

Individual Intellectual Integration in Russian Students

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By

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PREFACE

The ghost of integration stalks Russian psychological science. Integrative sentiments reveal the dissatisfaction of researchers with the long-term development of psychology along its path that is split and fragmented. Despite the increasing differentiation of psychology, the integrative trend denotes the opposite way of building psychological knowledge in common. The integrative approach focuses on the creation of a shared theory of human knowledge and proposes a holistic approach to the study of the human being and the regularities of how it operates. Contemporary psychologists are aware of the need to integrate psychological knowledge as one of the main tasks in psychology. The stage of psychological development is coming that is aimed at the integration of psychological science. The purpose of this book is to develop an integrative research applied to individual traits, intelligence, and creativity. This book is needed because it will contribute to the production of new psychological knowledge about how individual traits combine with intelligence and creativity. Achieving this purpose is hardly possible within the framework of a full-range analytical approach.

B. G. Ananiev (2018), B. F. Lomov (1984), V. S. Merlin (1986), and A. V. Yurevich (2005) laid the foundations for the integrative tradition in Russian psychology. Their followers develop this tradition (Chuprikova, 2016; Ponomarev, 1983; Tolochev, 2017; Ushakov, 2020; Viatkin, Dorfman, 2018; Volkova, 2016). The integrative trend can be traced in Western studies as well. In recent years (as opposed to previous ones), the importance of the integrative perspective has been recognized (Brewer, 2013; Burgoon, Henderson, Markman, 2013; Mischel, 2009; Sternberg, 2003).

The unity of the global philosophical principle is the basis of the integrative trend in psychology. Integrative research contributes to the production of new psychological knowledge, the acquisition of which is hardly possible in full with an analytical approach. As a result, the commonality appears beyond the particular, with the wideness and horizons arising in contrast to a narrow view on mind. This does not mean that the integrative tendency excludes the differentiating tendency in psychological knowledge. Rather, they are supplementary. However, if the latter focuses on the search for differences, the former, on the contrary, focuses on the

search for commonalities, acting as a kind of glue that holds different mental phenomena together.

There are many approaches aimed at understanding the commonalities of various mental phenomena. Among them are the comprehensive (Gurevich, 2005; Loginova, 2005), taxonomic (Norman, 2009; Rozova, 1986), holonomic (Dorfman, 2006; Stamps, 1980), structural and functional (Parsons, 2002; Yudin, 1997), synergetic (Astafieva, 2009; Haken, 1980), network (Guseltseva, 2013; Nazarchuk, 2011), and systemic and polysystemic (Bertalanfi, 1969; Merlin, 1986; Viatkin, Dorfman, 2018) approaches. They infer ideas of information—the holon—as well as multidimensionality, hierarchy, polymorphism, self-organization, networks, and certain others.

The integrative approach is distinguished from these approaches to some extent, although they overlap, are embedded in, and assume each other to some extent. In comparison with them, the integrative approach has its own specifics. This scope constitutes the specifics of the integrative approach in its own right and is not reduced to other synthetic views. The fact is that the ontological “arrow” of integration unfolds from the elements and components to the system of individuality and has a marked inductive character. Rather, an incomplete induction appears and leads to hypotheses about integration. The latter is a way of incorporation “from below,” while the above-mentioned approaches mainly develop “from above” and are deductive in nature. Besides, the integration is a way due to which a system arises, but it is not the system as it has been installed—an intrinsic device due to which the system exists as a whole but is not reduced to the system itself, that is, it is a process rather than its result.

The integrative trend also involves overcoming the disconnection of the analytical and synthetic trends, removing the gaps between them, and solving issues about how to consolidate heterogeneous properties. In the book, an attempt is made to fill in the gaps to a certain extent through methodological, theoretical, and empirical studies of the heterogeneous properties of individuality through their integration.

The main purpose of integrative research is to find the limits and boundaries of the regularities and conditions of association of various mental properties, their consolidation, and the establishment of common features that overcome their differences and disunity. But the concept of integration itself, its structure and regularities, and the ways of integration in opposition to disintegration, remain insufficiently studied and understood. This book is a particular step toward overcoming an arising gap.

The integrative approach opens up new and somewhat unusual problems. They are, in particular, in the gaps between different areas of psychological knowledge and indicate the prospects for their study. The

main lines of filling the gaps are the results of the intersection and crossing of heterogeneous and different-order mental properties. This is a common picture when psychological theories differ. In the integrative approach, on the contrary, the issues of their intersection come to the fore. For example, psychological behaviorism develops a theory of personality on both sides—behavior and personality (Staats, 2003). At the empirical level, research is not limited to capturing only relationships between variables, but rather to establishing their commonality and its measurement (Viatkin, Dorfman, 2018).

Thus, the integrative approach (in contrast to other synthetic approaches) highlights precisely its clarity in that it intends to search for shared regularities of mental properties. Integration asserts them in the area of their intersections and crossing.

The integrative trend has the end-to-end character of different scales and levels—from properties, their compositions and structures to psychological knowledge in general. It is not only about bringing together broad areas of psychology, but also about lower levels of integration.

In the book, the issue of integration develops on the ground of individuality, intelligence, and creativity. The methodology of the integrative approach addresses the polysystemic approach (Viatkin, Dorfman, 2018). It includes an individuality and intelligence with creativity as two independent systems. Despite differences, individual-intelligent integrations among them take place. The perspective of integrating two systems—individuality with intelligence and creativity—develops theoretically and empirically. This perspective is aimed largely at clarifying theories that fall into the focus of the research objective. In the current work, three theories come together. The first is V. S. Merlin's theory of integral human individuality. The second is D. V. Ushakov's structural-dynamic theory of intelligence, and the third is J. Guilford's theory of divergent (creative) thinking. The issue is to examine, comprehend, and understand the conditions of their integration at the theoretical level. Cross-theoretical integrations bring questions of combining these theories to the fore. Usually, these theories develop separately. However, the question arises, on what grounds and by what criteria does their synthesis emerge? The problem of their integration arises also because the traits of individuality are stable, and intelligence and creativity, on the contrary, are unstable, depending on the requirements of the task, the situation, human development, and the like.

Another level of integration is empirical. A proposal is to estimate the conditions and limits of empirical integrations of individuality variables with the variables of intelligence and creativity. Contrary to popular myths in Russian science, not everything links to everything.

Integrative research implies the search for those mental properties that operate in themselves, and open the door for a larger common one. Their investigation brings additional knowledge about the ways in which individuality, intelligence, and creativity exist in the area of integrative qualities. They specify a new place and function in the context of the larger commonality. Besides, the resources and potentials of cross-theoretical and empirical integrations show an important step towards understanding their mechanisms.

The individual-intelligent integrations will contribute to the practice of education in universities based on combinations of students' stable (individuality) and mobile (intelligence and creativity) properties.

The book consists of two parts and eight chapters. Part I describes the theoretical foundations of the individual-intelligent integrations of human beings. The part is divided into four chapters. Chapter 1 describes the concept of "integration." Chapter 2 presents V. S. Merlin's theory of integral individuality, D. V. Ushakov's structural-dynamic theory of intelligence, and J. Guilford's theory of divergent (creative) thinking. Chapter 3 highlights cross-theoretical and empirical integrations. Chapter 4 deals with resources and potentials, and their differentiation and integration. Part II presents the results of testing individual-intelligent integrations in students. Chapter 5 describes the research methods, diagnostic tools, and data analysis. The results of integration testing is expounded in Chapter 6 by the general criterion, in Chapter 7 by the mediation criterion, and in Chapter 8 by the time criterion. The content of the book concludes the outlines of the structural theory of individual-intelligent integrations in students. The book includes substantial references. An appendix includes a conceptual and psychometric analysis of the original four-factor questionnaire of the Self. Its basis is the integration of sub-selves.

PART I

FOUNDATIONS OF INDIVIDUAL-INTELLIGENT INTEGRATIONS

CHAPTER ONE

THE CONCEPT OF INTEGRATION

1.1. Introductory remarks

In this chapter, the concept of integration highlights a specific area of research in respect to individuality as a system. The question arises of how commonality can appear despite the individual and how individual traits combine despite their detachment. Within the framework of differential psychology and differential psychophysiology, the internal plan of integration develops in the system of individuality.

The focus of research is drawn to the triad of basic concepts, namely, individual traits, their compositions, and structures; these need some revision and updating. A proposal reveals some features of individual traits, such as self-identity and relativity, discontinuity and continuum, stability and change.

The internal and external contours describe the traits. An assumption is made that the external contour of the traits contributes to their embedding (integration) into the individual as a system. The inner contour of the traits, on the contrary, opposes integration or, at least, constrains it. The self-identity, discontinuity, and stability features enter the inner contour. The relativity, continuum, and change features enter the external contour. The balance of the external and internal contours is a resource marker of their integration into the system of individuality.

Further, in a methodological and theoretical way, an attempt is made to raise and comprehend the issue of structures and commonality as the final stages of integration. First, the integration of traits and compositions enter into structures. The main idea is that the integration is mobile, changes, and extends or narrows, relying on how structures relate to traits and compositions. In addition, structural diversity takes the form of static structures, isomers, and polymorphisms. The concept of divergent integration emphasizes the many ways of combining traits and compositions into changing structures.

Second, the relations of structures to the commonality are considered. To describe them, the concept of targeting integration is initiated. A separate task from divergent integration is the search for and detection of the

commonality. The structures mark it but the latter also detaches from the data array. Their superposition is possible in some intervals of relations. Three models for targeting integration were designated for testing. They move to the commonality from static structures, isomers, and polymorphic links. Finally, there are great chances that the integration contributes to the psychological health of the individual.

Initially, this work refers to the theories of integral individuality (Merlin, 1986) and the systemic integration of human individuality (Viatkin, Dorfman, 2018). The main emphasis deals with the integration of the individuality with intelligence and creativity. Therefore, the theory of integral individuality of V. S. Merlin (1986) joins integration with the structural-dynamic theory of intelligence of D. V. Ushakov (2003, 2011) and the theory of divergent creativity of J. Guilford (1950, 1967). Cross-theoretical and empirical integrations come into focus.

1.2. The meaning of the term “integration”

The term “integration” comes from the Latin words *integratio* (the process of inserting parts into something) and *integer* (the whole). The concept of integration has at least four meanings.

The *first* meaning implies the system as a common result of combining individual properties. The commonality does not belong to the universal category, but overcomes the limits of the individual, local, and separate. The results of combining properties characterize the system as a whole. The *second* meaning implies the process (and not the result) of collecting and combining properties, the stages of their integration into the individual as a system, the consistent overcoming of units by the commonality and a detachment of units by the consolidation. The *third* meaning implies the scope of individual properties. Their scale determines the size of the integration. The *fourth* meaning concerns the direction of the integration. It has an inductive character, more correctly, an incomplete induction, in which observations of individual properties lead to a hypothesis about their integration.

In contrast, the movement from the system of individuality to its elements and components, on the contrary, has a deductive character. This is the path that opens up the components of the system. It opposes the integration. In differential psychology and differential psychophysiology, the integrative trend is poorly developed from different angles and in different contexts, even if some studies in this direction are significant (Ananyev, 2018; Merlin, 1986; Ponomarev, 1983). It implies a path of

cognition that overcomes the disunity of analytical and integrative trends through the removal of gaps between them.

In this chapter, an attempt is made to fill in the gaps to a certain extent through a methodological and theoretical analysis of the heterogeneous properties of individuality and their integration in line with the natural science paradigm with a focus on empirical research.

1.3. Investments of traits and compositions to the integration of individuality

In recent decades, the integrative trend has been gaining strength in psychological science. In Russian philosophy and psychology, it develops mainly within the framework of a systemic approach (Viatkin, Dorfman, 2018; Volkova, 2016; Derkach, Sayko, 2010; Dorfman, 2016a; Kozlov, 2007; Kuzmin, 1982a, 1982b; Lomov, 1984; Mazilov, 2016; Medintsev, 2018; Merlin, 1986; Petrov, Mazhul, 2014; Petrovsky, 2013; Ponomarev, 1983; Samoilenko, 2011; Tyukhtin, 1978; Urmantsev, 1988; Ushakov, 2020; Chuprikova, 2016; and Yanchuk, 2016). In contrast to previous years, integrative research is also unfolding in Western psychological science (Brooks et al., 2018; Magnusson, 2001; Mischel, 2009; Mook, Mitchel, 2019; Preuss, Ehrsson, 2019; Sternberg, 2003; Varga, Esposito, Bauer, 2019).

The problems of integration still remain on the periphery of psychological knowledge, and the integrative trend continues to give way to the leading positions of the analytical trend. It leads to the differentiation of psychological knowledge and causes a set of relatively irrespective local theories. On the other hand, the differentiation comes down, at the limit, to the discovery of human properties as they function separately.

In differential psychology and differential psychophysiology, the concept of individual traits is fundamental. They are diverse and record individual differences. In addition, their heterogeneity takes place in various ways. They arise because individual traits are divergent, having different qualities.

For example, extroversion, neuroticism, psychoticism, and a search for sensations are individual traits with different qualities. They specify within the framework of one or more theories, which include Eysenck's theory of personality (Eysenck, 1999) and the theory of sensation search (Zuckerman, 2007) or their conjugation (Zuckerman, Eysenck, Eysenck, 1978). As psychology develops, researchers discover individual traits with new qualities, for example, within the framework of the "Big Five" personality model (Costa, McCrae, 1992), and create new theories relying on them (Shchebetenko, 2017; Costa, McCrae, 2005; Costa, McCrae, Lockenhoff,

2019). The inevitable consequence of the separation of traits and their heterogeneous features is the fragmentation of individuality. In contrast to the analytical trend, the basis of the integrative trend is the principle of unity of world. It suggests the search for the unity of individuality as a system. But with an analytical trend, individuality as a system often falls out of the field of research attention.

The tasks on integration produce a separate and relatively standalone field of research. The main problem is to understand how traits, on the one hand, are individual, local, and heterogeneous, and on the other, combine, integrate, and form systems.

Integration is ubiquitous. It occurs in nature, society, and people's lives. Integration takes place on different scales, and it is quite difficult to put it in a certain framework. In its content, integration can be social, economic, cultural, artistic and aesthetic, psychological, biological, etc. Epistemologically, integration covers, for example, scientific disciplines and can be transdisciplinary, multidisciplinary, interdisciplinary, and intra-disciplinary (Viatkin, Dorfman, 2018; Drobysheva-Razumovskaya et al., 2015). But what is the gist of integration? The tasks of this chapter are particularly interested in integration within the systemic approach to human individuality.

Integration is two-fold. It is a macro-process occurring at the system level, and a micro-process occurring within the system. System integration reveals its qualities in relation to the external environment (the macro-process). Then, meanings, personal resources and potentials, and human capital can possess integrative qualities. Competencies, adaptation, subjectivity, performance, values, and inclusion in social groups conceive of this kind, as well. The integration that takes place inside the system (the micro-process) involves its internal elements and components. The internal structure characterizes them. The key question is how individual traits create integration into a person's individuality as a system.

Thus, integration has two sides, external and internal. On the one hand, their unity emerges. On the other hand, each has a relative originality from the viewpoint of research. Further, integration in the internal plan, its internal "mechanism," will be under consideration.

Integration stages

Some stages describe the integration process within a system of individuality. Individual traits, compositions, and structures are the main stages of integration (Dorfman, 2018b). The search for a commonality identifies a system, and, to some extent, completes the integration. These concepts show the stages of integration with complicating relationships. The

greater the scope of individual traits, the larger scale on which their integration can arise. On the other hand, a certain set of individual traits serves as a basis for estimation of their compositions, and the latter, with links between traits, leads to the establishment of internal structures and a commonality of the system of individuality.

Individual traits, compositions, structures, and commonality express the successive stages of the integration of the individual. Individual traits (stage 1) pass into compositions (stage 2), internal structures arise on the basis of compositions (stage 3), and structures lead to the formation of a commonality (stage 4).

Each stage of integration, unlike the previous one (with the exception of stage 1), is progressively enriching, complicating, extending, and deepening. The knowledge moves from simpler to more complex with the acquisition of new qualities. The property matrix defines the initial stage of integration. At intermediate stages, the integration brings the individual closer to the system as a commonality, but it does not yet reach it. The integration turns out to be incomplete. The integration takes the form of connections and structures at stage 3; the common features of the individual as a system appear at stage 4. In this context, the integration of the individual system reveals successive gradual transitions from individual traits to their compositions, then to their structures, and then to the commonality.

The concepts of individual traits and their compositions and structures need some revision and updating. This is necessary in order to open their integrative resource and show the commonality as a condition for combining the individuality into a system.

Individual traits

The concept of a trait is plural; it denotes a quality, attribute, distinctive feature, meaning, score, and external expression.

In psychology, the concept of a trait is also ambiguous. Temperament consists of traits that are further indivisible, for example, extraversion, reactivity, and rigidity (Merlin, 1973). Personality consists of traits that break down into abilities, character, and purpose, but each represents a complex multi-aspect quality, which in turn breaks down into separate properties, for example, giftedness, talent, genius. Personality traits are also separate; for instance, sociability, openness, initiative, tolerance, and responsibility.

To narrow down the ambiguity, let's further understand traits as elementary, the smallest attribute of the individuality and its commonality. The trait can be described with the minimum part of the commonality. A trait can exist and function as a unit of analysis if it retains the main

distinctive features of the commonality. For example, the traits of psychodynamics serve units of temperamental analysis (Merlin, 1973). One can consider the traits simple, at least more “elementary” than the commonality, which it includes and whose marker it is. Usually, it assumes that the unit of analysis is not decomposable into even simpler components, without losing the meanings of the commonality. Modern facts, however, indicate otherwise. Units of analysis can be “elementary” in relation to the commonality, but have their internal structure and be “complex,” since they continue to split up.

The splitting of the nervous system traits serves an argument in favor of the fact that a decomposition of elementary traits can also occur. Initially, it assumed that the trait of the mobility of the nervous system is further indivisible. But a factor analysis of the common matrix of intercorrelations revealed not one but two groups of indicators that appeared in different factors. These facts led B. M. Teplov (2004) to the idea of “splitting” nervous traits, in particular, into mobility and lability.

Traits allow individual differences to be estimated. The former show, for example, not only a feature of the nervous system but also dispositions of the personality, its status, and role in the social group.

For greater clarity, let’s further keep in mind the trait as an elementary unit and not confuse it with complex multicomponent and larger properties such as character, abilities, personality disposition, and temperament. These complex properties require separate analysis. But the concept of the trait as an elementary unit also requires updating.

At first glance, the characteristics of self-identity and relativity, discontinuity and continuity, stability and variation adduce traits as opposites.

Self-identity and relativity

The trait of individuality is identical with itself in the sense that it reveals itself in its inherent characteristics. The trait is equal to itself and is not identical to any other trait. The identity of a trait determines its individual, separate, concrete existence. Due to self-identity, the essence of the trait remains, even if it undergoes changes over time; however, more strictly and precisely, it is appropriate to speak more about self-similarity than about self-identity as such. The similarity of a trait to itself means that it is not totally identical, but only approximates itself. This clarification justifies the argument, since the trait exists among many traits, differs from them, and also enters into certain relations with them.

As a result, a trait carries a relative character. It arises because different reference systems exist, which lead to the relativity of viewpoints on the relationship of a trait with other traits. Any reference system is not absolute;

in fact, traits appear in several reference systems. This means that traits deriving from different viewpoints gain their relativity, becoming equally important and significant in relation to each other. E. V. Startseva (Dorfman, 2010) investigated women aged between 18 to 20 years old. They engaged in several roles regarding previous to their mothers, fathers, younger siblings, and themselves on a number of variables. It assumed that women in the role of daughters (frame of reference 2) and the same women in the role of older sisters (frame of reference 1) evaluate themselves in various ways on the same variables. The results evidenced significant differences between the roles of women on the variables of self-concept, search for novelty, and dominance. It means that the reference systems influenced these variables and that therefore the latter turned out to be relative.

Self-identity and relativity are not only opposites. They are also additional to one another and have a dual organization. The focus of traits can reveal self-identity or relativity, as well as both sides together.

Discontinuity and continuity

Individual traits emphasize their discreteness (discontinuity). First, the trait has the certainty of its separate existence, which distinguishes it and differs from that of other traits. The trait possesses its range for its own right. Beyond it, there are other traits with their own ranges of existence. The trait may vary but its substantive qualitative and quantitative features remain. For example, the essential features of a trait remain constant. On the contrary, the non-essential traits change to some extent. Quantitatively, the range of the trait can be large, medium, or small, but the gist of the trait still takes place.

Second, individual traits are discontinuous. They are granular, fractional, finite, and detach from each other. At their borders, one trait ends and another begins. However many traits there are, there are the same number of boundaries between them. They interrupt each other and “force” them to cease to be what they are, beyond the range of their existence. The theory of personality of H. Eysenck (1999) is an example of how individual traits are discrete. The findings provide evidence of the orthogonality of extraversion, neuroticism, and psychoticism. Orthogonality is one of the variants of discontinuity. In the circular model of personality traits, dominance and care are discontinuous, although there are successive transitions between them through a number of other traits (Wiggins, 1995). The discreteness of individual traits does not disappear even when they link. The positive correlations of sociability with extraversion (Merlin, 1973) do not eliminate their differences in the sense of being discontinuous.

Individual traits are also continual like a duration or sequence. The continuity is two-fold. First, changes in traits are continuous and stepwise. The categories of continuity and discontinuity turn out to be additional for such traits. Let's take, for example, bipolar traits. They fit into the same category and act as poles to each other. There are gradual transitions between them; so traits of this kind are not only discrete but also continuous. In quantitative measurements and psychodiagnostics, rigidity and plasticity, extraversion and introversion, and dominance and submission represent pairs of both discrete and continuum traits. The boundaries between them are somewhat conditional and mobile. The discontinuity of bipolar traits does not exclude their continuity.

Second, the continuity is a set of individual traits that closely relate to each other, the form of their commonality (Belyaev, 2009; Katasonov, Bernstein, electronic resource). In exploratory factor analysis, for example, a number of manifest variables within factors correlate indirectly through latent variables. The latter are not only responsible for correlations between manifest variables, but also function as local commonalities, ensuring the continuity of the manifest variables within the factors. Conversely, the latent discreteness appears for those manifest variables that enter in different factors.

The above assumptions follow from mathematics. It defines the continuum this way. There is a third value located between any two other values. When discreteness and continuity relate to bipolar traits, presumably, the third value is a mediator. Discreteness and continuity are rather complementary and their organization is dual. They form a join in the structure of the traits.

Stability and variation

Differential psychology and differential psychophysiology customarily emphasize the stability of individual traits. They are little-changing, for instance, characterizing innate nervous-system traits (Golubeva, 2010). The stability of individual traits also means a constancy in the aspect of their expression in thoughts, emotions, and behavior, regardless of vital events and life experience (Hjelle, Ziegler, 2006).

To some extent, the individual traits are stable and cross-situative for long periods of life. The traits of temperament (Merlin, 1973) and the cross-situativeness of personal dispositions (Mischel, Skoda, 1998) illustrate the stability of individual traits. However, the view of traits as being stable needs certain additions. Let us pay attention to the current trend towards the transition from the stability of the mental and the personality to the study of their changes (Leontiev, 2018; Leontiev, Mitina, 2016). Among the most

important are representations that would combine stable and changing features of individual traits. This is a turn to their new understanding.

Usually, the stability of individual traits is in contrast with mental processes (Goldberg, 1993). Meanwhile, the invariance of individual traits and their variation can be regarded together, albeit within certain limits (John, Angleitner, Ostendorf, 1988; Mischel, Shoda, 1998). The traits have various degrees of expression, though they may have movable boundaries, and manifest themselves differently in different situations. They change over time.

Mischel and Skoda (1998) were perhaps among the first to develop a theory of the cognitive-affective personality system, which predicts and shows how a stable personality system leads to behavior variability depending on the situation. Instead of separating dispositions and processes, structure and dynamics, the theory of Mischel and Skoda (1998) treats them together. "Process dispositions" are a concept that combines stability and variability. The study by S. A. Shchebetenko (2017) also illustrates the relationship between them. He contrasts personality traits with reflexive adaptations (self-schemes). They can mediate (strengthen, compensate, and eliminate) the connections of personality traits with their life manifestations. The change of traits also gives rise to their variation. It functions in the sense not of development but of a multi-variant of traits. Rather, the variability serves as a prerequisite for development (Dorfman, Gasimova, 2017).

Like self-identity and relativity, and discontinuity and continuity, stability and variation express two sides of the same individual trait. Again, they are complementary and their organization is dual. Stability and variation can express the individual trait in a separate way or together.

Composition of traits

In the explanatory dictionary of the Russian language by D. N. Ushakov (2007), the concept of composition has several meanings. Two of these values are close to the topic of our work, namely, (1) a set of elements forming a whole, and (2) a combination of elements. The composition arises not from one, but from several traits. They are multi-local, and a special research task is to establish those of them that combine into a composition. For instance, a synesthesia (a composition) emerges when irritation in one sensory modality (an element 1) leads to an involuntary response in another (an element 2).

Elementary traits are able to give rise to their composition. As a result, elementary traits can combine in complex traits. The hierarchy of associations in the theory of creativity (Mednick, 1962) and in neural (Martindale, 1995)

and semantic (Gavrilova, Ushakov, 2012; Ushakov, 2006; Valueva, 2007) networks highlight compositions.

The concept of composition describes the set of individual traits, taking into account their coexistence, coupling, and conjugation. The composition of traits manifests itself in aggregation and composites, but differs from structures in that traits do not necessarily correlate with one another.

The aggregation indicates that several traits belong to the same composition. In questionnaires, homogeneous items combine into scales, as in the personality questionnaire of Eysenck (Eysenck, Eysenck, 1994), and homogeneous tasks in tests group into separate categories, as in the intelligence test of R. Amthauer (Amthauer, 1973; Senin, Sorokina, Chirkov, 1993). A composite is a heterogeneous quality composed of two or more individual traits with a distinct interface between them. The composite can take the form of an amalgam, such as an alloy, a mixture, or a combination of some heterogeneous features (Dorfman, 2019b; Gavrilova, Ushakov, 2012). Likewise, a motive is a composite because its two kinds fall into a drive and an object that “tags” the need (Dorfman, 2016a).

Finally, an updated view of individual traits and their compositions is put forward. First, they are dual, since they are inherent in self-identity and relativity, discontinuity and continuity, stability and variation. Second, a dynamism is inherent in the traits and their compositions because they carry multi-aspect transitions and mobility.

Resource basis for the integration of individuality

As mention above, the differentiation aims at finding differences between traits; and the integration, on the contrary, aims at establishing what they have in common. The compositions of traits are an intermediate step in the integration processes. But how can the commonality arise despite the individual? And how can individual traits combine despite their isolation? Here two different trends collide, their hidden conflict emerges; and it needs to be resolved. The ways to resolve this conflict can be deployed along three lines.

First, transitions from individual traits to their commonality conceive the process. The integration as a process shows the variation and mobility of individual traits and their compositions, and expresses the stages of their integration. Second, it is proposed to understand the integration as a consistent overcoming of individual differences by their commonality. Third, it assumes that the traits and compositions have some resource that ensures their integration into the system.

A physical metaphor, namely, the model of the shell structure of the atom (Bohr, 1970–71) in the most general form proves to be quite useful.

Physicists established that an atom consists of a nucleus and electron shells. The electrons of the outer shells locate farther from the nucleus and have more energy, and their connection with the nucleus is weaker and easier to break. On the contrary, the electrons of the inner shells locate closer to the nucleus and have less energy, and their connection with the nucleus is more difficult to break. In chemical reactions, the role of the electrons of the outer shells is more important than the role of the electrons of the inner shells.

One may extrapolate the shell structure of the atom on a model of how the individual traits overcome the commonality. To do this, two contours of the traits, namely, internal and external, are given rise to. The inner contour emphasizes characteristics of the traits facing themselves. The outer contour, on the contrary, shows the characteristics of traits that are open for combining them with other traits.

Then, the characteristics of the external contour, presumably, have a resource necessary and sufficient for the deployment of the integration process. The resource of the characteristics of the internal contour, on the contrary, is insufficient for the deployment of integration. The characteristics of the internal contour counteract the integration, or at least limit it. Indeed, the integration looks like a function of two opposites that the external and internal contours of traits provide, but their resources differ. Their balance determines the resource opportunities of the integration of individual traits.

It is easy to notice that the characteristics of the internal and external contours of the traits fall into two groups. The first group includes the characteristics of self-identity, discontinuity, and stability. Self-identity counteracts the processes of integration, because it closes the trait on itself and turns it in the opposite direction from integration with other traits. Discontinuity counteracts the integration processes, because the traits detach from each other. The stability of the trait also counteracts the integration processes because it “resists” changes.

The second group includes traits with the characteristics of relativity, continuity, and variation. They refer to the outer contour of the traits. The relativity indicates the mobility of traits because their relations with other traits are relative and allow their coordinates to change. This creates a favorable ground for integration processes. The continuity is the “ability” to make continuous transitions across the boundaries of traits. Due to continuity, the transition from individual traits to a common area ensures integration processes. The variation is expressed in the fact that traits may have movable boundaries in different situations and change over time. Due to this, a field of opportunities for integration processes also arises.

Thus, individual properties and compositions with their different sides can both promote and counteract the processes of their integration into the

system of individuality. The balance of the external and internal contours of individual traits serves as a resource marker for their integration into the system of individuality.

1.4. Investment of structures and commonality to the integration of individuality

In the previous paragraph, the integration of individual traits and compositions was emphasized. This paragraph continues this line of research on the final stages of the integration. It refers to structures and commonality.

Still, the concepts of traits, compositions, and structures were used apart from one another, but their relations remain ambiguous. Atomism is content with traits and compositions, and sees no need for structures. In structuralism, on the contrary, attention shifts from elements and compositions to their relationships, but the commonality is discarded. The basic principle of structuralism is fixed, namely, the methodological primacy of relations over elements.

In recent decades, there has been a tendency to consider the concepts of traits, compositions, and structures together. A systemic approach is the mainstream choice (Ananyev, 2018; Golubeva, 2005, 2010; Merlin, 1986; Viatkin, 2015; Viatkin, Dorfman, 2018). But the relationships in the approaches of the above authors are guessed rather intuitively, and the commonality is frequently outside the field of their attention. Theoretically, relations of traits, compositions, and structures are poor and need additional highlighting.

In the context of the topic of this work, it is especially necessary to consider structures, as well as their investments in commonality. Ideas about structures and commonality are necessary to understand and comprehend their part in the integration of individuality.

Structures

A structure (from the Latin *structura*) is a certain order, organizing the relationships of certain traits and links between them. A structure is an internal form in contrast to internal content (Sagatovsky, 2011). Logically, the concept of coherence combines structures with traits (compositions) and commonality. Coherence indicates the conjugation of traits and the creation of complexes, groups, and factors, with the commonality as their ground. Coherence is opposed to the stratification of traits, and the integration of their diversification.

Contrary to the myth that everything connects with everything, traits do not always add up to compositions, and if they arise, this does not mean that there are sufficient prerequisites for the structures. After all, in order for structures to appear, in addition to the compositions of traits, connections between them are necessary. But even when structures arise, there may be several structures, not just one (Dorfman, 2016a, 2018b). Then, it is appropriate to study structures both jointly and separately from traits and compositions, as well as together with the commonality.

This paragraph, in a methodological and theoretical way, intends to raise and comprehend the structures and the commonality within the framework of the integration. This issue develops with a focus on empirical research.

Divergent integration of individuality

Coherence is a generic concept for describing integration. A transition of traits and compositions into structures takes place. It has internal limits of the integration. Traits, compositions, and structures characterize a basis for the integration, although they can also refer to other concepts.

Two kinds of coherence arise in the integration. The first meaning implies that traits and compositions embed into structures. The second meaning refers to the relations of structures with the commonality. The latter is relevant to the system of individuality (Viatkin, Dorfman, 2018).

These coherences are under consideration apart. Attention is drawn to them in different paragraphs. In this paragraph, the integration of traits and compositions into structures develops. The main idea is that the integration is mobile, its range changes, extending or narrowing, and leads to the various structures.

Not so long ago, the structure was taken as a relatively stable coherence of traits. Respectively, a system was like a static construct such as the arrangement of an atomic crystal lattice. The fundamental idea of structuralism was to search for a static structure undertaken out of time, without any changes (Gutz, Pautova, 2013).

In recent decades, there has been a departure from the classical idea of structure as rigid. The new trend is to consider structure as changing, dynamic, and with mobile borders. Its features are variation and multi-variant, albeit within some limits. The concept of dynamic structure began to develop (Viatkin, 2015; Viatkin, Dorfman, 2018; Gutz, Pautova, 2013; Merlin, 1986; Bhaskar, 2008).

A dynamic structure means a structural multiplicity. Static and dynamic structures exist. In the study of discipline, not one but three structures appeared, namely, unitary, dual parallel, and dual with partial intersections. The unitary structure included all scores, the dual parallel structure included

scores of social discipline and self-discipline, and the dual structure with partial intersections included scores of general discipline, social discipline, and self-discipline (Dorfman et al., 2018). The results indicate several structures of discipline, rather than one, their variation and their dynamics.

The structural multiplicity leads to several integration opportunities. First, traits and compositions create a single structure. It is stable and does not change, namely, there is one composition and one structure (a static structure). This assumes that the integration opportunities are limited to embedding traits in a single structure.

Second, links between the same composition of traits and several structures arise, namely, there is one composition and several structures (isomerism). Then, the integration opportunities extends, since several structures are in use, even if the structural diversity is limited to a single composition of traits.

Third, many-many links between traits and structures arise. Many traits from several compositions link to one structure, and several structures link to one trait from one composition (polymorphism). Then, the opportunities for integration become even more diverse due to the many-many links that provide various structuring mechanisms. Taking into account all these links together, it is easy to come to the understanding of the integration as divergent.

Let's consider structural multiplicity in more detail.

One composition and one structure (a static structure)

The static structure of the system does not change under different modes of its operation. The traits and compositions also do not change. The coherence between them are stable and remain unchanging over time. The static structure ensures the stability of the system. This tendency to preserve is the opposite of changing it. A. M. Mishkevich (2015) studied the academic performance of high school students. The exploratory factor analysis examined grades of school disciplines. The hypothesis was that grades for humanities disciplines enter a separate factor. The results for one factor explained 70.6 % of the total variance. It included grades of all disciplines with significant loadings. This suggests that one academic composition leads to one structure.

One composition and several structures (an isomerism)

In 1823, U. Liebig and F. Wöhler established that two substances with different properties exist in the composition of the same AgCNO —cyanoic acid (AgNCO) and rattlesnake (AgONC) silver. These were the first facts about chemical isomerism. In 1830, J. Berzelius introduced the term

“isomerism” after studies of tartaric and grape acid. He suggested that the differences arise due to the different distribution of simple atoms in the molecule.

In the second half of the nineteenth century, isomerism received a genuine explanation due to the theory of the chemical structure of A. M. Butlerov (structural isomerism) and the stereochemical doctrine of J. H. van 't Hoff (spatial isomerism).

The famous Russian chemist A. M. Butlerov discovered that the physical and chemical properties of substances depend on the order of the atoms' connection, and not only on their composition. Thus, he justified the phenomenon of isomerism. Butane and propane have the same composition of atoms, but different structures, so they are different substances. Among the organic compounds of the alkane class, normal butane (n-butane) and its isomer isobutane detach. They have the same composition of atoms (4 carbon atoms and 10 hydrogen atoms), but different structures. In the first case, there is C_4H_{10} , in the second $CH(CH_3)_3$. Normal butane and isobutane are substances with different physical and chemical properties. Chemical transformations resulting from structural transitions conceive of isomerization. There are quite a lot of isomerism phenomena in chemical compounds. About seventy structurally isomeric decyl alcohols arise (Slanina, 1984).

In psychology, isomerism is treated with respect to emotion. It has the same composition, but has different structures in terms of quality and dynamics. These facts indicated the phenomenon of emotional isomerism (Dorfman, 1997). L. Ya. Dorfman and V. N. Lyadov (2015) showed that the composition of discipline can consist of general discipline, social discipline, and self-discipline. They found that in the same composition, several structures of discipline appeared, namely, “fork,” “arc,” and “ring.” There was a structural isomerism. Due to isomerism, the integration diverges in different directions against the background of the same composition of properties.

Several compositions and several structures (polymorphism)

Polymorphism (from the Greek *polymorphos*, “diverse”) illustrates the relationship of changing compositions of properties and the changing structures of individuality. The phenomenon has several compositions of properties and several structures. According to some sources, in 1798 M. H. Klaproth discovered polymorphism, according to other sources in 1822 E. Mitscherlich discovered this phenomenon.

Polymorphism occurs in physics and chemistry. Two modifications of carbon, namely, cubic (diamond) and hexagonal (graphite), differ in physical properties. White tin with a tetragonal crystal lattice is a plastic metal, and

gray tin with a diamond-like tetragonal lattice is a brittle semiconductor. Polymorphism is also observed in liquid crystals. Modifications of a substance are called polymorphic, and transitions from one modification to another are polymorphic transformations. Silicon dioxide has ten polymorphic modifications, calcium fluoride has six, and ammonium nitrate has four (Verma, Krishna, 1969).

Yu. A. Urmantsev (1988) discovered the law of systemic polymorphization. It states that any object is a polymorphic modification and any polymorphic modification belongs to at least one systemic polymorphism. Polymorphisms not only are physical and chemical but also can be social, biological, and geological. Spatial, temporal, dynamic, substantial, and other polymorphisms take place (Urmantsev, 1988). The above facts support the idea of N. I. Vernadsky (1892) about polymorphism as a general property of matter.

In psychology, V. S. Merlin (1986) developed polymorphism in a structural way. The criterion of hierarchy was in use and many-many links tested relations of individual traits pertaining to different levels.

Take, for example, the correlations of temperament and personality traits. In the theory of V. S. Merlin (1986), they refer to different levels of integral individuality. Extraversion (temperament) correlates with aggression and authoritarian attitude (personality). Aggression (personality) correlates with extraversion and frustration (temperament). The frustration (temperament) correlates with aggression, hostility control, and dominance (personality), and the aggression (personality) with extraversion and frustration (temperament).

Polymorphism unfolds in at least four aspects. First, the composition of traits changes. Second, several compositions of traits move to several structures. Third, transformations, modifications, and the interchange of polymorphic structures appear. Fourth, traits, compositions, and structures of a polymorphic kind predict new qualities of integral individuality.

Hierarchical polymorphic compositions and structures give a dynamism to integral individuality, which takes on a variety of relationships between traits of different levels, making it mobile and changeable. Thus, polymorphism comes into opposition with the traditional concepts of static structures. Compositions and structures of individual traits in various forms are the main results of the polymorphization processes (Dorfman, 2018b; Viatkin, Dorfman, 2018).

Like isomerism, polymorphism provides a divergent integration of traits and compositions into structures. Unlike isomerism, polymorphism opens up larger opportunities for integration.

Targeting integration of the individuality

As mention above, integration can be two-fold. First, traits and compositions embed into structures (divergent integration). Second, the relationship of structures with a commonality is important. Integration in its second meaning raises the question of targeting integration.

Targeting integration deals with the common as its target, and the commonality originates from the structures. The latter can serve the basis of the commonality. Structures are mobile (see the previous paragraph), and this implies the mobility of the commonality, its variability and multiplicity. Therefore, the structures and the commonality are more divergent than identical.

In philosophy, commonality is something that is present in several parts (elements) but goes beyond them and exists as an independent “gist” from the parts (Kant, 2006). For example, if Boris and Peter study at a university, it means that they have something in common, namely, that they are students (Viatkin, Dorfman, Kalugin, 2018).

Commonality describes a fragment of a life world. Its observation is hardly achieved because it exists latently. Structures help to find and define commonality as such. The advantages of it as a target of integration are as follows. (1) Commonality as a theoretical entity operationalizes by transferring to the empirical concept. (2) Although the commonality is latent, certain statistical methods can be used for calculations. (3) Empirical testing of the commonality is its advantage as an empirical concept. (4) The commonality is distinguished from a random array of data that do not characterize the commonality (Viatkin, Dorfman, 2018; Dorfman, 2018b).

In exploratory factor analysis, factors are markers of latent commonalities. The loadings of variables serve indicators of their proximity to latent factors. Some variables and compositions describe commonalities to a greater extent than others. Initially, before the calculations, it is not at all obvious which traits provide commonalities. They still need to discover by performing the appropriate search.

B. A. Viatkin, L. Ya. Dorfman, and A. Yu. Kalugin (2018) conducted a study that produced the following results. The variables of the value orientations spiritual satisfaction, social contacts, self-development, and achievements fall into one factor with significant factor loadings. This factor is a marker of their latent commonality. However, the variables of the value orientations prestige, material well-being, mental activity, physical activity, creativity, and preservation of individuality fall into the same factor as insignificant factor loadings. They make poor contributions to the latent commonality. Then, only a part of the traits of value orientations provide their latent commonality.

Commonality and structures

The commonality arises as a new state in comparison with structures; the latter, in turn, may not lead to the commonality or generate its several varieties. Indeed, there is something more in common than just structures. The commonality is the result of generalization and abstraction. It is unlikely that they are reduced only to structures. For example, the correlation matrix of a set of variables permits a view of a structure. But the commonalities arising from the structures of variables are not necessary at all. A many-many relationship may arise between the structure and the commonality. The structure of traits can generate several varieties of commonality (as in the exploratory factor analysis of data), and one kind of commonality does not exclude several structures (as in the confirmatory factor analysis of data). Thus, the structures and the commonality are not identical.

The question of similarity becomes acute when turning to systemic commonality. Yu. A. Urmantsev (1988) proposed the law of systemic similarity. He meant that the elements of a system of the same kind should be similar. The concepts of similarity and commonality are not identical, but they are close (Viatkin, Dorfman, 2018).

The commonality differs from local phenomena and is contained within them, in parallel. This view of I. Kant (2006) on commonality implies that the superposition of structures and the commonality can occur in addition. Then, the structure can represent an internal framework of the commonality. The targeting integration does not exclude the mobile mode of relations between the structures and the commonality.

Operationalization of the commonality and its measures

The measures of the commonality depend on how one understands commonality as an empirical concept. Then, its operationalization and defining measurement are perspective.

In statistics, the measure of the commonality in exploratory factor analysis is the generalization of variables by reducing their large number to a small number of factors. That is, the total is minimized by the number of factors. It has an increasing capacity in comparison with individual variables (Viatkin, Dorfman, Kalugin, 2018).

In studies of cognitive styles (Kholodnaya, 2004; Kolga, 1976; Shkuratova, 1994), the commonality has the opposite meaning. A wide range of equivalence (synthetics) is estimated by a larger number of objects that are included in one group, and a narrow range of equivalence (analyticity) by a smaller number of objects included in one group. In studies of categorization as a style, broad categorizers tend to bring a larger

number of confirming properties under one category than narrow categorizers. In both parameters of cognitive styles, the commonality is breadth, summing up more properties under the commonality.

Thus, two alternative measures of the commonality are in use. They deal with generalization, but empirically, it produces opposite sides. The first measure of the commonality appears through a smaller number of properties in its composition. The second measure of the commonality, on the contrary, appears through a greater number of properties in its composition (Viatkin, Dorfman, 2018).

The issue of the operationalization of the commonality is crucial. By focusing on the formal-logical law of the inverse correspondence between the content and the scope of the concept, B. A. Viatkin and L. Ya. Dorfman (2018) proposed to estimate the commonality by the criterion of the variation of its properties. Perhaps V. Stern (1998) was the first who tried to connect the commonality with the scope of variation. However, he did not bring his plan to the level of its empirical verification.

In current works, the study of commonality by the criterion of variation has been repeatedly undertaken on the basis of V. S. Merlin's integral individuality (Viatkin, Dorfman, 2018; Viatkin, Dorfman, Kalugin, 2018), the meta-individual world (Dorfman, 2016a), the plural self (Dorfman, Kalugin, 2016), creative thinking (Dorfman et al., 2015; Dorfman, Gassimova, 2017), and discipline (Dorfman, Lyadov, 2015). The results indicate that the range of variation of variables within the commonality is greater than the range of variation of variables outside.

Thus, a wide rather than narrow range of variation indicates the commonality. The variation criterion permits properties inside the commonality to be separated from properties outside it (Viatkin, Dorfman, 2018; Dorfman, 2016a). This fact hints at the targeting integration that includes a separation of the commonality from the structures.

From structures to commonality (structural modeling)

As mentioned above, the targeting integration involves the fact that the commonality functions as a target that the structures mark. The latter involve exogenous variables, and the former endogenous ones. Statistically, structural modeling most clearly expresses this research design (Nasledov, 2013). It permits setting and testing hypotheses about the paths from the variables of structures to the variables of commonality.

The targeting integration intends a search to clarify the variables of structures and commonality, as well as significant paths from the former to the latter. The structures can possess at least three varieties, namely, static, isomers, and polymorphic (see the previous paragraph). The breadth of