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1.17. STRUCTURAL FEATURES OF VERBAL AND FIGURAL CREATIVITY IN PRIMARY SCHOOL CHILDREN AS A BASIS FOR A DEVELOPMENTAL TECHNOLOGY IN THE EDUCATIONAL ENVIRONMENT

Yaroslava Vasylkevych, Oksana Kikinezhdi, Mykola Ryk

Abstract. *The study presents an empirical study of the structural features of verbal and figural creativity in primary school children and substantiates their use as a basis for a psychologically and educationally grounded developmental technology. Fluency, flexibility, and originality of verbal creativity, as well as fluency, originality, elaboration, abstractness of titles, and resistance to premature closure in figural creativity, are analysed. Resource components, priority areas for development, and component-specific gender differences are identified. A structurally oriented technology is proposed that combines assessment of the creative profile with the differentiated selection of verbal, figural, and integrated creative tasks.*
Keywords: *creativity, creative thinking, verbal creativity, figural creativity, primary school children, developmental technology.*

Creativity in Primary School Children in the Contemporary Educational Environment

The development of creativity is one of the important objectives of contemporary education, which is oriented not only toward knowledge acquisition but also toward developing the ability to act in novel and problematic situations, generate alternative ways of solving problems, reinterpret existing experience, and create new ideas. This issue is particularly important in primary school age, when thinking, speech, volitional regulation, reflection, and self-regulation develop actively, while the flexibility of imagination, cognitive curiosity, and openness to non-standard ways of acting are still preserved.

In psychology, creativity is regarded as a multidimensional phenomenon that cannot be reduced to intelligence or the ability to generate many ideas. Guilford's approach (1950) to divergent thinking and Torrance's system (1974) for its psychodiagnostic assessment laid the foundation for distinguishing such characteristics of creative thinking as fluency, flexibility, originality, and elaboration. Contemporary approaches complement this understanding by analysing motivational, personality-related, and socio-environmental factors of creative activity.

In Ukrainian psychology, Moliako and representatives of his scientific school (2023, 2024) have made a substantial contribution to the study of personal creative potential and creative-thinking strategies. Contemporary research assigns particular importance to the functioning of creative thinking under conditions of informational uncertainty, when an individual must independently identify reference points, generate alternatives, and restructure a problem-solving strategy.

The problem of creative thinking in primary school children is addressed in the works of Latysh (2023), Hnatiuk (2024), Chekstere (2024), Turbar and co-authors (2023). Their findings demonstrate the importance of the nature of learning tasks, characteristics of the educational environment, and play-based, verbal, and problem-solving methods for the development of children's creative activity.

The influence of education on creativity is not unequivocal: the educational environment can both support and constrain creativity depending on learner autonomy, task openness, the nature of assessment, and opportunities for independent exploration (Rawlings & Cutting, 2024). The importance of educational factors is also confirmed by the systematic review by Smare and Elfatihi (2023).

Creativity does not develop linearly or identically in all children. Jankowska and Karwowski (2025) identified different trajectories of creative-ability development and substantial individual

variability, which highlights the need to move from assessing only an overall level of creativity toward analysing its structural profile.

For such an analysis, the modality of creative activity is of fundamental importance. Verbal and figural creativity share a common basis associated with the ability to move beyond an obvious solution, yet they are realized through different means. Verbal creativity is manifested in variation of meanings, categories, and verbal associations, whereas figural creativity involves transformation of visual material, creation and elaboration of a new image, its symbolization, and maintaining openness to several possible interpretations.

The same overall creativity score may conceal different relationships among its components: many responses do not guarantee their flexibility or originality, while an elaborated image may coexist with rapid closure of an ambiguous stimulus. Structural analysis is therefore more informative for determining directions of psychological and educational intervention.

Systematic reviews confirm that children's creativity can be purposefully developed (Alves-Oliveira et al., 2022; Ruiz-del-Pino et al., 2022). At the same time, effectiveness depends on the content and organization of the intervention; therefore, a structurally oriented approach, in which assessment becomes the initial stage in designing developmental work, appears promising.

Organization and Methods

The empirical study aimed to determine the structural features of verbal and figural creativity in primary school children and to identify gender-specific characteristics of individual components of creative thinking. The obtained results were also considered an empirical basis for identifying priority directions of psychological and educational work aimed at developing creativity.

The study involved 50 children aged 7–8 years, including 24 girls and 26 boys. The Torrance Tests of Creative Thinking (TTCT) were used to assess creative thinking and to examine verbal and figural modalities of creativity (Torrance, 1974). Contemporary studies confirm the psychometric value of the TTCT while also emphasizing the need for differentiated interpretation of its individual indicators (Acar et al., 2024; Alabbasi et al., 2022).

Verbal creativity was analysed in terms of fluency, flexibility, and originality. The structure of figural creativity was examined using fluency, originality, elaboration, abstractness of titles, and resistance to premature closure. Standardized T-scores were used to compare the components.

Gender differences constituted a separate line of analysis. Mean scores for girls and boys were compared for each component of verbal and figural creativity. The statistical significance of between-group differences was determined using Student's t-test for independent samples. Gender was treated as a grouping variable, and the identified differences were interpreted at the level of individual components rather than generalized to children's overall creative capacity.

Structural Profile of Verbal and Figural Creativity

The results demonstrated uneven development of individual components of creative thinking (Table 1).

Table 1. Structural profile of verbal and figural creativity in primary school children

Modality	Component	T-score	Function in the structural profile
Verbal	Fluency	43	support component
Verbal	Flexibility	47	resource
Verbal	Originality	43	developmental area
Figural	Fluency	46	relative resource
Figural	Originality	43	developmental area
Figural	Elaboration	55	most pronounced
Figural	Abstractness of titles	42	developmental area
Figural	Resistance to premature closure	42	developmental area

Source: developed by the authors

Within the structure of verbal creativity, flexibility was the most pronounced component, at 47 T-score points, whereas fluency and originality each amounted to 43 T-score points. Thus, the primary school children in the sample found it relatively easier to change the direction of their search and shift between different semantic categories than to generate many alternatives or produce non-standard verbal solutions.

In this case, flexibility may be regarded as a resource of verbal creative thinking: the ability to change the direction of search creates prerequisites for subsequently increasing the number and originality of ideas. The relatively lower originality score, in turn, indicates the need to create conditions in which a child does not stop at the first available or socially expected response but continues searching for alternatives.

An even more pronounced differentiation was found in the structure of figural creativity. Elaboration had the highest score, 55 T-score points. Fluency amounted to 46 T-score points, originality to 43 T-score points, while the lowest values were obtained for abstractness of titles and resistance to premature closure, both at 42 T-score points.

Thus, the most pronounced characteristic of the children's figural creative thinking is their ability to add detail to and meaningfully develop an emerging idea. Primary school children actively supplement the image they create with details and give it a more complete form. Elaboration may therefore be regarded as a resource component of figural creativity.

The lower score for abstractness of titles indicates relative difficulty in moving from a concrete image to its generalized, symbolic, or metaphorical designation. From the perspective of creativity development, this makes it relevant to stimulate transitions along the "image – meaning – word" sequence and to use metaphors, symbols, unusual titles, and multiple interpretations of the same image.

Resistance to premature closure also amounted to 42 T-score points. The psychological meaning of this indicator is associated with the ability to preserve the ambiguity of a stimulus and not complete it immediately in the most obvious way. Accordingly, developmental work should include tasks involving incomplete and ambiguous stimuli with several possible interpretations.

The relationship between originality in the two modalities is particularly revealing: its standardized value was 43 T-score points in both the verbal and figural domains. Thus, moving beyond a typical and obvious solution is one of the relatively less developed components regardless of the material of creative activity. This makes it possible to define the development of originality as a cross-cutting direction of psychological and educational work.

The unevenness of the profile is of fundamental importance: a high score on one component does not compensate for a lower expression of another, because each component supports a specific aspect of the creative process. Creativity development should therefore be understood as expansion of a repertoire of strategies: from generating multiple alternatives to shifting categories, and from moving beyond the obvious solution to transforming and symbolizing an image.

A resource component is not merely the "stronger side" of the profile but a psychological foundation for developing less developed characteristics. Assessment thus acquires prognostic and design-oriented significance.

Lower scores should not automatically be interpreted as deficits; rather, they reflect an individual configuration of resources and developmental directions. This approach is consistent with contemporary views of the multidimensional nature of the TTCT (Alabbasi et al., 2022) and individual variability in creativity (Jankowska & Karwowski, 2025).

Gender-Specific Features of the Structural Components of Creativity

In verbal creativity, girls had somewhat higher mean scores for fluency, flexibility, and originality than boys; however, according to the student's t-test for independent samples, these differences did not reach statistical significance ($p \geq 0.05$).

In figural creativity, no statistically significant differences were found for fluency or originality ($p \geq 0.05$). At the same time, girls demonstrated statistically significantly higher scores for elaboration, abstractness of titles, and resistance to premature closure ($p \leq 0.05$).

The findings indicate that gender differences are component specific. They are manifested not in the general ability to generate figural solutions or create original products, but characteristics of further elaboration, semantic organization, and preservation of openness in a creative idea.

Girls' higher scores for elaboration, abstractness of titles, and resistance to premature closure may reflect a greater tendency toward detailing, semantic generalization, and readiness to preserve the openness of an incomplete stimulus.

At the same time, the results require cautious interpretation because of the sample size and the localization of significant differences to only some indicators. No significant gender difference in originality was found in either modality; therefore, there are no grounds for characterizing girls as generally more creative.

Meta-analytic evidence likewise cautions against conclusion about the overall creative superiority of either gender group (Taylor et al., 2024). In practice, the individual structural profile of creative thinking provides a more justified basis for differentiation.

Structurally Oriented Technology for Developing Creativity in Primary School Children

A structurally oriented technology for creativity development is understood as a system of sequential, assessment-informed psychological and educational actions aimed at developing individual components of verbal and figural creative thinking by using relatively well-developed characteristics as resources for further development.

The principal difference between this approach and universal "creativity training" is that the content of the developmental intervention is determined not only by children's age or the general goal of stimulating creativity, but also by prior analysis of the structure of creative thinking. Resource components are used as a foundation, less developed components as target directions for development, and components with intermediate values as areas requiring systematic support.

The general algorithm of the technology is as follows:

assessment of the structural profile → identification of resource and target components → differentiated selection of creative tasks → integration of verbal and figural activities → gradual increase in openness and uncertainty → reflection on the creative process → reassessment of the structural profile.

Implementation of the algorithm involves the interaction of *three levels of psychological and educational intervention: diagnostic-design, activity-developmental, and reflective-evaluative*.

At the *diagnostic-design level*, the current profile of a child's or group's verbal and figural creativity is determined. The aim is not to rank pupils as "more or less creative," but to establish the relationship among components of creative thinking. On this basis, resource characteristics, components requiring support, and priority developmental areas are identified. The assessment result is thus transformed into a specific psychological and educational decision: which characteristic should be developed, and which existing resource can support that development.

The *activity-developmental level* involves a system of tasks with a gradual increase in creative uncertainty. At the initial stage, a child works with partially open tasks that allow several acceptable responses. Subsequently, the number of external cues is reduced, the range of possible courses of action increases, and the need to formulate an idea independently becomes stronger. Thus, it is not so much the subject matter that becomes more complex as the structure of creative choice.

Three stages of such increasing complexity can be distinguished: *variation → transformation → independent construction*. At the first stage, the child creates several alternatives within a given condition; at the second, changes the function, structure, context, or meaning of the source material; at the third, independently determines the idea, the method of its implementation, and the form in which the result will be presented. This sequence supports a transition from scaffolded creative activity to creative independence (Table 2).

The first substantive direction is the development of fluency and multiplicity of search. Open-ended questions, alternative story endings, searches for different uses of familiar objects, and transformation of a single graphic stimulus into several images are used. The "three more ideas" rule is useful because the search does not end after the first acceptable response.

Table 2. Components of creativity and priority means of their development

Component	Function in the profile	Priority means
Fluency	support for search	multiple responses, “three more ideas”
Flexibility	resource	changing categories, roles, perspectives, contexts
Originality	cross-cutting developmental area	remote associations, inversion, unusual combinations
Elaboration	resource of the figural domain	meaningful development and transformation of an idea
Abstractness of titles	developmental area	metaphorization, symbolization, “image – meaning – word”
Resistance to closure	developmental area	ambiguous stimuli, delayed closure

Source: developed by the authors.

The next direction is the development of flexibility through changing category, position, or context. In verbal activity, this may involve changing the character, place, function, cause, or consequence of an event; in figural activity, changing the scale, position, function, or meaning of an initial element. Play-based and verbal methods create favorable conditions for variability in creative search (Turbar et al., 2023).

The central target characteristic is originality, which was equally less developed in the verbal and figural modalities. Its development requires continuing the search after the first obvious solution appears. Remote associations, inversion, combinations of functionally unrelated objects, changes in the familiar purpose of an object, creation of a fantastic object, or an unexpected ending to a story may be used. It is important that a non-standard response be regarded as acceptable and that an error not become grounds for negative evaluation. The importance of characteristics of the learning environment for primary school children’s creative productivity is emphasized by Chekstere (2024).

High figural elaboration can be used as a resource for moving from detailing to transformation of an idea. A child who readily adds details to a drawing can be encouraged to change the function, context, or meaning of the created image and construct an alternative version. The use of open-ended visual-art, problem-based, and heuristic tasks creates favorable conditions for the development of figural creativity (Mochan, 2025).

To develop abstractness of titles, tasks involving symbolization and metaphorization are appropriate: creating several titles for one image, searching for a title that conveys not the object itself but its hidden meaning or mood, and constructing a short story based on the created image.

The cross-modal principle is particularly important. Verbal and figural creativity should not be developed in isolation. Transitions following the “word → image → meaning → word” model are productive. A child may create an image from a verbal association, transform it, give it a metaphorical title, and then construct a story in which the image acquires a new meaning. In this way, one creative task successively activates several components of creative thinking.

Developing resistance to premature closure involves the use of ambiguous and incomplete stimuli. The child is encouraged not to accept the first solution as final, but to formulate several possible interpretations, change perspective, return to the initial idea, and restructure it. Such a gradual increase in the openness of the creative task is consistent with studies of creative thinking under conditions of informational uncertainty (Moliako et al., 2023; Moliako et al., 2024).

At the *reflective-evaluative level*, attention is directed not only to the final product but also to the process of creative search. Feedback should focus on awareness of the number of alternatives tried, changes in strategy, moving beyond the obvious solution, and development and transformation of the initial idea. Instead of relying on “right–wrong” evaluation, productive questions include: “What other options did you consider?”, “What helped you change your idea?”, “Which solution was the most unexpected?”, and “How could it be done differently?” Such reflection promotes children’s awareness of their own strategies of creative search.

An important characteristic of the technology is the possibility of integrating it into the regular educational process without creating a separate course. In language and literature education, this may include alternative continuations of a text, changing the narrator's perspective, and creating unusual and metaphorical titles; in arts education, transformation of incomplete graphic stimuli and creation of several images from one element; in mathematics, searching for different ways of solving a problem and constructing one's own problem conditions; and in science education, formulating alternative explanations, predictions, and hypotheses.

Thus, the main technological unit is not a specific exercise but a way of organizing a cognitive task that involves multiplicity, variability, transformation, openness of the outcome, and reflection on the way it was achieved. This makes the technology suitable for teachers across different educational domains and for psychologists in specially organized developmental sessions.

Differentiation does not require dividing children into fixed groups according to "levels of creativity." Within the same task, one child may be encouraged to produce more alternatives, another to shift categories, and a third to increase originality, transformation, or symbolization. Thus, a creative task shared by the whole class may have different individual emphases in accordance with each child's structural profile.

It is also important to ensure transfer of acquired creative-search strategies from one activity to another. If the strategy of searching for alternatives is first mastered using figural material, it can subsequently be applied when working with a text, an educational problem, or a project task. Such transfer contributes to the gradual transformation of an individual creative action into a more universal strategy.

Implementation of the technology should be based on the principles *of psychological safety, the right to make mistakes, multiplicity of acceptable solutions, gradual increase in uncertainty, integration of verbal and figural means, reliance on resource components, and individualization without gender stereotyping*.

The innovative nature of the proposed approach lies not in declaring individual creative exercises to be new, but in the assessment-informed algorithm for their selection, combination, and gradual increase in complexity. Assessment results are used not as a final judgment of a pupil's creative capacities, but as a basis for designing a subsequent developmental trajectory. This ensures the cyclical nature of technology: reassessment makes it possible to identify changes in the structural profile and accordingly adjust the content of the next stage of psychological and educational intervention.

Conclusion

The study confirmed the structural heterogeneity of creativity in primary school children. In the verbal modality, flexibility was relatively the most pronounced component, whereas in the figural modality, elaboration was the most pronounced; originality, abstractness of titles, and resistance to premature closure constitute priority areas for development.

Relatively lower originality was common to both modalities. At the same time, verbal flexibility and figural elaboration may perform a resource function in the development of less developed components.

Gender differences were component-specific: in the verbal domain they were statistically non-significant; in the figural domain, significant differences in favor of girls were found for elaboration, abstractness of titles, and resistance to premature closure, but not for fluency or originality.

The substantiated technology follows the sequence: assessment → identification of resource and target components → differentiated selection of tasks → integration of verbal and figural activity → increase in uncertainty → reflection → reassessment. Individualization is based not on gender but on the child's structural profile.

The proposed approach makes it possible to integrate creativity development across different educational domains and to use assessment as a tool for designing a subsequent trajectory of creative development.

References

Acar, S., Lee, L. E., & Scherer, R. (2024). A reliability generalization of the Torrance Tests of Creative Thinking–Figural. *European Journal of Psychological Assessment, 40*(5), 396–411. https://doi.org/10.1027/1015-5759/a000819

Alabbasi, A. M. A., Paek, S. H., & Cramond, B. (2022). What do educators need to know about the Torrance Tests of Creative Thinking? A comprehensive review. *Frontiers in Psychology,* 13, 1000385. https://doi.org/10.3389/fpsyg.2022.1000385

Alves-Oliveira, P., Arriaga, P., Xavier, C., Hoffman, G., & Paiva, A. (2022). Creativity landscapes: Systematic review spanning 70 years of creativity interventions for children. *The Journal of Creative Behaviour, 56*(1), 16–40. https://doi.org/10.1002/jocb.514

Chekstere, O. Yu. (2024). The influence of the learning environment on primary school children's creative productivity. In V. O. Moliako (Ed.), *Functioning of creative thinking under conditions of informational uncertainty* (pp. 127–131). G. S. Kostiuk Institute of Psychology of the NAES of Ukraine.

Guilford, J. P. (1950). Creativity. *American Psychologist, 5*(9), 444–454. https://doi.org/10.1037/h0063487

Hnatiuk, O. V. (2024). The problem of creative thinking in primary school children under contemporary conditions. In V. O. Moliako (Ed.), *Functioning of creative thinking under conditions of informational uncertainty* (pp. 17–23). G. S. Kostiuk Institute of Psychology of the NAES of Ukraine.

Jankowska, D. M., & Karwowski, M. (2025). The trajectories of creativity development in childhood. *Learning and Individual Differences,* 119, 102644. https://doi.org/10.1016/j.lindif.2025.102644

Latysh, N. M. (2023). Creative activity of primary school children under conditions of informational uncertainty. *Grail of Science,* 32, 351–356. https://doi.org/10.36074/grail-of-science.13.10.2023.065

Mochan, T. (2025). Development of creative thinking in primary school children through visual arts. *Scientific Notes. Series: Pedagogical Sciences,* 221, 236–240. https://doi.org/10.36550/2415-7988-2025-1-221-236-240

Moliako, V. O., Vahanova, N. A., & Hulko, Yu. A. (2023). Features of the functioning of children's creative thinking under conditions of informational uncertainty. *Scientific Notes of V. I. Vernadsky Taurida National University. Series: Psychology, 34*(73)(1), 154–159. https://doi.org/10.32782/2709-3093/2023.1/25

Moliako, V. O., Tretiak, T. M., & Latysh, N. M. (2024). The role of subjective reference points in students' creative thinking under conditions of informational uncertainty. Journal of Social and Practical Psychology, 3, 37–43. https://doi.org/10.32782/psy-2024-3-6

Rawlings, B. S., & Cutting, S. J. (2024). Linking disparate strands: A critical review of the relationship between creativity and education. *Educational Psychology Review,* 36, 135. https://doi.org/10.1007/s10648-024-09973-z

Ruiz-del-Pino, B., Fernández-Martín, F. D., & Arco-Tirado, J. L. (2022). Creativity training programs in primary education: A systematic review and meta-analysis. *Thinking Skills and Creativity,* 46, 101172. https://doi.org/10.1016/j.tsc.2022.101172

Smare, Z., & Elfatihi, M. (2023). A systematic review of research on creative thinking in primary education: Focus on empirical methodologies. *Issues in Educational Research, 33*(2), 752–780.

Taylor, C. L., Said-Metwaly, S., Camarda, A., & Barbot, B. (2024). Gender differences and variability in creative ability: A systematic review and meta-analysis of the greater male variability hypothesis in creativity. *Journal of Personality and Social Psychology, 126*(6), 1161–1179. https://doi.org/10.1037/pspp0000484

Torrance, E. P. (1974). *Torrance Tests of Creative Thinking: Directions manual and scoring guide*. Scholastic Testing Service.

Turbar, T. V., Zubtsova, Yu. Ye., & Denysova, K. V. (2023). Development of primary school children's creative thinking in language and literature lessons through play-based teaching methods. *Pedagogical Sciences: Theory and Practice,* 4, 21–28. https://doi.org/10.26661/2786-5622-2023-4-03

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