

## **THE ROLE OF MOTOR TRANSFER IN DIDACTICS OF PHYSICAL EDUCATION**

Prof. Dr. Dolfe RAJTMAJER, Pedagogic Faculty, University of Maribor, Slovenia

### **ABSTRACT**

Various transfers have a very important role in psychomotor learning, they regulate the state of homeostasis of a child with the help of the processes of assimilation and accommodation. The younger the child the more important are these processes. Transfer means an improvement of some psychic or motor function due to training of other, similar function. Its effects appear during perception, feelings and especially during learning. The effects are greater if the activities are structurally similar.

Key words: physical education, didactics, learning, transfer

### **1.0 INTRODUCTION**

Studying the problems of transfer is a basic course of pedagogical psychology (Plemenitaš 1983, Vučić 1989, Stevanović 1990). Transfer has namely a very important role in explaining cognition theory. It is no less important in pedagogics, since education comes from the supposition of transfer effects (Stevanović 1990). We try to explain the acquirement of experience of children with various types of transfer and how the children use these experiences in new educational situations. Transfer is often studied in didactics as well. Strmčnik (1996) states that the skills of solving problems are specific to individual subjects and that therefore training for problem solving should not be separated from the subjects in question. In connection with this, he cites Elshout (1987), who thinks "that transfer from the general to the specific is in no way easy".

For the purpose of this study, where we would like to explain the role of transfer in psychomotor learning, it is the results of basic studies of learning transfer which are important - by Thorndike (1930), Gibson (1940), Lashey/Wade (1946), Osgood (1949, 1950), Fuks (1969) and Skinner (1953, 1971, 1973), after Leist (1979) and Hesse (1976), Grissemann (1982) after Steppacher (1987). However, one should not overlook authors of applied researches of motor transfer, mentioned by Steppacher (1987), especially Jockenofner (1979), who studied transfer effects between gross and fine motorics. When studying the relations between motorics and speech the important authors are Hoven, Speth (1980), Borstel (1980), Kiphard (1983), Olbricht (1978), and for the relations between motorics and cognition Ismail (1965, 1967), Bergston (1966), Kirkendal (1968), Ruffer (1965), Slucher (1964), after Rajtmajer (1994) and Zimmer (1981), Planinšec (1995). The results of studies of the relations between motorics and social and emotional characteristics are of course also important, these were presented by Eggert (1975), Sander (1984), Panter (1980), Zimmer (1981) (after Steppacher 1987). The subject of our study is the role of motor transfer in sport didactic theory and praxis.

### **2.0 THEORETICAL BASE OF THE TRANSFER EFFECTS**

The first theory comes from the ideas of Plato, namely that learning improves the ability of speculative cognition (Vučić 1989). Later it was named (1) theory of formal disciplines. It explains transfer in that by learning the mental powers improve by the analogy that work strengthens the body. Thorndike (1901) explained transfer with (2) theory of identical

elements: the more the activities are structurally similar, the greater the transfer (Vučić 1989, Stevanović 1990). This theory is supplemented with (3) theory of generalisation (Judd 1908, Oxendine 1984, Vučić 1989) which, among other things, also takes into account the role of generalisation, knowledge of general principles and methods.

The definition of transfer still bases on Judd's elements of generalisation. Transfer means namely the carrying over of effects from one learned activity to learning and execution of another, similar activity (Pečjak 1975, Plemenitaš 1983). Here Warren feels (Pečjak 1975) that transfer is actually the improvement of some mental or motor function, because of training another, similar function. It is important to know what is being transferred. The thing that is being transferred, as Judd has realised already in 1908, is what is general for the concrete activity: procedure methods, procedures, nature of finding errors, focus, readiness, self confidence (Pečjak 1975, Singer 1985). For motor transfer it could be said that sensory experiences are being transferred, an important role is also played by the motivational and emotional orientation (Leist 1979, Steppacher 1987, Pokrajac 1987 & 1988).

### **3. METHODS**

The basic method of researching transfer is the experimental method of parallel groups (Leist 1979, Kleinman 1983, Oxendine 1984, Singer 1985, Vučić 1989, Stevanović 1990). However, when we are studying correlational relations between the various subsystems of personality - these show the indirect role of transfer - we use the psychometric method, that is the method of testing the abilities and characteristics of a larger number of entities (Strel/Šturm 1981, Zimmer 1981, Rajtmajer 1989 & 1993 & 1997, Videmšek/Cemič 1991, Planinšec 1995, Pišot 1997).

Our study "Role of motor transfer in didactics of physical education" is based on the use of the qualitative method analysis/synthesis. On this basis we are trying to discover the various natures of the motor transfer effects in the psychomotor cognition process. The conclusions of these studies can serve as theoretical starting points for later experimental studies of a quantitative nature. Analysis in this study is based on monitoring more than 800 exercise (physical education) sessions of children from the third to the eleventh year and on more than a decade long experience in studying children of this age group while skiing, playing basketball and in swimming.

### **4. RESULTS AND DISCUSSION**

#### **4.1 Structure of transfer**

Many authors speak of lateral and vertical transfer (Leist 1979, Singer 1985, Vučić 1989, Stevanović 1990, Rajtmajer 1990; 1994; 1996). In lateral transfer the effects come from one to another, similar motor task. The effect is then directly proportional to the level of structural similarity between the two activities. In vertical transfer it is a matter of transfer within the same activity, but from a lower to a higher level. In psychomotor learning of younger children bilateral transfer is also extremely important (Pečjak 1978, Singer 1985, Fischer 1988, Rajtmajer 1990), having its physiological grounds in the hemisphericity of the brain and its complex interconnectedness (Russell 1986, Abraham 1985, Gardner 1995).

Of course great differences exist in the ability of transferring "to the other side". This variability depends on the ability of the entities in spatial and physical-motoric intelligence (Gartner 1995). The problem we identified in analysing more than 800 exercise (physical education) sessions with children and also while teaching swimming, skiing and basketball lies in lateral transfer. The problem is, how practising one activity actually affects the speed and quality of practising (learning) another activity. This is the basic problem of analysis, both of pedagogic psychology, as well as special didactics. It is our assessment that the transfer effects are greater if the children practice more specialised movements, which is in accord with the findings of Fleishman (1963), Kane (1984) and Rajtmajer (1994). We solve the problems of vertical and bilateral transfer in praxis with a methodical procedure using a hierarchically ordered scale of exercises and preparatory exercises and the problems of lateral transfer with scientific studies of the structure of motorics, biomechanics and technique of the individual disciplines.

#### **4.2 Psychomotor learning**

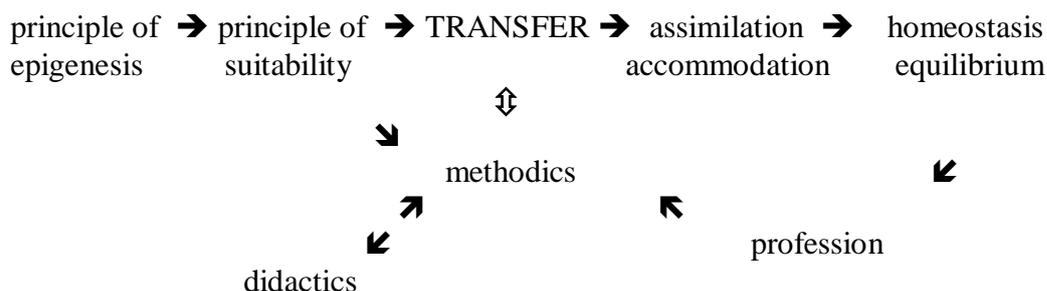
Pečjak (1986) defines psychomotor learning as an incessant changing of movement, which is nicely illustrated by the curve in the learning diagram (Rajtmajer 1990; 1994). The effects of vertical transfer show themselves through the points on the curve, where each previously learned motor movement (or elements of this movement) represent the transfer to the next exercise. Lateral effects on the other hand, show themselves through the influence of other activities that enable the child not to start some new movement at the point 0 (beginning of the learning curve). Beginners in swimming as a rule do start the learning process at point 0, this is the reason why educating non-swimmers is such a demanding and strenuous psychomotor process.

Didactically properly organised motor learning with younger children is strongly emotional and social learning (Praper 1981, Rajtmajer 1990), being regulated by processes of feeling comfort and the influences of the group. If motor learning is to be successful previous perceptive (sensory) and motor experiences are important. Cratty (1984) feels that perception is a process of organising and decoding sensory information. This ability is then being transferred between similar activities. Straus and Weizsacker (1950, after Trstenjak 1994) stressed the unity of perception and motorics. However, Trstenjak thinks that this unity of perception and movement exists on a psychological plane, while on the biologic plane they are separate. Therefore a richer repertoire of perceptions gives the child greater possibilities in the initial stages of learning. For such children, the effects of lateral transfer shall be greater at the beginning. Because this speeds up the auto-activity of the child, the effects of motor learning will be faster and greater (especially if the child also develops his/her motor abilities in parallel).

#### **4.3 Model of the role of transfer in the motor learning process**

Our multi-year observations of children learning basic (exercises and physical education classes in a playroom, gym, sports court etc.) and specific knowledge (learning how to swim; ski, ball games) led us to a model that nicely shows the role of transfer (Rajtmajer 1994b). This role manifests itself through the processes of assimilation and accommodation, which - if we follow the principles of epigenesis - lead to a psychological and biological balance of the child in the learning process. A proper ration of the processes of assimilation and accommodation, enabled by transfer effects, create in the child the so-important homeostatic state (equilibrium after Piaget; Labinowitz 1989), without which a successful learning would

be threatened.



#### 4.4 Motor transfer in Slovene didactic theory

A lack of studies, discussions and researches on the role of transfer in the Slovene sports-didactic theory shows how little we realise the importance of this psychic phenomenon. Even if some studies on the indirect role of transfer do exist - that is the lateral transfer between the individual subsystems of the child's personality (Vauhnik 1985, Strel/Šturm 1981, Videmšek/Cemič 1991, Planinšec 1995 and others) - there is a lack here of direct basic and applicative researches on the role of transfer effects in educational praxis. This void is being at least partly filled with this and two older studies, published in the 2nd book *Metodika telesne vzgoje* (Methodics of Physical Education)(Rajtmajer 1990) and in the periodical *Educa* (Rajtmajer 1994).

Our empirical studies augmented with the results of researches from abroad show the very important and complex role of transfer in psychomotor learning. We have already mentioned that with young children the cognitive process is regulated by the principle of epigenesis, to which all didactic-methodic work of practitioners should be subservient. This principle (axiom) says that all further development of the child is based on his/her previous experiences (Marjanovič-Umek, conception of pre-school education). From this principle we derive the principle of adequacy of contents and procedures, which - in case of a good practitioner - gives the child at the very start of the learning process a favourable "working climate".

In the case of lateral transfer we find great transfer effects between roller-skating and skiing, between alpine skiing and the free (gliding) technique of ski-running (Rajtmajer 1986), between systems of co-ordination (dexterity on the floor) and ball games, skiing-slalom and acrobatic skiing, between the system of reciprocal enervation which regulates locomotorics and cyclic sports (swimming, ski-running and partly also with alpine skiing - change over technique). Bilateral effects of transfer show themselves in learning ball games and other manipulative activities of the child.

#### 5. REFERENCES

1. Abraham H.: *Zavoj proti desni*. ZVUTS Slovenije, Ljubljana, 1985, 18-25
2. Herm S.: *Psychomotorische Spiele*. FIPP-Ferlag, Berlin, 1991, 32-36
3. Gradner H.: *Razsežnosti uma, Teorija o več inteligencah*. Tangram, Ljubljana, 1995, 205-270
4. Fischer K.: *Rechts-Links Probleme in Sport und Training*. Hofmann Schorndorf, 1988, 116-146
5. Irmisher T und E.: (Red,) *Bewegung und Sprache*. Band 7, Hofmann Schorndorf, Marburg,

- 1987, 9-62, 96-102
6. Kane D.E.: Ličnost, pojem o telu i ponašanje. Psihologija i sport, Nolit, Beograd, 1984, 143-190
  7. Kleinman M.: The Acquisition of Motor Skill. B. Company, USA, N.Jersey, 1983, 81-109
  8. Labinowitz E.: Izvirni Piaget, mišljenje-učenje-poučevanje. DZS, Ljubljana, 1989, 244-255
  9. Leist K.H.: Transfer im Sport. Band 72, Hofmann Schorndorf, 1979, 25-45, 60-65
  10. Oxendine J.B.: Psychology of Motor learning, N. Jersey, USA, 1984, 130-159
  11. Plemenitaš J.: Pedagoška psihologija. PeF Maribor, 1983, 127-134
  12. Pokrajac b.: Emocije i motorna uspešnost. 1 in 3 del Psihologija, SDP Srbije, Beograd, 3-4/1987, 79-91, 3/1988 73-86
  13. Rajtmajer D.: Tek na smučeh. ZO Maribor, 1986, 58-64
  14. Rajtmajer D.: Metodika telesne vzgoje. 2. knjiga, PeF Maribor, 1990, 43-70
  15. Rajtmajer D.: Psihomotorično učenje, Odnosi med splošnimi in specifičnimi vsebinami. EDUCA, Nova Gorica, 3/1994a 124-131
  16. Rajtmajer D.: Izbrana poglavja iz pedagogike in didaktike športa, PeF Maribor, 1994b 9-11, 77-101
  17. Russell P.: Knjiga o možganih. DZS, Ljubljana, 1987, 47-57
  18. Singer R.N.: Motorische Lernen und menschliche Leistung. Limpert, B. Homburg, 1985, 451-465
  19. Stevanović B.: Pedagoška psihologija. SD Srbije, 1990, 77-85
  20. Steppacher J.: Psychomotorische Forderung bei leicher geistiger Behinderung. Band 5, Berlin, 1987, 192-207
  21. Vučić L.: Pedagoška psihologija. SD Srbije, Beograd, 1989, 112-132
  22. Zimmer R.: Motorik und Persönlichkeitsentwicklung bei Kindern im Vorschulalter. Band 80/81, Hofmann Schorndorf, 1981, 31-37