart from this research, Gal'perin also conducted a study on emotions and took the well-known work of the Gestalt psychologist Tamara Dembo as a starting point. Dembo was a former student of Kurt Lewin at Berlin University in the 1920s. Lewin can be considered a member of the Gestalt school of psychology. He tried to incorporate the concepts of motivation, will and emotion within the Gestalt framework. The early research of Lewin and his followers constitutes a separate phase and differs from the kind of research done by the Lewinian group after they had gone to the United States in 1932 (see De Rivera, 1976, pp. 2-3).

Historically interesting is the fact that among Lewin's students (mainly women, the 'Lewin-Mädchen' - the 'Lewin-girls' - as they were jokingly called) were several Russians. Bliuma Zeigarnik became one of the most well-known of them. In a talk with Iaroshevskii (1988, p. 175) she mentioned Gita Birenbaum, Nina Kaulin, and Maria Rickers-Ovsiankina. Actually, this is not so surprising since Jewish students were not permitted to constitute more than 5 percent of the student body at Russian universities. Russian Jews from families with sufficient financial resources were able to study abroad, and Berlin University was an often chosen alternative.

The studies of the Lewinian group in Berlin in the 1920s and early 1930s on the dynamics and structures of activity bear a great 'family resemblance' to the research of the 'Kharkovian Kaurovtsians' in the early 1930s and 1940s. Both groups investigated the covert and overt structures and conditions of human activity. They both imposed tasks on their subjects, which were rather difficult to achieve, and studied the many social, psychological and sensori-motor dimensions and constraints by which the execution of a task is determined.

Apart from the apparent analogues in the concepts of human activity, as formulated by the two groups, they both employed research methods, which may be called 'experimental phenomenology,' to use the term coined by De Rivera (*ibid.*). Both groups stress the careful observation of particular instances and the degrees of freedom of the experimenter to vary the experimental conditions in order to investigate the process and the effects at the individual level. Such 'experimental phenomenology' contrasts with the standard experimental procedures more commonly used in psychological research (cf. Van Parreren, 1987, pp. 82-83; Zeigarnik, 1981).

These striking resemblances may explain why Gal'perin, and probably Leont'ev as well as the other 'Kharkovian Kaurovtsians', were interested in the Berlin investigations of the Lewinian group. It is not quite clear, why did Gal'perin choose Dembo's research in particular? Two points seem to be relevant here. First of all, a general point has to be mentioned. Gal'perin was fluent in German; he translated from German into Russian (e.g., Gal'perin, 1930b), published in German (e.g., Gal'perin, 1931), and he read German psychological periodicals. Soon after its publication, he became familiar with the extensive description of Dembo's method of frustrating somebody (Dembo, 1931). Her ideas on "Der Aerger als dynamisches Problem" are very lucidly set out in a lengthy article. An English translation of this article is published in a compilation of Lewin's Berlin group (De Rivera, 1976, Ch. X, The dynamics of anger).

However, a second point concerning Dembo's research seems more substantial. Before explaining this point, a terminological issue is in order. According to De Rivera (*ibid.*, p. 321), Dembo's study is primarily concerned with the effects of frustration, not with anger, and might better be titled "The dynamics of frustration." According to Sloore (1980, pp. 123-125), in Dutch, an adequate translation of 'Aerger' would be 'ergernis', i.e. 'annoyance.' Dembo concluded that in order for frustration to lead to anger, the subject must be trapped in the frustrating situation evoked by some kind of barrier. Apart from inner or psychological barriers, experienced by the subject, outer or situational barriers are preconditions for the emergence of anger. Instead of exploring the essence of anger as an emotion, Dembo was mainly interested in the situational constraints leading to frustration. Because of this, Dembo's results may be easily generalized towards areas of real life where a person is trapped in an impossible situation that is difficult to escape from, e.g., children failing at school or an unbearable marriage (cf. De Rivera, *ibid.*, p. 322; Vasilyuk, 1991, pp. 38-39).

The outcomes of Dembo's research changed the focus of Lewin's theoretical framework. The attention switched from the person's involvement in a certain activity toward the characteristics of the subjective definition of the situation in which the person was engaged. The activity in question moves more into the background, while the situational context became the focus of investigation. In the United States, the Lewin group extended this framework, which eventually became known as 'field theory.' This theory is an attempt to describe the distinctive characteristics of the situation in which a person participates.

Basically, independently from the Lewinian group, Gal'perin had reached comparable conclusions on the basis of his research on motor disorders. When an injured subject with impaired movements of the shoulder joints is asked to raise his arm upwards, with his shoulder blade immobile, the effectiveness of the movements is determined by the very nature and the goal of the task. Movement is not an isolated process (a process 'sui generis'), merely dependent on motor components. On the contrary, as we saw in Chapter 3, a movement is embedded in a broad context of psychological, situational and sensori-motor conditions. The way in which the subject perceives and interprets this context is crucial for the effectiveness of a particular movement. Any movement is subordinated to its context, which is called by Leont'ev (1978, par. 3.5) the "structure of activity."

Gal'perin's study on emotions

The 'family resemblance' (cf. Wittgenstein) between Lewin's Berlin group and Leont'ev's Moscow group brings me at the same time to a point of difference. Lewin's group came across the problem of emotions much earlier. Until the mid-1940s the issue of emotions within the structure of activity had not been raised by members of Leont'ev's group; it was beyond their scope. Apparently, Gal'perin wanted to bridge this gap and soon after his arrival in Moscow he took up the study on emotions. For reasons unknown, he did not publish this study. Consequently, my report on it is based mainly on hindsight information from Gal'perin in Moscow in 1986 (see also Haenen, 1989c, pp. 20-21).

Gal'perin used Dembo's description of her method of frustrating somebody as a point of departure. However, under Soviet conditions in the 1940s it was considered unethical to investigate frustration in connection with anger. At that time, emotionality was studied in the pursuit of a consciously fixed goal and placed within the development of so-called 'leading

activities' (*vedushchye deiatel'nosti*: play, study, work), determining the consecutive stages through which the child passes to assume his adult role in society (Leont'ev, 1981, p. 396; originally published in 1945).

Consequently, Gal'perin devised a variation on Dembo's method in which frustration was converted into joy. The gist of Gal'perin's method consisted of presenting an adult person with a very simple child's puzzle and pretending to also give the means to solve it. With the aid of a number of differently shaped pieces the subject had to make a pre-given figure. One piece, however, was missing so that the puzzle could not be solved. The subject began to feel uneasy and, as Dembo recommended, Gal'perin added fuel to the flames with remarks like, "Why are you progressing so slowly?" When the subject was totally absorbed in the little puzzle and his self-esteem was thoroughly undermined, Gal'perin unobtrusively added the missing piece. If the subject eventually found this piece and was able to make the figure, he became overwhelmed with joy. It was remarkable to see how an adult person could be so happy that he had made that silly little figure. He was happy to have escaped this humiliating situation!

Gal'perin merely registered this phenomenon of 'overreacting' to intense frustration, but did not know how to proceed. The rich theoretical nature of this line of research has been demonstrated by Barker, Dembo & Lewin (1941) in research on the way in which young children respond to frustration. This research is well-known and is usually noted in reviews of Lewin's approach to psychology (cf. Boring, 1957, p. 727; Murphy & Kovach, 1972, p. 266; Vasilyuk, 1991, p. 40). While playing with familiar toys, children of nursery-school age were given a chance to play with new and fascinating toys. After a few minutes the children were led back to the familiar toys and a wire partition was placed between the children and the new toys, so that they could still see them. In the face of this frustration, their play with the familiar toys deteriorates. Thus, a child who before the experienced frustration had been 'writing a letter' went back to mere scribbling.

Barker et al. devised this experimental activity setting in order to obtain an experimentally induced 'Freudian' regression and to test their hypothesis that regression may be explained within a field theoretical framework as the loss of differentiation, coined as 'dedifferentiation', i.e., a reduction of the boundaries within a person's topological system. Lewin considered the mind as an initially undifferentiated whole, becoming progressively differentiated. Dedifferentiation consists of losing the differentiated structure and reverting to previous forms of action. Frustration may produce such a process of dedifferentiation.

As mentioned above, this line of research did not fit within the Soviet conceptional framework for personality research at that time. In Soviet society, negative emotions like conflict and frustration, were in fact a taboo topic. Consequently, at that time, such emotions were not dealt with in the Soviet model of personality. This concept of personality has led to a sharp distinction between normal and deviant behavior and to a normative definition of 'standard' behavior. The credit belongs to Bratus' (1990) for changing this situation. He proposed a Soviet approach to 'anomalies of personality.' Bratus' put forward a heuristic approach to mental health in which patterns of deviant behavior also fit. In particular, the analysis of teenage alcoholism may illustrate the fertile and practical aspects of Bratus' model. A publication on this issue (Bratus' & Sidorov, 1984) was favourably reviewed by Gal'perin (1985b).

In 1969, during his first travel abroad, Gal'perin (1971a) took part in the 19th International Congress of Psychology, held 27 July - 2 August, in London. On that occasion, he had a personal meeting with Tamara Dembo. Dembo was the daughter of Russian emigrants, raised in Germany, but still fluent in Russian. So, both Gal'perin and she could communicate in their vernacular. He told her about his experiment and she fully agreed with him that this was a correct modification of her method, but in Gal'perin's case with a happy ending. Instead of negative emotions, Gal'perin had evoked positive ones.

Gal'perin, however, did not feel satisfied with the results of his study. He had evoked a state of joy, but he was not revealing any real mechanism. He had merely established that the phenomenon in question manifests itself in a certain way, which could be expected from common knowledge. Because he did not know how to proceed, he stopped this research project.

It could be argued, that the impossibility of following this line of research within Leont'ev's Moscow group had a more general significance concerning the very core of the activity approach in Soviet psychology. It could even be a mark of its 'weakness.' Much later, at the end of the 1960s, Leont'ev espoused the view that the activity approach was spinning its

wheels, like the wheels of a car, revolving on the spot without moving forward. Despite much work, the approach was getting nowhere. One could contend that Gal'perin's inability to continue his study on emotions in the mid 1940s anticipated by some 25 years Leont'ev's critical remarks concerning his own concept of activity. An elaboration of this point will follow in Chapter 5.

Problem solving

As stated above, Gal'perin stopped his study on emotions, because he did not know how to proceed. So far, he had studied emotions as concomitant with problem solving, but now he decided to study the process of problem solving itself. He became interested in the way creativity, imagination and insight manifest themselves when a subject is actually searching for possible solutions to a problem.

In the course of his research, Gal'perin (1986a) came across an interesting and striking phenomenon, which had been observed already by other researchers, e.g. Duncker. This phenomenon manifests itself when a person suddenly finds the solution, dwells on it quietly, reflects upon it, evaluates it and ... rejects it! The experimenter knows that it is the right solution, but the subject does not recognize it as such. Apparently, to use Selz's phrase, the subject has another 'anticipatory scheme' of the solution and employs a criterium that somehow does not meet the requirements of the problem in question.

Psychologists like Katona (1940), Duncker (1945) and especially Luchins (1942) have discussed exhaustively the dominant role of past experience. A habit or mental set acquired by past experience, either long ago or minutes ago, can blind a person and produce rigidity. A habit produces its damaging effect, because the subject is fixed upon misleading problem approaches and makes incorrect assumptions. For example, the problem of constructing four equilateral triangles from six matches may be solved only by abandoning the assumption that the triangles must lie in one plane. The solution in the form of a pyramid with a triangle-shaped base, requires recentering or shifting one's approach (see Davis, 1973, pp. 35-36).

Gal'perin (1986a) had a subject who regularly demonstrated what became known as 'functional fixedness' (Duncker, 1945; Bolton, 1972, p. 184). This subject could not work out the solution to a problem, because the persistent adoption of incorrect assumptions blocked effective problem solving. Gal'perin invited two colleagues to witness this. Unfortunately, on this very occasion the phenomenon did not occur. Gal'perin felt hopeless and saw no way out of the situation. He realized that he had evoked a process over which he had no influence. He could not predict when the phenomenon would appear again. The process ran out of control and he did not know what happened. Gal'perin felt disappointed and concluded that this was not experimenting, because one never penetrated the underlying processes. Thus, one could endlessly evoke, observe and describe one beautiful and intriguing phenomenon after the other, as often as one liked.

In this way Gal'perin became involved in a situation, in which he came up against a barrier between himself (being an experimenter) and his goal of showing colleagues experimental results. As Dembo's (1931) study demonstrated, in such a situation frustration occurs. However, Dembo pointed out that there is no reason for frustration and tension to build up when a person is faced with a single, inner barrier. Frustration in such situation is easily met by simply leaving the situation. And this he actually did. Gal'perin followed Dembo's advice of leaving the humiliating situation, wherein a subject did not behave according to the experimenter's expectations.

Much later, from the 1970s onwards, Gal'perin returned to it and with some co-workers developed an instructional method of teaching problem solving (Gal'perin & Danilova, 1980; Gal'perin & Kotik, 1982; Obukhova & Churbanova, 1992). They put the question of how to prevent 'functional fixedness' and its damaging effects during problem solving. In this period however, he had already made great strides in developing his assumptions on instruction.

At the end of the 1940s, however, Gal'perin put aside the study of problem solving and went back to what he began to consider the basic issues in psychology. It was in this framework that the history of Gal'perin's new approach to psychology began. In fact, he took the unsatisfying and 'frustrating' course of his studies on emotions and problem solving as a starting point for his new approach. He set himself the goal of giving psychology a new footing.

Gal'perin's new approach to psychology

Gal'perin (1986a) asked himself at the end of 1940s: "Why do we actually conceive of creative problems against a background that we do not know at all? Let us first look at how this background is established." Gal'perin therefore decided to study how the psychological background for the solution of various tasks was established. He first investigated how specific actions with distinctive properties are shaped.

According to Gal'perin's view, in traditional psychology one is satisfied with the observation of whether or not an action takes place and if so, of whether or not the action meets the requirements of the problem space. That is not enough for Gal'perin: he wants to stipulate under what conditions an action is established and which of its properties determines an optimal performance of the action. In order to achieve this goal Gal'perin decided not to observe the course of an action, but to form it with prescribed properties. Gal'perin's (1966a, p. 251) favourite methodological maxim became: **No more observation, only formation!** (see Chapter 8).

In the early 1950s, Gal'perin, with some co-workers, began to study the actions and pivotal concepts that have to be appropriated in elementary education. They resolved to work out the optimal way for pupils to master such actions and concepts. They studied the sequence of conceptual change that must occur in the context of schooling to make sure that the mental actions and concepts are optimally formed. For example, the formation of elementary arithmetical concepts was studied by V.V. Davydov (1957), and of geometrical concepts by N.F. Talyzina (1968).

For the first time in 1952 (Gal'perin, 1953b), a few months prior to his 50th birthday, he made a statement about the new direction he had conceived. For Gal'perin, the key issue was the genesis of concepts and representations and how the human being learns to act meaningfully on that basis. He devised detailed guidelines for the organization and regulation of 'teaching-learning processes' and, in this connection, indicated what he considered to be the subject matter and the method of psychology (see further Part Two).

In the 1950s Gal'perin lectured on his research program at several national conferences on psychology taking place at the height of the 'Pavlovization' of Soviet psychology. A good case can be made for saying that the 'Pavlovization' of Soviet psychology was instrumental to Gal'perin in making public his position.

The 'Pavlovization' of Soviet psychology

As we have seen in the previous chapter (Ch. 3), the 1936 'ped-decree' affected both pedology and psychology as independent sciences. Insofar as psychology still existed, it became part of philosophy, physiology, psychiatry and, especially, pedagogy. In the absence of any specifically psychological journal, the pedagogical journal *Sovetskaja Pedagogika* remained the only medium for the expression of the official view on psychology (see Bauer, 1952, p. 131). After its existence in the background a revival of psychology took place in the beginning of the 1950s as a result of the 'Pavlov conference.'

Between 28 May and 4 June, 1950, the 'Pavlov conference' was held in Moscow as a joint meeting of the Academy of Sciences and the Academy of Medical Sciences. The leading physiologists, psychologists and psychiatrists took part in it. The conference was devoted to an evaluation and discussion of Pavlov's contribution to physiology and related sciences. The outcomes of this discussion included, among others, a decision to reconstruct psychology along Pavlovian lines (see McLeish, 1975, p.203-230; Joravsky, 1989, pp. 406-413; Valsiner, 1988, p.110-112). Although this 'Pavlovization' of Soviet psychology primarily concerned psycho-physical issues, it was decided that future work in all the branches of psychology should be centred around Pavlovian ideas. McLeish (ibid., p. 216) reported that the initial reaction of many psychologists was confusion and that many adopted a wait-and-see attitude until the reconstruction actually took place.

The first All-Union conference on psychology discussing the Pavlovian approach to psychology took place in July 1952 and was attended by over 400 psychologists, among them Gal'perin. On that occasion, Teplov (1952/1985, pp. 281-309) held a keynote lecture on "The objective method in psychology." This lecture played an important role in the introduction and

propagation of Pavlov's terminology during the 'Pavlovization' of Soviet psychology. Recalling the 1950 conference, Teplov defended a kind of psycho-physical parallelism with Pavlov's physiology of higher nervous activity and Lenin's reflection theory as the twin pillars of Soviet psychology.

In his contribution to the discussion, Gal'perin (1953b) rejected Teplov's reconstruction of psychology and presented an alternative. Gal'perin briefly analyzed the subject matter, method and explanatory principles of psychology. To make progress in theory and research he proposed to study psychological problems along a new line, "which is little known and still unpublished" (Gal'perin, *ibid.*, p. 97). In his short report on this new line (pp. 97-99), he formulated his basic assumption that mental activity has to be considered a form of concrete, material, object-bound human activity. Characteristic of his view of mental activity is the role he assigned to both orientation and the actual manipulation of material objects (see further Chapter 6-9).

A second and third All-Union conference on psychology was held in 1953 and 1955. Again, these conferences were devoted to the evaluation and propagation of Pavlovianism in psychology. On both occasions, Gal'perin (1957a,b) gave a special talk on his new approach to psychology, paying only marginal attention to the relation between his approach and Pavlovianism. He used the conferences to propound his own answer to the principal demand that had been made at the 1950 Pavlov conference to reconcile psychology with scientific principles.

Gal'perin's lectures at these three conferences showed a tendency to quote infrequently and bypass the works of Marx, Lenin and Pavlov. It must be added, however, that he did not abandon the traditional assumptions of Soviet psychology. From the earliest days of the presentation of his views he thought in terms of these assumptions, but he developed and conceptualized them within the framework of his own program (see Chapter 7).

It is striking that Gal'perin managed to use these conferences during the 'Pavlovization' of Soviet psychology to make public his own position. How can we explain this? It is beyond doubt that the historical context of Soviet psychology had changed. The isolation of psychology had come to an end and 'Pavlovization' had caused this change. However, Pavlov's theory had not become as influential in psychology as Teplov and other leading psychologists had wished. Actually, one could assert that 'Pavlovization' did not mean an essential theoretical change.

The Dutch psychologist Burger (1955) convincingly argued that this was the case. He made a study on the nature and extent of 'Pavlovization' in Soviet pedagogy and child psychology. He analyzed Soviet publications, mainly volume 17 (1953) of the journal *Sovetskaia Pedagogika*, then still the main source for the official view in psychology. Burger (pp. 44-46) concluded that 'Pavlovization' did not provide psychology and pedagogy with new conceptions, which were not already known previously. 'Pavlovization' did not mean a fundamental change in psychological theorizing. It meant, as Burger (*ibid.*) has pointed out, a new historical and political context which produced a revival of psychology. The course of psychology was gradually left more free and this revival continued after Stalin's death in 1953. It is this context, which has caused Gal'perin's research program to develop more quickly (see further Ch. 11).

Gal'perin did not wait until the reconstruction of Soviet psychology along 'Pavlovian' lines actually took place. He did not feel confused as so many other psychologists, pursued his own 'reconstruction' and used the three conferences at the height of the 'Pavlovization' to state his ideas. Gal'perin's 'freewheeling' period lasted until the end of the 1950s. In 1959, at the First Congress of the Soviet Society of Psychologists, he first met extensive criticism leading to a sharp polemic on the pages of the journal *Voprosy Psikhologii* in the 1960s. I will come back to this topic when discussing some criticism of Gal'perin's research program in Part Three.

Lecturing at Moscow University

Gal'perin had a successful career at Moscow University. From 1943 onwards he continued to work in the psychology section of the Philosophical Faculty. In 1966, the section became an independent faculty, thanks to the efforts of A.N. Leont'ev. That year, Gal'perin was appointed professor. In 1971, when he was 69, Gal'perin became head of the Department of Developmental Psychology. Following a heart attack, Gal'perin assumed emeritus status in 1984. After a fall and a short hospitalization he died on 25 March 1988, at the age of 85.

As a lecturer and later a professor of psychology at Moscow University Gal'perin inspired and educated a whole group of current leading Russian and East European psychologists. During an informal lecture, V.P. Zinchenko (1975) called himself and his fellow-students the 'generation of Leont'ev, Luria and Gal'perin,' but went on to say that it is better to call it 'the generation of Gal'perin, Leont'ev and Luria.' In Zinchenko's mind it was Gal'perin who in his lectures and seminars was transferring, explaining and discussing with them the psychological tenets of the cultural-historical school and the different elaborations of its leading adherents. In a recently published article on the occasion of Gal'perin's 90th birthday, Zinchenko (1993, p. 91) reiterated this point. In it, he called his generation the 'Leont'ev-Gal'perin generation.'

As the last representative of the generation of psychologists having personal contacts with Vygotsky and its followers, Gal'perin was able to interpret from the inside this new direction of psychology. He had the gift of explaining it not only with authority but also with humor and enthusiasm. Due to his pedagogic qualities, his lectures and seminars were renowned and well attended.

Gal'perin's pedagogic qualities may even be considered a relevant factor in the ongoing continuation of this school. Soviet psychology had a special color and flavor, and Wertsch (1981, p. 219) observed that American investigators, after reading Soviet psychological literature, often raise questions not so much about what was being done, but why it was being done. From my own experience, the same could be said about foreign as well as Russian and East European psychology students and postgraduates at Moscow University, who had to read and study the works of the leading psychologists. His students and co-workers were grateful to Gal'perin as one of the active contributors to Soviet psychology for his explanations from within.

Apart from this, Gal'perin's lectures and seminars were especially interesting because he was known for his familiarity with the original sources of the history of psychology. He compiled (together with A.N. Zdan) two anthologies about the history of western psychology, one covering the period 1910-1940 and the other the period 1930-1970 (Gal'perin & Zdan, 1980, 1986). So, he was able to deal with psychological issues from a historical point of view.

Gal'perin himself actively participated in the development of Russian psychology. He established his own influential school and gained a following. El'konin (1989, p. 503) wrote in his personal notebooks that Gal'perin's psychological thoughts had been one of the main trends in Soviet psychology. This personal remark of El'konin underlines Gal'perin's essential contribution to Soviet psychology. Part Two will be devoted to this contribution.

Summary

The period described in this chapter runs from 1943 to 1988. In 1943, Gal'perin was appointed to Moscow University. He continued to work there until his retirement in 1984, at the age of 82. During this period he became a well-known and distinguished psychologist. At home and abroad, he was mainly known as an instructional psychologist, who transformed Vygotsky's sociohistorical approach to human development into a technology of instruction.

This chapter positions the development of Gal'perin's thoughts in its historical context. First a short interlude, wherein Gal'perin conducted various experiments, still not knowing in which direction to proceed further. To a certain extent, in retrospect, he considered his studies on emotions and on problem solving dead ends, because they did not lead him anywhere. He decided to change over and to search for a new approach.

In 1952, at the height of the 'Pavlovization' of Soviet psychology, he formulated a new position in psychology. It was from here that the history of the 'Gal'perin school' in Soviet psychology came to life. In hindsight, Gal'perin concluded in 1986: "We have made a start by laying down a solid base for psychology. Even though there is still much to do, I think that psychology has gained firm ground on which to stand" (quoted in Haenen, 1989c, p. 23). In Part Two I will examine in more detail how solid and firm the claim made by Gal'perin in the early 1950s actually was.

PART TWO

OUTLINE OF GAL'PERIN'S RESEARCH PROGRAM

INTRODUCTION TO PART TWO

In Part One I have outlined Gal'perin's quest for a new and objective approach to the investigation of the human mind. He dedicated his life to science, always searching for the foundation of psychology. Part One outlines the biographical facts and the theoretical and empirical research outcomes illuminating his 'life-plan' of giving psychology a new and objective starting point. In the early 1950s, he put forward this starting point in the theory of 'stage-by-stage formation of mental actions and concepts.' Gal'perin regarded this theory as the 'royal road' to the investigation of the origin and contents of mental functioning.

The history of the theory of 'stage-by-stage formation of mental actions and concepts' began with a broad idea, which was substantiated by experimentation, and then developed into increasingly more satisfactory theoretical formulations. During a period of nearly four decades - from the early 1950s until his death in 1988 - Gal'perin worked continuously on the empirical verification of his concept of psychology. His approach to psychological issues became influential in Soviet psychology, as witnessed by the fact that he attracted a following and that there existed a 'Gal'perin-school.' This school still exists in current Russian psychology, now headed by Nina Talyzina, Ludmilla Obukhova and Andrei Podol'ski. They are former students and co-workers of Gal'perin and are currently associated with the Psychological Faculty of Moscow University. Professor Talyzina occupies the chair of the Department of Pedagogical Psychology, and assistant professor Obukhova and professor Podol'ski both occupy the chair of the Department of Developmental Psychology. Gal'perin held this chair from 1971 until his retirement in 1984.

Part Two of this study is devoted to Gal'perin's concept of psychology. In my view, the work of six scholars has guided him. To begin with, there are two main sources, which stem from Vygotsky's cultural-historical theory as well as Leont'ev's theory of activity. These main sources, discussed in Chapter 5, have their origins in the 1920s and 1930s. Moreover, two new influences may be identified, which became more prolifically present from the early 1950s onwards, viz. Il'enkov's understanding of Marx's concept of the 'ideal,' and especially Pavlov's concept of the 'orienting reflex' as elaborated by Sokolov. Thus, in my view, the works by Vygotsky, Leont'ev, Marx/Il'enkov, and Pavlov/Sokolov, are the cornerstones of Gal'perin's research program (see Chapter 7).

The aim of the chapters 5 and 7 is not to present a survey of the works by these Russian scholars, but primarily to provide a conceptual framework for the key issues developed by Gal'perin. A more general interpretation of these works within the broad framework of Soviet psychology goes beyond the boundaries of the present study. I am fortunate that others have devoted time and energy to interpreting and summarizing these works in a more general sense for Western audiences (e.g. Cole, 1988; Joravsky, 1989; Matthäus, 1988; Mecacci, 1979; Kozulin, 1984, 1990; Van der Veer & Valsiner, 1991; Van Oers, 1987; Van Parreren & Carpay, 1980; Wertsch, 1985).

To Gal'perin, the problem of the subject matter of psychology has always been a theme of major concern. This theme will be discussed in Chapter 6, which is meant as an 'in between' chapter. It is conceived between the both chapters on the sources of Gal'perin's research program. I decided to expose it this way, because Gal'perin's main sources can be found in Vygotsky's and Leont'ev's work (Chapter 5), while Gal'perin used Marx/Il'enkov's and Pavlov/Sokolov's work to pursue further his concept of psychology (Chapter 7).

Gal'perin's thesis, in brief (see further Chapter 6), is that psychology is a special branch of science concerned with that aspect of the mind dubbed by Gal'perin as 'orienting activity.' Not human, mental or cognitive activity in general, but only orienting activity. It is in this respect

that Gal'perin imposed considerable restraints on himself, because he defined the subject matter of psychology in a rather narrow scope. According to Goethe's proverb, 'a master expresses himself in the skill with which he imposes restraints on himself.' It is a matter of further consideration whether or not Gal'perin is such a master.

In the remainder of Part Two, I will outline in detail the way Gal'perin pursued further his concept of orienting activity. This concept is the foundation of his research program on 'systematic formation of mental actions and concepts.' My use of the term 'research program' will be explained in Chapter 7, while the chapters 8 through 10 are devoted to an overview of Gal'perin's research program.

CHAPTER 5

MAIN SOURCES OF GALPERIN'S CONCEPT OF PSYCHOLOGY

In this chapter I will outline some basic assumptions and key concepts used by Gal'perin in developing his thought on psychology. Gal'perin's points of departure can be found in Vygotsky's cultural-historical theory and Leont'ev's theory of activity. My arguments are based on the assumption that the history of the cultural-historical school started with Vygotsky, and that Leont'ev and Gal'perin are part of this history. I agree with Minick's (1987, p. 19) argument that what is known as activity theory should be conceived as an attempt to solve some conceptual problems already outlined by Vygotsky.

Minick (*ibid.*, p. 17) identifies three phases in the development of Vygotsky's approach to psychology. Figure 5-1 illustrates these phases together with the historical positions taken by Luria, Leont'ev and Gal'perin who continued Vygotsky's work after his death. The figure, which depicts the content of this chapter, was composed after a personal consultation with Davydov on 9 October, 1992, in Amsterdam.

Cultural-historical theory

After the 1917 Revolution, Soviet psychology had to face the task of reconstructing psychology on the basis of dialectical materialism. This was a scientific challenge, because the works of Marx, Engels and Lenin do not contain straightforward guidelines for solving the problems of a Marxist psychology.

Kornilov (1879-1957) was the first Soviet psychologist to design a draft of Soviet psychology. He became the chief spokesman for psychology as an independent discipline based on dialectical materialism (cf. Rahmani, 1973, pp. 25-30). Kornilov (1931, p. 268) renamed psychology 'reactology,' that is, the science of the reactions of the living organism to the stimuli of its surroundings. According to Leont'ev (quoted in Cole & Cole, 1971, p. 90), Kornilov's restructuring of psychology along these lines was very warmly accepted and supported. During the 1920s, reactology flourished. In the early 1930s, a critical discussion was initiated and reactology was, along with pedology, abolished because of its alleged deviation from Marxist theory.

Kornilov presented reactology for the first time in the English language in Murchison's 'Psychologies of 1930.' His highly theoretical article on the relationship between psychology and dialectical materialism contains an extensive selection of the basic propositions of Marxist philosophy relevant to psychology. The article illustrates Gal'perin's (1992b, p. 37) view, that Kornilov's first draft was not yet psychology, but rather a paraphrasing of Marxist philosophy. Kornilov (*ibid.*, p. 267-268) considered consciousness an adaptive function determined by man's social environment. His description of consciousness lacks psychological terminology.

According to Gal'perin (e.g., 1972b; 1992b), it fell to Vygotsky to make the first step in translating the Marxist-Leninist concept of man into a psychological theory: the so-called cultural-historical theory. Vygotsky outlined a new, Marxist psychology leading to a "radical reconstruction" of the concept of psychic activity (Gal'perin, 1959a, p. 441). Two aspects of Vygotsky's new approach to psychology are crucial for such a reconstruction: his approach was cultural-historical and instrumental (cf. Luria, 1979, pp. 44-45; Wertsch, 1985a, p. 199).

PHASES IN THE DEVELOPMENT OF VYGOTSKY'S APPROACH TO PSYCHOLOGY

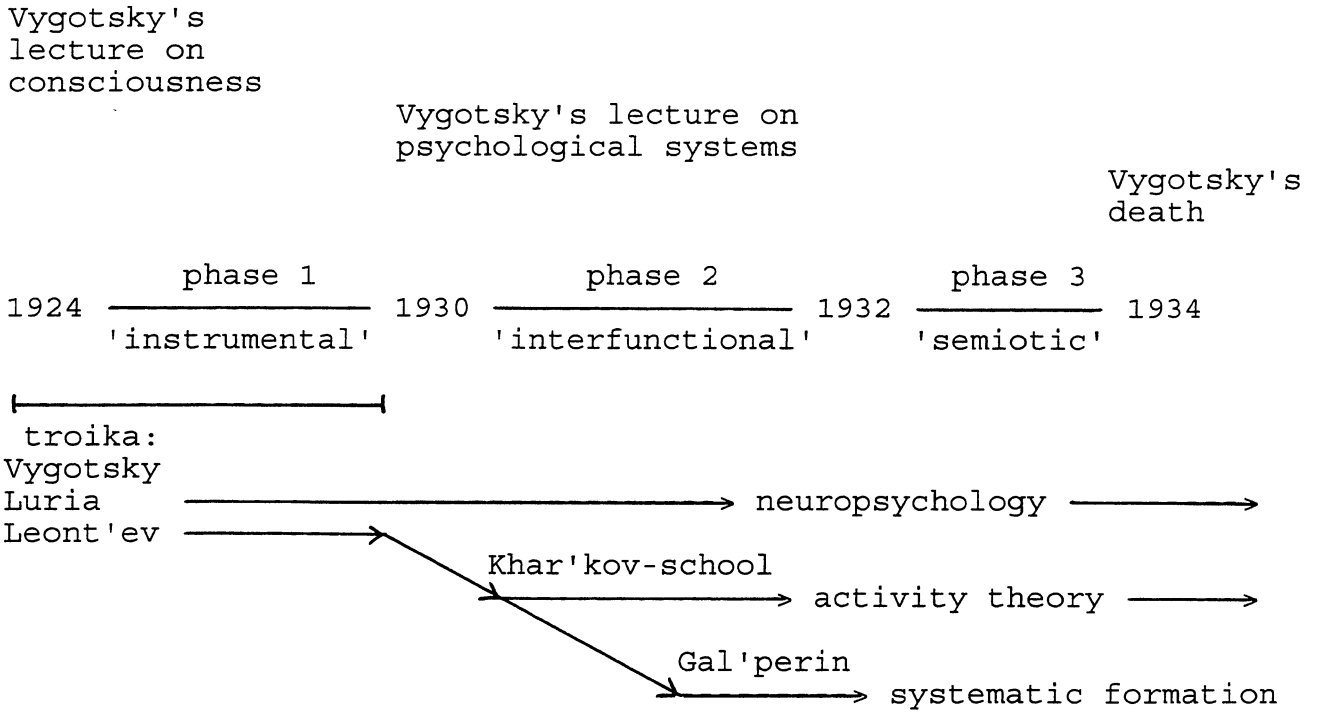


Figure 5-1

Phases in the development of Vygotsky's approach to psychology in the period from 1924 (when he first presented it before an audience of Soviet psychologists) till his death in 1934. Together with the phases, the historical positions are indicated taken by L.S. Vygotsky, A.R. Luria, A.N. Leont'ev and P.Ia. Gal'perin. The figure is adapted from Minick (1987) and Davydov (1992).

The cultural-historical aspect, which is the very foundation of Vygotsky's approach, is intrinsically interwoven with man's social life. It refers to Vygotsky's notion that in order to understand the human mind it is necessary to move beyond its immediate sphere and to consider it the outcome of the assimilation of cultural-historical experience, which pre-exists in social life. Or, as Marx (1845/1986a, p. 29) put it in his Sixth Thesis on Feuerbach: "The human essence is no abstraction inherent in each single individual. In its reality it is the ensemble of the social relations." The sources of these relations have to be found within the long course of man's social history. Henceforward, Vygotsky's approach presupposes a search for the causes of the cultural-historical development of the human mind in man's socio- and ontogenesis.

The instrumental aspect refers to the 'tool-mediated' nature of Vygotsky's approach to psychology. It originates from the concept that the basic condition for social life determines the basic condition for the human mind. According to Engels (quoted by Luria & Vygotsky, 1930/1992, p. 32), labor is "the first basic condition for the existence of man - to such an extent that we, in a sense, should say that (labor - JH) created the first man." Just as labor is characterized by the use of tools, so also is the human mind mediated by psychological tools and every conceivable kind of sign (cf. Vygotsky, 1978, p. 52; Gal'perin, 1992b, p. 38). Like labor itself, human mental activities use their own special psychological tools: signs - and particularly the signs of language. These tools are the 'instruments' of the higher psychological functions with which they perform particular tasks such as memorizing or reasoning. The concept of the tool-mediated or instrumental structure of human mental activity signified a breakthrough to a totally new understanding of the human mind.

Each of the two aspects (the cultural-historical and the instrumental) is linked to the other and can be fully understood only through their interrelationships. In fact, as Wertsch (ibid, p. 15) remarked, it is the way the aspects are interdefined which make Vygotsky's approach unique. How did the two aspects of Vygotsky's approach merge with each other? To understand this we need Vygotsky's concept of internalization, i.e. the mechanism bridging social interaction and psychological activity.

Internalization

The concept of internalization (*interiorizatsiia*) forms a cornerstone of Vygotsky's approach and in contemporary presentations of his views this issue is given much attention (e.g., Iaroshevski, 1989; Kozulin, 1991; A.A. Leont'ev, 1990; Lisina, 1985; Valsiner, 1988; Van der Veer & Valsiner, 1991; Wertsch, 1985). According to Gal'perin (1967, p. 28), Vygotsky brought the concept of internalization into general use in Soviet psychology and gave it a special meaning which it had not acquired in other theories. Gal'perin's theory of 'stage-by-stage formation of mental actions and concepts' represents an extension of Vygotsky's central principle of internalization. Therefore, internalization deserves special attention in the context of searching for the sources of Gal'perin's psychological thought.

From the moment of birth the human infant lives in a social world in which experience is structured through, embedded in and mediated in and through relationships with peers and adults. Psychological functions and the means mediating it are viewed as emerging out of the child's social interaction with objects and adults. Before these functions become an integral part of personality, they manifest themselves in the 'outer' world as interaction between the child and the people around him. They emerge in the social context and are gradually transformed 'inwardly.' Vygotsky views social interaction as analytically prior to individual functioning, or, as he puts it: "it is through others that we develop into ourselves" (Vygotsky, 1930/1981b, p. 161).

Vygotsky (ibid., p. 163) formulated this idea in his often cited 'general genetic law of cultural development' stating that "any function in the child's cultural development appears twice, or on two levels. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpsychological category, and then within the child as an intrapsychological category. This is equally true with regard to voluntary attention, logical memory, the formation of concepts, and the development of volition." This rule is a central tenet of the cultural-historical theory developed by Vygotsky.

As a consequence of Vygotsky's law, as Luria (quoted by Cole, 1985, p. 94) stated, "human beings always live in a double world." Therefore, "consciousness is never uniquely analysable: rather, it is the process of constantly constructing and resolving the differences between a world 'as given' and a 'mediated' image of the world" (Cole, *ibid.*). In order to elaborate this difference between a 'given' world and a 'mediated' image of the world, Vygotsky has made an analysis of the distinction between lower and higher psychological functions from the standpoint of his cultural-historical theory. Van der Veer (1985, p. 109) discussing Vygotsky's theory as a research program, considered this distinction one of its "hard core items."

Lower and higher psychological functions

In Vygotsky's time it was common to split up behavior into lower and higher forms. It was assumed that lower behavior was dominated by elementary sensori-motor functions which are common to both man and animal. Sensations and reflexes tell us, in a manner of speaking, the meaning of internal and external stimulations without the intervention of language and thought. These lower biological and elementary functions can be described and to some extent explained from a "stimulus-response framework" (Vygotsky, 1978, p. 58); i.e. an animal will salivate after smelling meat, a human being will start to perspire when becoming frightened.

On the contrary, the higher psychological functions are typically human and as such based on language and thought. These functions, be they needed to win a game of chess or to solve different kinds of problems, are assumed to represent a qualitatively new level of psychological functioning unique to humans. While lower functions have a biological origin and are formed by maturation and stimulus-response learning processes, the higher functions have their roots in social interaction and are formed as a result of internalization.

According to Vygotsky, the higher psychological functions can only be understood by concentrating on their development, their genesis. A developmental study will disclose their "causal dynamic basis" (Vygotsky, *ibid.*, p. 62). A historically based psychology has as its task to study "the process of a given thing's development in all its phases and changes - from birth to death" (*ibid.*). To underline his methodological preference for "causal dynamic" studies, Vygotsky (*ibid.* p. 65) refers to Blonsky's (1921) statement that "Behavior can be understood only as the history of behavior."

At the end of the 1920s, Leont'ev (1931/1983a, pp. 31-64, p. 387) designed an experiment to demonstrate Vygotsky's new experimental approach. This experiment was carried out at the psychological laboratory of the Krupskaja Academy of Communist Education in Moscow, in the period that Leont'ev was working together with Vygotsky and Luria. It was the period of Vygotsky's first phase (1924-1930) of the development of his theory and Leont'ev and Luria had joined him, forming what became known as the 'troika' of Soviet psychology.

Vygotsky had charged his co-workers with the task, among others, of investigating the psychological tools which mediate the higher psychological functions and the assimilation of such tools during the course of ontogenesis. Leont'ev (*ibid.*, p. 43) took the topic of memory, using the so-called 'functional method of double stimulation', developed by Vygotsky and Luria. Subjects were nursery school children, pupils of the 5th and 6th grade (ten to twelve years of age), and adults. They were presented with two kinds of stimuli: objects to be memorized (nonsense syllables and meaningful words) and auxiliary means as external supports for memorizing.

In one experiment the subjects had to memorize 20 words spoken simply at intervals of about three seconds. In a second experiment, 20 words had to be memorized with the use of 20 pictures. The subjects were instructed, upon the calling of a word, to choose from the pictures the one which represented the word and would help to remember it (for example, one child selected a picture of an onion to recall the word 'dinner'). Leont'ev found that the nursery school children were unable to take advantage of the auxiliary pictures. The pupils considerably improved their memorizing in the second experiment. They recalled twice as many words using the pictures as auxiliary aids. The aids did not facilitate memorizing by adults. There was no significant difference between the two experiments, because the adults' memorizing is so fully developed that the presence or absence of auxiliary aids does not matter.

According to Van der Veer & Valsiner (1991, p. 230), Leont'ev's experiment was, at that time, one of Vygotsky's favorite examples. It clearly demonstrated the two qualitatively different lines of development of psychological functions (in this case memory), on the one hand, and the interweaving of these two lines when such function becomes fully developed, on the other hand. For young children, memory is still a natural, unmediated, lower psychological function. At this age, memory is still a function of biological origin, tied to the processes of growth and maturation. The memorizing results of the schoolchildren reflect the transition from memory as a lower to a higher psychological function. Memory at this stage is externally mediated by the auxiliary aids, which considerably improve memorizing. Now, memory is of cultural-historical origin, although the means are still external. In the adult group the external means are fully internalized. Memory is full-fledged and internally mediated.

Leont'ev's experiment is reviewed and criticized by several authors, e.g. Rahmani (1973, pp. 46-47), Zinchenko (1961, pp. 118-125) and Van der Veer & Valsiner (1991, pp. 230-234). I refer to those authors for relevant criticism. Although this criticism is substantial, the merit of Leont'ev's experiment was evident. He was the first to study memory within the framework of Vygotsky's new approach and provided an example of the tenets of the cultural-historical theory in those early years of its coming into being. It was the time of the first phase (1924-1930) of the development of this theory, at that time still dubbed as 'instrumental' and not yet as 'cultural-historical.' For Leont'ev (1989, p. 28) it was his first step toward the concept of activity, although he at that time worked in Vygotsky's wake and did not yet use the term activity as an explanatory principle and a psychological category (see further on).

Vygotsky and Leont'ev split up

It could be argued that Vygotsky and Leont'ev went separate ways around 1930. Their research endeavors ceased to be so interwoven as in the years before. They both shifted the focus of their research and became separate. In October of 1930, Vygotsky (1982a, pp. 109-131) presented a talk to a circle of his closest co-workers. This talk, devoted to the topic of 'psychological systems,' is generally considered the starting point of the second phase in the development of Vygotsky's theory (cf. Bozhovich, 1977, p. 7; Minick, 1987, p. 18).

Vygotsky (*ibid.*, p. 109) started his talk with the remark that he wanted to discuss the results of their joint research. As mentioned before, Leont'ev's research on memory was such a joint enterprise, which can be used to clarify Vygotsky's concept of psychological systems. Leont'ev's data showed that memorizing of given words considerably improved when the child compared the word to be remembered (*dinner*) with a particular picture (*union*) and made a more or less arbitrary association. Thus, to some extent, the memory task was solved by means of reasoning. Remembering became a mediated activity and memory became logical memory, based on reasoning.

In Vygotsky's terminology, memory as a higher psychological function has come into its own, which means that a new function has emerged in the course of the child's development. Two previously distinct functions (memory and thought) are interrelated and incorporated into a new complex function, which Vygotsky called a psychological system. Vygotsky stated that the course of socio- and ontogenesis is not so much determined by the changing structures of separate functions (the development of memory, learning etc.), but by the formation of new psychological systems that incorporate these functions.

To study such systems and their formation, Vygotsky proposed a new conceptual and methodological framework which was more complicated than he and his co-workers had used up to that time. Thus, Vygotsky's lecture on October 9, 1930, marked the beginning of a new phase in the development of his theory. Up to that time he had focused on the development of separate psychological functions (the first or instrumental phase, 1925-1930). He had raised the question of how psychological tools are used as 'instruments' to mediate mental functioning. The prevailing approach had been the investigation of the mediated character of higher psychological functions. From 1930 onwards the prevailing approach became the investigation of psychological systems as unitary wholes developed through the interweaving of higher psychological functions. Consequently, the second phase in the development of Vygotsky's theory can be called the 'interfunctional' phase (see Figure 5-1). This phase lasted about two years (1930-1932).

According to Bozhovich (1977, pp. 10-11), this new approach was related to Vygotsky's medical work and study at the neurological clinic of Moscow University. Vygotsky held his lecture at this clinic. This lecture appeared to have had considerable influence on the development of neuropsychology in the Soviet Union. Vygotsky's concept of psychological systems was the basis of the study of systemic or dynamic localization of brain functions. It was this line of theorizing which was taken up by Luria, who developed it further and created neuropsychology.

A summary of Vygotsky's ideas concerning 'psychology and localization of functions' can be found in a paper that Vygotsky (1934/1982a, pp. 168-174, p. 467) prepared for the First All-Ukrainian Conference on Psychoneurology, held in Khar'kov, June, 1934. He wrote the text, which is considered his very last, shortly before his death on June 11, 1934. The ideas, expressed in it, are reviewed by Mecacci (1979, pp. 56-63) and Van der Veer & Valsiner (1991, pp. 177-178). In particular, Luria's (1965) article should be mentioned following the English translation of Vygotsky's (1965) 1934 paper. Luria clearly explained how his elaboration of neuropsychology evolved from a foundation laid by Vygotsky, particularly from the new 'interfunctional' approach.

Summarizing, it may be argued that the first phase of the development of Vygotsky's cultural-historical theory was characterized as a joint enterprise of Vygotsky, Leont'ev and Luria. Insofar as these three men are called the 'troika' of Soviet psychology, this refers to the years from 1924 until 1930. In 1930, Vygotsky summarized their joint research and proposed the new concept of psychological systems to develop further the findings of that first phase. After 1930, Luria remained in close contact with Vygotsky, followed Vygotsky's line, and became the founder of Soviet neuropsychology. Leont'ev, although he stayed in contact with Vygotsky, developed his own perspective in Soviet psychology.

Leont'ev received the invitation to move to Khar'kov and he became head of the so-called Khar'kov school in Soviet psychology. This school used a Vygotskian theoretical framework, as developed during the years 1924-1930, as a starting point for their own work. Partly, this starting point was based on this framework. However, there are significant differences. Before outlining the foundation of Leont'ev's critique of Vygotsky, let me give two typical examples of Vygotsky's theory in the first or instrumental phase of its development. From these examples I can move on more easily to Leont'ev's critique.

Two examples from the instrumental phase

Vygotsky (1930/1978, pp. 56-57; 1981b, pp. 160-161) analyzed the development of the child's pointing to an object. The development of this gesture passes through three basic stages. At first, this gesture is nothing more than an unsuccessful attempt to grasp something. The child tries to grasp an object and makes grasping movements with his fingers. In the second stage, people surrounding the child come to the aid and respond to the unsuccessful grasping movements by helping to obtain or reach the object. The child's movements are being comprehended and understood by these people as an indicatory gesture, and they are acting in accordance with this interpretation. Thus, the primary meaning of the child's grasping is established by others. In the third stage, the child itself begins to use the grasping movement as a movement directed to another person. The grasping movement is converted to the gesture of pointing.

According to Vygotsky, this example illustrates how an external movement like grasping is internally reconstructed by the child. The gesture is at first a movement directed towards an object. Through the actions of surrounding people it becomes a movement directed towards another person. Only later does the child begin to understand its movement as pointing. Consequently, after the meaning and functions of the movement is at first created by the objective situation and then by surrounding people, the movement becomes an indicatory gesture. The grasping movement is converted into pointing: it has become a psychological tool used to communicate with another person.

The transition from grasping movement to pointing follows Vygotsky's above-mentioned 'general genetic law' for the assimilation of psychological tools. In its early years, a child is unable to utilize these tools for organizing mental activity; this activity is still not mediated. Through the child's social interaction with adults, the tools are given to the child as external

objects. Gradually, the child acquires the capacity to use these tools 'in its head'; the tools are transformed 'inwardly.' As mentioned before, this transition from interpsychological to intrapsychological functioning is called internalization.

According to Vygotsky (1981b, p.162-163), one can also follow the stages of internalization in relation to the development in speech functions. First, there exists a direct link between a word and what it signifies. A word is just an attribute of an object. In the second stage, this link is used functionally by the adult as a means of social interaction with the child. With the aid of the word, adult and child can communicate with each other; they become interlocutors. Then, in the third stage, the word acquires a meaning and begins to exist as a part of the child's competence and repertoire of representations of the surrounding world. The word becomes a psychological tool in the child's cognitive and metacognitive skills.

This example makes clear an important point also mentioned by Wertsch (1981b, p. 146), namely that Vygotsky is not simply claiming that social interaction leads to a child's mental development. Vygotsky claimed that the very means in social interactions are taken over by the child. As previously stated, in Vygotsky's view it is speech (especially 'word meaning' and concepts) that functions as the most important means for the transmission of social experience from adult to child. So, Vygotsky chose the category of word meaning as a unit for the analysis of consciousness, and he proposed concept formation as an experimental approach to investigating the development of the child's consciousness.

Vygotsky's approach to consciousness is criticized by several authors, among them Brushlinski (1967), Leont'ev & Luria (1968), Gal'perin and Wertsch. Gal'perin (1967a), for example, remarked that Vygotsky in fact considered word meanings as the building blocks that combine to make consciousness. Gal'perin (p. 29) used the term "cellular consciousness" ("kletochkoe soznanie") to designate Vygotsky's notion that word meaning is 'consciousness in nuce;' word meaning is the smallest part (the 'analytic unit') of consciousness that is able to exist by itself. The same criticism has been raised by Wertsch (1985a), who put forward that word meaning does not comprise the structure of consciousness, because it is not really a "unit that reflects the interfunctional relationships that define consciousness" (p. 206).

Thus, according to these critics, word meaning does not fulfill the general theoretical requirements Vygotsky assigned to it. It should be mentioned, however, that Vygotsky himself recognized the inadequacy of the category of meaning as a unit for analyzing the development of the child's consciousness. Zinchenko (1985, p. 100) put forward that, according to Vygotsky, meaning is only one aspect, and does not count for the affective and volitional aspects of consciousness.

Apart from this epistemological problem concerning the insufficient notion of the analytic unit, there is still another problem, which is put forward by Gal'perin (1967a). Vygotsky's conclusion that the origins of consciousness were to be found in the external world, provides by itself no grounds for analyzing the process of internalization. The main question to be explained is how social interaction is gradually transformed inwardly. Vygotsky (1978, p. 57) stated the fact, that "the internalization of socially rooted and historically developed activities is the distinguishing feature of human psychology." However, according to Gal'perin, Vygotsky did not succeed in investigating the series of successive transformations bringing about internalization. Vygotsky's theory stayed unfinished, concluded Gal'perin (1965a, p. 4). He argued that Vygotsky's line of thought really was linked with a new stage in the development of psychology, but that the "radical significance of the concept of internalization remained only potential" (Gal'perin, 1967a, p. 29).

A.N. Leont'ev took the next step by developing the concept of activity within the framework of the cultural-historical theory. Around 1930, he took this step and here Vygotsky and Leont'ev went their separate ways.

The concept of activity

According to Gal'perin (1984, pp. 57-58), it was Leont'ev who first detected a certain hiatus ('prodel') in Vygotsky's ideas concerning the transmission of social experience from adult to child. Leont'ev stressed that the assimilation of social experience is a complex and long-term process in which the child's own active experience is gradually transformed and developed. Between the initial form of the child's activity (e.g., grasping) and its socially determined model

(e.g., pointing) there is a period to which Vygotsky referred in only the most general terms. Vygotsky did not specify what kind of activity is required from the child to assimilate and reproduce the assigned model of some kind of social experience.

In 1930, Leont'ev moved to Khar'kov and there made the concept of activity the focus of his research. Although Vygotsky was invited to join the activities in Khar'kov, his actual transfer did not take place. He frequently traveled to Khar'kov, but his contribution to the psychological discussions within the framework of the 'Khar'kov school' is difficult to reconstruct. Actually, in the chronicles of the history of Soviet psychology there exists a continuous discussion concerning the relationship between Vygotsky and the Khar'kov school (cf. A.A. Leont'ev, 1984). Vygotsky had a profound influence on this school, but they differed in their views on the inner psychological content of human activity.

In 1935, Leont'ev summarized his criticism of Vygotsky in a lecture "The psychological investigation of speech" which took place on 16 February in the All-Union Institute for Experimental Medicine in Moscow. The theses of this lecture were not published until the 1980s (Leont'ev, 1983a, pp. 65-75, p. 387; English translation 1992). It was not published earlier, because, in the mid-1930s, Leont'ev's work became associated with the psychological practices condemned by the 1936 decree against pedology, and psychology as a related science (see Chapter 3).

Leont'ev's lecture summarized the theoretical positions of the Khar'kov school. Leont'ev (1992, p. 29) stated that the development of speech had been chosen as a general theme to continue his previous research. This choice was based on his view that the development of speech can be considered central to the development of thinking and of consciousness. He (p. 30) remarked that this view proceeded from Vygotsky's work, who had investigated the development of speech by studying the development of word meaning. Vygotsky concluded that the development of word meaning (i.e. the generalization of which the word is the carrier) takes place within the social interaction between adult and child: "the child's speech does not develop in monolog but in dialog, that is, in interaction with the speech of adults" (p. 30). However, and here started Leont'ev's criticism (p. 31), it is impossible to find the cause of the development of meaning within social interaction itself. He took upon himself the task of discovering what lies behind social interaction.

Leont'ev (pp. 32-33) put forward the hypothesis that behind word meaning and social interaction lies the child's own activity: "The historical and the societal nature of the child's psyche consists therefore not in the fact that the child generalizes (i.e. acquires word meanings - JH), but rather in the fact that his or her activity (relation to nature) becomes objectively and societally mediated." One of the merits of this hypothesis is that it allowed Leont'ev (p.33) to bridge the gap between "societal and individual consciousness."

It is perhaps this gap ("antinomy," as Leont'ev called it) which most bothered the psychologists working in Khar'kov. Leont'ev expressed his views even more clearly in his 'Notes on Consciousness,' which on the basis of indirect evidence dates from approximately 1936. In 1988, this manuscript was published on the occasion of Leont'ev's 85th birthday with an informative introduction by A.A. Leont'ev (1988, pp. 3-6). An English translation of the 'Notes' have been published in 1989 (part 1) and 1990 (part 2).

In his 'Notes,' Leont'ev (1988, p. 17-18) put forward that Vygotsky's approach to psychology locked itself into a restricted concept of consciousness and that the problem of consciousness itself remained unsolved. Therefore, the new investigations which Leont'ev proposed had to go beyond the problem of consciousness: the origin of consciousness had to be found in external activity.

Gal'perin's position

It may be stated that Gal'perin followed in both Vygotsky's and Leont'ev's tracks. In the early post-Revolutionary years, Vygotsky played the most prominent role in the development of the concept of consciousness within the framework of Soviet psychology. The credit for putting forward an agenda for probing the concept of consciousness in relation to human behavior belongs to Vygotsky. In an early paper, Vygotsky (1925/1982a, p. 78) argued that by "ignoring

the problem of consciousness, psychology is blocking itself off from access to the investigation of any complex problem of human behavior." His effort to define man primarily as a conscious and active being became part of the foundation of Soviet psychology.

As described in Chapter 2, Vygotsky served as a point of departure for the members of the Khar'kov school, who developed their own psychology in the early 1930s. Their activity approach became part of the foundation of Soviet psychology. At that time Leont'ev formed the framework for his activity theory with the primary set of concepts like action, operation, goal and motive. Initially, the 'Khar'kovites' used the expression 'meaningful activity' ('osmyslennaia deiatel'nost'), but later Leont'ev (1989, p. 33) dropped the term 'meaningful,' leaving only 'activity.' Gal'perin (1977a/1992b) did not agree with Leont'ev's abandoning of this term. Gal'perin saw from the very outset that the whole core of the content of human activity consisted of its meaningfulness. Consequently, Gal'perin insisted on the use of the whole expression 'meaningful activity.'

This conceptual difference between Leont'ev and Gal'perin is substantial. Gal'perin studied activity as it relates to the actor himself, and was not interested in activity as it exists in and for itself. He emphasized the actor's personal experience of the activity. To cover Gal'perin's use of the term 'osmyslennaia deiatel'nost', it could be suitably translated as 'personalized activity,' as the Dutch psycho-linguist Carpay (pers. comm.) has suggested. It is activity that has been appropriated by the subject and that during the process of 'appropriation' ('usvoenie') has acquired 'personal sense' ('smysl'). Therefore, henceforward instead of the term 'meaningful activity' the term 'personalized activity' is used as an appropriate English equivalent for 'osmyslennaia deiatel'nost' within the framework of Gal'perin's concept of psychology (see further Chapter 6).

According to Gal'perin (1986a), Leont'ev's dropping of the adjectival term 'meaningful,' has had serious consequences for the elaboration of activity as a key concept in Soviet psychology. It could lead to the fact, that the activity approach somehow would 'spin its wheels' (*buksovat'*), to use Leont'ev's expression. In 1969, during an informal lecture at Luria's home, Leont'ev (1990) made a statement recognizing this state of affairs of the activity approach. On that occasion, apart from A.R. Luria and A.N. Leont'ev, D.B. El'konin, P.Ia. Gal'perin, V.P. Zinchenko and A.V. Zaporozhets were present (Zinchenko & D.A. Leont'ev, 1990, p. 134).

In his lecture, A.N. Leont'ev stated that there was no doubt that the concept of activity was given full expression in Soviet psychology. The various theoretical and experimental studies being carried out had led to a complete system with all the cardinal areas and problems of psychology undergoing redefinition in terms of the concept of activity. The concept was even used beyond the boundaries of psychology and was obviously accepted by a broad scientific community. At the same time, however, according to Leont'ev, despite much work, the activity approach was spinning its wheels.

In Galperin's view, one of the factors leading to this problem with the activity approach, was the fact that Leont'ev had developed his concept of activity in the direction of an all-embracing psychological doctrine. According to Kozulin (1986, pp. 272-273; this ran into trouble, because the concept of activity "was used at one and the same time as the explanatory principle and as a subject of concrete psychological study. The phenomena of activity were 'explained' through the principle of activity." Under such circumstances, it is inevitable that Leont'ev's theory of activity was getting nowhere.

Gal'perin put forward in his doctoral thesis (1965a) that in his opinion the central problems of psychology were still unsolved in Soviet psychology, in spite of all the theoretical and empirical research. He acknowledged, that Vygotsky had taken the first step to a truly psychological theory of consciousness, and that Leont'ev took a second step by introducing the concept of activity. But the next step had to be taken as well. In his view, Gal'perin had made a third step by putting the right question: Why do we need mental activity in daily life?

This 'why?' question is conspicuously absent in both Vygotsky's and Leont'ev's approaches to psychology. Both signified a breakthrough towards a new understanding of human mental activity. But what does it mean to have mental activity at one's disposal? And, if we know it, how do we learn to use it properly. So, Gal'perin put questions concerning the origin, content and acquisition of mental activity from a functionalistic perspective. And, according to Gal'perin, if you know its function, you can investigate how to make the processes of the teaching and learning of mental actions as good as possible (see the subsequent chapters of Part Two).

Summary

This chapter outlines the basic sources of Gal'perin's concept of psychology. These sources may be found in Vygotsky's cultural-historical theory and Leont'ev's theory of activity.

To describe Vygotsky's influence on Gal'perin, I have mentioned two aspects of his new approach to psychology: viz. its cultural-historical and instrumental aspect. Each of these aspects are linked to the other and can be fully understood only through their interrelationships. To understand their connection we need Vygotsky's concept of internalization, i.e. the mechanism bridging social interaction and psychic activity. Gal'perin's theory of 'stage-by-stage formation of mental actions and concepts' represents an extension of Vygotsky's central principle of internalization. Therefore, in this chapter this principle has been given special attention.

Vygotsky's scientific career may be divided into three phases: 1. the 'instrumental' phase (1924-1930); 2. the 'interfunctional' phase (1930-1932); and 3. the 'semiotic' phase (1932-1934). In the first 'instrumental' phase the above mentioned features and the concept of internalization are present and elaborated in the sense as used by Gal'perin. I have argued in this chapter that Gal'perin's source as far as Vygotsky is concerned, had to be found in that very first phase of the development of Vygotsky's approach to psychology.

The same holds for Leont'ev, who was an intimate co-worker of Vygotsky in that first phase. However, in the early 1930s, Leont'ev raised some criticism against Vygotsky causing them to split up. Leont'ev moved to Khar'kov and became head of the psychological school, which had been founded there by some local psychologists, among them Gal'perin. In Khar'kov, Leont'ev developed his critique of Vygotsky laying the basis for the activity approach in Soviet psychology. Leont'ev replaced Vygotsky's focus on signs with the idea that human activity mediates between subject and object. He started to analyze consciousness, activity and external objects as a unified system.

In Khar'kov, Gal'perin was a close co-worker of Leont'ev. In fact, he became a psychologist under Leont'ev's influence. Leont'ev's theory of activity is obviously the second source recognizable in Gal'perin's concept of psychology. However, Gal'perin developed his own concept of activity and considered Leont'ev's concept too broad and, consequently, problematic. According to Gal'perin, not the whole field of human activity can be considered the subject matter of psychology.

Thus, Gal'perin utilized information and modes of reasoning derived from his analysis of Vygotsky's cultural-historical theory and Leont'ev's theory of activity. His own concept of psychology must be understood as an attempt to solve some psychological problems outlined in both theories. Gal'perin's approach to psychology focused on the question: Why do we need mental activity in real life? I will take up this question in Chapter 6.

CHAPTER 6

THE SUBJECT MATTER OF PSYCHOLOGY

In the previous chapter I argued that the main sources of Gal'perin's concept of psychology are both in Vygotsky's cultural-historical theory and Leont'ev's theory of activity. Gal'perin utilized concepts and modes of reasoning from these theories to develop his own concept of psychology. He selected elements and terms considered by him to be crucial, and sharpened them up for use within his own conceptual framework.

Gal'perin considered, however, both theories too broad and too all-embracing. Vygotsky and Leont'ev believed that their approach to psychology was the latest and boldest attempt "to restore the history of the human psyche," as Vygotsky (quoted in Levitin, 1982, p. 322) wrote in a letter (April 15, 1929) to A.N. Leont'ev and A.R. Luria. Moreover, they believed that their approaches had been made possible by the fact that they were living in a revolutionary period under the leadership of the Communist Party. Or to put it in Popper's (1961, p. 64) terms, they were "utopian engineers." Gal'perin, on the contrary, may be considered, what Popper called, a "piecemeal engineer," who "knows, like Socrates, how little he knows" (p. 67). Driven by scientific modesty, a piecemeal engineer attempts to achieve scientific progress by a gradual enlargement of the approved body of knowledge.

Gal'perin developed a research program aimed at a piecemeal reform of psychology. His work is characterized by a balance between theoretical insights and empirical research. He was a skilled and inventive experimenter who attacked scientific problems with an open mind. He set up various research projects and carefully analyzed the results expected in comparison with the results achieved. To describe Gal'perin's research program further (Chapters 8-9-10), I need first to outline Gal'perin's concept of psychology, especially his concept of the subject matter of psychology. In Gal'perin's view, this is a problem of the utmost importance, because no progress in psychology can be achieved without its proper definition.

To Gal'perin, the problem of the subject matter of psychology has always been a matter of major concern. After establishing it, the task and method of psychology may be assigned. Gal'perin's thesis, in brief, is that psychology is a special branch of science concerned with that aspect of the mind dubbed by him as 'orienting activity.' Not human, mental or cognitive activity in general, but only orienting activity. It is in this respect that Gal'perin imposed considerable restraints on himself, because he defined the subject matter of psychology in a rather narrow sense.

This chapter touches upon Gal'perin's concept of psychology and its subject matter. I begin with a bird's eye view of the search for the subject matter of Western psychology from ancient Greece until the 1950s. Gal'perin distinguished three basic concepts (the human soul, the phenomena of consciousness, and behavior) used consecutively to designate the subject matter of psychology. He compared the search for it with the search for the Bluebird out of Maeterlinck's fairy-tale. Gal'perin found his Bluebird in the concept of orienting activity, developed by him in the early 1950s. This concept has laid the foundation for his research program.

The Bluebird of psychology

As described in Chapter 2, Gal'perin became a psychologist in the years 1930 - 1936. In this period he worked mainly with A.N. Leont'ev and actively participated in the foundation and development of the concept of activity in Soviet psychology. This concept was first outlined by the members of the Khar'kov school, of which Gal'perin was one of the organisers. In

Gal'perin's view (1977b/1992b, p. 47) the concept of activity was of fundamental importance only when followed by a radical overhaul of the concept of the subject matter of psychology. This had never been properly conceived, because the practitioners of psychology did not have a clear picture in their minds of the subject matter of psychology.

In this connection Gal'perin (e.g. 1977e, p. 4) used the metaphor of the Bluebird taken from the fairy-tale play of the same name by the French Belgian writer Maurice Maeterlinck (1862-1949). In 1908, this fairy-tale had its first night in Moscow under the direction of Konstantin Stanislavski. In this play Mytyl and her brother Tytyl are in search of the Bluebird in order to hand this bird to a sick neighbour's girl. In spite of a long and adventurous search they do not succeed in finding this mythical bird and instead give their own bird to the neighbour's girl. This generous and loving present makes her so happy that she recovers from her illness.

The Bluebird in Maeterlinck's fairy-tale stands for happiness; it attracts people, has something special and goodness, but nobody knows where to find it. Therefore, the adults send children to look for the bird, because perhaps they will succeed in finding it. But ... alas! Even the children, despite their imagination and persistence, do not succeed. The gist of Maeterlinck's fairy-tale is the message that happiness can be found in oneself. Moreover, we can make others - and by doing so, ourselves - happy by giving something that is dear to our hearts. Thus, according to Maeterlinck, happiness is in fact an attitude toward other people.

It should be clear that Gal'perin did not refer to the very notion of happiness using the metaphor of the Bluebird. Gal'perin was impressed by Maeterlinck's description of a quest for something that is unattainable and compared this with the quest in psychology. In Gal'perin's view, the quest for happiness bears resemblance to the quest for the subject matter of psychology by its practitioners. Pacing with seven-league boots through the history of Western psychology from ancient Greece until the 1950s (when he appeared on the scene), Gal'perin (1976d, pp. 11-22), distinguished three basic concepts used consecutively to designate the subject matter of psychology: the human soul, the phenomena of consciousness, and behavior. But as we will see, none of these fulfill the requirements assigned to them.

Following Gal'perin, I will briefly review the history of the subject matter of psychology. Figure 6-1 both summarizes Gal'perin's view on this issue and depicts the content of this chapter. (See for additional information, used as sources for the next paragraphs: Boring, 1957; Brennan, 1991; Bruno, 1972; Leahey, 1987; Murphy & Kovach, 1972; Van Rappard, 1979; Zusne, 1984.)

Human soul

Psychology as a science has existed for about a century. In the 1870s empirical psychology emerged and in the following decades psychology was established. Germany appeared to be first, due to the fact that Wilhelm Wundt (1832-1920) had started a psychological laboratory at Leipzig in 1879. Other countries soon followed. For example, in 1886 V.M. Bekhterev (1857-1927) opened such a laboratory at Kazan' in Russia, and in 1892 Gerard Heymans (1857-1930) founded the first psychological laboratory at the Groningen University in the Netherlands.

Although by the end of the nineteenth century psychology was recognized as an independent science, notions about its subject matter had existed long before. Psychological thought emerged with the existence of man. Since no written testimony remains, no one knows how prehistoric men conceived the subject matter of psychology. They probably explained psychological matters in terms of spirits that possess the human body (cf. Bruno, 1972, p. 3). Usually, however, outlines of the history of psychology, start with the classic Greek philosophers, because contemporary scientific psychology descends from the notion of psychology in ancient Greece.

SUBJECT MATTER OF PSYCHOLOGY

till 16th century	human soul (<i>dusha</i>)		
16th till end 19th century	phenomena of consciousness (<i>iavleniia soznaniia</i>)		
end 19th century till 1950s	behavior (<i>povedenie</i>)	or	activity (<i>deiatel'nost</i>)
1950s and onwards	information-processing (<i>pererabotka informatsii</i>)	or	activity (<i>deiatel'nost</i>)
			Gal'perin: orienting activity (<i>orientirovochnaia deiatel'nost</i>)

Figure 6-1

The subject matter of psychology from ancient Greece until Gal'perin appeared on the scene (adapted from Gal'perin, 1967d, pp. 11-22).

CONCEPT OF ACTIVITY

<i>developed by:</i>	<i>in terms of:</i>
Vygotsky (1924- 1934)	internal/external behavior/activity
Khar'kov School (1930-1936) *Leont'ev *Gal'perin	meaningful activity
Leont'ev +/- 1936	meaningful activity → activity
Gal'perin +/- 1936 early 1950s	meaningful = personalized activity → orienting activity

Figure 6-2

The development of the concept of activity as the subject matter of Soviet psychology from Gal'perin's point of view (adapted from Gal'perin, 1977b/1992b).

Gal'perin (1976d, p. 12) is no exception and finds the earliest expression of the subject matter of psychology among the ancient Greeks. They considered the human soul to be its subject matter. The advocates of this concept were usually idealists, who regarded the soul as the immortal and non-material aspect of a human being. However, they could be materialists as well, and according to Gal'perin, the early Greek thinker Democritus (ca. 460-362 B.C.) was the most explicitly representative of a purely materialistic approach to psychology. He held the 'atomistic' view that the human soul is made of tiny material particles and that the principles of psychology are expressions of the way in which these particles or 'atoms' combine or interact with one another.

According to Gal'perin, with such a concept of the human soul, it remained unclear what exactly it represented and what it was that psychology examined. The notion of the human soul was used at the same time as the basic explanatory principle and as the subject matter of psychology: "A human being is human by virtue of possessing a human soul and hence acts human", as Leahey (1987, p. 49) put it. Making a none-too-friendly comparison, it could be stated that the concept of the human soul represented to the ancient Greeks what the concept of activity represented to A.N. Leont'ev. As we saw in the previous chapter, Leont'ev developed his concept of activity towards the direction in which he 'explained' the phenomena of activity 'explained' through the concept of activity (cf. Kozulin, 1990, p. 253).

The preoccupation with the human soul remained unchanged for centuries. In fact, it was not seriously challenged until the sixteenth century.

Phenomena of consciousness

The subject matter of psychology changed with the new scientific movement of the sixteenth century. The advances in science and mathematics culminated in the downfall of Church authority based upon faith, and started the age of reason. Francis Bacon (1561-1626) became the great herald of the new empirical spirit and maintained that the scientific method must be predominantly inductive, proceeding from particular events to general conclusions. Due to the emergence of observational methods, knowledge of the physical world accumulated. Although the foundation was being laid for the development of psychology as an empirical science as well, psychology was far from ready to pursue this new course (cf. Brennan, 1991, p. 69). The major obstacle remained the problem of defining the true subject matter of psychology. The new emphasis on objective observation raised the question of how the subject matter should be defined so that observational methods could be applied.

According to Descartes (1641/1970, p. 35), the nature of man is composed of mind and body. However, how should their relationship be conceived? The roots of the central philosophical issue in psychology lie in our concepts of mind, body, and their relationship. Broadly speaking, two parallel positions emerged in philosophy and psychology to deal with this: one (following Descartes) consisted of arguments leading to a separation of mind and body, while the other (following Spinoza) stressed that mind and body are ultimately one.

Descartes (1596-1650) believed that mind and body are separate substances and made a sharp distinction between man's bodily and mental events. He was a dualist and his influence on psychological thinking lies in his mind-body dualism, which, according to Gal'perin (1987) still dominates psychology. The second trend was put forward by Baruch Spinoza (1632-1677), who offered an alternative to the Cartesian mind-body dualism, and believed that mind and body are only two aspects of one reality. He mainly influenced the German tradition in natural philosophy from Goethe onwards. Through this tradition, which became known as 'German classical philosophy,' Soviet psychology became influenced by Spinoza as well (cf. Tolman, 1993, p. 67).

Spinoza's influence is obvious in Vygotsky's writings. According to Gal'perin (1972b, p. 364), Vygotsky considered Spinoza a thinker struggling with the Cartesian dualism and anticipating its removal from psychology. Vygotsky (1972) was especially impressed by Spinoza's theory of the interaction between physiological and mental events during emotional states. He considered it "a starting point for research in a new direction" (p. 377), because it looked for a causal explanation of human emotions. Vygotsky viewed Spinoza's approach to

emotions as an example of the scientific solution of the watershed between explanatory and descriptive psychology. And, as we have seen previously in Chapters 1 and 5, this was exactly what Vygotsky himself attempted to achieve.

Like Vygotsky, Gal'perin (1987) considered the mind-body dualism the Achilles' heel of psychology and he devoted his life as a psychologist to replacing it. From this perspective, it is understandable that Gal'perin (1986a) appreciated such diverse endeavours as those of Hartley, Malebranche and Vygotsky, who all attempted to overcome it. David Hartley (1705-1757) attempted it by founding associationism as a scientific psychological system, including physiological aspects as well, and by referring to sensations and ideas in mental and physical terminology. The French philosopher Malebranche (1638-1715) followed Descartes, but sought to overcome dualism so that it would be compatible with Catholic theology.

However, the Cartesian mind-body dualism dominated in psychology and in this dualistic system the study of the body belonged to physiology and of the mind to psychology. According to Gal'perin (1976d, p. 12), the "phenomena of consciousness" (iavleniia soznaniia) or mental states such as feeling pain, thinking about a problem, mentally picturing an object, etc., became the subject matter of psychology.

Broadly speaking, from the seventeenth century until the end of the nineteenth century, psychology studied these phenomena which are made up of sensations, images, and feelings. Two trends of studying these phenomena emerged. The first trend that begun with Locke, studied their content and structure. This trend became known as structuralism and had been perfected by associationism, and afterwards by Wundt and Titchener. In contrast with the emphasis on mental contents and their structure, a second trend developed emphasizing mental processes and their function. This second trend, with such a notable spokesman as James, became known as functionalism and focused on the applications and use of psychology. This trend had arisen long before but became more prominent as a 'countermovement' to structuralism at the end of the nineteenth century.

As Brennan (1991, p. 164) suggested, one could say that these trends differed in spirit and attitude towards psychological issues. However, they did not differ so much in what they considered the subject matter of psychology. One way or another, both trends studied mental states or, to use Gal'perin's terms, phenomena of consciousness.

By and large, this was the situation at the end of the nineteenth century. Gal'perin (1976d, p. 15) acknowledged that an impressive body of knowledge had accumulated. In his view, however, this knowledge concerned the physical body and was related to such neighbouring disciplines as neurophysiology and psychophysiology. As far as this knowledge had spin-offs for the description of psychological problems, such descriptions were made in terms of these neighbouring disciplines. Apparently, as Gal'perin (p. 15) concluded "a real (psychological - JH) analysis of the phenomena of consciousness is impossible." The problems involved in gaining objective knowledge of these phenomena appeared to be insurmountable. Therefore, at the end of the nineteenth century, consciousness went out of fashion in psychology and the successive subject matter of psychology emerged.

Behavior

"Put it in its simplest terms," as Boring (1957, p. 620) remarked, "psychology deals with the data of consciousness, the data of behavior or both." When consciousness did not meet the desired requirements of psychologists, it was replaced by behavior. Behavior was studied in its own right and not in relation to consciousness. Many behaviorists even held the view that consciousness in man is irrelevant. In the first half of twentieth century, behaviorism became very influential, and, according to Gal'perin (1976d, p. 17), who quoted Boring (1957, p. 645), it seemed as if all psychologists had become behaviorists.

Behaviorism seeks to explain psychological events in terms of observable and measurable behavior. Overt behavior is considered the subject matter of psychology and its 'deep structure' is neglected. According to Gal'perin (1976d, p. 19), behaviorists were blinded by their desire to develop a psychology without consciousness to the fact that their concept of the subject matter of psychology was, scientifically speaking, unacceptable. It was just as vague and elusive as its predecessors: the human soul and the phenomena of consciousness.

Here ends my description of Gal'perin's bird's eye view of the search for the subject matter of Western psychology. He set himself the goal of attempting to solve this problem and give psychology a new and objective starting point. The remainder of this chapter is devoted to an explanation of how Gal'perin reached his concept of the subject matter of psychology. Figure 6-2 summarizes how the remainder of this chapter is outlined.

Activity as the subject matter of Soviet psychology

As described in Chapter 5, Gal'perin's approach reflects two distinctive theoretical orientations within Soviet psychology: Vygotsky's cultural-historical theory and Leont'ev's activity theory. Consequently, Gal'perin's concept of the subject matter of psychology reflects both orientations. To begin with, what was Vygotsky's concept of the subject matter of psychology?

Since the collapse of the Soviet Union, Soviet psychology as an 'area psychology' does not exist anymore. However, the history of Soviet psychology is not only alive but thriving. This is in no small measure due to the extraordinarily fertile mind of Lev Vygotsky who elevated Soviet psychology higher than any other scholar and, in the mid-1920s, rescued it from a persistent neo-behavioristic tendency. Vygotsky urged his colleagues towards a psychology which would reach new levels of meaning of the subject matter of psychology. Exaggerating somewhat, one could say that Vygotsky himself was not restricted to narrow definitions of psychology and found disciplinary boundaries absurd.

Vygotsky's interpretation of pedology may be used as an example. As mentioned in Chapter 3, Vygotsky considered pedology a synthetic science of the child, embracing physiology, defectology, psychology and pedagogy. Pedology is then the synthesis of all these sciences. Vygotsky's urge for synthesis does not confine itself to pedology. Van der Veer & Valsiner (1991, p. 390) considered this urge an "over-riding concern evident in Vygotsky's intellectual work." To underline Vygotsky's concern, they even undertitled their book on "Understanding Vygotsky" with the phrase: "A quest for synthesis."

Gal'perin (1936b, p. 13; 1986a) totally disagreed with Vygotsky on this very point and rejected in general Vygotsky's urge for synthesis. According to Gal'perin, scientific development is characterized precisely by the differentiation of the disciplines involved. If a need exists to synthesize the particular bodies of knowledge in order to collectively deal with the object of study, each science should remain strictly independent.

However, it is difficult to assess on what grounds Gal'perin rejected Vygotsky's synthetic approach. Why did Gal'perin defend disciplinary boundaries? Was his argument against synthesis based on a principled position or on wholly pragmatic grounds? There is reason to believe, that the latter is true and that he simply wanted to retain psychology as an independent science. For a long time, psychology had been subjected to attacks in the former Soviet Union. There had always been a strong impetus to substitute physiology for psychology. This could explain, why Gal'perin strongly argued against synthesis. In his view, the synthesis of psychology with other disciplines, would make psychology 'voiceless' and eventually lead to its disappearance.

Anyway, this is a main difference between Vygotsky and Gal'perin. In Gal'perin's view, Vygotsky did not convey a new concept of the subject matter of psychology. Although Vygotsky presented a new approach with tremendous perspectives, his theory remained unfinished and in need of further elaboration (see Gal'perin, 1965a, p. 4). Vygotsky's 'new look' was his concept of internalization. He viewed it as a process whereby external activity comes to be executed on an internal plane (cf. Wertsch, 1985a, pp. 61-62). Consequently, inner and outer forms of activity are not opposed to each other but intrinsically interrelated. However, the main questions of how their relationships should be conceived and how outer forms are converted into inner forms of activity, were not touched upon. According to Gal'perin (1967a, p. 29), Vygotsky's concept of internalization primarily contained a new method and an argument for "genetic research."

Even if perhaps not entirely original, Vygotsky's concept of internalization was extraordinarily stimulating and of great heuristic value. He once again stressed the importance of upbringing and education as basic factors in a child's development. To elaborate this theoretically, he developed the concept of the 'zone of proximal development.' With this concept he suggested the possibility of radical improvements in the way learners are taught in

school. Actually, this concept echoed Comenius' (1657/1963, p. 24) maxim that "men must be formed by education." In the context of Soviet psychology at the beginning of the twentieth century, Vygotsky was indeed a revolutionary force. But, within the tradition of Western psychological and educational thought, he is more a synthesizer than an innovator. He is a "man for all seasons," as Brown (1979) aptly called him.

In summary, Vygotsky designed a research program for psychology, but did not mention how its subject matter could be conceived. He left this task to others. Vygotsky newly introduced the concept of internalization and devised the conceptual framework within which this concept could be further developed. The Khar'kovites proposed the concept of activity in order to further investigate the process of internalization and especially the transformation of external (practical) into internal (mental) activity.

Historically the members of the Khar'kov school, among them Gal'perin, were the first in Soviet psychology to draw attention to the concept of activity as a psychological category. In Gal'perin's hand this concept took on a more radical form. The true subject matter of psychology, said Gal'perin, is not activity in general, but orienting activity. His distinction between 'activity' and 'orienting activity,' a distinction stated in one word, is really quite far-reaching. His approach is based on the assumption that activity must be psychologically described in terms of its orienting function. To work this out, I have to go back to the origins of the concept of activity in Soviet psychology

Two origins of the concept of activity in Soviet psychology

First of all, activity is not a new hypothesis invented by Soviet psychologists. On the contrary, the term activity is a philosophical and psychological concept originated in classic German philosophy and further developed in Marxism. These two distinctive theoretical orientations determined the basis of activity in Soviet psychology. Let me summarize them briefly .

First, Soviet activity psychology has a German philosophical basis. The psychology that emerged within German philosophy considered the mind as active and dynamic and studied predominantly mental activity. According to Brennan (1991, p. 106), the German philosophical basis of psychology took its inspiration more from Spinoza than from Descartes. Spinoza considered mind and body as integrative aspects of the same entity, which resulted in an emphasis on continuity in the activity of human functioning.

German psychology received its rationalistic approach of mental activity from the writings of Kant (1724-1804). Kant argued that the mind synthesizes the raw sensory data or physical stimuli into meaningful experiences. With the help of mental categories (of quality, quantity, relation, and modality) the mind orders what is known through the senses. The totality of conscious activities which are involved in the choice and the interpretation of sensory data, became dubbed in German psychology as 'apperception'. Especially in Wundt's psychology 'apperception' occupies a central position (cf. Van Rappard, 1979, p. 94).

Apperception can be conceived of as the process of appropriating and interpreting the elements of experience. Apperception is a process of relating these elements to each other and synthesizing them. Herbart (1776-1841) applied this concept to educational psychology and postulated that new knowledge has to contend with the existing 'apperceptive mass,' i.e. the learner's accumulated prior knowledge. Wundt (1832-1920) used the term apperception slightly differently and characterized the process of relating new experience as an active process described by him as 'creative synthesis.' Both Herbart's and Wundt's emphasis on 'wholeness' and 'dynamics' echoed Spinoza's view.

In Soviet psychology, the 'activity approach' of the German tradition received support from dialectical materialism. Consequently, 'dialmat' became the second theoretical orientation of the concept of activity. An early example of the merger of these two orientations can be found in Rubinshtein's work. He was well acquainted with German philosophy and received his philosophical education in Marburg, a centre of Neo-Kantian philosophy. In 1913, on finishing his education in Marburg, Rubinshtein presented his thesis discussing the relationship between thought and being within the framework of Neo-Kantianism (see Payne, 1968, pp. 68-69).

In 1934, Rubinshtein published an article on 'Problems of psychology in the works of Karl Marx,' in which he laid down the principle of the unity of consciousness and activity. According to Rubinshtein (1934/1987, pp. 114-116) this unity is implicit in the Marxian notion

of human activity. In activity, subject and object interpenetrate each other. There is a movement from subject to object, because through man's activity the inner subjective world of motives and goals is projected into the external world. This movement is realized on the level of cognition. However, there is also a movement from object to subject. Due to this movement, the content of consciousness is determined by its relation to objective reality.

The two mentioned distinctive orientations (German philosophy and Marxism) may be considered the philosophical points of departure for the development of the concept of activity in Soviet psychology. Although we can find this background in Gal'perin's writings as well, he developed his own position. In 1977, at the Activity Congress, he outlined it in detail.

Gal'perin's concept of activity

Soviet psychology had become preoccupied with the concept of activity. All leading Soviet psychologists felt obliged to express their understanding of this concept, and Gal'perin was no exception. He first developed his view on this subject in the early 1930s when he was involved in the so-called Khar'kov school. In the years following, he changed his view on the concept of activity and started research to develop it further. By doing this, he took his own position within the activity approach in Soviet psychology.

In 1977, the 5th All-Union Congress of the Association of Psychologists was held in Moscow from June 27 till July 2. This congress was devoted to 'The problem of activity in Soviet psychology' (Menchinskaia & Faraponova, 1977). The proceedings of the papers delivered by Soviet psychologists meeting in Moscow reflected the dispute surrounding the interpretation of it. Pushkin (1977, p. 52), for example, remarked, that in Soviet psychology no systematic psychological research existed to clarify and define properly the concept of activity. The absence of such research caused him to pose the question if activity could be considered such a key concept of Soviet psychology after all.

Menchinskaia (1977) used her paper to express her dissatisfaction with the situation that no generally accepted definition of activity existed among Soviet psychologists. In particular, she reproached psychologists from the cultural-historical stream in Soviet psychology for their "reductionist" interpretation. In her view, the adherents of the cultural-historical school reduced internal mental activity to external activity, because their notion of internal activity is solely concerned with the content and structure of external activity. According to Menchinskaia, this constitutes an obvious form of reductionism. She (p. 49) raised the question of how it was possible that the commitment to activity of the cultural-historical school could result in such a bold reductionistic claim.

Gal'perin's (1977b/1992b) address to the Activity Congress is a fresh, incisive commentary on the importance of this concept. Moreover, in his paper, Gal'perin attempted to explore his own position. Because he himself actively participated in the development of this concept, his reconstruction is far from impartial. To underline his contentious appraisal, Gal'perin used the terms "we" and "us" throughout the paper, and with these pronouns he particularly meant Leont'ev and himself.

As mentioned in the previous chapter, there was a substantial conceptual difference between Leont'ev and Gal'perin concerning the concept of activity. From the very outset, it was Gal'perin's opinion that the very essence of the content of human activity consisted of its meaningfulness. He studied activity as it relates to the actor himself and he emphasized the actor's personal experience of it. Therefore, Gal'perin insisted on the use of the complex expression 'osmyslennaia deiatel'nost,' which I have translated as 'personalized activity.' What does he mean with this epithet? What are the features of personalized activity as seen by Gal'perin?

Personalized activity

First of all, the very term 'activity' needs further explanation. As described in Chapter 5, Vygotsky served as the point of departure for the members of the Khar'kov school in developing their own psychology. The Khar'kovites followed Vygotsky but emphasized the importance of behavior for the development of consciousness. However, the rise of behaviorism

in mainstream psychology, led the Khar'kovites to abandon the term 'behavior' ('povedenie') as a key term which was no longer descriptive of their point of view. Instead, they introduced the term 'activity' (deiatel'nost') to characterize their view. According to Gal'perin (1977/1992b, p. 38), activity became the focal point, the "convex lens," which all the unresolved problems of psychology converged.

Activity was regarded by the Khar'kovites as a means of bringing psychology "out of the closed world of consciousness" (p. 39). The addition of the semantic marker 'meaningful' (or 'personalized') underlined two features of the concept of activity. First, it had to be clear, that there is a distinction from the activity of the forces of nature. These forces generate activity as well, but that activity is spontaneous. Secondly, as mentioned, the Khar'kovites were eager to underline with the aid of an adjective the distinction from the way the behaviorists used the term behavior as a form of human activity. The behaviorists were strongly against 'mentalism' and consequently, regarded consciousness as a non-existent psychological category. The Khar'kovites, on the other hand, wanted to study activity from a mental perspective, and consciousness in terms of its participation in and through activity. Although this notion was already expressed in the use of the very term activity (deiatel'nost') instead of behavior ('povedenie'), the Khar'kovites considered it sensible to emphasize the distinction by adding the adjective 'meaningful' or (in Gal'perin's context) 'personalized.'

Two features of personalized activity need to be especially mentioned: personalized activity is closely interwoven with both subject and object; it is both subject-bound and object-bound. As Carpay (personal communication) has suggested, the affix '-bound' has been chosen by analogy with the meaning of this affix in the word 'context-bound.' 'Subject-bound' refers to the fact that activity presupposes an actor, who understands, interprets, and monitors the content of the ongoing activity. Human activity presupposes subjective factors including man's experience, feelings, motives, goals and abilities. This feature of activity bears resemblance to the previously mentioned concept of apperception. In activity, man expresses his inner subjective world, he makes his inner world objective. Or, to use Marx's expression (quoted by Rubinshtein, 1934/1978, p. 114), all human activity is man's "objectification" of himself.

Moreover, activity is object-bound. This feature is very closely connected with the previous one, because, as stated, in activity subject and object interfere with each other. The Russian adjective for the term 'object-bound' is 'predmetnaia,' which is usually translated as 'object-related.' This translation is too vague, because it should be noticed that there is a primary and fundamental dialectical relationship between activity and its object. Thus, as proposed, the Russian term 'predmetnaia' could be better translated as 'object-bound.'

'Object-bound' refers to the relationship between activity and its object. This relationship is two-fold (see Payne, 1968, p. 85). First, there is an interdependence between activity and its products: the initial material is purposefully transformed into a predetermined product. Or, as Marx formulated it in his 'Capital' (1867/1977, p. 193): "At the end of the labor process we get the result which from the very beginning has been present in a person's mind" (cf. Marx, 1986b, p. 174).

This brings us to the second aspect: reflection or self-consciousness (cf. Il'enkov, 1977b, p. 93). Activity, by changing the environment, is directed upon itself, because it forces the actor to change (Gal'perin, 1977b/1992b, p. 39). The activity by which man transforms external reality, at the same time transforms man's consciousness. Or, to quote Marx' (1986b, p. 173) well known phrase "(by) thus acting on the external world and changing it, (man) at the same time changes his own nature." Or, to summarize the foregoing in Gal'perin's (pp. 39-40) words: "The stubborn facts - what is possible and what is not possible in the purposeful transformation of things - determine mental activity by virtue of their being reflected in consciousness: external, object-bound, personalized activity thus becomes the genuine foundation of mental development."

This was how the concept of (personalized) activity was presented by Gal'perin and his fellow-Khar'kovites in the 1930s. However, it is not easy to perceive the psychological reality behind the features of activity. I suggest the reader returns to the last quote from Gal'perin's work ("The stubborn facts - etc.") and to try to imagine its psychological significance. According to Gal'perin (1977b/1992b, p. 42), all the mentioned features are "important, necessary and fruitful" to understand the role of personalized activity. However, its role from a psychological viewpoint is difficult to grasp. What is the relationship between the concept of

activity and the concept of mind? What is the psychological content of personalized activity? The Khar'kovites hypothesized that they could get access to the mind and mental activity by studying the structure and content of personalized activity. Did they, and Soviet psychologists afterwards, succeed in fulfilling their hopes and in establishing the psychological content of personalized activity?

Gal'perin's (p. 47) answer is short but unequivocal: No! In his view, the concept of personalized activity is of fundamental importance only when "followed by a radical overhaul of the concept of mind" (ibid.). Unfortunately, this was not going to happen. Soviet psychologists, notably Rubinshtein and Leont'ev, did not clarify what the mind was. Obviously, they - and Gal'perin included himself as well - reassured themselves that this was a question of time and that the problem of the mind "would finally find a scientific solution in dialectical and historical materialism" (ibid.). However, the question of the mind was never raised. Consequently, Soviet psychology evaded the question of the subject matter of psychology. If the question of the mind is not raised, "what kind of psychology is this?," Gal'perin (ibid.) asked himself in astonishment.

In the early 1950s he raised the question: Why do we need psychic activity in daily life? What is, psychologically speaking, the function of the mind. The analysis of this problem brought him to the concept of orienting activity.

Orienting activity

Gal'perin puts forward in his doctoral thesis (1965a) that in his opinion the central problems of psychology were still left unanswered, in spite of all the theoretical and empirical research. In one of his latest articles, published posthumously in 1987, he again reiterated this opinion. However, it was his opinion that he had made a start, in the fifties, by laying a solid foundation for psychology by putting the question: What is the function of mind? Why does man need psychic activity (1987a, p. 172)?

According to Gal'perin, the basic function of mind is to orient a person's future actions. Consequently, he (e.g. 1989d, p. 85) views the mind as orienting activity. The mind has a planning and regulating function and is essential in situations involving a unique and non-standardized task. The subject can only cope correctly with this new situation and the tasks to be performed in it, if the actual action is preceded and prepared by orienting activity. This orienting activity must be accomplished at the level of images and involves sizing up and testing the results and products of 'realistic' and meaningful options. This implies that orienting activity is based on a psychological 'model' of the new situation and its tasks. Such a 'model' contains the mental actions and concepts and guides the person's actions in the new situation.

Orienting activity is mentally executed with the aid of thoughts and images in which real life situations are represented. On the basis of the representation of the problem space, a person can orient himself, foresee the effect of his own or somebody else's actions, change his actions to fit the distinctive features of the situation, anticipate options in relation to his experience (his 'knowledge of the world'), and achieve a successful execution of the action. Thus, a person can deal with a task or problem only if his actual action is preceded by orienting activity in the problem space as it is represented in the person's mind.

Gal'perin conceives this orienting activity as the specific subject matter of psychology. Not mental or cognitive activity in general, but only orienting activity. As we will see in the following chapters, Gal'perin's concept of orienting activity is attractive, offering a clear and alternative concept within the activity approach.

Summary

In Gal'perin's view, no progress in psychology can be achieved without a proper definition of its subject matter. Only after establishing this, can the task and method of psychology be assigned. Gal'perin viewed this as a problem of the utmost importance, because he argued that practitioners of psychology did not have a clear picture in their minds of what should be considered the subject matter of psychology. Gal'perin used the metaphor of Maeterlinck's Bluebird to elucidate the quest for it.

Analyzing the history of the subject matter of Western psychology from ancient Greece until the 1950s, Gal'perin distinguished three basic concepts which had been consecutively used to designate it: the human soul (from ancient Greece until the sixteenth century), the phenomena of consciousness (from the sixteenth century till the end of the nineteenth century), and behavior (from the end of the nineteenth century until the 1950s).

The roots of the problem of the subject matter of psychology lies in Cartesian dualism. In Descartes' dualistic system there is a sharp distinction between bodily and mental events. In this system the study of the body belonged to physiology and of the mind to psychology. In Soviet psychology the greatest attack to dualism came from Vygotsky. He outlined a new psychology, but his work remained unfinished. The Khar'kovites, among them Gal'perin, developed the concept of activity to continue Vygotsky's work. Two distinctive orientations (German philosophy and Marxism) may be considered the philosophical background for the development of this concept in Soviet psychology. Although we can find this background in Gal'perin's writings as well, he developed his own position.

From the very outset, it was Gal'perin's opinion that the very essence of the content of human activity consisted of its meaningfulness. He studied activity as it relates to the actor himself and he emphasized the actor's personal experience of it. Therefore, Gal'perin insisted on the use of the complex expression 'osmyslennaiia deiatel'nost,' which I have translated as 'personalized activity.'

In the early 1950s, Gal'perin went a step further. In his view (1992) the concept of activity was of fundamental importance only when followed by a radical overhaul of the questions concerning the subject matter of psychology. He developed the concept of orienting activity and on the basis of this foundation he outlined a new approach in Soviet psychology. As we will see in the next chapter, this approach constitutes a 'research program' based on four core assumptions.

CHAPTER 7

CORNERSTONES OF GAL'PERIN'S RESEARCH PROGRAM

In the previous chapters, I have outlined the main sources of Gal'perin's concept of psychology (Chapter 5) and his concept of the subject matter of psychology (Chapter 6). These issues were central themes in the new approach which Gal'perin developed from the early 1950s onwards. This approach became known in Soviet psychology as the 'theory of stage-by-stage formation of mental actions and concepts.' Gal'perin (1986a) avoided the term 'theory' in designating his approach to psychology, because it is not a scientific theory in the conventional sense. If it is considered as a set of assumptions underlining specific phenomena and capable of being verified by experiment or evidence, the term 'theory' is indeed ill-chosen as a heading of Gal'perin's approach. Gal'perin (1978a/1992c, p. 60) conceived his approach to be a specific way of tackling psychological problems, i.e. a research program, which is characterized by an interface between a theoretical framework and specific psychological phenomena. Gal'perin undertook a research program using some well-defined combinations of theoretical ideas and empirical facts. Because I use the term 'research program' throughout this book, let me first explain what it does and does not designate.

The notion of 'research program'

Lakatos (1974) introduced the notion of 'research program' in the philosophy of science. What he considers as a 'research program' is not much like the above description of Gal'perin's research program and is totally different from what in the regular scientific language is called a research program. A Lakatosian 'research program' is more abstract and historical, and might be conceived as a sequence of developing theories. A research program serves as a heuristic in laying out which problems are worth tackling and how to approach them.

To Lakatos, the history of science can be written as the history of developing, competing and stagnating research programs. Several authors (e.g., Anderson et al., 1986, p. 253; Chalmers, 1990, p. 87; Hacking, 1988, p. 116) underline that it is important to keep in mind that Lakatos introduced the notion of 'research program' to write a rational reconstruction of the history of science. Since Lakatos is not attempting to do anything other than reconstruct this history, his views have little implication for the proper methodology of science. We cannot tell what makes a research program good or bad until after the fact. Hence, the merits of a program can only be decided with hindsight. Nevertheless, I will use some elements of Lakatos' description of a research program to describe Gal'perin's approach to psychology.

In Lakatos' strict view, though, research programs in psychology cannot live up to the standards of rationality given by him to distinguish good from bad research programs. Lakatos agreed with other philosophers of science who considered psychology an immature, unscientific and 'irrational' science. Let me leave this question aside, because Gal'perin as a practicing scientist did not have this worry. He was concerned about solving his scientific problems and conducting the investigations which he saw as relevant and fruitful. In this narrow sense, he did undertake a research program.

Besides this, there are examples of attempts to apply standards of rationality to psychology as well. Van der Veer (1985) made an attempt to apply Lakatos' approach to psychology and showed that at least Vygotsky's cultural-historical theory satisfies Lakatos' demands for a fruitful research program. By doing so, Van der Veer argued that Lakatos' concept of a research program can be applied to psychology as well. Following Van der Veer's argument, I will touch upon Gal'perin's approach as a research program.

Lakatos (1974) introduced the idea of heuristics (a term he borrowed from his mentor Georg Polya) as a key to identifying research programs. Lakatos says that a research program is defined by its positive and negative heuristic. The negative heuristic contains a body of assumptions which are regarded as irrefutable. They are called the 'hard core' of a research program which is never to be challenged, because the "negative heuristic of the program forbids us to direct the modus tollens at this hard core" (Lakatos, 1974, p. 133). Or to put it shortly, the negative heuristic formulates the rule specifying "what path to avoid" (p. 132). It is in this sense that the core assumptions of a research program are called the irrefutable 'hard core.'

In my view, Gal'perin's research program is based on four core assumptions. To begin with I will outline the influences providing the cornerstones of Gal'perin's effort to develop his research program. Based on these influences Gal'perin formulated the assumptions which can be considered to be the hard core of his research program.

Influences on Gal'perin

To some degree, it is possible to rank the influences on Gal'perin in a chronological order. Two of these influences have already been mentioned in the previous chapters, but two others come to the fore from the 1950s onwards. Thus, in my view, four influences may be identified as the cornerstones of Gal'perin's research program:

- 1 Vygotsky's cultural-historical theory;
- 2 Leont'ev's activity theory;
- 3 Pavlov's concept of the orienting reflex as extended by Sokolov; and
- 4 Marx's concept of the ideal as explained by Il'enkov.

To begin with, I will briefly summarize the first two influences, because they have already been discussed in previous chapters (mainly Chapter 5). Then I will discuss the two other influences, which became more prolifically present from the early 1950s onwards. Figure 7-1 gives a chronological summary of the influences and may be conceived as the 'genealogy' of Gal'perin's research program.

Vygotsky's cultural-historical theory

In the early 1930s Gal'perin became a psychologist. At that time, as a member of the Khar'kov school, he first, through A.N. Leont'ev, underwent the influence of Vygotsky. Thus, the major influence that guided Gal'perin's concept of psychology has to be found in Vygotsky's cultural-historical theory. This theory certainly influenced the way Gal'perin posed his research questions.

Vygotsky made the concept of internalization into a key concept of Soviet psychology and gave it a special meaning which it has not acquired in other theories on human development. It is an essential element in the cultural-historical theory and may be considered its backbone. During the successive phases of Vygotsky's scientific career the concept of internalization remained the explanatory principle of the cultural-historical nature of human consciousness.

Vygotsky used this concept, which originated in the French sociological school (a.o. Emile Durkheim and Charles Blondel), to raise the psychological question of how external forms of behavior and social relationships were transformed into human mental activity. Vygotsky (1981b, p. 163; 1983a, p. 145) formulated this idea 'from the outside inward' in his 'general genetic law of cultural development' (see Chapter 5). This law reflects Vygotsky's original elaboration of the phenomenon of internalization. He argues that any psychological function appears "first on the social plane, and then on the psychological plane," and that the social character of a function remains preserved when it becomes internalized. This social-based interpretation is absent from other scientists who also elaborated on the theme of internalization, e.g., Karl Bühler and Jean Piaget (cf. Kozulin, 1990, p. 116). In Vygotsky's (1981b, p. 164) words: "In their own private sphere, human beings retain the functions of social interaction."

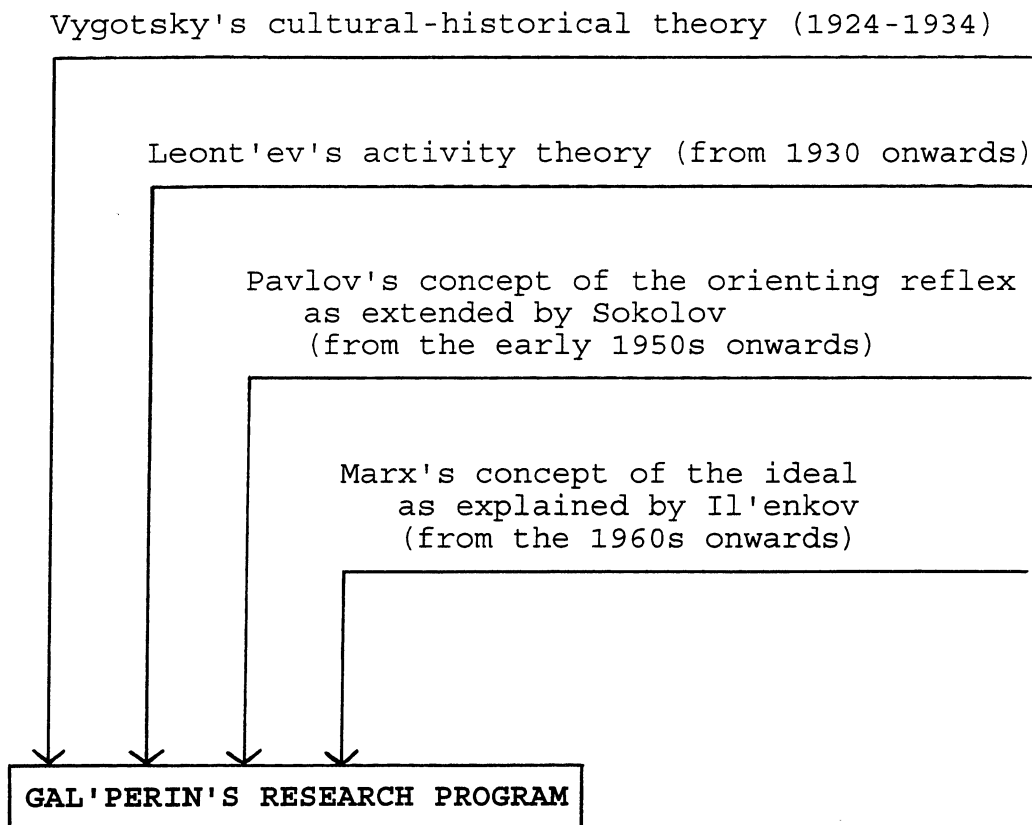
GENEALOGY OF GAL'PERIN'S RESEARCH PROGRAM

Figure 7-1

Genealogy of Gal'perin's research program. The four influences which are identified are presented in chronological order.

Consequently, the idea of internalization raised the question of the process of transformation from non-mental to mental, or, to put it in Soviet philosophical parlance, from material into ideal (see further on). Once the question had been posed in the way Vygotsky posed it, no Soviet psychologist ignored it. According to Kozulin (1984, p. 107), the phenomenon of internalization was studied from two different perspectives. One of these was developed by Vygotsky, who was himself especially interested in the internalization of symbolic tools and social relationships. The other perspective was developed by the Khar'kovites and their leader A.N. Leont'ev. This brings me to the second influence which guided Gal'perin in his process of developing his own position in psychology.

Leont'ev's activity theory

In the first half of the 1930s, the Khar'kovites took over Vygotsky's central principle of internalization and integrated it in the concept of activity. It was Leont'ev in particular who stressed that the assimilation of social experience is a long-term and painstaking process in which the child's own active experience is gradually transformed, developed and internalized. The Khar'kovites put forward that Vygotsky did not specify what kind of activity is required from the child to appropriate and mentally reproduce some kind of social experience. They applied the concept of internalization to the transformation of external activity into mental activity. Mental activity was conceived as derived from external practical activity (see Chapter 6).

Thus, the Khar'kovites based their work on the phenomenon of internalization as expounded by Vygotsky. Moreover, they introduced the concept of activity and laid the basis for the activity approach in Soviet psychology. It was Leont'ev who had given this approach its theoretical momentum. He expressed the activity framework with the aid of such concepts as motive, goal, conditions, action, operation, etc. However, the role of activity from a psychological viewpoint is difficult to understand. Leont'ev (1989, p. 35) was convinced that "if psychology understands what it does, it will study the mind," but what is the relation between activity and mind? For Leont'ev, the premise of the mind is activity and he argued that he could gain access to the mind by studying the structure of activity.

At that time, as a member of the Khar'kov school, Gal'perin largely agreed with Leont'ev and supported his position. Gal'perin contributed considerably to the elaboration of the activity approach in his own experimental work. However, from the very outset he emphasized the actor's personal experience of activity. He studied activity as it relates to the actor himself, and was not interested in the activity as it exists for and in itself, i.e. as an ontological category 'sui generis.' In the early 1950s, Gal'perin radically changed his position and pointed to the limitations of his former concept of activity. He expressed his conviction that, within the framework of Leont'ev's concept of activity, mental activity and the mind itself continued to be inaccessible to objective analysis. For Gal'perin, the concept of activity as expounded by Leont'ev was much too broad to be conceived as the proper subject matter of psychology.

Gal'perin utilized the conceptual inventory and modes of reasoning derived from his interpretation of Vygotsky's cultural-historical theory and Leont'ev's theory of activity. His concept of psychology must be understood as an attempt to solve some psychological problems contained in both theories. He developed the concept of orienting activity, which can be traced back to Pavlov. Here we find the third influence on Gal'perin.

Pavlov's orienting reflex

In the previous chapter I mentioned that Gal'perin considered orienting activity to be the proper subject matter of psychology. According to Gal'perin, the basic function of mind is to orient a person's future actions. The mind has a planning, regulating and monitoring function, and is essential in situations involving a new and non-standardized task. The subject can only cope correctly with a new problem situation and the tasks to be performed in it, if the actual action is preceded and prepared by orienting activity.

Gal'perin's source for the concept of orienting activity has to be found in Pavlov's concept of the 'orienting reflex' and its extension by Sokolov. Their ideas had an important influence on the way Gal'perin posed the question about the proper subject matter of psychology. In order to identify Pavlov's and Sokolov's influence on Gal'perin, I will briefly outline the historical background of the concept of the orienting reflex in Soviet psychology (cf. Gray, 1979, pp. 30-51; Kimmel, 1979; Mecacci, 1979, pp. 106-110; Pavlov, 1927/1960; Rahmani, 1973, pp. 152-158; Sokolov, 1955, 1960, 1969, 1975; Sokolov & Vinogradova, 1975; Van Olst, 1971).

The concept of the orienting reflex was coined by the Russian physiologist Ivan Pavlov (1849-1936). He delineated a new branch of physiology and called it the 'physiology of higher nervous activity.' Within this new branch of science, he developed the experimental procedure of paired presentation of the conditional (*uslovnyye*) and unconditional (*bezuslovnyye*) stimuli in order to study the nervous system and its relation to behavior. By the time he died, he had created a vast body of knowledge about conditional reflexes and had organized it into a systematic theory of learning. This theory of learning is known today as 'classical conditioning' (cf. Gray, 1979, pp. 30-31).

During his investigations with animals, Pavlov observed that any extraneous environmental stimulus elicited an observable attentional motor reaction: the dog may turn its head and eyes towards the source of stimulation, prick up its ears, and so on. Pavlov described this attentive behavior as the 'investigatory' or 'orienting reflex.' Initially, the orienting reflex was regarded as having a disturbing effect on the conditioning process. Due to the orienting reflex any unusual or unexpected change in the animal's general environment, gave Pavlov trouble in his attempts to study conditional reflexes systematically. But very soon Pavlov realized that only stimuli evoking these attentional reactions would serve effectively as conditional stimuli.

In 1910, Pavlov introduced the term orienting reflex (see Sokolov, 1960, p. 189). The orienting reflex was ascribed a central role in conditioning and was considered to have considerable biological significance. In 1926, Pavlov (1960, p. 12) became quite eloquent about the way in which the 'What-is-it?' reflex, as he frequently called it, influenced behavior: "It is this reflex which brings about the immediate response in man and animals to the slightest changes in the world around them, so that they immediately orientate their appropriate receptor organ in accordance with the perceptible quality in the agent bringing about the change, making full investigation of it. The biological significance of this reflex is obvious. If the animal were not provided with such a reflex its life would hang at every moment by a thread. In man this reflex has been greatly developed with far-reaching results, being represented in its highest form by inquisitiveness - the parent of that scientific method through which we may hope one day to come to a true orientation in knowledge of the world around us."

I have presented this long quotation, because Gal'perin's concept of orienting activity can be almost literally traced back to it. Despite the apparent difference (see further on), Gal'perin (1976d, pp. 90-91) acknowledged the resemblance with Pavlov. Moreover, there is still another terminological point making the resemblance once more evident. According to Kimmel (1979, pp. XII-XIII), Pavlov carefully labelled the orienting reflex the 'What-is-it?' reflex, emphasizing the particular object or stimulus eliciting the reflex. Or to use Gal'perin's term, Pavlov pointed with the phrase 'What-is-it?' to the object-boundedness of the orienting reflex. In addition to the simple, attentional meaning of 'What-is-it?,' Pavlov's conveyed the deeper, investigatory meaning of 'What is the nature of this thing?.' Kimmel argued that this designation, this 'reacting-plus-inquiring,' captured Pavlov's intentions and has been a feature of the orienting reflex ever since. But it should be noted that the step from Pavlov (1926) to Gal'perin (1976d) took half a century. Apart from the resemblance between Pavlov's orienting reflex and Gal'perin's orienting activity, there is a crucial point of difference. As mentioned, Pavlov described the phenomena of the orienting reflex in immediately overt motor reactions, e.g., at an unexpected sound the dog turns its head. Pavlov studied the orienting reflex by observation of its external manifestations in the reactions of the skeletal muscles. Consequently, the motor components began to be regarded as the only manifestation of the orienting reflex, and the participation of the skeletal muscles as its essential characteristic (cf. Sokolov, 1966, p. 335). Several Soviet physiologists (e.g., Anokhin, 1935) challenged this interpretation, but it was not until the 1950s that this picture underwent a profound change. This was mainly due to research done by E.N. Sokolov and his coworkers at Moscow University in the 1950s and early 1960s (Sokolov 1955, 1960, 1966, 1964/1969, 1975; Sokolov & Vinogradova, 1975). Sokolov started

to study the orienting reflex in its own right and to analyze it in a systematic way (see Mecacci, 1979, p. 106). As we shall see, notably Sokolov's extension of Pavlov's concept of orienting reflex, was instrumental in getting Gal'perin to outline his position on orienting activity.

Sokolov's neuronal model of the stimulus

Sokolov studied the role of the orienting reflex in human perception. Using electromyographic and electrophysiological techniques, he measured simultaneously various physiological variables such as muscle tonus, cortical arousal, and sensory sensitivity. The data indicated that all these variables may be conceived as components of the orienting reflex. Sokolov concluded that the orienting reflex is a complex general (non-specific) physiological reaction of the whole organism which occurs when any (perceptible) stimulus begins or changes. Thus, the orienting reflex is a non-specific reflex in which the whole organism is involved. With this conclusion Sokolov extended the operational definition of the orienting reflex.

Moreover, Sokolov (1954, 1969) showed that the orienting reflex gradually disappears (or, as it is usually called, 'is extinguished'), when the same stimulus is repeatedly applied (generally five to fifteen repetitions). The disappearance of the orienting reflex is known as 'habituation.' Sokolov (1969, p. 673) considered habituation a basic property of the orienting reflex.

Sokolov showed, that after habituation is complete, the slightest change in the stimulus is sufficient to once again elicit an orienting reflex. It follows, therefore, that the organism has noticed the slight change in the stimulus. After the orienting reflex is extinguished, a radical reduction of the stimulus to a value close to the absolute threshold, will inevitably reawaken the stimulus. For example, when a sound no longer produces an orienting reflex, the latter can be reactivated by slightly changing the pitch of the sound. Thus, Sokolov developed a method for studying fine sensory discriminations. This method appeared to be much simpler and far more sensitive than the conditioning method.

On the basis of his data, Sokolov (1975, p. 217) concluded that the orienting reflex is characterized by "the development of extinction which proves to be selective with respect to the parameters of the repeated stimulus." In order to explain the selective nature of the extinction, Sokolov hypothesized about the formation of a 'neuronal model of the stimulus.' After the first presentations of a new stimulus, a neuronal model gradually develops as a particular group of cells somewhere in the brain. The model retains the properties of the stimulus that evokes the orienting reflex. On successive presentations of the stimulus, there will be an inhibition of the orienting reflex when the properties of the incoming stimulus coincide with the properties of its model. Consequently, habituation of the orienting reflex takes place and the orienting reflex is no longer elicited. On the other hand, when there is a difference between the incoming stimulus and its model with regard to any of its properties, then the orienting reflex appears again.

Sokolov first presented his model in 1960 at the Third Conference on The Central Nervous System and Behavior, held 21-24 February in Princeton, New Jersey. This conference was attended by a select group of about 30 acknowledged scientists to represent a multidisciplinary approach to the discussed problems. Sokolov's paper delivered at this conference, and his later publications concerning his model (cf. Sokolov, 1969, 1975), received wide attention among Western scientists. Generally speaking, Sokolov (1969, p. 683) considered the orienting reflex a unique biological regulator and information-processing device which corrects and anticipates new information and new impulses based on the past flow of impulses.

Gal'perin's 'extension' of Sokolov's model

Gal'perin (1976d, pp. 53-55) was impressed by Sokolov's interpretation and extension of the concept of the orienting reflex. As such, Sokolov's research paved the way for Gal'perin's concept of orienting activity. However, Sokolov's research remained within the neuro- and electrophysiological domain. Sokolov is a brain - behavior theorist, a neuroscientist, while Gal'perin sought to establish a proper domain for psychological research. Already Cole & Maltmann (1969, pp. 13-14) mentioned, that, despite the use of equivalent phraseology, Gal'perin's concept of orienting activity is not used in the same fashion as Sokolov's

interpretation of the orienting reflex. Orienting activity is used by Gal'perin as 'exploratory' or mental activity at the psychological level, while Sokolov studies exploratory behavior on a neuronal or physiological level. The interplay between the two levels remains to be explored.

In the closing pages of his 'Introduction to Psychology', Gal'perin (1976d, pp. 143-147) hypothesized the relationships between the physiological and psychological levels of psychic functioning. He developed a genetic framework for the understanding of the orienting capacity of the animal and human psyche. He proposed four levels in the genesis of an action, where each level is characterized by the organism's increasing adaptive adjustments to environmental events. Within this hierarchy of four levels, the first level of the physical action relates to a mechanistic S-R scheme, while the second level of the physiological action relates to Sokolov's structural scheme of the orienting reflex. Both these levels are not part of the subject matter of psychology. The third level of the goal-directed action and the fourth level of the personalised action may, according to Gal'perin's requirements, be analyzed along psychological lines. In Gal'perin's view, psychology has to deal with the latter two levels.

In summary, Gal'perin was particularly impressed by Sokolov's extension of Pavlov's concept of the orienting reflex. Both Pavlov and Sokolov emphasized that the biological significance of this reflex is obvious. Gal'perin has extended the meaning of the orienting reflex, included mental elements as well, and developed the concept of orienting activity. As such, Pavlov and Sokolov paved the way for Gal'perin's concept of orienting activity. Gal'perin presumed that orienting activity provides the foundation of mental functioning. In this respect, he maintained that it is orienting activity that constitutes the proper subject matter of psychology (see Chapter 6).

So, Gal'perin has borrowed the term orienting activity from both Pavlov and Sokolov. To some extent, they made it clear to him why orienting activity is the basis on which mental functioning is structured. The question remains to be asked of where to find the source of orienting activity: Where does it come from? To this question, Gal'perin found an answer in Marx's writings, and particularly in Il'enkov's 'reading' of it.

Marx's concept of the ideal

Gal'perin's concept of psychology represents an extension of Vygotsky's central principle of internalization. Therefore, I have given it special attention in previous chapters. In the early 1950s, however, Gal'perin began to link the principle of internalization more closely to a theme found in Marx's writings. The following personal event illustrates the importance of this theme.

In February 1986, I had a number of conversations with Gal'perin in his appartement on the Lomonosov Prospekt near the main building of Moscow University. I met him for the first interview on the evening of the February 9th. After the welcome, a bit of social talk and Russian tea, I asked him what issue he at that moment considered to be one of the most difficult concerning his own psychological concept. He answered straightaway that he attributed great importance to the issue of the material versus the ideal. And indeed, it could be argued that Gal'perin's research program was about the question of the 'formation of the ideal.' Let me explain this claim.

To begin with, a succinct formulation of one of the differences between Vygotsky and Gal'perin can be found in their favorite references to certain basic propositions in Marx's writings. Vygotsky's cultural-historical theory had been influenced by Marx's theory and in particular by the Sixth Thesis on Feuerbach, stating that the human essence (the "species-being") is the "ensemble of the social relations" (Marx, 1845/1986a, p. 29). Vygotsky (1981b, p. 164) paraphrased this and said "that humans' psychological nature represents the aggregate of internalized social relations that have become functions for the individual and forms of his/her structure." Vygotsky added that he did not want to argue that his interpretation of the Sixth Thesis reflected its final exegesis, but that he had attempted to give Marx's thesis a psychological interpretation, viz., that individual behavior has to be derived from social behavior. Vygotsky took it upon himself to translate into concrete psychological terms Marx's socio-philosophical anthropology which is so clearly expressed in the Sixth Thesis on Feuerbach (cf. Wertsch, 1991, p. 26).

In comparison to Vygotsky, Gal'perin found inspiration in Marx's thesis in the Afterword to the second German edition of his 'Capital' (1873/1977, p. 27) that the ideal is "nothing other than the material transposed to the human head and transformed in it" (cf. 1986b, p. 29). Gal'perin was impressed by this thesis and considered his approach to the key issues of psychology ultimately grounded in it. He reproduced it in several places, considered it the basic foundation of psychology and argued that the activity theory will be complete if this proposition is taken seriously (Gal'perin, 1974/1989c, p. 74; 1977/1992b, p. 58).

Gal'perin referred to Marx's definition of the ideal to defend his view that mental activity is ultimately derived from concrete material activity. As we will see further on, this statement may be considered one of the elements of the 'hard core' of Gal'perin's research program. This statement provoked considerable controversy among his contemporary Soviet psychologists. Notably Budilova (1972, pp. 291-292), Menchinskaia (1960, p. 161) and Rubinshtein (1957, p. 52; 1959, p. 320) considered it a mechanistic and restrictive meaning of mental activity (see Part Three).

Gal'perin's research program is an attempt to give meaning to the definition of the ideal as 'transposed material.' However, Gal'perin himself did not elaborate his understanding of 'ideality,' but used the definition ready-made by Marx himself. It is obvious that this practice of Gal'perin's sharpened the controversy with his opponents, because Marx did not define the ideal from a psychological perspective.

Discussing this problem with Gal'perin on that evening of the 9th of February, 1986, he referred to the Soviet philosopher Evald Il'enkov (1924-1979) as a suitable source for understanding his own concept of the ideal. Il'enkov was a recognized, although controversial, authority on this subject and had written a long entry on "The Ideal" in the Soviet Philosophical Encyclopedia (Il'enkov, 1962, pp. 219-227). Recently, Bakhurst (1991) published a scholarly and informative book with, among other things, an account of Il'enkov's contribution to Soviet philosophy and psychology. Bakhurst introduced Il'enkov as the "philosophical spokesman" (p. 61) and "philosophical mentor" (p. 218) of the adherents of Vygotsky's cultural-historical school in the 1960s and 1970s. I refer the reader to Bakhurst for an extended and thorough discussion of the problem of the ideal and ideality. I will merely elucidate these terms as far as Gal'perin's reference to it is concerned and confine myself to the aspects relevant to understanding his position in this discourse.

Il'enkov's understanding of Marx's concept of the ideal

Gal'perin (1986a) referred to himself as a Marxist scientist and he certainly didn't only pay lip-service while referring to Marx's writings. For a Marxist, the 'problem of the ideal' is one of the most difficult issues. According to Bakhurst (1991, p. 175), it is the problem of "the status of non-material properties in the material world." Marx's most explicit definition of the ideal has been quoted above as the material "transposed and translated inside the human head."

At first sight, this sounds like a straightforward materialistic concept of the nature of the ideal. If we could equate the term 'ideal' with 'purely subjective and existing in consciousness' and the term 'material' with 'objective reality existing outside and independently of human individuals,' the whole issue is clearly explained. From this perspective, Marx's definition would state that consciousness emerges as a reflection of objective reality.

However, according to Il'enkov (1977a, p. 253) this superficial and general materialistic concept of the nature of the ideal merely served as a starting point for the marxist-leninist solution of the problem of the ideal. The point is that Marx uses the term 'ideal' in a sense that "may perplex the reader who is accustomed to the terminology of popular essays on materialism" (Il'enkov, 1977b, p. 72). What is the matter (see Il'enkov's (1977a, 1977b)?)

The ideal is closely related to activity, and especially to the issue of the object-boundedness of activity. As described in Chapter 6, the object-boundedness refers to the relation between the structure of activity and its object. There is a connection between activity and its products: the initial material is purposefully transformed according to a 'mental model' or image of the product one is striving for. Or, as Marx formulated it in his 'Capital' (1867/1977, p. 193): "At the end of the labor process we get the result which from the very beginning has been present in a person's mind" (cf. 1986b, p. 174). Thus, human activity gives the object a new appearance.

The object is created for a reason, put to a certain use, and incorporated into our life activities. It acquires value or "significance," as Bakhurst (1991, p. 182) called it. This significance is the 'ideal' new appearance of an object.

The ideal is "the form of social human activity represented in a thing", it "is like a peculiar stamp impressed on the substance of nature by social human life activity" (Il'enkov, 1977b, p. 86). Or, to put it more psychologically: the ideal is the mentally represented image of a thing created by human activity. Consequently, the ideal does not exist in objective reality and has nothing in common with the corporeal form of things. The ideal exists solely "in the human head," as Marx defined it. According to Il'enkov (1977a, p. 262), however, Marx did not conceive of "the human head" literally or naturalistically, in terms of a biological part of the body. Marx had in mind the "socially developed head of man" (Il'enkov, *ibid.*) with its 'ideal plane' of socially and historically developed non-material phenomena like language, thought, and logical categories. When, as Marx defined it, the material is 'transposed to the human head,' man acquires a 'ideal plane' through the appropriation of the historically and socially developed forms of human activity.

Put in these terms, the transformation of the material into the ideal implies that the material has to be transposed to and transformed into semiotic means (language, diagrams, etc.) and models of mental activity. Such a transformation is not a one-step process, but covers a series of stages. As we will see in the next chapter, Gal'perin's research program is an attempt to outline the series of successive stages and to give meaning to the definition of the ideal as 'transposed material.'

I close this section with the remark, that in my exposition a distinction has once again emerged between Vygotsky and Gal'perin. For Vygotsky, mental activity has predominantly a cultural-historical origin. For Gal'perin, mental activity has a cultural-historical and material origin, and with both origins present, there is a primacy of the material over the cultural-historical. Consequently, for Gal'perin, mental activity predominantly has a material origin.

Summary: The hard core of Gal'perin's research program

In this chapter I have argued that four influences may be identified as the cornerstones of Gal'perin's research program:

- 1 Vygotsky's cultural-historical theory;
- 2 Leont'ev's activity theory;
- 3 Pavlov's concept of the orienting reflex as extended by Sokolov; and
- 4 Marx's concept of the ideal as explained by Il'enkov.

The major influence that guided Gal'perin's concept of psychology has to be found in Vygotsky's cultural-historical theory. From Vygotsky Gal'perin borrowed the central principle of internalization. Together with Leont'ev, he integrated this principle in the concept of activity. In his own experimental work Gal'perin contributed considerably to the elaboration of the activity approach. However, from the very outset Gal'perin emphasized the actor's personal experience of activity.

In the early 1950s, Gal'perin radically changed his position and pointed out the limitations of his former concept of activity. To develop his own concept of psychology, he utilized the conceptual inventory and modes of reasoning derived from his interpretation of Vygotsky's cultural-historical theory and Leont'ev's theory of activity. His concept of psychology must be understood as an attempt to solve psychological problems contained in both theories. Gal'perin developed the concept of orienting activity, which can be traced to Pavlov. Here we find the third influence on Gal'perin.

Gal'perin's source for the concept of orienting activity has to be found in Pavlov's concept of the 'orienting reflex' and its extension by Sokolov. Their ideas had an important influence on the way Gal'perin posed the question about the proper subject matter of psychology. Both Pavlov and Sokolov emphasized that the biological significance of the orienting reflex is obvious, and as such, they paved the way for Gal'perin's concept of orienting activity. They made it clear to him why orienting activity is the basis on which mental functioning is structured. Gal'perin, however, extended the meaning of the orienting reflex, included mental

elements as well, and presumed that orienting activity provides the foundation of mental functioning. In this respect, he maintained that it is orienting activity that constitutes the proper subject matter of psychology.

The question remains of where to find the source of orienting activity. To this question, Gal'perin found an answer in Il'enkov's 'reading' of Marx's thesis that the ideal is "nothing other than the material transposed to the human head and transformed in it." Gal'perin was impressed by this thesis and considered his approach to the key issues of psychology ultimately grounded in it. He considered it the basic foundation of psychology and argued that the activity theory would be complete if Marx's thesis was taken seriously. Here we find the fourth influence on Gal'perin.

Gal'perin referred to Marx's definition of the ideal to defend his view that mental activity is ultimately derived from concrete material activity. The ideal is closely related to activity, and especially to the issue of the object-boundedness of activity. The transformation of the material into the ideal implies that the material has to be transposed to and transformed into semiotic means (language, diagrams, etc.) and models of mental activity. Such a transformation is not a one-step process, but covers a series of stages. As we will see in the next chapter, Gal'perin's research program is an attempt to outline the series of successive stages and to give meaning to the definition of the ideal as 'transposed material.'

Based on the above-mentioned four influences Gal'perin formulated four assumptions which can be considered to be the hard core of his research program:

- 1 Mental activity has to be considered a form of concrete, material, object-bound human activity;
- 2 The structure and content of mental activity have to be studied in the course of internalization.
- 3 The final product of the process of internalization is mental orienting activity. A person uses this orienting activity as a basis for directing and monitoring further actions in any new problem situation.
- 4 Therefore, orienting activity is the true subject matter of psychology.

Thus, the issue of mental activity as derived from material activity (assumption 1) can be found both in Leont'ev's activity theory and Marx's definition of the ideal. From Vygotsky Gal'perin borrowed assumption 2 concerning the central principle of internalization. Assumption 3 is an extension of Pavlov's and Sokolov's concept of the orienting reflex. In assumption 4 the three foregoing assumptions come together in Gal'perin's pivotal concept of orienting activity. It is the latter, which psychology is all about. Such are the four assumptions which cannot be abandoned or modified without repudiation of Gal'perin's research program.

The hard core in one phrase

Summarizing the four basic assumptions in one phrase one could say that, according to Gal'perin:

psychology is concerned with mental (ideal) orienting activity stemming from material (practical) activity and emerging as the final product in the course of internalization. Thus, mental orienting activity can be fully understood only when studied in the course of internalization. In fact, it is the way that mental orienting activity and internalization are interdefined which makes Gal'perin's research program both theoretically and practically appealing. In the next two chapters I will outline it in detail.

CHAPTER 8

THE SYSTEMATIC FORMATION

In the previous chapter I have identified four basic assumptions of Gal'perin's research program and summarized in one phrase. It was concluded that, according to Gal'perin, mental orienting activity can be fully interpreted only when it is studied as an 'ongoing' activity in the course of internalization. In Gal'perin's theoretical framework mental orienting activity and internalization are intertwined. In fact, this feature makes his approach both theoretically and practically appealing. Gal'perin (1966c, pp. 57-58) argued that previous "classic" research by, among others, Buytendijk, Köhler, Piaget, Stern, and Vygotsky, firmly established the psychological significance of the orienting activity itself. However, where it comes from and how it emerges was not elucidated by those researchers. In order to study these issues Gal'perin developed his research program which became known as 'the systematic formation of mental actions and concepts.'

For Gal'perin the key issue was the formation of mental actions, whose role it is to orient, to monitor and to control future actions in various new problem situations. His rather complicated research program was meant to develop and analyze the basic conditions (the prerequisites) which provide that mental actions will be formed optimally. To some extent, the heuristic value of the research program could be found in the system of newly developed and interrelated prerequisites used by Gal'perin to systematically analyze from various points of view the formation of mental actions and concepts. It is a seminal attempt to design a methodology for concept development in the context of formal (school) learning.

Gal'perin's hypothesis concerning mental actions did not, of course, spring ready-made into his mind. In the early 1950s he began to define this outlook and the prerequisites for the formation of the mental actions involved. Thirty years later, after a series of investigations, the elucidation of the entire set of prerequisites is still incomplete (Gal'perin, 1982a, p. 526). Though the general principles (the four hard core assumptions) of his program have remained almost unchanged over three decades, Gal'perin has continuously changed and developed the set of prerequisites. In a recent work Gal'perin (1985a) proposed a set of four prerequisites.

In this chapter I will give an overview of the whole of the program and the set of prerequisites. Next (Chapters 9 en 10), I will continue and discuss in detail their educational implications. However, before outlining the research program in this chapter, I need to explain the phrase 'the systematic formation of mental actions and concepts.' It is this phrase with which Gal'perin's name is mainly associated. Because it is Gal'perin's key term, I will start with 'mental action.' To begin with, I will indicate how the concept of action fits into Leont'ev's activity framework.

Activity - action - operation

Within the conceptual framework of the theory of activity as conceived by Leont'ev, a sharp semantic distinction is made between the terms activity, action, and operation. The complex structure of activity is analyzed on three levels and, according to Leont'ev, these levels must be kept strictly separate from one another. What a subject is doing has to be analyzed at the levels of activity, of action, and of operations, respectively. In this and the next paragraph Leont'ev's three-level model will be shortly described.

First, there is the level of activity. According to Leont'ev (1981, pp. 46-47), activity as a general concept refers to the accomplishment or result of a "nonadditive, molar unit of life for the material, corporeal subject." Activity is a large unit segment of the total 'life stream' that possesses essential unity. Activity is realized by concrete individuals and takes place either when the subject individually (on his own) deals with the surrounding world of objects ("at the potter's wheel or the writer's desk" - as Leont'ev called it) or jointly with other people. Examples of specific activities are education, labor, creative writing, all kinds of art, politics, etc.

In his keynote lecture on 'The perspectives of activity theory,' presented at a Forum on 'Vygotsky's legacy between past and future: towards a 'Weastern' approach', held October, 9th, 1992 at the Free University in Amsterdam, Davydov (1993, p. 50) defines activity as a "specific species of human societal existence which aims at a goal-directed *change* of physical and social reality" (italics in the original). In the semantic make-up of this definition two distinctive features of activity emerge: activity always includes the intentional change of reality and is situated in actual inter-personal intercourse. Thus, activity refers exclusively to events in the 'conditio humana,' i.e. in human life-forms. Because its basic meaning is restricted to the human kind, there is no need to add the adjective 'human' to the term 'activity.' According to Carpay (pers. comm.), Davydov considers it evidence of an inadequate conceptualization when this adjective is added. Consequently, following Davydov, I will speak of 'activity.'

With all its varied forms, activity does not exist without a system of social relationships. The activity of separate individuals is "determined by the forms and means of material and mental social interaction (...) created by the development of production" (Leont'ev, 1981, p. 47). Each activity of separate individuals answers to a specific motive which induces the subject's activity and gives it its direction. Leont'ev (ibid., p. 60) mentions 'getting food' as an example of a motive. There can be no activity without a motive.

Wertsch (1985a, p. 212) paraphrases Leont'ev's notion of activity as "a social institutionally defined setting" with (often implicit) "assumptions about appropriate roles, goals and means used by the participants in that setting." Wertsch turns to two types of specific activity settings (labor and formal schooling) to illustrate his own interpretation of Leont'ev's notion of activity and the motives involved. When someone takes part in a labor activity setting, his motive will be productivity, while the motive of formal schooling activity, at least in Western educational institutions, is defined by Wertsch as optimalization of learning or "learning for learning's sake." In both activity settings, the respective motives define the setting and act as a 'driving force.'

Through his own research on adult-child dyads in rural Brazil, Wertsch (ibid., pp. 213-216) argues that the identification of the activity level and its motive provides a means for relating social institutional phenomena with intrapsychological functioning. Until then, this analytical level was absent, and the credit for introducing it in Soviet psychology belongs to Leont'ev. Thus, as we have seen, Vygotsky developed the two levels of intra- and interpsychological functioning and indicated their relationship, and Leont'ev added the level of 'superstructure,' i.e. 'activity' to it. By doing so, Leont'ev extended Vygotsky's approach and through this he received attention from Western psychology. Wertsch (1991) extended both Vygotsky's and Leont'ev's perspectives with Bakhtin's approach to language as a 'institutionalized practice' and 'speech genres' as 'sub-routines' thereof. Consequently, Wertsch became capable of answering questions about the relationship between individual mental functioning and sociocultural activity settings. Wertsch (1991, p. 48) asserts that such a concern also became apparent in Vygotsky's work toward the end of his life when he became interested in concept development within the setting of formal schooling.

I have elaborated to this extent on these issues of extension, because at this point we can see the connections between Vygotsky and Leont'ev on the one hand, and Gal'perin on the other hand.

Gal'perin's extension of both Vygotsky and Leont'ev

As we have seen in the previous chapters, Gal'perin extended both Vygotsky's cultural-historical and Leont'ev's activity psychological perspective. Although Gal'perin draws on both, he differed from them in several essential ways. These differences can be found in the ways he extended them.

As far as Vygotsky is concerned, Gal'perin's name in Soviet psychology is especially associated with his attempt to transform Vygotsky's cultural-historical approach to human development into a technology of instruction. It is in this domain that Gal'perin has extended Vygotsky. Gal'perin's research program on the formation of mental actions represents an extension of Vygotsky's central principle of internalization. Gal'perin converted this principle into a new methodological maxim (see further on).

Gal'perin's extension of Leont'ev has to be found in his interpretation of the concept of activity. Gal'perin largely accepted this concept, but interpreted it in his own way as 'personalized activity.' As we have seen, Gal'perin studied activity as it relates to the actor himself, and was not interested in the activity as a 'sociocultural' fact, situated in cultural, historical and institutional settings (cf. Wertsch, 1991, pp. 15-16). Consequently, Leont'ev's three-level analysis did not occupy an important place in Gal'perin's research program. In fact, Gal'perin is merely concerned with the level of analysis of actions, which, according to Leont'ev (1981, p. 59), are "the basic 'components' of various human activities (...) that translate them into reality."

To paraphrase this position, one could say that Gal'perin extended Leont'ev by 'translating' the three-level analysis into the realm of actions. The concept of action is the most important component of activity, because an activity is usually executed by separate actions or a series of actions. Leont'ev (*ibid.*, p. 60) gives an example of this with the case of a human being's activity when motivated to get food. In order to satisfy the need for food, a person may carry out actions (e.g., making a tool for hunting, training hounds, cleaning weapons) that are strictly speaking not immediately directed toward obtaining food. These actions are activated by the motive of getting food, but are each directed to its own particular goal. Thus, in Leont'ev's activity framework, an action is connected with a goal, with the idea of achieving a particular outcome or effect. In its turn, a goal is subordinated to the motive or aim of activity.

Leont'ev introduced the distinction between the duplexes activity-motive and action-goal in order to develop a conceptual framework as a psychological counterpart to Marx's sociological concept of the 'division of labor.' As a society undergoes technological progress, the societal division of labor increases. For example, work in an agricultural society is done in less diverse places by less diverse people than is the case with work in an industrial society, where work is divided into commerce, manufacturing, and other areas (see Russell, 1980, p. 30). The breaking down of labor into different parts is associated with the emergence of specialization of tasks with its particular goals. These goals are subordinated to labor in society as a whole and the range of objectively adequate goals depends on the motive of the activity.

With his activity concept, Leont'ev wanted to explain how societal change affects individual psychological functioning. Leont'ev translated Marx's conceptual framework into a psychological terminology. Consequently, the societal component is prolifically present in Leont'ev's activity approach. This component is, on the other hand, remarkably absent in Gal'perin's approach. He was primarily concerned with the level of actions, and particularly with the transformation of material (practical) actions into mental (ideal) actions. Thus, it is at the level of actions that Gal'perin extended Leont'ev's work. As we will see in Chapter 11, Leont'ev acknowledged Gal'perin's extension of the 'intermediate' (see below) level of the activity framework. Undoubtedly, Leont'ev's support contributed to the successful launching of Gal'perin's research program in the 1950s.

I need to complete this section with a remark on operations. As mentioned, Leont'ev distinguished three levels in his activity framework. Besides activity and action, there is the third level of operations (Leont'ev, 1981, p. 63). This level is associated with the means by which and the conditions under which an action is carried out. For example, a person may choose various operations or means of getting to his office: by driving, walking, or cycling. Or, cutting up a material object may be accomplished by the operations of slicing or sawing. Thus, operations are subordinated to actions.

Gal'perin uses the term operation in a different sense than Leont'ev. To him, operations are 'part-actions' or components of an action. Sequences of discrete operations are combined into actions. The execution of an action means the successive execution of operations. As we will see, the systematic formation of an action implies that the operations involved will be abbreviated and joined together (telescoped as it were) or even skipped in the course of an action.

In summary, of Leont'ev's three-level activity framework, it is only the intermediate level of actions which plays a distinctive part in Gal'perin's research program. However, not actions as such, but mental actions. What is a mental action?

Mental action

Within Leont'ev's framework, actions are connected with goals, they are interwoven. Actions may be described as conscious attempts to change objects according to some goal. Such changes to objects may be realized on a material as well as mental level. Let me explain the execution of an action on a material or mental level.

To begin with, I shall give an example of a material action. A child has to do an addition sum in which the addends are presented with physical counters. The action is called material, when the child is carrying out the task (e.g., $2 + 3 = 5$) by bringing the counters together and joining them, or by touching the counters successively with the fingers, or by pointing at them. All these varied ways of carrying out the arithmetical addition sum are called material actions because these actions involve hands-on manipulation or handling of real corporeal objects, in this case physical counters.

However, objects are changed or transformed not only during material actions. Transformations may also be realized without any handling of real corporeal objects. They may be realized in the mind as well, where the objects have in fact been replaced by their images. Then, the action is exclusively performed internally, 'in the head' or mentally. For example, when I carry out a mathematical calculation or a grammatical or historical analysis internally, these are called mental actions. Thus, mental actions are conceived of as conscious attempts to change objects at the level of mental images.

The ability to perform an action mentally, without the aid of real corporeal objects, makes it possible to predict and visualize the results of that action if and when it becomes an actual action. To Gal'perin, here lays the essential feature of mental actions, because they may be accomplished at the level of images and they involve sizing up and testing the results and products of possible actual actions, before they become external. Together, mental actions and images are the main bases of human mental functioning. According to Gal'perin (1957a, p. 213), mental processes comprise two complementary components: images (representations, perceptions, ideas, concepts) of the world and modes of mental actions (thinking) for handling them.

It was in this way that Gal'perin conceived his key term 'mental action.' On this basis, I may recapitulate Gal'perin's basic assumptions concerning mental activity (see Chapter 7), but now applied to mental actions, as follows.

Gal'perin (1957/1989b) does not treat mental actions and mental images separately, because they cannot be isolated from one another. However, Gal'perin is immediately faced with the problem of how to explain their relationship both to each other and to mental 'objects' such as concepts. Gal'perin's first thesis to explain images and concepts concerns the relationship between material and mental actions. Gal'perin insists that mental actions must be considered to be internalized and abbreviated forms of external, material actions. Consequently, in the second place, the structure and content of mental actions have to be studied 'in vivo' and in genesis, i.e. within the process of internalization of material actions. In the third place, after mental actions have been formed as the final products of the transformation of and reflection on the execution of material actions, mental actions bring forth the formation of images and concepts. Or, in a sentence, images and concepts are formed as a result of mental actions, which in turn are internalized and abbreviated material actions.

This approach to mental actions has, according to Gal'perin, an immediate instructional and educational relevance since it requires that the formation of a new mental action starts with its external material (or, as we will see, materialized) form. Thus, for Gal'perin (1974/1989c, p. 66), the latter form is the cornerstone of any teaching strategy.

Gal'perin's methodological maxim

When we have appropriated a mental process, and this applies particularly to mental actions, it becomes automatic. The structure of the complex processes involved in (expert) reading, writing or counting is hidden from direct observation. Only the final product of learning and mastering these skills can be observed. However, the final product gives no indication of the nature, structure and content of the underlying process. So, the process is known almost entirely through its effects. According to Vygotsky (1978, p. 62), "... the process must be turned back to its initial stages" and studied in its genesis. Vygotsky's genetic approach is also a starting point for Gal'perin (1957a, p. 213), who wrote in his first theoretical 'manifesto' about his research program that "the best way of finding out about the structure of a mental action is to study it in the process of formation."

According to Gal'perin (1967a, p. 29), Vygotsky recognized that a genuine genetic analysis would be a teaching experiment in which the process of formation is systematically (re-)constructed. Therefore, the (re-)constructive role of education is significant in Vygotsky's well-known 'zone of proximal development.' Vygotsky placed the inter-individual interaction with adults and more competent peers at the very heart of this zone. But unfortunately (according to Gal'perin), Vygotsky did not succeed in developing a method of systematic formation, but continued to use cross-sectional and cross-cultural comparative methods to diagnose mental development. Gal'perin tried to fill this gap and extended Vygotsky's 'zone of proximal development' into the notion of 'the systematic formation.' Basically, the systematic formation is a teaching-learning experiment in which mental actions are formed with specific intended (prescribed and desired) properties.

When a child has to learn a new action (e.g. multiplication, the phonological analysis of a word), the educational objective is to bring forth actions with intended properties. In Gal'perin's (1969c/1989b, p. 28) words, the objective "is not simply to form an action, but to form it with specific, prescribed properties. Such a task decisively alters the general strategy of the investigation: instead of studying how an action is formed, another requirement now emerges: to ascertain and, if necessary, to create conditions ensuring that the action will be formed with the prescribed properties."

It was in this way that Gal'perin (1986a) decided to study how the psychological background for the solution of different learning tasks was established. He first started to investigate how different mental actions came into being. In this way he could find out what he was aiming to develop. He wanted to be able to stipulate under what prerequisite conditions within a prespecified activity setting an action would be established and would become characterized by properties that would provide its optimal performance in advance. Gal'perin's (1966a, p. 251) methodological maxim became: "**No more observation, only formation!**"

The American cognitive psychologist Kosslyn (1980, p. 407) called such a strategy a "backward extrapolation strategy." In Gal'perin's case, this means that the empirical and theoretical knowledge of the mature and full-fledged final outcome of a mental action directs the systematic formation of such action. In the early 1950s, on the basis of a "backward extrapolation strategy," Gal'perin with some co-workers began to study the mental actions and concepts that have to be appropriated in elementary education. They studied the qualitative changes that the teaching-learning process must undergo to provide the systematic formation of mental actions and concepts. Two of the first studies based on Gal'perin's newly proposed methodological maxim concerned the formation of the notion of addition (Davydov, 1953), and of geometrical concepts (Talyzina, 1955/1957). These and other early research projects were conducted under Gal'perin's direction at the psychological section of the Philosophical Faculty of Moscow University.

The positive results of these projects inspired Gal'perin to set himself the goal of giving psychology a new and objective starting point. In July 1952, a few months prior to his 50th birthday, Gal'perin (1953b) officially formulated this starting point in a paper delivered at the

the First All-Union Conference on Psychology, held in Moscow. Gal'perin regarded it as the 'royal road' to investigation of the genesis and psychological content of mental actions and of images and concepts that are formed as a result of them. As we will see further on, his approach was characterized by the role he assigned to orientation and actual handling of material objects. On this basis, he gave detailed instructions for the organization and arrangement ('orchestration') of 'teaching-learning processes.' These instructions can be found in the set of prerequisites Gal'perin distinguished to provide the proper systematic formation.

Here ends my explanation of the terms of the phrase 'the systematic formation of mental actions and concepts.' Henceforth, the whole phrase is not often used, because it is too cumbersome. I will refer to Gal'perin's research program with the summarizing term 'the systematic formation.' Now, I will begin the description of the set of prerequisites providing the systematic formation.

Set of four prerequisites for the systematic formation

The systematic formation embraces a comprehensive and complex teaching-learning process. In order to achieve it Gal'perin (1982a; 1985a, p. 4) has distinguished a set of four significant and interrelated prerequisites. These can be considered the four 'subsets' of the prerequisites for:

- 1 the learning motive;
- 2 the orienting basis;
- 3 the properties or parameters of an action;
- 4 the stepwise procedure aimed at the formation of a full-fledged mental action.

In the remainder of this chapter I will consider the first three prerequisites successively. These three are integrated to become elements of the fourth one, the stepwise procedure, which is basically a teaching strategy. Figure 8-1 depicts this state of affairs. The next chapter will be totally dedicated to the fourth prerequisite, because it can be considered the 'burgeoning kernel' of Gal'perin's research program.

The first prerequisite: The learning motive

From the very beginning of the history of Gal'perin's research program, the systematic formation of learning motives, especially 'intellectual' or 'epistemic motives' (cf. Berlyne, 1960), had occupied the minds of Gal'perin and his co-workers. It is generally acknowledged by them that 'intellectual learning motives' are inevitable for learning and that pupils should be initiated into the learning task in such a way that they are genuinely motivated to learn. Unfortunately, this prerequisite 'subset' on learning motives, which should be one of the most important, is almost void. According to Talyzina (1977, p. 3), there is only one work (Golu, 1965) which is especially designed to investigate this issue within the context of the systematic formation.

Two reasons can be mentioned for the investigation of learning motives was not being given due consideration within the context of the systematic formation. Firstly, it may be argued that Gal'perin's research program represents a 'theory of instruction' in which the investigation of learning motivation often has no explicit place. Secondly, within the activity approach, motivation is theoretically conceived at the analytical and highest level of activity, not at the intermediate level of actions, with which Gal'perin was primarily concerned. Both reasons need further clarification.

The first reason concerns the instructional focus of Gal'perin's research program. In Soviet psychology Gal'perin's name is especially associated with his attempt to transform Vygotsky's cultural-historical approach to human development into a technology of instruction. Soviet psychologists differentiated fairly sharply between education (*obuchenie*) and instruction (*nauchenie*). Education, in the narrower sense (i.e. *vosпитание*), has as its central task and problem the formation of the pupils' personality, including moral qualities and attitudes toward study, work and society. The personality aspect of education is crucial, because pupils must not only perceive but also accept schoolwork as an activity that has societal significance and for which they have personal responsibility.

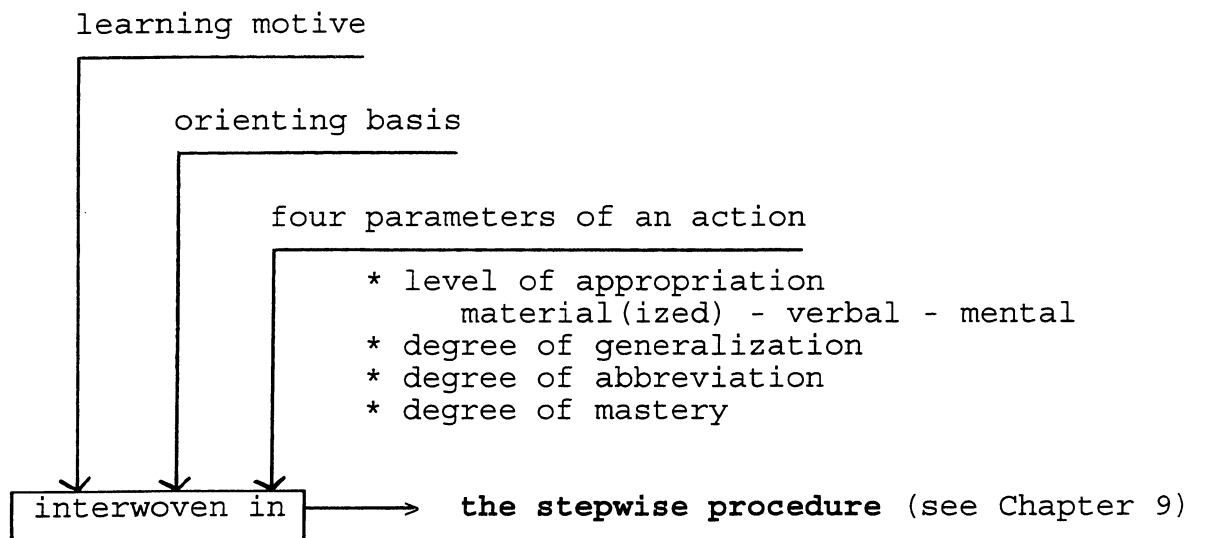
SET OF FOUR PREREQUISITES FOR THE SYSTEMATIC FORMATION

Figure 8-1

Set of four prerequisites for the systematic formation.
The first three become interwoven components of the stepwise procedure (cf. Figure 9-1).

In Gal'perin's work this concern of education has no explicit place. His research program is primarily concerned with the continuous sequence of learning actions within activities such as reading, writing, doing grammatical, mathematic, and historical analyses, etc. In such activity settings the immediate subject matter of instruction covers a considerable portion of school subjects. Gal'perin as an instructional psychologist, focused on the operational aspect and did not outline a particular view on learning motivation. According to him, when the subject matter content is properly conceived and taught, there will be no paramount motivational problems.

Gal'perin (1986a) simply stated that part of the problems in the domain of learning motivation has its origins in bad instruction. The overburdening of pupils, their insufficient preparation for learning tasks, vague explanations, etc., give rise to unpleasant feelings, lead to a loss of confidence in the teacher and will ruin the pupils' motivation. Such motivational problems due to bad instruction were not taken into account by Gal'perin, because he was convinced that his approach simply makes instruction as good as possible. And, as the proverb says, 'nothing succeeds like success,' which in an instructional context means that good instruction preserves or even enhances the pupils' motivation to learn.

From a common sense point of view this may seem a 'sound' assumption, but psychologically spoken, there is no empirical support for it. This brings me to the second reason for Gal'perin's neglect of the problem of learning motivation. There is more to it and Gal'perin's failure to examine it is obviously a demerit of his approach. Many authors (e.g., Duric, 1989, p. 91; Hakkarainen, 1985, p. 136; Van Parreren, 1985, p. 43) outline that motivation is the essence of learning and a lack of it is a psychological barrier to human learning. It is a long-term affair and certain requirements should be met in order to maintain motivation during prolonged learning activity and for further learning. Gal'perin did not properly analyze this subset of prerequisites and did not investigate the motivational domain of learning as a structural component of learning activity.

Davydov (Carpay, pers. comm.) explained this by rightly arguing that Gal'perin does not have an 'overall' concept of learning activity. Gal'perin remained at the level of learning actions, and at this level episodic learning motives can keep things going. Consequently, at this level learning motives do not have their proper place. As mentioned before, within the activity approach, motivation is theoretically conceived at the analytical level of activity, not at the level of actions. For the sake of brevity, I refer the reader to Markova (1990) for an account of the development of learning motives in the context of the activity approach.

Thus, discussion of the prerequisites for the learning motive within the Gal'perin's framework requires further research. I end this short exposition of the first prerequisite for the systematic formation with the conclusion that this particular field of study has been obviously neglected by Gal'perin.

The second prerequisite: The orienting basis

Gal'perin (e.g., 1975a, p. 88) considers his own approach as a new outlook on the appropriation of knowledge and skills. He sees appropriation from the point of view of the structure of the pupils' actions. His epistemology is based on the notion that the appropriation of new knowledge and skills is the outcome of human action. To him, 'actions' are the basic 'units of analysis' in psychological research.

Within the conceptual framework of the Theory of Activity, actions are conceived as conscious attempts to change objects according to some intended goal. Viewed from this perspective, the teaching-learning process aims at the qualitative improvement of the learners' repertoire of present and actual actions (cf. Van Oers, 1990, p. 60). To Gal'perin, the optimalization of this repertoire depends on the pupil's representations of the goal, the structure and the mediational means to execute a certain action. He introduced the term 'orienting basis,' which is an extension of the term orienting reflex (see Chapter 7), to refer to these representations. The orienting basis predetermines, to a very large extent, the quality of the execution of an action.

Extending the results of Köhler's (1917/1965) experimental demonstrations of apes' reasoning powers, Gal'perin (1969c/1989a, p. 30) argues that to some extent reasoning, rationality and insight are objective characteristics of an action. According to Heidebreder (1933, p. 354) Köhler's studies of anthropoid apes (chimpanzees) show that solving a problem is a

process in which every action falls into place in the total pattern (Gestalt). It is this alone which gives it significance. For Köhler (1965, p. 570), the criterion of insight is "the appearance of a solution complete with reference to the layout of the entire field."

To test this notion about learning, Köhler used, for example, an experimental setup in which an ape had to put together two sticks to make them long enough to reach fruit suspended out of reach. Before an insightful solution to such a problem is reached, a rather lengthy period of time passes. The ape goes through a number of 'hypotheses' until it hits upon one that works. Köhler (p. 571) noticed, that an ape seldom attempts an action that would have to be considered accidental in relation to the problem space. Moreover, Köhler observed that the solution never emerges from the disorder of blind impulses. Success often follows after a "period of perplexity or quit, a pause that is often also a period of survey" (ibid.).

Thus, in Köhler's experiments, when an ape learns some new behavior, there is often some kind of pattern in which three phases can be distinguished. Firstly, the ape learns the relationships between the objects involved. It makes various attempts to find a solution in a half-understood problem space. Secondly, there is a period of survey, in which the ape perceives the situation in a new and different way. Both phases are part of a pre-solution period, leading often to the sudden occurrence (the 'Aha-Erlebnis') of the third phase. This final phase is characterized by the appearance of a complete solution, which arises, according to Köhler, as 'insight.'

The ape's attempts at a solution usually proceeds by discontinuous improvements in performance. Köhler used his observations as arguments against Thorndike, who concluded that learning was incremental rather than insightful. To Thorndike, the basic form of learning was trial-and-error learning, which occurs incrementally, i.e. in very small distinctive steps. Thorndike (1911; quoted in Hergenhahn, 1988, p. 60) argues that he found no evidence to support the view of reasoning "as the function of reaching conclusions by the perceptions of relations, comparison and inference" in the behavior of apes. As mentioned above, Köhler (1917), in contrast to Thorndike, demonstrated their insightful reasoning powers. According to Köhler, for insight to occur, the ape must be exposed to all elements of the problem space. When important elements are hidden from the animal, insightful learning fails to occur (cf. Eisenga & Van Rappard, 1987, p. 51; Heidbreder, 1933, pp. 345-355; Hergenhahn, 1988, pp. 60-61, pp. 252-257).

In the mid 1930s (see Chapter 2), Gal'perin used, among others, Köhler's observations to design his own research on the development of motor skills. Like Köhler, he discovered the discontinuous improvement in the learning of tool-mediated operations. According to Gal'perin (1936a), the occurrence of a survey phase is exceptionally important for the improvement of motor skills. Based on the experience acquired from the feedback from its actions, the subject builds up a representation of the problem space. This representation is used to execute and monitor further actions.

In the early 1950s, Gal'perin introduced the term orienting basis to signify such a representation and its function. His theorizing on this key issue program can be traced back directly to Köhler's research and his own early research as a member of the Khar'kov school. In the 1950s, he transposed Köhler's concept of insight and insightful learning into his own framework and terminology. He argued that insightful learning can occur if the subject (be it an animal or a human being) has at his disposal a complete orienting basis consisting of all the elements of the problem space in question. With such an orienting basis the subject 'comes to see' the solution after pondering the problem.

Gal'perin (1969c/1989a, p. 30) came to the conclusion that the measure of rationality ('razumnost') of an action is determined by how much the pupil's action is driven by the components of an action, such as the goal, the structure and the means. These components constitutes the orienting part of an action. To signify this orienting part, Gal'perin introduces the term Orienting Basis of an Action. This term is abbreviated as OBA and refers to the totality of orienting elements by which the pupil is actually guided when executing an action. As we will see in the next chapter, the orienting basis consists of several components and serves in the teaching-learning process as a monitoring or 'homing' device. (The latter terms are suggested to me by Carpay as suitable equivalents of Gal'perin's term 'orienting basis'.)

It is obvious that the OBA is something that is difficult for pupils to discover by themselves. In one way or another pupils should be helped in constructing some kind of an OBA. In principle, some pupils are capable of discovering an OBA totally by themselves, which would

represent an instance of genuine creativity. However, most pupils need external help (or 'scaffolding') in developing a suitable OBA to execute the actions to be learned. Gal'perin has given guidelines for constructing an OBA in a collaboration between teacher and pupils (see Chapter 10). By doing so, Gal'perin developed a teaching strategy for learning in the 'zone of proximal development' (cf. Vygotsky, 1978, pp. 85-86). Or, to put it in current terminology, he developed a teaching strategy for 'scaffolding' (cf. Bruner, 1985, p. 25; Brown & Palinscar, 1989, pp. 410-411; Snow & Swanson, 1992, p. 609).

In summary, I conclude this section by stating that, to Gal'perin, there is always an orienting part of an action, before an action can actually be executed. The standard to measure rationality of an action is largely determined by the extent of this orientation. Gal'perin introduced the concept of orienting basis of an action (OBA) as the second prerequisite for the systematic formation. The OBA refers to the totality of orienting elements which a pupil has at hand and by which he is actually guided when executing an action.

The third prerequisite: The four parameters of an action

Gal'perin (1957a) focussed his first research on the mental actions taught and mastered in school settings. At the beginning of the 1950s, he and his collaborators started research on the formation and the structure of elementary mental actions in arithmetic in pre-school and first grade children. For example, they asked the children to add and subtract numbers from 1 to 10, and observed whether they could carry out this task with material objects, aloud, or 'in their head.' On the basis of several investigations along these lines, Gal'perin concluded that each concrete form of an action can be classified by several fundamental and characteristic properties. Gal'perin refers to these as the parameters of an action and considers these to be the third 'subset' of prerequisites for the systematic formation. He distinguishes four such parameters (see Gal'perin, 1957a, pp. 215-216; 1965a, p. 10; 1966a, p. 252; 1969a, p. 250; Talyzina, 1981, pp. 63-67):

- level of appropriation
- degree of generalization
- degree of abbreviation or completeness
- degree of mastery.

I will discuss them successively.

1. Level of appropriation (*uroven' usvoenie*)

An action may be performed at different levels and Gal'perin distinguishes three basic levels: the material(ized), the verbal, and the mental level.

At the **material** (or materialized) level the action is performed with the aid of physical objects (or the material representations - models, pictures, diagrams, displays - of the essential properties of these objects); this level involves manipulation of concrete external objects (material actions) or externalized modes of handling them (materialized actions).

Example: carrying out an arithmetical addition task (e.g., $2 + 3 = 5$) a child needs to touch the physical objects successively with his fingers or to point at them; as soon as the objects are removed, inability to solve the task reappears.

At the level of the spoken word (overt speech) or the **verbal** level the action is performed "speaking aloud" without using or without the presence of the physical objects themselves; at this level the external objects are no longer indispensable.

Example: doing the addition by speaking aloud the digits without the objects available.

At the **mental** level the action is exclusively performed internally ("in the head") and both external objects and audible speech are no longer necessary.

Example: a pupil does an addition by himself and gives the answer after completing the arithmetical task.

2. Degree of generalization (*mera obobshchenosti*)

This parameter represents the degree to which those properties of the object of an action, which are constant and essential to performing, are isolated and distinguished from the inessential and variable ones. To generalize an action means to distinguish those properties of an action which are necessary for the execution of an action. Generalization occurs when from the very beginning several varieties of the material involved are used in order to carry out the learning tasks. This prevents the learner from getting used to inessential properties of the objects.

Example: there is an obvious difference in degree of generalization between a child which can solve an addition using the numbers from 1 to 10, but not from 11 to 20, compared to a classmate who easily performs both types of addition.

3. Degree of abbreviation or completeness (*mera polnoty*)

This parameter indicates, whether all operations which are originally included in an action, are in fact executed. As an action develops, the number of operations is reduced and the action becomes abbreviated. Initially, an action will be executed in its most extended form. Then, some of its operations will be joined together or 'telescoped' as it were (cf. Carpay, 1990).

Example: a child will carry out an addition ($3+2=5$) by taking the first addend as a whole and adding the second on to it by counting in ones. Another child takes both addends as wholes, while a third child sees the solution in one glance, without intermediate steps. These three possibilities of solving the addition differ in their degree of abbreviation; the first child solves the addition in a more extended form than the other children.

4. Degree of mastery (*mera osvoeniia*)

This parameter includes such features of actions as the ease and the rate with which they are carried out, and the degree of automatization. Initially, each operation within an action is consciously distinguished and slowly executed, but gradually the action will become automatic.

Example: an action is not mastered sufficiently, when a child can carry out an action only at the teacher's request, but not on his own. Or, some pupils have a high degree of mastery of addition by directly counting objects one by one; this can be considered to be a premature automatization forming an obstacle to further arithmetics. The latter automatization exemplifies the fact that a high degree of mastery does not always signify a positive property of an action. It is often desired that the action on the material and verbal level retains an extended form and that automatization (often accompanied by abbreviation) only occur at the mental level.

These four parameters are viewed by Gal'perin as the distinctive properties of an action. They stand in different relation to each other and are relatively independent. At all the levels of appropriation (material(ized), verbal or mental) actions may differ in the three other parameters (the degree of generalization, abbreviation, or mastery). The formation of an action will pass through the three levels and at each level each parameter has to be elaborated according to the intended requirements. The levels of assimilation are related to each other in the sense that a higher level always assumes the presence of the preceding ones. The sequence of levels, combined with the appropriate elaboration of the action at each level guarantees that an effective and full-fledged mental action will be appropriated.

To provide the systematic formation, all parameters have to change in the intended directions. Passing through the levels of appropriation is but one aspect of the systematic formation. Gal'perin proposed a fourth prerequisite in which the preceding prerequisites (the learning motivation, orienting basis, and parameters) are integrated and interrelated in such a way that a full-fledged (*polnotsennoe*) action may be formed. The first three become interwoven components of the fourth prerequisite: the stepwise procedure, to which the next chapter is dedicated.

Summary

Gal'perin's research program is rather complicated and I need several chapters to cover the various issues involved. Gal'perin's name is mainly associated with the phrase 'the systematic formation of mental actions and concepts.' Indicating how Gal'perin's concept of action fits into Leont'ev's three-level analysis of activity, I have argued that it is only the level of (learning) actions which plays a distinctive part in Gal'perin's research program. Not actions as such, however, but mental actions.

Gal'perin does not treat mental actions and mental images separately, because they cannot be isolated from one another. However, Gal'perin is immediately faced with the problem of how to explain their relationship to one another and to mental phenomena such as concepts. I have summarized these relationships in one phrase, stating that images and concepts are derived from mental actions which in turn are internalized and abbreviated material actions. The crucial term in this phrase is 'mental action.' To Gal'perin, the key issue was the formation of mental actions, whose role it is to orient, to monitor and to control future actions in various new problem situations. His research program was meant to develop and analyze the basic conditions (the set of prerequisites) which ensure that mental actions will be formed systematically. It is a rather complicated research program, because Gal'perin proposed a set of four prerequisites for the systematic formation. These are the learning motive, the orienting basis, the four parameters, and the stepwise procedure. The first three are integrated in the fourth prerequisite, which can be considered to be the kernel of Gal'perin's research program.

In this chapter, I have given an outline of the research program and explained the meaning of the distinctive components of 'the systematic formation of mental actions and concepts.' I have employed the summarizing term 'the systematic formation' to indicate the content of the program with its set of four prerequisites. So far, I have only described the first three. The next chapter is devoted to the fourth prerequisite: the stepwise procedure.

CHAPTER 9

THE STEPWISE PROCEDURE

As previously stated, Gal'perin's name is mainly associated with the phrase 'the systematic formation of mental actions and concepts.' In this phrase the crucial term is 'mental action' and Gal'perin's research program was meant to develop and analyze the set of four prerequisites providing that mental actions will be formed systematically. These prerequisites are the learning motive, the orienting basis, the four parameters of an action, and the stepwise procedure. The first three are integrated in the fourth prerequisite, to which this chapter is dedicated. The fourth and final prerequisite can be considered the 'burgeoning kernel' of Gal'perin's research program. It brings the three preceding ones together in the teaching strategy, which Gal'perin has called a 'stepwise' (*poetapnoe*) teaching-learning process.

The term 'stepwise' refers to a sequence of stages leading to the formation of mental actions. This formation can be conceptualized as a process of internalization in which different stages must be discerned. Based on his research Gal'perin (1969c/1989a) discerns six stages for an action to pass through before becoming a full-fledged mental action. This chapter outlines in detail the stepwise procedure and its six stages. Basically, it is a teaching strategy aimed at the formation of full-fledged mental actions. Thus, to begin with, what is a full-fledged mental action (*polnotsennoe umstvennoe deistvie*) and which are its distinctive intended properties (*opredelennye, zaranee namechennyye svoistva*)?

A full-fledged mental action

As we have seen in the previous chapter, Gal'perin distinguishes four relatively independent parameters to classify each form of an action, viz.:

- level of appropriation: material(ized), verbal or mental
- degree of generalization
- degree of abbreviation or completeness
- degree of mastery.

The formation of an action will pass through the three levels of appropriation and on each level each parameter has to be elaborated according to the intended requirements. The sequence of levels, combined with the appropriate elaboration of the action at each level provides that a full-fledged mental action will be appropriated.

The formation of an action implies that the action moves in stages towards a particular outcome. The stepwise procedure provides this outcome. Passing through the levels of appropriation, all parameters have to change in the intended directions in such a way that a full-fledged mental action may be formed. The fundamental line of the stepwise procedure is determined by the first parameter, viz. the levels of appropriation. Accordingly, the fundamental property of an action is also determined by it. But the other properties of an action are determined by the remaining three parameters. Thus, a full-fledged mental action is to a great extent:

- **general(ized)**, i.e. the learner distinguishes the constant and essential features of the objects, necessary for the execution of an action, from the inessential and variable ones. Generalization occurs when from the very beginning several varieties of the material involved are used in order to carry out the learning tasks. So a general action permits transfer to a wide variety of related learning tasks.

- **abbreviated**, i.e. the number of all operations originally necessary for the execution of an action is reduced, because some actions are joined together or dropped out. The extended form of the original action has been made shorter and has been **telescoped** as it were.

- **mastered**, i.e. the initially slowly and consciously executed actions has become gradually automatic.

These are the distinctive intended properties of a full-fledged mental action. Such action is to a great extent general, telescoped and automatic, and the stepwise procedure provides its formation. The fundamental line of the stepwise procedure is the sequence of levels of appropriation from an action with external, material object to an action 'in the head.' At each stage a given action is carried out in a new form and undergoes changes in several prescribed directions. So at each stage, the other three parameters (generalization, abbreviation and mastery) indicate the quality of that action. The intended properties or parameters of the action are practiced at these stages.

Gal'perin (1957a, 1959, 1966a, 1966c, 1967, 1968, 1969a, 1982, 1985, 1989a,b,c,d) distinguishes the following six stages (cf. Duric, 1989, pp. 88-90; Fridman & Volkov, 1985, pp. 118-119; Talyzina, 1981, pp. 109-114; Van Parreren & Carpay, 1980, pp. 43-59):

- 1 Motivational stage:
preliminary introduction to the learner of the action and mobilization of the learning motive;
- 2 Orienting stage:
construction of the orienting basis of the action;
- 3 Material(ized) stage:
mastering the action using material or materialized objects;
- 4 Stage of overt speech:
mastering the action at the level of overt speech;
- 5 Stage of covert speech: mastering the action at the level of 'speaking to oneself' (covert speech);
- 6 Mental stage: transferring the action to the mental level.

Now, I will outline the successive stages in detail. Figure 9-1 depicts the range of stages of the stepwise procedure and the parameters involved.

The first stage: The motivational stage

First a new action to be appropriated is brought to the learners' attention and delineated within their horizon of problems to be solved. This first stage is called by Gal'perin (1982a, p. 528; 1985, p.8) "the motivational basis of an action." This stage is meant to provide the preliminary introduction of the action. The learner receives an 'advance organizer' of the action and its goal. This acquaintance and additional explanation to the learner have as its purpose the creation and mobilization of the necessary learning motive for the teaching-learning process to come.

THE STEPWISE PROCEDURE

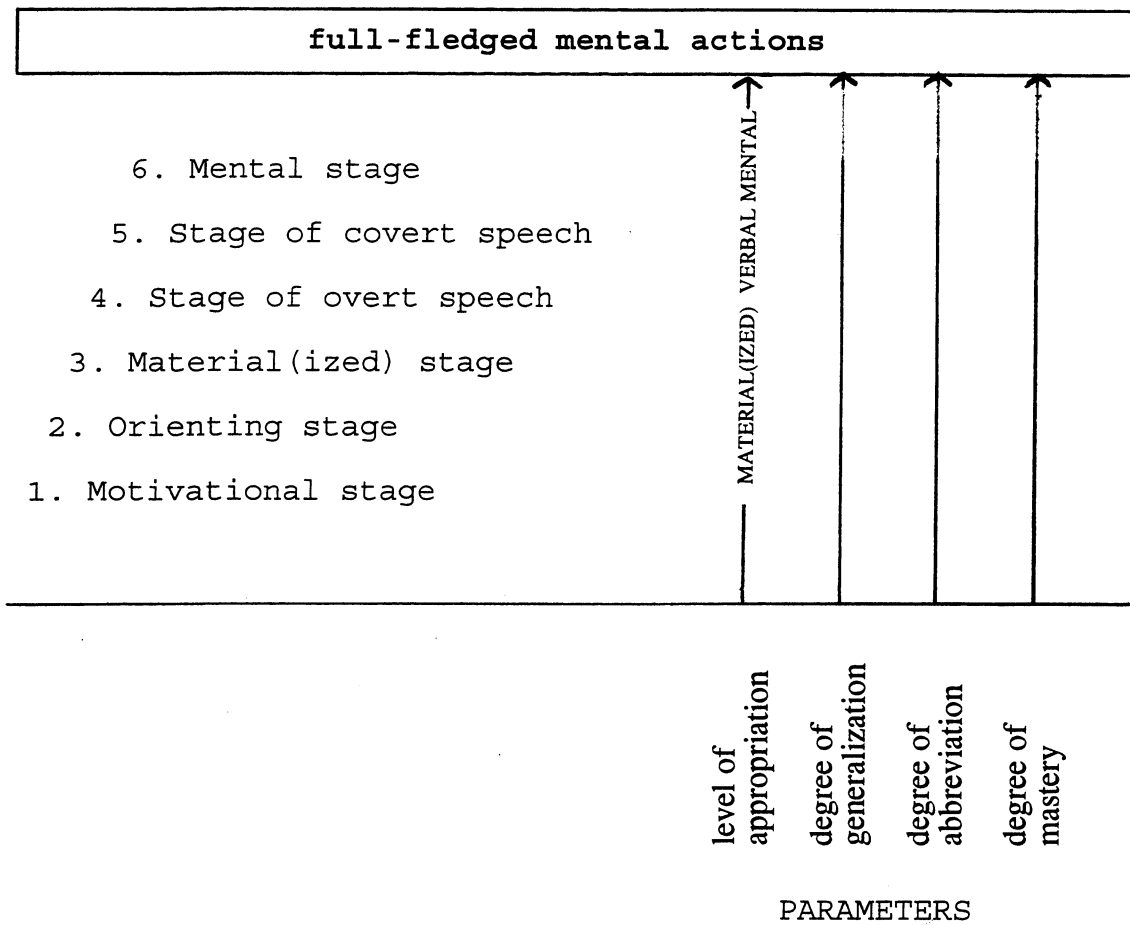


Figure 9-1

The stepwise procedure aimed at the formation of full-fledged mental actions (adapted from Treffers, 1974, p. 298; Multer & Borg, 1982, p. 87)

The second stage: The orienting stage

Every human action is accomplished on the basis of some orientation. Orientation largely determines its quality. Even trial-and-error learning is the result of a specific - though in this case completely inadequate - orientation. In the stepwise procedure, the orienting stage plays a key role and is designed to provide the learner with all the information necessary to the correct execution of a new action.

I have already mentioned in the previous chapter, that Gal'perin (1974/1989c, p. 70) introduced the term 'orienting basis of an action' (OBA) to refer to the whole set of orienting elements by which the learner is actually guided in the execution of an action. In addition, Gal'perin introduced a second term as well, viz. the term 'Scheme of a Complete Orienting Basis of an Action.' This term is abbreviated as SCOBA and signifies the complete set of conditions which are to be taken into account. Thus, OBA is the actual learner's orienting basis, while the SCOBA is the desired and intended form of the orienting basis leading to the correct execution of an action. An OBA does not ensure correct execution, whereas the SCOBA does.

Besides this whether-or- not guarantee of correct execution, there is another important difference between the OBA en SCOBA. An OBA is something which the learner actually has at his disposal, while the SCOBA is an externally presented scheme, which has to be appropriated by the learner. The goal of the orienting stage is to explain the SCOBA to the learner in such a way that he uses it as a future 'frame of mind' or a 'cognitive map' for his orienting basis. In the orienting stage an actually present OBA is transformed into the intended SCOBA.

How is a SCOBA explained to the learner (see Gal'perin, 1982a, p. 527)? At the beginning, the purpose and properties of the new action to be learned are demonstrated and explained verbally. The learner is given a preliminary idea of the action itself and what must be done. This verbal instruction serves to introduce and to explain the components of the SCOBA such as the structure of the action involved, the features of the material and the successive operations. The whole action is executed at a slow pace and in so much detail, that it becomes clear to the learner how the operations involved are connected to changes in the material.

The components of the SCOBA are rather complicated. Apart from being demonstrated and verbally explained, they have also to be depicted in an explicit and external form: the so-called **orienting chart**. This chart provides all the learners with a clear picture of the SCOBA and may be characterized as its materialized representation. It contains the components of the SCOBA in a very condensed and summarized version and serves as an external 'monitoring device.' The orienting chart is a "scientifically based, learner-proof 'cheat sheet,'" as Carpay (1990, p. 9) aptly called it.

According to Gal'perin (1989c, p. 69), a SCOBA includes five components. However, for the sake of clarity, I have added the orienting chart as one of its components as well. I have stipulated that the SCOBA is an externally presented scheme, of which the orienting chart serves as a summarized version. This makes the chart a component of the SCOBA. Consequently, the SCOBA includes six components:

- 1 the intended output of an action;
- 2 the pattern or model of the action as executed by an 'expert';
- 3 the means of the action;
- 4 the objects of the action;
- 5 a general plan of action, an 'action-algorithm' or 'operational thinking scheme' giving the course of the action and the sequence of its operations in a summarized form;
- 6 the orienting chart or 'cheat sheet' representing the previous five components in such a way that it serves as a 'tool of action.'

The orienting chart is the core of the SCOBA. It provides a clear picture of the components of the SCOBA in such a way that the learners can appropriate them within the teaching-learning process. Gal'perin (e.g. 1989c, p. 70) emphasizes that it would be very difficult to learn the components represented on the orienting chart by heart. He suggested that this is not necessary, because the orienting chart is a 'cheat sheet' in the literal sense. It contains all the information and the learners simply follow the instructions on it. It appears that under these circumstances the content of the charts is learned unexpectedly easily and in fact incidentally in the process of executing the learning tasks.

The retention of the contents of the charts occurs rather quickly and Gal'perin emphasizes that this results from incidental learning, i.e. learning taking place without an intent to learn. He argues that one of the main advantages of the stepwise procedure comes from the fact that learning by heart and voluntary storage in memory belong to the past. According to Gal'perin, the traditional and generally accepted teaching-learning methods are heavily based on intentional learning, while he himself uses the much greater capacity of incidental learning.

As mentioned, a great importance is placed on the orienting charts, because they largely determine the effective and successful organization and course of the orienting stage and its SCOPA. Before ending this section of this stage, let me give three examples of such charts. The first example has already been introduced and used to design this chapter. Figure 9-1 can be considered the orienting chart of the stepwise procedure. As such, this chart can be used in a teacher training course in order to represent and summarize the range of stages of the stepwise procedure and the parameters involved.

Before giving the other two examples, I have to make a general remark. Initially, when writing this chapter, I hesitated to give any examples of orienting charts. Generally they are dreadfully complex and mostly "terrible even to look at," as Gal'perin (1989c, p. 77) 'groaned' about Nechaev's (1972, 1988) orienting chart, used in an advanced course for lawyers (see Chapter 11). Actually such charts can be only appreciated in the context of a coherent curriculum. The reader should keep this in mind examining the two orienting charts depicted in Figure 9-2 and 9-3. The value of both charts has been empirically verified.

Figure 9-2 contains an orienting chart designed by Carpay (1974, 1990). He carried out an experiment in which he applied Gal'perin's program of the systematic formation to the teaching of semantic criteria for choosing the correct aspect form of the Russian verb. The algorithm was constructed as a "maquette" displaying the action of choosing the aspect form in one operational model (Carpay, 1974, pp. 175-176). Figure 9-3 depicts a part of the SPA-chart, as Mettes et al. (1981) called their orienting chart. They designed a Systematic Problem Approach (SPA) as a system of heuristics that students can use to orient themselves in problem solving in a thermodynamics course.

As mentioned, orienting charts are part of the SCOPA. In ending this section on the orienting stage, let me reiterate that Gal'perin (1989c, p. 81) underlines the distinction to be made between the learner's appropriation of 'the scheme of a complete orienting basis' (SCOPA) and the orienting basis (OBA) itself. The OBA, referring to the learner's actual orienting basis, is the 'sediment' in the learner's mind of the externally presented SCOPA. This also refers to the orienting charts. In the stepwise procedure the learner appropriates the orienting chart as one of the components of the SCOPA. Although the orienting charts are often 'dreadfully complex,' the appropriation of their contents occurs unexpectedly easily. According to Gal'perin, this results from incidental learning.

Being externally presented to the learner, the SCOPA remains constant, while the OBA gradually and 'incidentally' changes in the course of the stepwise procedure. The OBA comes nearer to the SCOPA, and the more the OBA resembles the SCOPA, the more successful the formation of the full-fledged action will be. The orienting stage determines whether or not the formation will be successful. In the next chapter I will further elaborate on this point, because of its educational implications.

Now I will continue the description of the stepwise procedure by introducing the third stage.

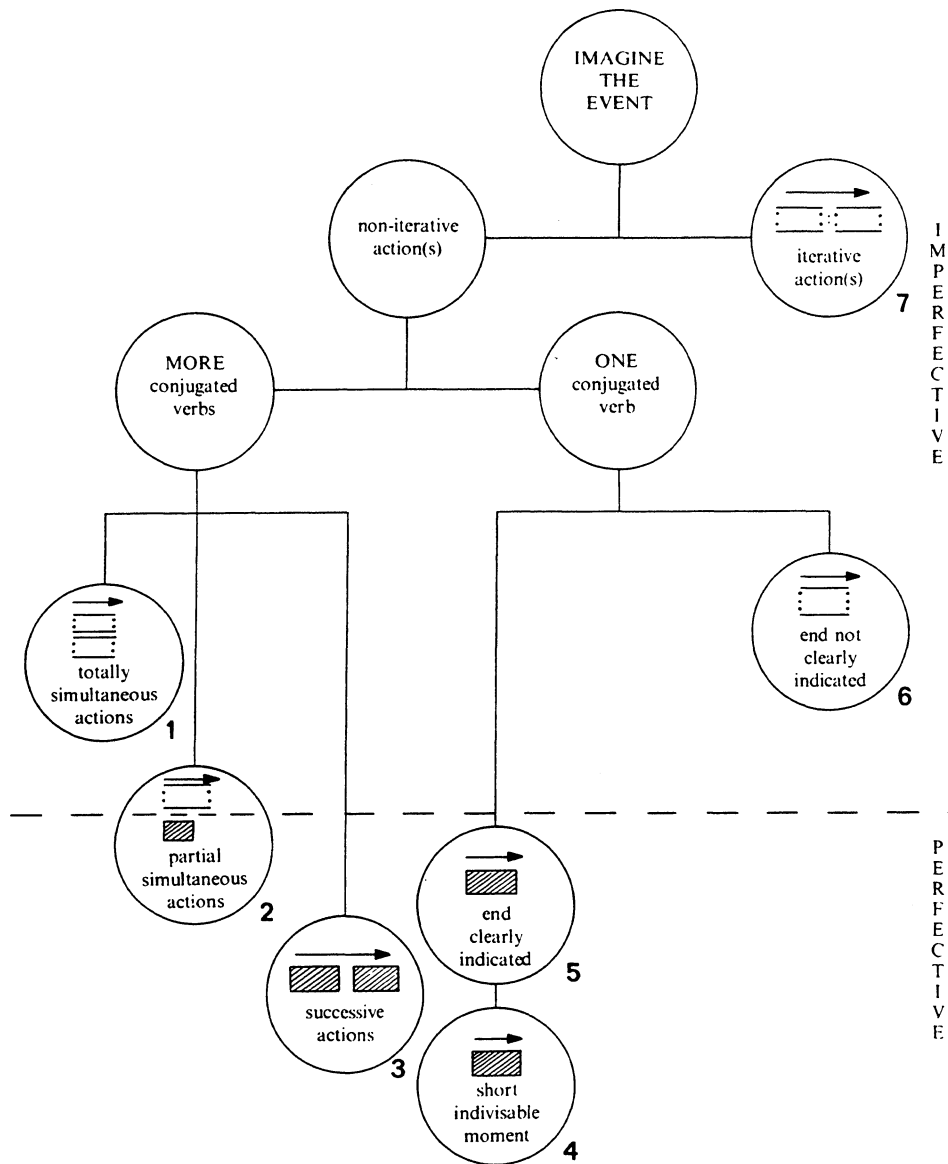


Figure 9-2

The orienting chart designed by Carpay (1974, p 177). Carpay applied Gal'perin's program of the systematic formation to the teaching of semantic criteria for choosing the correct aspect form of the Russian verb. The algorithmic branches the determination of an iterative versus a non-iterative action higher than that of one or more conjugated verbs in the sentence.

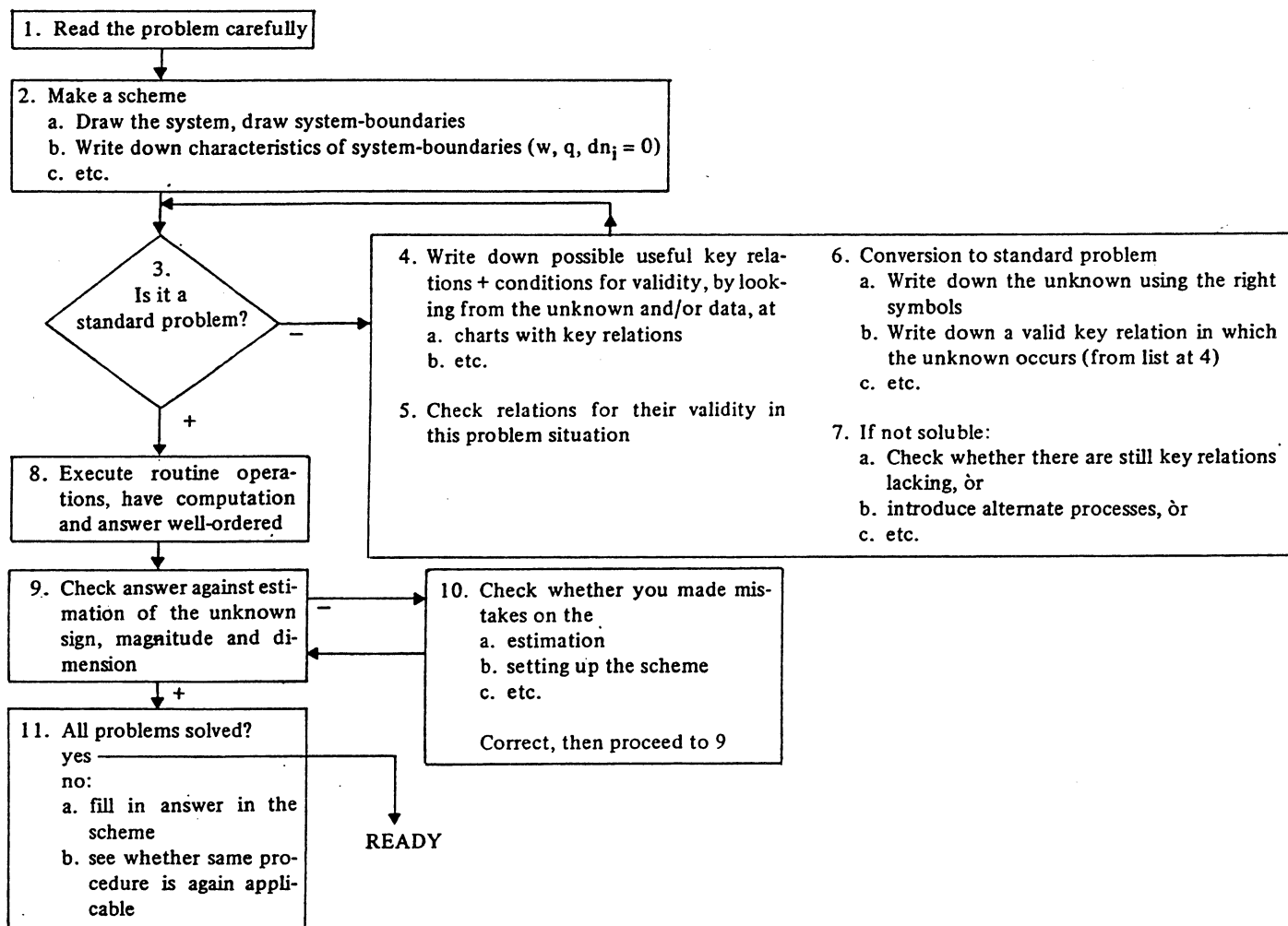


Figure 9-3

A part of the orienting chart designed by Mettes et al. (1981, p. 341). The chart depicts the Systematic Problem Approach (SPA-chart) as a system of heuristics that students can use to orient themselves in problem solving in a thermodynamics course.

The third stage: The material or materialized stage

The third stage refers to the formation of the action at the material or materialized level. After the received explanation and understanding thereof in the previous orienting stage, the learner becomes familiar with the new action in the course of the hands-on manipulation of physical, external and actual objects or their representations (Gal'perin, 1957a, pp. 218-219; 1969a, pp. 253-255).

Gal'perin refers to a material action since the objects are actual and perceptual. This is, for example, the case when a child is carrying out an arithmetical task while touching, replacing, putting together etc. real physical objects. However, when the object transcends the limits of direct perception, it is much more convenient and accessible to execute the action with the aid of the representation of physical objects. These representations may take the form of models, displays, diagrams, maps, drawings, etc. All such representations ought to contain and depict the properties and relationships of concrete things essential to the action. These representations permit the learner to execute the action by using the substitutes of the external physical objects. In such a case Gal'perin refers to a materialized action.

In teaching practice, it is often impossible to work with the actual physical objects. Then, the materialized actions offer the only possibility for the execution of the action. Materialization and visualization of the properties and relationships of the actual physical objects extends the possibility of retaining one of the obligatory conditions for the stepwise procedure of a new mental action: viz. beginning with the external material form of the indicated action.

At first glance, it might seem that the material and materialized forms of an action are necessary only in the lower forms of the educational system or in the beginning phases of a course or curriculum. However, according to Talyzina (1968, p. 49), closer study shows that even for adults the learning of fundamentally new knowledge and new mental actions first requires at least partial materialization. The models of molecules and graphs which adults use, are these same methods of 'materializing' certain aspects of mental activity.

A model used in an instructional setting can be characterized, as Lompscher (1985, p. 31) put it, as a representation of the action and its object, which at the same time is immediately given for perception and manipulation. So, models and modelling are playing a central role in the materialized stage. Talyzina (*ibid.*) warns, that an underestimation of this stage in the stepwise procedure leads to knowledge that is not properly practiced and embedded in the learner's repertoire of mental actions.

For Gal'perin (1957a, p. 219; 1959a, p. 451; 1969a, p. 254), only the material or materialized form of an action can be the source of a full-fledged mental action. Through the material or materialized action the learner discovers the concrete content of an action for himself and achieves his first practical appropriation of this content. Consequently, a paramount problem in the construction of the stepwise procedure of any new action is finding the initial material or materialized form of the action to be appropriated and in precisely establishing its contents.

The fourth stage: The stage of overt speech

When an action has been sufficiently appropriated with practical objects, it is necessary to separate the action from its previous material support and to transfer the action to the stage of overt speech. The learner is taught to execute the action without any direct dependence on the actual tangible objects or their materialized representations. What was at the previous stage a material or practical action now becomes a verbal one. In the previous stages, speech was primarily an indicator of the phenomena directly disclosed visible. Now speech becomes the sole carrier of both the action and its objects. At this stage the whole process relies on speech.

Gal'perin (1969a, p. 260) emphasizes that an action in overt speech is not material or materialized, nor is it yet a mental action. The learner is not yet able to perform the action in 'inner' speech, i.e. 'in his head.' Overt speech is a transitional stage between the material(ized) and the mental action. Actually, in the first studies in the early 1950s, Gal'perin and his co-workers did not pay special attention to this stage. However, several studies (e.g., Davydov, 1957) convinced them of its necessity. Gal'perin (1969a, pp. 260-263; 1989b, p. 52-53) gives two arguments for underlining the necessity of the stage of overt speech.

The first argument is that the action of overt speech is a 'theoretical' one. The action has become free from the necessity of manipulating tangible things or their representations. The whole content of the material(ized) action is transposed into speech. The tangible objects or their representations are replaced by words and reflected in speech. This means that the action becomes generalized. A practical advantage is that new tasks can be introduced with the aid of speech which could not be conveyed at the preceding stage.

The second argument refers to the function of speech as a means of communication. The effect of overt speech is determined by the social role of speech. The learner must execute the action verbally so that it is comprehensible not only to himself but to others as well. Learning how to execute an action in speech is learning a relation to this action from the standpoint of other people. The execution of the action meets the requirements of communication and, in particular, the requirements of the given discipline, from which the curriculum subject has been drawn. The teacher represents the discipline and makes sure that the verbal expression manner is acceptable to the discipline in question. The verbal execution of an action brings the action under the control of the teacher. Due to the teacher's control and instructions, the learner is obliged to orient himself not only to the execution of the action but to its verbal expression as well. The learner begins to refer to his verbal action just as others refer to it; it creates in the learner a "co-knowledge, a consciousness of just this action" (Gal'perin, 1989b, p. 53).

Due to the distinctive communicative feature, the stage of overt speech could be called 'the stage of communicated thinking' (Carpay, pers. comm.). I do not use this designation because it is somewhat beyond the Gal'perinian terminology. The stage of overt speech refers first and foremost to the execution of the action at the verbal level. Therefore, Gal'perin (1957a, p. 217) called it first the stage of 'audible speech' ('slyshimaia rec'), and later (1985a, p. 7) 'socialized speech' ('sotsializovannaia rec'). The latter term links Gal'perin's line of reasoning with Vygotsky's (1983a, p. 145) general genetic law (see Chapter 5). According to this law, social speech becomes the source of thought. It is this process of internalization which Gal'perin expanded and refined into a technology of instruction. It is only after the socially-based attitude of the learner toward the new action has been adopted, that proper internalization occurs. Or, as Vygotsky (1981b, p. 161) formulated it: "it is through others that we develop into ourselves." In sum, it is both the generalizing and communicative function of speech, which makes the stage of overt speech of utmost importance for the stepwise procedure.

The formation of the action at the stage of overt speech requires a simultaneous series of changes in the other parameters (the degree of generalization, abbreviation, and mastery). The action is now executed at the verbal level and this new mode demands a new return to the material objects or their materialized representations. They are converted into words and considered as abstract entities. This means a break with the direct presence of things. Through their absence they acquire a general meaning and this generalization is achieved only as a result of speech. The generalization must be made secure by introducing learning tasks which could not be presented at the preceding stage.

At the same time the actions must undergo abbreviations. At this level the abbreviations usually occur more easily and frequently spontaneously. However, they must be consciously elaborated and sufficiently mastered so as to become a reliable basis for the formation of the action on the two subsequent stages.

The fifth stage: The stage of covert speech

At this stage the learner is encouraged to whisper to himself instead of speaking aloud. The transition from overt to covert speech occurs mostly spontaneously and usually unnoticed by the learner. At first glance this transition would seem to be simply the transition from overt speech into 'speech minus sound.' In fact, it requires a semantico-grammatical transformation of the structure of speech itself. 'In the mind' the overt form of speech takes the shape of a 'deep structure' (cf. Chomsky), or, as D.B. El'konin suggested Gal'perin (1959a, p. 457) to call it, "the audible image of the word."

According to Gal'perin (1957a, p. 221), such an 'audible image' can only evolve after the action has passed through the stage of overt speech. The psychological significance of an overt image lies in the fact that it is more stable and stronger than a visual representation which should evolve on the basis of merely a material or materialized action without the subsequent

stage of overt speech. For Gal'perin, the intermediate stage of overt speech is an essential one for the transition of an external (material or practical) action into an internal (mental) one. He (ibid.) even formulates it as a rule stating that a full-fledged mental action, which can be used accurately and confidently, is formed only after the action has been thoroughly practised at the preceding stage of overt speech.

At the stage of covert speech, the learner continues to use speech 'in the head.' Initially, this action is an accurate reproduction of the final form of overt speech to which the action had evolved at the preceding stage. Due to this, Gal'perin (1985a, p. 7) called it the stage of 'external speech to oneself' ('vneshnaia rech' pro sebia'). Though the action has gone 'inward,' speech is still the carrier of both the action and its objects. The execution of the action still meets the requirements of communication. The execution relies on an 'inner dialog' or, as Carpay (pers. comm.) called it, the action is executed at the level of 'dialogical thinking' (cf. Wertsch, 1991, p. 90).

As the action at this stage becomes more habitual, it becomes more and more abbreviated. When the action on this stage has been developed almost to the point of being automatic, there can be a transition to the sixth and final stage.

The sixth stage: The mental stage

The preceding stage ends with the soundless utterance of the action entirely in the mind. Learners begin to execute all the operations without error and so quickly that they can give the answer as soon as they receive the proper information to with which solve the learning task. The teacher abandons the control of the outcomes of the successive operations and moves on to control of the final outcome of the action. Now, the action will be quickly abbreviated and extremely telescoped. The action takes place in the mind and has been transformed into a mental phenomenon.

At the mental stage the chain of words has disappeared from the field of consciousness and has become a chain of images and concepts. The learner "just knows that's how it is" (Gal'perin, 1957a, p. 221). The mental action has acquired a form which is inaccessible to neither observation nor introspection. So, as a result of appropriation, generalization, abbreviation, and mastery the actions have attained a new form: the external actions have become 'pure' thought.

Gal'perin (1966a, pp. 253-254) argues that after the actions have become 'pure' thought, they "do not simply disappear. They take on a status in which they are treated as if they had been performed and are hence being 'kept in mind.' As a result, actions acquire a very specific form. (...) At (...) the mental level the action itself is not carried out, but is only 'being kept in mind' beyond the limits of what is actually being done." In this quotation Gal'perin expresses his view that the action at the mental level has an orienting function. The action is mentally executed with the aid of mental images and concepts in which real life situations are represented. On the basis of the representation of the problem space, a person can orient himself, foresee the effect of his own or somebody else's actions, change his actions to fit the distinctive features of the situation, anticipate options in relation to his experience (his 'knowledge of the world') and achieve a successful execution if the action would be actually executed.

At the mental level, however, the action is still optional and implicit, or in Gal'perin's words, "being kept in mind" ("imeetsia v vidu"). Due to this, the mental action has a predominantly orienting function. A person can properly deal with a task or problem only if his actual action is preceded by mental orienting activity in the problem space as it is represented in the person's mind. As we have seen in Chapter 6, Gal'perin perceives this mental orienting activity as the specific subject matter of psychology. Gal'perin has designed the stepwise procedure to provide that mental actions acquire the proper orienting function, which it has all been about (see further Chapter 10).

An example of the stepwise procedure

Before summarizing this chapter, let me give as an example a short description of a program designed to teach children to analyze geometrical concepts. Gal'perin & Talyzina (1961) investigated the formation of elementary geometrical concepts, like the straight line, perpendicularity, adjacent angle, bisectrix etc. Smedslund (1964, p. 270) reviewed this study and found it remarkably close to the Western research on task analysis and on the active participation of the learner (see Chapter 12 for Freudenthal's critique of Gal'perin & Talyzina's research).

Gal'perin and Talyzina both stress the importance of giving pupils from the very beginning a sense of understanding and mastery by enabling them to solve given problems faultlessly. To achieve this objective the authors had, first of all, to consider the action on which the attainment of the concepts was to be based. The action of identification of instances of a concept was employed as the means of the formation of the concept to be learned. Landa (1966) has shown that such an action of identification is not found to be firmly established in the majority of pupils. This makes Gal'perin & Talyzina's research of immediate relevance to education.

The concept to be learned must be analyzed in terms of the necessary and sufficient, i.e. the distinctive features or 'critical attributes' governing application of the concept to any relevant instance (cf. Joyce & Weil, 1980, p. 33). The authors remark that such analysis should not be the job of psychologists, but it appears that, even in such a precise science as geometry, textbooks often fail to describe properly the critical attributes by which a concept may be identified. After establishing the critical attributes, they are presented as a 'working definition' and pointed out on an 'orienting chart.'

From the very outset, the subjects were given not only the critical attributes of the concept to be learned, but also the rules for handling them. The attributes and rules are written down on a orienting chart that the subjects keep in front of them. The chart is initially employed in an external, materialized form. At this materialized level of the action, the subjects are presented with items in the form of an object, a picture or a description, that either is or is not an instance of the concept. They are asked to inspect each item using the orienting chart and to decide whether the criteria are at hand for labelling it as an instance of the concept in question, e.g., perpendicularity.

The number of items necessary to appropriate the material action is determined empirically. The investigations have shown that the retention of the attributes occurs very quickly, after 4 - 5 items, when the number of these attributes is two or three. The appropriation of the operational procedure and the logical rule requires some more items. In the case of the concept of perpendicularity, after solving 5 - 8 items at the material level, the subjects begin to recite aloud the contents of the orienting chart and to describe aloud if the respective item belongs to the concept. It appears, that they have appropriated the contents and have learned it unintentionally by heart. Then, the orienting chart can be removed. The authors warn not to delay the action at this stage (or at the consecutive transitional stages), because of the possibility of its being automatized. Premature automatization would be an obstacle to the transition of the action into a new and more advanced form.

After solving a few items aloud at the overt verbal level, the experimenter encourages the subject to carry out the actions in the same order, but to speak silently 'to himself' (covert speech) and only to announce the results aloud. The subject is given items and is asked to decide on the subvocal level whether or not they are instances of the concept, and why this is so. If the subject does not answer correctly, he is referred back to the orienting chart and to the procedure at the materialized level of the action.

If the answers are correct, the experimenter allows the subject to perform an action with abbreviations, which generates the transition of the action to the final mental stage. The action at this stage differs from the preceding ones in terms of abbreviation and mastery. The items are automatically solved 'in the head' and there is no point in following through the whole course of an action. After receiving an item, the subject glances quickly over it, and then gives the answer immediately.

The authors mention, that subjects made very few errors at the mental stage. When subjects did make errors, a few simple questions on the part of the experimenter (e.g., "How do you know that attribute 1 applies in this case?") were sufficient to bring about a correct answer. These results are noteworthy, because the 48 subjects were deliberately selected

'underachievers': 32 pupils of class 5, who had previously not studied geometry and had shown poor grades in the major school subjects, and 16 pupils of class 6 and 7, who had studied geometry but who were described by their teachers as 'hopeless.'

Summary

Gal'perin proposed a set of four prerequisites for the systematic formation of mental actions and concepts. These are the learning motive, the orienting basis, the four parameters, and the stepwise procedure. The first three are integrated in the fourth prerequisite, which can be considered to be the kernel of Gal'perin's research program. In this chapter I have given an outline of the stepwise procedure aiming at the formation of full-fledged mental actions. To summarize, it goes as follows (see Gal'perin, 1957a, pp. 222-223; cf. Figure 9-1).

It begins with a learning task set by a 'significant' other, usually a teacher or an experimenter. After preliminary acquaintance with the new action to be learned (stage 1), the learner builds up a scheme of an orienting basis (SCOBA - stage 2). With the aid of this SCOBA, the learner makes himself familiar with the material(ized) action in the course of practical manipulation of tangible objects or their representations (stage 3). Next, the action is separated from these objects and transferred to the stage of overt speech (stage 4). At stage 5, the learner is encouraged to whisper or to 'speak to himself,' which transposes the action to the final and mental stage (stage 6).

On the basis of the stepwise procedure, Gal'perin and his colleagues have developed a new teaching strategy for a wide range of school subjects. In the next chapter I will discuss the features of this teaching strategy, which can be considered to be a further specification of the stepwise procedure in the direction of the actual teaching practice.

CHAPTER 10

THREE TEACHING STRATEGIES COMPARED

Chapters 8 through 10 are concerned with Gal'perin's research program on 'the systematic formation of mental actions and concepts.' These three chapters have been written as a unit and as sequels to each other. In Chapter 8, I introduced the four sets of prerequisites which, according to Gal'perin, provide the systematic formation of mental actions and concepts. Chapter 9 was dedicated to the stepwise procedure. This procedure is the fourth prerequisite in which the three others (the learning motive, the orienting basis, and the parameters of an action) are interwoven. In the stepwise procedure, the orienting stage plays a key role. In this chapter I will further elaborate on this stage in which the learner is provided with an orienting basis of an action. Gal'perin's concept of the orienting basis deserves special attention because it is crucial to full understanding of his scientific endeavor.

As stated in Chapter 6, Gal'perin considers ideal (mental) orienting activity the proper subject matter of psychology. The conceptual extension of his approach to psychology may be traced by reconstructing the way he developed the concept of the orienting basis. One may argue that the three other prerequisites are derived from it and that they are senseless if not properly related to the orienting basis. Moreover, the concept of orienting basis had an evident impact on teachers and researchers designing teaching strategies in the vein of Gal'perin's theoretical viewpoints.

This chapter will clarify the theoretical and educational aspects of Gal'perin's concept of the orienting basis, the three types he distinguished and the three teaching strategies based upon them. To begin with, more must be said on the relationship between the orienting basis and the structure of the action as such.

The orienting and executive components of an action

To Gal'perin, every human action is performed on the basis of some orientation. There is usually an orienting part of an action, before an action is actually executed. Consequently, every action consists of two components: an orienting and an executive component. Both components vary in complexity and scope and both must be present simultaneously in every action; without either one of them an action cannot be carried out properly.

Usually, however, an action is only associated with its executive component. And indeed, without this component one can hardly speak of an action. Without execution there is only a plan for action, a scheme for a (future) action, but not the action itself. However, if one only considers the executive component, one will overlook that the execution of an action, although it cannot be reduced to it, to a decisive extent depends on the subject's orientation toward the conditions of the action. But, as Gal'perin has argued, the orienting basis is not the action itself: "Whatever the quality of the orienting basis of an action may be (...) it remains no more than a subset of prerequisites as to how to execute the new action" (1969a, p. 253). In other words, though the orienting and executive components are distinctive but inseparable, they are at the same time together a 'unit of analysis' of an action.

According to Gal'perin (1989a, p. 28), one often forgets the orienting component, which is ultimately goal-setting and monitoring for the course of an action. The quality and outcome of actions and, more in general, the role they play in human activity are defined by the content of the orienting component. Talyzina (1981, p. 89) gives as an example of the monitoring function of the orienting component, the actions employed in playing chess. In such cases the main task

of this component is to select one of the possible moves. Usually, this orienting component of an action is complicated and often extended, while the executive component is simple: the position of a chess piece is changed from one position on the chess-board to another.

Understanding and ability

To further clarify the distinction between the orienting and executive component of a action, Gal'perin (1969a, p. 254; 1989a, p. 28) referred to the well-known distinction between understanding ('ponimanie') and ability ('umenie'). The orienting component provides the learner's understanding of a specific action, while the executive component provides that the learner is actually able to perform it. Thus, the orienting component refers to the understanding of a specific action and the executive component to the ability or mastery to execute it. Ability is something beyond mere understanding, because if the learner has not yet executed the action he will fail to appropriate it or to make it his 'own.'

Talyzina (1981, pp. 110-111; 1993) mentioned the educational relevance of the distinction made by Gal'perin. In her opinion it is often thought in teaching practice that if a learner has understood the subject matter he has also appropriated and mastered it. But appropriation only occurs if a learner is actually able to execute that specific action on his own account. What is often lacking in teaching practice is a sequence of the necessary steps to close the gap between understanding an action and the ability to execute it. In Gal'perin's teaching strategy, both understanding and ability are basically inseparable; they are conceived as a unity. The stepwise procedure is merely a teaching strategy to bring understanding and ability together.

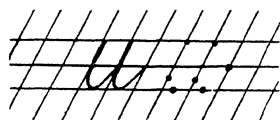
In Gal'perin's teaching strategy, the appropriation, i.e., the formation of the ability to execute an action, takes place when the action undergoes a stepwise elaboration ('otrabotka') following the orienting stage. The orienting stage is aimed at the understanding of the action and the four successive stages refer to the actual appropriation by executing the action by the learners themselves. Gal'perin's research focusses on how 'understanding' encoded from the orienting basis of an action becomes proceduralized in the process of mastering the action. This transposition dominates the stages of the stepwise procedure. It is achieved by using methods (mainly verbalization and abbreviation) that can transpose material(ized) actions into mental actions via the mechanism of internalization (see Chapter 9).

As a result of the stepwise elaboration a mental action is formed as a full-fledged, properly generalized, telescoped and automatic action. The range of the stages is carefully designed and, as we will see further on, has been tested in the context of the classroom. The question remains, however, of why are four stages needed in order to appropriate the action and to reach the mental stage? According to Gal'perin (1982a, p. 528), when previous experience is lacking and when the action to be learned is "absolutely new," the appropriation is shaped in four stages. It begins with the material or materialized stage, and ends via the overt and covert verbal stages at the mental stage. He is convinced that the formation of any new mental action should always start at the beginning. It seems natural to think that previous knowledge eliminates this necessity. Gal'perin (1969a, p. 254; 1959, p. 450) does not deny such a possibility, but his analysis of the appropriation of new mental actions leads him to believe they should not be executed directly 'in the mind,' but are only successfully shaped by starting from their external material(ized) form. As we will see in Part Three, some substantial criticism of this assumption has been voiced.

But, the stepwise procedure can only lead up to a full-fledged mental action if the proper orienting basis has been provided to the learner. Therefore, more needs to be said about the orienting basis and its possible forms.

Types of orienting bases

In the formation of mental actions a decisive importance is attached to the semantic make-up and the 'use value' of the orienting basis guiding the pupil. The orienting basis of an action determines both the rate of the teaching-learning process and the quality of the action to be learned.

**Figure 10-1**

Example of the grid from an exercise book used for teaching handwriting at Russian elementary schools (from Pantina, 1957, p. 121).

type SCOBA	degree of generalization		degree of completeness		way of appropriation	
	concrete	general	incomplete	complete	ready-made provided	guided constructed
1	+		+			+
2	+			+	+	
3		+		+		+
4		+		+	+	
5		+		+	+	
6		+	+			+
7	+			+		+
8	+		+		+	

Table 10-1

Overview of the eight SCOBA-types with their features (adapted from Talyzina, 1981, p. 90).

Teaching strategy	number of presentations	first 3 graphemes			last 3 graphemes		
		1	2	3	1	2	3
I (22 graph.)	1238	174	163	189	25	17	22
II (22 graph.)	265	22	17	30	11	5	7
III (13 graph.)	48	14	8	6	1	1	1

Table 10-2

The number of presentations of the graphemes in the three teaching strategies, based on the three types of orienting (from Pantina, 1957, p. 124; 1981, p. 86).

As we have seen in Chapter 9, Gal'perin introduced the term OBA ('orienting basis of an action') and SCOBA ('scheme of a complete orienting basis of an action'). An OBA is something which the learner actually has at his disposal, while the SCOBA is an externally provided scheme, which serves as a model to be mastered by the learner. The objective of the orienting stage is to convey the SCOBA in such a way that the learner can use it as a 'frame of mind' for his orienting basis. In the orienting stage the OBA 'at hand' is transposed into the intended SCOBA.

In Chapter 9, I raised the question: How is the SCOBA revealed to the learner? There, I gave a summarizing answer to this question. Now, I will dwell upon this point in more detail. My treatment in this section draws on Talyzina (1980b, pp. 9-13; 1981, pp. 88-108), who offered the most detailed picture of the orienting basis and the types which could be distinguished (see also Gal'perin, 1982a). In Talyzina's view, three distinctive features classify the various types of orienting bases. Table 10-1 gives an overview of the types distinguished by Talyzina (1981, p. 90). Which are these types and their features?

To begin with, it should be mentioned that, like the action as a whole, the OBA can be classified by the four parameters of an action pointed out in Chapter 8, viz. the level of appropriation, the degree of generalization, the degree of abbreviation, and the degree of mastery. According to Talyzina (1981, p. 89), however, research has shown that from these four only the degree of generalization can be considered to be a distinctive feature of the orienting basis. The orienting basis depends on the extent to which the guiding devices that the orienting basis contains, are generalized. Changes in the other three parameters do not substantially effect the use value of the orienting basis. Thus, the degree of generalization is its first distinctive feature.

To further specify this feature, I have to repeat what Gal'perin considered to be the intended content of the SCOBA. As we have seen in the previous chapter, Gal'perin (1989c, p. 69) has outlined six guiding devices or components of a SCOBA. A SCOBA should reveal to the learner the following characteristics of an action:

- 1 the intended output
- 2 the pattern ('model')
- 3 the means
- 4 the objects
- 5 a general plan for action, and
- 6 the orienting chart.

In terms of its degree of generalization, Talyzina suggests two possibilities of the way these six characteristics of an action are revealed to the learner. A SCOBA can have a limited or general application. A SCOBA is called limited when it can only be applied to the solution of a set of specific learning tasks, whereas it is called general when it can also be applied to solve related learning tasks. The first, limited, SCOBA is called 'concrete,' because it refers to specific instances, while the other is called 'general,' because it refers to a whole domain of learning tasks.

The second distinctive feature of an orienting basis refers to its whether-or-not completeness. The acronym SCOBA stands for 'Scheme of a Complete Orienting Basis of an Action.' Thus, a SCOBA contains the complete set of conditions which are to be taken into account for the correct execution of an action. However, in practice a SCOBA is not always as complete as it should be. Therefore, Gal'perin also distinguishes an ISOBA which refers to an 'incomplete scheme of the orienting basis of an action.' Consequently, the make-up of the SCOBA may be complete or incomplete. Strictly speaking, the latter is no longer a SCOBA but an ISOBA.

Apart from the degree of generalization and the degree of completeness, there is a third feature of the orienting basis which should be taken into account. It refers to the way the SCOBA has to be appropriated by the learner. Following Gal'perin, Talyzina distinguishes two possibilities: the SCOBA is provided ready-made to the learner or has to be constructed by the learner under the teacher's guidance. As we will see further on, the 'ready-made provided' SCOBA has shortcomings which may be overcome by the 'guided constructed' SCOBA. According to Gal'perin (1982a, p. 544), the latter may be used as an altogether new basis for education.

Now, we have three criteria which each have two possibilities: the degree of generalization (concrete or general), the degree of completeness (complete or incomplete), and the way the SCOBA is appropriated (ready-made provided or guided constructed). Thus theoretically, eight

types of SCOBAs may be constructed. Table 10-1 summarizes the eight types with their features. Until now the first three types have been experimentally identified by Gal'perin. Already at the end of the 1950s, research was carried out to explore the differences between these three types. According to Gal'perin (1959a, p. 448), this was first done in research on the formation of handwriting (Gal'perin & Pantina, 1957), and on the formation of linguistic concepts (Gal'perin & Dubrovina, 1957).

For information concerning the other five types enumerated in Table 10-1, I refer the reader to Talyzina (1981). The fourth type was first described by her (1975, pp. 93-96), while the types 5-8 had been merely theoretically stipulated by her. The remainder of this chapter only deals with the first three types of SCOBAs in Table 10-1. As far as Gal'perin's own writings are concerned, only these types have been acknowledged and described by him. However, before describing these, a terminological point has to be made.

The formation of the intended SCOBAs is the main objective of the second, orienting, stage of the stepwise procedure. This stage is primarily responsible for progress in the teaching-learning process. Therefore, Gal'perin (1982a, 1985a) refers to the types of orienting bases as 'teaching strategies.' To him, the integral arrangement of the teaching-learning process depends on the types of orienting bases revealed and conveyed to the learner. Gal'perin (1968b, 1969c, 1965a, 1966a, 1982a, 1985a) distinguished three orienting bases and consequently, three teaching strategies. Now, I will give some details concerning these strategies by illustrating them using the example of handwriting.

Three teaching strategies

Teaching Strategy I: $OBA < SCOBAs$ (or $OBA > SCOBAs$)

This strategy is based on the first SCOBAs type (see Table 10-1), which has the following features: concrete, incomplete and guided constructed. Strictly speaking, the features of this SCOBAs type do not meet the requirements of the intended SCOBAs, because it is incomplete, whereas it needs to be complete. The learner lacks information on the new action and on the proper way to execute it.

According to Gal'perin (1968b, p. 261) the teaching-learning process will be unstable, errors are unavoidable and success in learning will greatly vary between learners. They are compelled to construct their orienting basis with the help of the trial-and-error method. In Gal'perin's view, this method hitherto predominates in teaching practice, because it is common practice that the learner's actual orienting basis is far from complete ($OBA < SCOBAs$).

Apart from an incomplete basis, Gal'perin also mentions the possibility that the orienting basis contains more information than is needed to execute an action ($OBA > SCOBAs$). Such an 'overcomplete' orienting basis will to some extent interfere with a correct execution. Functionally the orienting basis will be, in this instance, less than a complete basis. Due to this, Gal'perin subsumes this instance under the category of teaching strategy I.

Teaching strategy II: $OBA = SCOBAs$ (empirical)

This strategy is based on the second SCOBAs type, which has the following features: concrete, complete and ready-made provided. The learners have a complete orienting basis at their disposal and use the complete scheme of conditions for the correct execution of a new action. Since such a complete scheme is at hand, the learners' involvement in the very process of learning will grow. Fluctuations in the quality of the execution from one learning task to the next are insignificant and consequently the learners' attitude toward learning will change.

The advantages of this strategy compared to teaching strategy I are evident and considerable, especially when instructions are limited to specific learning tasks. But this limitation is also the principal shortcoming of strategy II. The orienting basis for every new class of learning task must be indicated anew, because transfer remains limited. The scheme of conditions for a new task has to be found empirically by checking to what extent the conditions are still valid. Therefore, Gal'perin (1968b, p. 262) has called the orienting basis constructed under teaching strategy II 'empirical.' This shortcoming posed a new problem to Gal'perin, viz. to develop a teaching strategy which creates an orienting basis of a more rational nature.

Teaching strategy III: OBA = SCOBA (rational)

This strategy is based on the third SCOBA type, which is general, complete and guided constructed. Within the context of this strategy, learners become able to construct, under the teacher's guidance, a complete orienting basis for the phenomena and learning task in some well defined domain. They know how to solve similar and related problems and this paves the way for transfer to other knowledge domains involving a similar class of objects. The learners are armed with a method of analysis enabling them to put together a complete and 'rational' orienting basis.

To Gal'perin (1968b, p. 260), this teaching strategy is an altogether new one, because it provides rationality (*razum'nost*) in action as much as possible. It is of psychological and educational interest, because it can be considered an example of teaching in 'the zone of proximal development.' Gal'perin and his co-workers have done a lot of research to clarify the distinctive features of this teaching strategy and its relationship with the appropriation of a cognitive repertoire or "tool kit of concepts and ideas and theories that permit one to get to higher ground mentally," as Bruner (1986, p. 73) put it.

Early research projects on the three teaching strategies

Experimental studies to analyze and describe the differences between the three teaching strategies have been carried out for such educational subjects as handwriting (Gal'perin & Pantina, 1957, 1965), elementary arithmetics (Gal'perin & Georgiev, 1969), elementary grammar of the Russian language (Zhdan, 1968; Aidarova, 1968), and geometrical concepts (Gal'perin & Talyzina, 1957). In 1968, Gal'perin and Talyzina published a collection of research papers on the three teaching strategies in relation to polytechnical education (Reshotova & Kaloshina), grammar (Aidarova), chess (Talyzina & Iakovlev), concept formation with 'Vygotskian blocks' (Teplen'kaia), physics (Obuchova), and geometry (Butkin).

I mention all this research to give an indication of the range of subjects which Gal'perin and his co-workers were dealing with in the 1950s and 1960s. To Gal'perin (1965a, pp. 28-29), this research had lead him to the conclusion that the organization (the 'orchestration') of the teaching-learning process depends on the mode of orienting the learner into the new action to be appropriated. Moreover, he concluded that the teaching strategies II and III can only be realised through the stepwise procedure.

Let me illustrate the three teaching strategies with the aid of a method to teach the motor skill of handwriting in elementary school. This writing method was developed by G. T. Arkhangel'skaia, P. Ia. Gal'perin and N. S. Pantina (Gal'perin, 1982a, 1989a; Gal'perin & Pantina, 1957, 1958, 1965; Pantina, 1957). Apart from its educational relevance, this example is of historical relevance, because it was on the basis of the research data collected during this project on writing skills that Gal'perin came to the conclusion that a third teaching strategy was necessary. It was then that this strategy had first been successfully designed and this had made this project of great importance for the further development of Gal'perin's research program. The results of the third teaching strategy were proven to be so much better than the other two strategies, that Gal'perin and his co-workers decided to undertake the task of applying it first to the educational subjects of grammar and arithmetics, and later on to the above-mentioned subjects (cf. Gal'perin, 1989a, pp. 31-32).

The theoretical and practical propositions arising from Gal'perin's work concerning the third teaching strategy met with wide criticism in the former Soviet Union as well as abroad (see Part Three). Among those recognizing the significance of Gal'perin's work are the Dutch psychologists Van Parreren and Carpay (1972, 1980). They credit Gal'perin with having convincingly demonstrated how to transform Vygotsky's cultural-historical approach to the child's cognitive development into a technology of instruction. Both Van Parreren and Carpay have contributed a great deal to the introduction of Gal'perin's work to psychologists and educators in the Netherlands and the Flemish part of Belgium.

In 1972, Van Parreren and Carpay co-authored a volume including, among others, a translation (done by Carpay) of Pantina's 1957 article on 'The formation of the motor skill of handwriting in relation to the type of orienting into the task.' This article has been instrumental in providing the learning-theoretical basis for a Dutch curriculum project on handwriting in elementary school (Van Engen, n.d.). Van Engen designed the writing method 'Handwriting in

elementary school for left- and right-handers' which is currently used by about one-third of the Dutch elementary schools. This method has gained a growing influence on Dutch elementary education and has been favourably reviewed because of the explicitly elaborated learning-psychological vantage point (e.g., Lindeman, 1987; p. 67; Meulenbroek, 1989, p. 71). Now, let me introduce this work on handwriting exemplifying Gal'perin's teaching strategies.

Introduction to handwriting skills: units of analysis

Gal'perin and Pantina took as their starting point Gurianov's (1940, 1948) psychological analysis of handwriting. At that time, it was common practice at Soviet elementary schools to teach handwriting with an exercise book having three lines with slanted (65 degrees) lines across (see Figure 10-1).

The teacher required the children to correctly place each segment of the grapheme in the corresponding section of the grid ('setka'). Under these conditions it is necessary that the children have a precise visual image, which becomes a crucial factor in the formation of the motor skill of handwriting. Gurianov (cf. Gal'perin & Pantina, 1965, p. 426; Pantina, 1957, p. 119), however, showed that the most basic factor for the development of the writing skill is the presence of the correct motor image, and that one should shift as quickly as possible from visual to motor control strategies of the writing movements. According to Gurianov, handwriting on the basis of a motor image is possible only under conditions in which the lines of the exercise book are removed or reduced, and when only an approximately correct or global reproduction of the graphemes is required from the child.

Furthermore, Gurianov argued that the graphemes are so complex for the child's perception that they cannot easily be represented visually. Therefore, he suggested the dissection of the grapheme into segments, thus making it possible for the primary school children to split up the task of reproducing the grapheme. However, Gurianov did not indicate how his proposal could be developed into a teaching method. Gal'perin and Pantina decided to develop such a method. What, however, could serve as the basis of such a method?

According to Gal'perin (1982a, p. 531), the new method they developed in the mid 1950s was based on Vygotsky's ideas about units of analysis in psychological research. I refer to Zinchenko's (1985) comprehensive and systematic article for more details on Vygotsky's conception of 'units' that were at the basis of his theory on the relationship between thinking and speech. I merely quote Vygotsky's (1987, p. 46) definition of a unit as "a product of analysis that possesses *all the basic characteristics of the whole*. The unit is a vital and irreducible part of the whole. The key to the explanation of the characteristics of water lies not in the investigation of its chemical formula but in the investigation of its molecule and its molecular movements. In precisely the same sense, the living cell is the real unit of biological analysis because it preserves the basic characteristics of life that are inherent in the living organism." (Italics in the original.)

I have presented this long quotation, because Gal'perin used Vygotsky's view on 'unity' to analyse educational subjects. He raised the question: What then is a unit that possesses all the characteristics inherent to the educational subject in question? In the case of handwriting, Gal'perin answered this question as follows.

In writing graphemes, the learning task consists of the correct reproduction of its shape. In Gal'perin's (1969c, p. 18) view, in this case the 'unit of the shape of the grapheme' ('edinitza kontura bukvy') can be found in a 'segment of continuous movement' ('otrezok neizmennogo napravleniia'). Where the line begins or changes its direction, indices ('tochki') are added so that each discrete segment is located between two such indices (see Gal'perin, 1985a, p. 15). These indices, revealed on the basis of the analysis of the grapheme, are transposed onto the lines of the grid. In Figure 10-1 the indices of the Russian grapheme 'u' are indicated.

Each segment of a grapheme differs from every other in length and position within the slanted and horizontal axes of the grid (the 'coordinates of the page'). A grapheme may begin and end on these coordinates or between them, and may run close to or separate from them. Consequently, a precise inventory of indices are necessary as a reference, otherwise no exact reproduction of a grapheme can be made. Therefore, Gal'perin (1982a, p. 532; 1985a, p. 15) distinguished two types of indices: (1) dividing indices (*razdelitel'nye tochki*) for marking the beginnings and ends of a grapheme, and (2) guiding indices (*vspomogatel'nye tochki*) for

maintaining the movement of very long segments. Taken together, Gal'perin called these two types supporting indices (*opornye tochki*), that is, they are reference points providing support for orientation during the writing of graphemes.

Global or analytic orienting on the shape of a grapheme

Previous observation of how first grade pupils write graphemes brought Gal'perin & Pantina (1958/1965, p. 427) to the conclusion that all these pupils orient themselves on the overall shape of the grapheme. However, they identified two categories of pupils. One group spontaneously spotted indices during writing of single graphemes, whereas the other did not. The distinction between both categories was striking when they had to write an unfamiliar grapheme. After looking at it, the first category began to copy at once and did not pay any more attention to the model. The other category copy the grapheme while visually comparing the separate segments of the written form with the model.

Gal'perin and Pantina concluded that, apparently, two types of orienting are possible: one (global) orienting to the overall shape with no analysis at all of the separate segments, and one (analytical) orienting to the segments of the shape as a basis to divide it into parts and reproduce it accordingly. They decided to further study the differences between the categories and the types of orienting involved. Their research showed that when children are taught according to the first type of global orienting, they will split up into two subgroups: one sticks to the first type and keep on globally orienting themselves, while the other switches spontaneously to the analytical orienting of the second type. This result is in complete agreement with Gal'perin's and Pantina's previous observations.

When taught according to the second type of analytical orienting, the children learned to handle the indices as a means to reproduce the grapheme. However, a serious disadvantage of this teaching strategy emerged: the children did not learn to analyze the grapheme. The inventory of indices needed to be separately reconstructed anew for every single grapheme. To quote Gal'perin (1982a, p. 531): "To put it mildly, this strategy was very boring."

In fact, Gal'perin and Pantina expected that the children taught according to the second type would start to analyze the graphemes spontaneously. However, this did not happen. So Gal'perin concluded that the second teaching strategy did not have the intended outcome. Consequently, rather unexpectedly, Gal'perin (personal communication, 1986a) invented a third one. This invention and the further experimentation within a broad range of subject domains, accelerated the development of Gal'perin's research program.

Thus, the third type of orienting emerged during research on writing graphemes. Gal'perin and Pantina felt themselves forced to search for a method enabling the child to establish independently (though under the teacher's guidance) the inventory of indices through analyzing the shapes of the various classes of graphemes. To meet these requirements they designed a teaching strategy with the special flavour which has become Gal'perin's 'trade mark.' One could argue that the first and second teaching strategy had been studied time and again within other educational research traditions. Only the third one, based on Vygotsky's concept of the 'unit of analysis' is a typical Gal'perinian invention and may be considered Gal'perin's original contribution to educational psychology. Let me describe briefly the three strategies and clarify their differences. These differences are determined by the way the pupils learn to orient themselves to the grapheme and to the inventory of indices.

Three teaching strategies to write graphemes

In Gal'perin's and Pantina's research the three teaching strategies correspond to three series of experiments. In each of the series five 6- and 7-year-old children were taught who absolutely could not write a grapheme. The children in the first and second series were taught to write 22 graphemes, and in the third series 13 graphemes. The process of teaching each grapheme was considered completed when the child had written the grapheme correctly three times in succession (cf. Gal'perin & Pantina, 1958/1965, pp. 428-429; Pantina, 1957/1981, pp. 80-95, Talyzina, 1969/1980, pp. 11-12; 1981, pp. 92-94).

Strategy I

The pupil is presented with the model grapheme and the writing is demonstrated without indicating the composing segments. Showing the model and indicating the relevant indices in the grid, the experimenter or teacher provides the following instruction (e.g., for the Russian grapheme 'u' representing the sound 'i' - see Figure 10-1): "We begin to write at this point; follow the line downwards until this point; now we begin to curve at the bottom line towards this point, and now we curve upward and move to this point (etc.)." In this instruction there is no indication as to the necessity of analyzing the model and finding the inventory of indices. The teaching-learning process proceeds along the lines of trial-and-error.

At the request of the teacher, the pupil starts to write the grapheme on his own. If necessary, the instruction is repeated. The teaching process is continued until the pupil writes the grapheme three times without errors. Due to the inadequate and incomplete orienting basis, this criterium is only achieved after many trials. It appeared that on average 174 repetitions were needed for a correct writing of the first grapheme. Having learned to write the first one correctly, the pupil was unable to identify some of the indices of the second one. Learning the first hardly affected learning of the second grapheme. The teaching process had to start from the beginning once again. Now, on average, 163 repetitions were needed. For the last three graphemes, on average, 25, 17 and 22 presentations of each grapheme were needed (see Table 10.2).

Strategy II

Teaching according to the second type of orienting is as follows. The pupil is given the model of the grapheme and is shown all the indices from which the grapheme can be correctly reproduced. The teacher or the experimenter puts down the indices onto the grid and requests the pupil to do the same. This is repeated for each grapheme to be learned. Having learned to place the indices in the required positions, the pupil writes the grapheme without errors. But these indices are no longer relevant to another grapheme, and the teacher has to provide anew the necessary inventory of indices.

The teaching-learning process proceeds more successfully than in the case of the first type: only 22 presentations as opposed to the 174 were needed to correctly write the first grapheme (see Table 10-2). This is because the orienting basis is complete as opposed to the incomplete orienting basis of the first type. However, the inventory of indices has to be demonstrated for each new grapheme. The orienting basis is concrete (see Table 10-1), i.e. not general and not easily transferable to new graphemes.

Strategy III

The teaching-learning process in this case proceeds quite differently. The teacher offers a model of a grapheme, explains the purpose of the indices, and shows how one can isolate them. The explanation is accompanied by a demonstration of only the first grapheme. Instead of providing the inventory of indices, as was the case with the second strategy, the teacher explains the principle of identifying them, namely, they are placed where the line begins, ends and changes its direction. Beginning with the second grapheme, the pupil independently (though under the teacher's guidance) isolates all indices while the teacher merely corrects the mistakes.

Thus, in the case of the third strategy, the pupil establishes for himself the content of the orienting basis. This basis is complete and general, i.e. the orienting basis contains a general principle which is applicable to any specific grapheme. The teaching-learning process proceeds very rapidly. Only 14 presentations were needed to correctly write the first grapheme, 8 for the second grapheme, and beginning with the eighth grapheme every new one was immediately written correctly and independently. After the thirteenth grapheme the continuation of the teaching-learning process made no sense, because the pupils managed to write the most difficult graphemes by themselves. Therefore, the pupils in this third series were taught to write only 13 graphemes (see Table 10-2).

Test series

In order to characterize the results of the three series according to the three teaching strategies, a test series was carried out. After the pupils had been taught according to the three strategies, they were asked to correctly copy unfamiliar graphemes from the cyrillic, Georgian and Roman alphabet. From the first group of pupils, taught according to the first type, not one pupil could accomplish this task, while the pupils from the second group reproduced correctly only a small

percentage of the presented unknown graphemes. The pupils from the third series, however, were able to transfer the method they had learned to the reproduction of practically any grapheme. The pupils easily analyzed and copied the given graphemes. It appeared, that transfer was not only complete in the specific domain of writing Russian graphemes, but extended to other alphabets and to graphic representations in general in which taking into account the position of objects on a plane is relevant, such as blueprints, drawings, and trajectories of moving bodies.

According to Gal'perin (1982a, p. 533), he and his co-workers Arkhangelskaia and Pantina were surprised at how easily the pupils, who were taught according to the third teaching strategy copied graphic displays. Gal'perin explained this by mentioning that such displays can each be reduced to the analysis of line contours and their position on a two-dimensional plane. Apparently, the third teaching strategy had prepared the pupils to transfer the previously acquired method of analyzing graphemes far beyond its bounds. Such 'near-far' transfer could be achieved because Gal'perin and his co-workers systematically instilled in the pupils an "objective awareness of the structure of a plane and of the characteristics of its elements, and taught them to use both to identify and reproduce particular graphic objects" (Gal'perin, 1989a, p. 33).

Brainerd (1975) called it 'near-far' transfer when children who have been trained in particular tasks, also make progress in related tasks in a post-test phase. Due to such teaching outcomes, it is not surprising that other researches have been giving special attention to the third teaching strategy; much research was done to clarify its particular potential and to maximize its effects on the intended learning outcomes (cf. e.g. Burmenskaia, 1976; Koops, 1989; Lidars, 1980; Obukhova, 1966).

Summary

In this chapter I have further elaborated on the orienting basis of an action. According to Gal'perin, three types of orienting bases can be distinguished. In his view, the organization and outcomes of the teaching-learning process are to a decisive extent dependent on the type of orienting basis involved. Consequently, Gal'perin distinguished three teaching strategies, whereby each strategy is determined by the corresponding type of the orienting basis.

I have illustrated the three types of orienting basis and the corresponding teaching strategies with the aid of a method to teach the motor skill of handwriting in elementary school. In the 1950s, this approach to writing was developed by G.T. Arkhangelskaia, P.Ia. Gal'perin and N.S. Pantina. Notably, the third teaching strategy received special attention, because Gal'perin considered it an altogether new basis for education with perceptibly encouraging learning outcomes. It has that special flavour which has become Gal'perin's 'trade mark.'

In short, the third teaching strategy is based on a general and complete orienting basis, which is guided (re-)constructed, under the teacher's guidance, by the learners themselves. They are armed with a method of analysis enabling them to put together a 'rational' orienting basis which is transferable to other knowledge domains involving a related class of objects. I have illustrated the rationality of the orienting basis with the case of the pupils who learned to write graphemes. These pupils were able to transfer the method they had learned to the reproduction of practically any grapheme. Moreover, it appeared, that transfer was not only complete in the specific domain of writing Russian graphemes, but extended to other alphabets and to graphic representations in general.

I have described in this chapter that the third teaching strategy had been invented by Gal'perin and his co-workers rather unexpectedly. They had expected that the second strategy would instill in the learners the ability to analyze the learning content independently and to (re-)construct, under the teacher's guidance, the orienting basis themselves. But this did not happen, because the orienting basis remained concrete and not transferable to the subsequent learning task. The orienting basis had to be established anew for every single learning task. For example, in the case of teaching handwriting this meant that the pupils did not learn to analyze the graphemes; the inventory of supporting indices needed to be reconstructed anew for every single grapheme. The third teaching strategy emerged during research on writing graphemes. This made this research project of historical significance for the development of Gal'perin's research program. Apart from this significance, it is also an example of Gal'perin's approach to

teaching which had an evident impact on teachers and researchers. Gal'perin and his co-workers have done a lot of research to clarify the features of this teaching strategy and its relationship with the learners' appropriation of a cognitive 'toolkit,' a powerful repertoire of mental actions.

Here ends my description of Gal'perin's research program on 'the systematic formation of mental actions and concepts.' Three chapters were needed, the two previous and the current one, to cover the whole program. In Part Three the topic will be raised as to what criticism it sustained.

PART THREE

EVALUATION OF GAL'PERIN'S RESEARCH PROGRAM

INTRODUCTION TO PART THREE

In Part One, I was concerned with Gal'perin's intellectual biography and how he became a psychologist. The purpose there was to cover Gal'perin's life from the cradle to the grave and to present it in relation to the historical and scientific background of the development of his research program. In Part Two, I have outlined the conditions which urged him to define his own position in Soviet psychology and I have sketched his approach to psychology.

In the first two parts I did not concern a great deal about the fate of Gal'perin's research program and its impact on his contemporaries. The purpose of Part Three is to express and explore these issues. Part Three addresses such questions as: Which phases can be distinguished in the process of conceptualizing and extending Gal'perin's research program; What can explain its 'flying start' in the first decade of its existence (Chapter 11)? What criticism did Gal'perin's approach in psychology come up against (Chapters 12 and 13)?; and finally, What can be considered its heuristic value and productivity (Chapter 13)?

CHAPTER 11

THE DEVELOPMENT OF GAL'PERIN'S RESEARCH PROGRAM

The primary aim of this chapter is to outline some historical aspects of the development of Gal'perin's research program. The chapter consists of two sections. In the first section will be argued that three phases can be distinguished in the development and maturation of Gal'perin's research program. The second section will go into more detail about the first decade of its existence and describe some vicissitudes during that first decade. At that time in the early and mid-1950s, it is striking that Gal'perin got off to a flying start with his research program and that the objections raised against it lasted until the end of the 1950s.

Since I have been involved in studying Gal'perin's work, I have always been astonished by the fact that he managed to launch his research program in the 1950s so successfully. Sometimes I even got the impression that Gal'perin was the most criticized psychologist in Soviet psychology. However, this impression refers only to the period from the end of the 1950s onwards. In my view, three reasons can be identified to explain why Gal'perin so successfully launched his research program. As we will see these reasons are related to the state of affairs of Soviet psychology in the 1950s.

For Part Three is concerned with the evaluation of Gal'perin's research program, it seems useful as its first chapter to insert an account on the developmental phases and early vicissitudes of Gal'perin's research program. The subsequent phases of this program are connected with its claim of giving new possibilities to the investigation of human psychological functioning. Consequently, an account of the development of the research program offers an overview of its claim and possibilities. Such an account in this chapter is an appropriate starting point for the subsequent chapter on criticism.

Three phases

As a vantage point for the first chapter section, a succinct retrospective report is used in which Gal'perin (1983a, pp. 154-156) identified three phases in the development of his research program of 'systematic formation of mental actions and concepts' (cf. Podol'ski, 1990, pp. 4-5):

- 1 the first phase of outlining the starting points of the research program;
- 2 the second and consolidating phase of defining its core assumptions and broadening its applications;
- 3 the third and extending phase of opening up new possibilities.

Before summarizing the contents of these phases, it is important to emphasize that there is a great deal of continuity in the subsequent phases. The development of Gal'perin's work is characterized by a balance between theoretical insights and empirical research. The consequent reorganizations have always tended toward coherence. After establishing, in the first phase, the central concepts as formation, mental action and orienting, Gal'perin did never abandon them. In the next two phases he further elaborated them in a more expanded conceptual framework through which he wanted to describe and investigate diverse forms of mental activity.

In his retrospective of the development of his research program, Gal'perin (1983a) himself did not mention time periods associated with the three phases or dates to mark their starts and finishes. So, I had to make up these demarcations on my own account. In my view, the first phase encompasses the 1950s and lasted until 1965, the second phase runs from 1966 until the end of the 1970s, and the third phase encompasses the 1980s and afterwards.

The first phase (1950-1965)

Around 1950, the first phase started, when Gal'perin decided to study how to identify the psychological rationale for the solution of various learning tasks. He wanted to investigate how various mental actions with their specific properties came into being. He wanted to be able to indicate under what conditions an action was established and took shape to an extent where it was optimally executed. The aim of the first phase may be summarized by Gal'perin's (1966a, p. 251) methodological maxim stating his principle of 'No more observation, but only formation!' Gal'perin, with some co-workers (among them V.V. Davydov and N.F. Talyzina), began to study which prerequisites in the teaching-learning context provide the formation of the mental actions and concepts that must be appropriated by the pupils.

In the early 1950, Gal'perin defined this outlook in the so-called 'stage-by-stage formation of mental actions and concepts.' Gal'perin's name became mainly associated with the term 'stage-by-stage formation.' According to Gal'perin (1992c, p. 61), it was El'konin who suggested this term, because 'stage-by-stage' was indeed a vital condition and a marked component of Gal'perin's research strategy. Gal'perin agreed, because that term strikingly referred to his approach at the time, when it was still in its initial phase. Later, Gal'perin (*ibid.*) regretted, that his approach had become known under its limited heading as 'stage-by-stage formation,' because in the 1970s and afterwards it no longer reflected its main content. The 'stage-by-stage' component is only part of his scientific endeavour.

In particular, two dates should be given special attention to specify the first phase in the development of Gal'perin's research program: 1952 and 1965. One could say that the start and finish of this phase are marked by these two dates. As we have seen in Chapter 4, in July 1952, the First All-Union Conference on Psychology took place discussing the Pavlovian approach in psychology. This conference, attended by Gal'perin, was devoted to a follow-up of the decision of the 1950 'Pavlov conference' to reconstruct psychology along Pavlovian lines. At the follow-up conference, Teplov (1952/1985) held his key-note lecture on "The objective method in psychology" and put forward that Pavlovianism provides this objective method.

In his contribution for discussion, Gal'perin (1953b) rejected Teplov's call for a Pavlovian renewal of psychology and presented an alternative. In a short paper Gal'perin analyzed the subject matter, method and explanatory principles of psychology. To make progress in theory and research he proposed to study psychological problems along the lines of 'stage-by-stage formation.' Gal'perin's contribution to this conference may be considered his 'maiden speech' on his research program: July 2nd, 1952 was the research program's birthday.

Another memorable date is 1965, which I consider the end point of the first phase of the development of Gal'perin's research program. That year Gal'perin received his second higher degree. In 1938, he obtained his first degree of Candidate in Medical Sciences (see Chapter 2), and in 1965, his advanced degree of "Doctor in Pedagogical Sciences, with Specialization in Psychology" ('doktor pedagogicheskikh nauk (po psikhologii)'), as mentioned in his dissertation.

Gal'perin's (1965) doctoral dissertation is entitled: Fundamental results of the investigation of the problem of 'The formation of mental actions and concepts.' It has 52 pages, including 6 pages of references. According to these, he himself published 36 titles and his co-workers 76 titles referring to the first phase of Gal'perin's research program. Given the total amount of 112 publications, the first phase can be considered rather productive. In his doctoral dissertation, Gal'perin summarized the results of his research program up to 1965. He covered such major themes as the significance of a complete orienting basis, the parameters of an action, the stepwise procedure, and the teaching strategies (see Chapters 8-10).

In short, the first phase of Gal'perin's research program is distinguished by three features. First, Gal'perin formulated his central themes and his methodological maxim stating his principle of 'No more observation, only formation!' Second, the stepwise procedure became

part of the hard core of his research program. And third, Gal'perin and his co-workers focussed on the study of various mental actions and concepts, such as arithmetic and geometrical concepts, that must be appropriated in elementary education.

The second phase (from 1966 till the end of the 1970s)

The year 1966 marks a significant historical event in the development of Soviet psychology. Until that year, psychology was a department of the Faculty of Philosophy, but now it became an independent faculty. Owing mainly to the efforts of A.N. Leont'ev, psychology was recognized as a scientific discipline. This event was crowned by a decree issued by the Council of Ministers of the USSR, dated 15 October 1968, that advanced degrees (Candidate of Science and Doctor of Science) could be awarded in the field of 'psychological sciences' (see Brozek, 1972, p. 9). With the establishment of the Faculty of Psychology at Moscow University, Gal'perin was appointed one of its professors.

There is a second event, which makes the year 1966 even more historically significant in the development of Soviet psychology. In August 1966, the 18th International Congress of Psychology was held in Moscow. This congress was instrumental to Soviet psychologists in achieving mutual exchange of scholarly information with Western psychologists, and for the latter it meant an opportunity to make acquaintance with Soviet psychology.

Gal'perin took part in the organization of this congress and convened, together with the Genevan psychologist and Piaget's co-worker Barbara Inhelder, Symposium 24 on 'Concept formation and 'inner action' (Inhelder & Gal'perin, 1966; cf. Menchinskaia & Saburova, 1967). Although in this symposium participated J. Piaget, J.S. Bruner and H.E. Gruber, most of the papers were delivered by Soviet psychologists presenting research in the vein of Gal'perin's theoretical viewpoints (among them D.H. Dubovis-Aranovskaia, G.V. Eiger, L.S. Georgiev, M.M. Gochlerner, S.N. Karpova, L.F. Obukhova, Ch.M. Teplen'kaia).

Thus, to some extent this symposium seemed to be organized to present the Gal'perinian school to an international audience. However, after reading the proceedings of this symposium one may doubt if this objective was achieved. It is unfortunate that the English translations of the Russian papers are not satisfactory and not properly edited. For example, Georgiev's paper is awkwardly entitled 'Moulding of wholesome mathematical ideals and actions in children,' where it should be rendered as 'Formation of full-fledged mathematical concepts and actions in children.'

Even so, at that time the proceedings of this symposium contained valuable papers, because in it Soviet psychologists from the Gal'perinian school presented their research data. Notably, Obukhova's (1966) and Teplen'kaia's (1966) papers attracted the attention of the Dutch psychologist G.A. Kohnstamm, who mentioned both papers in his Ph.D. thesis (Kohnstamm, 1967). Kohnstamm in turn brought that work to the attention of the Utrecht psychologists Carpay (pers. comm.) and Van Parreren and it appears that this exchange of information has not been without consequence for the development of Dutch psychology.

Carpay and Van Parreren recognized the significance of Gal'perin's work and they started to publish on it extensively (e.g., Van Parreren & Carpay, 1972, 1980; see Chapter 10). At that time, Van Parreren was an influential Dutch learning psychologist and in the novelty of Gal'perin's work he and his co-workers found a new theoretical dimension for continuing their own research. In particular, they felt inspired by the fact that Gal'perin's approach to teaching-learning processes bears resemblance to that of Otto Selz, the late member of the Würzburg group, who had such an influence on Dutch educationalists and psychologists (cf. Carpay, 1993; Frijda & De Groot, 1981).

In short, the first year of the second phase of the development of Gal'perin's research program is in two respects a memorable moment in Gal'perin's scientific career. His appointment as professor at Moscow University and his participation in the 18th International Congress of Psychology marked 1966 as the beginning year of the second phase. In this phase Gal'perin underwent an upsurge of his creative and scientific activity. Based on research in the first phase, the essence of his research program became visible.

The essence can be found in four basic assumptions together forming the hard core of Gal'perin's research program. Summarizing these assumptions in one phrase one could say that, according to Gal'perin, psychology is concerned with mental (ideal) orienting activity stemming

from material (practical) activity and emerging as the final product of the process of internalization. Consequently, mental orienting activity can be fully understood only when studied as an 'ongoing activity' in the course of internalization, which means in Gal'perin's terms, in the course of formation.

In 1971, when he was 69, Gal'perin became head of Moscow University's Department of Developmental Psychology. Now, he had his own department at the Faculty of Psychology and the possibility of gaining a following. From that time on, the Gal'perin school became firmly established. January 13, 1974, El'konin (1989, p. 504) wrote in his notebooks that Soviet psychology could be split up in at least three corresponding and at the same time very different conceptual approaches to psychology, namely Vygotsky's, Leont'ev's and Gal'perin's. According to El'konin, these three approaches, although different in many ways, originated from one source, but had grown apart. I agree with El'konin and I touched upon these differences in Chapter 5. Anyway, El'konin's assertion recognized Gal'perin's influential position in Soviet psychology in the early 1970s. It is beyond doubt that Gal'perin retained this position until his death in 1988 (cf. Zinchenko, 1993).

Given the articles and books Gal'perin has published, one could argue that the theoretical integration of his psychological thought took place in the 1970s. In that decade Gal'perin himself was in his 70s as well. Thus, the integration took place almost at the end of his scientific career. This contention can be illustrated by the special Gal'perin issue published in 1992 by the *Journal of Russian and East European Psychology* (formerly titled *Soviet Psychology*). This issue contained four articles all written by Gal'perin and originally published in Russian in the 1970s (Gal'perin, 1976/1992a, 1977a/1992b, 1977b/1992c, 1978/1992d). Together these articles outline Gal'perin's psychological thought and illustrate the above-mentioned 'hard core' from different angles. They also reflect how Gal'perin expanded the range of his research program to include the psychological aspects of such diverse disciplines as ethology (1992a), theory, history and methodology of psychology (1992b, c), psycholinguistics and instructional psychology (1992c, d).

In the 1970s, it became obvious as well that the term 'stage-by-stage formation' no longer reflected the whole content of Gal'perin's research program. According to Gal'perin (1978/1992c, p. 61), it would be correct to call his system 'planned' ('plannomernoe', i.e. in accordance with a plan), not just stage-by-stage formation, because the term planned was a more accurate reflection of its content. However, it was not until the third phase, that he found a suitable heading to cover the content of his research program.

On the basis of research done by himself and his co-workers during a period of a quarter of a century (early 1950s till mid-1970s), Gal'perin started to distinguish a set of four prerequisites (the learning motive, the orienting basis, the parameters of an action, and the stepwise procedure), which according to him, are required for the proper formation of mental actions and concepts (see the Chapters 8-10). This set of prerequisites enabled him to describe and investigate the process of formation from diverent vantage points and to deal with the proper arrangement of the teaching-learning process.

Thus, in the second phase of the development of his research program, Gal'perin had the complete set of prerequisites at hand. So he started to investigate new problems and broadened his research area. In the first phase he exclusively studied the formation of separate actions and concepts. Now he carried out new studies concerning the conceptual inventories in a certain learning domain at the same time (cf. Gal'perin, 1974/1989c). Moreover, he started research concerning all levels of the educational system and a broad range of ages. This research deals with how education at any level - from kindergarten to graduate school - can be organized according to Gal'perin's method.

A typical example may be found in research done by Nechaev (1972), which differed from earlier research in two respects. First, it concerned adult education, a level not as yet touched upon by 'Gal'perinian' researchers. Secondly, it dealt with the teaching of conceptual inventories which are not taught within the context of the regular school curriculum. Nechaev studied the teaching of legal concepts from one of the sections of labor legislation, specifically, the section on imposing penalties for damage caused by an enterprise. He designed an advanced course for lawyers and compiled a 'scheme of a complete orienting basis of an action' (SCOBA) on all the theses of this legal section.

The distinctive feature of Nechaev's curriculum was a revised arrangement of the learning content. The learning content was taught not on the basis of separate concepts, but immediately as a whole. It was presented as an extensive and highly branched flow-chart on an orienting chart which was "terrible even to look at" (Gal'perin, 1989c, p. 77). With the help of this orienting chart and the subsequently stepwise procedure, the students quickly learned to solve tasks in this legal domain.

Summarizing, the second phase of the development of Gal'perin's research program is distinguished by the following features. First, Gal'perin was appointed as professor at Moscow University and became head of the Department of Developmental Psychology of the Faculty of Psychology. Owing to this official scientific position he could further develop his research program and gain a following of 'Gal'perinian' researchers who worked on his program. Second, on the basis of research he formulated the set of four prerequisites enabling him to describe and investigate the proper (or 'planned' as it then still was called) formation of mental actions and concepts. Third, he and his co-workers further elaborated the possibilities of 'planned' formation, notably into the direction of whole learning units.

The third phase (from 1980 onwards)

In the 1980s, Gal'perin was still not satisfied with the heading of his research program. Instead of 'stage-by-stage' or 'stepwise formation' (*poetapnoe formirovanie*), Gal'perin (1985, p. 4) proposed to call his approach the 'planned stage-by-stage formation of mental actions and concepts' (*plannomerno-poetapnoe formirovanie umstvennykh deistvii i poniatii*). This term is not employed in this volume, because it is too cumbersome. Following a suggestion by Carpay (pers. comm.), I have simplified my vocabulary and referred to Gal'perin's research programme with the summarizing term 'systematic formation.'

The term systematic formation needs further comment. According to Collins Cobuild English Language Dictionary, 'systematicity' refers to "a fixed plan or system, so that things are done in a thorough and efficient way" (p. 1485). It is in this sense that Gal'perin's approach to education is 'systematic.' Gal'perin developed a set of prerequisites which is used to arrange and investigate teaching-learning processes. Thus, the term 'systematic formation' is used as an appropriate English equivalent for the Russian term 'plannomerno-poetapnoe formirovanie.'

In the early 1950s, Gal'perin first began to define the set of prerequisites for the formation of mental actions. In the 1980s, thirty years later, after a series of investigations, the elucidation of the whole set is still incomplete (Gal'perin, 1982a, p. 526). Or to put it in Gal'perin's terminology, the scheme of the orienting basis which may be offered to researchers and educators to deal with the proper organization of the teaching-learning process, is not complete. This is a serious threat to the further development of Gal'perin's research program, because an incomplete orienting basis in this context means an inadequately conceptualized outlook leading to trial-and-error investigation and organization of teaching-learning processes.

Gal'perin (1986a) was well aware of this state of affairs in the 1980s. According to him, he addressed major - and often contentious - issues in psychology and hence he developed a conceptual framework to tackle them. However, he kept repeating that he had only made a start by laying a new foundation and that there was still much to do. Now, in the third phase of its development, the final question is: Whither Gal'perin's research program in the future? Gal'perin's (1983a, p. 155) own view of the direction that his program should take was that it should be applied to a broad range of domains and learning tasks. Thereby, the central research question should be: "What does a person do when he perceives, retrieves, imagines, thinks, etc.?"

To Gal'perin (*ibid.*), the cognitive processes involved in these activities are directed toward the construction of mental images. Images contain representations about the experienced world, about the external world of objects 'before the eyes'; these representations are 'refracted' by previous experience and adapted to representations of how to deal with the actual situation. According to Gal'perin, imagery is a basic property of human cognition and a primary way in which information can be represented. Initially, information is stored in images, and the person's subsequent modification and elaboration of this information within the framework of such mental images, leads to the emergence of ideas and concepts.

Due to this imagery-based conception of cognition, the problem of the formation of images and the problem of perception in general came to the fore in the Gal'perinian school. Since the early 1980s, there has been a growing interest in the study of perception and several works have been published (e.g., Lerner, 1980; Podol'ski, 1987; Shabel'nikov, 1982).

Now, in the third phase of the development of Gal'perin's research program, one could argue that Gal'perin has finally laid the basis for a new approach to psychology. We have the 'blueprint' of this research program on 'systematic formation' at our disposal, but it has to be further developed and modified. Speculation about its further possibilities requires extensive examination of the apparent productivity of Gal'perin's research program, a task with which Gal'perin's followers should come to terms.

Getting off to a flying start

The aim of this chapter section is to describe some early vicissitudes of Gal'perin's research program. I want to pause briefly on the first years of the emergence of Gal'perin's research program and describe some events in its first decade, when Gal'perin got off to a flying start with his research program. In the 1950s, Gal'perin was obviously given the time and the opportunity to work patiently and tenaciously on the development of his research program. He received support from several influential psychologists, and the names of A.N. Leont'ev, A.R. Luria, and D.B. El'konin should be especially mentioned in this respect.

In 1986, when I had the opportunity to have a number of conversations with Gal'perin, I discussed this issue with him. The information presented in this chapter is partly based on these conversations and indicated as 'Gal'perin, 1986a.' On the basis of these conversations. I will outline three reasons for the calm before the storm of criticism which broke the end of the 1950s. These three reasons are:

- 1 Leont'ev's support;
- 2 The 'Pavlovization' of Soviet psychology;
- 3 Systematic school experiments.

A.N. Leont'ev's support of Gal'perin research program

In the early 1950s, Leont'ev was already an influential psychologist and above all else, he should be mentioned as the one who offered support to Gal'perin's approach. He considered it a "new way" of confirmation and clarification of his own hypothesis concerning psychological tools mediating psychological functions. According to Leont'ev (1957a, p. 230), he started to investigate this hypothesis as one of Vygotsky's co-workers as early as the end of the 1920s. At that time, Leont'ev (1931/1983, pp. 31-64, p. 387) designed an experiment to demonstrate Vygotsky's new experimental approach. Leont'ev (1983, p. 43) took the topic of memory, using the so-called 'functional method of double stimulation,' developed by Vygotsky and Luria. Subjects were nursery school children, pupils of the 5th and 6th grade (ten to twelve years of age), and adults. They were confronted with two kinds of stimuli: objects to be memorized (quasi-words and real words) and monitoring devices (pictures) serving as external supports to the memorizing process. Leont'ev wanted to investigate to what extent his subjects were able to take advantage of these devices (see Chapter 5 for more details).

Leont'ev's research showed the possibilities of using monitoring devices as external support for memorizing. Depending on the age of the subjects, the presence or absence of support appeared to have a significant effect on memorizing. However, Leont'ev only observed this effect in an exploratory research setting designed to demonstrate Vygotsky's instrumental approach to higher psychological functions. Gal'perin, however, in the early 1950s, placed Leont'ev's preliminary experimentation within the new research context of 'systematic formation,' or as it then was still called 'stepwise formation.' This research context may be considered a 'teaching experiment' in which psychological functions are formed with intended properties. According to Leont'ev (1957, p. 232), Gal'perin's new experimental approach made a goal-directed (systematic) formation of psychological functions possible.

Thus, Leont'ev recognized and promoted Gal'perin's approach. Leont'ev made ample mention of Gal'perin's work in two papers delivered at international psychological congresses. In 1954, Leont'ev headed the Soviet delegation to the 14th International Congress of Psychology, held in Montreal, and presented a paper in French on 'The nature and formation of human psychic properties' (Leont'ev, 1955a, 1955b). About one-quarter of his paper summarized the research done by Gal'perin and his co-workers at Moscow University. Leont'ev's (1957a) paper was published in the first anthology of Soviet psychological literature in English translation (Simon, 1957).

In 1956, Leont'ev (1957b) lectured at the 4th Congress of the Association of Scientific Psychology, held in Strassbourg. An English translation (Leont'ev, 1961) of this lecture appeared in the second anthology of Soviet psychological literature (O'Conner, 1961). Leont'ev's lengthy paper on the psychology of learning addresses the issues of Pavlov's limited - both theoretical and empirical - value for research on human learning, and the promising alternatives existing and being developed in the Soviet Union in the 1950s. Leont'ev referred to, among others, Sokolov's, Anokhin's and Gal'perin's work. On that occasion, Leont'ev's (1961, pp. 240-242) summary of Gal'perin's work was more detailed than in his previous Montreal paper mentioned above.

I have mentioned both papers, presented by Leont'ev at international conferences, to underline the fact that apparently, at that time, Gal'perin's work had received recognition in the Soviet Union. In the 1950s, Leont'ev was already a leading figure in Soviet psychology and the extensive attention he paid to Gal'perin's work was not without significance. Undoubtedly, his support contributed to the successful launch of Gal'perin's research program.

The 'Pavlovization' of Soviet psychology

Apart from Leont'ev's support, other reasons may also be significant for the 'flying start' of Gal'perin's research program in the early and mid-1950s. The second reason may be found in the political and scientific situation at that time. As we have seen before (Ch. 4), it was the time of 'Pavlovization' of Soviet psychology. McLeish (1975, p. 216) reported that the initial reaction of many psychologists was confusion and that many adopted a wait-and-see attitude until the reconstruction of psychology along 'Pavlovian' lines had actually taken place.

Gal'perin, however, felt like a fish in water. As a neuropsychiatrist by training (see Chapter 1), he was familiar with reasoning along 'Pavlovian' lines. He had actively participated in the discussions on this issue and published articles on it as early as 1935, and later in 1953. He did not feel confused as did so many other Soviet psychologists and did not wait until the reconstruction of Soviet psychology had actually taken place. He created his own 'reconstruction,' expressed his point of view at several official occasions and lectured on his program at the conferences on psychology held in Moscow in 1952, 1953, and 1955 (Gal'perin, 1953b, 1957a, 1957b). These three conferences took place at the height of the 'Pavlovization' of Soviet psychology and were meant as follow-up conferences to the 'revenons à Pavlov' directive of 1950.

It is striking that Gal'perin managed to use these conferences to put forward his own research program. His lectures showed a tendency to bypass the works of Marx, Lenin and Pavlov. It must be said, however, that he did not abandon the traditional basic assumptions of Soviet psychology. From the earliest days of presentation of his research program he thought in terms of these assumptions, but he elaborated and conceptualized them within his own framework.

The 'Pavlovization,' as I (following Burger, 1955) argued in Chapter 4, did not mean a 'paradigm switch' (cf. Kuhn) in psychological theorizing, but meant another scientific context, in which more emphasis was to be placed on theoretical foundations and systematic research. 'Pavlovization' led to a historical and political change, producing a revival of psychology in the Soviet Union. After Stalin's death in 1953, the course of psychology was gradually left more free and this revival continued. It is this context, which had given the boost to Gal'perin.

Apparently, within this new climate Gal'perin felt free to announce a new line of theorizing and experimentation. From the very beginning he did not merely theorize, but designed research projects to put his ideas on a rigorous experimental footing. In my view, this 'empirical inclination' is expressed in his methodological maxim ('No more observation, only formation!').

This characteristic can probably in part explain Gal'perin's influence. He had a particular sense of the need to combine theoretical ideas with their practical application in educational settings. He was a doer, and he wanted research that made changes possible in the real world of education. Due to the 'Pavlovization' of Soviet psychology, Gal'perin felt free to launch his research program and to start a series of research.

Already at the end of the 1950s, there is a substantial list of papers concerning research carried out under his supervision (see the references in Gal'perin's 1965 doctoral dissertation). This early research referred mainly to concept formation in elementary education but other domains of psychological functioning had been investigated as well. This early research was done by L.I. Aidarova, K.V. Bardin, V.I. Bashilov, G.A. Butkin, A.G. Chrustaleva, T.V. Fomina, I.S. Freidkin, L. S. Georgiev, I.E. Golomshtok, and V.V. Davydov, D.M. Dubovis-Aranovskaia, A.N. Dubrovina, A.N. Ivanova, E.I. Kachurova, N.D. Kadymova, M.N. Lentina, T.K. Meleshko, I.S. Morozova, N.I. Naenko, N.I. Nepomniashchaia, V.V. Nikolaeva, A.K. Niranen, V.Ia. Nos, L.S. Obuchova, A.E. Ol'shannikova, N.S. Pantina, L.R. Prindul, Z.A. Reshetova, N.I. Ryzhkova, N.N. Sachko, K.A. Stepanova, and N.F. Talyzina.

Consequently, when in 1958, the official establishment of experimental schools took place, Gal'perin and his co-workers had gathered a tremendous amount of relevant research data, which could be adapted to the classroom setting and re-evaluated on that basis. This brings me to the third reason.

Systematic school experiments

The third and final reason for the successful launch of Gal'perin's research program can be found in the establishment of experimental schools at the end of the 1950s. Where did they come from and why did they have such an influence upon Gal'perin's impact in the 1950s? In the former Soviet Union, dialectical materialism as the official Soviet philosophy, had established the ground rules guiding Soviet science and research. As one of its assumptions, dialectical materialism articulates a hope and vision to remake society and the individual's relation to it. This assumption put the theoretical, empirical and practical problems concerning upbringing, education and development of children in the centre of Soviet psychology and pedagogy. While dialectical materialism ('diamat') provided the framework for the study of these problems, it did not mean that a single paradigm emerged from it. Its assumptions had to be modified and adopted to orient theory building and research practice in psychology and pedagogy (cf. Popkewitz, 1984).

In an exhaustive study, the Dutch psychologist Vos (1976) reviewed the historical development of psychology and pedagogy within the context of 'diamat' in the former Soviet Union. He argues that in the former Soviet Union from the 1920s onwards, research in educational psychology has been given considerable moral and financial support. As far as Gal'perin is concerned, an especially noteworthy event is the adoption of a party resolution entitled 'On the work of the RSFSR Academy of Pedagogical Sciences and on strengthening its ties with the schools and pedagogical research centres.' This resolution, announced in 1958, indicated the lines along which the Academy must proceed in order to bridge the gap between its research work and the practical demands of the schooling and educating of children. The resolution extended the network of experimental schools and of laboratory schools established under the RSFSR Academy of Pedagogical Sciences.

El'konin (1961, pp. 3-4) who called these newly established experimental schools 'laboratories of normal child development,' emphasized that already before the resolution there had been an outstanding tradition of conducting research on the basis of new arrangements for teaching and learning in schools. But now it became possible to apply and (re-)evaluate in the classroom the accumulated research findings and to design a longitudinal research project based on a macrogenetic approach to mental development. This interesting period in the development of Soviet psychology is extensively described and reviewed by Davydov (1975), El'konin, (1961), Vos (1976, pp. 371-372) and Zankov (1977).

In short, even more than before, the classroom itself became the laboratory of Soviet educational researchers. In the former USSR educational psychology received considerable impetus from this newly established research approach. One could state that much successful research in Soviet psychology can be traced to this highly favourable research context in which

the impact of schooling and educating of ordinary children is studied under the conditions of systematic school experiments. Several authors (Popkewits, 1984; Simon, 1978, p. 142; Van Parreren & Carpay, 1980, p. 19) have mentioned this experimental approach as the first one of the main characteristics of Soviet educational psychology.

At the time, El'konin had become director of the Laboratory of the Psychology of the School Child. This laboratory was part of the Institute of Psychology of the RSFSR Academy of Pedagogical Sciences. El'konin and his associates (among them Davydov) set up one experimental first-grade class at school No. 91 located in the Krasnopresnenskii District of Moscow. In the first (1959-60) school year of their experiments they decided not to make changes in all the subject matters but to restrict their experiments to those sections for which they already had sufficient experimental data. To begin with, they decided to only introduce changes to the school curricula for elementary reading and arithmetics. El'konin supervised the curriculum of reading, while Davydov took charge of arithmetics.

According to El'konin (1961), to realize these educational changes they used the results that had been achieved in previous research done by Zankov, and by Gal'perin and his co-workers. In particular, it appeared that Gal'perin's and his co-workers' research had been of great importance for the changes to the two curricula of reading and arithmetics El'konin and Davydov had in mind. To reorganize the teaching-learning processes in both curricula they adopted Gal'perin's stepwise procedure. It is obvious that the impact of his work on the design of these first experimental curricula brought Gal'perin scientific prestige. Therefore, I mention it as the third reason of Gal'perin's scientific success in the 1950s.

In ending this section on the establishment of the experimental schools at the end of the 1950s, it should be mentioned that in the years following, El'konin (e.g. 1973, p. 560) continued to refer to Gal'perin's substantial influence on his early design of elementary reading. It should also be recorded that Davydov gradually ceased to acknowledge that Gal'perin greatly influenced his early design of elementary arithmetics (see Haenen, 1988c). Both El'konin's (1961, 1963, 1973, 1988a,b) and Davydov's (1982, 1988a,b,c,) research at that time and onwards had a great impact on the development of Soviet educational psychology (El'konin & Davydov, 1975). Through this work they also both received attention from Western psychologists and researchers on the field of reading (e.g., Downing, 1988; Gresnigt, 1992) and arithmetics (e.g., Nelissen, 1987; Wolters, 1978).

Summary

This chapter consists of two sections, one on the phases of Gal'perin's research program, and one on its early vicissitudes in the 1950s. I have identified three phases in the development of Gal'perin's research program. A first phase from the early 1950s until 1965, a consolidating phase from 1966 until the end of the 1970s, and a third phase extending from the 1980s onwards. There is a great deal of continuity between these phases. While the general assumptions of his research program had remained practically unchanged over all these years, Gal'perin has continuously further developed his conceptual framework. This framework is based on a set of four interrelated prerequisites which are required for the 'systematic formation of mental actions and concepts.'

I have described the differences between the three phases with the aid of Gal'perin's changing view on his concept of the adjective attached to formation: first stepwise or stage-by-stage, then planned, and finally systematic. In the first phase, the stepwise procedure was the most marked component of Gal'perin's research program. Consequently, his approach was called 'the stepwise formation of mental actions and concepts.' Although the stepwise procedure remained the 'burgeoning kernel' of Gal'perin's research program, it became more and more embedded in a set of prerequisites which are required for its proper formation.

In the second phase Gal'perin started to underline that formation should be planned, i.e. formation should occur in accordance with a pre-established plan. The outline of such a plan is defined by the set of prerequisites. However, it could be argued that the term 'planned' is too limited and too general to cover the richness of Gal'perin's approach. A teaching-learning process in formal education usually has a planned character. Other research traditions which are

distinct from Gal'perin's, refer to planned and controllable instructional events as well (cf. Gagné et al, 1992). Thus, the term planned is not distinctive enough to designate Gal'perin's approach.

It lasted until the 1980s - the third phase - before Gal'perin proposed to call his research program 'plannomernoe-poetapnoe,' i.e. 'planned stage-by-stage.' I introduced the term 'systematic' as an appropriate English equivalent for the cumbersome term 'plannomernoe-poetapnoe.' The whole process of formation is determined by the set of four prerequisites (the learning motive, the orienting basis, the parameters of an action, the stepwise procedure). To Gal'perin, this set enables us to determine and to investigate the organization and outcomes of the formation of new actions and concepts. Examination of the merits of Gal'perin's research program should be based on this entire set of prerequisites.

The second section of this chapter described the early vicissitudes and the successful launch of Gal'perin's research program in the 1950s. One could even argue, as I have actually done, that the first decade of its existence is characterized by the 'flying start' of Gal'perin's research program. In my view, three reasons can be identified, which are to some extent related to the situation of Soviet psychology in the 1950s. These reasons concerned (1) Leont'ev's support, (2) the 'Pavlovization' of Soviet psychology, and (3) the establishment of experimental schools.

The decade of the 1950s was extremely important for the development of Gal'perin's research program. He became a Russian psychologist of the first rank, whose psychological thought has been accepted and developed as well as rejected and criticized. In 1988, when he died, Gal'perin left a rich legacy, the value of which has not yet been exhaustively explored. Or, is this view too optimistic and is Gal'perin's research program in need of fundamental modification? To answer this question, I first have to consider the main criticism of the various aspects of Gal'perin's research program in the next chapter.

CHAPTER 12

CRITICISM OF GAL'PERIN'S RESEARCH PROGRAM

In chapter 11, I asserted that it seems that Gal'perin has been one of the the most criticized Russian psychologists. Gal'perin's research program gained ground despite the opposition of powerful opponents, some of whom continue to reject his ideas and methods emphatically. On the one hand, his views on psychology have been accepted and elaborated by some Soviet psychologists (e.g., A.V. Zaporozhets, D.B. El'konin), but on the other hand they have been rejected by others as limited or even wrong (e.g., N.A. Menchinskaia, I.S. Iakimanskaia, A.A. Smirnov, E.A. Budilova).

The aim of this chapter is to cover two of the main objections raised by Gal'perin's critics as early as the 1950s. The criticism described in this chapter has been raised by two research projects, viz. Karpova's and Kalmykova's. Both projects are, although in a different sense, critical. Karpova's experiment was meant to support one of Gal'perin's basic assumptions regarding the material action. It corroborated the function Gal'perin assigned to the physical manipulation of material objects. The design and results, however, of Karpova's experiment caused the first criticism. Kalmykova's experiment, on the other hand, was meant to challenge Gal'perin's entire scientific enterprise. Kalmykova argued that it constituted a limited teaching strategy making the learners passive recipients of the curriculum content.

In sum, Karpova addressed the issue of the material action, while Kalmykova put forward the issue of the passive learner or 'one-way transmission.' Both issues are still relevant today. I will cover in this chapter the early criticism concerning both issues and enlarge it with the ongoing discussions. Furthermore, I will pay attention to Gal'perin's reaction to it. By doing so, I cover both issues from the early days of Gal'perin's research program until their present state of affairs.

The first criticism: The material(ized) action

In chapter 11, I have identified three phases in the development of Gal'perin's research program. An initial phase from the early 1950s until 1965, a consolidating phase from 1966 until the end of the 1970s, and a third phase extending from the 1980s onwards. I have described the differences between the three phases with the aid of Gal'perin's changing view on the adjective attached to formation: first stepwise or stage-by-stage, then planned, and finally systematic.

In the first phase of the development of Gal'perin's research program, the stage-by-stage or stepwise procedure was its most marked component. Consequently, his approach was called 'stage-by-stage formation of mental actions and concepts.' The criticism levelled against his approach referred to several aspects of his stepwise procedure. First of all, I have to mention the criticism of the material(ized) action. I will cover the criticism concerning this issue and I will use Karpova's research to elaborate on it. Historically, it was her research which first raised criticism of Gal'perin's research program. However, no written record of that first criticism is available. As we will see further on, for the first officially published criticism of Gal'perin, we have to wait until 1958. And a year later, in 1959, the storm of criticism really begins.

The first criticism concerns a basic assumption of Gal'perin's which has remained a recurring issue up to the present time, viz. the function Gal'perin ascribed to the material action. In the vein of L.S. Vygotsky, Gal'perin asserted that individual mental functioning

(human cognition) can only be understood in genetic terms, i.e. as the final outcome of the internalization of external material actions. Especially, the alleged relationship between material and mental actions has been the subject of many critiques. Summarizing these enables me to elaborate further on Gal'perin's answer. As we will see, during the years which follow, Gal'perin's concept of the material action will lose its prominent place in his research program in favour of the materialized action.

The historical context of the first criticism

The historical context of the first criticism was communicated to me in a personal conversation with Gal'perin (1986a). He wanted to illustrate the fact that others at the time, in the midst of the 1950s, did not properly understand the essence of his approach. As we have seen in the previous chapter, it was the time of the 'Pavlovization' aimed at the reconstruction of Soviet psychology along Pavlovian lines. This period was characterized by a wait-and-see attitude and confusion within the whole community of Soviet psychologists. It is very understandable that most psychologists were minding their own affairs and their own scientific 'reconceptualization' in the new context of the revival of Soviet psychology. There was less interest in other people's work, let alone in criticizing it. This fact of ignorance about the work of other psychologists was illustrated by Gal'perin by a personal recollection during my conversations with him in February, 1986. He wanted to illustrate that his colleagues at the time did not properly understand the gist of his approach. Due to this misunderstanding, they raised critical questions and, although no written testimony is available, these may be considered the first criticism of Gal'perin's research program.

The first criticism was caused by an experiment by Sofia Nikolaevna Karpova, who later became one of Gal'perin's co-workers and who succeeded him as head of Moscow University's Department of Developmental Psychology when he assumed emeritus status in 1984. Although the experiment was done under the guidance of A.R. Luria as early as 1953, according to Karpova (1955, p. 50), it was in fact inspired by Gal'perin's approach. Apparently, Luria was, like Leont'ev (see Chapter 11), impressed by Gal'perin's approach to dealing with issues within - in Karpova's case - the linguistic domain. On several occasions, also in later publications, Luria favourably reviewed Gal'perin's approach and called it "a completely new solution to one of the major complex problems of psychology" (Luria, 1982, p. 106).

The topic of Karpova's experiment concerned the function Gal'perin ascribed to the material action with regard to learning to identify words as discrete linguistic units in spoken sentences.

Introduction to Karpova's research on identifying words

Soviet (Vygotsky, Luria, Karpova a.o.) as well as Western (Downing, Oliver, Johns, Read a.o.) researchers have reported on the difficulty which preschool children experience if they have to identify words in a spoken sentence. The ability of 'segmentation,' as such identification is usually called, normally develops gradually during the early school years (cf. Read, 1978, p. 72). For the preschooler segmentation lags considerably behind the mastery of oral speech.

The difficulty of segmentation arises from the fact that, in the preschool stage, children's attention is chiefly concentrated on the objects to which the spoken words refer to. Although they are able to handle speech, they are not yet able to focus their attention on words as the smallest linguistic units which can occur on their own in speech and are marked by blanks before and after them in written speech (cf. Richards et al., 1992, p. 311). Luria (1988, p. 95) has dubbed the children's ignorance the "glass window phenomenon": the word may be likened to a pane of glass through which the child views the surrounding world. Preschool children perceive the referent (i.e. the object to which the word refers to) without being aware of the existence of the wordform itself. They are not aware that a wordform as such is an object on its own in speech (or writing).

This fact was also mentioned by Vygotsky (1987, p. 254), who observed that young children treat the labels of referents as if they were a property of the referents themselves. This becomes apparent in diagnostic settings where the child is asked to exchange the labels of referents, e.g. calling a cow "ink" and ink "cow." For a child such an exchange of labels is impossible,

because "you write with ink and a cow gives milk," as a preschool child answered being a subject in Vygotsky's research. The distinctive features of a referent are so closely connected with its label that to exchange it means to exchange the features.

This peculiar nature of the preschoolers' conception of speech has been mentioned time and again in child psychology and linguistics. I refer the reader to Sinclair et al. (1978) who mapped out this research topic and the phenomena involved. According to Luria (1977, p. VII), Karpova (1955) was one of the first in psychological literature to analyze the preschoolers' ability of the segmentation of spoken sentences into words. Moreover, she designed a method of teaching preschoolers this ability and introduced them to the study of 'word analysis' as part of a preschool program. Karpova (1977) has shown that this ability is part of the preschoolers' 'zone of proximal development' and that linguistic competence can be sharpened or formed in preschoolers. According to Luria (ibid. p. IX) in his foreword to Karpova's book, the preschoolers' conscious awareness of their linguistic competence is "one of the most interesting chapters in psychology and linguistics."

As for the expediency of including this topic in the curriculum at preschool level, Karpova (1977, p. 268) holds the view that such a decision should be based on research and relevant to children of this age. Karpova took upon herself the task of investigating the mere teachability of segmentation at preschool level. In 1953, she conducted her first experiment under the guidance of A.R. Luria (Karpova, 1955). In the late 1960s, she continued it choosing as a point of departure Gal'perin's stepwise procedure. This led to a "new theoretical interpretation of the facts we observed," as Karpova (1977, p. 6) remarks. Due to this connection between Karpova's early and subsequent experiment, I will call for the sake of clarity the first one a 'pilot experiment' to distinguish it from the 'main' experiment. I will begin with a summary of the results of her pilot experiment, which had an exploratory and a teaching part and which had been carried out in the early 1950s (Karpova, 1955, 1977; Slobin, 1966, pp. 370-371).

Karpova's pilot experiment and the criticism it raised

Children between the ages of three and seven, were asked to repeat sentences like: "Galia and Vova went walking", and respond to the question: "How many words are there in all?" A child (4;6 year) said that there are two words because "Galia and Vova went walking." Or, a seven-year-old child said that there is one word in the sentence "The boy is laughing" because "only one boy is laughing." Or, the amount of words is zero in the sentence "Katja ate all the patties", because "she ate them all." Karpova classified these and other difficulties in the exploratory part of her pilot experiment in which 102 subjects were involved (93 preschoolers and 9 first-graders). Her experiment showed that 84 per cent of the preschoolers she examined could not correctly identify the words in a spoken sentence. Although I leave it out of my discussion, the features of the childrens' analysis of the sentences and the three performance levels which Karpova (1977, pp. 24-25) had identified, are of special interest.

In the teaching part of her pilot experiment, Karpova attempted to teach preschoolers to perform the segmenting task properly. She introduced counters and taught a child to move a counter for each word in a sentence. It appeared that the provision of such material as a monitoring device (external support) in analyzing sentences did help the majority of her subjects to shift to a higher performance level. But it also appeared that the transition did not always have a sufficiently stable nature. Although at first glance the teaching experiment was successful, its outcomes were not without substantial shortcomings. Let me mention two of these shortcomings.

First, the provision of material support gave rise to some difficulties for the children, because establishing the connection between counter and word appeared to the children to be a barrier. And secondly, the external support by counters was virtually only useful to those children who could not otherwise perform the task. These children could only work with the counters and could not transpose this skill to working just with the words as such. They were also unable to perform the task at a verbal level, because they remain dependent upon the counters for solving the task. In Gal'perin's terminology, the material action with the concrete physical counters was ineffective and a barrier to the children to move on to the verbal and mental actions.

Thus, in Karpova's study apparent shortcomings came to the fore in the material action. Karpova herself registered the difficulties as soon as the material support was introduced to the children and mentioned these difficulties extensively in her research paper. In 1955, this paper was published in *Voprosy psikhologii* (Questions of Psychology). A.A. Smirnov, at the time the chief editor of the journal, informed Gal'perin (1986a) that many colleagues were indignant at the publication of this research paper. They were completely bewildered and unable to understand why young children have to learn to analyze the word structure of a spoken sentence with the aid of counters. It was considered nonsense to analyze sentences with such material support.

According to the Dutch psychologist Van Oers (1987, p. 68) hands-on manipulation of external physical objects may even be dangerous to the arrangement of teaching-learning processes. He has called such actions with concrete physical objects "reification," meaning that pupils learn to expect an abstract quality to have concrete existence. Therefore, according to Van Oers, material activity may be a psychological barrier to some pupils preventing them from taking part in 'theoretical' activity, i.e. discipline-bound (mathematical, linguistic, etc.) understanding. In research on teaching elementary mathematics carried out by the Dutch psychologist Nelissen (1987, pp. 30-31) such a shortcoming of the material action is once more established. It turned out that material actions are ineffective in mathematics education, because pupils become dependent upon them and transfer to other classes of material objects does not take place.

To some extent, Gal'perin (1986a) agreed with this criticism, because the provision of material support has to meet several requirements and its usage should pass through several stages in order to become a meaningful basis for the analysis of sentences. Karpova's 1955 teaching experiment did not meet these requirements and, consequently, the action formed by her was not without its shortcomings. The results of her pilot experiment convinced Karpova of the problems related to the usage of counters as material support. In her subsequent experiment in the late 1960s, in collaboration with Gal'perin, she investigated this issue in more detail, but this time based on a strictly Gal'perinian stepwise procedure. In short, in Karpova's case the stepwise procedure is as follows (Karpova, 1977, pp. 29-185; Gal'perin, quoted in Haenen, 1988d, pp. 49-50).

Karpova's main research

To begin with, at the stage of the child's preliminary orientation toward the action intended, it is necessary to teach the children to compare so-called minimal pairs, e.g., 'Devushka igraet miachom' ('The girl is playing with the ball'), and 'Mal'chik igraet miachom' ('The boy is playing with the ball'). Both sentences are the same except for the first words. This difference may be recorded by writing the first Russian letters of the first words ('d' respectively 'm') on a square. The last word is 'miachom' and this word may be recorded by laying down a picture with a 'ball' on it. The verb form 'igraet' ('is playing') may be recorded by writing down on a square the letter 'i.'

At this stage, a meaningful relation must be established between the word form and the square. In proceeding to the analysis of the sentences, the action with the squares is explained in more detail. This explanation went as follows (Karpova, 1977, p. 30): "Here we have squares. I will say the words, and you and I will write one word on each square. Thus it will be easy for us to count the words: we will have as many squares as there are words." After this, each word is identified and recorded on a square. Next the child is asked to give the recorded word by pointing to the squares and then to determine the total amount of words.

When the child is able to analyze a sentence with the help of squares, the latter is replaced by puzzle pieces or counters. These no longer represent the words themselves, but the order of the words in the make-up of the sentence: the first word, the second word, etc. Now, the material indices represent the outcome of the sentence analysis. The child has no difficulties when asked to respond to the question: "Which is the first second third word?" After analyzing a few (six to eight) sentences in the same extensive and detailed mode of operation, the use of material support becomes less necessary. The child himself begins to ask aloud the questions formerly asked by the experimenter, and to execute the ordinal (the first, second, etc. word) and cardinal ("How many in all?") analysis. At the end of the teaching

process, this material support is no longer needed and the child may first aloud and subsequently silently analyze the sentence on his own strength: the original material action has transposed into a mental action. The question remains, however, to be asked of where to find the relationship between the material and the mental action.

The equivalence between the material and the mental level

According to Gal'perin, the stepwise procedure is required to provide that the child will not become dependent on the material action and to avoid that dreaded 'reification' taking place. Despite the above-mentioned supposed shortcomings of the material action, Gal'perin insists on the stage of material(ized) action as an essential condition for the systematic formation. One of his basic assumptions deals with his strong opinion that mental actions have to be considered as transformations of external, material actions. In accordance with this assumption it can be claimed, that there is, in Gal'perin's argumentation, a guiding epistemological monism. His approach to the systematic formation originates from a single unifying principle: all mental actions - and this includes all that refers to mind and cognition - have a material origin and are the outcomes of a process of internalization. The propositions connected with this principle have been the subject of criticism by Smirnov (1975, p. 241), Menchinskaia (1977), and by the Dutch psychologists Nelissen (1987), Van Oers (1987) and Vos (1976).

These critics have questioned Gal'perin's monism and have voiced the accusation of the theoretical untenability of his concept that mental actions originate from material actions. According to these critics, one problem with Gal'perin's assumption that mental actions are derived from material actions, is the juxtaposition of both forms of action. On the one hand, Gal'perin wants to demonstrate that a mental action preserves the 'deep' structure of a material action, i.e. the mental action is conceived in a way isomorphic to the material action. On the other hand, Gal'perin rejects the notion that the mental action is a replica of the material action.

It is true, that Gal'perin proposes a kind of equivalence between the material and the mental action. However, he rejects a morphological equivalence between both forms of action. To Gal'perin, his notion of equivalence implies a more functional isomorphism in which the mental action to some degree 'mirrors' the material action. The two forms are not the same, but functional relations in the material action are directly related to functional relations in the mental action. It is only through some functional equivalence between both forms of action that Gal'perin can uphold that a mental action originates from a material action.

In other words, Gal'perin describes a mental action as an inner 'counter-part' of an external material action. He examined how external (material) functioning is eventually internalized and becomes mental functioning. However, this process of internalization is not a process of mere copying an external action onto an internal preexisting level. According to Gal'perin (1967a, p. 30), "the internalization process is also the process of forming the inner plane." Or, as Leont'ev (1981, p. 57) put it: "Thus, the process of internalization is not the transferal of an external activity to a preexisting, internal 'plane of consciousness': it is the process in which this internal plane is formed" (underlining in original).

Wertsch (1981b, pp. 254-255; 1985a, p. 66) points out that Gal'perin's account of internalization involves a genetic relationship between external and internal functioning and that the stepwise procedure can be viewed as an elaboration of Vygotsky's concept of internalization. Central to this concept is Vygotsky's "semiotic" (as Wertsch called it) analysis of the initiation of pupils into the usage of mediational means (language, mnemonic techniques, schemes, etc.) conceived as psychological tools (cf. Wertsch, 1985a, pp. 77-81). It is also Wertsch's (1981b, pp. 254-255) view that "the Vygotskian claim that the mediational means (schemas, speech) used on the interpsychological plane will be the same means used on the intrapsychological plane is inherent in Gal'perin's account."

Wertsch' comment regarding the position of (what he calls) mediational means in Galperin's account of internalization is consistent with the way I have interpreted it (see Chapter 5). However, one could argue that mediational means as such did not play an important role in the first phase (1950-1965) of Gal'perin's research program. It is this alleged absence of a Vygotskian semiotic account of internalization which brought Gal'perin's critics to the conclusion that he over-emphasized the role of the material action, respectively that he hypothesized an untenable equivalence between the material and the mental action.

Focus on the materialized action

The early criticism of Gal'perin's approach concerned the function he ascribed to the material action. As we have seen in Chapter 8, Gal'perin refers to a material action if the objects involved are of physical and perceptual nature. This is, for example, the case when a child is carrying out an arithmetical task while being able to touch and replace real physical objects or to see somebody else manipulating them. However, when the object transcends the span of direct perception, it is much more convenient and accessible to start executing the action with the aid of a display of the physical objects. Such displays permit the learner to execute the action by using artifacts as substitutes for the physical objects in question. In such a case Gal'perin refers to a materialized action. Since the early 1970s, i.e. in the second phase of Gal'perin's research program (see Chapter 11), this materialized action became more and more prominent in Gal'perin's stepwise procedure.

Salmina (1981, pp. 18-19) points out, that Gal'perin in his lectures on this topic during the 1970s changed his position with respect to material or materialized actions in favour of the materialized form. In 1985, Gal'perin published a reader with lectures held at the Moscow University. In it, Gal'perin (1985a) mentioned three notorious shortcomings of material actions. First, it is often impossible and unpractical to work at this level of action. Second, a material action is bound up with the physical structure of the objects themselves, not with the relevant properties of the objects investigated (e.g., in Karpova's case, a wordform). Third, given this fact, a material action may encourage a narrow epistemological attitude among learners and create, in a sense, an 'applied' rather than a 'theoretical' attitude toward the reception and (re-)production of knowledge.

Because of these shortcomings of material actions, in the latest version of his research program, Gal'perin (1985a) has put forward that it is much more effective to give learners the possibility to work with the displays or 'didactic models' as they are currently called. Didactic models ought to represent the concrete objects and to depict the relevant properties and relationships of the action in question. For, instruction has as one of its objectives to teach learners generalized knowledge including the regularities and properties common to a specific set of objects. This purpose can be met better when materialized actions are provided.

Didactic models

Gal'perin's shift of focus from material to materialized actions is prospective in two aspects. First, as already mentioned, it has broadened the applicability of Gal'perin's approach, because in teaching practice it is often impossible to work with the actual physical objects. In such a case the materialized actions offer the only possibility for execution of the action. So, they extend the possibility to retain one of the prerequisites for the systematic formation of a new mental action: viz. starting from the external materialized form of the intended mental action.

Apart from the practical constraints, there is also another, second, aspect which makes Gal'perin's shift from the material to the materialized action significant. In my view, through this shift Gal'perin's educational conception bears some resemblance to the concept of learning activity as developed by Davydov (cf. Davydov, 1982, 1988; Davydov & Vardanian, 1981; Haenen & Van Oers, 1986; Lompscher, 1985). Davydov used Gal'perin's concept of the orienting basis as a 'prototype' for the development of his concept of learning activity in which didactic models play an important role (cf. Talyzina, 1993, p. 95). According to Lompscher (p. 31), didactic models are interfaces between external and internal levels of action. Models are abstract displays of the features of an object and the structure of an action, while at the same time they are things 'at hand' for perception and physical manipulation.

According to Davydov and Lompscher, didactic models should represent the 'essence' of the structure of the discipline (mathematics, linguistics, etc.). Their frequent use of the term 'essence' marks their concept as "essentialistic" (cf. Van Rappard, 1983, p. 102). Davydov and Lompscher take their concept from one of the principles of dialectical materialism stating the distinction between 'essence' on the one hand, and 'appearance' as the manifestation of the essence on the other (Russell, 1980, p. 33, p. 73). This distinction generates the scientific (and,

according to Davydov and Lompscher, also educational) urge for different levels of content analysis and for a new teaching strategy. Accordingly, there is the scientific method of inquiry ('the descent from concrete to abstract'), which has to analyze the object of inquiry, its different forms of conceptual development and the relationships involved. If this analysis is done successfully, then through the scientific method of presentation ('the ascent from abstract to concrete') the object of inquiry can be adequately described.

In education, according to Davydov and Lompscher, it is the method of presentation which should determine the arrangement of the teaching-learning process. They designed the so-called 'teaching strategy of ascent from abstract to concrete.' In this strategy, didactic models are crucial, because they make it possible to separate the inessential or accidental properties from essential ones, to penetrate the surface structure (i.e. the appearance or 'the manifestation of the essence') of things and to uncover their deep structure (i.e. their essence). The usage of didactic models and the processes of abstraction instigated by these models are thus meant to be a movement towards, not away from reality, or - in Marxian terminology - the ascent from abstract to concrete. This movement implies a concentration on certain details of the object of inquiry, adding to the abstract image all the wealth of concrete detail (cf. Blakeley, 1964, pp. 69-72; Marx, 1986b, p. 28; Russell, 1980, p. 19, p. 33, p. 73).

It should be explicitly mentioned here, that the Hegelian dialectics of the abstract and concrete is absent from Gal'perin's concept of didactic models. Gal'perin does not use the terminology which is characteristic of Davydov's and Lompscher's writings. Gal'perin (1974/1989, p. 69) views didactic models as 'action algorithms' and considers them to be similar to what Vygotsky (1981a, p.137) calls psychological tools, and Wertsch (1981b, pp. 254-255) mediational means. Van Parreren (1983, p. 55) suggested the term "rational object scheme" to designate Gal'perin's notion of a didactic model. Anyway, Gal'perin's didactic model is designed on the basis of a psychological and educational analysis of the subject matter involved (see Chapter 13). It is not derived from the way Marx describes the dialectical and disciplined way in which scientists should investigate the object of their study. Gal'perin does not emphasize the explicit bond between education and dialectical logic, as Davydov (e.g. 1972/1988d, p. 177) does. Hence Davydov's remark (ibid., p. 184), that Gal'perin's work is "insufficiently developed."

In my view, Davydov's criticism of Gal'perin is not sufficiently corroborated. It is true that Gal'perin has devoted little attention to dialectical logic, and that from this philosophical point of view, his work can be considered to be "insufficiently developed." But, Gal'perin's strength should be sought in the way that he approached the teaching-learning process as such from a psychological point of view. Gal'perin decided to study educational problems from an exclusively (experimental) psychological angle of attack. Consequently, it is obvious that he puts between brackets the philosophical issues and the educational aims which are Davydov's main concern.

What is common in both Gal'perin's and Davydov's work is their emphasis on the usage of didactic models. For Davydov, didactic models need to be based on dialectical logic, while in Gal'perin's (see Chapter 13) case they can be called 'rational object schemes.' On the assumption that a rose by any other name smells as sweet, I would argue, that both Gal'perin's and Davydov's concepts of models bear great family resemblance (cf. Wittgenstein). They both use didactic models as a 'jumping board' for the concept formation in school.

In the 1980s, there was an increasingly psychological and educational interest in the usage of models as didactic tools in the teaching-learning process (cf. Engeström & Hedegaard, 1985; Haenen & Van Oers, 1986, Van Oers, 1988). In the 1980s, this increasing interest is also manifest in the Gal'perinian school. One of its current trends is the theoretical and empirical analysis of the usage of didactic models as the core of a materialized action. Salmina (1988) has made an interesting effort to analyze the usage of "semiotic tools" (*znakovo-simbolicheskie sredstva*), as she called didactic models, in different forms of activity (learning, play, etc.). This shift to the 'semiotic' domain in current Gal'perinian experimentation seems promising and the experimental findings gained so far encourage the wider incorporation of didactic models within Gal'perin's framework of the systematic formation.

Here ends my account of the criticism concerning the material action which was first levelled against Gal'perin in the mid-1950s. I enlarged on this first criticism with Gal'perin's reaction to it. By doing so, I have covered the main criticism of the material(ized) action. This issue is, undoubtedly, central in Gal'perin's research program.

The second critical experiment touches on a totally different but equally important aspect of Gal'perin's research program: Is the stepwise procedure a teaching strategy with a limited capacity for transfer? This has been studied by Kalmykova.

The second criticism: One-way transmission of the curriculum content

A four-day Conference on Teaching Methods, devoted to educational issues due to the intended reform of the school system, was held at the beginning of December, 1958, at the Institute of the Theory and History of Pedagogy of the RSFSR Academy of Pedagogical Sciences. Zinaida Il'inichna Kalmykova, who was associated with the Institute of Psychology of the RSFSR Academy of Pedagogical Sciences delivered a paper on the psychological prerequisites for the acquisition of school knowledge. In the same year, an article based on Kalmykova's (1958) paper appeared in the journal *Sovietskaia Pedagogika* and was published the following year in English in the first volume of *Soviet Education* (Kalmykova, 1959). This article containing a critical account of Gal'perin's approach to the teaching-learning process, was - as far as I know - the first officially published criticism of Gal'perin.

It is an interesting paper, in three ways. First, it is an experimental report and not a theoretical essay on the pros and cons of Gal'perin's approach. Second, it deals with the appropriation of a set of concepts. Third, it compares Gal'perin's procedure with discovery learning. The second and third aspect of Kalmykova's paper needs further explanation.

The second aspect refers to the fact that Kalmykova studied the appropriation of a set of mutually related concepts in physical education, viz. pressure, force of pressure, and area of pressure. This is significant, because at that time, in the initial phase of Gal'perin's research program (see Chapter 11), Gal'perin and his co-workers had studied exclusively the stepwise formation of a variety of separate actions and specific concepts.

For example, Gal'perin & Talyzina (1961) had studied the formation of elementary geometrical concepts (adjacent angle, bisectrix etc.; see Chapter 9). They had taught the learners to identify an object as an instance of a category (i.e. a concept or conceptual inventory) sharing some distinctive features. A concept identifies these features (in this case, shape, position, and so on). Gagné et al. (1992, pp. 57-59) has called them 'concrete concepts,' because it requires the learner to recognize or identify a concrete object.

In the Gal'perin & Talyzina teaching experiment, the distinctive features are introduced as a 'working definition' and listed on an 'orienting chart,' also containing the identification procedure and the algorithm which is used to decide if a given instance belongs to the concept in question or not. With this chart at hand the pupils have to decide whether something is a straight line, an adjacent angle, and so on. According to the Dutch mathematician Freudenthal (1991, p. 141), this type of geometry instruction is the "most traditional and the barest form of concept formation," which "reminds one of a catechism rather than of geometry instruction."

Yet in the second phase of the development of the research program, Gal'perin and his co-workers started to study the formation of a set or network of concepts at the same time. In fact, this is more related to real activity settings in classrooms situations. Usually, concepts are not taught separately but combined with each other in some kind of system with specific rules. For example, if learners are asked: "Assuming that an electric circuit has a resistance of 12 ohms, if the current is increased from 20 amps to 30 amps, what change is required in the voltage?" we expect them to use Ohm's law, $E = IxR$ (cf. Gagné et al., 1992, p. 62).

According to Kalmykova, the learner's ability of solving such school book problems are beyond Gal'perin's scope. Consequently, in the second half of the 1950s, at the time when she was carrying out her research, Kalmykova considered Gal'perin's approach very limited. She challenged Gal'perin and argued that he had designed a teaching strategy with a narrow range of applicability. To underpin her arguments, she designed an experiment that is critical in the strict meaning of the Latin term 'experimentum crucis.'

It is tempting to conclude that Kalmykova's research urged Gal'perin to face the problem of whether concepts have to be formed successively (literally 'step-by-step'), or directly from the outset in relation to a system of concepts. The latter is exactly what happened. The credit belongs to Obukhova (1968) for designing an experiment replicating Kalmykova's and answering her critique. Obukhova has shown that Gal'perin's approach can be used to teach networks of concepts, but her experiment was carried out in the mid-1960s, at the time that Gal'perin's research program was evolving into its second phase. In the mid-1950s, at the time when Kalmykova carried out her experiment, Gal'perin's research program was still in its first phase. At that time, Kalmykova's critique had a sound foundation. Below we will see, which critical questions Kalmykova raised in connection with Gal'perin's research program in the early years of its existence.

There is yet a third aspect which makes Kalmykova's paper interesting, viz. the fact that it reports on an experiment in which she compared Gal'perin's stepwise procedure with discovery learning. There are striking similarities between Kalmykova's research and the research which, at the time, was fashionable in American psychological and educational circles. In such research, discovery learning is compared with expository teaching. Usually, the most significant independent experimental variable is the amount of guidance provided by the teacher during the teaching-learning process. As the amount of guidance from the teacher increases, it is said that opportunities for discovery decrease and the learner may rely more on the teacher's guidance and, consequently, on rote learning (cf. Kersh & Wittrock's (1962) review of experimental findings at the time).

Although this discussion on 'open' versus 'closed' learning is now history in American instructional psychology, it has been up till now a critical issue as far as Gal'perin is concerned. Gal'perin is often reproached for viewing the learner as a passive recipient of information and for designing an expository or 'one-way' teaching strategy with an extremely high amount of teacher guidance, which leaves the learner no room for initiative. Notably, Menchinskaia (e.g., 1960), a senior colleague of Kalmykova and a lifelong opponent of Gal'perin's, was convinced right from the outset that the stepwise procedure would discourage learners from exploring things on their own strengths and would consequently hinder the development of productive or creative thinking. This has remained a recurrent theme in the discussions on Gal'perin right up until the present day. More recently, this point was once again put forward by Freudenthal (1991, p. 142) and Iakimanskaia (1989).

Menchinskaia and Kalmykova closely followed Rubinshtein's (1959) line of thought that the effectiveness of the teaching-learning process should be raised by guiding the learners' activity in analyzing and synthesizing on their own strengths the relevant features of the learning content involved. They disagreed with Gal'perin's position that the teacher must try to disclose beforehand the relevant features of the learning content, to regulate the course of the actions aimed at these features, and, by doing so, to make it easier for the learners to appropriate new knowledge. Rather, according to Menchinskaia and Kalmykova, learners should be regarded as active participants in the processes of the (re-)construction of knowledge and in the search for its meaning. Among these processes, analysis and synthesis are inseparable and are a prerequisite for thinking operations such as abstraction and generalization (cf. Menchinskaia, 1966/1989, pp. 78-80).

From this (Rubinshteinian) perspective, Menchinskaia and Kalmykova criticized Gal'perin's stepwise procedure for being an 'one-way' transmission of the curriculum content; it is not a teaching strategy which enhances and broadens the learner's competence to solve problems, whether they are textbook problems or problems in life. It is precisely this alleged shortcoming of Gal'perin's approach, which Kalmykova decided to make the topic of her research (Kalmykova, 1959; see also Menchinskaia, 1966/1989, pp. 81-82; Rahmani, 1973, pp. 283-284)?

Kalmykova's research

Kalmykova compared two teaching strategies (the stepwise procedure and the guided discovery method) focusing on concept development during the elementary physics education. The subjects were 24 sixth grade pupils (12-13 years old), divided into two groups (group A and B) of 12 pupils each: five high-achieving or bright pupils who had mastered the subject matter

readily and rapidly and seven low-achieving or weak pupils, who had mastered it slowly and with difficulty, notwithstanding great diligence. The matching of bright and weak pupils was based on a preliminary teaching experiment aimed at the formation of the physical concept of 'pressure.' This concept is the starting point for a large section of the physics curriculum in grades six to nine. Kalmykova used the results of that preliminary experiment to match an equal number of bright and weak pupils in each group.

The main experiment consisted of three stages. In the first preparatory stage, Kalmykova made certain that the subjects possessed the necessary knowledge to understand the concept of pressure. Moreover, the subjects were introduced to the concepts 'force of pressure' and 'area of pressure.' This preparatory stage applied to both groups and was an introductory course aimed at giving the subjects of both groups the same starting knowledge. Only then did Kalmykova set about the second stage of the experiment.

During the second or 'teaching' stage occupying the major part of the experiment, the pupils were taught the concept of pressure itself. The effect of pressure, its force on a given area and their relationship as expressed in the formula $p = F/A$ (pressure = Force/Area), was demonstrated and explained. After this, all pupils were asked to solve the same series of problems. This teaching stage was performed in two ways. Group A was taught according to Gal'perin's stepwise procedure (as interpreted by Kalmykova), while group B was taught according to the guided discovery method.

In teaching group A, the teacher explained the concepts and handed each pupil an orienting chart on which the distinctive features were recapitulated. To solve the problems, the pupils were obliged to act precisely in the sequence the teacher had indicated and which was stipulated on the chart. Guided by the teacher's questions, the pupils of group B themselves singled out the distinctive features of the new concepts and formulated the definition. They attempted themselves to solve the problems with minimal aid from the teacher. They received help only when required.

The third and testing stage of the experiment was identical for both groups. All subjects were asked to solve not only problems similar to those in the teaching stage of the experiment, but also new variations which required the application of the acquired knowledge under new conditions. These problem variations made it possible to discover the level of generalization or transfer, i.e. the possibility of using the knowledge in relatively new conditions.

What were the results? According to Kalmykova, the two teaching strategies had no significant effect of any kind on the bright pupils. The testing stage showed that there were no significant differences between the two groups in solving the test problems. At the same time, both teaching strategies had different effects on the weak pupils. The weak pupils of group A, taught according to the stepwise procedure, performed more poorly and showed a low level of transfer in solving problems unfamiliar to them. The weak pupils who had 'discovered' under the teacher guidance what was to be learned, displayed a higher level of transfer.

Kalmykova concluded that she had shown the disadvantages of Gal'perin's procedure and that better teaching results could be attained when pupils were allowed to analyze the subject matter content autonomously from the very first moment of its introduction. Kalmykova admits that not every kind of subject matter is suitable for the application of such a method, allowing pupils a high degree of independence. But, in her view, a teacher still has to present the subject matter in a way that creates favourable conditions for the pupils' independent activity.

Here ends my summary of Kalmykova's experiment and its results. In the subsequent chapter, I will briefly mention how Gal'perin answered to Kalmykova's critique. Her experiment appeared to be significant, because the officially published paper on it was the first criticism of Gal'perin's research program in the Soviet psychological literature. As we will see, more criticism would follow, and Kalmykova would once again take the initiative.

Summary

While preparing the material concerning the main criticism on Gal'perin's research program, it seemed appropriate to divide it over two chapters. First, I wanted to cover criticism supported or raised on the basis of replication research. This part of criticism has been described in this chapter using two research projects which are both, although in a different sense, critical, viz. Karpova's and Kalmykova's experiments.

Karpova's research project was meant to support one of Gal'perin's basic assumptions regarding the material action. It underpinned the function Gal'perin assigned to the physical manipulation of material objects. In the 1955 Karpova experiment this objective was not entirely achieved, but her subsequent research in the late 1960s was more strictly based on Gal'perin's concept of the material action, and consequently, achieved significantly better results.

According to Gal'perin, the formation of mental actions proceeds from a base of material(ized) actions. In its extreme form, this assumption implies that new mental actions can only be understood through development, i.e. as the final product of the internalization of material actions. As we have seen, in the current version of Gal'perin's research program, the material action has lost its prominent place in favour of the materialized action. I have introduced this shift in focus from the material to the materialized action as a significant and fruitful modification and extension of the program.

Kalmykova's research is critical in the strict sense of the term. She challenged Gal'perin's research program and argued that it constituted a teaching strategy with a small range of applicability. She designed an 'experimentum crucis' to underpin her arguments. She compared two teaching strategies (the stepwise procedure and the guided discovery method) focusing on the development of problem solving. She considered Gal'perin's stepwise procedure as a method which did not enhance the learner's ability of solving problems. In her view, guided discovery learning and the stepwise procedure are opposite to each other, the latter of which is inferior.

In the subsequent and final chapter I will describe how Gal'perin answered Kalmykova's critique. There I will also cover some other Russian as well as 'Western' criticism and draw conclusions.

CHAPTER 13

MORE CRITICISM AND CONCLUDING REMARKS

In the previous chapter I described criticism of Gal'perin's research program raised by research, viz. Karpova's and Kalmykova's. This criticism concerned the two central issues of the material(ized) action and the alleged one-way transmission of the curriculum content. The primary aim of this chapter is to cover more generally the main objections raised by Gal'perin's critics.

As already mentioned in Chapter 11, it was not until 1959 that Gal'perin's work became the target of extensive criticism. To begin with, I will outline the events of 1959. Once again, Kalmykova's name will come to the fore. After a brief description of the two events concerning the history of the Gal'perinian critique, I will mention the main objections as well as some further objections emerging in later years. Apart from presenting these objections, I will also evaluate them. This evaluation will point to some issues in Gal'perin's research program which I consider to be a seminal contribution to the study of cognitive processes in relation to teaching and learning.

Finally, I will summarize Gal'perin's contribution with the concepts of the 'reconceptualization' of the subject matter content, and of the 'rational object scheme.' Both concepts are needed to explain how orientation (as the key component of the stepwise procedure) can be practically applied in the classroom. In my view, Gal'perin's contribution to educational psychology can be clarified and extended by further elaborating on what must be taken into account when 'reconceptualization' and 'rational object scheme' are being laid at the heart of the orienting stage, and consequently, of the stepwise procedure.

But first, I have to go back to 1959, the year in which the criticism of Gal'perin's research program really broke loose.

A storm of criticism

As we have seen before, in 1958, a Conference on Teaching Methods was held, at which Z.I. Kalmykova presented a polemic paper comparing Gal'perin's stepwise procedure with guided discovery learning. At the First Congress of the Soviet Society of Psychologists, held in Moscow, 29 June - 4 July, 1959, Kalmykova once again presented a paper discussing the results of her research. It appeared that this presentation acted as a catalyst setting off the Gal'perin criticism in Soviet psychology. What had happened?

According to M.V. Sokolov (1959, p. 171), who wrote an account of the 1959 congress, Kalmykova's paper aroused a lively discussion on Gal'perin's stepwise procedure and its presumed shortcoming in its contribution to the development of the pupils' ability to perform such cognitive strategies as analysis and synthesis. During that discussion, the leading critic was Menchinskaia who recognized that Gal'perin newly attacked the problem of the arrangement of the teaching-learning process. At the same time she considered Gal'perin's solution to this problem too limited and not suitable for a broad range of learning tasks within various curriculum domains.

As we have seen, Kalmykova had levelled the same critique. Menchinskaia reiterated it and, due to her position as a leading Soviet psychologist, her attack challenged the heuristic value of Gal'perin's research program. I have already mentioned that Gal'perin's co-worker Obukhova (1968) designed an experiment to answer Kalmykova's and Menchinskaia's critique. But Obukhova's replication experiment had been carried out when Gal'perin's research program

had already gone into its second phase of existence. At the end of the 1950s, when it was still in its first phase, Gal'perin had to agree to some extent with some of the critique. Until then, he and his co-workers had exclusively studied the formation of separate actions and concepts, while the formation of networks of concepts was still beyond their scope. Kalmykova had urged them to go into the direction of studying such formation.

Consequently, in 1959, in his contribution to the discussion, Gal'perin had to give an evasive answer to Kalmykova's and Menchinskaia's critique. He claimed that Kalmykova incorrectly applied his approach and that she did not understand it as both a research program and a teaching strategy. Moreover, he viewed the two teaching strategies (the stepwise procedure and guided discovery learning) conceived by Kalmykova, as incomparable. Gal'perin (quoted by Sokolov, *ibid.*) stated, that he had not designed a teaching strategy which could be compared as such with another teaching strategy. First and foremost, he had designed his strategy as a research approach to analyzing the mechanisms underlying the process of internalization. Talyzina contributed to the discussion as well and put forward additional arguments to support Gal'perin's objections against Kalmykova's experiment.

However, this discussion of Kalmykova's paper appeared to be merely a prelude to more substantial discussion and criticism of Gal'perin's research program at the same congress. On a subsequent day a seminar had been organized dedicated to the problem of the interrelationship between instruction and the pupils' development (see Sokolov, *ibid.*, pp. 172-173). After L.V. Zankov's opening lecture, the four remaining lectures were on Gal'perin's concept of the formation of mental actions. In fact, this seminar happened to be a 'Gal'perin'-seminar. Gal'perin (1959c) summarized his "Basic teaching strategies," while N.F. Talyzina, V.V. Davydov, and L.N. Landa & A.R. Belopol'skaia lectured on Gal'perin's research program from various points of view.

According to Sokolov's review of this 'Gal'perin'-seminar, after all the papers had been presented, twelve opponents had contributed to the discussion. Apparently, the discussion had been lively, because it was proposed that it should be continued on the pages of the leading scientific journal *Voprosy psikhologii* (Problems of Psychology). This proposal received general support and consequently, in 1959 and 1960, a series of articles were published pro and contra Gal'perin's research program.

The discussion on the pages of *Voprosy psikhologii*

The discussion of Gal'perin's research program launched on the pages of *Voprosy psikhologii* was sharp and polemical. Participants were D.B. El'konin (1959), E.N. Kabanova-Meller (1959), A.A. Liublinskaia (1960), N.A. Menchinskaia (1960), Iu.A. Samarin (1959), and of course Gal'perin (1960) himself. Let me summarize the main issues put forward in this discussion as well as Gal'perin's reaction to them. In relation to these issues, I will also mention some further objections emerging in the years thereafter. By doing so, I will cover the main objections, which were both paramount and crucial for the development of Gal'perin's research program.

Apart from presenting the objections, I will also evaluate them and summarize the conclusions that can be drawn. The discussion in the Soviet journal is also mentioned by Van Parreren & Carpay (1980, pp. 93-96) and Rahmani (1973, pp. 275-276). I will consider the main objections under the headings:

- the conceptual framework;
- the underestimating of learner characteristics; and
- error avoidance.

The conceptual framework

First of all there is a paramount problem and pitfall mentioned by almost all of Gal'perin's opponents. This is the problem of the terminology he employed, which had led to a misinterpretation of his work. Gal'perin had developed a conceptual framework in which

familiar psychological terms received a new interpretation. Especially his term 'mental actions' and the way he conceptualized it, could easily lead to misinterpretation and criticism (cf. Samarin, 1959, pp. 154-155).

For example, due to Gal'perin's (1969a) frequent use of the term 'mental' in his contribution to 'A Handbook of Contemporary Soviet Psychology', the editors of this volume justly warned their readers not to understand Gal'perinian terms in a 'mentalistic' sense (Cole & Malzmann, 1969, p. 14). At the same time, Gal'perin's concept of mental actions as internalized material actions, brought his opponents to the conclusion that he conceived internalization to be a mechanistic and reductionist event (cf. Menchinskaia, 1977, p. 49). Thus, the very term 'mental' could evoke the impression that Gal'perin's work had a mentalistic or, on the contrary, a mechanistic flavour.

However, as with all the other technical terms introduced by Gal'perin, his concepts such as mental action and internalization can not be criticized in isolation or at the level of 'opposite' terms (e.g., external vs. internal, material vs. mental). Of course, Gal'perin conceptualized internalization as the transformation of external into internal actions. But, in Gal'perin's view, this transformation is supposed to pass through several stages during which the external actions undergo changes in several directions. Moreover, these changes are dependent upon a set of four prerequisites (see the Chapters 8-10). All the terms and prerequisites he used to designate and describe the changing actions while being internalized, have to be taken into account, because they are interrelated.

For example, in Gal'perin's conception of the process of internalization, the role of speech, generalization and abbreviation are of the utmost importance. The importance of these components for the appropriation of knowledge and the development of the learners' cognitive structure had been known for a long time, but in Gal'perin's approach they came to acquire a new reference and emerged as a set of coordinate entities. One could even argue that the development of such a complex and, at the same time, comprehensive conceptual framework has certain merits in itself. According to Carpay (pers. comm.), Davydov put forward this contention at the Gal'perin Memorial Conference, held in Moscow, October, 1992, on the occasion of his 90th birthday. In his address commemorating Gal'perin, Davydov acclaimed him for having conceptualized the complex process of internalization and for providing the conceptual inventory to outline this process and the prerequisites involved.

Davydov has given empirical proof of the validity of Gal'perin's conceptual framework in a paper containing the results of research on the appropriation of counting skills (Davydov & Andronov, 1979/1981). Starting from Gal'perin's (1966a, pp. 253-254) concept of abbreviation, the authors spell out in meticulous detail how internalization of counting as a mental action takes place, and especially how initial and extended action structures are abbreviated into new and more complicated ones. Davydov discussed this important paper at a Conference on Initial Acquisition of Addition and Subtraction Skills held in Rascine, Wisconsin, November 1979 (Romberg, 1981, p. VI).

This article on the topic of counting actions and their abbreviation demonstrates how Gal'perin's conceptual framework may be applied in a specific and well defined content domain. The heuristic value of Gal'perin's research program stems from its practical application to a broad range of content domains. It has a promise of generality and this very fact makes it a valuable and practical tool for researchers, curriculum designers, and educationalists.

Learner characteristics

A second objection had been raised by Menchinskaia (1960, p. 158), when confronting Gal'perin with the question of how he explained the different instructional effects on the learners' ability to perform an action while being taught by the same teacher under equal conditions. According to Menchinskaia, such individual differences are to be attributed to the various psychological qualities that relate to learning, i.e. the learner characteristics as these qualities are nowadays called (cf. Gagné et al., 1992, p. 100). Gal'perin (1960, p. 144) replied that it was "quite imprudent" (*ves'ma neostorozhno*) to attribute differences in instructional effects directly to learner characteristics, because many factors play their roles in the outcomes of instruction.

However, in his reply Gal'perin left aside the important educational fact that learners who approach new learning tasks are at the onset already in their characteristics as learners. Several authors have mentioned that this issue is beyond the scope of Gal'perin's educational thought. Krutetski (1976, p. 55) remarks that Gal'perin has actually neglected this issue and that he even declared its study at the current stage of scientific development a non-issue. According to Velichkovski (1988, p. 155), Gal'perin "nullifies discrete differences between individuals, thereby eliminating manifestation of the creative resolution of tasks, such as sudden insight."

Admittedly, there is a scarcity of research on learner characteristics in the Gal'perinian school. However, since about 1975, interest in this issue has increased noticeably and several works have been published. Recently, Talyzina et al. (1991) published a study on "The nature of individual differences." Moreover, within the Gal'perinian school there is a growing interest in the psychodiagnosis of cognitive development (e.g. Burmenskaia, 1993; Karpov, 1990; Talyzina, 1982, 1986; Karpov & Talyzina, 1986).

Notably, Karpov & Talyzina (1986) should be mentioned here. They developed an alternative to traditional methods for testing children's intelligence. Recently, more of such methods have become available in the form of Learning Potential Tests (cf. Hamers & Ruijsenaars, 1992). These new tests reflect intelligence primarily as the child's ability to profit from learning experience or the 'educability' (*obuchaemost*) as Menchinskaia (1968/1989, p. 48) called this ability. The Karpov & Talyzina test is designed as a teaching experiment, the test is interactive and proceeds from the zone of proximal development.

These new approach to the assessment of someone's potential for learning reflects the current importance of this issue and indicates that at present learner characteristics are playing a more significant role in the Gal'perinian school.

Error avoidance

This next point of criticism has much to do with Kalmykova's research concerning the supposed limitations of Gal'perin's teaching strategy and its being a psychological barrier to the development of independent problem solving. It has to do with Gal'perin's belief, that learning to solve problems can occur without trial and error on the part of the pupil. Gal'perin denies the importance of dealing with errors in the context of problem solving. Although errors are part of the pupils' reality in any teaching-learning process, Gal'perin does not give them due attention.

Van Oers (1984, p. 239-243) has quite rightly put forward, that, in educational psychology, relatively little attention has been paid to the phenomenon of pupil errors. He has advocated the arrangement of learning settings which provide opportunities for making errors. In his view, to develop theoretical and reflective thinking in school, priority should be given to inquiry teaching in school. In connection with this claim, Van Oers gives a reasonable psychological account of the nature of errors and their function in the context of inquiry activity of pupils.

Gal'perin, on the contrary, considers the occurrence of pupil errors during the solving of learning tasks an indicator that the systematic formation has not been adequately analyzed and that education has gone in the wrong direction. One could even argue that Gal'perin has expressed a teachers' first imperative to prevent the making of errors by pupils. Teaching Strategy III (see Chapter 10) is, among other things, devised to prevent errors on the part of the pupil.

This characteristic of Teaching Strategy III underwent extensive criticism. Outstanding Soviet scholars and academicians like the cyberneticist A.I. Berg (Gal'perin, 1975a, p. 90) and the psychologists E.N. Kabanova-Meller (1959), N.A. Menchinskaia - as we have seen before - and O.K. Tikhomirov (1974) rebuked Gal'perin because the systematic formation only guarantees the appropriation of ready-made or 'second-hand' knowledge and discourages the independent search for the meaning of knowledge.

It even went so far that Gal'perin's way of organizing and monitoring the teaching-learning process was compared with Skinner's view which is now generally referred to as programmed instruction. According to the Dutch psychologist Bol (pers. comm.), Bruner once qualified Gal'perin as an adherent of Skinner's approach: Gal'perin is a sort of a 'Soviet Skinnerian.'

In the 1960s and 1970s, it was a common misconception, both in the former Soviet Union as well as elsewhere, to identify Gal'perin's call to improve the efficiency of the teaching-learning process with Skinner's view on programmed instruction. In his very own writings Gal'perin

(1986a) avoided the term programmed instruction ('programmirovannoe obuchenie'), though in the 1960s he used the term in several places (e.g. Gal'perin, 1967b). Moreover, as co-author his name is associated with books and articles bearing this term in the title, e.g., Leont'ev & Gal'perin (1965) and Gal'perin et al. (1966).

In hindsight, the usage of this term has had some unfortunate consequences. "Willingly or not", as A.A. Leont'ev (1977, p. 507) puts it, Gal'perin's view "has thus been drawn into the cluster of ideas most forcefully represented in contemporary science by B.F. Skinner." In any way, this question provoked emotional reactions in the Soviet Union and had educators and pedagogues in turmoil. Notably, the educationalist Babanski (1977/1989, p. 46) has criticised Gal'perin on the basis of the presumed similarities with Skinner's way of looking at teaching and learning. Both German and Dutch as well as Russian psychologists have attempted to defend Gal'perin against this attack (cf. A.A. Leont'ev, 1977; Talyzina, 1981; Matthäus, 1988; Wilhelmer, 1979; Bol, 1973; Carpay & Van Parreren, 1972, 1980).

Now, I will leave this discussion aside, because it is history now and has not retained such a relevance today. From the very early days of the emergence of his research program, Gal'perin has offered a cognitive perspective, totally different from Skinner's approach. Due to his emphasis on mental processes, Gal'perin's research program has become part of the cognitive perspective in Soviet and Russian educational psychology. It can be considered to be one of its 'endemic' elaborations. This cognitive perspective is rooted in an ongoing tradition which can be traced back to L.S. Vygotsky as the first Soviet psychologist posing the problem of the relationship between teaching and schooling on the one hand and the child's personal and social identity development on the other. One aspect of this development, viz. the child's appropriation of a cognitive 'toolkit,' i.e. a powerful repertoire of mental actions, has been further elaborated by Gal'perin. Here, in my opinion, lays Gal'perin's main contribution to educational psychology.

To end this book on Gal'perin's work, I will summarize his contribution to educational psychology with the terms 'reconceptualization' (term suggested by Carpay) of the subject matter content, and the 'rational object scheme' (term suggested by Van Parreren). Both terms are needed to explain how the concept of orientation (as the key component of the stepwise procedure) takes shape in the classroom.

Reconceptualization and the 'rational object scheme'

In my historical analysis (Chapter 5-7) of Gal'perin's research program, a commitment to basic essential aspects came to the fore. Summarizing these aspects in one phrase one could say that, in Gal'perin's dynamic approach, psychology is concerned with ideal (mental) orienting activity originating from material(ized) (practical) activity and transposing into the final outcome of the process of internalization.

Consequently, mental orienting activity can be fully conceptualized if investigated as an 'ongoing activity' during the entire process of internalization. The term 'ongoing' in this context is introduced by Leont'ev (1978) to designate the phenomenon that an activity at the mental level is not merely the outcome of the transformation 'from the outside inward.' There is no "preexisting, internal 'plane of consciousness': it is the process (of internalization - J.H.) in which this internal plane is formed" (Leont'ev, 1981, p. 57; underlining in original). This assumption, that the 'internal plane of consciousness' is formed as a part of the process of internalization, implies that mental actions should not be observed, but formed. Hence, Gal'perin's (1966a, p. 251) methodological maxim: "No more observation, only formation!"

In Gal'perin's 'maxim of formation,' the activity of both learners and teachers as well as the joint learner-teacher interaction should be tailored to the prerequisites as provided by the systematic formation. Systematic formation may be considered a teaching strategy, in which the intended full-fledged mental actions are gradually shaped according to the stepwise procedure (see Chapter 9). In this procedure the key component is the orienting stage. Orientation largely determines the quality of the subsequent execution of an action. In teaching practice, orientation is realized by way of the learner's 'reconceptualization' ('pereosoznanie') of the subject matter content and by the (re-)construction of a 'rational object scheme.' In my view, these two characteristics of the systematic formation are needed to explain how the leap from Gal'perin's

'maxim of formation' to teaching practice can be made. In order to design teaching-learning 'activity settings' according to the systematic formation the elaboration of both characteristics in a classroom situation are needed.

Notably, Teaching Strategy III (see Chapter 10) is associated with the elaboration of the two characteristics. Let me give two examples to explain the contents of the concepts of reconceptualization and rational object scheme. First, the organisation of the Teaching Strategy III by Gal'perin & Georgiev (1960/1969). They investigated the appropriation of the concept of number and preliminary arithmetic operations. Second, an experimental curriculum on the initiation of pupils in the numeration system (Haenen, Jansen & Wolters, 1983).

The concept of number

Gal'perin (1982a, pp. 536-539; 1989a, pp. 34-44) took issue with the traditionally held view that in education the concept of number consisted of building on the pupil's perceptual ability to distinguish visually between a set of physical objects. In the traditional approach to mathematical education, pupils were expected to infer their concept of unity from concrete physical examples. This concept was usually introduced by contrasted presentation of 'many' objects and 'one' object. For example, the teacher explains by pointing to a group of things (set) and selecting one object: "These are many blocks (spoons, pencils, etc.), and this is one block (spoon, pencil, etc.)." Thus, teaching is designed in such a way that the content of the notion of unity is understood by the pupil as something separate or individual.

This traditional handling of a unit (*edinitisa*) perceived as discreteness (*otdel'nost*), as a 'seperate thing,' was criticized by Gal'perin. He argued that under these conditions pupils do not acquire a genuine concept of number nor other mathematical concepts. Gal'perin's explanation for the pupil's difficulties with number is that pupils are not properly initiated in the 'numeracy' practice in daily life. Before describing how Gal'perin conceives to undertake a revision of this issue, I have to go into more detail on the kind of difficulties children experience when mastering arithmetics.

In order to investigate these difficulties, Gal'perin & Georgiev conducted a preliminary exploratory experiment with 60 children aged between 6;6 and 7;2 from three kindergartens where elementary arithmetics had been especially well presented. In this experiment they attempted to observe and to trace the origin of these difficulties. They first verified the arithmetic knowledge of these children. 9 children had not fully mastered the curriculum. The knowledge of 51 of them was generally at the level of the curriculum or even surpassing it in some respects. For example, the curriculum required counting to 10, while the children could count forward to 20 (all 51 children), above 20 (30 children) or backwards from 20 (17 children).

Gal'perin & Georgiev gave these 60 children individually 15 Piagetian-type tasks. As an example, let me describe task 3 (Gal'perin & Georgiev, 1969, p. 191). First, by pouring water from mugs into cups, the child is shown that two full mugs make one full cup. Then he is offered three cups and four mugs, filled to the brim with water, and asked: "How many **cups** of water are there on the table?" Only 11 children answered correctly; they grouped the mugs in pairs, encircled them with their fingers, and counted each pair as one cup. The remaining 49 children answered incorrectly: 37 children counted in succession, calling all mugs cups (20 children) or calling all objects by their names (17 children); and 12 children, counting the cups, stopped, saying that there were no more cups. For these 12 children the mugs and the cups were incomparable entities. For the other 37 children an entity was a unit. The point of this task is that the unit consists of parts. The children who solved it incorrectly, oriented themselves toward the outwardly visible quantitative aspect of the objects, and made no distinction between unit and entity.

Gal'perin & Georgiev suggested that the child's primary orientation toward the straightforwardly visible attributes of objects is inherent in the difficulties children experience solving such problems. This tendency among children is completely in line with the 'phenomena' Piaget previously discovered in his research on the cognitive development of children of this age. Gal'perin & Georgiev found that such difficulties could be eliminated simply by changing the organization and the content of preschool arithmetics.

There had been a widespread agreement among developmental psychologists that young children do in fact respond to the above-mentioned tasks in the way the Genevan school of Piaget describes. For several decades, the emphasis had been on young children's limitations. In the 1960s, the Dutch psychologist Kohnstamm (1967, p. 148) first challenged Piaget's "pessimistic viewpoint," but mainly in the 1970s, several influential books (notably, Gelman & Gallistel, 1978; Donaldson, 1978) had been published introducing the view that young children have greater cognitive capacities than previously thought. Now, the study of young children's thinking is an extremely lively area and new ways of understanding it are proliferating (cf. Meadows, 1993; McShane, 1991; Subbotsky, 1992).

In Soviet psychology, it was Gal'perin who first questioned whether the young children's limitations in the cognitive domain can be eliminated (cf. Gal'perin & El'konin, 1967). Gal'perin and his co-workers - above all Georgiev, Obukhova (1966, 1972), Burmenskaya (1976), and Lidars (1978) - did extensive research to illustrate how the child can overcome such 'Piaget phenomena' (in Russian: *fenomeny Piazhe*), as they called young children's difficulties with numbers and quantities. Their work have cast doubt on Piaget's (e.g. 1953) claim that true understanding of the concept of number and the mathematical operations involved stems only from the child's autonomous and spontaneous learning experiences outside the school.

At the centre of Gal'perin's (1965a, p. 36) argument is the idea that the real problem is "the shift from unmediated (i.e. perceptual or empirical - J.H.) thinking to mediated thinking" (*perekhod ot neposredstvennogo myshleniia k myshleniiu oposredstvennomu*). The notion of mediated thinking was seminal in Vygotsky's cultural-historical theory (see Chapter 5). In this theory mediated thinking presupposes the use of socioculturally elaborated 'mediational means' of activity such as tools, signs, various speech genres and other symbols and artefacts. Gal'perin's rational object scheme is also such a mediational means, and namely for getting a cognitive hold on the initial abstractions of the subject matter content.

Gal'perin developed a rational object scheme as a mediational means of overcoming the child's difficulties with the concept of number and to induce the child's reconceptualization of this concept and the operations involved. With a rational object scheme at hand the child starts a search for meaning. With his approach to the concept of number and of quantities, Gal'perin has laid the basis for a series of experiments on the interrelationship between education and the cognitive capacities of children aged 5-7. This branch of Gal'perinian research has had an evident impact on Western developmental psychology as well (cf. Kingma, 1981; Koops, 1989; Kingma & Koops, 1983).

Gal'perin hypothesized that a number always reflects the outcome of a measurement. In order to appropriate a 'rational object scheme' for the concept of number, learning of this concept must start with measuring quantities (length, volume, etc.). Pupils should first be taught to measure and then to count. The advantage of measuring before counting may be that it forces the children's attention away from the perceptual aspect of counting based on the children's ability to discern between objects. Numbers should be introduced as artefacts invented in order to fix the outcomes of a measuring process, and thus to be used as a new way of approaching (i.e. a reconceptualization of) the physical world.

This concept of number as an artefact is virtually a process of reconceptualization of the children's initial 'pseudo-concept' of number. Such a reconceptualization can take place because the child has at his disposal a cognitive hold, or in Gal'perin's terms, a 'rational object scheme' serving as an orienting basis. Such a scheme enables the child to see any object as a set of distinctive features (form, colour, length, weight, volume, etc.) that can be conceived in quantitative terms (cf. Van Parreren, 1983, pp. 55-56; Koops, 1989, p. 7).

Gal'perin & Georgiev have devised an experimental kindergarten curriculum the first component of which is devoted to the concept of measure, the selection of the unit measure and the measuring process itself. The Gal'perin-Georgiev curriculum originally appeared in Russian (Gal'perin & Georgiev, 1960a,b,c,d; 1961), but an English translation of these articles - except one - is available (Gal'perin & Georgiev, 1969). Short summaries of the curriculum were made by Stones (1979, pp. 94-95) and Brackbill (1962, pp. 137-139).

The numeration system

A related example also aimed at reconceptualization may be found in an experimental curriculum on the numeration system (Haenen, 1980; Haenen, Jansen & Wolters, 1983; Wolters, 1986). The intention of this curriculum was to supply first graders (6-7 year old) with a 'rational object scheme' for addition and subtraction by giving them a complete orientation on the deep structure of the numeration system itself. The authors attempted to investigate the effects of a teaching strategy in which the properties of numeration systems were taught as an 'advance organizer' (cf. Ausubel, 1963) before introducing the algorithm for addition and subtraction. So, they hoped to prevent some well-known errors, which will keep cropping up as long as pupils do not understand how to deal with addition and subtraction problems.

The numeration system is a place value system in which there are two aspects to distinguish: it is a ten base system (ten ones are represented by one ten) and it is place holding (the one in 41 has a different value than the one in 14). In the experimental curriculum these properties of our numeration system are presented to the first graders through games and stories. The 'deep-structure' of the curriculum follows roughly the historical line of development of our so-called Hindu Arabic numeration system (cf. Struik, 1967).

Along this historical line, first graders are presented first with a primitive system based on one-to-one correspondence between two sets. Secondly, with an additive system with a base but no place value, and thirdly with our positional system. All this is organized in a play with three 'scenes' which happens to take place in an animal forest. In the first scene Eelco the Squirrel counts and represents the results like our ancestors probably used to do. In the second scene, Piet the Post-pigeon counts according to an additive trading system with base six and two symbols. It is a system in which quantities are counted with two counting units. In the third scene, the apes Ineke and Tineke are counting using their fingers. Ineke counts the smallest unit - the ones, Tineke the biggest - the tens. A label is put on each ape, indicating who is counting what. As long as the labels are used no place value is necessary. At the end of the play the pupils are shown that if no labels are used, an agreement has to be made: place value becomes necessary.

Four first and second grade classes from four elementary schools in two Dutch towns took part in the experiment. The statistical analysis of the results indicated that there was a significant difference between the experimental and control group on numeration items at the end of grade one and of addition and subtraction items at the end of grade two. The experimental group was superior to the control group. Moreover, the effect of the experimental curriculum could still be demonstrated more than a year after it had been carried out (cf. Wolters, 1986).

In the case of our numeration system, the reconceptualization has to be related to the way the children are taught to approach numbers. At the end of the experimental curriculum they had obtained a general understanding of the structure of numbers and the meaning and value of the place of digits. Place value is to some extent an arbitrary matter, based on an agreement. As the results of this study indicated it does matter if this insight is obtained before introducing the algorithm for addition and subtraction.

Summary

The instructional elaboration of Gal'perin's research program points to an approach to teaching strategies and curriculum development which is markedly different from those advocated within other educational traditions. I have described how educationalists and researchers have shown that this program can lead to new teaching-learning materials for a broad range of curriculum domains. Their reports deal with how education at any level - from kindergarten to graduate school - can be designed using concepts and issues derived from Gal'perin's program.

Although these curricula are designed in the vein of Gal'perin's ideas, this does not mean that he would advocate them. Actually, Gal'perin (1986a) was very sceptical and critical when educationalists and researchers were explicitly claiming to base their work on his research program. He referred to the fact that the implementation and application of the systematic formation in the classroom created many difficulties. Several reasons for this are put forward by Podol'ski (1990, p. 536).

According to Podol'ski, the main reason can be found in the fact that application of the program requires extensive reorganisation of the prevailing teaching practice in the regular classroom. However, it often occurs that applications of the program are limited to the formation of specific actions, not connected with other units of the curriculum. This is to some extent senseless, because in a real teaching-learning activity setting an action is part of a hierarchy of actions. Improving the quality of one single action is wasted effort if the quality of the other actions or of the actions hierarchy as a whole is not taken into account.

According to Gal'perin's critics, the difficulties with Gal'perin's research program can be traced to the restricted and false of its basic assumptions. Apart from these basic assumptions, several theoretical and practical propositions arising from Gal'perin's research met with extensive criticism in the former Soviet Union as well as elsewhere. The main objections were directed against the supposed epistemological monism of Gal'perin's research program and hence against several of its theoretical and practical implications.

I have covered the main objections raised by Gal'perin's critics. In the previous chapter I have considered the material(ized) action and the supposed one-way transmission of the subject matter content. In this chapter I have covered them under the headings of Gal'perin's conceptual framework, his underestimation of learner characteristics, and his 'categorical imperative' at the teachers' address to prevent the making of errors by pupils

To end this final chapter, I have also drawn attention to some general features of Gal'perin's research program which have, in my view, heuristic value and may well be prospective for those who intend to continue and extend Gal'perin's research program as a part of the activity approach to psychology.

Gal'perin's research program on the systematic formation of mental actions and concepts may be considered a teaching strategy in which the intended full-fledged mental actions and concepts involved are gradually shaped according to the stepwise procedure (see Chapter 9). In this procedure the key component is the orienting stage. In teaching practice, orientation is realized by way of organizing the learner's 'reconceptualization' of the subject matter content starting from the provision of a 'rational object scheme.' In my view, these two characteristics of the systematic formation, and especially of its orienting stage, are needed to explain how the leap from Gal'perin's 'maxim of formation' to teaching practice can be made. Notably, Teaching Strategy III is associated with the elaboration of both characteristics. I have given two examples to explain the contents of the concepts of reconceptualization and rational object scheme.

However, the final sentences of this book should be a warning not to consider these and the other concepts of Gal'perin's conceptual inventory in isolation. The strength of his research program should be found in the way Gal'perin conceptualized the complex process of internalization by means of the set of four prerequisites: the learning motive, the orienting basis, the parameters of an action, and the stepwise procedure. These prerequisites have to merge with each other to bring forth that which it is all about: full-fledged mental actions as the basic components of a powerful cognitive 'toolkit.'

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SAMENVATTING

In dit proefschrift wordt een kritisch overzicht en analyse gegeven van het leven en werk van de Russische zenuwarts en psycholoog Piotr Iakovlevich Gal'perin (1902-1988). Gal'perin was een vooraanstaand psycholoog die een belangrijke rol heeft gespeeld bij de afbakening en fundering van de handelingspsychologische benadering in de Russische psychologie. Als zodanig is Gal'perin een voorbeeld van een wetenschapper die een invloedrijke positie verwierf binnen een bepaalde wetenschappelijke context, maar daarbuiten betrekkelijk onbekend is gebleven. Deze context betreft de Sovjetpsychologie en vooral de meest vruchtbare benadering daarbinnen, t.w. de cultuurhistorische theorie.

Gal'perin was de laatste vertegenwoordiger van een generatie van psychologen die persoonlijk contact hadden met Lev Vygotskij (1896-1934), de grondlegger van de cultuurhistorische school in de Sovjetpsychologie. Deze school heeft inmiddels internationale wetenschappelijke aandacht gekregen. Het verzameld werk van Vygotskij, dat in het begin van de jaren tachtig in het Russisch is gepubliceerd, wordt momenteel vertaald in het Engels, Duits en Spaans. Deze internationale beschikbaarheid van zijn werk zal er ongetwijfeld toe leiden dat Vygotskij een van de klassieke psychologen van deze eeuw zal worden, wiens invloed vergelijkbaar is met die van Freud en Piaget. In de recente psychologische handboeken wordt Vygotskij's theorie dan ook besproken vanuit de optiek dat hier sprake is van een eigensoortige en nieuwe benadering van psychologische vraagstukken (bijv. Koops & Van der Werff, 1987; Verhofstadt-Denève et al., 1991; Meadows, 1993). De populariteit van en bekendheid met Vygotskij's theorie groeit onmiskenbaar en inmiddels is er een omvangrijk en wassend aanbod van literatuur over deze theorie (bijv. Daniels, 1993; Iaroshevski, 1989; Kozulin, 1990; A.A. Leont'ev, 1990; Moll, 1990; Newman & Holzman, 1993; Van der Veer & Valsiner, 1991; Wertsch, 1985, 1991).

Tegelijkertijd moeten we beseffen dat Vygotskij in 1934 overleed en dat zijn theorie nu deel uitmaakt van de geschiedenis van de sociale wetenschappen. Zijn theorie is onmiskenbaar een produkt van tijd en plaats (de revolutionaire periode van de jonge Sovjetrepubliek). Bijgevolg is het nodig na te gaan hoe deze theorie verder is ontwikkeld door de leden van de cultuurhistorische school. In dit proefschrift wordt beargumenteerd dat Gal'perin beschouwd kan worden als een lid van de cultuurhistorische school die via eigen theoretisch en empirisch onderzoek een substantiële bijdrage heeft geleverd aan de verdere ontwikkeling ervan. De stelling wordt verdedigd dat Gal'perin een 'Vygotskiaan' is en dat hij de cultuurhistorische theorie als uitgangspunt heeft gekozen voor de ontwikkeling van een eigen onderzoeksbenadering in de psychologie.

Behalve een onmiskenbare Vygotskiaanse invloed, zijn er nog drie andere invloeden die duidelijk aanwezig zijn in het werk van Gal'perin. In de eerste plaats dient Leont'evs activiteitstheorie te worden genoemd. Maar ook de marxistische opvatting van het 'ideële' en vooral Pavlovs 'oriënterende reflex' hebben Gal'perin beïnvloed. In dit proefschrift wordt de stelling verdedigd dat de grondslagen van Gal'perins psychologische theorie gezocht moeten worden in het werk van Vygotskij, Leont'ev, Marx en Pavlov. Gal'perin's werk wordt gekarakteriseerd als een benadering waarin psychologische vraagstukken worden uitgewerkt die gerelateerd zijn aan het werk van de genoemde vier wetenschappers.

Binnen het kader van de Sovjetpsychologie heeft Gal'perin een zelfstandige en invloedrijke positie opgebouwd en 'school' gemaakt. Hij is van meet af aan een veelzijdig denker geweest, die zich ten doel stelde de psychologie een nieuw en objectief uitgangspunt te geven. Hij publiceerde over allerlei thema's binnen de psychologie zoals fysiologie, orthodidactiek, psychotherapie, functiestoornissen, onderwijspsychologie, en theorie en geschiedenis van de psychologie. Gal'perin promoveerde zowel in de medicijnen (1936a) als in de psychologie (1965a) en deze 'dubbel-professie' maakte hem tot een prominent wetenschapper die een actieve rol heeft gespeeld in vrijwel alle grondslagendiscussies binnen de Sovjetpsychologie. Vandaar

dat in dit proefschrift de ontwikkeling van Gal'perins denken belicht wordt tegen de achtergrond van bepaalde ontwikkelingen binnen de Sovjetpsychologie. Dit doel wordt nagestreefd door middel van dertien hoofdstukken verdeeld over drie delen.

Samenvattend: In dit proefschrift wordt een kritisch overzicht en analyse van leven en werk van Piotr Gal'perin uitgewerkt binnen de historische kontekst van de Sovjetpsychologie waarbij drie uitgangspunten als rode draad fungeren: (1) Gal'perin is een Vygotskiaan, die (2) zich beroept op het werk van Vygotskij, Leont'ev, Pavlov en Marx, en die (3) op basis hiervan zijn theorie heeft uitgewerkt en beproefd.

Deel I: Gal'perins wetenschappelijke biografie (Hfdst. 1-4)

Deel I geeft een overzicht van Gal'perins wetenschappelijke loopbaan 'van de wieg tot het graf'. Gal'perin wordt ten tonele gevoerd als een gedreven wetenschapper met een sterke drang de psychologie als wetenschap verder te ontwikkelen. Zijn wetenschappelijke biografie wordt gereconstrueerd aan de hand van een indeling in vier periodes:

- 1 1902-1930 (Hfdst. 1)
- 1 1930-1936 (Hfdst. 2)
- 3 1936-1943 (Hfdst. 3)
- 4 1943-1988 (Hfdst. 4)

Eerste periode (1902-1930): Jeugd en opleiding (Hfdst. 1)

Deze periode omvat Piotr Gal'perins jeugdijaren, opvoeding, onderwijs en zijn eerste onderzoeksprojecten. Na afsluiting van het gymnasium ging Piotr medicijnen studeren aan de universiteit van Khar'kov, toen de hoofdstad van de Ukraine. Zijn vader was KNO-arts en sinds 1911 aldaar hoogleraar. Gal'perin studeerde af als psychiater-neuroloog, een kwalificatie die vergelijkbaar is met wat bij ons vroeger een zenuwarts werd genoemd.

Vanaf het derde cursusjaar werkte Gal'perin in de neurologische kliniek van professor K.I. Platonov, in die jaren een internationaal bekende arts-hypnotiseur. Platonov gebruikte hypnosetechnieken in de meest uiteenlopende gevallen: bij de behandeling van neuroses, ter vervanging van een narcose bij operaties, bij bevallingen. Op het gebied van de hypnose ligt Gal'perins eerste onderzoek, dat betrekking had op hypnose in relatie tot spijsvertering. Hij wilde onderzoeken hoe diep hypnose inwerkt op fysiologische processen door de schommelingen na te gaan in het aantal witte bloedlichaampjes als gevolg van het onder hypnose nuttigen van een ontbijt. Het verslag van dit experiment was zijn eerste publikatie (Istomin & Gal'perin, 1926). Istomin en Gal'perin behoorden tot de eersten die op dit gebied experimenteel onderzoek deden.

Na afsluiting van zijn studie in 1926 kreeg Gal'perin een baan in een avond-polikliniek en opvangcentrum voor alcoholici en drugverslaafden. Hij verdiepte zich in de mogelijkheid om verslaafden via hypnose te behandelen en publiceerde daar ook over (Gal'perin, 1930a, 1930b). Tevens werkte hij in Platonovs neurologische kliniek waar hij ondermeer onderzoek deed naar de neurologische achtergrond van de 'pseudo Babinski' reflex, waarbij alleen de grote teen reflexmatig naar boven buigt. Hiervan toonde Gal'perin (1928) aan dat deze neurologische stoornis een vroeg symptoom kan zijn van chorea minor, oftewel sintvitusdans, een voornamelijk bij kinderen optredende ziekte, gekenmerkt door plotselinge bewegingen van ledematen en gelaat.

Daarnaast verrichtte Gal'perin nog een onderzoek naar de zgn. Poggendorff-illusie (zie de afbeelding op de voorkant), één van de geometrische illusies, die toentertijd sterk in de belangstelling stonden. Kenmerkend voor dit soort materiaal is, dat de psychische waarneming sterk afwijkt van de geometrische kenmerken van de betreffende figuur. Gal'perin (1931) ontwikkelde verschillende varianten van de Poggendorff-illusie met het doel om de toentertijd gangbare opvatting (o.m. verdedigd door Hering, Helmholtz en Wundt) te bestrijden dat geometrische illusies voornamelijk het gevolg zijn van de overschatting van scherpe hoeken. Gal'perins interpretatie sluit meer aan bij de recente opvatting (bijv. Gregory, 1974; Gillam, 1986) dat de betreffende illusie tot stand komt doordat de hersenen bij de twee-dimensionale afbeelding reageren alsof er in de figuur sprake is van een drie-dimensionaal perspectief (zie Van Wieringen, 1989, p. 34).

Al dit onderzoek uit Gal'perins eerste periode is in deze samenvatting aangestipt omdat hieruit twee belangrijke conclusies kunnen worden getrokken die zijn positie in de Sovjetpsychologie verhelderen. Op de eerste plaats valt op dat Gal'perin een inventief en productief onderzoeker is die flexibel is in de keuze van zijn onderzoeksthema's. Volgens Asmolov (persoonlijke mededeling) stond Gal'perin inderdaad bekend als een creatief en eigenzinnig onderzoeker die goed op de hoogte was met de relevante vakliteratuur. De tweede conclusie hangt samen met het type onderzoek dat Gal'perin in de periode tot 1930 verrichtte. Het betreft vooral fysiologisch onderzoek in relatie tot psychologische vraagstellingen, een onderzoeksgebied waarmee Gal'perin zeer vertrouwd raakte. Dit is van belang omdat de relatie tussen fysiologie en psychologie (het zgn. psychofysisch probleem) steeds weer in de Sovjetpsychologie aan de orde werd gesteld en zelfs, aldus Rubinshtein, een van haar kernproblemen vormde. Het is het probleem van de relatie tussen psyche en materie, waarbij onder materie niet alleen de hersenen en het zenuwstelsel ('inner matter') worden verstaan, maar ook de wereld buiten het menselijk lichaam ('outer matter' of 'outer material world').

In de Sovjetpsychologie is er altijd een sterke tendens geweest om het psychofysisch probleem op te lossen door psychische verschijnselen ondergeschikt te maken aan fysiologische, resp. sociologische verschijnselen. Gal'perin heeft zich hiertegen in woord en geschrift altijd verzet (bijv. Gal'perin, 1935, 1953a, 1986a). Zijn bijdrage aan de Sovjetpsychologie moet dan ook worden opgevat als een poging de psychologie af te zonderen van de fysiologie en sociologie en te voorzien van een eigen en duidelijk afgebakend studie-object met een daarbij passende methode van onderzoek. Gal'perins polemieken (o.m. met Pavlov, Vygotskij en Leont'ev) zijn deels terug te voeren op zijn streven de psychologie binnen het stelsel van de Sovjetwetenschappen een eigen plek te verschaffen. Vandaar dat dit streven in de ondertitel van dit proefschrift is opgenomen.

Tweede periode (1930-1936): Khar'kov School (Hfdst. 2)

De periode die beschreven wordt in dit hoofdstuk loopt van 1930 tot 1936. Was Gal'perin tot 1930 nog vooral neuroloog en fysioloog, vanaf de jaren dertig treedt hij op als psycholoog. In 1930 was hij samen met een aantal collega's betrokken bij de oprichting van de Psychoneurologische Academie van de Oekraïense Republiek. In het kader van de psychologische sectie van de Academie, werd op initiatief van Gal'perin aan Vygotskij en zijn medewerkers gevraagd in Khar'kov te komen werken. Zo ontstond de zgn. Khar'kov School, die een belangrijke rol heeft gespeeld in de ontwikkeling van de handelingspsychologie in de Sovjetunie. Leden van deze school waren onder meer L.I. Bozhovich, P.Ia. Gal'perin, A.V. Zaporozhets, P.I. Zinchenko, en A.N. Leont'ev die de feitelijke leider was. Toen in 1935 Kiëv in plaats van Khar'kov de hoofdstad van de Oekraïne werd, verloor de Academie haar directe contact met regeringsfunctionarissen en hield zij op te bestaan. Daardoor verloor de Khar'kov School haar institutionele basis. Het beruchte pedologie-decreet in 1936 (zie verderop) betekende het definitieve einde van de Khar'kov School.

Gal'perins eigen bijdrage aan de theorievorming binnen de Khar'kov School zijn terug te vinden in zijn dissertatie (Master's thesis) ter verkrijging van de titel van Kandidaat in de Medische Wetenschappen. Hierin beschrijft Gal'perin zijn bekende onderzoek naar de verschillen in werktuiggebruik tussen mens en dier. Dit type onderzoek was kenmerkend voor de theorievorming binnen de Khar'kov School, dat vooral gericht was op het in kaart brengen van de samenhang tussen het psychische functioneren en de verschillende aspecten van het psychomotorische handelen.

Gal'perins dissertatie bestaat uit twee delen. In het eerste deel laat hij aan de hand van eenvoudige voorbeelden zien dat een dier een hulpmiddel gebruikt als verlengstuk van een natuurlijk lichaamsdeel. Hoewel dit een verbetering is, omdat dat lichaamsdeel langer wordt, voegt het hulpmiddel geen nieuwe eigenschappen aan dat lichaamsdeel toe. Daarentegen heeft een werktuig, dat door de mens is ontworpen, zijn eigen logica, waarnaar de natuurlijke mogelijkheden van de hand zich moeten voegen. Een hamer, bijvoorbeeld, pak je bij de steel vast, zodat je met de kop kunt slaan.

In het tweede gedeelte beschrijft Gal'perin een onderzoek naar de ontwikkeling van psychomotorische vaardigheden. Het onderzoek heeft betrekking op het gebruik door kinderen van een schopje waarvan het blad in een hoek van 90° aan de steel zit. Met behulp van dit schopje moeten de kinderen voorwerpen omhoog halen uit een kist. Na veel lukraak proberen lukt het de kinderen tenslotte om voorwerpen omhoog te halen door het schopje handig te

gebruiken. Aanvankelijk is de handeling nog 'manueel', zoals Gal'perin het noemt, omdat het schopje niet anders gebruikt wordt als een verlengstuk van de hand. Gaandeweg wordt de handeling 'instrumenteel', omdat het manipuleren nu in overeenstemming is met de specifieke eigenschappen van het schopje als instrument en werktuig.

De ontwikkeling van manueel naar instrumenteel handelen is volgens Gal'perin kenmerkend voor het leren van een dergelijke motorische vaardigheid. Deze ontwikkeling beschrijft hij aan de hand van vier fasen. Tussen de manuele (eerste) fase en de instrumentele (vierde en laatste) fase onderscheidt hij twee tussenfasen. Volgens Gal'perin worden deze tussenfasen, hoewel ze essentieel zijn voor het via trial-and-error leren van een motorische vaardigheid, als zodanig onvoldoende onderkend. In de tussenfasen exploreert de lerende de taaksituatie (tweede fase) en vervolgens (derde fase) gebruikt hij de opgedane ervaringen doelgericht.

Hoewel Gal'perin in 1936 de term nog niet gebruikt, legt zijn onderzoek de nadruk op het belang van het oriënteren voor het leren. De beide essentiële tussenfasen zijn immers gericht op het oriënteren van de persoon op verschillende aspecten van de te leren handeling. Tijdens het oriënteren bouwt de persoon een 'representatie' op van het handelingsverloop op grond waarvan het leerproces zich vervolgens voltrekt. Dat het oriënteren inderdaad plaatsvond, leidde Gal'perin af uit zijn observatie dat het uitvoeringstempo van de handeling tijdens de beide tussenfasen afneemt en vervolgens weer toeneemt. Deze afname duidt volgens Gal'perin op het feit dat de persoon de taaksituatie exploreert en de opgedane ervaringen toetst. Kortom, zijn onderzoek uit 1936 is een voorbode van de psychologische theorie die hij vanaf de jaren vijftig zou gaan ontwikkelen en waarin het oriënteren een centrale plaats krijgt. Daarnaast illustreert zijn onderzoek nog een tweede thema dat kenmerkend is voor de aanpak van het onderzoek binnen de Khar'kov School. De leden van deze school bestudeerden de relatie tussen het materiële, praktische handelen en het inwendige, mentale handelen. Daarbij gingen ze ervan uit dat het materiële handelen de grondslag legt voor het mentale handelen. Vandaar dat de leden van de Khar'kov School beschouwd worden als de grondleggers van het handelingsbegrip in de Sovjetpsychologie.

Samenvattend kan gesteld worden dat de beide thema's die vanaf de jaren vijftig kenmerkend zouden worden voor Gal'perins psychologische theorie, nl. de nadruk op zowel het materiële als het oriënterende handelen, al aanwezig waren in het werk van Gal'perin als lid van de Khar'kov School in de eerste helft van de jaren dertig.

Derde periode (1936-1943): omstreeks de Tweede Wereldoorlog (Hfdst. 3)

In 1936 werd er door het Centrale Comité een decreet uitgevaardigd met betrekking tot de vermeende misstanden in de pedologie ('kinderkunde'). Het 'ped-decreet' veroordeelde nadrukkelijk het gebruik van tests in de onderwijspraktijk. De testpraktijk vond plaats onder de vlag van de pedologie en door het decreet werd de pedologie als zelfstandige wetenschap opgeheven. Omdat de pedologie nauw met de psychologie gelieerd was, ondervond de laatste ook de repercussies. Het decreet betekende dan ook het einde van de Khar'kov School in de Sovjetpsychologie. Gal'perin ging werken in de chronische afdeling van de psychiatrische kliniek in Khar'kov. Vanaf midden 1936 tot aan het begin van de Tweede Wereldoorlog werkte hij in de psychiatrie.

Voordat Khar'kov werd bezet door de Duitsers, werd de kliniek waar Gal'perin werkte, omgevormd tot een psychoneurologisch ziekenhuis en geëvacueerd naar Tjumen' in West-Siberië. Daar werkte Gal'perin als arts tot begin 1943. Maart 1943 verhuisde hij naar Kaurovka in de buurt van Yekaterinburg (zoals Sverdlovsk sinds 1991 heet). A.N. Leont'ev zette in een sanatorium in Kaurovka een revalidatie-centrum op en nodigde onder meer Gal'perin en Zaporozhets uit om er te komen werken. Het centrum werd opgezet ter behandeling van stoornissen in de motoriek ten gevolge van schotwonden en stijfheid of onbeweeglijkheid, omdat de ledematen om te genezen lange tijd in het gips hebben gezeten. Het centrum maakte deel uit van een hele reeks centra dat, mede op initiatief van Luria, in de Oeral werd opgezet ter behandeling van oorlogsslachtoffers.

Gal'perin werd hoofd van de medische afdeling van het centrum in Kaurovka en deed tevens onderzoek naar de revalidatie van stoornissen in de motoriek. Het was hem namelijk opgevallen dat een patiënt die motorisch gehandicapt was wel zijn haar kon kammen, maar niet op verzoek zijn arm kon optillen (Gal'perin (1943, p. 321). Dit opmerkelijke verschijnsel vormde de aanleiding voor een onderzoek naar de psychologische samenhang tussen de handelingsstructuur

en de karakteristieken van de taaksituatie. Volgens Leont'ev (1945/1983c, p. 32) was Gal'perin de eerste psycholoog die in de voormalige Sovjetunie dit onderzoeksthema oppakte. Gal'perin ontwierp samen met Ginevskaia een apparaat waarmee zij de uitvoering van armbewegingen door motorisch gehandicapten konden onderzoeken (Gal'perin, 1943; Gal'perin & Ginevskaia, 1947). Volgens Leont'ev & Zaporozhets (1945/1960) zijn de resultaten van dat onderzoek van invloed geweest op de opzet van het revalidatie-programma in Kaurovka.

Hoewel Gal'perin en Ginevskaia de term niet gebruikten, deden zij in feite onderzoek naar een bijzonder aspect van het oriënteren tijdens de uitvoering van een handeling. Dit aspect heeft betrekking op de wijze waarop een handeling moet worden uitgevoerd gelet op de relevante gegevens van de situatie waarmee rekening moet worden gehouden. In Nederland is hiernaar onderzoek gedaan door Pijning (1991, p. 18) die deze vorm van oriëntering gedragscentrerend noemt: bij het uitvoeren van een complexe beweging richt de persoon niet alleen zijn aandacht op het doel van het handelen, maar ook op de vervoersvorm van de beweging zelf. Kortom, net als in Khar'kov tijdens de tweede periode van zijn wetenschappelijke carrière, treedt ook in Kaurovka het thema van het oriënteren op de voorgrond. Bijgevolg kan vastgesteld worden dat het voorwerk voor Gal'perins latere psychologische theorie verricht werd in de periodes die daaraan vooraf gingen.

Vierde periode (1943-1988): Moskou Universiteit (Hfdst. 4)

In de herfst van 1943 verhuiste de groep psychologen die tot dan toe in Kaurovka werkte naar Moskou. Op voorspraak van Leont'ev kreeg Gal'perin een aanstelling aan de Moskouse universiteit. Eerst als docent bij de psychologische sectie van de filosofische faculteit. In 1966 werd de psychologie een zelfstandige faculteit en werd Gal'perin benoemd tot een van de hoogleraren. Sinds 1971 bezette hij aldaar de leerstoel ontwikkelingspsychologie. Na een hartaanval ging hij in 1984 met emeritaat. Op 25 maart 1988 overleed Gal'perin op 85-jarige leeftijd in Moskou.

Na zijn aanstelling aan de Moskouse universiteit in 1943, begon Gal'perin met onderzoek naar emoties en vervolgens naar het probleemoplossen. Beide onderzoeksthema's leverden echter niet op wat hij ervan verwacht had. Hij kwam tot de conclusie dat de psychologie vanuit een nieuw theoretisch perspectief moest worden opgezet. In 1952 presenteerde Gal'perin voor het eerst zijn denkbeelden tijdens een conferentie in Moskou. Dat jaar kan dus beschouwd worden als het 'geboortjaar' van zijn psychologische theorie. Deel II van dit proefschrift behandelt de uitgangspunten en inhoud van Gal'perins theorie.

Deel II: Overzicht van Gal'perins psychologische theorie (Hfdst. 5-10)

Gal'perin is van meet af aan een veelzijdig denker geweest, die zich ten doel stelde de psychologie een nieuw en objectief uitgangspunt te geven. De hoekstenen van zijn psychologische theorie moeten worden gezocht in het werk van zes vooraanstaande wetenschappers: Vygotskij, Leont'ev, Pavlov/Sokolov en Marx/Il'enkov (Hfdst. 5 en 7).

Op de eerste plaats is daar Vygotskij's cultuurhistorische theorie die in één zin als volgt gekarakteriseerd kan worden: "hogere cognitieve processen komen in de omgang of sociale interactie tot stand via culturele instrumenten" (Van der Veer, 1984, p. 221). Leont'ev trekt de lijn van Vygotskij verder door en beklemtoont dat sociale interactie is verweven met de object-gerichte menselijke activiteit. Geïnspireerd door Pavlovs concept van de 'oriënterende reflex', zoals geïnterpreteerd door Sokolov, benadrukt Gal'perin het oriënterende aspect van de object-gerichte menselijke activiteit. Vanuit de marxistische opvatting van het 'ideële', zoals geïnterpreteerd door Il'enkov, voegt Gal'perin hieraan vervolgens toe dat oriënterende mentale activiteit uit materiële activiteit voortkomt.

Een bespreking van deze vier invalshoeken (Vygotskij, Leont'ev, Pavlov/Sokolov en Marx/Il'enkov) leidt in dit proefschrift (Hfdst. 7) tot het formuleren van vier uitgangspunten waarop Gal'perins theorie is gebaseerd:

- 1 Mentale activiteit is een vorm van concrete, materiële, object-gebonden activiteit;
- 2 De structuur en inhoud van mentale activiteit komen via interiorisatie tot stand. Mentale activiteit moet dus bestudeerd worden door het proces van interiorisatie te bestuderen: De studie van mentale activiteit is de studie van de genese van mentale activiteit;
- 3 Het eindproduct van het proces van interiorisatie is mentale oriënterende activiteit. De mens gebruikt deze oriënterende activiteit om het handelen in nieuwe probleemsituaties te plannen, te sturen en te bewaken ('monitoring');
- 4 Bijgevolg, aldus Gal'perin, is oriënterende activiteit het feitelijke studie-object van de psychologie.

Deze vier uitgangspunten kunnen worden samengevat in één omschrijving, als volgt:

Volgens Gal'perin moet de psychologie zich bezig houden met oriënterende mentale activiteit, die via interiorisatie voortkomt uit materiële activiteit.

Vanuit deze uitgangspunten heeft Gal'perin zijn eigen psychologische stellingname geformuleerd, die bekend is geworden als de theorie van de 'systematische vorming van mentale handelingen'. Deze theorie beschouwde hij als de 'koninklijke weg' waarlangs de genese en de structuur van psychische processen kunnen worden onderzocht. Voorop staat bij Gal'perin de vraag naar de concrete inhoud, structuur en functie van psychische processen. Wat is de aard van het psychische en welke rol speelt het in het tot stand komen van het menselijke handelen?

Volgens Gal'perin is dit probleem vóór hem nooit naar behoren aan de orde gesteld, onder meer omdat psychologen niet duidelijk voor ogen hebben wat het object van hun wetenschap is. In dit verband gebruikt Gal'perin graag de metafoer van de blauwe vogel uit het gelijknamige toneelstuk van Maurice Maeterlinck. Deze blauwe vogel is een symbool voor het geluk van de mens en in het sprookje gaan twee kinderen ernaar op zoek. Bij Gal'perin staat de blauwe vogel voor het object van de psychologie en de 'systematische vorming' fungeert als leidraad bij de zoektocht. De 'systematische vorming' geeft, volgens Gal'perin, richting aan de genese en de structuur van psychische processen en zodoende weten we wat de functie is van het psychische: het oriënteren op toekomstig handelen (Hfst 6).

De 'systematische vorming' is vooral bekend geworden als procedure voor de vormgeving van onderwijsleerprocessen (Hfdst. 8, 9 en 10). Wezenlijk voor deze procedure zijn oriënteren, materialiseren en interiorisatie. Zich iets eigen maken betekent bij Gal'perin: leren handelen op mentaal niveau, d.w.z. denkoperaties leren. Aan elke handeling onderscheidt hij een oriënterende en uitvoerende component en optimaal leren betekent dat deze componenten 'trapsgewijs' tot ontwikkeling dienen te komen. Een leerproces doorloopt achtereenvolgens materiële, verbale en mentale fasen (in totaal 6 fasen) en in elke fase maakt de lerende zich een bepaalde handeling eigen. Zo realiseert Gal'perin (via de zgn. trapsgewijze procedure - Hfdst. 9) een proces van verinnerlijking of interiorisatie, waarbij een uitwendige, materiële handeling transformeert in een inwendige, mentale handeling. Bovendien benadrukt Gal'perin dat het uitvoeren van een handeling op elke niveau inzicht en overzicht vereisen in de opbouw van die handeling. Inzicht en overzicht worden verschaft doordat de lerende zich adequaat oriënteert op en in de handeling. Het succes van het leerproces wordt bepaald door de kwaliteit van het oriënteren: Wat is het doel van de handeling, welke eigenschappen van de leerinhouden zijn relevant, wat zijn de achtereenvolgende deelhandelingen, enz.? Deze informatie over de handeling moet zo 'volledig' mogelijk zijn. De eis van een volledige 'oriënteringsbasis voor de handeling', zoals Gal'perin het noemt, is volgens hem voor een optimaal leerproces overigens belangrijker dan het trapsgewijze karakter van de procedure.

Gal'perins opvatting is dat de psychologie zich moet richten op de wijze waarop de persoon zijn handelen reguleert en bewaakt; dit vat hij samen met de term oriënteren. Het oriënteren dat aan de uitvoering van de handeling voorafgaat, vormt de feitelijke psychologische basis ervan. Hiermee hangt ook Gal'perins definitie van het psychische samen. Het psychische is een bijzondere activiteit waarin zich voor het subject het veld van handelingsmogelijkheden openbaart. Vervolgens maakt het subject een keuze voor de handeling die onder de gegeven omstandigheden het meest veelbelovend, effectief, succesvol en dergelijke lijkt. De volgende vraag is dan: Wat betekent dit in concreto? Dat kan volgens Gal'perin achterhaald worden door via de procedure van de 'systematische vorming' planmatig en zorgvuldig te onderzoeken wat

de genese en structuur zijn van psychische processen. Via deze procedure wordt nagegaan hoe de aanvankelijk uitvoerige, materiële handeling via interiorisatie transformeert tot een volwaardige mentale handeling.

In zijn methode van 'systematische vorming' heeft Gal'perin een geheel van richtlijnen ontwikkeld aan de hand waarvan interiorisatie zo goed mogelijk tot stand kan worden gebracht. Deze richtlijnen hebben betrekking op de volgende vier categorieën van het onderwijsleerproces: het leermotief, de oriënteringsbasis, de parameters van een handeling, en de traspwijze procedure. Voor Gal'perin zijn dit de vier categorieën die het verloop en de kwaliteit van het onderwijsleerproces bepalen. Ze worden beschreven in hoofdstuk 8 en 9, en in hoofdstuk 10 aan de hand van een voorbeeld toegelicht.

Deel III: Evaluatie van Gal'perins psychologische theorie (Hfdst. 11-13)

Gal'perin beoogde een algehele vernieuwing van de psychologie; hij was een systeembouwer die geduldig en vasthoudend zijn levensdoel nastreefde. Hij heeft altijd benadrukt dat hij slechts de eerste stap in een nieuwe richting heeft gezet en dat de uitwerking van zijn programma door anderen moet worden voortgezet. Inmiddels heeft zijn theorie toepassing gevonden op velerlei gebied zoals leer- en onderwijspsychologie, orthodidactiek en behandeling van funktiestoornissen. In Oosteuropa, maar ook daarbuiten - vooral in Nederland, België en Duitsland -, hebben de opvattingen van Gal'perin invloed gekregen.

Het zal duidelijk zijn dat Gal'perins visie op de psychologie zowel positieve als negatieve reacties oproep. Gal'perin werd (in meer of mindere mate) gesteund door invloedrijke Sovjetpsychologen als D.B. Elkonin, A.N. Leont'ev, A.R. Luria, A.V. Zaporozhets. Tegelijkertijd wezen andere, even invloedrijke, Sovjetpsychologen zijn opvattingen af, zoals E.A. Budilova, I.S. Iakimanskaia, N.A. Menchinskaia en A.A. Smirnov.

De reacties die Gal'perins theorie oproep, worden aan de orde gesteld via een historische invalshoek. Dientengevolge wordt eerst in hoofdstuk 11 beschreven welke drie fasen er onderscheiden kunnen worden in de ontwikkeling van Gal'perin's theorie. De eerste fase omvat de periode van 1950 tot 1965. Het is de fase waarin Gal'perin de uitgangspunten van zijn theorie formuleert en empirisch beproeft. In de tweede fase (1966 tot het eind van de jaren zeventig) worden zijn denkbeelden verder ontwikkeld. In 1966 wordt Gal'perin hoogleraar aan de nieuw opgerichte Faculteit Psychologie van de Moskouse Universiteit. Deze officiële positie geeft hem status en de nodige financiële armslag om onderzoek te doen. Op basis van dit onderzoek formuleert hij midden jaren zeventig de bovengenoemde richtlijnen die volgens hem ten grondslag liggen aan de 'systematische vorming van mentale handelingen'.

De derde fase begint in de jaren tachtig. Gal'perin benadrukt dat er nog steeds blinde vlekken zitten in zijn psychologische theorie. Eigenlijk heeft hij niet meer dan de eerste stap gezet in de richting van een nieuwe onderzoeksbenadering in de psychologie. Anderen moeten verder onderzoek doen teneinde haar heuristische waarde en mogelijkheden aan te geven.

In hoofdstuk 11 wordt nader ingegaan op de eerste fase van de ontwikkeling van Gal'perins theorie. Het is opvallend dat in de jaren vijftig Gal'perin alle ruimte kreeg om zijn denkbeelden te ontwikkelen. Er was nog geen noemenswaardige oppositie en hiervoor worden drie oorzaken aangegeven. Op de eerste plaats is de steun van A.N. Leont'ev van belang. Leont'ev (1957a, p. 230), die toen al zeer invloedrijk was, beschouwde Gal'perins theorie als een nieuwe benadering binnen de cultuurhistorische school. Hij presenteerde Gal'perins theorie op een tweetal internationale conferenties (Montreal, 1954 en Straatsburg, 1956). Hieruit kan worden geconcludeerd, dat Gal'perin al in het midden van de jaren vijftig erkenning had gekregen in de Sovjetunie.

Ten tweede heeft ook de politieke en wetenschappelijke situatie van de Sovjetpsychologie er toe bijgedragen dat Gal'perins theorie een vliegende start maakte in de jaren vijftig. Het waren de jaren van de 'Pavlovisering' van de Sovjetpsychologie. In navolging van Burger (1955) wordt in dit proefschrift (Hfdst. 4) de opvatting verdedigd dat de 'Pavlovisering' vooral inhield dat de politieke en historische kontekst zich wijzigde, waardoor de psychologie (die sinds het omineuze 'ped-decreet' van 1936 ondergronds was gegaan) zich weer kon manifesteren. Van deze nieuwe situatie heeft Gal'perin ten volle kunnen profiteren.

Op de derde plaats moet het jaar 1958 worden genoemd, waarin van hogerhand een netwerk van experimenteerscholen werd opgezet. Hierdoor werd het mogelijk om op grotere schaal dan voorheen systematische schoolexperimenten uit te voeren. El'konin en Davydov die hierbij betrokken waren, lieten zich door Gal'perins theorie inspireren om het aanvankelijk lees- en rekenonderwijs vanuit een nieuwe benadering vorm te geven.

Kortom, aan het eind van de jaren vijftig, had Gal'perin al het nodige wetenschappelijke krediet opgebouwd. Gezien de pretenties van Gal'perin kon kritiek echter niet uitblijven. In hoofdstuk 12 en 13 wordt daarvan een overzicht gegeven. De beschrijving van deze kritiek wordt toegespitst op vijf thema's:

- 1 de materiële cq. gematerialiseerde handeling;
- 2 eenrichtingsverkeer
- 3 het conceptuele kader
- 4 leerlingkenmerken
- 5 het afwijzen van fouten door leerlingen

Ad 1. de materiële cq. gematerialiseerde handeling (Hfdst. 12)

Historisch gezien is dit de eerste kritiek die in relatie tot Gal'perin aan de orde kwam. Het betrof een onderzoek van Karpova (1955) dat zij onder supervisie van Luria uitvoerde. Op basis van Gal'perins theorie leerde Karpova kinderen van 3;6 tot 7 jaar een gesproken zin in woorden te segmenteren. De kinderen leerden bij het naspreken van een zin voor elk woord een blokje neer te leggen. Deze vorm van materiële steun bleek voor het merendeel van de kinderen het uitvoeren van de taak aanmerkelijk te vergemakkelijken (cf. Van Parreren & Carpay, 1980, pp. 138-145). Het verslag van dit onderzoek verscheen in het Russisch vakblad *Voprosy psikhologii* en werd met stijgende verbazing door de psychologische vakbroeders gelezen. Volgens Gal'perin (pers. comm.) vroegen veel psychologen zich af waarom het nodig was om kinderen te leren een gesproken zin taalkundig te ontleden in woordvormen met behulp van blokjes. Men vond dat onzin.

De kritiek kwam, kort samengevat, op twee punten neer. Ten eerste, Gal'perin legt ten onrechte een rechtstreeks verband tussen het handelen aan materieel-tastbare dingen (materiële handelingen) en denkprocesses (mentale handelingen). Ten tweede, Gal'perin gaat ervan uit dat het onderwijsleerproces benaderd kan worden als een proces van interiorisatie, waarbij een aanvankelijk materiële handeling autonoom, als het ware 'vanzelf', overgaat in een mentale handeling. Overigens kon Gal'perin (pers. comm.) zich deze kritiek wel voorstellen, omdat Karpova's experiment de nodige tekortkomingen vertoonde.

Eind jaren zestig heeft Karpova (1977) daarom haar experiment onder supervisie van Gal'perin gerepliceerd. Met name op twee punten onderscheidde dit latere experiment zich van het voorafgaande. Ten eerste werd ervoor gezorgd dat de stappen die Gal'perin in zijn trapsgewijze procedure aangeeft tussen materieel en mentaal handelen, zorgvuldig werden afgewikkeld. Geleidelijk gaat dan de aanvankelijke taalkundige ontleding aan de hand van materiële hulpmiddelen over in een analyse op mentaal niveau. Ten tweede werd er voor gezorgd dat de leerlingen zich ervan bewust werden dat materiële hulpmiddelen niet de woorden van de zin representeren, maar gebruikt worden om het resultaat van de analyse vast te leggen. In eerste instantie is die vastlegging zeer uitvoerig en gedetailleerd, maar geleidelijk wordt de noodzaak van materiële steun minder. Aan het eind van het leerproces is die steun niet meer nodig en kan het kind een zin hardop en voor zichzelf analyseren. Dit is een voorbeeld van interiorisatie, waarbij de aanvankelijke taalkundige ontleding aan de hand van materiële hulpmiddelen via tussenstappen overgaan in een taalkundige ontleding op mentaal niveau.

Kortom, de kritiek die naar aanleiding van Karpova's onderzoek op Gal'perin geleverd werd, had betrekking op de functie van het materieel handelen voor de vormgeving van het onderwijsleerproces. Voor Gal'perin stond voorop dat in de aanvangsfasen van het onderwijsleerproces het handelen van leerlingen ondersteund moet worden met behulp van materieel-tastbare dingen. In Nederland is dit uitgangspunt met name gekritiseerd door Nelissen (1987, pp. 30-31) en Van Oers (1987, p. 68). Beide auteurs wijzen op het gevaar dat vooral jonge leerlingen de materiële steun niet kunnen loslaten. Dan blijkt het materieel handelen een aanzienlijke hindernis te vormen voor de ontwikkeling van gegeneraliseerde handelingen op mentaal niveau.

Ook in Gal'perins eigen onderzoek zijn er problemen gerezen met een al te strikte definiëring van materiële handelingen als handelingen aan materieel-tastbare dingen. In 1985 vatte Gal'perin de tekortkomingen van materiële handelen als volgt samen: (1) ze zijn in het onderwijsleerproces vaak onpraktisch en moeilijk te realiseren; (2) ze zijn te vaak gebonden aan toevallige, fysische eigenschappen van de tastbare objecten en niet aan de voor het onderwijsleerproces relevante eigenschappen; (3) ze bouwen bij vooral jonge leerlingen het verwachtingspatroon op dat abstracte eigenschappen van de objecten concreet zichtbaar zijn. Dat bemoeilijkt vervolgens voor deze leerlingen de stap naar de meer abstracte vormen van denken op het verbale en mentale niveau.

Vanwege deze tekortkomingen van materiële handelingen is Gal'perin geleidelijk het accent gaan leggen op gematerialiseerde handelingen, nl. handelingen aan symbolen, zoals formules, tekeningen, schema's e.d. die op een of andere manier de tastbare objecten aanschouwelijk representeren. Gal'perin (1986b) noemt deze symbolen 'operationele denkschema's' omdat ze het handelen van leerlingen sturen. In feite kan een operationeel denkschema getypeerd worden als een leermodel. Het is een speciaal geconstrueerd en voor leerlingen bevattelijk hulpmiddel, dat het leren oplossen van een bepaald soort opgaven ondersteunt en dat het handelingsverloop van het oplossingsproces stuurt (cf. Haenen & Van Oers, 1986). De verdere ontwikkeling van leermodellen is een trend die in de jaren tachtig binnen de school van Gal'perin op de voorgrond is getreden.

Ad 2. eenrichtingsverkeer (Hfdst. 12)

Het tweede punt van kritiek is aan het eind van de jaren vijftig naar voren gebracht door Kalmykova (1959). Zij stelde dat Gal'perins onderwijsstrategie te beperkt is omdat er sprake is van eenrichtingsverkeer: de docent bepaalt en stuurt het proces van kennisverwerving en de leerling wordt opgevat als een passieve consument van de leerinhoud. De afwezigheid van initiatief van de kant van de leerling heeft, volgens Kalmykova, vooral tot gevolg dat er geen sprake zal zijn van transfer naar verwante of afwijkende (bijv. ingeklede) opgaven. De leerling leert namelijk niet om construerend en vanuit het eigen initiatief met de leerinhoud om te gaan. Door de jaren heen is dit een steeds terugkerend punt van kritiek op Gal'perin geweest en recentelijk heeft Freudenthal (1991, p. 142) dit punt nog eens in zijn 'China lectures' aan de orde gesteld.

Kalmykova onderbouwde haar argumentatie door middel van empirisch onderzoek. Zij maakte leerlingen van 12-13 jaar volgens een Gal'perinaanse onderwijsmethode vertrouwd met de elementaire natuurkundige begrippen kracht (F), oppervlak (A) en druk (p), inclusief hun relatie zoals samengevat in de formule $p=F/A$. Na de leerfase bleken met name de zwakke leerlingen veel moeite te hebben met ingeklede opgaven waarop het geleerde begripsnetwerkje niet zomaar kon worden losgelaten. Bij deze groep was amper sprake van transfer naar verwante taken.

Gal'perin en zijn medewerkers hebben zich deze kritiek aangetrokken, omdat Kalmykova met haar onderzoek de toepasbaarheid van de methode ter discussie had gesteld. Kalmykova had namelijk een parallelle groep leerlingen hetzelfde begripsnetwerkje geleerd door ze de gelegenheid te geven de begrippen en de formule op eigen kracht te ontdekken. Kalmykova plaatste dus het zelfontdekkende leren naast Gal'perins methode die volgens haar niets anders inhield dan dat de leerinhoud kant en klaar voor inprenting en reproductie aan de leerlingen werd aangeboden. Volgens Kalmykova toonde haar onderzoek aan dat vooral de zwakke leerlingen profiteerde van de zelfontdekkende methode.

Het is duidelijk dat Kalmykova's onderzoek Gal'perin en zijn medewerkers onder druk zette. Het is Obukhova (1968) geweest die de handschoen oppakte en een replicatie-onderzoek opzette om de kritiek te pareren. Obukhova's onderzoek heeft een versnelling teweeg gebracht in de ontwikkeling van het Gal'periaanse onderzoeksprogramma. Tot dan toe hadden Gal'perin en zijn medewerkers vooral onderzoek gedaan naar het leren van afzonderlijke mentale handelingen en begrippen. Bijvoorbeeld, Gal'perin & Talyzina (1961) onderzochten hoe elementaire geometrische begrippen (rechte lijn, hoek, bissectrice e.d) afzonderlijk en achtereenvolgens, de een na de ander, in het onderwijs kunnen worden overgedragen. Hoewel dit vanuit een leerpsychologische invalshoek tot 'volwaardige' leerresultaten leidt (cf. Van Parreren, 1969, p. 196), kan deze aanpak van begripsvorming in het onderwijs maar beperkt worden toegepast. Leerlingen worden namelijk veelal geconfronteerd met leertaken die van hen vragen om vanuit

een begrippennetwerk naar oplossingen te zoeken. Geen afzonderlijke begrippen, maar juist een netwerk van begrippen en hun samenhang in relaties, regels en definities moeten in het onderwijs aan de orde worden gesteld. Volgens Kalmykova vereist dit een andere benadering dan Gal'perin voorstaat.

Obukhova heeft een geslaagde poging gedaan deze benadering ook binnen de Gal'perinaanse aanpak vorm te geven. In haar onderzoek kwam naar voren dat hierbij toch meer kwam kijken dan aanvankelijk door Gal'perin gedacht werd. Het bleek bijvoorbeeld nodig de leerlingen te leren om systematisch de opgave te analyseren, tekeningen en schema's te maken e.d. Dit heeft geleid tot een uitbreiding van de richtlijnen die Gal'perin heeft opgesteld voor de vormgeving van het onderwijsleerproces. In terugblik kan worden gesteld dat Kalmykova's kritiek geleid heeft tot een versnelling en verdieping van het onderzoek binnen de school van Gal'perin.

Ad 3,4 en 5. Nog meer kritiek (Hfdst. 13)

Kalmykova's presentatie van haar onderzoeksresultaten tijdens het 1ste Congres van Sovjetpsychologen in Moskou in 1959 deed veel stof opwaaien en was de aanzet tot een storm van kritiek. Ter plekke werd afgesproken om de discussie voort te zetten in het toonaangevende vakblad *Voprosy psikhologii*. De punten van kritiek die toen maar ook nog in de jaren daaropvolgend aan de orde zijn gekomen, worden in dit proefschrift samenvattend behandeld door ze toe te spitsen op de volgende drie thema's: (1) het conceptuele kader dat Gal'perin ten behoeve van zijn theorie ontworpen heeft; (2) de onderwaardering van leerlingkenmerken; en (3) het feit dat Gal'perin het maken van fouten door leerlingen afwijst.

Ter afsluiting van dit proefschrift wordt in hoofdstuk 13 nader ingegaan op Gal'perins bijdrage aan de onderwijsleerpsychologie. Deze bijdrage ligt vooral in de wijze waarop het concept van 'oriënteren' door Gal'perin wordt opgevat. Tevens wordt aan de hand van twee voorbeelden aangegeven hoe het oriënteren van leerlingen in de leertaak (de 'oriënteringsbasis') praktisch kan worden gerealiseerd. De oriënteringsbasis wordt door Gal'perin opgevat als de sleutel tot de 'systematische vorming van mentale handelingen'. Wezenlijk voor de vormgeving van de oriënteringsbasis zijn de 'reconceptualisering' door de leerling van de leerinhoud en het 'rationele dingschema' om de leerinhoud te representeren en te (re-)construeren. Hierdoor krijgen de leerlingen de beschikking over de middelen waarmee zij zich 'volledig' kunnen oriënteren in de leertaak.

Reconceptualisering houdt in dat de leerling de leerinhoud op een andere manier gaat benaderen dan veelal vanuit de praktijk van alledag voor de hand ligt. De leerinhoud wordt beschouwd en geherinterpreteerd (vandaar: gereconceptualiseerd) vanuit een invalshoek die ontleend wordt aan het betreffende wetenschapsgebied. Dit leidt ertoe dat de leerlingen een 'rationeel dingschema' verwerven, waarmee de objecten benaderd kunnen worden. Bijvoorbeeld, Gal'perin & Georgiev (1969) hebben het meten (i.e. het aanleggen van een maat aan een te meten grootheid) als uitgangspunt gekozen voor een experimentele leergang dat betrekking heeft op de introductie van het getalbegrip. Het kwantitatieve aspect van objecten wordt benaderd vanuit een 'maat' en elk object dat gelijk is aan de maat, wordt beschouwd als 'eenheid': als één. Bijgevolg is 'eenheid' een relationeel begrip, dat afhangt van de gekozen maat. Het getal wordt vervolgens geïntroduceerd als een wiskundig verantwoorde wijze om het resultaat van meethandelingen vast te leggen.

Dit proefschrift sluit af met de opmerking dat de begrippen 'reconceptualisering' en 'rationeel dingschema', net als alle andere begrippen die Gal'perin geïntroduceerd heeft, niet in afzondering beschouwd kunnen worden. De kracht van Gal'perin schuilt juist in de manier waarop hij het complexe proces van interiorisatie vanuit een 'totaalbenadering' aan de orde stelt. Hij heeft een geheel van richtlijnen ontwikkeld waardoor interiorisatie tijdens het onderwijsleerproces optimaal tot stand kan worden gebracht. Het doel van het onderwijsleerproces is de vorming van volwaardige mentale handelingen die, zoals Van Parreren (1988, p. 34) dat genoemd heeft, het 'instrumentarium' leveren voor onze 'cognitieve gereedschapskist'.

