PSYCHOLOGY IN RUSSIA: STATE OF THE ART

Volume 14 Issue 1 2021

Clinical psychology

Fixed Forms of Behavior as Excessively Rigid Behavior in Normal and Pathological Individual and Group Systems Zalevskii G. V.	3
A Study of Oddity in a Russian Clinical Sample <i>Atadzhykova Ju. A., Enikolopov S. S.</i>	12
Postpartum Depression and Birth Experience in Russia Yakupova V. A., Suarez A.	28
The Validity and Reliability of the Turkish Scale for the Assessment of Fatigue in Pediatric Oncology Patients Aged 7–18 in Russia Deviaterikova A. A., Kasatkin V. V., Velichovsky B. B.	39
Organizational psychology	
Counterproductive Work Behavior in Russian Nanotechnology Organizations <i>Sayapina K., Botone D.N.</i>	49
Psychological Burnout among Professionals Working with Children with Motor Disabilities <i>Taghreed Al-Ali, Mutasem M. Akour, Enas Al-Masri,</i> <i>Mizaghobian A. A. H., Ghaith S.</i>	69
Psychometrics	
Sources of Artifacts in SLODR Detection	86
Korneev A. A., Krichevets A. N., Sugonyaev K. V., Ushakov D. V.,	

Vinogradov A. G., Fomichev A. A.

Psychology in Russia: State of the Art Volume 14, Issue 1, 2021



CLINICAL PSYCHOLOGY

Fixed Forms of Behavior as Excessively Rigid Behavior in Normal and Pathological Individual and Group Systems

Genrikh V. Zalevskii*

Immanuel Kant Baltic Federal University, Kaliningrad, Russia

*Corresponding author. E-mail: usya9@sibmail.com

Background. This article is devoted to the problem of excessively rigid behavior, which the author has named "fixed forms of behavior" (FFB). This term was suggested to me by the concepts of P. Janet (*idée fixe*), S. Freud (*Fixierung*), and D. Uznadze (*fiksirovanaya ustanovka* — fixed set/attitude). By FFB, the author understands a broad spectrum of behaviors of a person or a group of people, which, according to the cultural norms of a given society for persons of a certain age, gender, and status, have become inappropriate, yet are repeated in situations objectively requiring that they change; the degree of realization and acceptance of the need for this change can vary.

Results. Through literature analysis and the collection of experimental data over many years of research, in which over 1,150 persons took part — 550 healthy subjects and 600 mental patients from a broad spectrum — and on the basis of a biopsychosocionoetic model of the nature of man and his health, and a system-network approach, it has become possible to distinguish the following models to explain the nature of fixed forms of behavior: *neurodynamic, energy-economic, phylogenetic, personenvironment relationship, dispositional, stressogenic, pathogenic, psychodynamic, learning (behavioral-cognitive), system (an excessively rigid system and structural relations between levels of action).* Keywords: FFB, fixed forms of behavior, individual and group systems, biopsychosocionoetic model, systemnetwork approach

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online) © Lomonosov Moscow State University, 2021 © Russian Psychological Society, 2021 http://psychologyinrussia.com

The journal content is licensed with CC BY-NC "Attribution-NonCommercial" Creative Commons license.

Introduction

By fixed forms of behavior (FFB), I understand a broad spectrum of behaviors of a person or a group of people, which, according to the cultural norms accepted in a given society for persons of a certain age, gender, and status, have become inappropriate, yet are repeated in situations objectively requiring that they change; the degree of realization and acceptance of the need for this change can vary. Such behavior can be defined as inert, sluggish, stagnant, bigoted, rigid, dogmatic, inelastic, non-plastic, inflexible, uncreative, unchangeable, or difficult to change. But the term fixed forms of behavior includes all of those characteristics (Zalevskii, 1976, 1987, 1993, 2003, 2007, 2008, 2013).

The concept of fixed forms of behavior was proposed by me over 40 years ago in the *Zhurnal nevropatologii i psikhiatrii imeni S.S. Korsakova* (Zalevskii & Rogovin, 1970). The term was not in use at that time, but the idea was suggested to me by those of P. Janet (*idée fixe*), S. Freud (*Fixierung*), and D. Uznadze (*fiksirovanaya ustanovka* — fixed set/attitude).

My understanding of fixed forms of behavior has developed considerably since then, but the problem itself is far from having been studied sufficiently.

The best demonstrations of fixed forms of behavior — their nature, variety of manifestations, and place in the lives of people — are situations of social upheaval and rapid transformation (for example, the Perestroika period in the Soviet Union).

The spectrum of fixed forms of behavior is very broad. Throughout our lives there are two types of activity — variable and invariable (or difficult to change), that is, fixed forms of behavior. The relationship between them is one of the key problems of biology and psychology, as well as related sciences: physiology, general and social psychology, personality psychology, and psychopathology.

Fixed forms of behavior can reveal themselves both at the level of the individual personality, that is *individual systems*, as well as at the level of groups of people (families, organizations, societies, and states), i.e., *group systems*. Their influence is observed in different spheres of everyday human activity: in education (in closed educational systems, in difficulties accepting innovative processes), science (unjustified defense of one's own ideas and "cherished" theories, irrational resistance to ideas offered by colleagues), culture (obsolete customs and traditions, ethnocentrism, fanaticism) (Zalevskii, 1996, 1999, 2008), and in professional activity, for instance, that of psychologists and psychotherapists ("adjusting the client to one's concept", adherence to one's favored methods). Problems of education (re-education) and psychotherapy often involve the need to change fixed forms of behavior (inappropriate habits and stereotypes of behavior, varied forms of inappropriate or deviant behavior (Zalevskii, 1976, 1987, 1999).

I emphasize that, like Janet, I regard behavior (both fixed and non-fixed) as comprising thought, feeling, attitude, and motion. From this standpoint, the opinion of psychotherapist Robert Goulding appears quite justified, that "psychotherapy is a science of how to change oneself — to change one's thoughts, feelings, behavior, sometimes even one's body" (Goulding, 1998).

5

Methods and Participants

Through theoretical analysis of the specialized literature and data from my own experimental studies over many years (Zalevskii, 1976–2015), in which over 1,150 persons took part — 550 healthy subjects and 600 mental patients from a broad spectrum — and on the basis of a biopsychosocionoetic model of the nature of man and his health, and a system-network approach, it has become possible to distinguish the following models to explain the nature of fixed forms of behavior: *neurodynamic, energy-economic, phylogenetic, violation of person-environmental relationship, dispositional, stressogenic, pathogenic, psychodynamic, learning (behavioral-cognitive), maladjusted person system (excessive rigidity of the system and violation of the structural relations between levels of action/behavior).*

Results and Discussion

1. The neurodynamic model of fixed forms of behavior

This model explains their nature and causes by the inertness of nervous processes for various reasons — asthenization (fatigue, nervous exhaustion), pathology (as a result of brain damage), etc. But the demonstrated relations between the nervous processes and psychological characteristics of a person reflect only indirect links and low correlations. For instance, in perseveration, one of the fixed forms of behavior, pathological inertness of nervous processes is caused by weakening of attention or of "conscious control of action" (E. Kraepelin).

2. The energy-economic model of fixed forms of behavior (habits, routine actions, etc.)

First developed by V.M. Bekhterev (1926), this model is derived from the general principle of energy conservation. There are references to the principle in the works of the Georgian school of the psychology of set (D.N. Uznadze) as well. A mental set corresponding to objective circumstances normally includes some fixed elements gained from past experience, and, in keeping with the principle of energy conservation, guarantees the satisfaction of a need (Prangishvili, 1973, pp. 355–356). But, as is well known, a fixed set, apparently based on the same principle, does not guarantee the satisfaction of a need. Russian scientist A.A. Ukhtomskiy, developing his theory of the dominant, uses examples borrowed from the science of science to demonstrate that the principle of energy conservation, being the essence of the dominant, works well in stereotyped, routine conditions, but produces fixed forms of behavior in conditions that are new and "do not coincide with the dominant". "I feel it my duty", wrote Ukhtomskiy, "to point out that many doctrines and theories are biased a priori, because from the outset they are oriented towards stability and minimal action; reality is sacrificed to the beautiful eyes of theory" (Ukhtomskiy, 1973, p. 390).

3. The phylogenetic model of fixed forms of behavior

This model is close in many respects to the "energy approach". Observations by ethologists and experiments of zoopsychologists show that fixed forms of behavior are demonstrated by animals too, and the lower are the organisms on the phylogenetic scale, the more numerous are the manifestations of such forms of behavior. Instinct, directing the behavior of the animal, is adapted to life in a stable environment and functions well in these conditions. But what if the conditions of life change suddenly? Why did the dinosaurs die out so suddenly? It is because instincts are potentially fixed forms of behavior. Convincing illustrations of this can be found in the studies of K. Lorenz, N. Tinbergen, and other ethologists.

4. Fixed forms of behavior as a violation of the person-environment relationship

This model goes back to the work of Russian physiologist and psychologist I.M. Sechenov more than a century ago, who wrote: "Always and everywhere life is made by cooperation of two factors — present but changing inner organization and certain influences from outside. It does not matter whether we look at life in terms of its ultimate objective — preservation of the individual — as on something developing, because preservation at each discrete moment of existence is achieved through unceasing transformations. This follows from that fact that in all organisms, the preservation of the whole body and of life itself is achieved not by stability once formed, but by constant partial destruction and rebuilding of the elements of the body" (Sechenov, 1963, pp. 288–289).

From the thoughts of Sechenov, as well as those advanced later by C. Bernard ("on the constancy of internal ambiance"), W. Cannon ("on homoeostasis"), and I. Pavlov ("on balancing"), the conception evolves, first, of harmony between internal conditions and external influences, and, secondly, that this harmony is ensured only when activity and behavior are determined by the constantly changing influences of the ambiance. In the case of fixed forms of behavior, this harmony is broken and behavior is determined only by internal conditions, while disregarding external, objective requirements.

In mental disorders, the determination of the person's mental activity and behavior by the external world is considerably weakened and even completely disappears. W. Griesinger, one of the founders of scientific psychiatry, wrote that "the essential process of insanity manifests itself predominantly in that certain moods, feelings, emotions, decisions come from within as a consequence of mental illness, while in the normal state our feelings and decisions are caused only by sufficient external motives and therefore manifest a certain link with the external world" (Griesinger, 1881, p. 64). "Stereotypes are actions completely independent from the general situation, which do not correspond to any objective surroundings" (Y. Klasi, cited in Bash, 1955).

5. The pathogenic model of fixed forms of behavior

Clinical practice and various clinical studies, including our own, allow us to formulate a pathogenic conception of fixed forms of behavior. It is somewhat global, but can be rendered more concrete by including elements of other schemes, such as psychodynamic and learning (behavioral-cognitive). This is because fixed forms of behavior, first of all, noticeably increase in intensity and extensity from the norm to mental pathology and, secondly, there is a further increase, despite certain qualitative specifics, from mild forms of psychiatric disorders (e.g., neurosis) to more severe forms (e.g., schizophrenia).

These results were obtained with the Tomsk Rigidity Questionnaire developed by me (see Burlachuk, 2008; Zalevskii, 1987; Wasserman & Kudryavtsev, 1985; Pawlik & Rosenzweig, 2000).

5.1. The psychodynamic model of fixed forms of behavior

Within this framework, fixed forms of behavior characteristic of neurosis are interpreted as manifestations of defense mechanisms. "The neurotic protects himself", wrote Freud (1948, p. 376), "by shaping the fixed habits leading to the preference of certain ways to solve personal problems". According to A. Adler (1975), the neurotic tends toward a rigid, maladaptive lifestyle. G. Murphy also considered that "any schematization, any stereotypization, will be a neurotic means of defense" (1947, p. 240).

5.2. The learning (behavioral-cognitive) model of fixed forms of behavior

Advocates of this approach share the opinion that fixed forms of behavior (the tyranny of "should" and irrational thought, inappropriate cognitive schemes and wrong decisions, inappropriate attitudes, bad habits, anxiety and depression, learned helplessness) are the result of "faulty learning", including social learning, although the specific mechanisms of this learning can be rather different (J. Wolpe, A. Lazarus, A. Bandura, A. Ellis, A. Beck, M. Seligman).

6. The maladaptive person model of fixed forms of behavior

The nature of fixed forms of behavior can be explained by the humanistic psychology of Rogers (1961), implemented in person-centered psychotherapy for the "maladaptive person", as a consequence of "ineffective Ego-concepts" and "incongruence between the Ego-concept and new experience". Such a condition occurs when a new experience is rejected and distorted, since clients often deny and distort the positive feedback received from the outside, trying to protect their Ego-concept from threats of violation or even from having to replace it with a new one. This mechanism, in terms of growth in the number and intensity of fixed forms of behavior, often synergizes anxiety and tension (intensionality). Tension-related reactions (intensional reactions — in this case FFB) assess an experience with rigid (absolute and hard) positions in the form of excessive generalization, mixing facts, and striving to rely on abstractions without checking their validity.

7. The stressogenic model of fixed forms of behavior

Psychologists of different orientations note that the reason for fixed forms of behavior may be connected with alerting, fear, frustration, shock, or stress caused by either powerful and brief or weak and long-acting stressors. The last of these turn out to be particular reasons, under the influence of which the familiar, the accustomed, is so carefully and persistently protected, that hostility is shown to anything

7

new, to changes (Levitov, 1977). Levitov himself, alongside other researchers, considers it possible to think of mental rigidity as a state that emerges as a dispositional factor of fixed forms of behavior. In our studies, we have found experimentally a relationship between the action of stressors and fixed forms of behavior, highlighting this along with trait-rigidity and state-rigidity, manifested separately or with synergistic connections between them. This occurs particularly with nervous psychopathology.

8. System models of fixed forms of behavior

8.1. Excessive rigidity of the system of fixed forms of behavior

L. von Bertalanffy (1968) distinguished between open and closed systems: The first can only exchange energy, whereas the second can exchange energy and matter. Interesting in this context is his idea that "a prerequisite for the stability of organic systems is the constant renewal of their elements". It can be assumed that "closed systems", not only organic but also social ones, lack this "constant renewal of elements" both within them and in interaction with other systems. This happens according to our concept of "excessive rigidity of the system" (Zalevskii, 2007), because any system striving for stability, by virtue of disruptive feedback, "rushes past" the optimal necessary measure of stability and directs itself toward hyperstability, becoming rigid (stiff, hardened), excessively closed, as evidenced by the increase in the number of fixed forms of behavior and their increased intensity. As a rule, in such cases an individual or group system collapses.

We noted above, albeit in other terms, one of the classics of German psychiatry by Griesinger, on the extreme (pathological) case of closed individual systems. M. Rokeach (1960) wrote about "the open and closed mind". Could something similar happen with a group system? Probably it could, since this has been characteristic of small groups such as a certain type of family, religious sects, mafia-like formations, and even large social groups such as entire states, for example, the famous totalitarian regimes. We find the philosophical context of this idea already stated by H. Bergson: "The morality of a closed society is static. The morality of an open society is dynamic. … The foundation of open morality is the creative personality; its main characteristic is the spirit of innovation, breaking all the fixed schemas of a closed society" (Bergson, 1932). V. Satir et al. (Satir, Stachowiak, & Taschman, 1975) rightly believed, based on their rich experience of psychotherapeutic work with the family, that in a closed system, people cannot flourish; at best they can only exist, but people need significantly more.

8.2. Violation of the structural relations between levels of behavior

Long-standing experimental studies of personality, both normal and pathological, allow me to offer an original psychological conception of fixed forms of behavior. Its main features are as follows: (a) a hierarchical organization of personality and behavior (activity, actions), in which the personality manifests itself and "personality becomes real" (Hegel); (b) spatial rigidity (embracing the structure and levels of personality), stipulating particular manifestations of fixed forms of behavior; (c) distortion of relationships within the basic structure — between the high level of purpose and the subordinate level of means. Two variants of such distortion are possible: (a) when the fixogenic tendency (a tendency toward FFB) is a means, and (b) when the fixogenic tendency is the purpose of an action (behavior). In the first case, an inadequate means (whether material or ideal) merges with the purpose, making the action maladaptive and leading the person to function on a lower level. In the second case, an inadequate purpose becomes an end in itself, merging with the means, which again makes the action inadequate and leads the person to function on a lower act level. In the third case, both purpose and means can be fixogenic. An example: one purpose and one means — an alcoholic and/or a suicide (hanging oneself) (Durkheim, 1912).

9. The dispositional model of fixed forms of behavior

The basis of the dispositional approach to the study of personality is the assumption that "personality is what lies behind specific acts and within the individual" (Allport, 1937) and that a personality trait is a determining or at least defining element of behavior (Allport, 1954). Rigidity was shown to be a core element of all fixed forms of behavior. R. Cattell (1964) even distinguished a particular type: "dispositional rigidity". A number of studies note that one of the features of "an emotionally sound personality" is flexibility (Rogers, Maslow, Ellis). "Emotionally sound people are intellectually flexible, tend to be open to change," wrote Ellis, "and are prone to take an undogmatic and unbigoted view of the infinitely varied people, ideas, and things in the world around them. They can be firm and passionate in their thoughts and feelings, but they can also look comfortably at new evidence and often revise their notions of 'reality' to conform with this evidence" (Ellis, 1987).

In our studies we also discovered a correlation between the position of the person on the continuum of rigidity-flexibility and features of intensity and extensity of fixed forms of behavior. Furthermore, specific representations of mental rigidity (partial, total, or as a type-forming trait) lead to various "types of rigid personality" (authoritarian, dogmatic, etc.).

Conclusions

On the basis of the biopsychosocionoetic model of man's nature and health (Zalevskii & Kuzmina, 2012) and the system-network approach (Guseltseva, 2007), it is become possible to distinguish some models to explain the nature of fixed forms of behavior.

Our list of explanatory models of the nature of fixed forms of behavior is not exhaustive. Quite close to this approach are attempts to explain fixed forms of behavior through other models, for example: "disruption of the feedback mechanism" (P.K. Anokhin, A.R. Luria), "reactions without meaning and value" (Leerlaufreaktionen — K. Bash, K. Lorenz), "lapse of meaning" (L. Jakobovits, W. Lambert), "ignorance of life experience" (P. Gannushkin, O. Kerbikov), "non-congruence between I-conception and new experience" (C. Rogers), "lazy thinking" (D. Kahneman).

Of course, the explanatory models of fixed forms of behavior described here do not exclude, but rather complement each other.

9

References

Adler, A. (1975). Über den nervösen Charakter. Frankfurt am Main: Fischer Bücherei.

- Allport, G.W. (1937). Personality: A psychological interpretation. New York: Henry Holt and Co.
- Allport, G.W. (1954). The nature of prejudice. Cambridge: Addison-Wesley.
- Bash, K. (1955). Lehrbuch der allgemeinen Psychopathologie. Stuttgart: G. Thieme.
- Bekhterev, V.M. (1926). Obshchie osnovy refleksologii [General principles of reflexology]. Leningrad.
- Bergson, H. (1932). Les deux sources de la morale et de la religion [The two sources of morality and religion]. Paris.
- Bertalanffy, L. von (1968). General system theory. N.Y.: Braziller.
- Burlachuk, L.F. (2008). *Slovar-spravochnik po psikhodiagnostike* [Dictionary of psychodiagnostics] (3rd ed., p. 488). Moscow: Piter.
- Cattel, R. (1964). Personality and social psychology. San Diego, CA.
- Durkheim, E. (1912). *Samoubiystvo. Sotsiologicheskii etude* [Russian translation of *Le suicide* (The suicide)]: Saint Petersburg.
- Ellis, A. (1998). Evolyutsiya ratsionalno-emotivnoi i cognitivno-bikhevioralnoi terapii. In J.K. Zeig (Ed.), *Evolyutsiya psikhoterapii*, vol. 2 (pp. 141–240) [Russian translation of *The evolution of ratio-nal-emotive therapy (RET) and cognitive-behavioral therapy (CBT)*, in J.K. Zeig (Ed.), *The evolution of psychotherapy*]. Moscow.
- Freud, S. (1948). Gesammelte Werke [Collected works], vol. XI. London.
- Griesinger, W. (1881). Dushevnye bolezni [Mental illnesses]. Saint Petersburg.
- Goulding, R.L. (1998). Gruppovaya psikhoterapiya: osnovnoi ili vspomogatelnii metod? [Group psychotherapy: Primary or auxiliary method?) In J.K. Zeig (Ed.), *Ekzistentsialno-gumanisticheskaya psikhoterapiya* [Existential-humanist psychotherapy], vol. 3 (pp. 235–246). Moscow: Klass.
- Guseltseva, M.S. (2007). Postmodernistskie perspektivy rasvitiya psikhologii [Post-modern perspectives of the development of psychology]. In A.L. Zhuravlev & A.V. Yurevich (Eds.). *Teoriya i metodologiya psikhologii* [Theory and methodology of psychology] (pp. 45–73). Moscow: Institut Psikhologii RAN.
- Kahneman, D. (2013). *Dumai medlenno reshai bystro* [Russian edition of *Thinking, fast and slow*]. Moscow: AST.
- Levitov, N.D. (1977). Psikhicheskie sostoyaniya perseveratsii i rigidnosti [The mental states of perseveration and rigidity]. In A.V. Petrovskii (Ed.), *Khrestomatiya po psikhologii* [A psychological anthology] (pp. 195–199). Moscow: Prosvechenie.
- Murphy, G. (1947). Personality: A biosocial approach to origin and structure. New York: Harper & Brothers. https://doi.org/10.1037/10759-000
- Pawlik, K. & Rosenzweig, M.R. (Eds.) (2000). *The international handbook of psychology* (p. 392). London: SAGE Publications.
- Prangishvili, A.S. (1973). Problema ustanovki na sovremennom urovne eyo razrabotki gruzinskoi shkoloi [The problem of set at the current level of its development by the Georgian school]. In *Psikhologicheskie issledovaniya, posvyachennye 85-letiyu D.N. Uznadze* [Psychological research in honor of the 85th birthday of D.N. Uznadze (pp. 10–26). Tbilisi: Mezniereba.
- Rogers, C. (1961). On becoming a person. Boston: Houghton Mifflin.
- Rokeach, M. (1960). The open and closed mind. New York: Basic Books.
- Satir, V., Stachowiak, J., & Taschman, H.A. (1975). Helping families to change. New York: Aronson.
- Sechenov, I.M. (1963). Refleksy golovnogo mozga [Reflexes of the brain]. Leningrad.
- Ukhtomskiy, A.A. (1973). Pisma [Letters]. In *Puti v neznaemoe* [Paths to the unknown]. Moscow, pp. 371-435.
- Wasserman, L.I. & Kudryavtsev, I.A. (1985). *Psikhologicheskaya diagnostika pri nervno-psikhicheskikh i psikhosomaticheskikh zabolevaniyakh* [Psychological assessment in neuropsychiatric and psychosomatic diseases]. Leningrad.
- Zalevskii, G.V. (1976). Fiksirovannye formy povedeniya [Fixed forms of behavior]. Irkutsk.

- Zalevskii, G.V. (1987). Differentsialnaya diagnostika psikhicheskoi rigidnosti pri osnovnykh nervno-psikhicheskikh rasstroystvakh [Differential diagnostics of mental rigidity in major neuropsychiatric disorders]. Tomsk.
- Zalevskii, G.V. (1993). *Psikhicheskaya rigidnost v norme i patologii* [Mental rigidity in the normal and pathological]. Tomsk: TGU.
- Zalevskii, G.V. (1996). Predubezhdeniya, eticheskie stereotipy kak problema psikhologicheskoi antropologii [Stigmatization, ethical stereotypes as a problem in psychological anthropology]. Sibirskii psikhologicheskii zhurnal [Siberian Psychological Journal], no. 2, 70–80.
- Zalevskii, G.V. (1999). Otkrytye i zakrytye obrazovatelnye systemy [Open and closed educational systems]. In *Ekspertisa innovationnykh processov v obrasovanii* [Expert evaluation of innovational processes in education] (pp. 33-46). Tomsk.
- Zalevskii, G.V. (2003). Teoriya subekta i fiksirovannye formy povedeniya [The theory of the subject and fixed forms of behavior]. *Psikhologicheskii zhurnal* [Psychological Journal], *24*(3), 32–36.
- Zalevskii, G.V. (2007). *Lichnost' i fiksirovannye formy povedeniya* [The personality and fixed forms of behavior]. Moscow: Institut Psikhologii RAN.
- Zalevskii, G.V. (2008). Fanatism kak osnovanie i kharakteristika destruktsii systemy tsennostei i dukhovnogo nezdoroviya lichnosti i sotsialnykh soobshhestv [Fanaticism as the foundation and characteristic of the destruction of the value system and of the spiritual ill health of individuals and communities]. In V.V. Znakov & G.V. Zalevskii (Eds.), *Tsennostnye osnovaniya psikhologicheskoi nauki i psikhologiya tsennostei* [The axiological foundations of psychological science and the psychology of values] (pp. 314-340). Moscow: Institut Psikhologii RAN.
- Zalevskii, G.V. (2013). Fiksirovannye formy povedenyia na urovne individualnykh i gruppovykh system (v culture, obrasovanii, nauke, v norme i patologii) [Fixed forms of behavior on the level of individual and group systems (in culture, education, science; in the normal and pathological]. In *Izbrannye trudy G.V. Zalevskogo v shesti tomakh* [Selected works of G.V. Zalevskii in six volumes], vol. 2 (pp. 3-326). Tomsk: TGU.
- Zalevskii, G.V. (2015). Tsenostno-tselostnaya paradigma v kontekste antropologicheskoi psikhologii [The integral value paradigm in the context of anthropological psychology]. In V.V. Kozlov (Ed.), *Metodologiya sovremennoi psikhologii. Akademicheskii sbornik nauchnykh statei* [Methodology of modern psychology. Academic collection of scientific articles], no. 5, 15–26.
- Zalevskii, G.V. & Rogovin, M.S. (1970). Fiksirovannye formy povedeniya i ikh znachenie dlya nevropatologii i psikhiatrii [Fixed forms of behavior and their significance for neuropathology and psychiatry]. *Zhurnal nevropathologii i psikhiatrii imeni S.S. Korsakova* [S.S. Korsakov Journal of Neuropathology and Psychiatry], nos. 8, 9, 11).
- Zalevskii, G.V. & Kuzmina, Y.V. (2012). *Psikhologiya zdorovya studentcheskoi molodezhi* [Psychology of the health of young students]. Tomsk: TGU.

Original manuscript received February 17, 2019 Revised manuscript accepted December 20, 2020 First published online March 20, 2021

To cite this article: Zalevskii, G.V. (2021). Fixed Forms of Behavior as Excessively Rigid Behavior in Normal and Pathological Individual and Group Systems. *Psychology in Russia: State of the Art, 14*(1), 3–11. DOI: 10.11621/pir.2021.0101

Psychology in Russia: State of the Art Volume 14, Issue 1, 2021

Russian Psychological Society

A Study of Oddity in a Russian Clinical Sample

Julia A. Atadzhykova^a*, Sergey S. Enikolopov^a

^aMental Health Research Center, Moscow, Russia

*Corresponding author. E-mail: at.julia@gmail.com

Background. At the beginning of 20th century, the phenomenon of oddity began to be studied. It was defined as a set of characteristics responsible for an individual giving the impression of being unusual, odd, and peculiar. Later, psychiatrists integrated oddity into the concept of schizotypy. Yet, while considered a part of the schizotypy construct, oddity has remained singular and maintained its status as an independent dimension.

Objective. The present article discusses oddity as a set of particular clinical traits that can be evaluated both by self-report measures and clinical assessment. We set out to investigate the oddity phenomena as manifested in a clinical sample, in order to delineate key features that constitute this concept.

Design. Seventy-one patients were selected according to a specific set of criteria and subjected to a set of self-report measures (the Schizotypal Personality Questionnaire and the Adult Personality Traits Questionnaire), a clinical interview, and a pathopsychological experiment. A number of cognitive, behavioral, and emotional characteristics were analyzed. An intra-group comparison was carried out in order to clarify the potential differences between the self-reported and clinically assessed phenomenon of oddity.

Results. The study's first finding was that the SPQ-74 does not identify odd personalities in the general population, as reflected in the fact that the sample's average scores proved to be low. Secondly, restricted emotionality and a deficit in social interactions proved to be the prevalent characteristics of the sample of "odd" individuals. Furthermore, a set of certain speech peculiarities (word coinage, bizarrerie, etc.) and thinking impairments of various types (distortion of abstraction level and motivational deficit) emerged as prominent characteristics in the majority of subjects. Finally, it was determined that clinical assessment allows for a more comprehensive evaluation of the psychology of odd personalities than self-report measures, due to a number of the personality, temperamental, and cognitive characteristics that the latter tend to exhibit.

Conclusion. "Odd" individuals can be characterized by a number of cognitive, emotional, and behavioral features independent of social perception and relevant to clinical practice; they can be captured more successfully by the application of qualitative methods. Further research is needed to elaborate this set of traits and test this hypothesis on new samples.

© Russian Psychological Society, 2021

http://psychologyinrussia.com

Keywords: oddity; schizotypy; schizophreniaspectrum disorders; peculiar speech; Verschroben; psychological assessment

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)

[©] Lomonosov Moscow State University, 2021

Introduction

The awareness that a specific group of individuals can be distinguished by a set of peculiarities that manifest through a variety of behavioral patterns became the focus of attention many years ago, back at the beginning of the 20th century. Clinicians of that period noted that a number of individuals on the schizoid spectrum demonstrated various cognitive, emotional, and behavioral qualities that often appeared strange, odd, and unusual to the public eye. Kraepelin (1915) described so-called "eccentric personalities" based on his observations that the relatives of schizophrenic patients showed attenuated signs or mild forms of impairments characteristic of schizophrenia itself. These individuals' peculiarities involved ambivalence and incongruence of emotionality, absurd ideas (*e.g.*, ludicrous dieting), disintegration of thought, vague speech, etc.

In addition, he separated out a group of "odd personalities," whom he put in the category of psychopaths, potentially qualifying this phenomenon as distinct from endogenous disorders.

Birnbaum (1920) identified opposition to society as a common feature of oddity, whether it expressed itself outwards or was projected inwards, and highlighted cognitive characteristics such as rigidness, and non-continuous, or autistic, thinking. Binswanger (1954) was the first author to use the German word "odd," and differentiate the two clinical contexts where it had been used: 1) *verschrobenen Psychopathen* (ger., "odd psychopaths"), which indicated a group of individuals who supposedly shared a personality disorder; and 2) *schizophrenen Verschrobeneheit* (ger., "schizophrenic oddity"), a strangeness that resulted from an endogenous disorder. Importantly, Binswanger pointed out that oddity represented an aspect of personality rather than an isolated symptom.

Later, when Rado (1953) proposed the term "schizotypy," oddity became an inherent part of the formulation of the construct. Consequently, the research continued within the framework of schizotypy studies. Two chief research directions were delineated: familial and clinical. The former line of studies focused on the observations and investigation of the relatives of schizophrenic patients, among whom various anomalies of character are often present. Analysis of the descriptive works in this line of research (Eysenck & Barrett, 1993; Kendler, 1985) identifies five characteristics that were often prominent in this group of individuals: 1) eccentricity; 2) irritability; 3) social isolation; 4) aloofness; and 5) suspiciousness. These characteristics can be considered the definition of the concept of schizotypy.

Within clinical studies, oddity has been investigated in the context of mental illnesses such as schizophrenia. Rado (1953) described schizotypy as a "psychodynamic manifestation of schizophrenic genotype," a notion that was later developed by Meehl (1962), who used the term "schizotaxia' to refer to an integral neural deficit. According to Meehl, a particular genetic basis, which interacts with various environmental factors such as social learning, education, etc., creates a schizotypic personality organization. Although this personality predisposition is considered a risk factor for developing schizophrenia, Meehl notes that the "stress-diathesis" model allows different developmental pathways, thus highlighting the fact that not all schizotypic individuals will develop schizophrenia. Meehl proposed four core symptoms to constitute schizotypy: anhedonia; social aloofness; cognitive slippage; and ambivalence. Thus the concept of schizotypy is phenotypically similar to the schizotypal personality disorder as formalized in DSM-III, the chief distinction being the fundamental difference in their origins (APA, 1980; Bove, & Epifani, 2012).

Russian clinicians also followed the clinical tradition and conceptualized oddity phenomena in line with the traditional medical model (Smulevich, 2016; Snezhnevsky, 1983; Vorobyov, 1988). Relying on the works of Kraepelin (1915) and Bleuler (1993), Russian psychiatrists developed the notion of the *Verschroben*-type schizophrenic defect, which was categorized as psychopathy-like negative changes and manifested through odd, extravagant behavior, strange interests and hobbies, peculiarities of movement and speech, etc. (Snezhnevsky, 1983; Vorobyov, 1988). Then the research of oddity per se became more or less neglected, since strangeness was either considered a part of a more extensive construct of schizotypy or formulated within the context of endogenous disorders.

Soon after Meehl's proposed schizotypy model, other authors deemed it reasonable to bring forward an alternative dimensional model, which broadened the clinical context of this construct (Claridge et al., 1996). In these works, schizotypy was conceptualized as representing both a predisposition to developing psychosis, and a source of individual differences in general population. The understanding of schizotypy as a dimension allowed it to be presented in a continuous form — as a multifactorial construct. The authors formulated four core dimensions that were seen as inherent to schizotypy; these were 1) unusual experience, 2) cognitive disorganization, 3) introversive anhedonia, and 4) impulsive non-conformity (Corcoran, Devan, Durrant, & Liddle, 2013).

The idea that oddity can be observed in a normal personality stimulated attempts to distinguish the oddity domain in the multifactorial personality model (Widiger, 2010; Verbeke & De Clercq, 2014). In that model, oddity is perceived as a core personality dysfunction specific to A-cluster personality types. Verbeke and colleagues found statistical and empirical grounds for the existence of this fifth factor in a sample of over 400 adolescents. The oddity factor featured hypersensitivity to feelings, excessive fantasizing, daydreaming, and unusual thoughts and behavior. The notion that A-cluster personalities, and schizotypal individuals in particular, are seen as strange and eccentric, provides evidence for the strong relevance of oddity features for schizotypy and schizoid-spectrum phenomena, whereas the continuous nature of schizotypy also allows for the occurrence of oddity features in the normal personality (Ashton & Lee, 2012; Grant, 2015; Lenzenweger, 2015).

All in all, the research at the beginning of the 20th century provided descriptive studies of oddity, wherein particular traits or impairments characteristic of these individuals were defined. Later, this set of peculiarities was transformed into the notion of schizotypy, which merged oddity with other characteristics of schizophrenia-spectrum disorders. Conspicuously, schizotypal individuals have mostly been described as "strange" and "unusual," so that these everyday epithets made their way into the of-

ficial formulation of the schizotypal personality disorder (APA, 1980; 2013). Analysis of the body of work dedicated to the issue of oddity allows one to delineate a number of key features that may be definitive for oddity itself. They are: 1) the impairment of social functioning; 2) sensitivity; 3) eccentricity; and 4) peculiarities of cognitive processes. (Chemerinski, Triebwasser, Roussos, & Siever, 2013; Cohen & Lee, 2011; Fumero, Rodríguez, Roa, & Peñate, 2017; Verbeke, De Clerq, Van der Heijden, Hutsebaut, & van Aken, 2015).

In western clinical science, oddity has been operationalized as "perceived strangeness or eccentricity" (Ashton & Lee, 2012). In this frame of reference, the oddity phenomenon is mostly studied psychometrically, and its core notion is explained and/or defined with the help of a variety of common adjectives, such as "bizarre," "peculiar," "unusual," and some others, including the negatives like "not average," "not normal," etc. This approach involves social perception as the chief factor that is supposed to clarify the content of these phenomena. However, it does not necessarily shed light on the problem of clinically assessing the oddity phenomenon. For example: If changing occupation had been considered unusual and often maladaptive in Russia a decade ago, it is more likely to be viewed as a flexible and healthy way of life in 2021. Such shifts in social perception of what is "normal" and acceptable behavior leave little opportunity for practicing clinicians to identify, and even less operationalize, the oddity phenomenon.

In modern Russian psychiatry, oddity is studied under the name of "Verschroben"-type negative changes in schizophrenia-spectrum disorders (Mukhorina, 2018; Smulevich, Romanov, Mukhorina, & Atadzhykova, 2017). This line of research is mainly grounded in studies of schizotypy as a categorical construct, and traditional Russian clinical studies of schizophrenia — namely, the Verschroben-type defect (Smulevich, 2016; Snezhnevsky, 1983). This medical model of the Verschroben syndrome considers endogenous factors as determinant of the development of oddity.

In our study, we have proposed a set of manifestations of this syndrome, which include: 1) distinctness of behavior that is not congruent with the social and cultural context of one's life; 2) impairment of social functioning; 3) emotional deficit such as coldness and/or blunted affect; 4) occupational dysfunction; and 5) unusual perceptions of one's body, distorted bodily image, and/or psychosomatic disorders (Smulevich et al., 2017). As can be seen, this list includes cognitive, emotional, and behavioral patterns that move beyond the criterion of social perception, which allows more clarity and flexibility for qualitative study. In this modern conceptualization, the notion of *Verschroben* serves to absorb the data accumulated in different contexts of studying the oddity phenomenon, thus acquiring clinical value that is expected to prove useful both in theory and practice today.

The present article discusses the results of a psychological study of patients with diagnosed *Verschroben* syndrome. The investigation has been carried out in collaboration with the Russian psychiatrists and is theoretically based on a vast field of prior research (for more extensive theoretical reviews, see Atadzhykova & Enikolopov, 2016; Mukhorina, 2018).

Methods

Participants

The clinical sample included 71 patients (44 women and 27 men, average age = 40.2) who were selected and examined at the premises of the Department of Borderline Mental Pathology and Psychosomatic Disorders of the Mental Health Research Center (led by the academician of RAMS, A. Smulevich) and the Department of Psychotherapy of the Clinical Centre of Psychosomatic Medicine of Sechenov University in Moscow. Subjects were included in the clinical sample if they had previously received an F21 diagnosis (for more details, see Mukhorina, 2018). The sample was formed after the subjects were examined by a council of clinicians which agreed that they met the examination criteria, and had medical histories which included years-long records of unusual, bizarre, and/or peculiar behavior. Due to the absence of a control group, various sub-groups (*e.g.*, with highest/lowest SPQ scores) were selected from the clinical sample for further intra-group comparison.

Procedure

The chief goal of this study was to analyze the cognitive and personality characteristics of patients who demonstrate the phenomenon of oddity. The study's tasks included: 1) specification of the emotional and personality characteristics that may be relevant to the differentiation between self-reported and clinically assessed oddity; 2) qualitative analysis of cognitive functions, in particular, the peculiarities of speech; and 3) detection of the key features that could help mark off the oddity phenomenon with regard to the method of assessment.

The design and procedure of the research sought to consolidate qualitative and quantitative methods in order to obtain the most definitive data. At the first stage of the study, the data was collected with the help of self-report measures. Then, a pathopsychological experiment was carried out, which included two steps: a nonstructured clinical interview, and a set of tasks to evaluate particular qualities of cognitive abilities and speech. Finally, statistical analysis was performed, and the data was integrated and interpreted.

Questionnaires

1) Schizotypal Personality Questionnaire (Raine, 1991) — SPQ-74 translated and adapted by A. Efremov and S. Enikolopov (Efremov & Enikolopov, 2001). This questionnaire was originally developed on the basis of the diagnostic criteria for the schizotypal personality disorder of DSM-III. It includes 74 items that are categorized into 9 subscales (Ideas of Reference, Social Anxiety, Odd Beliefs/Magical Thinking, Unusual Perceptual Experiences, Eccentric Behavior, No Close Friends, Odd Speech, Constricted Affect, and Suspiciousness). The items also load on three factors: 1) Cognitive Perceptual (which consists of the following subscales: Ideas of Reference/Suspiciousness, Magical Thinking, and Unusual Perceptions); 2) Interpersonal (No Close Friends/Constricted Affect and Social Anxiety); and 3) Disorganized (Eccentric Behavior and Odd Speech). They can be categorized as two poles of schizotypy: positive

(subscales Ideas of Reference, Odd Beliefs/Magical Thinking, Unusual Perceptual Experiences, Odd Speech) and negative (Social Anxiety, No Close Friends, Constricted Affect, and Suspiciousness).

2) Adult Personality Traits Questionnaire — APTQ (Rusalov & Manolova, 2003), a self-report instrument developed on the basis of G. Shmishek's Character Test. The APTQ includes 80 items and 10 subscales (Hyperthymia, Fixedness, Affectability, Meticulousness, Anxiety, Cyclothymia, Demonstrativity, Excitability, Dysthymia, and Emotional Reactivity).

3) *Clinical interview* (Zeigarnik, 1986). This took a non-structured form and was aimed at establishing contact, and assessing speech patterns and magical thinking, using criteria complementary to the similarly named subscales of SPQ-74:

- a) *odd speech* a tendency to use unusual speech constructions, where the distinctness of speech is attributable to combining words that do not usually go together, or words that belong to different registers. Also, oddity of speech included the tendency for word coinage (to create new words by combining or changing the existing ones) and the usage of words in unusual contexts. This criterion is complementary to the subscale Odd Speech of the SPQ-74, which assesses more formal characteristics of speech such as its dynamics, tempo, frequency of slippage, etc., and focuses on how understandable speech is to other people. If the aforementioned patterns of speech were detected, the patient received a score of 1 for each usage. The protocols and issued scores were then revised by an expert.
- b) *magical thinking* another criterion complementary to a similarly-named subscale in the SPQ-74, where magical thinking is evaluated in more extreme forms such as beliefs in paranormal worlds, telepathy, etc. and includes experiencing the listed phenomena in real life. The clinical interview allowed the observation of subtler and sometimes unconscious aspects of magical thinking, such as inconsistent religiousness and other incoherent cases (*e.g.*, when a patient rationally denied believing in anything paranormal, yet later in the interview referred to his horoscope sign to explain his behavior, etc.). A binary scale was used to appoint a score of 0 or 1, according to the presence or absence of the listed characteristics. This decision was then re-assessed by another expert.

4) *Pathopsychological experiment* — a set of selected tasks aimed at assessing most aspects of thinking activity (dynamic, operational, and motivational). The tasks included a pictogram, interpretation of idioms and metaphors, and the oddball task (Rubinshtein, 2010). The psychologists' reports of the experiment's results were analyzed, and the distortions found within the course of the procedure were codified in order to be available for further quantitative analysis (the overall number of trials was counted, and each trial received a score of 0 or 1, depending on whether the distortion was detected or not). The distortions were registered according to the previously established criteria (Zeigarnik, 1986; Rubinshtein, 2010).

Results

First, the clinical sample was studied as a whole, in order to investigate possible additional characteristics of the group. Surprisingly, the respondents from the clinical sample scored low on the SPQ-74 (average overall score being 19.56), and the analysis of the personal and temperamental traits of the patients revealed an average profile, without any striking peaks or declines, with the exception of a slight tendency towards the accentuation on the subscale of Dysthymia (an average score of 6.3, whereas the score of 7 would suggest the accentuation).

Then, the links between the SPQ-74 scales and temperamental and personality characteristics (assessed by APTQ) were analyzed, using the non-parametric test (Spearman's correlation). *Table 1* shows the most relevant correlations between the subscales of the SPQ-74 and some subscales of the APTQ.

As expected, the Restricted Affect subscale showed a positive link with the Dysthymia scale and a similarly discernable negative one with the Hyperthymia scale. The Fixedness scale showed significant correlation with the Suspiciousness subscale, which allows for a more expansive interpretation of the latter. In fact, this correlation may extend and explain suspiciousness in terms of hostility, lack of empathy, unforgivingness, etc., and also imply that suspiciousness and fixedness might be mediated by stress, as suspiciousness is named among the possible coping strategies for individuals who demonstrate the trait of fixedness (Rusalov & Manolova, 2003). Another important finding was the variety of links between the characteristics of mood with a number of the SPQ-74 subscales (Hyperthymia, Cyclothymia, and Dysthymia), which suggests that emotional instability may be internally linked to the oddity phenomena.

	HYP	FIX	MET	CYC	DYS	EMR
SPQ-74 (sum)		0.40	0.43	0.48		0.56
Lack of Close Friends			0.41	0.42		0.49
Restricted Affect	-0.42		0.42		0.43	
Suspiciousness		0.44				
Odd speech				0.45		0.47
Social Anxiety						0.50
Negative Schizotypy			0.42	0.45		0.51
Positive Schizotypy						0.50
F1 (Cognitive/Perceptual)			0.45			0.47
F2 (Interpersonal)			0.44			
F3 (Disorganized)						0.46

Table 1

Significant	Correlations	between SPC	0-74 and APTC) subscales
0.2	0011010100100	corneen or q		

Note. HYP = Hyperthymia; FIX = Fixedness; MET = Meticulousness; CYC = Cyclothymia; DYS = Dysthymia; EMR = Emotional Reactivity.

The Emotional Reactivity scale showed the highest number of significant links with various SPQ-74 subscales. This personality feature also reflects emotional instability with mood swings, along with high reactivity and impulsivity, and tendencies towards increased impressionability and attention-getting expressiveness.

The results of the analysis of the cognitive sphere of the patients with oddity phenomena are summarized in *Figure 1*. The most intact aspect of thinking in our clinical sample was the subjects' thinking dynamics; here, the great majority of subjects (98.6%) did not show any impairment, whether it be passivity or lability of thinking processes. Even though more than half of the patients demonstrated the ability to generalize by categories (57%), less than half (37%) showed a genuinely high level of abstraction (which implied correct interpretations of idioms and metaphors); 4% showed lowered levels of abstraction with a high prevalence of situation-bounded responses. Altogether, 63.4% of the patients demonstrated a reduced level of abstraction level and motivational deficit in thinking processes proved to be the prevalent types of thinking impairments in these patients with odd personalities.



Figure 1. Thinking impairments in clinical sample.

Apart from the basic aspects of thinking, two additional domains were assessed in the course of the clinical interview: magical thinking and odd speech. These constructs had been operationalized with the help of content analysis of the protocols and further quantification of these criteria. As hypothesized, these characteristics showed significant correlations with the SPQ-74 subscales Odd Speech (Spearman's r = .42, p < .01) and Magical Thinking (r = .58, p < .01), which proved the validity of the complementary criteria. Yet it also demonstrated that the constructs assessed with the help of a clinical interview are not completely equivalent to their corresponding subscales content-wise, and may serve as an additional source of information. *Figure 2* shows that the majority of the patients with the oddity phenomenon (80.3%) tended to use unusual speech structures that fell into one or more of the following categories: a) unusual combination of words, including using the words of different register and/or in irregular context); b) word coinage; c) ornate words or phrases; and d) usage of collocations, idioms, and jargon out of the context of the situation and conversation topic. The criteria for magical thinking had also been expanded with the help of the data collected within the clinical interview — mostly by including extra characteristics that are mainly attributable to Russian culture (beliefs in superstitions, traditional medicine, etc.). Unexpectedly, only a little more than half of the patients (53.5%) demonstrated magical thinking in any of the abovementioned forms, whereas the rest of the subjects did not show any of the signs of magical thinking in a result that will be discussed in the next section.

Figure 2. The study of complementary characteristics of thinking processes

Finally, the problem with discrepancies between the different "types" of oddity was addressed. The subjects' SPQ-74 scores represented self-reported oddity (how the patients — odd personalities — saw themselves), whereas the assessment of key criteria for oddity by the clinicians (with the method of clinical interview and pathopsychological experiment) constituted clinically assessed oddity. Thus, two sets of sub-groups were identified, and the SPQ profiles were then compared.

To determine any statistically significant differences between these "extreme" groups, we ran a Wilcoxon test, which revealed differences in the Odd Speech parameter as assessed by the clinical interviews (p = .010), and a number of the APTQ scales: Fixedness (p = .001); Meticulousness (p = .016); Cyclothymia (p = .000); and Emotional Reactivity (p = .000). Having noted that the prevailing differences had been detected in temperamental and personality traits, we constructed a graph to illustrate the difference between the profiles of the "extreme" groups as assessed by APTQ parameters (see *Figure 3*). It demonstrated that the levels of Fixedness, Meticulousness, Cyclothymia, and Emotional Reactivity were significantly lower in patients with the lowest SPQ-74 scores. This means that patients who considered themselves less, or not at all, odd, also tended to ignore insults and/or criticism, showed certain carelessness and irresponsibility in their daily routine as well as emotional indifference and remoteness, and reported a more stable mood.

Figure 3. Averaged APTQ Profiles of groups with low and high SPQ-74 scores.

Then, based on the overall score that patients were appointed by the experts (which was assigned first by the psychologist and then re-evaluated by the council of clinicians), the sample was divided into two different groups, that is, a "less odd" group, clinically perceived as having less prominent odd traits, and, in contrast, a "highly odd" group. The criteria correlated positively and moderately with the overall SPQ-74 scores (Spearman's r = .508). Further, the Wilcoxon test revealed that the classification of the subjects into two groups, figuratively less and more odd, based on the clinicians' criteria, revealed significant differences on all SPQ-74 scales (p < .020), with the exception of Restricted Affect scale of SPQ-74. These findings may indicate that the specialists' assessment differentiated between less odd and more odd personalities at least as successfully as the validated self-report measure. Further analysis showed statistical differences in such parameters of thinking as the Abstraction level (p = .007), as well as the Emotional Reactivity Scale of APTQ (p = .050).

Discussion

10.0

The fact that patients with oddity phenomena scored low on the SPQ-74 may signify that schizotypal individuals, classified as such based on clinicians' criteria, might not be aware of, or insightful about their condition. Furthermore, the general tendency of the presented profiles (SPQ-74 and APTQ) is towards averaging, which is not unsurprising in the current study. The clinical sample included individuals with rather diverse and long medical histories, which described odd, unusual behavioral patterns, as well as peculiar emotional and personality characteristics. In light of this, it was not entirely unexpected that employing self-report measures did not yield any significant results.

These findings support the idea that self-report measures are vulnerable to a number of the external influences that are widely discussed in clinical literature (Paulhus & Vazire, 2007). Consequently, in the case of the current analysis, the questionnaire does not seem sufficient for diagnosing oddity without additional means of personality assessment. Moreover, a highly averaged temperamental and personality profile may imply that no specific profile can be developed which coherently defines the oddity phenomenon, at least not based solely on the common personality and temperamental traits assessed by APTQ. This finding had been expected since none of specific personality types, apart from schizotypal itself (which had been initially derived from the observed peculiarities), can be held accountable for an individual's appearance to be characterized as "odd" or "strange."

The analysis of the interrelations between a number of the APTQ parameters and the SPQ-74 subscales revealed a range of traits that may be particularly important for some schizotypal characteristics in the clinical sample. We found that a general instability of mood and a tendency for inadequate and/or paradoxical emotional reactions, as well as the predominance of a particular extreme of mood (that is, melancholy with signs of anxiety, passivity, etc., or excitability with high activity level, ingenuity of judgment, and so forth), were the most prominent features. Another distinguishing characteristic was rigidness in behavior, judgment, and affect, which manifested through commitment to inner principles, lack of empathy, and high levels of aspiration. It can be hypothesized that inflexibility, tendencies to develop predominant ideas or interests, low emotionality, and focus on personally significant goals might create an image of oddity for such individuals and their consequent lack of engagement.

Emotional Reactivity is also a characteristic that was found to have high importance for the schizotypal style. It is described in the official manual of ATPQ as the "inability to conceal one's feelings" (Rusalov & Manolova, 2003, p. 86), and, since such traits as emotional lability and general expressiveness cannot be controlled sufficiently, they can contribute to seemingly inadequate, or socially unacceptable, behavior.

The analysis of the cognitive sphere revealed that the thinking process of patients with the oddity phenomenon was characterized by the impairment of its motivational aspect and a tendency to generalize based on latent characteristics. According to traditional and modern clinicians, these patterns are more characteristic of schizophrenia-spectrum disorders, including schizotypy. Thus, these findings may indirectly support the modern view of the oddity phenomenon as pertaining to the spectrum of negative disorders, as hypothesized in the recent work by Russian clinicians (Smulevich et al., 2017). On the other hand, these results can also indicate the tendency of clinicians to employ some symptoms of motivational impairments in thinking (*e.g.*, tangential thinking, or cognitive slippage) as inconspicuous signs of oddity itself. Further studies are needed in order to determine whether the detected cognitive impairments are essentially related to the diagnoses, are is simply part of the "odd" image.

Further analysis of their speech showed that the great majority of the patients demonstrated at least one of the designated signs of unusualness in speech patterns,

which may imply that speech peculiarities are a significant feature of the oddity phenomena. Undoubtedly, the use of the specific structures in speech as described in the previous section will facilitate the impression of one's speech as strange and inappropriate, and also serve as an implicit sign of social insensitivity — a tendency to ignore conventional standards of communication (Kritskaya & Meleshko, 2015; Morrison, Brown, & Cohen, 2013; Zeigarnik, 1989). In particular, bizarrerie, or affectation of style, which term describes a number of thinking and speech patterns that are cumbersome and loaded with irrelevant details (Cherednikova, 2015; Zeigarnik, 1989; Zhmurov, 2012), was found to be prominent in the studied sample. Therefore, such complexity makes speech too difficult to comprehend and generally evokes a sensation of theatricality and/or constraint. Bizarrerie is also considered to be a specific sign of schizophrenic spectrum disorders (Cherednikova, 2015; Panteleeva, Cucul'kovskaya, & Belyaev, 1986), as well as characteristic of a schizotypal personality (APA, 2013).

When it comes to the assessment of magical thinking in patients with oddity, cultural norms must be taken into account, since most Russian-speaking groups, including mentally healthy individuals, have demonstrated more or less high levels of magical thinking (Bairamova & Enikolopov, 2016). Researchers attribute this to Russian culture, which normalizes magical thinking in a variety of forms (*e.g.*, beliefs in superstitions, traditional medicine, etc.). In this connection, we introduced a complementary criterion in the course of the clinical interviews, which allowed exploration of not just beliefs in the paranormal, but also incongruence between declared and real beliefs (where real beliefs tend to be subconscious or concealed but in reality determine individual's behavior). However, this additional criterion did not result in qualifying magical thinking as a prevailing feature in the clinical sample, which led us to question the diagnostic significance of this particular characteristic — at least in this specific Russian-speaking sample.

Lastly, since our research focused only on one kind of clinical sample — that is, individuals with confirmed medical histories and long-established odd personalities — we addressed the juxtaposition between the self-reports and clinically assessed oddity. For these purposes, we divided the sample in two different sets of so-called "extreme" groups: 1) the two groups with the lowest and the highest SPQ-74 scores; and 2) two alternative groups qualified by the experts as "the most" and "the least" odd according to the relevant clinical criteria, evaluated with the help of qualitative methods and then revised by a council of experts consisting of both medical doctors and psychologists.

The two criteria showed a moderately strong positive correlation (r = .508), and the division based on the clinical criterion was also confirmed by the corresponding significant differences in SPQ-74 scores. In other words, when patients reported themselves as odd, it only partially coincided with the clinicians' assessment, but when clinicians rated some individuals more odd than others, it turned out to be mostly congruent with the self-report data.

These findings suggest that both ways of measuring the oddity phenomena are more likely to assess the same phenomenon than not, yet the differences between these methods should definitely be accounted for. Altogether, the differentiation between the "extreme" self-report groups appeared mainly to be related to some parameters of emotionality (Cyclothymia and Emotional Reactivity) as well as personality traits, whereas the chief focus of the specialists seemed to be emotional and cognitive characteristics. Obviously, the parameters of cognitive functioning are not likely to be assessed in any kind of self-report measure; yet they may have importance for identifying and studying oddity.

Conclusion

The notion that the individuals who are perceived as odd and eccentric may form a special group that can be defined by a consistent complex of manifestations, has been the focus of many researchers since the beginning of the 20th century. Later, as this notion developed, it was interpreted in the context of the schizotypy construct, where oddity was given a central role. To avoid conceptual confusion and to focus attention solely on the oddity phenomena, we selected a clinical sample with a long-established history of expressed oddity, and included criteria concentrated on the relevant characteristics of all mental spheres instead of a formal diagnosis of schizotypal personality disorder, since the latter could have allowed unwanted heterogeneity.

The profiles of schizotypal (as assessed by the SPQ-74) and temperamental and personality traits (as assessed by APTQ) were constructed based on data from the entire sample, and their tendency towards the average was revealed, which is supportive of the view of schizotypy as a singular, independent construct which requires more qualitative analysis than self-report measures can provide.

The qualitative analysis of the cognitive sphere, including speech, revealed a range of peculiarities and impairments that pertain to the cluster of symptoms specific to schizophrenia-related disorders. However, whether these findings add to the evidence of schizotypy being placed on the spectrum of negative disorders, or simply uncover the method of clinical assessment of oddity, is yet to be investigated.

The question of differentiation between self-reported and clinically assessed oddity has been raised. We found that both methods of evaluation are of importance; however, clinical assessment naturally encompasses more spheres of psychological functioning and generally provides more insight into the psychology of odd personalities, since the latter tend to ignore, block, or remain otherwise unaware of their peculiarities.

Finally, in addition to a validated measure of schizotypal traits, new means of measurement and assessment have been employed and analyzed, which could pave the way for further investigation of the oddity phenomenon.

Limitations

The discussion of whether particular personality types can be specifically tied to the oddity phenomenon indeed requires further research. Due to the limited availability of the respondents of our clinical sample, there were restrictions on the number of methods that could be applied, and a single self-report measure of the personality sphere combining both common personality traits as well as major temperamental characteristics was required. Future research will need to take into account a general-

ly accepted typology of personality types and focus on the interconnections between more personality features and the peculiarities of cognitive sphere.

One of the chief problems we identified was the use of self-report measures, such as SPQ-74, to study schizotypy in patients with the oddity phenomenon. The absence of significant differences between the scores of the clinical sample and the normative data may be attributed to widely acknowledged weaknesses of self-report measures in general (Paulhus & Vazire, 2007), as well as the specific nature of the oddity phenomenon. Whether or not this problem is exclusive to this particular group of patients, or relevant for other groups as well, is open to discussion and requires further research.

Finally, even though the current study could not fully support the hypothesis that magical thinking, as defined by the SPQ-74 and complemented by additional criteria, is particularly likely to be responsible for an individual giving the impression of "oddity," further research for evidence in favor of this hypothesis needs to be done, since the literature suggests that magical thinking is still a relevant part of the characteristic features of schizophrenia-spectrum disorders, and schizotypy in particular.

Ethics Statement

All participants were hospitalized voluntarily and gave informed consent before taking part.

Author Contributions

All authors discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

References

- American Psychiatric Association. (1980). *Diagnostic and Statistical Manual of Mental Disorders (3rd Edition) (DSM-III)*. American Psychiatric Association, Washington, DC.
- American Psychiatric Association. (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Washington, DC.
- Ashton, M.C., & Lee, K. (2012). Oddity, Schizotypy/Dissociation, and Personality. *Journal of Personality*, 80(1), 113–134. https://doi:10.1111/j.1467-6494.2011.00735.x
- Atadzhykova, Yu.A., & Enikolopov, S.N. (2015). Aprobatsiya metodiki diagnostiki psikhopatii K. Patrika na rossiiskoi vyborke [Testing the K. Patrick Method of Psychopathy Diagnosis in a Russian Sample]. *Psikhologicheskaya nauka i obrazovanie* [Psychological Science and Education], 20(4), 75–85. https://doi:10.17759/pse.2015200407
- Atadzhykova, Yu.A., & Enikolopov, S.N. Problemy koncepta psihopatii v sovremennoj otechestvennoj i zarubezhnoj psihologii [Problems of the Psychopathy Concept in Modern Domestic and Foreign Psychology]. Psihologicheskaya nauka i obrazovanie psyedu.ru, 8(1), 114–127. doi:10.17759/psyedu.2016080111
- Binswanger, L. (1954). Verschrobenheit. Monatsschrift für Psychiatrie und Neurologie, 127, 127–152. https://doi.org/10.1159/000140103

- Birnbaum, K. (1920). Psychopathologische Dokumente. Selbstbekenntnisse und Fremd zeugnisse aus dem seelischen grenzlande. Berlin: Verlag von Julius Springer, 171–175. https://doi.org/10.1007/978-3-642-99625-2
- Bleuler, E. (1993). Rukovodstvo po psihiatrii [Textbook of Psychiatry]. Moscow: Izd-vo Nezavisimoj psihiatr. assoc.
- Bove, E.A., & Epifani, A. (2012). From schizotypal personality to schizotypal dimensions: A two-step taxometric study. *Clinical Neuropsychiatry*, 9(3), 112–122.
- Chemerinski, E., Triebwasser, J., Roussos, P., & Siever, L.J. (2013). Schizotypal Personality Disorder. Journal of Personality Disorders, 27(5), 652–679. https://doi.org/10.1521/pedi_2012_26_053
- Cherednikova, T.V. (2015). Struktura i mekhanizmy narushenij myshleniya pri shizofrenii i ehkzogennoorganicheskih zabolevaniyah golovnogo mozga s pozicij informacionnoj teorii psihiki [Structure and mechanisms of thinking impairments in schizophrenia and exogeno-organic neural disorders from the view of informational theory of psyche]. Saint-Petersburg.
- Claridge, G., McCreery, C., Mason, O., Bentall, R., Boyle, G., & Slade, P. (1996). The factor structure of schizotypal traits: a large replication study. *British Journal of Clinical Psychology*, 35, 103–115. https://doi.org/10.1111/j.2044-8260.1996.tb01166.x
- Cohen, A., & Lee, S. (2011). Understanding constricted affect in schizotypy through computerized prosodic analysis. *Journal of Personality Disorders*, 25(4), 478–491. https://doi.org/10.1521/ pedi.2011.25.4.478
- Corcoran, R., Devan, K., Durrant, S., & Liddle, P. (2013). The relationship between schizotypal ideation and subjective cognition reflects more than just cognitive disorganization: Introducing the Brief Cognitive Schizotypy Index. *Cognitive Neuropsychiatry*, 18(6), 491–514. https://doi.or g/10.1080/13546805.2012.747431
- Efremov, A.G., & Enikolopov, S.N. (2001). Aprobaciya metodiki vyyavleniya stepeni vyrazhennosti shizotipicheskih chert SPQ-74) [Approbation of the SPQ-74 Technique of Revealing the Intensity of Schizotypal Traits]. *Materialy Pervoi Mezhdunarodnoi konferentsii, posvyashchennoi pamyati B.V. Zeigarnik* [Materials of the First International Conference Devoted to B.V. Zeigarnik Memory] (pp.109–112). Moscow, 2001.
- Eysenck, H., & Barrett, P. (1993). The nature of schizotypy. *Psychological Reports*, 73, 59–63. https://doi. org/10.2466/pr0.1993.73.1.59
- Fumero, A., Rodríguez, M., Roa, A., & Peñate, W. (2017). Importancia diferencial de los components fundamentales de la esquizotipia: un metaanálisis [The importance of differences in the fundamental components of schizotypy: a metaanalysis]. *Revista Latinoamericana de Psicología*, 49, 5–18. https://doi.org/10.1016/j.rlp.2016.09.001n
- Grant, P. (2015). Is schizotypy per se a suitable endophenotype of schizophrenia? Do ot forget to distinguish positive from negative facets. *Frontiers in Psychiatry*, 6, 143–152. https://doi.org/10.3389/ fpsyt.2015.00143
- Kendler, K.S. (1985). Diagnostic approaches to schizotypal personality disorder: A historical perspective. Schizophrenia Bulletin, 11(4), 538–553. https://doi.org/10.1093/schbul/11.4.538
- Kraepelin, E. (1915). Psychiatrie, 8. Auft. Bd. IV, Teil III. Leipzig.
- Kritskaya, V.P., & Meleshko, T.K. (2015). Patopsihologiya shizofrenii [Pathopsychology of schizophrenia]. Institut psihologii RAMS.
- Lenzenweger, M.F. (2015). Thinking Clearly About Schizotypy: Hewing to the Schizophrenia Liability Core, Considering Interesting Tangents, and Avoiding Conceptual Quicksand. Schizophrenia Bulletin, 41(2), 483–491. https://doi.org/10.1093/schbul/sbu184
- Meehl, P.E. (1962). Schizotaxia, schizotypy, schizophrenia. American Psychologist, 17, 827–838. https:// doi.org/10.1037/h0041029
- Morrison, S.C., Brown, L.A., & Cohen, A.S. (2013). A multidimensional assessment of social cognition in psychometrically defined schizotypy. *Psychiatry Research*, 210, 1014–1019. https://doi. org/10.1016/j.psychres.2013.08.020
- Mukhorina, A.K. (2018). Negativnaya shizofreniya s izmeneniyami tipa fershroben (psihopatologiya, klinika, terapiya) [Negative schizophrenia with Verschroben-type changes (psychopathology, clin-

ic, therapy)]. Moscow: Federal'noe gosudarstvennoe byudzhetnoe nauchnoe uchrezhdenie Nauchnyj centr psihicheskogo zdorov'ya.

- Panteleeva, G.P., Cucul'kovskaya, M.Ya., & Belyaev, B.S. (1986). *Geboidnaya shizofreniya* [Heboid Schizophrenia]. Moscow: Medicina.
- Paulhus, D., & Vazire, S. (2007). The self-report method. In: R.W. Robins, R.C. Fraley, & R.F. Krueger (Eds.), Handbook of research methods in personality psychology (pp. 224–239). New York: Guilford.
- Rado, S. (1953). Dynamics and classification of disorders behavior. *American Journal of Psychiatry*, 110, 406. https://doi.org/10.1176/ajp.110.6.406
- Raine, A. (1991). The SPQ: A Scale for the Assessment of Schizotypal Personality Based on DSM-III-R Criteria. Schizophrenia Bulletin, 17(4), 555–564. https://doi.org/10.1093/schbul/17.4.555
- Rubinshtein, S.Ya. (2010) *Eksperimental'nye metodiki patopsikhologii* [Experimental Methods of Pathopsychology]. Moscow, Izdatel'stvo Instituta Psikhoterapii.
- Rusalov, V.M., & Manolova, O.N. (2003). Oprosnik chert haraktera vzroslogo cheloveka [Adult Personality Traits Questionnaire]. Moscow.
- Smulevich, A.B. (2016). Rasstrojstva shizofrenicheskogo spektra v obshchemedicinskoj praktike [Schizophrenia spectrum disorders in general medical practice]. *Zhurnal nevrologii i psikhiatrii im. S.S. Korsakova* [S.S. Korsakov Journal of Neurology and Psychiatry], 1, 4–9. https://doi. org/10.17116/jnevro2016116114-9
- Smulevich, A.B., Romanov, D.V., Mukhorina, A.K., & Atadzhykova, Yu.A. (2017). Fenomen "fershroben" pri shizofrenii i rasstroistvakh shizofrenicheskogo spektra (aspekty tipologicheskoi differentsiatsii) ["Verschroben"-phenomenon in schizophrenia and schizophrenia spectrum disorders: aspects of systematics]. *Zhurnal nevrologii i psikhiatrii im. S.S. Korsakova* [S.S. Korsakov Journal of Neurology and Psychiatry], 117(1), 5–16. https://doi.org/10.17116/jnevro2017117115-16
- Snezhnevsky, A.V. (1983). Rukovodstvo po psihiatrii. V 2-h tomah. Tom 1. [Textbook of psychiatry. In 2 volumes. Volume 1]. Moscow: Medicina.
- Verbeke, L., & De Clercq, B. (2014). Integrating Oddity Traits in a Dimensional Model for Personality Pathology Precursors. *Journal of Abnormal Psychology*, 123(3), 598–612. https://doi.org/10.1037/ a0037166
- Verbeke, L., De Clerq, B., Van der Heijden, P., Hutsebaut, J., & van Aken, M.A.G. (2015). The Relevance of Schizotypal Traits for Understanding Interpersonal Functioning in Adolescents with Psychiatric Problems. *Personality Disorders: Theory, Research, and Treatment*, 7(1), 1–10.
- Vorobev, V.Yu. (1988). Shizofrenicheskij defekt (na modeli shizofrenii, protekayushchej s preobladaniem negativnyh rasstrojstv) [Schizophrenic defect (on the model of schizophrenia with the prevalence of negative disorders)]. Moscow: NII KPV NCPZ.
- Widiger, T.A., & Mullins-Sweatt, S.N. (2010). Clinical utility of a dimensional model of personality disorder. *Professional Psychology: Research and Practice*, 41(6), 488–494. https://doi.org/10.1037/ a0021694
- Zhmurov, V.A. (2012). Bol'shaya ehnciklopediya po psihiatrii. [Big encyclopedia of psychiatry]. Moscow.

Original manuscript received April 16, 2019 Revised manuscript accepted November 22, 2020 First published online March 20, 2021

To cite this article: Atadzhykova, Ju.A., Enikolopov, S.S. (2021). A Study of Oddity in a Russian Clinical Sample. *Psychology in Russia: State of the Art, 14*(1), 12–27. DOI: 10.11621/pir.2021.0102

Psychology in Russia: State of the Art Volume 14, Issue 1, 2021

Postpartum Depression and Birth Experience in Russia

Vera A. Yakupova^{a*}, Anna Suarez^b

^{*a}Lomonosov Moscow State University, Moscow, Russia* ^{*b}University of Helsinki, Helsinki, Finland*</sup></sup>

*Corresponding author: vera.a.romanova@gmail.com

Background. In European countries, postpartum depression (PPD) occurs in 13–19% of women. The statistics indicate that postpartum depressive disorders affect up to 300,000 women in Russia annually. There is still an extremely acute lack of psychological comfort provided to women during labor in Russia.

Objective. To our knowledge, ours is the first study that examines the association between childbirth experience and the risk of PPD in Russia.

Design. We collected data from 190 Russian-speaking mothers, ages 19 to 46, $(M = 32 \pm 4.3)$ two months after their delivery.

Results. Birth satisfaction and physical well-being two months after delivery were significantly inversely associated with PPD. Birth satisfaction negatively correlated with the perceived severity and unpredictability of labor, and positively correlated with physical well-being two months after delivery. The presence of a partner and a personal midwife or doula at birth was associated with higher birth satisfaction.

Conclusion. Our results emphasize the significance of childbirth satisfaction in the context of PPD and suggest the importance of individual professional support during labor.

Keywords:

postpartum depression (PPD); birth satisfaction; maternal mental health; prevention of postpartum depression; doula support

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online) © Lomonosov Moscow State University, 2021 © Russian Psychological Society, 2021 http://psychologyinrussia.com

The journal content is licensed with CC BY-NC "Attribution-NonCommercial" Creative Commons license.

Introduction

Postpartum depression (PPD) occurs in 13–19% of women globally (O'Hara & McCabe, 2013), with an estimated overall prevalence of 17% among healthy mothers without a prior history of depression (Shorey et al., 2018). However, there is a significant heterogeneity of the PPD prevalence across nations, ranging from 3% in Singapore to 38% in Chile (Hahn-Holbrook, Cornwell-Hinrichs, & Anaya, 2018). Therefore, it is important to study PPD within national contexts.

Higher rates of PPD have been observed in nations with significantly higher rates of income inequality, maternal and infant mortality, and women of childbearing age working more than 40 hours a week (Hahn-Holbrook, Cornwell-Hinrichs, & Anaya, 2018). In Russia, income inequality has increased significantly over the past 30 years (Morgan & Neef, 2020), and while rates of both maternal and infant mortality have been improving, they are still considerably higher than in the European countries (Danishevski, Balabanova, Parkhurst, & McKee, 2003). While these factors indicate that we may expect high prevalence of PPD in Russia compared to the global trend, there is a substantial knowledge gap, since no comprehensive studies have addressed the incidence, prevalence, and risk factors for PPD in Russia.

An extensive World Health Organization (WHO) report in 2003 indicated a number of risk factors for PPD (Stewart et al.). The authors showed that a history of psychopathology before and during pregnancy, maternal neuroticism and difficult child temperament, lack of social support, and obstetric difficulties among others, present risk for development of PPD. While obstetric factors were reported to make a small but significant contribution to the development of PPD, the subjective experience of childbirth was not examined in this literature review.

Newer evidence, however, suggests that a traumatic childbirth experience plays a major role in the development of PPD (Bell & Andersson, 2016; Gosselin, Chabot, Béland, Goulet-Gervais, & Morin, 2016); our previous studies have corroborated this (Yakupova, 2018). In line with these studies, obstetric violence and medical interventions were associated with increased risk for PPD (Mohammad, Gamble, & Creedy, 2011; Silveira et al., 2019; Souza, Rattner, & Gubert, 2017; Xu Ding, Ma, Xin, & Zhang, 2017). Obstetric violence includes being subjected to mistreatment, disrespect, abuse, negligence, and violation of human rights by health professionals (WHO, 2014), while medical interventions include emergency cesarean section, routine synthetic oxytocin administration, pre-labor rupture of membranes, and episiotomy.

In Russia, modern evidence- and ethics-based obstetric practices are still in their infancy, while the maternity healthcare system largely follows the conservative Soviet approach (Borozdina & Novkunskaya, 2020). The conservative approach includes a paternalistic style of communication, lack of ethical concern, outdated medical practices, and overall medicalization of birth, with medical personnel focusing primarily on the bureaucratic demands rather than on the patient's needs and psychological comfort (Temkina, 2014).

Studies indicate that maternal psychological well-being after childbirth is associated with a sense of security, the ability to make her own decisions, and continuous support during labor (Bohren et al., 2017; Saisto, Salmela, Nurmi, & Halmesmaki, 2001). However, in Russia, women frequently lack support during labor, since small regional maternity hospitals can still prevent partners from attending the birth, and a doula or private midwife is available only by paid contract, not through the public healthcare sector (Novkunskaya, 2017).

Taken all together, these factors indicate that women may be at higher risk for developing PPD in Russia. However, to our knowledge, no study has investigated this risk or protective factors against it in relation to PPD. Thus, the aim of our study was to examine the association between obstetric factors, childbirth satisfaction, and continuous support during labor with PPD symptoms two months after delivery.

We hypothesized that 1) a higher level of PPD symptoms was associated with a lower level of childbirth satisfaction, poorer physical well-being after delivery, and delivery mode (emergency cesarean vs. elective cesarean vs. vaginal birth); and 2) a higher level childbirth satisfaction was associated with delivery mode (vaginal vs. elective cesarean vs. emergency cesarean birth), better physical well-being after delivery, and mode of birth support (support by a partner, doula or private midwife vs. no support).

Materials and Methods

Study design

Data collection took place from June 2018 to February 2019. The women received an invitation to take part in the study through thematic communities and training classes for moms-to-be and new parents. Questionnaires were sent to respondents via e-mail after their written consent to participate was received. The participants were interviewed two months after delivery (the average age of the children was 1.9 ± 0.22 months). The inclusion criteria were 1) being at least 18 years old, and 2) giving birth no more than two months ago.

Participants

One hundred ninety (190) women participated in the study. All participants spoke Russian and lived in big cities (population over 500,000). The characteristics of the sample are presented in the *Table 1*. More than 96 percent (96.3%) of the participants gave birth in maternity hospitals and 3.7% gave birth at home. More than one third (34.3% = 65) of the participants showed clinically significant depressive symptoms (*Table 1*).

48.7% of the participants gave birth in Moscow and the Moscow Region; 14.4% in other regions of the Russian Federation; 18.2% in European cities; 9.6% in Israel; and 9.1% in former USSR countries.

Procedures

The Russian version (Yakupova, 2018; Cronbach's $\alpha = 0.84$) of the Edinburgh Postnatal Depression Scale (EPDS) (Cox, Holden, & Sagovsky, 1987) was used to esti-

		M/N	SD/%	Range
Age at testing (years)		32	4.3	19-46
Education	Upper secondary/College	16	8.4%	
	Tertiary/University	174	91.6%	
Family status	Married	158	83%	
	Cohabiting with a partner	27	14.5%	
	Single	5	2.5%	
Time passed after the childbirth (months)		1.9	0.22	1.7-2.1
Gestational age		39.4	1.6	37-42
Parity	Primiparous	82	43%	
	Multiparous	108	57%	
Delivery mode	Vaginal	139	73%	
	Emergency cesarean	23	12%	
	Elective cesarean	28	15%	
Mode of birth support	No support	69	36.1%	
	Partner	75	39.3%	
	Doula/Private midwife	15	8.2%	
	Partner + Doula/Private midwife	31	16.4%	
EPDS score		7.9	2.3	0-21
EPDS scores ≥ 10 (clini- cally significant PPD symptoms, yes)		65	34.3%	
Physical health in 2 months after delivery		4.2	0.8	2-5
Perceived severity of labor		2.5	1.1	1-5
Expectations about labor		2.9	1.2	1-5
BSS-RI score		7.3	2.2	0-10
Type of the birth support	No support	7	2.6	0-10
	Partner	8	1.9	0-10
	Partner + doula/midwife	9	1.7	0-10
	Doula/midwife	7	2.1	0-10

Table 1Characteristics of the sample (N=190)

Note. EPDS = *Edinburgh Postnatal Depression Scale. BSS-RI* = *Birth Satisfaction Scale Revised Indicator.*

mate PPD symptoms. It is a 10-item questionnaire scale rated on a 4-point Likert scale, ranging from 0 to 3, which indicates how the mother has felt during the previous week. A score of 10 and higher is considered to indicate symptoms of depression.

The participants were asked to measure the discrepancy between their expectations about labor and real experience ("How closely did your expectations of childbirth match reality?") on a 5-point Likert scale (1 = "did not at all" to 5 = "matched completely"). We also asked the participants to assess the perceived severity of their birth experience ("How hard was the birth experience for you?") on a 5-point Likert scale (1 = "easy" to 5 = "extremely hard").

We used the Russian version (Yakupova, 2019; Cronbach's $\alpha = 0.70$) of the Birth Satisfaction Scale Revised Indicator (BSS-RI), a short 6-item self-report questionnaire, to assess birth satisfaction (the subscales include the level of stress and anxiety, feeling of control, and medical staff support) (Martin, Martin, & Redshaw, 2017). A 3-point Likert scale was used for each question (range 0-2), with the higher scores representing greater birth satisfaction.

We also asked the participants to assess their health condition at the moment of the screening (two months after delivery) on a 5-point Likert scale (1 = "very poor" to 5 = "very good"). Finally, we collected data on the participants' socio-demographic characteristics, such as the number of children, the mode of delivery, gestational age, place and time of delivery, and type of delivery support.

Statistical analysis

The main variables of the study were: PPD (based on EPDS scores); physical wellbeing after delivery; birth satisfaction (based on BSSR-RI scores); and the subjective severity and unpredictability of labor.

Spearman's correlation coefficient was used to estimate the relationship between PPD, birth satisfaction, physical well-being, and the predictability and subjective severity of labor.

Multiple linear regression analysis examined the factors predicting PPD, where PPD was a dependent variable, and birth satisfaction, physical well-being after delivery, perceived severity of birth experience, and predictability of birth were entered in the model as the independent variables. The data met the assumptions for multiple regression analyses; the residuals were normally distributed after the square root transformation of the dependent variable. Model 1 explored unadjusted associations; Model 2 was adjusted for maternal age, gestational age at birth, and the number of children.

We used the Kruskal-Wallis test to assess the differences in the levels of PPD, physical well-being, and childbirth satisfaction between the groups with different kind of labor support (alone; with partner; with doula or midwife and partner; or with doula or midwife without partner) and mode of delivery. We analyzed the differences in individual support depending on the country of birth by the chi-square test.

All analyses were performed using IBM SPSS Statistics 22.

Results

The level of childbirth satisfaction correlated negatively with PPD (rho = -.28; p < .01) (*Table 2*). Women with higher PPD scores more often perceived their labor as severe (rho = .21; p < .01). A serious discrepancy between the reality and expectations of childbirth was negatively associated with satisfaction with childbirth (rho = -.40; p < .01).

Table 2

Levels of pre- and postnatal depression birth experience and physical well-being

	EPDS	BSSR-RI	Physical well-being after delivery	Predictability	Severity of labor
EPDS		-0.278**	-0.398**	0.121	0.206**
BSSR-RI			0.066	-0.399**	-0.519**
Physical well-being (after delivery)				0.041	-0.064
Predictability					0.419**

Note. Rho, ** p < .01, * p < 0.05; the statistically significant correlations are **in bold**. EPDS = Edinburgh Postnatal Depression Scale. BSS-RI = Birth Satisfaction Scale Revised Indicator.

No statistically significant relationship was found between the mode of delivery [vaginal (VB), emergency caesarean (ECS), or elective caesarean section (ELCS)], and the level of PPD. Neither did these groups differ in the quality of physical wellbeing after childbirth.

Satisfaction with childbirth was significantly lower in women who had emergency caesarean sections than in those who gave birth vaginally (H = 8.17; p = .017). VB and ELCS women did not significantly differ in their levels of childbirth satisfaction. ECS mothers perceived their delivery as being more difficult than VB and ELCS mothers did (H = 19.22; p < .001, and H = 17.26; p < .001, respectively). Similarly, the ECS mothers' expectations about the childbirth tended to differ more often from the reality than those of VB mothers (H = 8.42; p = .015) and ELCS mothers (H = 8.21, p = .003).

In our study, 36.1% (n = 69) of the participants gave birth unaccompanied, while 69.3% (n = 121) had individual support (*Table 1*). Women who were accompanied by a midwife and a partner during childbirth showed the highest average level of childbirth satisfaction (*Table 1*). Significantly higher birth satisfaction scores occurred in the group with doula/midwife and partner support, compared to unaccompanied birth (H = -3.32; p = .001).

Childbirth satisfaction and well-being after childbirth did not significantly differ based on the country in which the delivery took place. However, there were significant country differences in the support given at the time of delivery, so that in Russia, women gave birth to a child without the support of her partner, a personal midwife or a doula more often than in Europe and Israel ($X^2 = 34.844$; p < 0.001).

34 V.A. Yakupova, A. Suarez

Multiple linear regression analysis showed that levels of birth satisfaction, physical well-being after delivery, perceived severity of the birth experience, and the predictability of labor process contributed significantly to the regression model F (7, 183) = 8.80; p < .001, and accounted for 26% of the variance in PPD. Significant predictors of PPD were physical well-being after delivery (B = -2.504; p < .001) and birth satisfaction (B = -.481; p = .007). Controlled for maternal age, gestational age at birth, and the number of children, the model explained 25% of variance in PPD (*Table 3*).

Table 3

	В	SE	95%CI	р		
Model 1						
Birth satisfaction	498	.171	84:16	.004		
Physical well-being in 2 months after delivery	-2.542	.395	-3.3: -1.7	.000		
Model 2 (adjusted for maternal age, gestational age at birth, and parity as covariates)						
Birth satisfaction	481	.177	83:13	.007		
Physical well-being in 2 months after delivery	-2.504	.404	-3.3: -1.7	.000		

Multiple linear regression results examining associations with PPD.

Note. B = Unstandardized B. SE = Standard Error. 95% CI = 95% Confidence Interval. p = p-value.

Discussion

To our knowledge, this is the first study to examine the association between PPD and childbirth experience in Russian women. Our results show that lower birth satisfaction and physical well-being two months after delivery were associated with higher levels of PPD. These findings corroborate previous studies indicating psychologically and physically traumatic childbirth experiences as a serious risk factor for depression after childbirth (Yildiz, Ayers, & Phillips, 2017). It is further in line with the evidence that acute postpartum pain and persistent pain after delivery are associated with increased risk of PPD (Eisenach et al., 2008).

Our study showed that the mode of delivery (vaginal, emergency caesarean, or elective caesarean section) did not directly correlate with the risk of developing PPD. However, an emergency cesarean section seems to be harder for a woman, as this delivery mode was associated with lower childbirth satisfaction and the realities that fell short of the expectations. Subjectively, such childbirth is perceived as being more difficult.

There are contradictory findings in this regard, with some studies reporting elevated risk of PPD following emergency cesarean section (Yang, Shen, Ping, Wang, & Chien, 2011), while others find no such association (Eckerdal et al., 2018), as is the case in our study. This may be because the important risk factor for postpartum depression is not a mode of delivery per se, but the emotions the woman is experiencing — a fear of an unexpected outcome, a fear for her baby's health, a feeling of guilt, etc. For example, mothers who had a strong antepartum preference for vaginal delivery, and then delivered by cesarean, may be at increased risk for depression in the early postpartum period (Houston et al., 2015). Importantly, this involves the quality of the support the woman gets from relatives and specialists (Noyman-Veksler, Herishanu-Gilutz, Kofman, Holchberg, & Shahar, 2015).

Our study's findings indicate that the level of childbirth satisfaction in Russia does not significantly differ from that in European countries and Israel. Specific to childbirth in Russia were lower rates of partner and doula support during the childbirth (especially in the provinces of Russia). This is the legacy of the Soviet system of obstetrics (Temkina, 2014). The presence of a partner or other family member during labor was only allowed in state hospitals beginning in 2012; nowadays there is a growing trend for an increased number of deliveries with the partner present (Novkunskaya, 2020).

Current Federal legislation in Russia does not establish woman's right to have more than one companion during labor. However, our study shows that childbirth with a doula or individual midwife and a partner's support is associated with higher levels of birth satisfaction and physical well-being after delivery. These results are consistent with the research data on the positive impact of doula assistance on the psychological well-being of women in childbirth (McLeish & Redshaw, 2019). Thus, a doula may be a mediating specialist who helps the couple to go through the challenging birth experience (Lanning & Klaman, 2019). The results of our research emphasize the importance of the individual professional support during labor and its possible application for the prevention of PPD in Russia.

Conclusion

Our study showed that birth satisfaction and physical well-being two months after delivery were inversely correlated with PPD. Perceived severity of labor and worse well-being after delivery were associated with lower birth satisfaction. The presence of a partner and a personal midwife or doula at birth was associated with higher birth satisfaction, which indicates the importance of the individual professional support during labor as a possible avenue for PPD prevention.

Limitations

We used self-report methods to assess the levels of depression. Clinical interviews would supplement the results and make them more valid. A more detailed question-naire about the woman's birth experience or a qualitative study would enrich the results about the association between birth satisfaction and perinatal affective disorders. Further research with the larger group with doula or midwife support is needed.

Ethics Statement

This study was conducted according to the Declaration of Helsinki. The study was approved by the Ethical Committee of the Russian Psychological Society, approval ID #18-1102. We affirm that all the participants gave informed consent before taking part in the research.

Author Contributions

VY and AS conceived of the idea. VY developed the study design and performed the computations. AS verified the analytical methods and standards for results presentation. VY and AS discussed the results and contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgements

This research was supported by grant 18-313-00051 of Russian Fundamental Research Fund.

References

- Bell, A.F., & Andersson, E. (2016). The birth experience and women's postnatal depression: a systematic review. *Midwifery*, 39, 112–123. https://doi.org/10.1016/j.midw.2016.04.014
- Bohren, M.A., Hofmeyr, G.J., Sakala, C., Fukuzawa, R.K., & Cuthbert, A. (2017). Continuous support for women during childbirth. *Cochrane Database of Systematic Reviews*, 17. https://doi.org/10.1002/14651858.CD003766.pub6
- Borozdina, E., & Novkunskaya, A. (2020). Patient-centered care in Russian maternity hospitals: Introducing a new approach through professionals' agency. *Health: An Interdisciplinary Journal for the Social Study of Health, Illness and Medicine*. https://doi.org/10.1177/1363459320925871
- Cox, J.L., Holden, J.M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry*, 150, 782–786. https:// doi.org/10.1192/bjp.150.6.782
- Danishevski, K., Balabanova, D., Parkhurst, J., & McKee, M. (2003). What do we know about the state of maternal health in Russia? Report on the situation analysis. Retrieved from http://researchonline. lshtm.ac.uk/id/eprint/17934/
- Eckerdal, P., Georgakis, M.K., Kollia, N., Wikström, A.K., Högberg, U., & Skalkidou, A. (2018). Delineating the association between mode of delivery and postpartum depression symptoms: a longitudinal study. Acta Obstetricia et Gynecologica Scandinavica, 97(3), 301–311. https://doi.org/10.1111/ aogs.13275
- Eisenach, J.C., Pan, P.H., Smiley, R., Lavand'homme, P., Landau, R., & Houle, T.T. (2008). Severity of acute pain after childbirth, but not type of delivery, predicts persistent pain and postpartum depression. *Pain*, *140*(1), 87–94. https://doi.org/10.1016/j.pain.2008.07.011.
- Gosselin, P., Chabot, K., Béland, M., Goulet-Gervais, L., & Morin, A.J. (2016). Fear of childbirth among nulliparous women: Relations with pain during delivery, post-traumatic stress symptoms, and postpartum depressive symptoms. *Encephale*, 42(2), 191–196. https://doi.org/10.1016/j.encep.2016.01.007
- Hahn-Holbrook, J., Cornwell-Hinrichs, T., & Anaya, I. (2018). Economic and Health Predictors of National Postpartum Depression Prevalence: A Systematic Review, Meta-analysis, and Meta-Re-
gression of 291 Studies from 56 Countries. Frontiers in Psychiatry, 8, 248. https://doi.org/10.3389/fpsyt.2017.00248

- Houston, K.A., Kaimal, A.J., Nakagawa, S., Gregorich, S.E., Yee, L.M., & Kuppermann, M. (2015). Mode of delivery and postpartum depression: the role of patient preferences. *American Journal of Obstetrics and Gynecology*, 212(2), 229.e1–229.e7. https://doi.org/10.1016/j.ajog.2014.09.002.
- Lanning, R.K., & Klaman, S.L. (2019) Evaluation of an Innovative, Hospital-Based Volunteer Doula Program. *Health Care Improvement and Evaluation*, 48(6), 654–663. https://doi.org/10.1016/j. jogn.2019.08.004
- Martin, C.R., Martin, H.C., & Redshaw, M. (2017). The Birth Satisfaction Scale-Revised Indicator (BSS-RI). BMC Pregnancy and Childbirth, 17(1), 277. https://doi.org/10.1186/s12884-017-1459-5
- McLeish, J. & Redshaw, M. (2019). "Being the best person that they can be and the best mum": a qualitative study of community volunteer doula support for disadvantaged mothers before and after birth in England. BMC Pregnancy and Childbirth, 10, 19–21. https://doi.org/ 10.1186/s12884-018-2170-x
- Mohammad, K.I., Gamble, J., & Creedy, D.K. (2011). Prevalence and factors associated with the development of antenatal and postnatal depression among Jordanian women. *Midwifery*, 27, 238–245. https://doi.org/10.1016/j.midw.2010.10.008
- Morgan, M., & Neef, T. (2020). What's New About Income Inequality in Europe (1980-2019)? World Inequality Lab. Retrieved from https://wid.world/document/whats-new-about-income-inequalityin-europe-1980-2019/
- Novkunskaya, A. (2017). Rody po myagkim metodikam v provincii: vozmojnosti i ogranicheniya [Gentle birth methods in province: opportunities and restrictions]. In Temkina, A. & Borozdina, E. (Eds.), *Menyayuscheesya rodovspomojenie: vzglyad akusherok I sociologov* [Changing obstetrics: midwives' and sociologists' perspective] (pp. 31–44). Izdatel'stvo EUSPB [EUSPB Publishing].
- Novkunskaya, A. (2020). Some symptoms of neoliberalisation in the institutional arrangement of maternity services in Russia. In Cardano, M., Gabe, J., & Genova, A. (Eds.) *Health and illness in the Neoliberal Era in Europe* (pp. 177–193). Emerald Publishing Limited. https://doi.org/10.1108/978-1-83909-119-320201010
- Noyman-Veksler, G., Herishanu-Gilutz, S., Kofman, O., Holchberg, G., & Shahar, G. (2015). Postnatal psychopathology and bonding with the infant among first-time mothers undergoing a caesarian section and vaginal delivery: sense of coherence and social support as moderators. *Psychology and Health*, 30(4), 441–455. https://doi.org/10.1080/08870446.2014.977281
- O'Hara, M.W., & McCabe, J.E. (2013). Postpartum depression: Current status and future directions. Annual Review of Clinical Psychology, 9, 379–407. https://doi.org/10.1146/annurev-clinpsy-050212-185612
- Saisto, T., Salmela, A.K., Nurmi, J.E., & Halmesmaki, E. (2001). Psychosocial predictors of disappointment with delivery and puerperal depression — a longitudinal study. Acta Obstetricia et Gynecologica Scandinavica, 80, 39–45. https://doi.org/10.1034/j.1600-0412.2001.800108.x
- Silveira, M.F., Mesenburg, M.A., Bertoldi, A.D., De Mola, C.L., Bassani, D.G., Domingues, M.R., ... Coll, C.V.N. (2019). The association between disrespect and abuse of women during childbirth and postpartum depression: Findings from the 2015 Pelotas birth cohort study. *Journal of Affective Disorders*, 256, 441–447. https://doi.org/10.1016/j.jad.2019.06.016
- Shorey, S., Chee, C.Y.I., Ng, E.D., Chan, Y.H., Tam, W.W.S., & Chong, Y.S. (2018). Prevalence and incidence of postpartum depression among healthy mothers: A systematic review and meta-analysis. *Journal of Psychiatric Research*, 104, 235–248. https://doi.org/10.1016/j.jpsychires.2018.08.001
- Souza, K.J. de, Rattner, D., & Gubert, M.B. (2017). Institutional violence and quality of service in obstetrics are associated with postpartum depression. *Revista de Saude Publica*, 51. https://doi. org/10.1590/S1518-8787.2017051006549
- Stewart, D.E., Robertson, E., Phil, M., Dennis, C., Grace, S.L., & Wallington, T. (2003). Postpartum Depression: Literature review of risk factors and interventions. WHO Publication. Retrieved from https://www.who.int/mental_health/prevention/suicide/lit_review_postpartum_depression.pdf
- Temkina, A.A. (2014). Medikalizaciya reprodukcii i rodov: Bor'ba za control' [Medicalization of childbirth: fight for control]. Jurnal issledovaniy social'noy politiki [Journal of Social Policy Research], 12(3): 321–336. Retrieved from https://www.researchgate.net/publication/280546647_ATem-

kina_2014_Medikalizacia_reprodukcii_i_rodov_borba_za_kontrol_Zurnal_issledovanij_social-noj_politiki_123_321-336

- World Health Organization (2014). The prevention and elimination of disrespect and abuse during facility-based chidlbirth. Genebra: WHO. Retrieved from http://apps.who.int/iris/bitstream/10665/134588/1/WHO_RHR_14.23_eng.pdf?ua=1&ua=1
- Xu, H., Ding, Y., Ma, Y., Xin, X., & Zhang, D. (2017). Cesarean section and risk of postpartum depression: A meta-analysis. *Journal of Psychosomatic Research*, 97, 118–126. https://doi.org/10.1016/j. jpsychores.2017.04.016
- Yakupova, V. (2018). The Impact of Psychological and Physiological Conditions of Motherhood on Postnatal Depression. Russian Journal of Psychology, 15(1), 8–23. https://doi.org/10.21702/rpj.2018.1.1
- Yang, S.N., Shen, L.J., Ping, T., Wang, Y.C., & Chien, C.W. (2011). The delivery mode and seasonal variation are associated with the development of postpartum depression. *Journal of Affective Disorders*, 132, 158–164. https://doi.org/10.1016/j.jad.2011.02.009
- Yildiz, P.D., Ayers, S., & Phillips, L. (2017). The prevalence of posttraumatic stress disorder in pregnancy and after birth: A systematic review and meta-analysis. *Journal of Affective Disorders, 208,* 634–645. https://doi.org/10.1016/j.jad.2016.10.009

Original manuscript received December 24, 2019 Revised manuscript accepted December 22, 2020 First published online March 20, 2021

To cite this article: Yakupova, V.A., Suarez, A. (2021). A Postpartum Depression and Birth Experience in Russia. *Psychology in Russia: State of the Art*, 14(1), 28–38. DOI: 10.11621/pir.2021.0103

Psychology in Russia: State of the Art Volume 14, Issue 1, 2021

Russian Psychological Society

The Validity and Reliability of the Turkish Scale for the Assessment of Fatigue in Pediatric Oncology Patients Aged 7–18 in Russia

Alena A. Deviaterikova^{a, b*}, Vladimir V. Kasatkin^a, Boris B. Velichovsky^c

^a Dmitry Rogachev National Medical Research Center of Pediatric Hematology, Oncology, and Immunology, Moscow, Russia

^b Russian Academy of Education, Moscow, Russia

^c Lomonosov Moscow State University Faculty of Psychology, Moscow, Russia

* Corresponding author. E-mail: alena.deviaterikova@gmail.com

Background. Fatigue is the most common complaint by children both during and after cancer treatment, but in Russia, there is no reliable method for assessing fatigue.

Objective. To develop a Russian version of the Turkish Scale for the Assessment of Fatigue in Pediatric Oncology Patients Ages 7-18.

Design. Our first step was to translate all the items of the Turkish questionnaire into Russian. Then, through discussion, we created a single proposition for each item. The next step was obtaining expert opinions to assess the validity. Once the expert estimates agreed, a pilot version of the questionnaire was formed. The next step was to collect a large sample of patients to study the reliability and validity of the questionnaire.

Results. As a result of factor analysis, three factors were identified. The first factor was "fatigue associated with actions;" the second was "fatigue as feeling;" and the third was "fatigue associated with sleep difficulties." The children's and parents' versions had the same factor structure.

Conclusion. This study showed the possibility of using the questionnaire in a Russian sample. That's why it is necessary to continue collecting and analyzing data in this direction. The reliability of the test was also assessed. The reliability of the parent version scored a Cronbach's alpha of 0.91. The reliability of the children's version showed a Cronbach's alpha of 0.93.

Keywords: fatigue; pediatric cancer; questionnaire; adolescent; quality of life.

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online) © Lomonosov Moscow State University, 2021 © Russian Psychological Society, 2021 http://psychologyinrussia.com

Introduction

Cancer is a serious disease that occurs throughout the world (Stewart & Wild, 2014; Jemal, 2011; Stewart et al., 2019). It affects both children and adults. In addition to the pain of the disease and treatment, patients suffer emotional and behavioral disorders (Olson et al., 2008).

The most common cancer complaint is fatigue (Curt et al., 2000). It is the most distressing symptom for patients, since it reduces their quality of life (Bower et al., 2000). However, patients who have completed treatment and are in remission also have symptoms of fatigue. Even after their cancer is cured, patients have chronic illnesses due to their treatment (Oeffinger et al., 2006). Fatigue remains with some patients for many years after the completion of treatment (Bower et al., 2006). Many studies show that over 50% of adults treated for cancer have signs of fatigue after finishing treatment (Richardson et al., 1998). Adult fatigue has psychological, physiological, and emotional components (Richardson et al., 1998; Akechi et al., 1999).

The chronic fatigue syndrome of cancer survivors has not been studied. In the first attempt at such a study, a survey was conducted of children with cancer, their parents, and the hospital staff who worked with the children. There was children's group of 7–12 year-olds and one of 13–18 year-olds (Winningham et al., 1994). The children complained of fatigue and the lack of enough strength to even get up and open their eyes. They had no desire to play and learn. They wanted to lie down and do nothing, and their parents allowed them not to attend classes and school, because the children complained of fatigue as soon as they woke up.

The task of a psychologist who wants to help such children is to help them cope with fatigue (Hockenberry-Eaton et al., 1998). To do this, however, you should first determine the degree of fatigue. Fatigue can be alleviated, and therapy can improve patients' quality of life (Varni et al., 2005). In order to alleviate the symptoms of fatigue in children, joint work by the therapist, the parents, and the hospital staff is necessary (Miaskowski, 2006). The feeling of fatigue prevents children from leading active lives, as well as preventing them from getting an education. Children can be cognitively intact, but lack of strength does not allow them to effectively solve problems. High degrees of fatigue prevent children from attending school, which leads to emotional deprivation and a decrease in social contact. In addition, the quality of home education may be lower than that at school (Wu et al., 2010).

Therefore, fatigue is a serious problem for cancer survivors. Since it affects the quality of a patient's life, it's necessary to diagnose it as quickly as possible.

In order to assess fatigue, a reliable method is required. However, in Russia there is no such method for assessing fatigue in children who have survived cancer. Current methods for assessing fatigue are not reliable and valid (Miaskowski, 2006; Wu et al., 2010). Most often, if a child complains of fatigue, he is permitted more rest and freed from any activities.

In world practice, however, fatigue is assessed using questionnaires. For example, in Turkey there is a national questionnaire for assessing fatigue. The Turkish Chronic Fatigue Questionnaire was developed for children 7–12 and 13–18 years of age, and their parents. This questionnaire has shown its reliability, validity, and consistency in Turkish samples (Gerceker & Yilmaz, 2012; Kudubes et al., 2014; Bektas & Kudubes, 2014).

The aim of our study was to adapt the Turkish questionnaire measuring the Scale for the Assessment of Fatigue in Pediatric Oncology Patients Ages 7–12 and 13–18, for use with a Russian population.

Methods

Participants

Our sample included 295 children (*Table 1*). The mean age of their oncology diagnoses was 7.25 years (SD = 1.5 years). Their periods of remission ranged from 24 to 72 months, with most children having received that status by the age of 8.2. The older the child, the longer the remission period (for example, a 12 year-old child's remission period was 3.8 years; a 15 year-olds was 6.8 years). Mothers filled out the parent version of the questionnaire.

Table 1

Description of Sample

Patients	Ν	M (SD)	% boys
Medulloblastoma	95	12.1 (3.0)	53
Acute lymphoblastic leukemia	50	12.07 (2.7)	45
Hodgkin's lymphoma	50	11.5 (3.2)	40
Hematopoietic stem cell transplantation	50	10.95 (3.04)	39

Parents and children over 14 signed informed consent forms to participate in the study. An ID number was assigned to each patient to maintain anonymity. The children spent from seven to 32 days as patients at a rehabilitation center, and received various forms of rehabilitation depending on their needs. Some children underwent motor training and some cognitive training; some children saw a psychotherapist (individually or in a group). Also, all the children underwent physiotherapy, which included swimming. During admission to the center, the children received an invitation to participate in the study assessing chronic fatigue syndrome. So, their responses were not affected by their presence in the center. Procedures can be difficult for a child and increase his fatigue.

Measures

The original version of the Scale for the Assessment of Fatigue in Pediatric Oncology Patients had been developed in Turkey and consisted of a total of 27 items and 3 factors. The factor of general problems was measured by the first eighteen items. This factor measured overall fatigue. The next factor measured fatigue associated with difficulty sleeping (9–24 items). The last factor consisted of 25–27 items and evaluated fatigue during treatment procedures. We carried out the for the Assessment of Fatigue in Pediatric Oncology Patients (Gerceker et al., 2012; Kudubes et al., 2014; Bektas & Kudubes, 2014).

We used the scales presented by Aslı Akdeniz Kudubes (Gerceker et al., 2012; Kudubes et al., 2014; Bektas & Kudubes, 2014). The first step was to translate all the items of the questionnaire into Russian. Eight psychologists, five doctors, two biologists, and one translator took part. Each expert presented his version of the translation. Then, through discussion, they created a single proposition for each item. This stage lasted a month and a half. The result was a list of items in Russian.

The next step was an expert assessment, which took place in several stages. The pool of translated items was sent to several independent experts for improving the translation. The aim was to get an identical interpretation of the items after reverse translation.

The experts studied the translated items and evaluated how each statement related to what we wanted to measure, and whether this affirmation was clear to the respondents. If the experts' assessments had significant differences, the additional opinion of other experts in this field was required.

Then, 16 expert opinions were obtained to assess the validity of the content of the scales (Bektas & Kudubes, 2014; Akgul, 2003; Gozum & Aksayan, 2002; Ozdamar, 2005; Sencan, 2005).

Once the expert estimates were agreed upon, a pilot version of the questionnaire was created. Respondents were to grade each item on a Likert scale. The pilot version of the test was offered to 20 patients. This was necessary in order to assess how clear the items were for the patients. At this stage, we also checked whether the patients understood the items correctly. Both parents and children filled out the questionnaires and affirmed that all the items were understandable and did not have different interpretations. Then, the next step was to collect a large sample of patients to study the reliability and validity of the questionnaire.

To assess the coherence of our questionnaire with other valid questionnaires, we used the Achenbach Children Behavior Checklist for assessing emotional states. The Achenbach Children Behavior Checklist (CBCL) has three forms: one for parents, one for children, and one for teachers. In this study, we used only the ones for parents and children. The questionnaire was standardized in Russian, and described behavioral and emotional problems.

Results

Construct Validity

The results of the assessment by the 16 experts were tested for accuracy. The consistency scores were determined to be 0.716. Thus, the estimates were considered consistent.

The Parent Form of the Scale for the Assessment of Fatigue in Pediatric Oncology *Patients*: Construct validity of the scales was tested by factor analysis, which showed the Kaiser-Meyer-Olkin coefficient (KMO) to be 0.931. The resulting factor structure differed from the original. In our study, three factors were also highlighted, but the distribution of assertions varied.

The first factor can be called "fatigue associated with actions" (it included items 2, 8, 9, 10, 11, 12, 13, 15, 17, 25, 26, & 27); the factor loads were determined to be 0.42-0.68. The second factor was "fatigue as feeling" (it included items 1, 4, 5, 7,14, 16, 18, & 22); the factor loads were determined to be 0.42-0.72. The third factor was "fatigue associated with sleep difficulties" (it included items 3, 6, 19, 20, 21, 23, & 24); the factor loads were determined to be 0.48-0.66.

The "fatigue associated with actions" explained 38.3% of the total variance; the "fatigue as feeling" explained 38.3%; and the "fatigue associated with sleep difficulties" explained 18.9%. The total of the three explained 94% (see *Table 2* in the Appendix).

The Child Form of Scale for the Assessment of Fatigue in Pediatric Oncology Patients: As a result of the factor analysis, the Kaiser-Meyer-Olkin coefficient (KMO) was determined to be 0.888. The resulting factor structure differed from the original. In our study, three factors were also highlighted, but the distribution of assertions varied.

The first factor can be called "fatigue associated with actions" (it included items 2, 8, 9, 10, 11, 12, 13, 15, 17, 25, 26, & 27); the factor loads were determined to be 0.40–0.75. The second factor was "fatigue as feeling" (it included items 1, 4, 5, 7,14, 16, 18, & 22); the factor loads were determined to be 0.46–0.68. The third factor was "fatigue associated with sleep difficulties" (it included items 3, 6, 19, 20, 21, 23, & 24); the factor loads were determined to be 0.46–0.68.

The "fatigue associated with actions" explained 33.4% of the total variance; the "fatigue as feeling" explained 33.4%; and the "fatigue associated with sleep difficulties" explainsed 18.9%. The total variance explained by the factors was 82.9% (See *Table 3* in the Appendix).

Internal consistency analysis

One of the steps required to successfully adapt the questionnaire was to evaluate its internal consistency; that is, how much did each item in the test correspond to what the questionnaire measured? The reliability coefficients of the factors of the parent form showed a Cronbach's alpha of 0.91. The reliability coefficients of the factors of the factors of the child form showed a Cronbach's alpha of 0.93.

Relationship to other questionnaires

The coherence between the parent version of the questionnaire Scale for the Assessment of Fatigue in Pediatric Oncology Patients and the parent version of the Achenbach Child Behavior Checklist was evaluated; it amounted to p = 0.001. The relationship between the child version of the Scale for the Assessment of Fatigue in Pediatric Oncology Patients and child form of the Achenbach Child Behavior Checklist measured p = 0.001.

Discussion

In the present study, we completed the first stage of the adaptation of the Turkish questionnaire Scale for the Assessment of Fatigue in Pediatric Oncology Patients for use in Russia. We showed that this questionnaire had validity and reliability. We as-

sessed the validity of the questionnaire: it was translated with the help of experts from various fields who work with this cohort of patients. We also obtained expert opinions of psychologists. As a result, we created the first version of the questionnaire, which was used for getting a large sample of patients.

Fatigue is a common complaint of cancer survivors. Fatigue prevents children from leading a standard lifestyle, communicating with peers, and attending educational institutions. Often, due to fatigue, children cannot cope with cognitive tasks. In this case, they don't have problems with cognitive functions, but they lack enough strength to solve cognitive tasks. Since fatigue is an obstacle to a full life, high-quality tools are needed to evaluate it.

We then carried out a factor and explanatory analysis. The goal of the factor analysis was to identify the structure of the relationship between the variables and highlight the factors describing them (Gozum & Aksayan, 2002; Ozdamar, 2005; Simsek, 2007). In the course of a factor analysis, from the first rotation, the varimax structure was divided into three factors. The first factor was "fatigue associated with actions;" the second was "fatigue as feeling;" and the third was "fatigue associated with sleep difficulties." The resulting factor structure differed from the original. In our study, three factors were also highlighted, but the distribution of assertions was different.

Currently, in Russia, rehabilitation programs for cancer survivors are just beginning to be created. These programs are based on correction of the children's cognitive and motor deficits, but don't take into account the emotional consequences of cancer. However, fatigue complaints are the most frequent. Adaptation of the Turkish tool will help professionals to assess the degree of fatigue and create a rehabilitation plan for each child. This study showed the possibility of using the Turkish questionnaire with the Russian sample. It is necessary to continue collecting and analyzing data in this direction.

Conclusion

As a result of our study, a questionnaire was created which assesses chronic fatigue syndrome in Russian children who survived cancer. This questionnaire showed high validity and reliability in the Russian sample. The advantage of this questionnaire is the presence of both a children's and parental version, because the subjective feelings of the child and the parent may differ; having both versions will be helpful for the doctor's diagnosis. While our sample was small, this study was only the first step toward collecting extensive data. The questionnaire will be distributed to other children's centers in Russia for more extensive data collection. Our research has not yet presented data on test-retest reliability; this is the subject of further research.

Limitations

There are possible issues with the ability to generalize the results, *e.g.*, sample size and limited access to data.

One limitation is that the sample size was not very large. Another limitation is that the sample was not divided by oncological diagnoses. Additional research is needed on large samples of children with various diagnoses and different ages.

In the creation of the Russian version of the questionnaire, only a direct translation of the questionnaire into Russian was carried out. No back translation from Russian was made. Also, test-retest reliability was not evaluated.

Acknowledgements

We are grateful to the head of the psychology department of our center, Glebova E., for assistance in collecting material.

Ethics Statement

The study obtained ethics approval of the Ethics Committee of Dmitry Rogachev National Medical Research Center of Pediatric Hematology, Oncology, and Immunology 27.10.2017. All the participants gave informed consent before taking part in our research.

Author Contributions

Vladimir Kasatkin and Alena Deviaterikova conceived of the idea. Alena Deviaterikova and Boris Velichovsky developed the theory and performed the computations. Boris Velichovsky supervised the findings. The authors discussed the results and all contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

References

- Akechi, T., Kugaya, A., Okamura, H., Yamawaki, S., & Uchitomi, Y. (1999). Fatigue and its associated factors in ambulatory cancer patients: a preliminary study. *Journal of Pain and Symptom Management*, 17(1), 42–48. https://doi.org/10.1016/S0885-3924(98)00105-5
- Akgul, A. (2003). Statistical analysis techniques, using SPSS in medical research. Ankara: Offset Labour Limited Company, 187(224), 382–5.
- Bektas, M., & Kudubes, A.A. (2014). Developing scales for the assessment of fatigue in Turkish pediatric oncology patients aged 13-18 and their parents. *Asian Pacific Journal of Cancer Prevention*, 15(22), 9891-8. https://doi.org/10.7314/APJCP.2014.15.22.9891
- Bower, J.E., Ganz, P.A., Desmond, K.A., Bernaards, C., Rowland, J.H., Meyerowitz, B.E., & Belin, T.R. (2006). Fatigue in long-term breast carcinoma survivors: a longitudinal investigation. *Cancer*, 106(4), 751–758. https://doi.org/10.1002/cncr.21671
- Bower, J.E., Ganz, P.A., Desmond, K.A., Rowland, J.H., Meyerowitz, B.E., & Belin, T.R. (2000). Fatigue in breast cancer survivors: occurrence, correlates, and impact on quality of life. *Journal of Clinical Oncology*, 18(4), 743–743. https://doi.org/10.1200/JCO.2000.18.4.743
- Curt, G.A., Breitbart, W., Cella, D., Groopman, J.E., Horning, S.J., Itri, L.M., ... & Vogelzang, N.J. (2000). Impact of cancer-related fatigue on the lives of patients: new findings from the Fatigue Coalition. *The Oncologist*, 5(5), 353–360. https://doi.org/10.1634/theoncologist.5-5-353
- Gerceker, G.O., & Yilmaz, H.B. (2012). Reliability and validity of Turkish versions of the child, parent and staff cancer fatigue scales. *Asian Pacific Journal of Cancer Prevention*, 13(7), 3135–3141. https:// doi.org/10.7314/APJCP.2012.13.7.3135

- Gozum, S., & Aksayan, S. (2002). Guidelines for cross-cultural scale adaptation II: Psychometric properties and cross-cultural comparison. *J Nur Res Development*, 5, 3–14.
- Hockenberry-Eaton, M., Hinds, P.S., Alcoser, P., O'Neill, J.B., Euell, K., Howard, V., ... & Taylor, J. (1998). Fatigue in children and adolescents with cancer. *Journal of Pediatric Oncology Nursing*, 15(3), 172–182. https://doi.org/10.1177/104345429801500306
- Jemal, A., Bray, F., Center, M.M., Ferlay, J., Ward, E., & Forman, D. (2011). Global cancer statistics. *CA:* A Cancer Journal for Clinicians, 61(2), 69-90. https://doi.org/10.3322/caac.20107
- Kudubes, A.A., Bektas, M., & Ugur, O. (2014). Developing a scale for the assessment of fatigue in pediatric oncology patients aged 7–12 for children and parents. Asian Pacific Journal of Cancer Prevention, 15(23), 10199–207. https://doi.org/10.7314/APJCP.2014.15.23.10199
- Miaskowski, C. (2006). Symptom clusters: establishing the link between clinical practice and symptom management research. Support Care Cancer, 14, 792–794. https://doi.org/10.1007/s00520-006-0038-5
- Oeffinger, K.C., Mertens, A.C., Sklar, C.A., Kawashima, T., Hudson, M.M., Meadows, A.T., ... & Schwartz, C.L. (2006). Chronic health conditions in adult survivors of childhood cancer. *New England Journal of Medicine*, 355(15), 1572–1582. https://doi.org/10.1056/NEJMsa060185
- Olson, K., Turner, A.R., Courneya, K.S., Field, C., Man, G., Cree, M., & Hanson, J. (2008). Possible links between behavioral and physiological indices of tiredness, fatigue, and exhaustion in advanced cancer. *Supportive Care in Cancer*, *16*(3), 241–249. https://doi.org/10.1007/s00520-007-0298-8
- Ozdamar, K. (2005). Software Packages with Statistical Data Analysis. Eskisehir: Kaan Bookstores.
- Panepinto, J.A., Torres, S., Bendo, C.B., McCavit, T.L., Dinu, B., Sherman-Bien, S., ... & Varni, J.W. (2014). PedsQL[™] Multidimensional Fatigue Scale in sickle cell disease: feasibility, reliability, and validity. *Pediatric Blood & Cancer*, 61(1), 171–177. https://doi.org/10.1002/pbc.24776
- Richardson, A., Ream, E., & Wilson-Barnett, J. (1998). Fatigue in patients receiving chemotherapy: patterns of change. *Cancer*, 21(1), 17–30. https://doi.org/10.1097/00002820-199802000-00003
- Şencan, H. (2005). Reliability and validity in the social and behavioral measurements. Ankara: Outstanding Publishing.
- Simsek, O.F. (2007). Structural equation modeling inputs: basic principles and application of LISREL. İstanbul: Ekinoks Publishing.
- Stewart, B.W.K.P., & Wild, C.P. (2014). World Cancer Report. https://doi.org/10.12968/ nuwa.2014.10.2.1142051
- Stewart, B.W.K.P., & Wild, C.P. (2019). World Cancer Report 2014. Public Health.
- Varni, J.W., Burwinkle, T.M., Katz, E.R., Meeske, K., & Dickinson, P. (2002). The PedsQL[™] in pediatric cancer: reliability and validity of the pediatric quality of life inventory[™] generic core scales, multi-dimensional fatigue scale, and cancer module. *Cancer*, 94(7), 2090–2106. https://doi.org/10.1002/cncr.10428
- Winningham, M.L., Nail, L.M., Burke, M.B., Brophy, L., Cimprich, B., Jones, L.S., ... & Beck, S. (1994). Fatigue and the cancer experience: the state of the knowledge. *Oncology Nursing Forum*, 21(1), 23–36.
- Wu, M., Hsu, L., Zhang, B., Shen, N., Lu, H., & Li, S. (2010). The experiences of cancer-related fatigue among Chinese children with leukemia: a phenomenological study. *International Journal of Nursing Studies*, 47(1), 49–59. https://doi.org/10.1016/j.ijnurstu.2009.05.026

Original manuscript received February 05, 2020 Revised manuscript accepted March 02, 2021 First published online March 31, 2021

To cite this article: Deviaterikova, A.A., Kasatkin, V.V., Velichovsky, B.B. (2021). The Validity and Reliability of the Turkish Scale for the Assessment of Fatigue in Pediatric Oncology Patients Aged 7–18 s in Russia. *Psychology in Russia: State of the Art, 14*(1), 39–48. DOI: 10.11621/pir.2021.0104

Appendix

Table 2

Factor structure of the Parent Form of the questionnaire

Factor name	Items included in factor	Factor loads
Fatigue associated with actions	He/She feels tired even if eating	0.544
	He/She needs to stop and rest while walking	0.466
	He/She needs help in doing his/her daily work	0.482
	He/She feels powerless for do his/her favorite things (play games, spend time with his/her friends, etc.)	0.515
	He/She is having trouble starting his/her day job.	0.420
	He/She is having trouble finishing his/her daily business	0.417
	He/She needs to rest too much	0.424
	He/She feels too tired to deal with his/her external appearance	0.422
	He/She feels sick	0.459
	He/She feels tired before treatment	0.487
	He/She feels tired during treatment	0.512
	He/She feels tired after treatment	0.574
Fatigue as feeling	He/She feels tired	0.507
	He/She feels more tired in the afternoon	0.456
	He/She feels more tired in the evening	0.420
	He/She wants to just lie down and rest	0.485
	He/She doesn't want to do anything	0.476
	He/She feels exhausted/sluggish	0.518
	He/She has had to deal with fatigue during the day	0.439
	He/She needs to sleep during the day (nap)	0.430
Fatigue associated with sleep difficulties	He/She feels more tired in the morning	0.491
	He/She has trouble getting out of bed during the day	0.432
	He/She wakes up tired in the morning	0.412
	He/She sleeps too much	0.568
	He/She is having trouble keeping his/her eyes open	0.655
	He/She has trouble falling asleep at night	0.535

Table 3

Factor structure	e of the	Child Form	n of the	question	ıaire
------------------	----------	------------	----------	----------	-------

Factor name	Items included in factor	Factor loads
Fatigue associated with actions	I feel tired even if eating	0.617
	I need to stop and rest while walking	0.553
	I am able to do my usual activities	0.576
	I have felt angry	0.576
	I have not felt like talking	0.469
	I need help to do my usual activities	0.458
	I don't feel like being with others	0.431
	I feel too tired to deal with my external appearance	0.427
	I feel sick	0.434
	I feel tired before treatment	0.606
	I feel tired during treatment	0.550
	I feel tired after treatment	0.597
Fatigue as feeling	My body has felt tired	0.606
	I want to rest more	0.510
	I sleep more often	0.462
	I don't feel like doing much	0.595
	I don't want to do anything	0.574
	I feel exhausted/sluggish	0.632
	I have had to deal with fatigue during the day	0.536
	I need to sleep during the day (nap)	0.480
Fatigue associated with sleep difficulties	I feel more tired in the morning	0.535
	I have trouble getting out of bed during the day	0.414
	I sleep too much	0.493
	I wake up at night consistently	0.362
	I wake up tired in the morning	0.568
	I have trouble keeping my eyes open	0.604
	I have trouble falling asleep at night	0.579

Psychology in Russia: State of the Art Volume 14, Issue 1, 2021



ORGANIZATIONAL PSYCHOLOGY

Counterproductive Work Behavior in Russian Nanotechnology Organizations

Karina Sayapina^{a*}, Daniela N. Botone^b

^a Financial University under the Government of the Russian Federation, Moscow, Russia ^b Lucian Blaga University of Sibiu, Sibiu, Romania

*Corresponding author. E-mail: Kvsayapina@fa.ru

Background. Organizational behavior plays a significant role in the effectiveness of enterprises specializing in nanotechnology. Its negative side — counterproductive work behavior (CWB) — has not been analyzed sufficiently in this industry. We evaluated different theoretical approaches to this problem.

Objective. To estimate the predominant forms of counterproductive work behavior in relation to dimensions such as the intensity of the nanotechnology industry, seniority in the organization, and the age and gender of the subjects.

Design. We used a descriptive exploratory methodology that analyzes the preponderance of counterproductive work behavior in profile companies throughout the Russian Federation. CWB was assessed through a self-report questionnaire and in-depth interview with each employee. The results were analyzed by correlation-regression analysis in SPSS.

Results. We found significant correlations between the variables "intensity of the nanotechnology industry within the organization", "seniority of employees within the organization", "age of employees", and the total score of CWB. Regarding the CWB dimensions, the highest average of the scores was obtained for "low level of conscientiousness" (mean = 21.75; SD = 2.9), followed closely by "low level of personal development" (mean = 20.53; SD = 3.09). Among the CWB dimensions, it seems that the conscientiousness of the employees plays a key role in the continuation of their professional activity and consequently in the increase of seniority in the organization.

Conclusion. A professional difficulty can be perceived as a challenge by an employee with good physical and/or psychological resilience. Russian nanotechnology companies should evaluate their approach to dealing with employees and mitigate situations that might be unnecessarily stressful. From the data obtained through the semi-structured interview, we found that what happens in a work group is essential in the emergence of CWB. Organizations need clear policies that empower employees to deal with certain work tasks and with employees who engage in specific CWB.

Keywords: organizational behavior; counterproductive work behavior; organizational behavior management; nanotechnology

© Lomonosov Moscow State University, 2021

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online)

[©] Russian Psychological Society, 2021

http://psychologyinrussia.com

Introduction

Improvement of professional performance and responsible development of nanotechnology are goals of many organizations worldwide. Facilitating cross-disciplinary research has attracted much attention in recent years, with special concerns about nanotechnology working behavior (Bonaccorsi & Thoma, 2007; Gulumian, Verbeek, Andraos, Sanabria & Jager, 2016; Gravina et al., 2018; Khan, 2015; Kohnen, 2018; Ma et al., 2018; Maynard & Kuempel, 2005; Mogoutov & Kahane, 2007; Palmberg, Dernis, & Miguet, 2009; Schulte et al., 2014; Youtie, Iacopetta, & Graham, 2007; Zucker & Darby, 2007).

We notice that traditionally high qualifications and narrow specialization are at the forefront in nanotechnology companies in Russia: Most personnel (predominantly those who work in enterprises in Moscow) know about the skills and experience required for the production process. Nanotechnology organizations in Moscow and the European part of Russia are interested in highly qualified engineers and managers who specialize in the solar energy sector, microprocessors production, and industrial-scale metal production.

Managing occupational safety and communicating risks to workers are the cornerstones of responsible nanotechnology. Since it is early in the commercialization of nanotechnology, there are still many unknowns and concerns; therefore, it is prudent to treat these issues as potentially hazardous until sufficient data are gathered for risk assessments.

Counterproductive Work Behavior (CWB)

The problem of counterproductive work behavior has been insufficiently analyzed in the Russian Federation. Krushkova and Deviatovskaia (2017) highlighted the role of organizational vandalism in Russian organizations, including such forms as "vulgar" (primitive damage), "resource" (damage to the organizational resources), "information" (corporate sabotage), and "professional" (antisocial performance of professional activities).

In our study, we explored the problem of CWB in the nanotechnology industry, highlighting the most common counterproductive work behaviors in relation to employees' seniority, the intensity of the nanotechnology profile, and some demographic characteristics of employees.

We have found no studies that describe a model of analysis for CWB in the Russian nanotechnology industry; therefore, we focused our attention on the most common types of counterproductive work behaviors found in other countries and organizations.

Counterproductive work behaviors are behaviors that are intended to harm the organization and are quite common among employees in many organizations worldwide; in most cases, these appear unnoticed or unreported (Bennet & Robinson, 2000). For this reason, the concept has played an essential role in Total Quality Management (TQM). Initially research was devoted to the question, "How do we achieve the best quality in the production process?" (Agrawal, 2019; Modgil & Sharma, 2016). Today, the TQM concept has been dramatically deepened, including such terms as organizational citizenship behavior and counterproductive work behavior, and it is connected with specific industries: Special rules are suggested, taking into account the specifics of an industrial sector, such as biotechnology or nanotechnology (Lavrynenko, Shmatko, & Meissner, 2018; Neyestani, 2016; Priede, 2012).

CWB includes acts directed against organizations and people; the most common CWB typology distinguishes between CWB targeted at the organization and CWB targeted at individuals (Bennett & Robinson, 2000).

The concept was defined as "voluntary behavior that violates significant organizational norms and in so doing, threatens the well-being of the organizations, its members, or both" (Robinson & Bennett, 1995, p. 556). Sackett and DeVore (2001) developed a hierarchical model of CWB: interpersonal deviance (harassment, gossip, verbal abuse, fighting) and organizational deviance (property deviance and production deviance). Property deviance consists of theft, property damage, and sabotage. Production deviance consists of absence, tardiness, long breaks, substance abuse, and sloppy work.

Gruys and Sackett (2003) found 11 categories of CWB: theft and related behavior, destruction of property, misuse of information, misuse of time and resources, unsafe behavior, poor attendance, poor quality of work, alcohol use, drug use, inappropriate verbal and physical actions. A few years later, Landy and Conte (2010) considered three common counterproductive behaviors: dishonesty, absenteeism, and sabotage. Dishonesty was defined as "employee theft of goods and theft of time (arriving late, leaving early, taking unnecessary sick days) or dishonest communications with customers, co-workers, or management" (Landy & Conte, 2010, p. 187). Absenteeism was defined as "a type of counterproductive behavior that involves failure of an employee to report for or remain at work as scheduled" (Landy & Conte, 2010, p. 188). Sabotage is "the intention to damage, disrupt, or subvert the organization's operations for personal purposes of the saboteur, by creating unfavorable publicity, damage to property, destruction of working relationships, or harming of employees or customers".

Employee theft is a major issue in many organizations worldwide (Cropanzano & Schminke, 2001; Greenberg, 2010; Landy & Conte, 2010; Murphy, 1993); for instance, a report by the American Management Association recorded a few decades ago that companies record huge losses each year, somewhere between \$5 billion and \$50 billion (Greenberg, 1990).

Greenberg (2002) reported that employee theft is correlated with moral development: "Employees who had attained Kohlberg's conventional level of moral development refrained from stealing money when they worked in an office that had an ethics program in place. However, those at the preconventional level of development and who worked at an office without an ethics program stole from their employers" (Greenberg, 2002, p. 985).

Some researchers (Blau, 1985; Cropanzano & Schminke, 2001; Neuman & Baron, 2005) have identified another issue: The theft may be the effect of emotional states such as feelings of inequity and perceived violations of justice.

What are the organizational factors that cause absenteeism? In many studies (e.g., Nicholson, Brown, & Chadwick-Jones, 1977; Nicholson & Johns, 1985) absenteeism

is correlated with job commitment and job dissatisfaction, and it is caused by an informal agreement between a worker and a supervisor. Shamian and her colleagues (2003) suggested that stress perceived by the employees caused a high level of absenteeism, especially among women.

From another perspective, it seems that smoking plays an important role in producing CWB among workers: "Current smokers had significantly greater absenteeism than did never smokers, with former smokers having intermediate values; among former smokers, absenteeism showed a significant decline with years following cessation" (Halpern, Shikiar, Rentz & Khan, 2001, 233). However, the problem of employees who are smokers can be much more complicated for a large organization. It is also possible that in addition to lost time as a result of illness, smokers are less productive at the workplace.

Sabotage ("the Lordstown Syndrome") is strongly determined by stress and frustration among employees. In the early 1970s, in the General Motors company in the United States, workers intentionally dropped nuts and bolts into engines. Nowadays, it seems that injustice is the most common cause of sabotage. Researchers have shown that "when the source of injustice was interactional, individuals were more likely to engage in retaliation, and when the source of injustice was distributive, individuals were more likely to engage in equity restoration" (Ambrose, Seabright & Schminke, 2002, p. 947).

Other researchers have pointed out that perceived organizational support and the organizational ethical climate influence interpersonal deviance, whereby organizational justice and perceived organizational support affect organizational deviance among the support staff (Alias & Rasdi, 2015).

CWB, Resilience, and Emotional Behavior

Turning to the Russian Federation, when a researcher tries to describe Siberian behavior in specific situations, it would be a significant mistake not to refer to what life in Siberia is like. Life and consequently work in Siberia are not easy, whether we are talking about physical work, intellectual work, or emotional work. Besides industrial development and climate, socioeconomic shocks to Siberian organizations include the collapse of the Soviet Union, which led to increased uncertainty about the region's future economic development. Analyzing professional behavior in Siberia, some authors talk about "cultural resilience" (Crane, 2010; Forbes, 2013). According to Crane (2010, p. 2), cultural resilience is "the ability to maintain livelihoods that satisfy both material and moral (normative) needs in the face of major stresses and shocks; environmental, political, economic, or otherwise". Therefore, when researchers try to perform an analysis of professional behavior in this geographical area, resilience, in all its forms, plays an important role.

In the Western world, many researchers have tried to highlight the roles of emotional behavior and resilience in CWB at the workplace. From a psychological point of view, resilience is a complex phenomenon that describes a fundamental coping competency (Seligman, 2012; Shoss, Jiang, & Probst, 2018; Sinclair & Wallston, 2004), associated with a variety of positive psychological and physical outcomes: professional performance, job satisfaction, work happiness, organizational commitment, organizational citizenship behavior, motivation, health, well-being, psychological contract, leadership style, self-esteem, and others.

Sinclair and Wallston defined resilience as the tendency to "cope with stress in a highly adaptive manner" (Sinclair & Wallston, 2004, p. 94). Highly resilient employees should generally be able to cope with a variety of stressors such as muscle pain caused by prolonged exertion or the psychological fatigue caused by intensive professional activity; this is rather a form of physical resilience. When we refer to psychological resilience, resilient workers seek out the positive in situations, search for creative solutions to difficult challenges, and focus on recovering losses they encounter (Bonanno, 2004; Tugade & Fredrickson, 2007).

The problem of resilience is very complex; usually resilient employees seek to adapt to difficult situations and tend to be more creative in teamwork; they also tend to be more conscientious and ambitious. Loyalty to the organization (as part of organizational citizenship behavior, OCB) can also be a true indicator of their professional behavior.

The assumption is that resilient employees tend to express organizational citizenship behavior more frequently, and CWB less often. Thinking in this direction, we suggest that resilience may be able to buffer the negative impact of CWB on a number of variables such as seniority, personality, and leadership style. We can talk about a "positive adaptation" that involves a lot of physical and emotional effort. A recent study has argued that resilience partially mediates the relationship between leadership style and sabotage, withdrawal, and theft, which are sub-dimensions of counterproductive work behavior (Ocel, 2018).

In our view, resilience is a very important predictor for diminishing or eliminating CWB, but it is not the only factor in this equation; for instance, there are few studies that try to outline the significance of emotional effort made by employees at the workplace.

In several studies, emotional effort was operationalized within the concepts of emotional work, emotion regulation, coping, emotional intelligence, occupational stress, emotional exhaustion, and others (Krischer, Penney & Hunter, 2010; Penney & Spector, 2005; Raman, Sambasivan, & Kumar, 2016; Spector & Fox, 2002; Spector & Fox 2005). According to Penney and Spector (2005), CWB has an instrumental use: It may be performed as an attempt to cope with stressful situations at work and reduce the experience of negative emotions. Although we have identified many studies that link CWB, resilience, and emotional behavior, unfortunately no study has demonstrated the specific influence of emotional effort on CWB in the nanotechnology industry.

There are also many studies that link CWB to a pattern of positive or negative emotions. Spector and Fox concluded in 2002: "Negative emotion will tend to increase the likelihood of CWB and positive emotion will increase the likelihood of OCB. CWB is associated with anger and anxiety, locus of control, and delinquency. OCB is associated with empathy and perceived ability to help (Spector & Fox, 2002, p. 269). This conclusion seems to be a bit restrictive, because there are jobs where anger can be operationalized as a positive emotion; for example, controlled anger may be a

positive emotion for military personnel in special operations. Sadness or melancholy can have a positive effect on the creative process, whether we are talking about painters or musical composers.

The hypothesis that an emotion can change the valence of actions from negative to positive was supported by Krischer and colleagues, who outlined a positive effect of CWB in relation to some professional performance, an effect achieved through the instrumental role of emotion. Workers may experience some benefit as a result of CWB: "Employee withdrawal (e.g., taking longer breaks than allowed) may reflect attempts by employees to limit their exposure to stressful situations and prevent subsequent strain. Production deviance (e.g., intentionally working slowly) may serve as a strategy to gain control over stressors and the accompanying negative emotional reactions" (Krischer, Penney, & Hunter, p. 155).

Personality factors also have their well-defined role in the emergence of CWB (Barrick & Mount, 1991; Mount, Barrick, & Stewart, 1998; Salgado, 1997; 2003). Salgado (2003, p. 121) wrote: "Conscientiousness did not predict absenteeism and accident rate". He concluded his study with a very interesting explanation, that "a possible explanation for the results is that accidents are by definition out of the volitional control of individuals and conscientiousness is largely a volitional trait".

Self-control and the need for control over one's working behavior is nuanced by Allen and Greenberger (1980). They suggested that individuals might engage in destructive or vengeful acts, including CWB, to increase feelings of control over a stressful situation. Also, it is very possible that those who perceive that they have control over their own professional actions will be willing to show more physical/intellectual/emotional effort and less CWB (Fox & Spector, 1999; Fox & Spector, 2006; Fox, Spector, & Miles, 2001; Spector, 1998; Spector & Fox, 2003; Spector et al., 2006).

We can conclude that CWB is related to a multitude of psychological constructs, such as physical and psychological resilience, emotions, personality factors, locus of control, and motivation. First we will try to identify forms of CWB in relation to the seniority of employees from two geographical areas characterized by economic development.

Methods

We used a descriptive-exploratory methodology to identify possible forms of CWB in relation to employees' seniority, the intensity of the company's nanotechnology profile, and some demographic characteristics. For a start, we considered seniority in the organization as a significant indicator of organizational commitment, the opposite of CWB.

CWB was assessed through a self-report questionnaire and in-depth interview with each employee. Alternative sources for the assessment of CWB included objective indicators retrieved from organizational records, such as the KPI (key performance indicator) system for certain groups of workers. The KPI system makes it possible to attain transparency and clarity, fairness and perspective among personnel, which in turn directly influence loyalty to the organization. Other such indicators include monitoring of conflict situations (including resistance to innovations and lack of mutual understanding between workers) by the HR manager by means of expert assessment; and an employee card ID system, which is recognized as an effective instrument to tackle misbehavior by smokers and absenteeism.

Participants

The participant population for the study comprised companies from the European and Asian areas of Russia. A systematic random sampling procedure was first used to select the company from which the individual respondents were chosen. A variety of occupations were represented in this sample, the main groups of which were managers (50), engineers and technical specialists (39), research assistants (22), workers (18), students (7), entrepreneurs (6), public servants (5), and teachers (3). Most employees worked at privately owned companies. The sampling unit is made up of employees between 21 and 55 years of age. The sampling base was made up from lists of employees at the beginning of the year. They come mostly from Moscow and St. Petersburg in the European part of Russia, and Tomsk, Chelyabinsk, Barnaul, Kyshtym, and Ekaterinburg in the Asian part of Russia. The sample group comprised 150 employees (102 males, 48 females).

To sum up respondents' portfolios, the main characteristics are presented in *Table 1*.

Table 1

Number of respondents	Number of employees	Ownership	Seniority	Type of activity	Intensity of nanotechnology	Specialization in nanotechnology
8	> 301	State	More than 48 months	Production, science and education, central coordination unit	Nanotechnol- ogy is one among other fields; there is also a science and education center	Huge spectrum (solar energy, nanocomposite material, optics, electronics, metallurgy)
62	101-300	State, private	More than 24 months,	Production, science and education	High intensity in nanotechno- logy, among other fields	Nanooptics, solar energy, microelectron- ics, nanomateri- als, biotechno- logy
80	< 100	Private	Less than 24 months	Produc- tion, central coordination unit	Most are in nanotechno- logy industry only (33%); nanotechnology is one among other fields	Nanomaterials, biotechnology, electronics, optics

Portfolio of respondents' Russian nanotechnology organizations

We should note that, although an organization can simultaneously work in different fields (production, science, education, central coordination unit), respondents could only identify the field in which they were working at present. All respondents were from organizations where nanotechnology intensity is highly developed (none of the firms were simply planning to develop nanotechnology, and none had no relationship at all to nanotechnology).

Instruments

In investigating the CWB, we used a self-report survey and the semi-structured in-depth interview technique. The measure developed by Landy and Conte (2010) was chosen to determine and scale the CWB among the respondents. Participants were asked to rate how often they engaged in various counterproductive workplace behaviors, on a 5-point Likert scale ranging from Never (1) to Every day/Always (5). The survey consists of three sections: the first is devoted to common characteristics that link micro-level firm features and specialization in industry; the second section covers questions about counterproductive behavior and its opposite: organizational conformity-dishonesty, loyalty to the organization-organizational sabotage, conscientiousness-carelessness/negligence, and personal developmentlow commitment/ absenteeism; the last section identifies personal characteristics of the respondents (gender, working position, place of residence, number of employees, age of organization, and seniority in the organization). The reliability and validity of the survey were tested on a group of 67 employees from the private sector, before we started the research procedure. The internal consistency coefficients (Cronbach's alpha) for each dimension are presented in Table 2. The test-retest reliability coefficient obtained a value of $r_{aa} = 0.84$, and it was achieved at an interval of three months between the two tests. Content validity was obtained by consulting four experts from the academic and economic sectors; they checked that the definition of the construct to be measured is clear and the items used to measure it are representative for the construct. The discriminant validity (r = -85) was obtained using a survey for evaluating organizational citizenship behavior, developed by van Dyne and LePine (1998), which was translated, adapted, and standardized for the Russian population.

Table 2

Alpha coefficient for CWB dimensions

	CWB dimensions	Alpha coefficient
1	Organizational conformity-Dishonesty	0.71
2	Loyalty to the organization–Organizational sabotage	0.84
3	Conscientiousness-Carelessness/Negligence	0.73
4	Personal development-Low commitment /Absenteeism	0.71

The semi-structured interview was used to complete the information obtained through the self-report technique. Questions in the semi-structured in-depth interview also included aspects of individual differences among personnel at work (whether managers divide workers by types of personality and form "harmonized" groups in carrying out projects; whether there are any conflict situations during work); handling negative emotions and high stress at work; methods of assessing degree of loyalty to the organization on the part of key highly qualified personnel; methods of motivating personnel to more effective work; expectations on the part of workers about their career development and their level of satisfaction with their current position; methods (predominantly expert assessment techniques) of monitoring internal communication among personnel; and finally, questions to identify special features of the organizational culture. The semi-structured in-depth interview technique was also applied to managers responsible for human resources in the nanotechnology organizations, who were asked additional questions about cases of counterproductive behavior among staff and ways of solving problematic situations.

Procedure

After calling to confirm that the company met the sampling criteria, we personally delivered a questionnaire to the firm. Companies whose questionnaires had not been returned by the end of this procedure were considered non-respondents. Respondents completed the questionnaire individually in their own home or their work unit in one sitting, under the supervision of an interviewer. After completing the questionnaires, all the materials were passed to the interviewers and then to the authors to be analyzed. No personal information was recorded in the materials.

Prior to conducting the survey, participants were informed that the purpose of this study was to learn about their working behavior and social problems in their organization. All participants were assured that they were free to refuse participation if they did not agree with the objective of the study. Their confidentiality was also assured. Data collection occurred between October 10, 2019 and October 30, 2019.

For testing the research assumptions, we used several statistical methods processed in the SPSS 23 program.

Hypotheses

- 1. The intensity of the nanotechnology industry within the organization will be negatively related to measures of CWB.
- 2. The seniority of employees within the organization will be negatively related to measures of CWB.
- 3. The age of employees will be positively related to measures of CWB.

Results

We conducted several statistical analyses to test our hypotheses. First, we aimed to establish that the intensity of the nanotechnology industry within the organization would be negatively related to measures of CWB (Hypothesis 1). We also assumed that the seniority of the employees within the organization would be negatively related to measures of CWB.

The total score of the CWB registered a mean of 49.22, with a standard deviation of 4.67. Regarding seniority in the organization (expressed in months), we obtained an average of 17.08, with a standard deviation of 8.46. The average age of the employees was 32.4 years, with a standard deviation of 3.75. The results showed significant correlations between the variables "intensity of the nanotechnology industry within the organization", "seniority of employees within the organization", "age of employees", and the total score of CWB. We obtained a negative correlation between the variables CWB (total score) and "intensity of the nanotechnology industry within the organization" (r = -.252; p < .01); between the variables: CWB (total score) and "seniority of employees within the organization" (r = -.229; p < .01). These results confirm hypotheses no. 1 and no. 2. Also, the data show a significant correlation between variables CWB (total score) and the variable "age of employees" (r = .227; p < .01). This result does not confirm hypothesis no. 3 (that the age of employees would be positively related to measures of CWB).

According to our data, it seems that for the population of employees considered, we cannot say that their age has special significance in relation to counterproductive work behavior.

The results showed many interesting aspects regarding the dimensions of CWB and other variables. Although the number of employees investigated in the European and Asian parts of Russia was not equal (40 in Asia and 110 in Europe), the frequency of counterproductive work behavior among the employees was much higher in companies located in the European part of Russia.

Referring to dimensions of counterproductive work behavior (organizational conformity-dishonesty; loyalty to the organization-organizational sabotage; conscientiousness-carelessness, negligence; and personal development-low commitment/ absenteeism), the results are as follows: employees from Russian companies located in Tomsk, Chelyabinsk, Barnaul, Kyshtym, and Ekaterinburg obtained a much lower score for organizational sabotage and dishonesty compared to their colleagues from European Russia (Moscow and St. Petersburg). Loyalty to the employer tends to be much higher, and consequently there was lower organizational sabotage, in the central Russian and Siberian companies. This score could be due to the characteristics of the population from Siberia. One key characteristic of the Siberian people is their high level of collectivism and mutual assistance: Cooperation, involvement, and success play important roles in relationships among personnel. The Siberian population is also characterized by very good physical and psychological resilience. Life where temperatures are frequently less than -30° C in the winter is not easy. Cooperation and involvement are very evident, both inside and outside a company. For example, no one is left stranded if a car has broken down on the highway. At very low temperatures, other drivers have a moral obligation to rescue passengers from the damaged car.

Tolerance toward violation of the norms and rules is low: Here, employees prefer to work in a coherent manner. Many employees from the Siberian companies surveyed in this study maintain principles of a so-called adjustment strategy: changing one's own position and behavior in order to smooth out potential contradictions, frequently at the expense of one's own expectations and personal interests. Specialists are more oriented to a long-term relationship in an organization than to a short-term one. Socio-emotional relationships between colleagues in the same department and/ or other departments, as well as extra-professional activities among colleagues, are very important concepts in the perception of all employees in the Siberian companies we studied.

Discussion

In order to prevent CWB, many managers responsible for this aspect periodically monitor the level of personnel satisfaction through surveys about corporate culture, the company's values, the psychological state of workers, and relationships between workers and heads of departments.

In an Asian nanotechnology company that specializes in light-emitting diode production, personnel are interested in keeping appropriate norms of organizational behavior due to a grading system: All working positions are ranged according to their level of significance, difficulty, and amenability.

In the nanotechnology companies in the Asian region of Russia, respondents mentioned that appreciation and friendliness from their supervisor, and that person's willingness to accept feedback, are the main conditions to feel satisfied and to fulfill all professional tasks.

The Asian Russian region is similar to collectivist cultural models: Appreciation of the supervisor is realized in the context of the formal and hierarchical organizational structure. Loyalty among personnel is predominantly high. The salary and award systems are directly related to qualifications.

However, although behavior of the employees is mainly characterized by cooperation and loyalty, the relationship between supervisors and subordinates is characterized by a low level of power distance. Managers prefer to use instruments of informal control, such as informal talks with personnel, to understand how fully and effectively projects are being performed. Working tasks are mainly unstructured in form, without strict goals and distribution of responsibility among personnel.

Specialists who have key positions in an organization have the opportunity to study on the job. The main roles of the HR manager in the Asian nanotechnology organizations in Russia include labor relations administration and conflict resolution.

For the companies located in European Russia, counterproductive work behavior is slightly different than for those in the Asian area.

First of all, personal development is more advanced than in Asian Russia. In the European companies, it is much more emphasized and is focused especially on economic attributes and less on human relations at work (professional relationships with a supervisor and/or co-workers). The amount of money earned monthly seems to be the most important factor in professional satisfaction or dissatisfaction.

In a nanotechnology company in Moscow specializing in solar energy projects, a manager pointed out that personnel satisfaction is provided by economic factors, because economic losses due to staff turnover amount to 7-10% of annual salary among laborers, 20-25% for highly qualified specialists, and up to 100% for supervisors. An innovative system of evaluating working conditions was another important way to tackle the problems of CWB: In all business units, specialized organizations helped to evaluate all workplaces to discover potentially harmful factors and possible deviations. As a result, a range of preventive activities was worked out, and this dramatically improved internal organizational behavior in that company.

The problem of tobacco smoking among personnel in nanotechnology enterprises is one of the key problems in the European part of Russia. Companies are trying to tackle it quite seriously: Most of our respondents mentioned that the most popular instrument here is a strict punishment system (prohibition of smoking on company premises, "a fully healthy law"). One respondent pointed out that he could not handle such strict rules and wrote a letter of resignation; but considering his high level of qualification and narrow specialization (he was a nanotechnology material designer), his general manager allowed him to smoke one cigarette per day at lunchtime, but with a deduction of 5% from his salary. As a result, the respondent has been extremely motivated to quit smoking.

As we have mentioned, representatives of a huge state nanotechnology company from Moscow were among our respondents. This company found a quite extraordinary approach to solve the smoking problem: Apart from a complex system to support non-smoking workers (including both tangible and intangible motivations – bonuses, higher salaries, a board of honor, corporate events), it has invested more than \$50 million in research and development of an anti-nicotine vaccine (in partnership with American scientific centers). This vaccine is aimed at the human immune system activation: Nicotine is directly connected with neuron receptors, which is why it gives immediate pleasure to a smoker. The whole production cycle of the vaccine is planned to be fully realized in Russia. In our opinion, this measure is one of the top ones to get personnel to quit smoking.

In European Russia, the main characteristic of the companies we surveyed is the so-called short-term career; according to the information we gathered from the semi-structured interview, staff turnover here is higher than in Asian Russia.

Personnel in the European companies do not show significant loyalty towards the organization, and the key instrument for motivation of an individual is financial (estimation of how talented a specialist is, what innovation he/she has offered to supervise, how many projects he/she has already participated in). Here, the nanotechnology organizations prefer to comply with formal control instruments. Hiring of personnel is predominantly based on work experience.

However, we cannot say that the place where the employee lives or the geographical area where the company is located are the most important factors associated with a high frequency of counterproductive work behavior. As can be seen in *Figure 1*, the size of the organization seems to be a factor that associated with CWB. Although the frequency of CWB is higher in organizations with more than 60 employees, our data do not allow us to say for sure that the size of the company is a causal factor in increasing CWB frequency among employees. The average employee's age was 32.4 years, and the average professional seniority was 17.08 months (*Table 3*).

Table 3

Descriptive statistics (mean and SD) for the research variables

	Mean	Standard Deviation	Ν
Age of employee (years)	32.44	3.751	150
Where the employee lives	1.05	.225	150
Size of the organization	2.38	.642	150
Seniority in organization (months)	17.08	8.466	150
Seniority in profession (months)	49.08	29.897	150
Counterproductive behavior (total score)	49.22	4.674	150
Intensity of nanotechnology	3.16	1.165	150
Gender	1.32	.468	150

The size of the employer organization



Figure 1. Frequency of CWB according to the size of the organization

62 K.Sayapina, D. N. Botone

Regarding the CWB dimensions, the highest average of the scores was obtained in the case of "low level of conscientiousness" (mean = 21.75; SD = 2.9), followed closely by "low level of personal development" (mean = 20.53; SD = 3.09) (*Table 4*).

Table 4

Descriptive statistics (mean and SD) for the CWB dimensions

	Mean	Standard Deviation	Ν
Seniority in organization (months)	17.08	8.466	150
Counterproductive work behavior (total score)	49.22	4.674	150
Counterproductive work behavior (low level of organizational conformity)	10.13	2.086	150
Counterproductive work behavior (low level of loyalty to the organization)	6.67	1.701	150
Counterproductive work behavior (low level of personal development)	20.53	3.091	150
Counterproductive work behavior (low level of conscientiousness)	21.77	2.904	150
Intensity of nanotechnology	3.16	1.165	150



Figure 2. Low conscientiousness depending on seniority in the organization (number of months)

As can be seen in *Figure 2* and *Figure 3*, CWB tends to decline as the number of months in the organization increases. Among the CWB dimensions, it seems that the

conscientiousness of employees plays a key role in their continuation of the professional activity and consequently the increase of their seniority in the organization. As can be seen in Figure 3, as the seniority increases (measured in number of months), so does conscientiousness at the workplace. The high score in Figure 2 represents the level of counterproductive work behavior, characterized mainly by a low level of conscientiousness (a high level of negligent and careless behavior at work).



Figure 3. Frequency of CWB depending on seniority in the organization (number of months)

Conclusions

The emergence of counterproductive work behavior in Russian nanotechnology companies can be related to a multitude of factors: the size of the company, the leadership style, or the organizational culture. Employee age is not a significant factor.

Personality plays an important role as well, as the interplay of individual differences and the work environment combine to induce specific forms of CWB. It is well known that negative emotions are significant in much CWB, but the effects of negative emotion at the workplace may be directly conditioned by the employee's physical and psychological resilience. Thus, a professional difficulty may be perceived as a challenge by an employee with good physical and/or psychological resilience, leading the employee to become more professionally involved, to show more loyalty to the organization, and as a result to obtain higher seniority.

Two types of employees have emerged from our study: the eastern Russian employee, generally with good physical and psychological resilience, for whom altruism and loyalty to the company are very important issues and also conditions for professional success; in the western part of Russia (especially in Moscow), we identified a typical employee who is very determined to achieve professional success, but who is experiencing frustration regarding money, position in the organization, or lack of control at work. Also, we repeatedly identified specific forms of CWB in this area. Basically, in the western part of Russia, we cannot talk about "positive adaptation" in most cases, adaptation that involves a great physical and emotional effort from the employee. For example, in the western area, often work stressors can trigger anger or anxiety that under some work circumstances leads to CWB.

Russian nanotechnology companies should evaluate their approach to dealing with employees and mitigate situations that might be unnecessarily stressful. From the data obtained through our semi-structured interview, what happens in a work group is essential in the emergence of CWB. Organizations need clear policies that empower employees to deal with certain work tasks and with employees who engage in specific behaviors and CWB.

Limitations

The number of participants is a limitation of our study. We set out to have a larger number, but certain objective conditions prevented us from obtaining more participants.

Ethics Statement

The study obtained ethics approval of the Human Experimentation Review Board at the Financial University under the Government of the Russian Federation, Department of Management, 20 June 2019.

The document was signed by Natalia Linder, Deputy Chief, Department of Management.

All the participants gave informed consent before taking part in our research.

Author Contributions

Daniela N. Botone and Karina Sayapina conceived of the idea. DNB developed the theory and performed the computations. Both authors verified the analytical methods. DNB encouraged KS to investigate the intensity of the nanotechnology industry, the seniority of employees within an organization, and their counterproductive work behavior (CWB). DNB supervised the findings. The authors discussed the results and both contributed to the final manuscript.

Conflict of Interest

The authors declare no conflict of interest.

References

Agrawal, N. (2019). Modeling Deming's quality principles to improve performance using interpretive structural modeling and MICMAC analysis. *International Journal of Quality & Reliability Management*, 36(7), 1159–1180. https://doi.org/10.1108/IJQRM-07-2018-0204

- Alias, M., & Rasdi, R.M. (2015). Organizational predictors of workplace deviance among support staff. Procedia—SocialandBehaviouralSciences, 172, 126–133. https://doi.org/10.1016/j.sbspro.2015.01.345
- Allen, V. L., & Greenberger, D. B. (1980). Destruction and perceived control. In A. Baum & J. E. Singer (Eds.), Applications of personal control (Vol. 2, pp. 85–109). Hillsdale, NJ: Erlbaum.
- Ambrose, M. L., Seabright, M. A., & Schminke, M. (2002). Sabotage in the workplace: The role of organizational injustice. Organizational Behavior and Human Decision Processes, 89(1), 947–965. https://doi.org/10.1016/S0749-5978(02)00037-7
- Barrick, M. R., & Mount, M. K. (1991). The big five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44(1), 1–26. http://dx.doi.org/10.1111/j.1744-6570.1991. tb00688.x
- Bennett, R. J, & Robinson, S. L. (2000). Development of a measure of workplace deviance. *Journal of Applied Psychology*, 85(3), 349–360. https://doi.org/10.1037/0021-9010.85.3.349
- Blau, G. J. (1985). Relationship of extrinsic, intrinsic, and demographic predictors to various types of withdrawal behaviors. *Journal of Applied Psychology*, 70(3), 442–450. http://dx.doi.org/10.1037/0021-9010.70.3.442
- Bonaccorsi, A., & Thoma, G. (2007). Institutional complementarity and inventive performance in nano science and technology. *Research Policy*, 36(6), 813–831. https://doi.org/10.1016/j.respol.2007.02.009
- Bonanno, G.A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 59(1), 20–28. https://doi. org/10.1037/0003-066X.59.1.20
- Crane, T. A. (2010). Of models and meanings: Cultural resilience in social–ecological systems. *Ecology and Society* 15(4), 19. https://doi.org/10.5751/ES-03683-150419
- Cropanzano, R., & Schminke, M. (2001). Using social justice to build effective work groups. In M. Turner (Ed)., *Groups at work: Advances in theory and research* (pp. 143–171). Hillsdale, NJ: Erlbaum.
- Forbes, B. C. (2013). Cultural resilience of social-ecological systems in the Nenets and Yamal-Nenets Autonomous Okrugs, Russia: A focus on reindeer nomads of the tundra. *Ecology and Society*, 18(4), 36. http://dx.doi.org/10.5751/ES-05791-180436
- Fox, S., & Spector, P.E. (1999). A model of work frustration-aggression. Journal of Organizational Behavior, 20(6), 915-931. https://doi.org/10.1002/(SICI)1099-1379(199911)20:6<915::AID-JOB918>3.0.CO;2-6
- Fox, S., & Spector, P. (2006). The many roles of control in a stressor-emotion theory of counterproductive work behavior. In P. Perrewé & D. Ganster (Eds.) *Employee health, coping and methodologies* (*Research in occupational stress and well being, Vol. 5*), Emerald Group Publishing Limited, Bingley, pp. 171–201. https://doi.org/10.1016/S1479-3555(05)05005-5
- Fox, S., Spector, P.E., & Miles, D. (2001). Counterproductive work behavior (CWB) in response to job stressors and organizational justice: Some mediator and moderator tests for autonomy and emotions. *Journal of Vocational Behavior*, 59(3), 291–309. https://doi.org/10.1006/jvbe.2001.1803
- Gravina, N., Villacorta, J., Albert, K., Clark, R., Curry, S., & Wilder, D.A. (2018). A literature review of organizational behavior management interventions in human service settings from 1990 to 2016. *Journal of Organizational Behavior Management*, 38(2–3), 191–224. https://doi.org/10.1080/01608 061.2018.1454872
- Greenberg, J. (1990). Employee theft as a reaction to underpayment inequity: The hidden cost of pay cuts. Journal of Applied Psychology, 75(5), 561–568. http://dx.doi.org/10.1037/0021-9010.75.5.561
- Greenberg, J. (2002). Who stole the money, and when? Individual and situational determinants of employee theft. Organizational Behavior and Human Decision Processes, 89(1), 985–1003. https://doi.org/10.1016/S0749-5978(02)00039-0
- Greenberg, J. (2010). Organizational injustice as an occupational health risk. *Academy of Management Annals*, 4(1), 205–243. https://doi.org/10.1080/19416520.2010.481174
- Gruys, M. L., & Sackett, P. R. (2003). Investigating the dimensionality of counterproductive work behavior. International Journal of Selection and Assessment, 11(1), 30–42. https://doi.org/10.1111/1468-2389.00224

- Gulumian, M., Verbeek, J., Andraos, C., Sanabria, N., & Jager, P. (2016). Systematic review of screening and surveillance programs to protect workers from nanomaterials. *PLoS One*, 11(1). https://doi. org/10.1371/journal.pone.0166071
- Halpern, M.T., Shikiar, R., Rentz, A.M., & Khan, Z.M. (2001). Impact of smoking status on workplace absenteeism and productivity. *Tobacco Control*, 10, 233–238. http://dx.doi.org/10.1136/tc.10.3.233
- Khan, A. (2015) Ethical and social implications of nanotechnology, *QScience Proceedings* (Engineering Leaders Conference 2014). http://dx.doi.org/10.5339/qproc.2015.elc2014.57
- Kohnen, J. (2018). Oakland on quality management. Quality Management Journal, 12(4), 61–62. https://doi.org/10.1080/10686967.2005.11919274
- Krischer, M. M., Penney, L. M., & Hunter, E. M. (2010). Can counterproductive work behaviors be productive? CWB as emotion-focused coping. *Journal of Occupational Health Psychology*, 15(2), 154–166. http://dx.doi.org/10.1037/a0018349
- Krushkova, O., & Deviatovskaia, I. (2017). Organizatsionnyi vandalizm: k probleme destruktivnogo povedeniya personala. [Organizational vandalism: The problem of staff destructive behavior]. Sibirskii psikhologicheskii zhurnal [Siberian Journal of Psychology], 63, 150–169. https://doi. org/10.17223/17267080/63/11
- Landy, F. J., & Conte, J.M. (2010). Work in the 21st century: An introduction to industrial and organizational psychology. John Wiley & Sons.
- Lavrynenko, A., Shmatko, N., & Meissner, D. (2018). Managing skills for open innovation: The case of biotechnology. *Management Decision*, 56(6), 1336–1347. https://doi.org/10.1108/MD-04-2017-0301
- Ma, Z., Cai, S., Mao, N., Yanga, Q., Feng, J., & Wang, P. (2018). Construction quality management based on a collaborative system using BIM and indoor positioning. *Automation in Construction*, 92, 35– 45. https://doi.org/10.1016/j.autcon.2018.03.027
- Maynard, A.D., & Kuempel, E. D. (2005). Airborne nanostructured particles and occupational health. Journal of Nanoparticle Research, 7(6), 587–614. https://doi.org/10.1007/s11051-005-6770-9
- Mogoutov, A., & Kahane, B. (2007). Data search strategy for science and technology emergence: A scalable and evolutionary query for nanotechnology tracking. *Research Policy*, 36(6). https://doi. org/10.1016/j.respol.2007.02.005
- Modgil, S., & Sharma, S. (2016). Total productive maintenance, total quality management and operational performance: An empirical study of Indian pharmaceutical industry. *Journal of Quality in Maintenance Engineering*, 22(4), 353–377. https://doi.org/10.1108/JQME-10-2015-0048
- Mount, M. K., Barrick, M. R., & Stewart, G. L. (1998). Five-Factor Model of personality and performance in jobs involving interpersonal interactions. *Human Performance*, 11(2–3), 145–165. https://doi.org/10.1080/08959285.1998.9668029
- Murphy, K. R. (1993). Honesty in the workplace. Pacific Grove, CA: Brooks/Cole Pub. Co.
- Neuman, J. H., & Baron, R. M. (2005). Aggression in the workplace: A social-psychological perspective. In S. Fox & P. E. Spector (Eds.), *Counterproductive work behavior: Investigations of actors and targets.* Washington, DC: American Psychological Association. https://psycnet.apa.org/ doi/10.1037/10893-001
- Neyestani, B. (2016). Effectiveness of Quality Management System (QMS) on construction projects. https://doi.org/10.5281/zenodo.290272
- Nicholson, N., Brown, C. A., & Chadwick-Jones, J. K. (1977). Absence from work and personal characteristics. *Journal of Applied Psychology*, 62(3), 319–327. http://dx.doi.org/10.1037/0021-9010.62.3.319
- Nicholson, N., & Johns, G. (1985). The absence culture and the psychological contract: Who's in control of absence. Academy of Management Review, 10(3), 397–407. https://doi.org/10.5465/ amr.1985.4278945
- Ocel, H. (2018). The relations between authoritarian leadership and counterproductive work behaviors: The role of psychological resilience. *Journal of Entrepreneurship & Organization Management*, 7(1), 229. https://doi.org/10.4172/2169-026X.1000229
- Palmberg, C., Dernis, H., & Miguet, C. (2009). Nanotechnology: An overview based on indicators and statistics. OECD Science, Technology and Industry Working Papers, 2009/7, OECD Publishing. https://doi.org/10.1787/223147043844

- Penney, L.M., & Spector, P.E. (2005). Job stress, incivility, and counterproductive work behavior (CWB): The moderating role of negative affectivity. *Journal of Organizational Behavior*, 26(7), 777–796. https://doi.org/10.1002/job.336
- Priede, J. (2012). Implementation of Quality Management System ISO 9001 in the world and its strategic necessity. *Procedia Social and Behavioral Sciences*, 58, 1466–1475. https://doi.org/10.1016/j.sbspro.2012.09.1133
- Raman, P., Sambasivan, M., & Kumar, N. (2016). Counterproductive work behavior among frontline government employees: Role of personality, emotional intelligence, affectivity, emotional labor, and emotional exhaustion. *Journal of Work and Organizational Psychology*, 32(1), 25–37. https://doi. org/10.1016/j.rpto.2015.11.002
- Robinson, S.L., & Bennett, R.J. (1995). A typology of deviant workplace behaviors: A multidimensional scaling study. Academy of Management Journal, 38(2), 555–572. https://doi.org/10.5465/256693
- Sackett, P.R., & DeVore, C.J. (2001). Counterproductive behaviors at work. In N. Anderson, D.S. Ones, H.K. Sinangil, & V. Viswesvaran (Eds.), *Handbook of industrial, work and organizational psychol*ogy, Vol. 1, 145–164. London: Sage. https://doi.org/10.4135/9781848608320.n9
- Salgado, J. F. (1997). The five factor model of personality and job performance in the European Community. *Journal of Applied Psychology*, 82(1), 30–43. https://doi.org/10.1037/0021-9010.82.1.30
- Salgado, J. F. (2003). The Big Five personality dimensions and counterproductive behaviors. International Journal of Selection and Assessment, 10(1–2), 117–125. https://doi.org/10.1111/1468-2389.00198
- Schulte, P.A., Geraci, C.L., Murashov, V., Kuempel, E.D., Zumwalde, R. D., Castranova, V. M., ..., Martinez, K. F. (2014). Occupational safety and health criteria for responsible development of nanotechnology. *Journal of Nanoparticle Research*, 16, 2153. https://doi.org/10.1007/s11051-013-2153-9
- Seligman, M.E.P. (2012). Flourish: A new understanding of happiness and well-being and how to achieve them. *The Journal of Positive Psychology*, 7(12), 159–161. https://doi.org/10.1080/1743976 0.2011.614831
- Shamian, J., O'Brien-Pallas, L., Thomson, D., Alksnis, C., & Kerr, M. (2003). Nurse absenteeism, stress and workplace injury: What are the contributing factors and what can/should be done about it? *International Journal of Sociology and Social Policy*, 23(8/9), 81–103. https://doi. org/10.1108/01443330310790651
- Shoss, M. K., Jiang, L., & Probst, T. M. (2018). Bending without breaking: A two-study examination of employee resilience in the face of job insecurity. *Journal of Occupational Health Psychology*, 23(1), 112–126. http://dx.doi.org/10.1037/ocp0000060
- Sinclair, V.G., & Wallston, K.A. (2004). The development and psychometric evaluation of the Brief Resilient Coping Scale. Assessment, 11(1), 94–101. https://doi.org/10.1177%2F1073191103258144
- Spector, P.E. (1998). A control model of the job stress process. In C.L. Cooper (Ed.), Theories of organizational stress (pp. 153–169). London: Oxford University Press.
- Spector, P. E., & Fox, S. (2002). An emotion-centered model of voluntary work behavior: Some parallels between counterproductive work behavior and organizational citizenship behavior. *Human Resource Management Review*, 12(2), 269–292. http://dx.doi.org/10.1016/S1053-4822(02)00049-9
- Spector, P.E., & Fox, S. (2003). Reducing subjectivity in the assessment of the job environment: Development of the Factual Autonomy Scale (FAS). *Journal of Organizational Behavior*, 24(4), 417–432. https://doi.org/10.1002/job.199
- Spector, P. E., & Fox, S. (2005). The stressor-emotion model of counterproductive work behavior. In S. Fox & P. E. Spector (Eds.), *Counterproductive work behavior: Investigations of actors and targets* (pp. 151–174). Washington, DC: American Psychological Association. http://dx.doi.org/10.1037/10893-007
- Spector, P.E., Fox, S., Penney, L.M., Bruursema, K., Goh, A., & Kessler, S. (2006). The dimensionality of counterproductivity: Are all counterproductive behaviors created equal? *Journal of Vocational Behavior*, 68(3), 446–460. https://doi.org/10.1016/j.jvb.2005.10.005
- Tugade, M. M., & Fredrickson, B. L. (2007). Regulation of positive emotions: Emotion regulation strategies that promote resilience. *Journal of Happiness Studies*, 8(3), 311–333. https://doi.org/10.1007/ s10902-006-9015-4

- Youtie, J., Iacopetta, M., & Graham, S. (2007). Assessing the nature of nanotechnology: Can we uncover an emerging general purpose technology? *The Journal of Technology Transfer*, 33(3), 315–329. https://doi.org/10.1007/s10961-007-9030-6
- Zucker, L. G., & Darby, M. R. (2007). Nanobank: Data overview. 2007 Kauffman Symposium on Entrepreneurship and Innovation Data. http://dx.doi.org/10.2139/ssrn.1022964

Original manuscript received May 06, 2020 Revised manuscript accepted February 09, 2021 First published online March 31, 2021

To cite this article: Sayapina, K., Botone, D.N. (2021). Counterproductive Work Behavior in Russian Nanotechnology Organizations. *Psychology in Russia: State of the Art, 14*(1), 49–68. DOI: 10.11621/ pir.2021.0105



Psychological Burnout among Professionals Working with Children with Motor Disabilities

Taghreed Al-Ali^a, Mutasem M. Akour^{a*}, Enas Al-Masri^b, Annie Abu Hanna Mizaghobian^b, Soua'd Ghaith^a

^a The Hashemite University, Zarqa, Jordan

^b Al-Hussein Society for the Rehabilitation of the Physically Challenged, Amman, Jordan

*Corresponding author. E-mail: mutasem@hu.edu.jo

Background. Psychological burnout is a state of psychological and physical fatigue that shows the effect of work stress on the individual and negatively affects his/her attitudes towards work. The current study was motivated by the assumption that people who work directly with students with special needs are at the forefront of professions that can create feelings of frustration, and thus may be vulnerable to psychological burnout.

Objective. To identify the level of psychological burnout among professionals working with children with motor disabilities, and how these levels differ according to gender, workplace, years of experience, and the number of children the employees treat.

Design. The sample comprised 195 staff members at the Al-Hussein Society for the Rehabilitation of the Physically Challenged and the Cerebral Palsy Foundation in Amman, Jordan. The researchers used the Maslach Burnout Inventory, which consists of three dimensions: emotional exhaustion, depersonalization, and the lack of a sense of personal accomplishment.

Results. We found a low level of psychological burnout among those who work with children with motor disabilities. The level of psychological burnout was low for two dimensions: lack of a sense of personal accomplishment and depersonalization, whereas it was average for emotional exhaustion. The results showed statistically significant differences in the degrees of psychological burnout in its three dimensions according to the employee's workplace, with higher levels at the Cerebral Palsy Foundation. However, no statistically significant differences were found among the participants due to gender, years of experience, or the number of children they treat.

Conclusion. The low levels of psychological burnout among professionals who work with children with motor disabilities might be due to the psychological and professional support they receive from their institutions.

Keywords:

psychological burnout; emotional exhaustion; depersonalization; children with special needs; Jordan

The journal content is licensed with CC BY-NC "Attribution-NonCommercial" Creative Commons license.

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online) © Lomonosov Moscow State University, 2021 © Russian Psychological Society, 2021 http://psychologyinrussia.com

Introduction

The concept of psychological burnout is of relatively recent origin, having emerged in its modern form during the 1970s in the field of functional psychology. Freudenberger (1974) was the first to introduce this concept to refer to the physical and emotional responses resulting from long-term exposure to work stress among staff at a clinic, who had high and unrealistic expectations. Modern life is full of multiple and varied sources of psychological and mental stress, including from people's social, psychological, family, professional, marital, political, and academic lives (Ghoneim & Qatanani, 2011). People at work who do not have enough resources to cope with job demands might be in risk for psychological burnout (Seriwatana & Charoensukmongkol, 2020).

Psychological burnout is one of the most severe incidents to be encountered at work. It is defined as a group of symptoms of nervous stress, exhaustion of emotional energy, depersonalization, and a sense of dissatisfaction with one's personal achievement in one's professional field. These symptoms could occur in people who perform work that requires direct interaction with others (Goddard & Goddard, 2006). Psychological burnout is a state of psychological and physical fatigue that shows the effect of work stress on the individual and negatively affects his/her attitudes towards work; it can be clearly diagnosed through the individual's behavior at work (Askar, 2003).

Maslach (2003) identified three components of psychological burnout: emotional exhaustion, depersonalization, and the loss of a sense of accomplishment. *Emotional exhaustion* is defined as the feeling of being psychologically and mentally exhausted. An emotionally exhausted person feels that he/she no longer wants to work. *Depersonalization* refers to the display of negative attitudes towards everything that relates to work, including coworkers. Lastly, *loss of the sense of accomplishment* indicates lower levels and loss of motivation and self-confidence at work (Angerer, 2003; Kacem et al., 2020). These components were reflected by the instrument used in this study.

Individuals whose jobs require considerable contact with others, such as teachers and health-care personnel, may have a high likelihood of experiencing emotional exhaustion (Chaukos et al., 2017). Previous research has shown that emotional exhaustion can have negative effects both on the employee and the organization (Bakker, Westman, & Schaufeli, 2007). Emotional exhaustion can result in reduced job satisfaction (Shanafelt et al., 2015), inappropriate behavior with coworkers and customers (Kim, 2008), and may lead employees to quit their jobs (Skaalvik & Skaalvik, 2016). In general, psychological burnout may negatively affect employees' health (Chen & Chen, 2012), job satisfaction, job performance, and organizational commitment (Singh, Goolsby, & Rhoads, 1994).

Efforts have been made in many societies to train specialists to work in the fields of psychological and social services; however, many of these occupations involve various forms of work stress that prevent such specialists from performing their roles effectively, which can weaken their efficiency and ability to help others (Al-Zayoudi, 2007). People working in humanitarian jobs, such as nursing, medicine, counseling, social work, and teaching, are particularly prone to psychological burnout (Keel, 1993). However, those working with people with special needs come at the forefront of professions that can create feelings of frustration. This work requires these professionals to have the skills to deal with various groups of people who suffer from physical, mental, auditory, visual, or multiple disabilities. Each person with a disability is a special case who requires a special pattern of service, learning, training, and assistance. In addition, the diversity and severity of their problems may sometimes create among staff a feeling of frustration and a weak sense of achievement, leading to psychological burnout because of these work-related stressors (Al-Farah, 2001).

The concept of psychological burnout has drawn the attention of many researchers and scholars. In a study conducted by Al-Shami and Al-Smadi (2020) to investigate burnout among teachers at special education institutions in Jordan compared to teachers working in public schools, they found that the level was moderate among all participants regardless of their workplace. There were no significant differences in the level of burnout among teachers according to gender, age, or academic qualification. Similarly, Kharfallah, Balalia, and Sadlib (2019) detected the levels of psychological burnout among 48 people who worked with special needs students. They found that burnout was high, and that those who worked with students who were intellectually disabled suffered from higher levels of burnout than staff who worked with visually impaired and autistic students.

Abu Mustafa and Al-Zein (2009) conducted a study aimed at identifying the sources of work stress among teachers of children with disabilities in special education institutions in Gaza. They found that the most common sources of psychological pressure among teachers were their relationship with the children, their salary, promotion, relationship with colleagues, relationship with the parents, working conditions, relationship with managers, and the work environment.

Platsidou and Agaliotis (2008) studied psychological burnout among teachers of special education in Greece, finding low levels of burnout among teachers on the three dimensions of the Maslach Burnout Inventory (emotional exhaustion, depersonalization, and sense of personal accomplishment). However, no statistically significant differences were found according to the variables of gender and teaching experience.

In another study, Al-Zahrani (2008) tried to identify the nature of the relationship between psychological burnout and some personality traits of staff working with special needs children in the city of Jeddah, Saudi Arabia. The results showed that employees with 11–15 years of experience had more burnout than those with fewer years of experience. No statistically significant differences in the level of psychological burnout were found according to age, gender, academic qualification, or marital status.

Al-Zayoudi (2007) identified the sources of psychological stress and burnout among teachers of special education in Karak Governorate, Jordan. The subjects suffered from different levels of psychological stress and burnout ranging from medium to high. Male teachers suffered from emotional stress more than female teachers, and teachers with low experience and low income had higher levels of psychological burnout. In comparing psychological burnout among teachers of ordinary students, gifted students, students with severe learning difficulties, and students with disabilities, Al-Qaryouti and Al-Khatib (2005) found higher levels of burnout for teachers of gifted students and students with severe disabilities as compared to teachers of ordinary students and those with learning difficulties. No statistically significant differences were found according to gender, academic qualification, years of experience, or marital status.

Al-Gamali and Hassan (2003) studied psychological burnout among teachers of students with special needs in the Sultanate of Oman. The results showed that the teachers suffered from a moderate degree of burnout, while teachers who worked with students with multiple disabilities were particularly vulnerable to burnout. No statistically significant differences were found in the three dimensions of psychological burnout according to gender and teaching experience.

Finally, Al-Farah (2001) conducted a study of psychological burnout among teachers working with students with special needs in Qatar, and found a medium degree of burnout. The results also showed that specialists in the treatment and training of people with special needs were more vulnerable to burnout than the two categories of teachers in the field of special education. There were no statistically significant differences in the level of psychological burnout due to educational level or years of experience. Teachers who work with students with multiple disabilities suffered from depersonalization more than those who work with students with mental disabilities and physical sensory disabilities.

Research Questions

Psychological burnout and its consequences leave negative impacts on the individual, whether in relation to adaptation to or controlling any challenges, which may also extend to include others who interact and communicate with this individual. People who work directly with students with special needs, such as teachers and specialists, or others such as administrators, are at the forefront of professions that can create feelings of frustration. Therefore, the current study aimed at revealing the level of psychological burnout among staff who work with people with special needs and motor disabilities in the relevant centers in Amman, Jordan. We also sought to identify the level of psychological burnout among staff in the field of motor disability according to different variables. More specifically, the current study attempted to answer the following research questions:

- 1. What is the level of psychological burnout among staff who work with children with motor disabilities?
- 2. Are there statistically significant differences in the level of psychological burnout among those who work with children with motor disabilities, according to the gender of the staff member?
- 3. Are there statistically significant differences in the level of psychological burnout among those who work with children with motor disabilities, according to the workplace?
73

- 4. Are there statistically significant differences in the level of psychological burnout among those who work with children with motor disabilities, according to their years of experience?
- 5. Are there statistically significant differences in the level of psychological burnout among those who work with children with motor disabilities, according to the number of children they treat?

Significance of the Study

Working with persons with special needs is one of the professions most exposed to psychological burnout. This study is one of the few that has tackled this phenomenon among teachers, specialists, and administrators who work with children with motor disabilities in Jordan. Children with different types of disability require a special pattern of service, learning, training, and assistance. Therefore, it is of importance to compare burnout among professionals who deal with children with different types of disabilities. The findings of the current study might suggest the need to develop appropriate counseling programs for those who are dealing with children with different types of disabilities, to support them in reducing psychological burnout, and thus to achieve psychological adaptation that would result in better performance. The psychological status of these workers, if stable and controlled, will improve the adaptation and performance of children with motor disabilities academically, developmentally, and socially.

Method

Sampling

The targeted population for this study consisted of all professional employees (N = 215) at Al-Hussein Society for the Rehabilitation of the Physically Challenged, and at the Cerebral Palsy Foundation, in Amman, Jordan. These two institutions are specialized centers concerned with motor disability, and work under the Supreme Council for Persons with Disabilities in Jordan. The professional employees in these two institutions include: teachers, administrators, specialists, physiotherapists, occupational therapists, doctors, and nurses. The sample comprised 195 staff members who volunteered to participate. Of these, 129 (66%) were females, and 66 were males. Of the study sample, 109 (56%) people work at the Al-Hussein Society and the remaining work at the Cerebral Palsy Foundation.

Instrument

The instrument of this study consisted of two parts. The first part contains demographic information about the sample, such as: gender, workplace, years of experience, and the number of children the employee treats. The second part consists of the Maslach Burnout Inventory (Maslach & Jackson, 1981), which was used to identify the levels of psychological burnout. This inventory is widely used as a global scale for psychological burnout and has been used in many Arabic and other international studies (Al-Farah, 2001; Al-Gamali & Hassan, 2003; Al-Kharabsheh, 2005; Bataineh & Al-Jawarneh, 2004; Schwarzer & Hallum, 2008; Worley, Vassar, Wheeler, & Barnes, 2008).

The inventory consists of 22 items related to the individual's feeling towards the profession. Each participant is asked to respond twice to each item: the first response indicating a repeat of the feeling (scored on a scale from 0 to 6), and the second one indicating the intensity of feeling (scored on a scale from 0 to 7). These items are divided into three dimensions: (a) emotional exhaustion: item numbers 1, 2, 3, 6, 8, 13, 14, 16, and 20; (b) depersonalization: items numbers 5, 10, 11, 15, and 22; and (c) lack of a sense of personal accomplishment: item numbers 4, 7, 9, 12, 17, 18, 19, and 21.

The score of each participant was calculated for each item, on the three dimensions of the Maslach Burnout Inventory (emotional exhaustion [EE], depersonalization [DP], and lack of a sense of personal accomplishment [PA]), and on the total scale. In interpreting the scores, the following scale was used: 1–2.66 (low), 2.67–4.33 (medium), and 4.34–6 (high).

Reliability of the scores was estimated using Cronbach's alpha, which was 0.85 for the whole scale. Corrected item-total correlations were computed as a measure of the internal consistency of the instrument as provided in Table 1. All values ranged between 0.23 for item 15 and 0.60 for item 8. All corrected item-total correlations exceeded that value of 0.2, which indicated that all items were consistent in measuring psychological burnout.

Data Analysis

To answer our first research question, we computed the mean and standard deviation for each item, for each dimension, and for the total scale. The t-test and oneway ANOVA were used to detect differences in psychological burnout among those working with children with motor disabilities, according to gender, workplace, experience, and number of children they treat.

Results

The findings are presented for each research question sequentially.

First Research Question

To find the level of psychological burnout among staff working with children with motor disabilities, the mean and standard deviation for each dimension and for the total scale were computed and are presented in *Table 1*.

Table 1 shows that in general, the level of psychological burnout among those working with children with motor disability was low (mean = 2.54, SD = 0.71). The levels of depersonalization and lack of a sense of personal accomplishment were also low (mean = 2.32, SD = 0.85, and mean = 2.36, SD = 0.85, respectively). The level of emotional exhaustion was medium (mean = 2.81, SD = 0.80).

Table 1

Means, standard deviations, and levels of psychological burnout for scores on the burnout scale and its three dimensions

Dimension	Mean	SD	Level of burnout
Emotional exhaustion	2.81	0.80	Medium
Depersonalization	2.32	0.85	Low
Lack of a sense of personal accomplishment	2.36	0.85	Low
Total scale	2.54	0.71	Low

To have a better visualization of these results, the mean and standard deviation for participants' score on each item were computed and are presented in *Tables 2*, *3*, and *4*.

Table 2 shows that study participants had low levels of emotional exhaustion on half of the items (items 13, 3, 8, and 14), with item means ranging between 2.14 for item 14 (I feel that employees blame me for some of the problems they face) to 2.58 for item 13 (Actually, I don't care or take interest in the problems of employees). Medium levels of emotional exhaustion were captured on the other half of the items (items 2, 16, 22, 6, and 1), with item means ranging between 2.66 for item 1 (I feel emotionally drained from practicing this profession) to 3.67 for item 2 (I feel used up at the end of the workday).

Table 2

Means and standards deviations for scores on each item related to emotional exhaustion

Item	Mean	SD	Level
2- I feel used up at the end of the workday.	3.67	1.80	Medium
16- I deal very effectively with employees' problems.	3.44	1.80	Medium
22- I deal with the emotional problems of employees during my professional practice.	3.23	1.85	Medium
6- I feel overwhelmed by the practice of this profession.	2.93	1.73	Medium
1- I feel emotionally drained from practicing this profession.	2.66	1.70	Medium
13- Actually, I don't care or take interest in the problems of employees.	2.58	1.78	Low
3- I feel anxious when I wake up and know that I will have to face new work.	2.45	1.77	Low
8- Working directly with people causes severe emotional stress.	2.24	1.54	Low
14- I feel that employees blame me for some of the problems they face.	2.14	1.54	Low

Table 3 shows that people working with children with disabilities had low levels of depersonalization on three items (items 5, 10, and 11), with item means ranging

between 1.71 for item 11 (I became cruel with people after joining this profession) to 2.43 for item 5 (I feel psychological exhaustion from practicing this profession). Levels of depersonalization on the remaining two items (items 15 and 20) were medium, with the item mean of 2.73 for item 20 (I feel happy and comfortable after working with the employees) and 2.97 for item 15 (I can easily understand employees' feelings about things).

Table 3

Means and standards deviations for sco	res on each item related to de	personalization
--	--------------------------------	-----------------

Item	Mean	SD	Level
15- I can easily understand employees' feelings about things.	2.97	1.71	Medium
20- I feel happy and comfortable after working with the employ- ees.	2.73	1.75	Medium
5- I feel psychological exhaustion from practicing this profession.	2.43	1.66	Low
10- I feel like I am dealing with some of the employees as if they were not human.	1.75	1.43	Low
11- I became cruel with people after joining this profession.	1.71	1.33	Low

Table 4

Means and standards deviations for scores on each item related to lack of a sense of personal accomplishment

Item	Mean	SD	Level
7- I feel that I work in this profession under great stress.	3.18	1.866	Medium
18- I feel active and energetic.	2.64	1.716	Low
4- Dealing with people all day long causes stress and fatigue.	2.58	1.686	Low
19- I can easily create a comfortable psychological atmosphere with the employees.	2.44	1.674	Low
17- I feel that I have a positive impact on the lives of many people through practicing this profession.	2.36	1.667	Low
21- I have accomplished many valued and important things in this profession.	2.25	1.650	Low
12- I feel disturbed and anxious because this profession increases the cruelty of my emotions.	1.75	1.352	Low
9- I feel like I'm at the edge of desperation from practicing this profession.	1.64	1.262	Low

Table 4 shows that the level of lack of a sense of personal accomplishment among those working with children with motor disability was low for all items, except for item 7 (I feel that I work in this profession under great stress), which was medium. The level of psychological burnout was low for items 18, 4, 19, 17, 21, 12, and 9.

Second Research Question

To find out whether the level of psychological burnout differs between male and female staff working with children with motor disabilities, an independent samples t-test was carried out on each dimension score and on the total scale scores, as presented in Table 5. The assumption of equality of variances was checked via Levene's test. It was found that variances of the scores for males and females were homogeneous across each dimension.

Table 5

The t-test for the psychological burnout scale and its three dimensions as a function of staff members' gender

Dimension	Gender	Ν	Mean	SD	t
Emotional exhaustion	Male Female	66 129	2.76 2.84	0.83 0.79	0.66
Depersonalization	Male Female	66 129	2.38 2.28	0.85 0.86	0.78
Lack of a sense of personal accomplishment	Male Female	66 129	2.41 2.32	0.83 0.86	0.70
Total scale	Male Female	66 129	2.55 2.53	0.73 0.71	0.21

Table 5 shows that there were no statistically significant differences in the level of psychological burnout between male and female staff working with children with motor disabilities, t = 0.21, p > 0.05. In addition, no statistically significant differences in the level of psychological burnout between male and female staff working with children with motor disabilities were found on the dimensions of emotional exhaustion (t = 0.66, p > 0.05), depersonalization (t = 0.78, p > 0.05), and lack of a sense of personal accomplishment (t = 0.70, p > 0.05).

This indicates that the levels of psychological burnout and the levels of emotional exhaustion, depersonalization, and lack of a sense of personal accomplishment were the same for both male and female staff working with children with motor disabilities.

Third Research Question

To find out whether the level of psychological burnout differs among staff working with children with motor disabilities according to their workplace, an independent samples t-test was carried out on each dimension score and on the total scale scores, as presented in Table 6. The assumption of equality of variances was checked via Levene's test. It was found that variances of the scores for workers at the two workplaces were homogeneous across each dimension.

Table 6

The t-test for the psychological burn	out scale d	and its th	ree dimensions	as a function
of workplace				-

Dimensions	Workplace	Ν	Mean	SD	t
Emotional exhaustion	Al-Hussein Society Cerebral Palsy Foundation	109 86	2.66 3.01	0.74 0.83	3.04**
Depersonalization	Al-Hussein Society Cerebral Palsy Foundation	109 86	2.19 2.47	0.78 0.92	2.30*
Lack of a sense of personal accomplishment	Al-Hussein Society Cerebral Palsy Foundation	109 86	2.23 2.52	0.77 0.92	2.37*
Total scale	Al-Hussein Society Cerebral Palsy Foundation	109 86	2.40 2.71	0.65 0.76	3.06**

Note. * p < 0.05. ** p < 0.01

Table 6 shows that there were statistically significant differences in the level of psychological burnout among staff working with children with motor disabilities according to their workplace, t = 3.06, p < 0.01. Staff at the Cerebral Palsy Foundation tended to have higher levels of psychological burnout as compared to those at the Al-Hussein Society. Moreover, workers at the Cerebral Palsy Foundation, as compared to workers at Al-Hussein Society, had statistically significant higher levels of emotional exhaustion (t = 3.04, p < 0.01), depensionalization (t = 2.30, p < 0.05), and lack of a sense of personal accomplishment (t = 2.37, p < 0.5).

Fourth Research Question

To find out whether the level of psychological burnout differs among staff working with children with motor disabilities according to their years of experience, the mean and standard deviation were computed for each dimension score and for the total scale scores, as presented in Table 7.

Table 7 shows that the mean of the scores on the burnout scale and its three dimensions as a function of years of experience ranged from 2.14 to 2.94. In order to examine the statistical significance of these differences, a one-way ANOVA was conducted, and the results are presented in Table 8.

Table 8 shows that there were no statistically significant differences in the level of psychological burnout as a function of years of experience (F = 1.74, p > 0.05). In addition, no statistically significant differences were found as a function of years of experience with respect to emotional exhaustion (F = 1.80, p > 0.05), depersonalization (F = 1.39, p > 0.05), and lack of a sense of personal accomplishment (F = 1.33, p > 0.05). This indicates that the level of psychological burnout, emotional exhaustion, depersonalization, and lack of a sense of personal accomplishment did not differ according to the staff members' years of experience.

Table 7

Dimension	Years of experience	N	Mean	SD
	Less than 5 years	64	2.94	0.85
Emotional exhaustion	From 5 to 9 years	43	2.75	0.64
Emotional exhaustion	From 10 to 14 years	36	2.93	1.01
	15 years and over	52	2.63	0.68
	Less than 5 years	64	2.33	0.87
Denemonalization	From 5 to 9 years	43	2.35	0.87
Depersonalization	From 10 to 14 years	36	2.51	0.91
	15 years and over	52	2.14	0.76
	Less than 5 years	64	2.39	0.74
Lack of a sense of personal	From 5 to 9 years	43	2.47	0.99
accomplishment	From 10 to 14 years	36	2.42	0.99
	15 years and over	52	2.16	0.72
	Less than 5 years	64	2.61	0.69
	From 5 to 9 years	43	2.56	0.73
lotal scale	From 10 to 14 years	36	2.65	0.88
	15 years and over	52	2.35	0.59

Means and standards deviations for score on the burnout scale and its three dimensions as a function of years of experience

Table 8

One-way ANOVA for the psychological burnout scale and its three dimensions as a function of staff members' years of experience

Dimension	Source of variance	SS	df	MS	F
	Years of experience	3.431	3	1.14	
Emotional exhaustion	Error	121.347	191	.64	1.80
	Total	124.778	194		
	Years of experience	3.014	3	1.01	
Depersonalization	Error	138.073	191	.72	1.39
<u>1</u>	Total	141.087	194		
	Years of experience	2.873	3	.96	
Lack of a sense of personal	Error	137.441	191	.72	1.33
accomplishment	Total	140.314	194		
	Years of experience	2.647	3	.88	
Total scale	Error	96.649	191	.51	1.74
	Total	99.297	194		, 1

Fifth Research Question

To find out whether the level of psychological burnout differs among those working with children with motor disabilities according to the number of children they treat, means and standard deviations were computed for each dimension score and for the total scale scores, as presented in *Table 9*.

Table 9

Dimensions of burnout No. of children Ν SD Mean < 15 42 2.97 0.78 15 - 19 0.64 34 2.65 Emotional exhaustion 20 - 2522 2.90 0.92 > 25 97 2.79 0.83 < 15 42 2.37 1.05 0.75 15 - 1934 2.28 Depersonalization 20 - 2522 2.08 0.85 > 25 97 2.37 0.80 < 15 42 2.54 0.94 15 - 1934 2.33 0.77 Lack of a sense of personal accomplishment 20 - 2522 2.31 0.82 > 25 97 2.29 0.85 < 15 42 2.68 0.80 15 - 19 0.60 34 2.45 Total scale 20 - 2522 2.50 0.75 > 25 97 0.71 2.51

Means and standards deviations for scores on the burnout scale and its three dimensions as a function of the number of children the staff member treats

Table 9 shows that the mean of the scores on the burnout scale and its three dimensions as a function of years of experience ranged from 2.08 to 2.97. To examine the statistical significance of these differences, a one-way ANOVA was conducted, and the results are presented in *Table 10*.

Table 10 shows that there were no statistically significant differences in the level of psychological burnout as a function of the number of children the employee treats (F = 0.77, p > 0.05). In addition, no statistically significant differences were found as a function of the number of children the employee treats with respect to emotional exhaustion (F = 1.14, p > 0.05), depensionalization (F = 0.73, p > 0.05), and lack of a sense of personal accomplishment (F = 0.88, p > 0.05). This indicates that the level of psychological burnout, emotional exhaustion, depensionalization, and lack of a sense of personal accomplishment did not differ according to the number of children the employee treats.

Table 10

Dimension	Source	SS	df	MS	F
	No. of children	2.193	3	.731	
Emotional exhaustion	Error	122.585	191	.642	1.14
	Total	124.778	194		
	No. of children	1.599	3	.533	-
Depersonalization	Error	139.488	191	.730	0.73
	Total	141.087	194		
- 1 6 6 1	No. of children	1.907	3	.636	
Lack of a sense of personal	Error	138.406	191	.725	0.88
accompnishment	Total	140.314	194		
	No. of children	1.191	3	.397	
Total scale	Error	98.105	191	.514	0.77
	Total	99.297	194		

One-way ANOVA for the psychological burnout scale and its three dimensions as a function of the number of children the employee treats

Discussion

This study tackled the issue of psychological burnout among professional staff working with children in the field of motor disability in Jordan, and its relationship to some demographic variables. The exposure of many working in the human and social professions to psychological burnout motivated the study.

The results showed that staff working with children with motor disabilities did not suffer from psychological burnout. The levels of psychological burnout, depersonalization, and lack of a sense of personal accomplishment were low, although the level of emotional exhaustion was medium. These findings agree with those of Platsidou and Agaliotis (2008), which showed that Greek teachers had low levels of psychological burnout on the three dimensions of the scale.

On the other hand, the results of the current study disagree with those of Al-Farah (2001), which showed that psychological burnout among those working with students with special needs in Qatar was at a medium level. In addition, the results of this study disagree with those of Al-Zayoudi (2007), which showed that special education teachers in the Karak Governorate were subject to psychological burnout ranging from medium to high.

The low levels of psychological burnout among the sample of this study could be attributed to the type of disability that those working in this field in Amman confront — motor disabilities — whereas the previous studies were conducted with teachers who work with people with mental, hearing, visual or multiple disabilities.

81

The present study also found no statistically significant differences between males and females in the level of psychological burnout with its three dimensions among those working with children with motor disabilities. This result is consistent with previous studies (Al-Gamali & Hassan, 2003; Al-Qaryouti & Al-Khatib, 2005; Platsidou & Agaliotis, 2008). However, this result disagreed with those of Al-Farah (2001), which indicated that males working with people with special needs are more vulnerable to psychological burnout than females. In the current study, the researchers noted that some male staff members themselves have a motor disability. This could explain the absence of statistically significant differences in the level of psychological burnout in the study sample due to the employees' gender.

According to the workplace, the results of the present study indicated that the level of psychological burnout with its three dimensions was higher at the Cerebral Palsy Foundation than at the in Al-Hussein Society. This result may be attributed to the fact that the Cerebral Palsy Foundation deals with other types of disability, particularly mental disability, in addition to physical disability, while the Al-Hussein Society deals only with people with motor disabilities.

The results also found no statistically significant differences in the degree of psychological burnout with its three dimensions according to the employees' years of experience. This result is consistent with previous studies (Al-Farah, 2001; Al-Gamali & Hassan, 2003). However, the results disagree with those of Al-Zayoudi (2007), which indicated that employees with less experience were more exposed to psychological burnout than those with more experience. In addition, the results of this study did not go along with those of Al-Zahrani (2008), which indicated that female teachers with 11–15 years of experience were more exposed to psychological burnout than were other categories of staff.

The present study found no statistically significant differences in the degree of psychological burnout with its three dimensions among staff working with children with motor disabilities attributed to the number of children the employee treats. Miller, Brownell, and Smith (1999) indicated that one of the reasons that teachers stop working with people with disabilities is the large number of students. This is not consistent with the results of the present study, which did not show any statistically significant difference in the level of burnout due to the number of children.

Conclusion

The findings of the present study revealed that the teachers working with children with motor disabilities had low levels of psychological burnout. These levels did not differ as a function of the teachers' gender, years of experience, or the number of children they treat. This may be a result of the psychological and professional support that these educational and service institutions provide their employees who serve children with motor disabilities. It may also indicate the amount of continuous support through rehabilitation and selection of the best qualified employees to work in supporting these children. It is hoped that centers that work with children with motor disabilities will extend such support and contribute to alleviating the suffering of these children and their parents.

Limitations

One of the limitations of the current study was related to the sample, which involved only one type of disability, namely motor disability. Future research could study psychological burnout among those working with children with other types of disabilities, in addition to examining the effects of other variables on psychological burnout, such as educational qualifications, personal characteristics, and monthly income.

Ethics Statement

Participants in the current study were recruited in an ethical manner, and all participants gave informed consent before taking part in the study.

Conflict of Interest

The authors declare that there are no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

- Abu Mustafa, N., & Al-Zein, D. (2009). Job stress sources among special education teachers. *Journal of the Islamic University*, 17(2), 303–347. http://dx.doi.org/10.33976/iugjhr.v17i2.919
- Al-Farah, A. (2001). Psychological burnout among workers with persons with special needs in the State of Qatar. *Dirasat: Educational Sciences*, 28(2), 247–271.
- Al-Gamali, F., & Hassan, A. (2003). Levels of psychological burnout among teachers with special needs and their training needs in the Sultanate of Oman. *Arab Studies in Psychology*, 2(1), 151–211.
- Al-Kharabsheh, O. (2005). Levels of psychological burnout among educational counselors in public schools in Jordan (Unpublished master's thesis). Yarmouk University, Irbid, Jordan.
- Al-Qaryouti, I., & Al-Khatib, F. (2005). Psychological burnout among teachers of normal students and students with special needs. *Journal of the Faculty of Education–UAE University, 23*, 131–154.
- Al-Shami, K. & Al-Smadi, S. (2020.) The level of burnout among special education teachers compared to teachers working in public school in the province of Irbid in relationship to some variables. *Journal* of Education [Al Mejlh Altrbwyh], 2(34), 189–226.
- Al-Zahrani, N. (2008). *Psychological burnout and its relationship to some personality traits among workers with special needs* (Unpublished master's thesis). Umm Al-Qura University, Mecca, Saudi Arabia.
- Al-Zayoudi, M. (2007). Sources of psychological stress and psychological burnout among special education teachers in Karak Governorate and their relationship to some variables. *Damascus University Journal of Educational and Psychological Sciences*, 23(2), 189–219.
- Angerer, J., M. (2003). Job burnout. *Journal of Employment Counseling*, 40, 98–107. https://doi: 10.1002/j.2161-1920.2003.tb00860.x
- Askar, A. (2003). *Psychological and social foundations of behavior in the field of work*. Cairo: Dar Al-Kitab Al-Hadith.
- Bakker, A. B., Westman, M., & Schaufeli, W. B. (2007). Crossover of burnout: An experimental design. European Journal of Work and Organizational Psychology, 16(2), 220–239. https://doi: 10.1080/13594320701218288

- Bataineh, O., & Al-Jawarneh, A. (2004). The levels of psychological burnout among special education teachers in Irbid Governorate and their relationship to some variables. *Journal of the Federation of Arab Universities for Education and Psychology*, 2(2), 46–76.
- Chaukos, D., Chad-Friedman, E., Mehta, D. H., Byerly, L., Celik, A., McCoy, T.H. & Denninger, J. W. (2017). Risk and resilience factors associated with resident burnout. *Academic Psychiatry*, 41(2), 189–194. https://doi:10.1007/s40596-016-0628-6
- Chen, C. F., & Chen, S. C. (2012). Burnout and work engagement among cabin crew: Antecedents and consequences. *The International Journal of Aviation Psychology*, 22(1), 41–58.
- Freudenberger, H. J. (1974). [Staff burn-out]. Journal of Social Issues, 30(1), 159-165. https://doi:10.1111/j.1540-4560.1974.tb00706.x
- Ghoneim, K., & Qatanani, H. (2011). Psychological burnout of a sample of psychological counselors in public schools in Balqa Governorate and its association with some variables. *Journal of the Faculty of Education-Ain Shams University*, 35(2), 221–265.
- Goddard, R., & Goddard, M. (2006). Beginning teacher burnout in Queensland schools: Associations with serious intentions to leave. *The Australian Educational Researcher*, 33(2), 61–75. https:// doi:10.1007/BF03216834
- Kacem, I., Kahloul, M., Arem, S., Ayachi, S., Hafsia, M., Maoua, M., Ben Othmane, M., ... & Mrizek, N. (2020). Effects of music therapy on occupational stress and burn-out risk of operating room staff. Libyan Journal of Medicine, 15(1), 1768024. https://doi:10.1080/19932820.2020.1768024.
- Keel, P. (1993). Psychological stress caused by work: Burnout syndrome. *Soz Praventivmed, 38 Suppl 2,* 131–132. https://doi:10.1007/bf01305364
- Kharfallah, A. Balalia, M., & Sadlib, J. (2019). Psychological burnout among workers with some special needs groups in the light of two variables. *Journal of Psychological & Educational Sciences*, 5(2), 156–173.
- Kim, H.J. (2008). Hotel service providers' emotional labor: The antecedents and effects on burnout. International Journal of Hospitality Management, 27(2), 151–161. https://doi: 10.1016/j.ijhm.2007.07.019
- Maslach, C. (2003). Job burnout: New directions in research and intervention. Current Directions in Psychological Science, 12(5), 189–192. https://doi:10.1111/1467-8721.01258
- Maslach, C., & Jackson, S. E. (1981). The measurement of experienced burnout. Journal of Organizational Behavior, 2(2), 99–113. https://doi:10.1002/job.4030020205
- Miller, M. D., Brownell, M. T., & Smith, S. W. (1999). Factors that predict teachers staying in, leaving, or transferring from the special education classroom. *Exceptional Children*, 65(2), 201–218. https:// doi.org/10.1177/001440299906500206
- Platsidou, M., & Agaliotis, I. (2008). Burnout, job satisfaction and instructional assignment-related sources of stress in Greek special education teachers. *International Journal of Disability Development and Education*, 55(1), 61–76. https://doi:10.1080/10349120701654613
- Seriwatana, P., & Charoensukmongkol, P. (2020). The effect of cultural intelligence on burnout of Thai cabin crew in non-national airlines moderated by job tenure. *ABAC Journal*, 40(1), 1–19.
- Schwarzer, R., & Hallum, S. (2008). Perceived teacher self-efficacy as a predictor of job stress and burnout: Mediation analyses. *Applied Psychology*, 57(s1), 152–171. https://doi:10.1111/j.1464-0597.2008.00359.x
- Shanafelt, T. D., Hasan, O., Dyrbye, L. N., Sinsky, C., Satele, D., Sloan, J. & West, C. P. (2015). Changes in burnout and satisfaction with work–life balance in physicians and the general US working population between 2011 and 2014. *Mayo Clinic Proceedings*, 90,(12), 1600–1613. https://doi:10.1016/j. mayocp.2015.08.023
- Singh, J., Goolsby, J. R., & Rhoads, G. K. (1994). Behavioral and psychological consequences of boundary spanning burnout for customer service representatives. *Journal of Marketing Research*, 31(4), 558–569. https://doi:10.1177/002224379403100409
- Skaalvik, E., M. & Skaalvik, S. (2016). Teacher stress and teacher self-efficacy as predictors of engagement, emotional exhaustion, and motivation to leave the teaching profession. *Creative Education*, 7(1), 1785–1799. https://doi:10.4236/ce.2016.713182

Worley, J. A., Vassar, M., Wheeler, D. L., & Barnes, L. L. B. (2008). Factor structure of scores from the Maslach Burnout Inventory: A review and meta-analysis of 45 exploratory and confirmatory factor-analytic studies. *Educational and Psychological Measurement*, 68(5), 797–823. https:// doi:10.1177/0013164408315268

> Original manuscript received June 16, 2020 Revised manuscript accepted February 20, 2021 First published online March 31, 2021

To cite this article: Al-Ali, T., Akour, M.M., Al-Masri, E., Mizaghobian, A.A.H., Ghaith, S. (2021). Psychological Burnout among Professionals Working with Children with Motor Disabilities. *Psychology in Russia: State of the Art, 14*(1), 69–85. DOI: 10.11621/pir.2021.0106



PSYCHOMETRICS

Sources of Artifacts in SLODR Detection

Aleksei A. Korneev^a, Anatoly N. Krichevets^{a*}, Konstantin V. Sugonyaev^b, Dmitriy V. Ushakov^{a, b}, Alexander G. Vinogradov^c, Aram A. Fomichev^d

^a Lomonosov Moscow State University, Moscow, Russia

^b Institute of Psychology of Russian Academy of Sciences, Moscow, Russia

^c Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

^d TalentCode Consulting Company, Moscow, Russia

*Corresponding author. E-mail: ankrich@mail.ru.

Background. Spearman's law of diminishing returns (SLODR) states that intercorrelations between scores on tests of intellectual abilities were higher when the data set was comprised of subjects with lower intellectual abilities and vice versa. After almost a hundred years of research, this trend has only been detected on average.

Objective. To determine whether the very different results were obtained due to variations in scaling and the selection of subjects.

Design. We used three methods for SLODR detection based on moderated factor analysis (MFCA) to test real data and three sets of simulated data. Of the latter group, the first one simulated a real SLODR effect. The second one simulated the case of a different density of tasks of varying difficulty; it did not have a real SLODR effect. The third one simulated a skewed selection of respondents with different abilities and also did not have a real SLODR effect. We selected the simulation parameters so that the correlation matrix of the simulated data was similar to the matrix created from the real data, and all distributions had similar skewness parameters (about -0.3).

Results. The results of MFCA are contradictory and we cannot clearly distinguish by this method the dataset with real SLODR from datasets with similar correlation structure and skewness, but without a real SLODR effect. The results allow us to conclude that when effects like SLODR are very subtle and can be identified only with a large sample, then features of the psychometric scale become very important, because small variations of scale metrics may lead either to masking of real SLODR or to false identification of SLODR.

Keywords:

intelligence; Spearman's law of diminishing returns; mathematical modeling; structural modelling; structure of intelligence

The journal content is licensed with CC BY-NC "Attribution-NonCommercial" Creative Commons license.

ISSN 2074-6857 (Print) / ISSN 2307-2202 (Online) © Lomonosov Moscow State University, 2021 © Russian Psychological Society, 2021 http://psychologyinrussia.com

Introduction

In 1927, British psychologist Charles Spearman (Spearman, 1927; Detterman & Daniel, 1989) formulated the hypothesis that, when measuring intellectual ability, one finds higher subtest correlations in the lower region of general factor (g) distribution and, vice versa, lower subtest correlations in the higher region of the g distribution (the so-called Spearman's Law of Diminishing Returns, SLODR). Testing and discussion of this hypothesis continued, and has even increased over the past three decades. Many studies involving widely varying types of respondents, tests, and data-processing methods have been published over that period. The results were discordant.

Although the tendency for a decrease of intercorrelations between the subtests when the g factor is growing has been verified in a meta-analysis, only a little more than half of the studies reviewed directly confirmed Spearman's hypothesis (Blum & Holling, 2017). There is some criticism of this meta-analysis in a study by Hartung and colleagues (Hartung, Doebler, Schroeders, & Wilhelm, 2018). The first point of the criticism is that the meta-analysis did not include recent studies with new methods for examining the SLODR hypothesis. Indeed, the question of which statistical methods are appropriate to investigate the structure of intelligence is very important. It seems that the SLODR effect in general is not strong, and the ways to detect it statistically may not be so trivial as was originally supposed. To examine the differentiation and dedifferentiation of intelligence along the age dimension and/or growth of ability, current studies use the following methods: confirmatory factor analysis, moderated factor analysis (Molenaar, Dolan, Wicherts, & van der Maas, 2010), multi-group confirmatory factor analysis (Reynolds & Keith, 2007), factor mixture modeling (Reynolds Keith, & Beretvas, 2010), and local structural equation models (Hildebrandt, Lüdtke, Robitzsch, Sommer, & Wilhelm, 2016) (for a brief review, see the introduction to Hartung et al., 2018). We believe that each of these procedures is worth a separate discussion in the context of SLODR detection, but in our study we will focus on moderated confirmatory factor analysis (MCFA). The goal of our study is to investigate the capabilities of MCFA to detect SLODR under different conditions.

As the SLODR effect is not strong, it can be statistically confirmed only when large data samples are used. We have seen such very large samples in SLODR studies (for instance, Arden & Plomin, 2007; Breit, Brunner, & Preckel, 2020; Dombrowski, Canivez, & Watkins, 2018; Hartmann & Reuter, 2006; Hartung et al., 2018; McGill, 2015). Using large samples not only allows the researcher to obtain more statistically reliable results, but it also enhances the probability of the appearance of artifacts (Korneev, Krichevets, & Ushakov, 2019). In particular, artifacts may be generated by the scale characteristics and skewed distributions of scores.

In a field close to SLODR study — the study of gene–environment interactions — artifacts have become the object of deep reflection and special investigations. Analysis so far indicates that some of the results may be explained equally by either real interactions or subtle features of the distributions. For instance, A. Murray and colleagues conclude that "Estimates of gene–environment interactions (G×E) in behavioral genetic models depend on how a phenotype is scaled. Inappropriately scaled phenotypes result in biased estimates of G×E and can even suggest G×E sometimes in the direction opposite to its true direction" (Murray, Molenaar, Johnson, & Krueger, 2016, p. 552). The authors also point out two reasons for the violation of normal distribution of phenotypic characteristics, which then often lead to ambiguity in the measuring scales. These are the irregularity of the distribution of tasks according to their difficulty, and selection of respondents according to their abilities. "The problem of dependency of $G \times E$ on phenotype scaling has been known since the time of R.A. Fisher who noted that $G \times E$ interaction could be manipulated by re-scaling the variable involved" (Murray et al., 2016, p.553). Re-scaling here refers to a non-linear but monotonic scale transformation, which is permissible for ordinal scales of measurement as defined by S. Stevens (Stevens, 2017), but not for interval scales. However, only the latter can be used in the great majority of complex mathematical measurements (for instance, in modeling by linear structural equations and in linear regression). Nevertheless, a great number of cases where those methods are employed do not contain any serious arguments in favor of interval scales.

Some researchers who understand the importance of this problem opt for using measurement methods based on Item Response Theory (IRT) (Breit, Brunner, & Preckel, 2020; Embretson & McCollam, 2000, Tucker-Drob, 2009). For instance, I. Schwabe argues that the IRT approach generally provides greater reliability than the summation of scores (Schwabe, 2016). Another approach is using item scores in factor analysis directly (Molenaar, Kő, Rózsa, & Mészáros., 2017). In our work, we do not discuss in detail the applications of IRT in the context of the SLODR effect, but we think it is an important direction of investigation.

In SLODR studies we see, first of all, interest in the effect of distribution skewness on SLODR detection. Murray, Dixon, and Johnson (2013) point out that subtest distribution skewness may result in SLODR detection when the effect is actually absent. The sources of the skewness are the same as in Murray et al. (2016): the selection of respondents in the data set, which is defined by external factors, and the difference in the number of easy and difficult tasks presented in a subtest (with floor and ceiling effects as special cases).

As we show in this paper, these are the very different sources of the very different aspects of SLODR detection, and the problem is not in the skewness itself, but in the sources of deformation of the distribution.

Now, let us consider the SLODR detection methods in more detail.

The most interesting case for testing the SLODR hypothesis is when there is one data set with a continuous spectrum of respondents' test results. In this case the hypothesis is that there will be a weakening of the interdependence of the subtests that may be expressed in intercorrelations that weaken along with the growth of the respondent's intellectual ability. But if there is just one data set, it is difficult to explain what could be considered subtest correlation in different regions of the single set.

An earlier method of studying SLODR (which is now called "traditional") employs principal component analysis of the subtests. The first component (obtained with no rotation) is interpreted as the general intellect factor *g*. The SLODR may be expressed in several modes:

1. Denser distribution of respondents' *g*-factor scores at higher levels of *g*. If the subtest results have the standard normal distribution (or at least equal vari-

ances), then the *g*-factor scores have negative skewed distribution (Molenaar et al., 2010, Murray et al., 2013).

- 2. After dividing samples into two halves according to the median of *g* factor scores, factor analysis is carried out separately for each group (see, for instance, Reynolds & Keith, 2007). Finding less eigenvalue of the first factor (less variance) and less average value of factor loadings by subtests on this factor for a high *g*-value group is an SLODR marker in this case.
- 3. The average subtest intercorrelation (as obtained in item 2) may be compared for the two groups. The high intercorrelation average for the low *g*-value group also may be considered as evidence in favor of Spearman's law (Hartmann & Reuter, 2006; Sugonyaev & Radchenko, 2018). The variants of the method use some other variable to divide the whole sample, and then exclude it from the analyzed set of data.

In all three cases, the supposition that the values of all the mentioned indicators are different on subsamples due to the presence of the SLODR effect, is based upon the presupposition that all subtest distributions are symmetrical; otherwise, differences in the SLODR indicators in the high and low groups might be generated by distribution skewness of any origin (Murray et al., 2013). As was shown in the 2019 study by Korneev, Krichevets, and Ushakov of "traditional" SLODR detection, skewness from different sources will tend to produce different results, expressed in different combinations of the properties outlined in the three modes.

The so-called modern methods employ structural equation modelling. There are two types of models in use: (a) second-order or higher-order models (in which g is loaded only by the factors of special abilities, which in turn are loaded by the subtests); and (b) bi-factor or nested models, in which g is directly loaded by the subtests, and then each of them loads its factor of special abilities. The advantages and disadvantages of the two types of models are discussed by Gignac (2016) and Molenaar (2016), but this question is beyond the scope of this article. We consider here only the second type (*Figure 1*).



Figure 1. The tested bi-factor model.

Note. V11–V22 *are results of (sub)tests (real and simulated); f1 and f2 are factors of special abilities; g is the general factor.*

In such models, Spearman's law may be expressed, first of all, in the factor loadings being lower for an increasing level of the general factor (g), i.e., in a decrease of factor loadings of the subtests on the factors of special abilities, and/or on the *g* factor along the growth of the *g*-factor score. As *g* increases, residuals (on the level of subtests) may be expected to increase. The negative skewness of *g*-factor score distribution may be connected with all those phenomena (Molenaar et al., 2010; Murray, Dixon, & Johnson, 2013). The modern method of SLODR detection, moderated factor analysis, allows us to uncover such phenomena (Bauer, 2017; Bauer & Hussong, 2009). It uses the moderation of structural model parameters, i.e., the linear dependence of model parameters (factor loadings or/and residuals and so on), on factor *g* or other moderators introduced. The task is to estimate coefficients of a parameter's linear dependence on the moderator.

In many current studies, researchers are using a hybrid methodology: The analysis of real data is compared with the results achieved by the same method applied to simulated data, with similar parameters and clear structure. When structural modeling for simulated sampling is performed to assess the same parameters that were used in sample generation, this operation does not always lead to values of the parameters close to those used in the simulations (Molenaar, Dolan, Wicherts, & van der Maas, 2010). That result shows the limits to the sensitivity of the method, so this methodology is a good supplement to the real data analysis. Moving in parallel with Molenaar et al. (2017), we constructed simulations of data with different sources of skewness and then compared the results of the application of the above-mentioned methods to the simulations and natural data.

Our research question can be formulated as follows:

Can the moderation by the *g* factor of factor loadings or residuals in moderated confirmatory factor analysis help to distinguish different sources of skewness of data? And, as a result, is it possible to distinguish a real SLODR effect from similar data patterns with other sources? Beside simulation of "true" SLODR, we simulate the situation of skewed distribution of respondents' ability and the situation of skewed distribution of respondents ability and the situation of skewed distribution of real data sets and these sets after normalization and try to check:

- 1. Whether MCFA can differentiate the sources of skewness in the simulated data sets and real data;
- 2. If we have skewed the real data of intelligence testing, can we differentiate the contribution of different sources of the skewness to the SLODR effect using MCFA?

Methods

Data

Real Data

The test data of 11,335 military school recruits were used in this study. The test battery of intellectual abilities, which was specially designed for the candidate selection, consisted of 10 subtests, each of which included 30 tasks. A more detailed description appeared in studies by Korneev, Krichevets, & Ushakov (2019) and Sugonyaev & Radchenko (2018). We chose four subtests with a simple correlation structure for our comparative investigations, in order to make it possible to obtain similar correlational structures in the simulations. These subtests were: (a) analogies (An); (b) syllogisms (Syl); (c) memorization of shapes (SM); and (d) verbal memory (VM). Every task required the choice of one answer out of five suggested ones. The respondents' scores were evaluated in two ways: by the classical procedure (number of correct answers), and by the two-parameter IRT method.

The process of IRT analysis was as follows:

First, we estimated the difficulty and the discriminative ability of every task, and measured the ability score for each respondent on every scale. We used the two-parameter logistical model from the mirt R package (Chalmers, 2012; Lord & Novick, 1968).

The next step was to exclude guessers from the data. We assessed the probability of a right answer for each respondent on each item, and if the probability was lower than 0.2 (that is, the probability that the person will guess the right answer among five proposed ones) and the respondent gave the correct answer, that respondent was marked as a potential guesser on this item. Those respondents who were marked as guessers more than 10 times within one scale, were excluded from the analysis. In fact, the probability of guessing is often greater than 0.2, because some of the proposed answers could be easily rejected, so it is not surprising that our algorithm found as many as 164 guessers (1.44% of the sample), so the final sample size was 11,171. Next, we repeated the estimation of task parameters and the ability of each respondent with the updated model on the clear sample.

Simulated Data

In addition to the sample of real data, three sets of simulated data were produced. The random sample generation and data processing were based on SPSS version 22. The scripts for generating the data are available in Appendix S1 at http://mathpsy.com/ slodr. We tried to select the parameters of simulation so that the correlation matrices of simulated data were similar to those of the natural data, and so that the variables had similar coefficients of skewness simultaneously.

Simulation of the selection of respondents according to the external criterion (case selection). During the first step, a sample of 17,000 cases from a four-dimensional normal distribution with definite correlation structure was selected. Intragroup correlations were $R_{12} = .71$ and $R_{34} = .66$; four intergroup correlations (R_{13} , R_{14} , R_{23} , R_{24}) were approximately equal to .57. The first factor score (using principal component analysis) for each "respondent" was calculated. Then, the respondents with factor scores of under 0.3 (12,218 cases) were selected. The distributions of variables we obtained had negative skewness.

Simulation of the skewed distribution of tasks according to their difficulty (different task density). Four standard normal variables (the correlations between them were similar to the correlations of our real data) were transformed by the following formulas: for $OLD_i < 0$, $NEW_i = -(-OLD_i)^{1.08}$; for $OLD_i > 0$, $NEW_i = (OLD_i)^{.93}$. The transformation caused the negative skewed distribution (the left semi-axis was

stretched, and the right one was compressed). That distribution corresponded to a higher density of easy tasks than of difficult ones. (In reality, the modelling of different task density requires an additional supposition about the interdependency of respondents' answers to tasks with equal difficulty. Our stretching/compression corresponds to a strong correlation.) The size of the obtained sample was 11,338.

Simulation of the "true SLODR." An additional sample was obtained using a model with decreasing factor loadings and growing residuals along increasing *g*-factor scores (the script is available in the supplementary materials, Appendix S2). The size of the simulated sample was 10,000.

We also normalized the measured variables of real data and simulated variables for the "case selection" set. The value of normalized variable V for the given case X, with a range R among all values of V from our set containing N cases, was calculated as $\Phi^{-1}((R-0.5)/N)$, where $\Phi(x)$ is the distribution function for standard normal distribution.

Construction and Assessment of the Model

We constructed a simple bi-factor model (see *Fig.* 1) with four indicators (real or simulated results of four subtests), two factors of special abilities (f1 and f2), and one general factor. The variance of latent factors was fixed to 1 in the models, to allow scaling and identification of latent variables. Then we estimated the same model using seven data sets: (a) raw real data; (b) normalized real data; (c) IRT real data; (d-f)) three simulations; and (g) one normalization of the simulated sample.

Then for every data set we performed principal component analysis and used the first factor scores as moderators. The following types of moderation were used: (a) the moderation of factor loadings from indicators on special abilities; (b) the moderation of residuals from the indicators; and (c) the moderation of both factor loadings and residuals from the same indicators.

In order to compare the baseline model without moderation with the moderated models (they can be considered as nested models), we used the Bayesian Information Criterion (BIC) (Bollen, Harden, Ray, & Zavisca, 2014). This criterion is relative and does not have a standard scale, but a lower BIC is a sign of a better fit. The difference in fit between two nested models can be considered significant if it is greater than 10 (Raftery, 1995).

We assessed our models in Mplus 8.3, using maximum likelihood estimation with robust standard errors (MLR), and used R version 3.6.0 (R Core Team, 2016) with the MplusAutomation package (Hallquist & Wiley, 2018) for automated processing of the model and summarizing of the results.

Results

Correlations and Skewness in the Real Data

The matrix of correlations is shown below in *Table 1*. The bi-factor model, with factor *g* loaded by all variables and two factors of special abilities loaded by pairs of variables, corresponds to such a structure.

Scale	An	Syl	VS	VM
An	1	.536	.349	.323
Syl	.536	1	.289	.311
VS	.349	.289	1	.464
VM	.323	.311	.464	1

Table 1The matrix of correlations of the four variables included in the analysis

The coefficient of skewness is -.309 for the variable of our real An, and -.022 after normalization. It is -.232 and -.002 for Syl; -.302 and -.032 for VS; and -.361 and -.066 for VM, respectively.

Skewness and Correlations in the Simulated Data

Simulation of Case Selection

Within this sample, the relatively high values of the test indicators were represented by a greater number of "respondents." The coefficients of skewness of the four "truncated" variables fluctuated around the mean value of -.305 (SD = .023). Correlations inside the subgroups were: $R_{12} = .55$ and $R_{34} = .48$; the mean intergroup correlation (R_{13} , R_{23} , R_{24} , R_{34}) was .33 (SD = .064). For the normalized data, $R_{12} = .53$ and $R_{34} =$.46; the mean intergroup correlation (R_{13} , R_{23} , R_{24} , R_{34}) was equal to .39 (SD = .054).

Simulation of Different Task Density

Within this set of the data, the coefficients of skewness fluctuated around -.298 (SD = .015). The intragroup correlations were: $R_{12} = .53$ and $R_{34} = .48$; the intergroup ones were equal on average to .32 (SD = .048).

Simulation of the "True SLODR"

As a result, the intragroup correlations were .54 and .54, and the intergroup ones were .33 (SD = .014). The variables were standardized (they did not need any normalization since the sampling distribution differed little from the normal one; the absolute value of skewness did not exceed .03).

Testing of the Model on Real and Simulated Data

The results are presented in Table 2.

The results of MCFA showed that the coefficients of moderation of factor loadings or residuals or both are often significant, but the patterns of moderation vary in different simulations. Before we discuss the specifics of these patterns, let us recall that the simulations of *different task density* and *case selection* as distinct from "true" SLODR have been constructed without the SLODR effect. Starting from a bivariate normal distribution, the first of these is obtained by simple scale deformation; the second is obtained by case selection with skew in favor of more productive "persons".

The results of moderation

Variable moderated	Δ ΒΙC	When moderated separately		When moderated together					
		Factor Loading	Residual	Factor Loading	Residual				
Data set 1. "True" SLODR (non-skewed distribution)									
(Chi–Sq(1) = 1.041, RMSEA 0.002 [0.000, 0.027], CFI 1.000)									
V11	-9; 0; -43	-0.031* (0.008)	0.028* (0.009)	-0.061* (0.009)	0.070* (0.011)				
V12	3; -10; -53	-0.018* (.008)	0.038* (0.009)	-0.046* (0.009)	0.069* (0.011)				
V21	-2 -3; -33	-0.024* (.008)	0.032* (0.009)	-0.053* (0.009)	0.067* (0.011)				
V22	-5; -9; -48	-0.029* (.008)	0.039* (0.009)	-0.058* (0.009)	0.075* (0.01)				
Data set 2. Simulation of different task density (skewed, not normalized) (Chi–Sq(1) = 0.710, RMSEA 0.002 [0.000, 0.023], CFI 1.000)									
V11	-12: -167: -169	-0.033* (.008)	-0.108* (.008)	0.028* (0.009)	-0.127* (0.010)				
V12	-11; -138; -30	-0.033* (.008)	-0.100* (.008)	0.021 (0.015)	-0.108* (0.014)				
V21	4; -123; -136	-0.018* (.008)	-0.100* (.009)	0.042* (0.010)	-0.128* (0.011)				
V22	-28; -48; -38	-0.046* (.008)	-0.112* (.009)	0.001 (0.009)	-0.112* (0.010)				
Data set 3. Simulation of case selection (skewed, not normalized) (Chi-Sq(1) = 0.841, RMSEA 0.002 [0.000, 0.026], CFI 1.000)									
V11	-63; 4; -57	-0.063* (0.008)	-0.021* (0.009)	-0.021* (0.009)	0.020* (0.010)				
V12	-124; -17; -114	-0.086* (0.008)	-0.049* (0.01)	-0.049* (0.010)	0.003 (0.011)				
V21	-67; 4; -59	-0.065* (0.008)	-0.02* (0.009)	-0.02* (0.009)	0.020* (0.010)				
V22	-105; 5; -108	-0.08* (0.008)	-0.018* (0.009)	-0.018* (0.009)	0.036* (0.010)				
Data set 4. Simulation of case selection (normalized) (Chi–Sq(1) = 0.982, RMSEA 0.003 [0.000, 0.027], CFI 1.000)									
V11	-35; -15; -11	-0.051* (0.009)	0.044* (0.009)	-0.085* (0.009)	0.094* (0.010)				
V12	-47; -16; -135	-0.059* (0.009)	0.046* (0.009)	-0.094* (0.009)	0.101* (0.010)				
V21	-33; -20; -115	-0.05* (0.008)	0.049* (0.009)	-0.084* (0.009)	0.096* (0.010)				
V22	-54; -25; -172	-0.062* (0.009)	0.052* (0.009)	-0.103* (0.009)	0.113* (0.010)				
Data set 5. Real data (negative skewed, not normalized) (Chi–Sq(1) = 41.261, RMSEA 0.060 [0.045, 0.076], CFI 0.995)									
An	-54; -175; -166	-0.054 (0.006)	-0.134* (0.011)	-0.005 (0.008)	-0.13* (0.014)				
Sil	-24; -45; -41	-0.041* (0.007)	-0.067* (0.008)	-0.020 (0.009)	-0.054* (0.011)				
SM	-30; -228; -219	-0.046* (0.006)	-0.186* (0.011)	0.007(0.008)	-0.191* (0.015)				
VM	-90; -290; -279	-0.073* (0.007)	-0.188* (0.01)	-0.009 (0.01)	-0.181* (0.014)				
Data set 6. Real data (normalized) (Chi–Sq (1) = 41.962, RMSEA 0.060 [0.045, 0.076], CFI 0.995)									
An	7; 9; 10	-0.012 (0.007)	0.007 (0.008)	-0.023* (0.009)	0.024* (0.011)				
Sil	-5; -4; -20	-0.026* (0.007)	0.019* (0.008)	-0.046* (0.009)	0.047* (0.01)				
SM	2; 9; 10	-0.019* (0.007)	-0.05 (0.010)	-0.023* (0.008)	0.010 (0.012)				
VM	-25; 0; -16	-0.042* (0.007)	-0.029* (0.009)	-0.042* (0.009)	-0.001 (0.012)				

Variable moderated	Δ ΒΙΟ	When moderated separately		When moderated together				
		Factor Loading	Residual	Factor Loading	Residual			
Data set 7. Real data (IRT score) (Chi–Sq(1) = 46.663, RMSEA 0.066 [0.051, 0.083], CFI 0.993)								
An	-62; -126;-117	-0.064* (0.008)	-0.111* (0.009)	-0.007 (0.013)	-0.105* (0.015)			
Sil	-155; -367; -375	-0.100* (0.007)	-0.202* (0.007)	-0.037* (0.009)	-0.179* (0.010)			
SM	4; -8; 1	-0.017* (0.007)	-0.046* (0.011)	-0.001 (0.009)	-0.045* (0.014)			
VM	5; 10; 4	-0.015 (0.008)	-0.004 (0.010)	-0.019 (0.010)	0.010 (0.013)			

Note. * significant coefficients (p-value < 0.05). In column Δ BIC the differences between correspondent model BIC and 'baseline' model BIC (a negative number corresponds to a better fit with the moderated model) are presented for three variants of moderation. After the regression coefficient, the estimated standard error appears in brackets. The indicators of model fit are placed after the data set number and characterize the baseline models. The next four columns contain regression coefficients (RC) for four moderations of (a) factor loadings being moderated alone; (b) RC for residual being moderated alone; (c) and (d) RCs for factor loading and residual respectively, moderated simultaneously. The four strings contain information for the four variables.

Note that the normalization of the first one returns the distribution to the original symmetrical state, so we do not include it in our comparison. The second distribution normalization leads to a more interesting distribution symmetrization, which is created by deformation of the original scale. The result of the deformation is a product of the neutralization of two opposite asymmetrizations, neither of which can actually produce the SLODR effect.

Table 2 contains the coefficients of moderation of different latent variables, with the first factor scores as moderators. These scores were obtained by principal component analysis of the four measured variables and have a strong correlation with latent *g*.

Data set 1 ("true" SLODR) demonstrates the expected decreasing of factor loadings and increasing of residuals, all in accordance with Spearman's hypothesis. In this case, the moderation effect increases when the parameters are moderated together. These data give an example of what may be seen as a "good SLODR effect."

In *data set 2* ("different task density"), we see stronger moderation coefficients in factor loadings moderated alone than in the "good SLODR case." As expected, residuals decrease (in a direction opposite to that of the SLODR), because the left side of the scale was stretched and the right one was compressed, which implies corresponding changes in residuals. When these parameters are moderated together, the factor loadings lose the decreasing tendency and even change it to increasing, and the residuals decrease more strongly than when being moderated alone. A similar effect may cause the inconsistent heteroscedasticity of residual variances (unexplained in Molenaar, 2011), although all other parameters show an effect consistent with Spearman's hypothesis.

In *data set 3* ("case selection"), the picture is contradictory. It may be proposed a priori that neither factor loadings nor residuals have to show any significant mod-

eration coefficient, but the model shows the strongest decreasing of factor loadings among all our sets of data, and not very strong *decreasing* of residuals in the case of separate analysis of these parameters. If moderation is estimated for both parameters together, then the decrease of the factor loadings becomes weaker, and residuals become about constant (which corresponds to the real residuals of our simulation).

In *data set 4*, which was derived from data set 3 by the normalization procedure described above, we have a result very similar to the "true SLODR" set in all moderated parameters. This most interesting case shows the importance of the skewness source. The negative skewness of data set 2 is accompanied by residual decreasing in the positive part of the *g* scale, and also the negative skewness of data set 3 is accompanied by equal residuals for the entire *g* scale. When the second effect (data set 3) and the effect opposite to the first effect (data set 2) (the normalization produced just this effect) are neutralized, we get a normal distribution, with increasing residuals along the *g* score (cf. Murray et al., 2013), and hence the false SLODR effect.

In *data set 5* (real data with the sum score), which contains variables with negative skewness from -.22 to -.36, the results are different for different variables, reflecting their natural differences. Nevertheless, considering them as a whole, one can see residual negative moderation coefficients similar to those of simulation data sets 2 and 3.

Comparing the results obtained in the original real data (sum score) normalization (*data set 6*), we see that the positive residual moderation coefficients for them are less strong than those of data set 4. This shows real data similar to the residual moderation coefficients of data set 2, which are theoretically equal to zero, because normalization restores these data to the simple form of correlated variables without any SLODR effect.

Thus the analysis of data sets 1–6 shows that the real data SLODR-like effect may have been achieved due to similar properties in both cases: the predominance of simpler tasks in the subtests, and the predominance of high-ability persons within the respondents' distribution (this is only a hypothesis). Actually, only 15% of the tasks were solved by fewer than 40% of respondents, but this fact might be explained by either reason. Such a result coheres with the analysis of the same data that was produced by "traditional methods" (Korneev, Krichevets, & Ushakov, 2019).

Data set 7 (with the IRT scores) shows the SLODR effect in factor loadings and the opposite tendency in residuals. Such a situation is theoretically possible — the distribution of the results is similar to that of data set 2 — but what it means in terms of intellectual abilities is not a simple question.

Discussion and Conclusion

We analyzed real data of intellectual tests, choosing four subtests from the total. In all cases, the distribution of results is skewed with a score of about 0.3. The MCFA gave a contradictory result, with negative moderation coefficients for both loadings and residuals. Analysis of the item difficulties shows that the subtests contain more easy items than difficult ones. So the real data result can be explained, at least partly, by irregularity of task difficulty. But the comparison of the real data and data set 2 simu-

lation shows that the loading moderation coefficients of real data are greater modulo than those of data set 2, and, vice versa, the residual moderation coefficients for data set 2 are greater than those of the real data. So there may be some additional effect that can be explained either by SLODR or by case selection.

The similarity of the "true" SLODR model and the normalized case selection model raises the question whether it is possible to differentiate such situations in principle in the classical psychometric framework. In that framework, the normalization is considered as a possible instrument to get an interval scale (Furr & Bachrach, 2008), and just such rescaling converts data set 3 to data set 4, which is very similar to the "true" SLODR, data set 1. We expect that the answer is "no", but the subject needs detailed exploration.

Not only normalization may lead to this effect. If there is a negatively skewed distribution of participant abilities, we may pick up a set of tasks with a positively skewed distribution of difficulties to make the distribution of sum scores normal, as in the case of data set 4, with the spurious SLODR effect. Note that this effect can be detected by both "traditional" methods (Korneev, Krichevets, & Ushakov, 2019) and the MCFA methods of detection used here, so the skewness itself cannot be completely responsible for the spurious SLODR detection.

At the same time, the IRT approach may reveal both the different densities of easy and difficult tasks and skewed distribution of respondents' ability, and so can help solve the problem mentioned above.

The two-parameter IRT model method of test scoring could not be considered as fully adequate for our test tasks, due to the presence of a guessing strategy among some participants and its absence among others; but to the extent that it is appropriate, it shows a more complicated situation than the SLODR effect with normal subtest distributions. It shows a decreasing of both intercorrelations and residuals, while ability level is increasing.

An interesting question is to what extent the different easy and difficult task density in the IRT model may lead to spurious detection of a dedifferentiation effect or masking the "true" SLODR effect within the IRT framework (such a hypothesis was formulated by Breit, Brunner, & Preckel, 2020, Study 2), due to different variance of ability estimated at different loci of the ability scale. This may be a subject of future simulation studies.

Supplementary Materials

The following are available online at http://mathpsy.com/slodr: Table S1: Goodness of fit of the model obtained to different datasets. Appendix 1: Running variation estimate. Appendix 2: SPSS syntax for generation of dataset with SLODR simulation.

Author Contributions

Anatoly Krichevets and Dmitry Ushakov developed the concept of the study and performed the theoretical analysis. Konstatin Sugonyaev collected the data. Aleksei Korneev, Alexander Vinogradov and Aram Fomichev developed and performed simulations and computations. Anatoly Krichevets, Aleksei Korneev, and Dmitry Ushakov prepared the original draft and performed review and editing of the manuscript. All authors discussed the results of the study and contributed to the final manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Acknowledgements

This research was funded by Russian Foundation for Basic Research, grant number 17-29-07030.

References

- Arden, R., & Plomin, R. (2007). Scant evidence for Spearman's law of diminishing returns in middle childhood. *Personality and Individual Differences*, 42(4), 743–753. https://doi.org/10.1016/j. paid.2006.08.010
- Bauer, D. (2017). A more general model for testing measurement invariance and differential item functioning. *Psychological Methods*, 22(3), 507–526. https://doi.org/10.1037/met0000077
- Bauer, D.J., & Hussong, A. (2009). Psychometric approaches for developing commensurate measures across independent studies: traditional and new models. *Psychological Methods*, 14(2), 101–125. https://doi.org/10.1037/a0015583
- Blum, D., & Holling, H. (2017). Spearman's law of diminishing returns. A meta-analysis. *Intelligence*, 65, 60–66. https://doi.org/10.1016/j.intell.2017.07.004
- Bollen, K.A., Harden, J.J., Ray, S., & Zavisca, J. (2014). BIC and alternative Bayesian Information Criteria in the selection of structural equation models. *Structural Equation Modeling: A Multidisciplinary Journal*, 21(1), 1–19. https://doi.org/10.1080/10705511.2014.856691
- Breit, M., Brunner, M., & Preckel, F. (2020). General intelligence and specific cognitive abilities in adolescence: Tests of age differentiation, ability differentiation, and their interaction in two large samples. *Developmental Psychology*, 56, 364–384. https://doi.org/10.1037/dev0000876
- Chalmers, R.P. (2012). mirt: A Multidimensional Item Response Theory package for the R environment. *Journal of Statistical Software*, 48(6), 1–29. https://doi.org/10.18637/jss.v048.i06
- Detterman, D.K., & Daniel, M.H. (1989). Correlations of mental tests with each other and with cognitive variables are highest for low IQ groups. *Intelligence*, 13, 349–359. https://doi.org/10.1016/ S0160-2896(89)80007-8
- Dombrowski, S., Canivez, G., & Watkins, M. (2017). Factor structure of the 10 WISC-V Primary Subtests across four standardization age groups. *Contemporary School Psychology*, 22(1), 90–104. https://doi.org/10.1007/s40688-017-0125-2
- Embretson, S.E., & McCollam, K.M.S. (2000). Psychometric approaches to understanding and measuring intelligence. In R.J. Sternberg (Ed.), *Handbook of intelligence* (pp. 423–444). Cambridge University Press. https://doi.org/10.1017/CBO9780511807947.020
- Furr, R. M., & Bacharach, V. R. (2008). Psychometrics: An introduction. Sage Publications, Inc.
- Gignac, G.E. (2016). The higher-order model imposes a proportionality constraint: That is why the bifactor model tends to fit better. *Intelligence*, 55, 57–68. https://doi.org/10.1016/j.intell.2016.01.006
- Hallquist, M.N., & Wiley, J.F. (2018). MplusAutomation: An R package for facilitating large-scale latent variable analyses in M plus. *Structural Equation Modeling: A Multidisciplinary Journal*, 25(4), 621–638. https://doi.org/10.1080/10705511.2017.1402334

- Hartmann, P., & Reuter, M. (2006). Spearman's "Law of Diminishing Returns" tested with two methods. Intelligence, 34(1), 47–62. https://doi.org/10.1016/j.intell.2005.06.002
- Hartung, J., Doebler, P., Schroeders, U., & Wilhelm, O. (2018). Dedifferentiation and differentiation of intelligence in adults across age and years of education. *Intelligence*, 69, 37–49. https://doi. org/10.1016/j.intell.2018.04.003
- Hildebrandt, A., Lüdtke, O., Robitzsch, A., Sommer, C., & Wilhelm, O. (2016). Exploring factor model parameters across continuous variables with local structural equation models. *Multivariate Behavioral Research*, 51(2–3), 257–258. https://doi.org/10.1080/00273171.2016.1142856
- Korneev, A.A., Krichevets, A.N., & Ushakov, D.V. (2019). Zakon ubyvayushchei otdachi Spirmena: vidy asimmetrii raspredelenii i ikh rol' v porozhdenii artefaktov [Spearman's Law of Diminishing Returns: The impact of the distribution asymmetry in artefact [producing]. Sibirskiy Psikhologicheskiy Zhurnal [Siberian journal of psychology], 71(1), 24–43. https://doi.org/10.17223/17267080/71/2
- Lord, F.M., & Novick, M.R. (1968). Statistical theory of mental test scores. Addison-Wesley.
- McGill, R. (2015). Spearman's Law of Diminishing Returns (SLODR): Examining effects at the level of prediction. *Journal of Psychology and Behavioral Science*, 3(1), 24–36. https://doi.org/10.15640/jpbs. v3n1a3
- Molenaar, D., Dolan, C.V., Wicherts, J.M., & van der Maas, H.L. (2010) Modeling differentiation of cognitive abilities within the higher-order factor model using moderated factor analysis. *Intelligence*, 38(6), 611–624. https://doi.org/10.1016/j.intell.2010.09.002
- Molenaar, D., Dolan, C.V., & van der Maas, H.L.J. (2011) Modeling ability differentiation in the secondorder factor model. *Structural Equation Modeling: A Multidisciplinary Journal*, 18(4), 578–594. https://doi.org/10.1080/10705511.2011.607095
- Molenaar, D., Kő, N., Rózsa, S., & Mészáros, A. (2017). Differentiation of cognitive abilities in the WAIS-IV at the item level. *Intelligence*, 65, 48–59. https://doi.org/10.1016/j.intell.2017.10.004
- Molenaar, D. (2016). On the distortion of model fit in comparing the bifactor model and the higherorder factor model. *Intelligence*, *57*, 60–63. https://doi.org/10.1016/j.intell.2016.03.007
- Murray, A.L., Dixon, H., & Johnson, W. (2013) Spearman's law of diminishing returns: A statistical artifact? *Intelligence*, 41, 5, 439–451. https://doi.org/10.1016/j.intell.2013.06.007
- Murray, A.L., Molenaar, D., Johnson, W., & Krueger, R.F. (2016) Dependence of gene-by-environment interactions (G×E) on scaling: Comparing the use of sum scores, transformed sum scores and IRT scores for the phenotype in tests of G×E. *Behavior Genetics*, 46(4), 552–572. https://doi.org/10.1007/ s10519-016-9783-5
- R Core Team (2016). R: A language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing. Retrieved from https://www. R-project.org/
- Raftery, A.E. (1995). Bayesian model selection in social research. Sociological Methodology, 25, 111–163. https://doi.org/10.2307/271063
- Reynolds, M.R., & Keith, T.Z. (2007). Spearman's law of diminishing returns in hierarchical models of intelligence for children and adolescents. *Intelligence*, 35(3), 267–281. https://doi.org/10.1016/j. intell.2006.08.002
- Reynolds, M. R., Keith, T. Z., & Beretvas, S. N. (2010). Use of factor mixture modeling to capture Spearman's law of diminishing returns. *Intelligence*, 38, 231–241. https://doi.org/10.1016/j.intell.2010.01.002
- Schwabe, I. Nature, nurture and item response theory A psychometric approach to behavior genetics. Thesis for: PhD, 2016. https://doi.org/10.3990/1.9789036540735
- Spearman, C. The abilities of man. New York: MacMillan. 1927.
- Stevens, S.S. (2017) Measurement. In Scaling: A sourcebook for behavioral scientists. Routledge, 22–23. https://doi.org/10.4324/9781315128948-3
- Sugonyaev, K.V., & Radchenko, Yu.I. (2018) 'Zakon umen'sheniya otdachi' Spirmena: Issledovanie na masshtabnykh rossiiskikh vyborkakh [Spearman's Law of Diminishing Returns: Investigation on large-scale Russian samples]. Vestnik Yuzhno-Ural'skogo gosudarstvennogo universitet. Seriya psikhologiya [Bulletin of South Ural State University. Ser. Psychology], 11(1), 5–21. https://doi. org/10.14529/psy180101

Tucker-Drob, E. M. (2009). Differentiation of cognitive abilities across the lifespan. *Developmental Psychology*, 45(4), 1097–1118. https://doi.org/10.1037/a0015864

Original manuscript received March 28, 2020 Revised manuscript accepted February 06, 2021 First published online March 31, 2021

To cite this article: Korneev, A.A., Krichevets, A.N., Sugonyaev, K.V., Ushakov, D.V., Vinogradov, A.G., Fomichev, A.A. (2021). Sources of Artifacts in SLODR Detection. *Psychology in Russia: State of the Art, 14*(1), 86–100. DOI: 10.11621/pir.2021.0107