

# Developmental Theories: The Role of Genetic and Environmental Influences in Childhood, Classic and Modern Developmental Theories

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## ABSTRACT

This text begins with an outline of the nature-nurture debate. Next, it introduces the six key theories of developmental psychology: Freud, Erikson, Piaget, Vygotsky, and Bowlby, and the social learning theory (SLT). Some of the theories presented focus on personality as a whole, while others refer mainly to cognitive development, socialisation, etc. Some take firm positions on stages (Piaget, Freud, and Erikson), others do not (Vygotsky and Bowlby), and some do not even include stages in their conceptual corpus (SLT). Erikson's theory covers the entire life course, while other theories cover stages up to maturity. Sources of the individual theories are indicated: clinical work for the theories of Freud and Erikson, the epistemological problem for Piaget's theory, Marxism for Vygotsky's theory, and a combination of two traditions (stimulus-response learning theory and psychoanalysis) for SLT. The general propositions of the key theories are presented, followed by specific issues of psychological development. The text comments on each theory's developmental factors: biological, environmental (physical, social, cultural), and individual activity. An outline of two further orientations in developmental psychology is provided at the end.

## KEYWORDS

factors of development, stages of development, learning and maturation, attachment, imitation

## 1. Nature vs. Nurture

Developmental psychology was established as a separate discipline<sup>1</sup> in the last quarter of the 19<sup>th</sup> century. Since then it has added many theories to its "fund". These theories differ based on the solutions they offer to several fundamental questions about development. Is development quantitative or qualitative, continuous or discontinuous, modular or holistic, and contextual or universal? What is the role of the individual and what is the role of social interaction in development?

1 Cairns, 1998, pp. 25–105.

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Is psychological development determined by heredity or the environment? This remains a question of the greatest and timeless importance. It is even older than developmental psychology itself.

In the field of development, this question often arises in terms of maturation and experience: Does novelty in the developmental course appear because of genetically programmed neurophysiological maturation or learning? In the beginnings of the developmental psychology fields, biological science was used as a model for psychological theorising about development. The theory of embryogenesis served as the basis for theories about stage-like psychological development:<sup>2</sup> That is, development has stages, which are invariable in order and universal, and the final stage is reached before maturity. Freud, Erikson, and Piaget incorporated such a conception. However, not one of them adhered to the principle of preformism, the idea that everything that will appear later on in life exists in prototypical form in the germ cell. Instead of preformism, these theorists accepted, in one way or another, the principle of epigenesis, according to which development is determined not only by the initial content but also moments (experiences) that appear later during interaction with the environment. Piaget attached more importance to the later experiences than Freud; Freud believed that the most important experiences occurred in the first five years, and that they permanently determined the personality (hence the saying, “The child is the father of man”).

With the principle of epigenesis, the biology-culture, nature-nurture, and innate-acquired relationships are not set in the form of either-or, but rather inclusively, in the form of and-and. In other words, the principle of interaction between genes and the environment was adopted. Of the theorists presented below, Vygotsky and social learning theorists attributed the least significance to inheritance in that interaction.

If it is considered that genes and the environment are not independent but correlated, then there are three types of interaction<sup>3</sup>. *Passive interaction* occurs where parents provide the child with an environment that matches his genotype. If the parents are intelligent, they will provide the child with various books and engage in intelligent conversation. Thus, the child receives not only genes similar to the parents, but also a suitable environment. *Active interaction* occurs when a child seeks an environment that matches his genotype: if intelligent, he will spend time with intelligent peers, and if he likes sports, he will join sports groups. *Reactive-evocative interaction* occurs when a child with certain genetic tendencies influences a positive reaction from the environment that further strengthens those tendencies.

The role of individual activity is not seen only in postnatal life. For example, if the egg shell is removed and the chick is injected with an agent that immobilises its leg movements, the chick will not develop normal walking after hatching.

The extent to which genes and the environment influence behaviour is examined, among other things, through the methods of behavioural or quantitative genetics.

2 Ibid.

3 Workman and Reader, 2021, p. 152.

These studies especially examine monozygotic twins raised in the same and different environments. Statistical procedures determine the extent to which of the variance in the measured values of a phenotypic trait can be attributed to genetic or to environmental variability. The results show that 40–50% of the phenotypic variance can be explained by genetic variability. It is important to know that the influence of an intrauterine environment also exists (it accounting for up to 20% of the non-genetic variance). Various nutrients reach the mother's bloodstream. If they are harmful, they may cause permanent damage to the embryo. The case of the drug thalidomide is well known, as it leads to severe damage if the mother takes it 20–37 days after conception.

**Table 1.** Genetic and environmental influences on antisocial behaviour<sup>4</sup>

Behavioural genetic studies on antisocial behaviour (AB) of children and young people have been conducted on families, twins and adopted children. These studies convincingly demonstrated that approximately 50% of the phenotypic variance in AB can be explained by genetic influences; the remaining half of the variance can be attributed to both shared and non-shared environmental influences<sup>5</sup>. The genetic origin of variance was estimated statistically by using phenotypic similarity across individuals with different degrees of genetic and environmental sharing. We can call these studies G+E studies, because they treat the genetic and environmental components additively. However, genes and the environment can be correlated, and studies that estimate G and E interaction (GxE) are needed. Gard, Dotterer and Hyde<sup>6</sup> believed that research with a more complex design is needed, because AB is not homogeneous (aggression is dominant in some subtypes, and rule-breaking is dominant in others) and because aversive environmental events associated with AB occur at different ages.

Behavioural genetic studies cannot identify specific genetic markers for AB. Advances in molecular genetics have made it possible to identify individual genomic variants (candidate genes [-cG]) associated with a risk for AB. Thus, cGxE studies appeared. Of particular importance are hypothesis-free genome-wide association studies, which involved surveying the genomes of many people. They used large sample sizes (even tens and hundreds of thousands of individuals), to identify genes with small but significant contribution to AB. The first cGxE studies focused, as expected, on genes involved in the regulation of dopamine, serotonin, and epinephrine hormonal systems. It can be said that this field of research is very dynamic today.

## 2. Psychoanalytic Theory of Sigmund Freud

Sigmund Freud (1856–1939) was a neurologist who dealt with the psychotherapy of adults who were neurotic. Based on the gained knowledge, he applied hypnosis and then the free association technique, to formulate and over time refined one of the most influential theories of personality development.<sup>7</sup>

4 Author's own work.

5 Tuvblad and Beraver, 2013, pp. 273–276.

6 Gard, Dotterer and Hyde, 2019, pp. 46–55.

7 Freud, 1933, 1940.

Freud did not believe that the environment played a significant role in development, but that the role of instinctual drive forces was crucial. He distinguished two groups of drives. One group consists of self-preservation drives, including the sexual drive. Freud called those drives *Eros*, and the energy of the drives as *libido*. Freud's sexual drive is understood very broadly, far from what is directly or indirectly connected with reproduction. The second group consists of death or self-destruction drives, which were later called *Thanatos*. Drives strive for unconditional satisfaction, and the death drive, under the early influence of *Eros*, turns outward and manifests itself as aggressiveness.

These drives meet the demands of the social environment early in childhood, primarily in the form of parental prohibitions. Freud's work with adults showed that the origin of neurotic disorders lies in early childhood and the ways in which parents treated children's drives. Freud believed that experiences during the first five years were crucial.

Development takes place through stages. Each stage is marked by one dominant feature, the body's erogenous zone. In the first (*oral*) stage, the oral cavity becomes the dominant zone. In the beginning, libido has no object: it is free-floating, and so it relies on the function of feeding, that is, taking milk from the mother's breasts. Thus, sucking becomes the first pleasure source in life, and the mother's breast becomes the primary object. Near the end of the first year, the libido moves to the anus, and so retention of faeces or emptying of bowels (*anal stage*) acquires libidinous value. The third stage is *phallic* (3–5 years). With the transfer of libido to the genital organ, the male child enters an Oedipal situation: sexual desire towards the mother and rivalry with the father appear (in girls, a similar situation is called the Elektra complex). The Oedipal situation is resolved around the age of five by identifying with the father (more precisely, with the father's superego) and later shifting sexual interest from the mother to other persons. By resolving the Oedipal situation, the child enters the *stage of latency*, the state of rest of the driving forces. In adolescence, the sexual drive and Oedipal conflict are reawakened, after which the fifth, *genital*, stage is reached, which is the most mature stage in normal psychosexual development. The young person transfers the sexual drive from the opposite-sex parent and identifies with the same-sex parent's superego.

Freud's theory is not structuralist like Piaget's, but Freud talks about the three-part structure of personality: id, ego and superego. These parts are not distinctly separated from each other but are mutually merged. Driving forces do not go to the muscular system and external objects directly: they are mediated by these structures and their interrelationships. At the beginning of development, there is only the id, made up of driving forces and desires. The id is the basic source of psychic energy. It strives for immediate and prompt satisfaction, in accordance with the pleasure principle. It contains the primary-process thought: when the object that provides satisfaction (e.g., the mother's breast) is not immediately available, hallucinatory satisfaction is resorted to. Over time, the ego develops, because the id is not always able to produce satisfaction. The ego uses energy borrowed from the

id. The ego has the secondary-process thought (perception, thinking, and problem solving) whose goal is to test reality (the reality principle). The ego also provides a delay in satisfaction and adaptation. The ego serves three masters: the id, superego, and reality. When rational processes fail to find the solution, anxiety arises, which is overcome by *defence mechanisms*: suppression, projection, reactive formation, and fixation. The superego develops last. It arises from the resolution of the Oedipal situation and identification with the same-sex parent. It has two parts. One is conscience (i.e. parental prohibitions) which is mostly negative. The other part, the ego ideal, is positive.

In the topological sense, Freud distinguished three types of processes: conscious, preconscious, and unconscious. Consciousness is what a person perceives at one moment. The preconscious is not distinctly separated from consciousness and, under certain conditions, gains access to consciousness. Unconsciousness was created in the course of individual history by mechanical suppression and can come to the consciousness by dialling down the ego, weakening the defence mechanisms or undergoing the conditions of psychotherapy.

During Freud's lifetime, there were minor or major deviations by some of his students and collaborators, such as A. Adler, S. Ferenczi, K. Horney, M. Klein, and C. G. Jung. Carl Gustav Jung went the furthest of all of them, creating his original theory called *analytical psychology*. Today, psychoanalysis has moved very far from Freud's ideas.

### 3. Theory of Erik Erikson

Erik H. Erikson (1902–1994) was also a psychoanalyst. He did not create a psychosexual theory but a *theory of psychosocial development*, because he gave the social relationships of the developing child the greatest importance.<sup>8</sup> Relationships with the caretaker, usually the mother, are especially important in early childhood. Erikson also differed from Freud as his theory encompassed the entire life, from birth to death, and not just the genital stage. In addition, Erikson did not believe that the early years are crucial or that nothing significant happens afterwards: development is influenced by what happens during the entire life course. According to Erikson, development takes place through eight stages, which cannot be skipped or changed in order. At each stage, the child encounters a new, specific developmental task. At the centre of each stage is a *normative crisis*. Each well-solved crisis leads to further development and better coping with the next crisis and the next developmental tasks. Unresolved crises can halt the development and cause major or minor problems in life. Erikson distinguished the following eight developmental stages:

- Stage 1: Trust vs. mistrust (birth to 18 months)

8 Erikson, 1968.

- Stage 2: Autonomy vs. shame and doubt (18 months to 3 years)
- Stage 3: Initiative vs. guilt (3 to 5 years)
- Stage 4: Industry vs. inferiority (6 to 11 years)
- Stage 5: Identity vs. confusion (12 to 18 years)
- Stage 6: Intimacy vs. isolation (18 to 40 years)
- Stage 7: Generativity vs. stagnation (40 to 65 years)
- Stage 8: Integrity vs. despair (65 years to death)

Erikson was not the first psychologist to talk about identity, but he was the one who strongly demonstrated the importance of identity.<sup>9</sup> His ideas about identity and identity crisis inspired numerous empirical studies on identity formation, the most significant of which are linked to the name of Gabriel Marcia.<sup>10</sup> Marcia singled out two basic dimensions of achieving identity in Erikson's work: exploration (crisis) and commitment. By crossing them, he obtained empirically validated four identity statuses: identity achievement, foreclosed, moratorium,<sup>11</sup> and identity diffusion. From his first works until today, research has spread worldwide in terms of different aspects of identity, such as sexual, professional, and religious.

#### 4. Theory of Jean Piaget

Initially interested in biology, Jean Piaget (1896–1980) turned his attention to the epistemological issues surrounding the origin of knowledge. Disputes between rationalists and empiricists in epistemology led Piaget to conclude that the solution to this problem should be sought in human ontogenesis, not through philosophical speculation but through the scientific method (hence, his theory is also called *genetic epistemology*).<sup>12</sup> This led Piaget to the field of developmental psychology.

Piaget's theory is one of the best examples of the theory of stages. Each stage is a complete and qualitatively different organisation of intellectual functioning. Stages are defined by a specific structure and degree of equilibrium reached. Development involves moving from one stage to another, without skipping or detours. Piaget distinguished the following four global stages:<sup>13</sup>

- Sensorimotor stage, from birth to 1.5 to 2 years of life
- Preoperational stage, from 1.5 or 2 to 7 years
- Concrete operational stage, from 7 to 11–12 years
- Formal operational stage, from 11–12 to 14–15 years.

9 Erikson, 1980.

10 Marcia, 1966, pp. 551–558.

11 A moratorium person is in a period of severe identity crisis and is not yet able to make commitments.

12 Piaget, 1971.

13 Piaget, 1967; Piaget and Inhelder, 1969.

The initial point of ontogeny for Piaget is biological. The birth of a child brings the processes of assimilation and accommodation, as well as the factor of equilibration, which is both a motivational and formative factor of development. Along with the physical and social environment and the individual's activity, equilibration acts during the entire course of development. Thus, cognitive development is in a way an extension of the biological one: equilibration continues to balance the processes of accommodation and assimilation (giving adaptation) and maturational and environmental factors. This is why Piaget's theory is labeled as interactionist; it is about the interaction between heredity and the environment.

Development in the first, sensorimotor period takes place through six phases.<sup>14</sup> Immediately after birth, innate reflexes start to function. Over time, *action schemes* emerge from reflexes as the first mental units. They are capable of generalization (i.e. transfer to a new stimuli) and of combining with other schemes, building the first topological structure at the end of the sensorimotor period. In this period, the whole psychic life is limited to the "here and now"- situation and consists of the coordination of *perception and movement*. In the fourth phase, several different action schemes are coordinated into complete acts – such as when the first intelligent acts arise, and when there is a distinction between objects-means and objects-goals and *intentions*. This is also when the first *epistemic categories* emerge: scheme of object permanence, objectified causality, and continuous space and time. At the end of the sensorimotor period, semiotic means appear, especially words, and so mental development is transferred from the sensorimotor to a new, symbolic level.

In the preoperational period, the units the intellect deals with are *symbolic* (mental images, and words). Thinking in this period is guided by prominent perceptual dimensions and is called intuitive. Intuitive thought is neither reversible<sup>15</sup> nor composable, but it is, like the operation, interiorised, from the action plan to the mental one. The child is not sensitive to contradictions and does not distinguish between a verbal symbol and a referent.

Indicators of the concrete operations are the *concepts of conservation*: conservation of quantity, weight and volume of matter, conservation of surface, etc. The operations of classification and seriation also arise around the age of seven years, as does the operational concept of number. Reversible, interiorised and composable operations are called concrete because they are performed and depend on the content: they will be performed successfully for some contents but not for others.

14 Piaget, 1977, 1936.

15 Reversibility refers to the ability to mentally reverse or undo an action, process, or operation.

**Table 2.** Conserveation of quantity<sup>16</sup>

Piaget constructed about 400 tasks to examine thinking during the child's development. One most famous is the task for testing the conservation of the quantity of matter. Two glasses of the same size and shape, A and B, are taken, and the same amount of juice is poured into each of them in front of the child. When the child confirms that there is the same amount of juice in both glasses, juice from one of those glasses, B, is poured in front of the child into the third glass, C, which is thinner and taller than the first two. The child must now compare the amounts of juice in glasses A and C. The child under the age of 7 claims that there is more juice in glass C, pointing to the level of liquid in it. The child's judgment is guided by the perceptually prominent difference. A child older than 7 years will claim that there is the same amount of juice in glasses A and C and will justify his judgement by claiming that it is the same juice or that nothing has been added or taken away or by claiming that if we pour the juice back in glass B, there will be the same amount of juice (clear evidence of mental reversibility). Weight conservation is tested with other material, but it occurs later, at the age of 8–9 years. Volume conservation occurs even later, at 10–11 years of age.<sup>17</sup>

Formal operations are performed with *propositions*. At this stage, understanding of the relationship between real and the possible has changed: now, the real is only a part of the possible. Numerous innovations in intellectual functioning are emerging, such as: hypothetical-deductive thinking, understanding of probability, experimental thinking, and building theories.

Piaget attempted to apply his theory to the development of moral reasoning<sup>18</sup> but failed to confirm the existence of stages. Instead, he found that there were two processes, heteronomy and autonomy,<sup>19</sup> where autonomy gradually overpowers heteronomy with age. However, the Piagetian theory of the development of moral thinking was developed by Lawrence Kohlberg, who empirically confirmed the existence of six stages defined structurally.<sup>20</sup> It should be noted that studies regularly confirm that moral reasoning lags behind logical-mathematical reasoning by several years.

Over time, there were certain changes in Piaget's theory. Moreover, two neo-Piagetian authors tried to combine Piaget's theory with the information-processing theory.<sup>21</sup>

The theories of both Piaget and Vygotsky have been applied significantly in education.<sup>22</sup>

16 Author's own work.

17 Piaget and Inhelder, 1969.

18 Piaget, 1977/1932.

19 Heteronomy and autonomy for Piaget do not have the same meaning as for I. Kant. Piaget used the notion of heteronomy to include developmentally immature moral ideas: moral realism, objective responsibility, collective responsibility, immanent justice, expiatory punishment. Conversely, autonomy included more mature ideas: subjective and individual responsibility, reciprocal punishment, equity distributive justice etc.

20 Colby and Kohlberg, 1987.

21 Case, 1998, pp. 745–800; Fisher and Bidel, 2006, pp. 313–399.

22 DeVries, 2000, pp. 187–213.

## 5. Social Learning Theory

Social learning theory (SLT) started taking shape in the years before the World War II in the USA, through the works of Dollard, Miller, Sears, and others. Although the SLT cannot be attributed to one author, Robert Sears,<sup>23</sup> and Albert Bandura have played a special role in its formation. Emergence of the SLT can be understood as an effort to combine two traditions, the stimulus-response (S-R) learning theory and psychoanalysis. The first social learning theorists took the concepts and constructs from psychoanalysis (dependency, identification, aggression, conscience, and guilt), and objective methods of registering and measuring variables from the learning theory, as well as the S-R principles of learning for explanation. Experimental laboratories, as well as non-experimental research are used in the verification of hypotheses selected from the field of psychoanalysis. In addition, the SLT introduced *social reinforcers*, such as the presence of the mother, verbal praise, non-verbal signs of approval, and peers, as very important. Over time, researchers began to explore another direction of influence, from the child to the parent.<sup>24</sup>

Early research was driven by these authors' ambition to objectively collect data on a large number of environmental factors, so as to explain personality entirely. Hereditary factors were given minimal importance. 'The guiding belief of social learning theorists was that personality is learned'.<sup>25</sup> However, researchers (e.g. Sears, Maccoby, and Levin)<sup>26</sup> often obtained low correlations between parental practices and children's behaviour.

Much information was gathered on environmental factors, particularly regarding parental activities, in non-experimental studies. Different writers proposed different approaches to organise the huge amount of gathered data on parental activities into more manageable units (variables). Some created *parenting styles* and some *disciplinary techniques*,<sup>27</sup> while others singled out special *dimensions*. Diana Baumrind<sup>28</sup> combined the two dimensions of parental disciplinary behaviour towards children (demanding-undemanding and warmth-cold), thus identifying four parenting styles: authoritative (demanding with warmth and accepting), authoritarian (demanding with cold and unaccepting), permissive (undemanding with warmth and accepting), and neglectful (undemanding with cold and unaccepting). Her approach inspired a research practice still relevant<sup>29</sup> in different cultural groups.<sup>30</sup>

23 Grusec, 1992, pp. 776–786; Sears, 1951, pp. 476–483.

24 Hoffman, 2000, p. 169.

25 Miller, 2011, p. 232.

26 Sears, Maccoby, and Levin, 1957.

27 See: Hoffman, 2000, pp. 140–172.

28 Baumrind, 1971, pp. 1–103.

29 Baumrind, 2013, pp. 11–34.

30 Pinquart and Kauser, 2018, pp. 75–100.

The use of unidirectional transparent glass gave a great boost to SLT researchers, which, among other things, led to the flourishing of SLT, especially during the 1960s and 1970s. A mobile laboratory with two rooms was constructed, one in which the experimenter and child created experimental conditions and the other in which the experimenter went to observe and measure the child's behaviour without being noticed. In such investigations of children's morality, different indicators of conscience<sup>31</sup> were used, which were connected with experimentally manipulated finer variables, such as various parameters of punishment (intensity, timing, and delay), relationship with the child (warm-cold), and rationale (or reasoning), to determine their influence on the strength of resistance to temptation as an indicator of conscience.

SLT is not just one theory but several theories of a wider and narrower domain. SL theorists do not see development as occurring through stages: they believe that learning mechanisms are also developmental mechanisms, and development consists of modifying a behaviour and creating a new one. Socialisation, as a process of matching behaviour with the demands of the social environment and acquiring internal control over behavior, is the main subject of interest of these authors.<sup>32</sup> Through decades of work, these authors expanded the forms of social learning by adding observational and imitative learning.

The morality and social behaviour of children are affected by not only rewards and punishments directly assigned to them but also by indirect punishments and rewards assigned to the observed models.<sup>33</sup> Albert Bandura and his collaborators studied the influence of the model the most. In a classic experiment, a group of children was shown the behaviour of an adult hitting a Bobo rubber doll in a specific way, while using specific verbal statements. When the children were then left alone with the Bobo doll, it was noticed that they imitated the model's behavior, hitting the doll in the same way and saying what they heard: 'Stupid ball', 'Right in the nose' etc.<sup>34</sup> Bandura called this method of learning *vicarious conditioning*. In this way, children can acquire completely new forms of behavior, which cannot be done through classical or operant conditioning. In numerous experiments, various characteristics of the model were identified that increase or decrease imitation, such as: consequences to the model (reward or punishment); the model's reputation, power, competence, resemblance to the child, and attitude towards the child; and characteristics of the child (intelligence, personality traits, and self-esteem).

Over time, Bandura developed the view that developing children acquire and change behaviours in very complex ways, including through cognitive processes. Accordingly, he called his theory the *social cognitive theory*.<sup>35</sup> Bandura attributed a central role to observational learning, saying that children learn the most by observing different models (live and in the media), reading books, etc. Children combine

31 Hoffman and Saltzstein, 1967, pp. 45–57.

32 Grusec, 2019, pp. 776–786.

33 A model is a person exhibiting the behaviour to be imitated by the others.

34 Bandura, Ross and Ross, 1961, pp. 575–582.

35 Bandura, 1989.

information gathered from these different sources, creating behaviours that get increasingly complex with age.

## 6. Socio-Cultural Theory of Vygotsky

Lev Semyonovich Vygotsky (1896–1934) was a Soviet psychologist, one of several who sought to create the Marxist psychology.

For Vygotsky, the organic evolution of the animal species occurred, until man emerged, accompanied with the evolution of behaviour.<sup>36</sup> Instincts, conditioned reflexes, and (practical) intelligence emerged during evolution as a form of behaviour. All these behaviours before the emergence of man are subject to the principle of signalisation (I.P. Pavlov) and the S-R scheme. With the emergence of *Homo sapiens*, the structure of behaviour changed so that a sign was inserted between the stimulus and reaction as an intermediary (principle of signification), which corresponds with the new scheme “stimulus-sign-reaction” or S-Sg-R.<sup>37</sup> Then, *history* begins, in which changes in behaviour and psychological functioning rested on historically changing sign systems and tools (*culture*). Vygotsky believed that all organic changes were completed with the emergence of *Homo sapiens*, that evolution was completely replaced by history, and that human nature as a whole is a historical product.

This is the most general framework for several particular theories on mental ontogeny. The main and most developed theory has as its subject the development of *higher psychological functions* (HPFs). In each HPFs, speech has the most important place and the greatest attention is paid to speech, as well as its relations with thinking. Besides, another mediator in man’s relationship with the environment are tools, which also determine ontogenesis. Further, Vygotsky provided a periodisation of development, with an elaborate study of stable and crisis periods.<sup>38</sup> His theory<sup>39</sup> also includes detours, that is, paths that culture has introduced into the development of persons with disabilities.

Unlike evolution and history, where the transition is sudden and sharp, the transition in ontogenesis is gradual. For the first year of life, Vygotsky talks about the natural type of development. This type corresponds with evolution. Natural development comprises neurophysiological maturation, with the principle of signalisation and the S-R scheme. At the end of the first year, with the development of speech, the cultural type of development begins, involving the principle of signification and the S-Sg-R scheme. However, neurophysiological maturation continues, so Vygotsky speaks of the dual influence of ‘the child’s activity system’.<sup>40</sup> Still, cultural development is as clearly different from natural development as history is from evolution.

36 Vygotsky, 1983, p. 26.

37 Ibid. pp. 79–83.

38 Vygotsky, 1984a, pp. 243–385.

39 Vygotsky, 1984b.

40 Vygotsky, 1983, p. 34.

The second intermediate assumption is regarding the *source* of development, which is determined differently, as the: ideal cultural form,<sup>41</sup> social environment,<sup>42</sup> learning,<sup>43</sup> or training.<sup>44</sup> The next middle-level assumption speaks of the allomorphic principle of cultural development,<sup>45</sup> which means that development rests on something that is external to the personality – on sign systems and tools, which are of external, socio-cultural origin. Of course, along with such statements, there is an appropriate solution to the issue of the mechanism of development: Vygotsky sees it in imitation.<sup>46</sup> Along with imitation as the main mechanism of development, there is also an assumption about the necessity of asymmetric interaction. Asymmetric interaction occurs between a child and someone else (adult or older child) with higher developmental achievement. Finally, this group of assumptions also includes learning that precedes and drives development. The concept of the *zone of proximal development (ZPD)* is also in line with the middle-level assumptions. ZPD is defined as the difference between what a child can do alone (e.g. in solving some type of task) and what he can do with the help of an adult. The size of the zone determines the dynamics of individual development.<sup>47</sup>

These propositions provided adequate reasons for many to consider Vygotsky's theory as a theory of cultural acquisition and not a theory of development.

With the main assumptions regarding *the sociogenesis of the HPF*, we move on to the field of individual functions. This assumption is understood as a kind of formula and is core statement of the Marxist Vygotsky: 'every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)'.<sup>48</sup> Each HPF arises in a real social relationship and then interiorises at a certain age. Here are two examples. Thinking arises from disputes between children,<sup>49</sup> while will arises from commanding.<sup>50</sup> Therefore, the real social relationship and the speech used in that relationship are the root of every HPF. Speech is the basic content of every HPF, thanks to which a person gains awareness, willingness, and self-regulation of his psychological processes and behaviour.

Since speech is of central importance for development, it is natural that Vygotsky paid special attention, through empirical research, to the development of speech and the relationship between speech and thinking at certain ages.

41 Vygotsky, 1984a, p.356.

42 Ibid. p. 258.

43 Vygotsky, 1982b, p. 252.

44 Ibid. p. 199.

45 Vygotsky, 1983, p. 146.

46 Vygotsky, 1982b, pp. 250–251; 1983, p. 131.

47 Ibid., p. 247.

48 Vygotsky, 1983, p. 114.

49 Vygotsky, 1984a, p. 222.

50 Vygotsky, 1982b, p. 465.

Both these functions have separate roots in the natural period,<sup>51</sup> and for a while, the development of these two functions takes place independently. At some point, they partially merge when a spoken thought or intellectual speech arises.

When we observe only the development of speech as HPF, we see that, at the beginning, there is *social speech* (loud speech addressed to others), after which (around the age of three) *egocentric speech* (a term taken from Piaget) appears as a private loud speech not directed to others but as speech for oneself.<sup>52</sup> Egocentric speech disappears around the age of seven years with ‘transitions inside’, and *inner speech* arises; along with it comes thinking in the true sense of the word. Private loud speech is the middle link between social and inner speech. Thus, we see how the former social relationship (interpsychic category) is transformed into an intrapsychic category through individualisation of the function (private speech).

**Table 3.** Empirical research on the development of concepts<sup>53</sup>

Vygotsky used the so-called dual stimulation test to investigate the development of concepts. The test consists of 22 figures with six different shapes, painted with five different colours. It is a perceptual stimulation. Each figure has one of four different words written on the bottom: fik, lag, sev and mur. This is another stimulation. Figures can be classified into four groups using two parameters, height and size. The child should sort all the figures into 4 groups and explain each of his decisions. In this way, syncretism (the connection between elements is random, subjective and unstable), complexes (the connection is perceptible and unstable) and concepts (the connection is stable and abstract) were discovered.<sup>54</sup>

The development of spontaneous and scientific concepts also attracted Vygotsky’s attention.<sup>55</sup> Spontaneous concepts arise in everyday life through spoken interactions, they are rich in experience but are unconscious. Scientific concepts, on the other hand, are concepts of science, they are brought into children’s lives at school through verbal definitions, but they lack experience and are self-conscious (i.e. the child can define them). According to this author, scientific concepts surpass the development of spontaneous concepts and make the latter develop faster than they would on their own, because they are part of the system and act within the ZPD.

Today, Vygotsky’s work is considered one of the most influential in developmental psychology, and education. Together with related theoretical approaches, it belongs to the category of co-constructivist approaches in psychology.

51 Ibid. p. 105.

52 Ibid. pp. 46–58; pp. 317–331.

53 Author’s own work.

54 Vygotsky, 1982b, pp. 118–184.

55 Ibid., pp. 184–317.

## 7. Bowlby's Theory of Attachment

John Bowlby (1907–1990) was a British psychiatrist and psychoanalyst who did not create a broader theory like Freud or Piaget, but his narrow-scope theory had and still has a great influence on the psychology field. Bowlby has long dealt with problems arising from the child's tie to his mother. While working on them, he realised that the theoretical solutions of psychoanalysis and SLT were not adequate. Bowlby turned to the ethological theory and the theory of control systems, where he found more adequate theoretical solutions. Based on his familiarity with these theories, in 1958, Bowlby published his new opinion in the work 'The Nature of the Child's Tie to his Mother'. The following year, zoo psychologist H. Harlow published his work investigating the attachment of young rhesus monkeys, with views close to Bowlby's.<sup>56</sup> Bowlby presented his theory in more detail in three volumes in 1959, 1973, and 1980.

Starting from ethology, Bowlby defined attachment<sup>57</sup> as a *system of behaviour* whose goal is to *seek and maintain closeness with another individual*. The system was created in the evolutionary past of the human species, when its basic function was protection from predators. The strongest emotions are included in that behavior system, which consists of five main components, joined later in the development by calling. The first group of three components (smile, cry, and calling) comprise *signals*, and their role is to bring the mother (caretaker) to the child. The second group (sucking, clinging, and following) is made up of *approach behaviours* whose role is to bring the child to the mother.

Attachment is an evolving phenomenon. Newborns do not yet have a system of behaviour that establishes and maintains closeness with a particular person. Of the attachment components, they can only engage in crying, and later smiling, while the other components are not developed. In addition, the child does not yet have *perceptive discrimination* of one person. Bowlby described four stages in the development of attachment. The answer to the question of when the complete attachment system will be developed can be arbitrary, but it can be said that the system is established in most children at eight months for one or several persons. Then, one can notice the fear of strange persons, also one of the indicators of attachment. At the end of the first year, the child also develops *internal working models* as attachment representations created based on bonding experience. Internal models consist of a model of the other person (whether or not he/she is available when needed), a model of the self (whether or not I am worthy of someone's care), and a model of the relationship.

The intensity and frequency of the occurrence of attachment behaviour changes daily and depends on organismic and external factors. Organismic factors that activate this behavior system include hunger, fatigue, cold, illness, and pain. External factors are the mother's departure, refusal to approach the child, holding of another

<sup>56</sup> Harlow and Zimmerman, 1959, pp. 421–432.

<sup>57</sup> Bowlby, 1969.

child in her lap, etc. The termination of this behaviour is always the same: as soon as proximity is established.

The attachment system is complementary to the mother's *caretaking*, while the antithetical behaviours are the child's play and exploration of the environment, as well as the mother's dedication to other family members and responsibilities. During play and exploration of the environment, the crawling or walking child does not move outside the mother's visual field. The mother functions as *a secure base*, and when the child is hurt or hit, the mother provides comfort as *a safe haven*.<sup>58</sup>

Bowlby believed that after the child's third birthday, the intensity of attachment to the mother begins to decrease, so that during the latency period, attachment to peers begins to develop. During adolescence, attachment to parents remains, and daughters are more strongly attached to their mothers than sons. That is the age when attachment to institutions (e.g. the state) appears, even more so in adults, as well as partner attachment. In old age, attachment is established to the young.

### 7.1. Work of Marry Ainsworth

Bowlby's theory remained incomplete, especially because a methodological procedure for assessing individual differences in attachment was not developed. That was achieved by M. Ainsworth.<sup>59</sup> She designed a *strange situation*, in a room with three chairs and toys in one corner. A child (about one year old) and his mother are greeted by a 'stranger' and brought into the room; the child is observed (through one-way transparent glass) in eight episodes, in which he is sometimes alone, sometimes with his mother, and sometimes with the 'stranger' and toys.

By considering patterns and not individual behaviour, it is possible to distinguish three forms or *attachment statuses*. One of them is *secure attachment (B)*, and two are insecure statuses: *insecure-ambivalent attachment (C)* and *insecure-avoiding attachment (A)*.

It should be said that it is not justified to assign the same attachment status to one child permanently. He/she can have one status with one parent and another with the other parent. In addition, the attachment status may change, even if a high rate of stability has been established over time.

The original research included 106 children, with 23 (21.70 %) children being in group A, 70 (66.04%) in group B and 13 (12.26%) in group C. A meta-analysis summarising the results of several studies worldwide confirmed similar proportions.<sup>60</sup>

### 7.2. Further Research on Attachment

Bowlby's theory and Ainsworth's method strongly encouraged research on attachment around the world and in relationships with numerous variables.

Observation of children in a strange situation also revealed a fourth form of attachment, *disorganised or disoriented (Status D)*. A child with this status did not have

58 Bowlby, 1988.

59 Ainsworth et al. 2015.

60 Van IJzendoorn and Bakermans-Kranenburg, 1997, pp. 135–170.

coherently organised behaviour in a strange situation (coherence was a feature of statuses A, B, and C). He/she expressed contradictory behavior at the same time: he/she was calm and occupied with the game and suddenly becomes angry or he/she had a very stiff expression, slow movements, and stereotypical body posture but often reversed roles and told the parent what to do.<sup>61</sup>

Numerous studies aimed to determine the antecedents and consequences of attachment, on the part of the child, the caretaker, and the environment.<sup>62</sup> Moreover, numerous studies were conducted in various cultural environments<sup>63</sup>. Research has been extended to peer and partner attachment in young people and adults,<sup>64</sup> stability of attachment over time.<sup>65</sup> transgenerational transmission of attachment,<sup>66</sup> etc. New methods for assessing attachment status were also created, of which Adult Attachment Interview should be mentioned. Even attachment to animals is being investigated.<sup>67</sup>

It is natural to expect that insecure attachment relationships in early childhood predispose person to later mental disorders. Research confirmed these expectations.<sup>68</sup> However, the correlations between insecure attachment styles and psychopathology are moderated by various biological, psychological, and socio-cultural factors.<sup>69</sup>

## 8. Other Orientations and Theories

### 8.1. Evolutionary Developmental Theories

The general principles of evolutionary developmental psychology (EDT) in terms of psychological development are derived from evolutionary theory, which serves as a distant explanatory framework. Evolutionary developmental theorists do not deny the determinants of behaviour that come from a closer framework, made up of the immediate environment and individual history; rather, they emphasise that the existence of childhood and development has an evolutionary significance, that is for adaptation and inclusive fitness.<sup>70</sup> One main idea of EDT is that the mind consists of discrete modules that have specific developmental trajectories, as well as specific disorders. Modules should be understood as specific predispositions that facilitate development in special areas: language acquisition, face perception, mastery of the physical environment, and understanding of people. A special group within EDT is *ethological psychology*.<sup>71</sup> Ethologists are especially known for their method, the observation of

61 Main and Solomon, 1986, pp. 95–124; Hesse and Main, 2000, pp. 95–124.

62 Sutton, 2019, pp. 1–22.

63 Van IJzendoorn and Kroonenberg, 1988, pp. 147–156.

64 Bartolomew and Horovitz, 1991, pp. 226–244; Shaver, 2016.

65 Groh et al. 2014, pp. 51–66.

66 Benoit and Parker, 1994, pp. 1444–1456.

67 Endenburg, Van Lith and Kirpensteijn, 2014, pp. 390–414.

68 See example for personality disorders: Levy et al. 2015, pp. 197–207.

69 Mikulincer and Shaver, 2013, pp. 11–15.

70 Geary and Bjorklund, 2000, pp. 57–65; Workman and Reader, 2021.

71 Bateson, 2015, pp. 208–243.

living organisms in the natural environment. Konrad Lorenz and Niko Tinbergen laid the theoretical foundations of ethological psychology before the World War II. For ethologists, the basic idea is that each living species possesses a set of inherent behavioural systems, which differ along the lines of environmentally stable/labile systems. One such system serves to establish and maintain attachment to another person. Ethologists point to the existence of sensitive periods in the development of these systems. These periods are the most favourable for the development of certain systems.

### 8.2. Bioecological Theory

Urie Bronfenbrenner is the main representative of this orientation in developmental psychology. This orientation, or model, as it is also called, has evolved over time.<sup>72</sup> 'Human development takes place through processes of progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment'. This concept emphasises that development takes place through interaction with the environment, and is not only observed within a concrete environment.<sup>73</sup> A developing person is active; he/she participates with his/her dispositions as well as bio-ecological resources and demands; and development takes place in proximal processes, in interaction with other persons, objects, and symbols.<sup>74</sup> The human environment is a system made up of special systems as layers. A *microsystem* is the closest system in which an individual participates in two-way, face-to-face interactions such as a family environment, kindergarten, and group of children at play. A *mesosystem* includes two or more connected microsystems, such as the family and school systems. The *exosystem* includes several environments, but the individual does not participate directly in at least one of them (e.g. the parent's work environment). The *macrosystem* consists of the most general cultural patterns, symbolic and value systems, and customs that influence development through lower systems. Finally, the *chronosystem* indicates the degree of stability and changeability in the environment and the individual, such as changes in the family's composition, working place of parents, and migration.

## 9. Concluding Remarks

Developmental theories can be evaluated and compared with each other according to several parameters: internal consistency, comprehensiveness, empirical testability, heuristic value, and practical usability. If we focus on practical usability, it is useful to first distinguish between competence and performance. Some theories (e.g. by Piaget, Freud, and Erikson) talk about development at the competence level, which means

72 Rosa and Tudge, 2013, pp. 243–258.

73 Bronfenbrenner and Morris, 1998, p. 996.

74 Bronfenbrenner and Morris, 2007, pp. 793–828.

that development takes place at the level of basic dispositions. Other theories (e.g. SLT and Vygotsky's theory) talk about changes at the performance level. It can be said that Piaget's theory does not cover the situational variability of cognitive concepts, where SLT has the greatest strength (different models and different regimes of rewarding and punishing children's behaviour). However, Piaget provides a reliable basis for knowing at what age certain concepts *can* appear,<sup>75</sup> or when these concepts *can* be adopted. On the other hand, the psychoanalytic tradition (from Freud to Bowlby and beyond) can point to external factors (e.g. parental practices) that can lead to arrested development and various psychological disorders.

75 For example, the concept of rights, as normative and different from concepts of desire and need, can be understood in its true meaning only at the adolescent age.

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