

# Theoretical Approaches to The Nature and Conceptual Evolution of Intelligence

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**Abstract:** This article analyzes the historical and philosophical roots of the concept of intelligence and the stages of its investigation in psychological science. The author examines theoretical approaches ranging from ancient philosophers to modern psychological schools. The article provides a comparative study of fundamental theories regarding the structure of intelligence by scholars such as A. Binet, Ch. Spearman, L. Thurstone, R. Cattell, and J. Guilford. Furthermore, it extensively covers the modern classification of intelligence — the concepts of "hot" and "cold" intelligence, their specific characteristics, and the approaches proposed by John Mayer.

**Keywords:** Intelligence, G-factor, S-factor, fluid intelligence, crystallized intelligence, "hot" intelligence, "cold" intelligence, divergent thinking, psychodiagnostics, mental abilities.

**Introduction:** Scientific sources indicate that the term "intelligence" is derived from the Latin word *intellectus*, which literally signifies intellect, understanding, and comprehension. From a psychological perspective, intelligence is a relatively stable system of an individual's cognitive abilities.

The study of human mental development has been a focal point for thinkers and scholars since ancient times. Ancient philosophers, notably Plato and Aristotle, proposed the concept of "nous" (reason)—the highest component of the human soul—as the most optimal way to comprehend existence.

During the Middle Ages, the scope of the concept of intelligence expanded further. Within the framework of Scholasticism, the concept of "divine intellect" was explored to explain the highest cognitive faculties. Immanuel Kant, the founder of German Classical Philosophy, distinguished between "Verstand" (intellect)—the structural cognitive faculty that systematizes concepts—and "Vernunft" (reason)—the higher understanding that forms metaphysical ideas.

Historically, two main opposing directions have

emerged in explaining the essence and developmental factors of intelligence:

- **Biological approach:** Contends that intellectual characteristics are inherited through genetic factors.
- **Psychophysiological approach:** Links intelligence to the speed of perception and individual reaction characteristics to external stimuli.

The problem of intelligence is one of the most extensively studied topics in global psychology. While approaches vary across psychological schools in Uzbekistan and foreign countries, their common goal is to uncover the uniqueness of human intellectual potential. In the former Soviet school of psychology, this concept was more frequently referred to as "mental ability" or "talent," whereas Western psychology (USA and Europe) widely utilized the term "intelligence" for the quantitative measurement of abilities.

At the turn of the 20th century, scholars such as J. Cattell, L. Terman, and Ch. Spearman developed various intellectual tests to determine the level of human ability.

## A. Binet and the Era of Intellectual Testing

Alfred Binet initiated the scientific study of intelligence in global psychology. Based on his "functional psychological theory," and in collaboration with his student T. Simon, he created a system of tests to measure the mental development of children. The key aspects distinguishing Binet from other researchers include:

- **Age differentiation:** Developing specific test series tailored to each age period.
- **Independence from knowledge:** Emphasizing that tests should be based on innate mental potential rather than school-acquired knowledge.
- **Practical orientation:** Viewing intelligence as a dynamic process manifested during problem-solving.

### **Fundamental Theories of Intelligence Structure**

From the early 20th century, identifying the components of intelligence became a pressing issue. Several fundamental theories were proposed:

1. **Spearman's Two-Factor Theory (1904):** Charles Spearman identified a core "general" factor of intelligence, termed the G-factor, and a S-factor (specific factor) related to particular activities (music, math, language).
2. **Multi-factor Approaches:** F. Freeman identified 6 components, while L. Thurstone (1938) used statistical methods to identify 7 "primary mental abilities," including numerical ability, verbal fluency, and spatial orientation.
3. **Cattell's Fluid and Crystallized Intelligence:** R. Cattell and J. Horn divided intelligence into Fluid intelligence (innate reasoning and problem-solving) and Crystallized intelligence (accumulated knowledge and experience).
4. **Guilford's Structure-of-Intellect Model:** James Guilford (1959) created a complex cube model involving nearly 120 factors, categorized by Content, Operations, and Products.

### **"Hot" and "Cold" Intelligence**

In the late 1990s and early 2000s, the concepts of "Hot" and "Cold" intelligence were introduced into psychology. While their roots trace back to the 1960s, John Mayer (2000) systematized this terminology. Mayer used these terms to distinguish between traditional IQ (logic, memory—"Cold") and personal/emotional abilities ("Hot").

**Walter Mischel and Janet Metcalfe (1999)** proposed the "Hot vs. Cool systems" in their cognitive-affective personality system:

- **Cool system:** Cognitive, strategic, emotionless, slow, and logical.
- **Hot system:** Rapid, emotional, instinctive, and based on a "go/no-go" principle (e.g., during fear or passion).

**David Wechsler (1940s) – Indirect founder.** Although he did not utilize the terms "hot" and "cold," David Wechsler, the author of the renowned IQ tests, emphasized as early as the 1940s that intelligence includes "non-intellective" factors (emotional and social). He argued that these factors are crucial for life success, providing a theoretical foundation for later researchers like John Mayer.

The analysis of foreign and domestic literature reveals several groups of abilities related to processing personally significant information. The primary group is categorized as "hot" intelligences. While this is a relatively nascent field in psychology, the growing body of theoretical and empirical evidence confirms that it is independent and distinct from "cold" intelligence, which is associated with traditional academic intelligence, logic, reasoning, and the processing of impersonal (neutral) data [8].

1. **Emotional intelligence:** The majority of theoretical research is dedicated to emotional intelligence. This set of abilities is responsible for the accurate perception and understanding of one's own and others' emotions. It facilitates the flexible use of emotional information. Analysis suggests that emotional intelligence should be examined as a distinct variable while exploring its correlations with other personality and intellectual traits.
2. **Social intelligence:** Despite early interest, social intelligence remains a less theoretically developed construct. Research distinguishes it from emotional intelligence, noting that emotional intelligence is more introspective (internally oriented) in nature, whereas social intelligence focuses on interpersonal navigation.
3. **Personal and practical intelligence:** These are recent additions to the "hot" intelligence framework:
  - o **Personal intelligence:** Helps in understanding the personality traits and character of others.

o **Practical intelligence:** Represents "life-smartness" or "street smarts," essential for solving everyday challenges.

**Emotional regulation Ability:** While not strictly part of the "hot" intelligence group, its primary function is psychological self-management. It serves to process information related to emotional states, enhancing efficiency in achieving personal goals and allowing for adaptation to life situations where context plays a vital role.

**Intuition (internal sense):** Intuition concludes the theoretical review. It is a complex cognitive process based on implicit (subconscious) learning. Often termed "subconscious intelligence," intuition allows for better orientation in social and personal cognitive processes. While it can manifest in processing "cold" information,

it is indispensable for internal psychological activities with personal significance.

From a psychological perspective, these two types of intelligence represent two different adaptive systems for humans:

- **"Cold" intelligence:** This is a person's instrumental potential. It is responsible for understanding objective laws of the external world, avoiding logical fallacies, and solving technical problems. It operates "in isolation" from emotions.
- **"Hot" intelligence:** This is a person's socio-psychological vitality. It processes subjective information of high personal importance. Here, logic is secondary; context and empathy play the leading roles. This intelligence ensures social survival and maintains mental equilibrium.

Comparison of "Cold" and "Hot" intelligence

| Characteristic            | "Cold" intelligence                            | "Hot" intelligence                                       |
|---------------------------|--|--|
| <b>Primary material</b>   | Numbers, symbols, and logical rules.           | Emotions, intentions, and social relationships.          |
| <b>Objective</b>          | Finding the correct answer (academic success). | Adaptation, building relationships, and self-regulation. |
| <b>Context dependency</b> | Context-independent (rules remain constant).   | Highly context-dependent.                                |
| <b>Practical example</b>  | Solving a complex equation.                    | De-escalating a conflict during a conversation.          |

The scientific basis for this distinction primarily relies on the research of John Mayer and Jack Mayer (2000s) [7,8,9]. According to Walter Mischel's theory, the brain operates through "cool-down" and "heat-up" mechanisms.

From a neurobiological standpoint, "Cold" intelligence is mainly associated with the dorsolateral prefrontal cortex (logical planning), while "Hot" intelligence is closely linked to the ventromedial prefrontal cortex and the amygdala (emotional and social decision-making).

Research indicates that an individual's IQ (cold intelligence) may be exceptionally high, yet they may feel entirely helpless in social situations (hot intelligence). A direct correlation between these two indicators does not always exist.

Modern psychological research (e.g., the works of Daniel Goleman) suggests that in long-term life

success—including career, family, and health—the role of "hot" intelligence is considered more significant than "cold" intelligence in approximately 80% of cases.

While "cold" intelligence is shaped through academic learning, "hot" intelligence develops primarily through life experience, social interaction, and introspection (self-observation).

### CONCLUSION

In summary, the problem of intelligence has been extensively studied in Western psychology (Western Europe, USA), with research grounded in diverse theories, concepts, and methodological approaches. The criteria for measuring intelligence, development indicators, and the psychometric systems used to determine mental development across different age groups possess distinct scientific and theoretical foundations.

Through the analysis of these studies, we have categorized them into several key directions. This facilitated a systematic perception of the problem's essence, identified causal links between scientific perspectives, and ensured the logical harmony of theoretical conclusions.

A general limitation in studying these psychological abilities—aimed at processing personally significant information—is the scarcity of empirical research. Simultaneously, there are significant opportunities in the field of psychometric development, particularly in creating specialized tests. The analysis demonstrates that there is currently a sufficiently robust and differentiated theoretical framework to continue exploring these abilities within the domains of both personality psychology and psychodiagnostics.

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