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Professional Culture of the Specialist of the Future

THE INFLUENCE OF PROFESSIONAL COLOR COMPETENCE ON COLOR LEXICON AND NAMING PATTERN

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Abstract

We explored sociolectic differences in color lexicon of Russian speakers. The study aim was twofold: (i) to investigate the influence of growing competence in individuals professionally working with color (henceforth: "color professionals") on the pattern of color names and (ii) to compare color-naming patterns in groups of participants with different levels of professional competence (beginner, intermediate, and advanced). For intergroup comparison, we employed the following indices: (1) frequency of occurrence of recurring color terms; (2) number of words in color descriptors; (3) occurrences of basic color terms (BCTs), monolexemic nonBCTs, and polylexemic BCT-derivatives; and (4) the scope of objects used as color-term referents. An unconstrained color-naming method was used in an online experiment, with total 600 standardized color stimuli presented across respondents. Final dataset contained 48,687 responses of 1,737 native Russian speakers (1,204 females, 526 males), with different levels of color expertise and aged between 16 and 95 years. Results show that both color vocabulary and linguistic patterns of naming color change considerably with respondents' increasing professional experience and expertise. Specifically, the growing color competence is reflected in advanced specificity of naming colors; prevalence of complex patterns of color descriptors that contain greater number of nonBCTs, along with BCTs; greater variety of modifiers and emotionally-laden linguistic components, and professionally-specific object referents, such as dyes, pigments and paint brand names.

Keywords: Color education, color naming, Russian, professional competence, professional culture, sociolectic differences in color lexicon.

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1. Introduction

The Russian language possesses rich and nuanced inventory of color terms – the focus of abundant anthropologic, linguistic, and psycholinguistic studies (Apresjan, 2018; Astakhova, 2014; Bimler & Uusküla, 2017; Kalita, 2017; Kezina & Perfilova, 2017; Moss, Davies, Corbett, & Laws, 1990; Paramei, Griber, & Mylonas, 2018; Shchitova, Shchitov, & Hua, 2018; Stefanov, 2015; Uusküla & Bimler, 2016). Across languages, studies provided evidence that richness and linguistic refinement of the color-term vocabulary differs markedly among representatives of various social and demographic groups.

In particular, gender differences have been demonstrated in numerous studies comparing male and female color lexicons (for recent reviews see: Mylonas, Paramei, & MacDonald, 2014; Paramei et al., 2018). It was found that women have a more extensive color vocabulary than men. Also, in addition to basic color terms (BCTs), women utilize significantly more specific color terms – BCT hyponyms, elaborate and "fancy" color terms, whereas men often employ combinations of BCTs with lightness or saturation adjectives (see e.g., Simpson & Tarrant, 1991; Lindsey & Brown, 2014).

Also observed was inter-generational variation of color lexicon: informants of various age groups differ in the number of specific color names compared to nonspecific ones (Simpson & Tarrant, 1991), with older women and men manifesting richer color lexicon than young representatives of their sex (Ryabina, 2009; Samarina, 2007). Moreover, specific color terms of females, in some Caucasian endogenous cultures, were found to reflect familiar objects in their environment, such as fruits, vegetables, plants, semiprecious stones etc., compared to more abstract males' terms (Samarina, 2007).

2. Problem Statement

Sociolectic differences in color naming indicated above are largely attributed to life experience and, as well, to the influence of the material culture and individual's professional environment (professional education and competence, professional culture). Simpson and Tarrant (1991) argue that if men have a profession or hobby related to color, they usually know more color names. Indeed, a positive relationship between male speakers' color-related hobbies and the size of their color vocabulary was demonstrated for speakers of English (Swaringen, Layman, & Wilson, 1978) and Chinese (Yang, 2001). Furthermore, in a group of male (Udmurt) respondents, professional education was found to play a significant role in the size of color lexicon: painters and specialists in Udmurt language used many more color terms than other groups (varying in age and sex), producing fancy and idiosyncratic words (Ryabina, 2009). Interestingly, in all these studies females' (richer) color vocabulary was found to be independent of their professional education or hobbies.

In comparison, differences in individual color lexicons in relation to varying levels of professional color competence remain unexplored. More generally, it was found and is commonly agreed that, in the process of explicit, implicit and "informal" professional development (cf.: Evans, 2019), professional environment – education and culture – molds an individual's mind resulting in specific ways of thinking, or "habits of mind" (e.g., Chick, Haynie, & Gurung, 2012, p. 2). To our knowledge, no systematic exploration has been undertaken of the influence of occupation and/or professional color competence on color-naming pattern or size and/or specific characteristics of color vocabulary.

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3. Research Questions

In the present study we addressed the question of sociolectic differences in color lexicon in Russian native speakers.

4. Purpose of the Study

The aim of the study was twofold: (i) to investigate influence of experience in individuals working professionally with color (henceforth: "color professionals") on the pattern of color names and (ii) to compare this in groups of participants with different levels of professional competence (beginner, intermediate, and advanced). The intergroup comparison employed the following indices: (1) frequency of occurrence of recurring color terms; (2) number of words in color descriptors; (3) occurrences of BCTs, monolexemic nonBCTs, and BCT-derivatives; and (4) the scope of objects used as color-term referents.

5. Research Methods

5.1. Design of the web-based experiment procedure

An online data gathering technique was used in the study. Data were collected in a web-based color-naming experiment (Web-based color-naming experiment, n. d.), designed and developed in Adobe Flash CS4 S.V. and ActionScript 3 (Mylonas & MacDonald, 2010). The Flash applet was embedded in HTML and connected via PHP bridges to a mySQL database that sent the test images (color stimuli) in a random order and, in return, stored the information for each participant.

The experimental procedure consisted of six steps (Mylonas & MacDonald, 2010, 2016). First, observers were asked to adjust their display to RGB settings and adjust brightness, so that all 11 steps of a grayscale ramp were visible. In the second step, participants answered questions relating to the ambient lighting conditions, their environment, and display properties. In the third step, participants were screened for possible color-vision deficiency using a web-based Dynamic Color Vision Test developed at the City University London (Barbur, 2004). The next, fourth and main part was the unconstrained color-naming (UCN) task: any color descriptor in Russian, either a single word, or a compound, or term(s) with modifiers could be produced to name each of presented color samples. In the fifth step, information about the participant's residency, nationality, language proficiency, educational level, age, gender, and color competence was collected. In the final step, participants were provided with a summary of their responses and a "Communication Form" for comments.

The experiment required approximately 15 minutes to complete.

In the reported results below, the elicited Russian color names are transliterated into Latin letters using a free online transliterator (Online Transliterator, n. d.).

5.2. Color stimuli

Each participant was presented, in random order, with a sequence of 20 colors selected from the total of 600 samples in the Munsell Renotation Dataset (Figure 1).

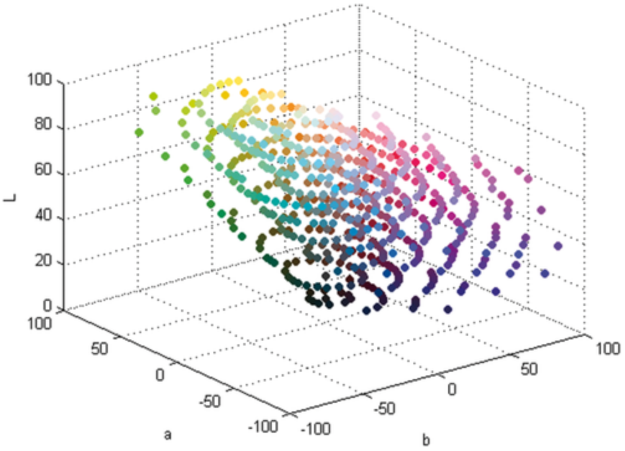

Figure 01. Color stimulus set (in CIELAB) used in the online color-naming experiment (Mylonas & MacDonald, 2010)

5.3. Participants

In total, 2,457 respondents took part in the web-based experiment and produced 55,818 color descriptors of the 600 samples. In the process of data cleaning, we removed responses of participants who indicated that they do not live or were not raised in Russia, as well as responses of those, who had not indicated their competence in working with color. We also excluded all color names entered using non-Cyrillic alphabet, as well as irrelevant comments (e.g., "I'm so tired" or "Stop it!") or inconsistent and numerical responses.

This filtering resulted in a dataset containing 48,687 responses of 1,737 native Russian speakers (1,204 females and 526 males). Their age ranged from 16 to 95 years with mean age 41.36 years. With regards to the education level, 21.8% participants reported secondary school degree; other reported a Bachelor (28.8%), Master's (18.2%), Doctoral (7.7%), or Professional (18.5%) degree.

The respondents reported different levels of color competence: 63.5% participants described their competence as that of beginners; 29.3% reported an intermediate level; and 7.2% indicated that they were color professionals. None of the respondents reported problems with color vision.

The sample characteristics are presented in Table 1.

Table 01. Sociodemographic characteristics of the total respondents' sample and subsamples

Response Categories	Beginner		Intermediate		Advanced		Total	
	N	%	N	%	N	%	N	%
Gender								
Female	756	43.5	359	20.7	89	5.1	1,204	69.3
Male	343	19.8	149	8.6	34	2.0	526	30.3
Other	1	0.1	0	0	2	0.1	3	0.2
Age								
16–20	85	4.9	35	2.0	14	0.8	134	7.7
21–30	296	17.1	122	7.0	26	1.5	444	25.6
31–40	202	11.6	113	6.5	29	1.7	344	19.8
41–50	178	10.3	66	3.8	24	1.4	268	15.4

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51–60	147	8.5	75	4.3	11	0.6	233	13.4
61–70	143	8.2	75	4.3	16	0.9	234	13.5
71–80	40	2.3	22	1.3	4	0.2	66	3.8
81+	10	0.6	0	0	1	0.1	11	0.6
Level of Education								
No qualification	51	2.9	28	1.6	3	0.2	316	4.7
Secondary school degree	252	14.5	108	6.2	18	1.0	322	21.8
Bachelor degree	328	18.9	143	8.2	30	1.7	5	28.8
Master's degree	184	10.6	99	5.7	33	1.9	133	18.2
Professional degree	206	11.9	99	5.7	17	1.0	82	18.5
Doctoral degree	81	4.7	29	1.7	23	1.3	501	7.7
Not indicated	1	0.1	3	0.2	1	0.1	378	0.3
Total	1,103	63.5	509	29.3	125	7.2	1,737	100

6. Findings

The refined dataset contained 2,403 unique color descriptors. Table 2 presents the elicited color names stratified according to participants' levels of color competence.

Table 02. Number of responses in the subsamples of respondents varying in the level of competence in working with color

Level of competence	Number of responses	Number of unique color descriptors
Beginner	31,469	1,736
Intermediate	13,725	1,308
Advanced	3,493	659
Total	48,687	2,403

6.1. Frequency of color names

To begin with, we compared frequency of recurring color names in the three color-competence-groups. The first 26 most frequent color names were similar in all three groups, although the name ranking differed slightly (see Figure 2). These frequent names included the 12 Russian BCTs (for the list see Figure 4 below), along with frequent nonBCTs *sirenevyj* "lilac", *birûzovyj* "turquoise", *salatovyj* "lettuce-colored", *bordovyj* "claret", *beževyj* "beige", *malinovyj* "raspberry, *fuksiâ* "fuchsia", *bolotnyj* "marsh-colored", and *malinovyj* "raspberry", the outcome similar to results for a general sample of Russian respondents (Paramei et al., 2018). It is worth noting that more than 1/5 of the inventory of the most frequent descriptors (6 out of 26) in all three groups denoted colors using achromatic modifiers *svetlo-* "light" and *tëmno-* "dark".

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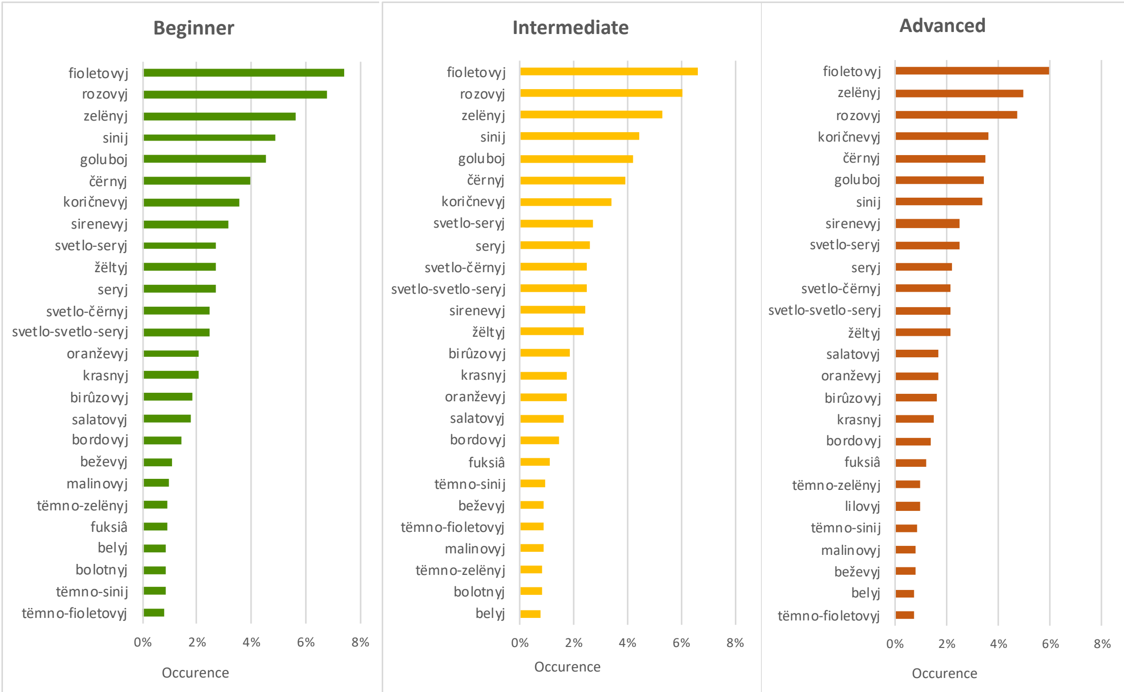
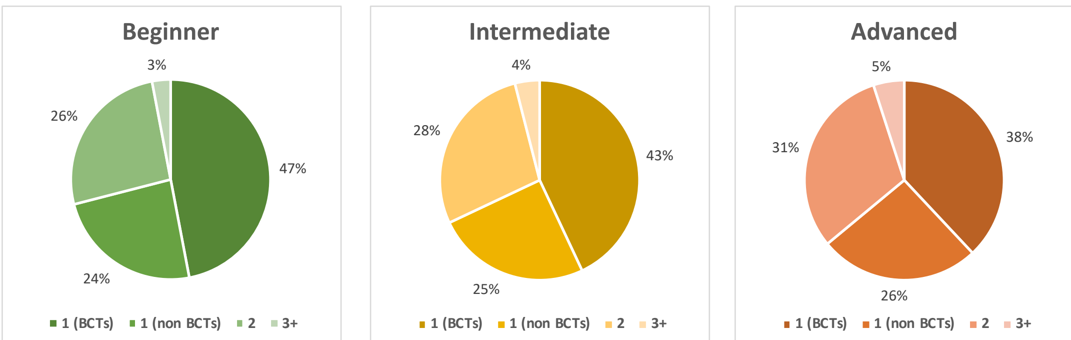


(a) (b) (c)

Figure 02. Percentage of occurrence of 26 most frequent color names elicited from Russian participants with the beginner (a), intermediate (b), and advanced (c) competence in working with color

6.2. Number of words in color descriptors

The proportion of elicited BCTs was found to decrease with advancement in color competence: the beginners produced more BCTs (47%) than color professionals of both the intermediate (43%) and advanced level (37%) (Figure 3). Furthermore, compared to the beginners, color professionals of both levels offered slightly more monolexemic nonBCTs (e.g., *persikovyj* "peach"), as well as double and triple compound color terms (e.g., *sine-zelënyj* "dark blue-green") and color terms with achromatic modifiers, such as *svetlo-* "light", *jarko-* "bright", *tëmno-* "dark", *bledno-* "pale", *tusklo-* "dull", *nežno-* "tender", or *grâzno-* "dirty".



(a) (b) (c)

Figure 03. Percentage of color descriptors with varying number of words in groups varying in the level of competence in working with color: beginner (a), intermediate (b), and advanced (c)

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6.3. Occurrence of the 12 Russian BCTs

In spite of the unconstrained method of color naming employed in the experiment, (unmodified) basic color terms were produced very frequently by all participants totalling to 45%. Although the pattern of relative usage of individual BCTs was similar across all three groups (Figure 4), the absolute number and frequency of occurrence of the 12 BCTs was significantly greater for the beginners (B) than for those who had competence in working with color at the intermediate (I) or advanced (A) level (Figure 4): $N_B = 14{,}851$ (47%) vs. $N_I = 5{,}943$ (43%) ($\chi 2 = 58.1$, $P < .001$; Yate's correction) and vs. $N_A = 1{,}319$ (38%) ($\chi 2 = 112.1$, $P < .001$; Yate's correction). In accord with previous findings for English speakers in an online experiment using the same color set (Mylonas et al., 2014), the primary BCT *belyj* "white" had the lowest occurrence, whereas the secondary BCTs *fioletovyj* "purple" and *rozovyj* "pink" had the highest total frequencies. (Rather high frequencies of these two color names is partly explained by relative prevalence of the corresponding stimuli rendered on a monitor in the employed color set.)

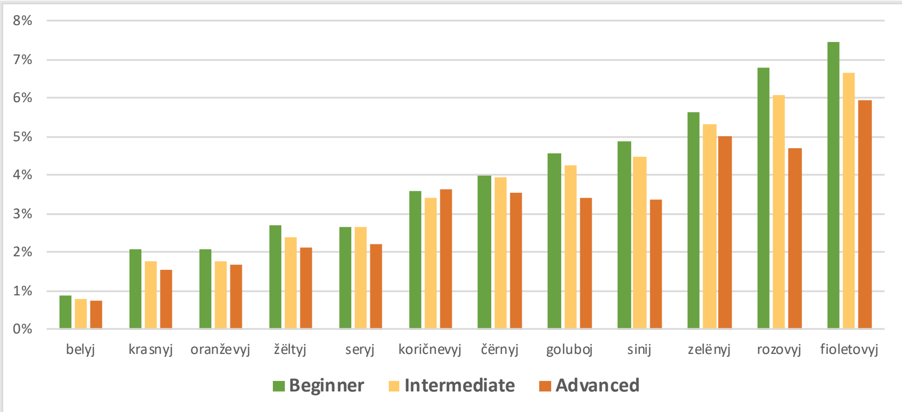

Figure 04. Percentage of occurrence of the 12 Russian BCTs for participants with different level of competence in working with color. The BCTs are ordered according to the frequency of responses, from lowest (left) to highest (right)

6.4. Derivational productivity of the 12 Russian BCTs

Along with the BCTs, all respondents frequently also offered various BCT-derivatives – BCT compounds and combinations of BCTs with modifiers or object glosses (Figure 5). Frequency of BCT-derived terms was slightly higher in the two groups of color professionals. There was though one exception – for *goluboj* "light blue": the beginners' frequency of occurrence of *goluboj*-derived names constituted 8.47%, much higher compared with 1.86% in the color lexicon of the intermediate- or 2.06% of the advanced-level color professionals. Another noteworthy outcome is relatively high frequency of color names derived from *seryj* "gray" in all three groups of participants. This probably reflects relatively high frequency of general occurrence of *seryj* in Russian language (cf.: Moss et al., 1990, Table 2), as well as its rich derivational productivity (cf.: Paramei et al., 2018, Table 3). In addition, the high proportion of *seryj*-derivatives in the present case may have resulted from a relatively large area of color space in the color set ("inner core" of a color solid) represented by unsaturated chromatic colors with gray tints, so named as, e.g., *zelëno-seryj* "green-gray", *rozovo-seryj* "pink-gray" etc.

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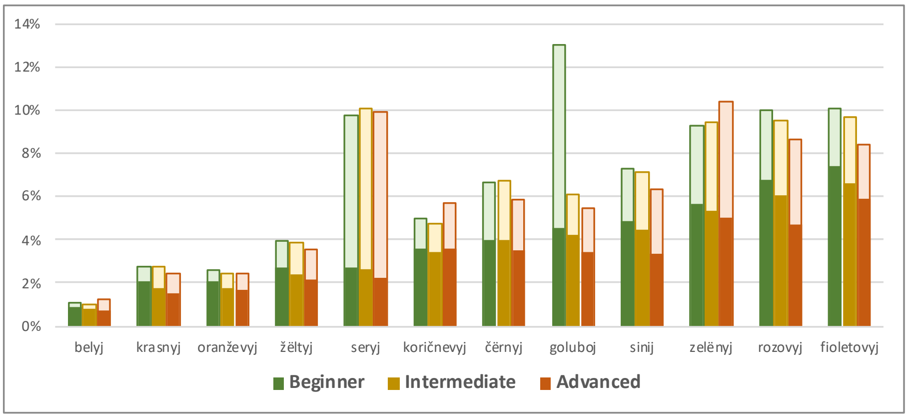

Figure 05. Percentage of occurrence of BCT-derivatives (light shades) of the 12 Russian BCTs (dark shades) in color names of participants with different color competence. The BCTs are ordered according to the frequency of responses, from lowest (left) to highest (right)

The inventory of names derived from the BCTs varied significantly in both the total number of unique polylexemic descriptors and the frequency of the descriptor occurrence. Furthermore, the BCT-derivatives were produced using the following four patterns (cf.: Simpson & Tarrant, 1991; Rakhilina & Paramei, 2011):

(1) **“basic-basic” (BB)**: a combination of two or more BCTs, either hyphenated (e.g., *sine-zelënyj* “dark blue-green”, *belo-zelëno-koričnevyj* “white-green-brown”), or conjuncted by a preposition (e.g., *koričnevyj s fioletovym* “brown with purple”), or modified (e.g., *rozovato-žëltyj* “pinkish-yellow”, *issinâ-čërnyj* “jet black”, lit. “deep dark blue-black”);

(2) “**lightness-modified basic” (LMB)**: BCTs specified by achromatic modifiers, such as *bledno*- “pale,” *svetlo*- “light,” *jarko*- “bright,” *tëmno*- “dark”, *tusklo*- “dull”, *nežno*- “tender”, or *grâzno*- “dirty” (e.g., *grâzno-rozovyj* “dirty-pink”);

(3) **“hue-modified basic” (HMB)**: one or more BCT(s) modified by nonBCT(s) in the form of compounds (like *fioletovo-lilovyj* “purple-violet”); adjective + substantive collocations (such as *fioletovaâ fuksiâ* “purple fuchsia” or *oranževyj bež* “orange beige”); descriptors containing various conjunctions, prepositions or adverbs (e.g., *fioletovyj s lilovym* “purple with violet” or *počti fioletovyj lilovyj* “almost purple violet”);

(4) **“complex basic” (CB)**: one or more BCT(s) with one or several lightness or hue modifiers, often idiosyncratic or exotic compounds (such as *blednyj purpurno-rozovyj s fioletovym otlivom* “pale cardinal red-pink with a purple opalescence”).

Notably, compared to the beginners, both color professional groups used less frequently the CB pattern (4), i.e., complex unconventional, idiosyncratic compounds or collocations with BCTs, but more often the HMB pattern (3), i.e., combinations of BCTs with various hue-modifying nonBCTs (Figure 6).

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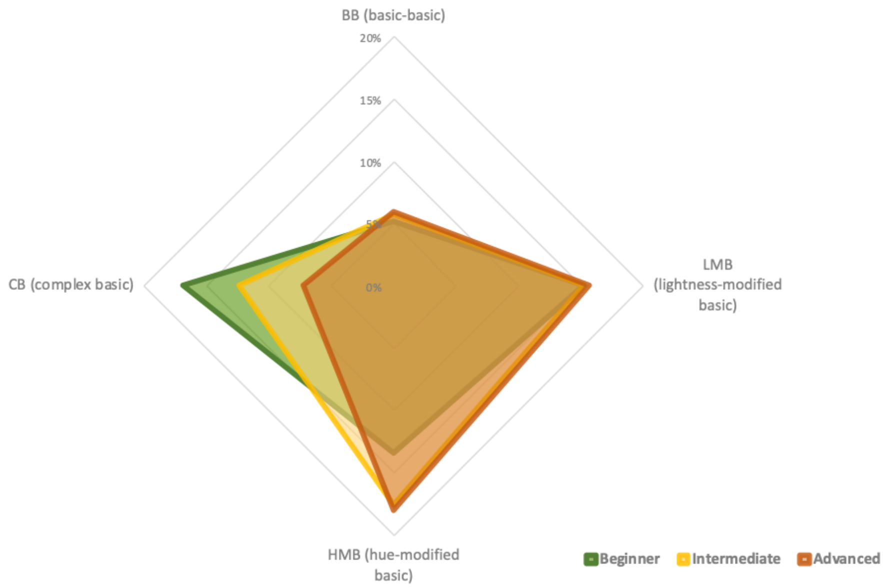

Figure 06. Occurrence of complex color descriptors produced according to the four patterns of BCT derivation in the groups of participants with different levels of color expertise

In describing stimuli, color professionals used complex patterns with components, which were entirely absent in the beginners' lexicon; namely, the former used expert-specific notions referring to technical aspects of dye and pigment production, or paint brands (like Camel, Moveyn, Safari, Serenity, etc.), and exotic terms appearing in modern advertisements. Furthermore, in color professionals' descriptors fairly common were expressions such as: *X s Y podtonom* "X with an Y undertone"; *mâgkij X* "soft X"; *X s dobavleniem Y* "X supplemented by Y"; *razbelennyj X* "whitened X"; *X iz banki* "X from a [pigment] can"; *X ukhodâŝčij v Y* "X wearing off into Y"; *X osvetlënnyj* "mellowed X"; *X s primesû Y* "X with an admixture of Y"; *glubokij X* "deep X"; *melovannyj X* "coated X"; *X v razbele* "X with a white admixture". In addition, the advanced color professionals often used patterns with emotionally-laden adjectives, e.g., *žukhlo-X* "withered X"; *pul'siruûŝčij X* "throbbing X"; *radioaktivnyj X* "radioactive X"; *zatemnënnyj X* "dimmed X"; *signal'no-X* "signal X"; *depressivnyj X* "depressive X".

6.5. Occurrence and "valency" of achromatic modifiers

The variety of color descriptors also revealed a wide range of different achromatic modifiers, the majority of which are commonly used by Russian speakers. In all three groups, the highest usage frequency was of lightness modifiers *svetlyj* "light" and *tëmnyj* "dark" (Figure 7), most commonly found in combination with the 12 BCTs (like *tëmno-zelenyj* "dark green" or *svetlo-koričnevyj* "light brown"), and frequent nonBCTs (such as *tëmno-sirenevyj* "dark lilac" or *svetlo-birûzovyj* "light turquoise").

Furthermore, across all participants' descriptors, certain achromatic modifiers revealed comparable "valency", that is, by analogy with chemistry, high potential to form compounds and collocations with color terms (cf.: Kezina & Perfilova, 2017). Particularly productive appeared modifiers *tëmnyj* "dark", *svetlyj* "light, *blednyj* "pale", *ârkij* "bright", *grâznyj* "dirty", and *nasyŝčennyj* "saturated" (Figure 7).

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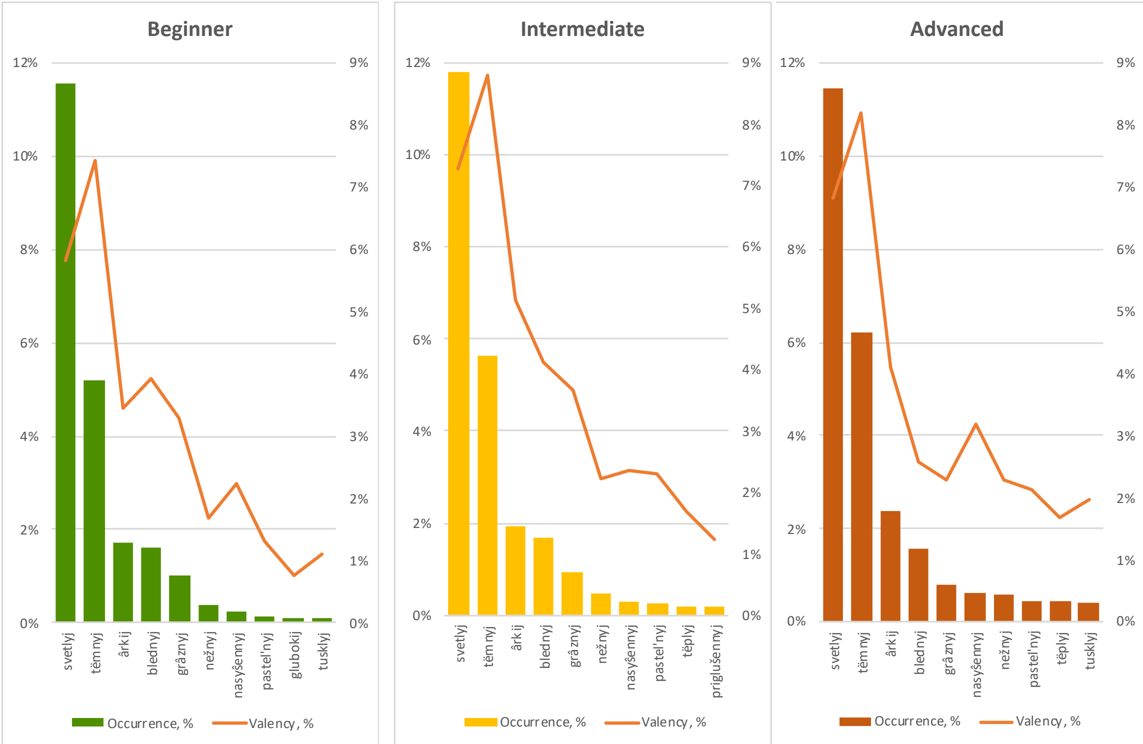

(a) (b) (c)

Figure 07. Occurrence and "valency" of the most frequent achromatic modifiers elicited from participants with the beginner (**a**), intermediate (**b**), and advanced (**c**) color competence

6.6. Object-derived color names

A significant number of color terms (28.95%) were derived from names of objects. In the present dataset, we found that both the catalogue of objects used as color-term referents and the frequency of occurrence of object-derived color names increased with color expertise (Figure 8).

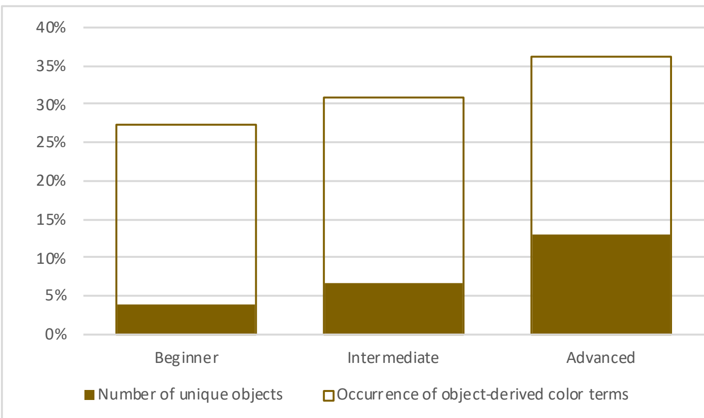

Figure 08. Frequency of occurrence (%) of object-derived color terms elicited from Russian participants with different levels of color competence

In our analysis, we focused on 30 categories of objects functioning as color-term referents (Table 3) and grouped these into the following 6 classes that semantically are justified and well-defined in different European languages (cf.: Rakhilina, 2000; 2007; Kudria, 2015; Griber, Mylonas, & Paramei, 2018):

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1.**Flora**: plants, flowers, fruits, vegetables, berries, nuts;

2.**Fauna**: mammals, birds, invertebrates, amphibian and reptilian, fish;

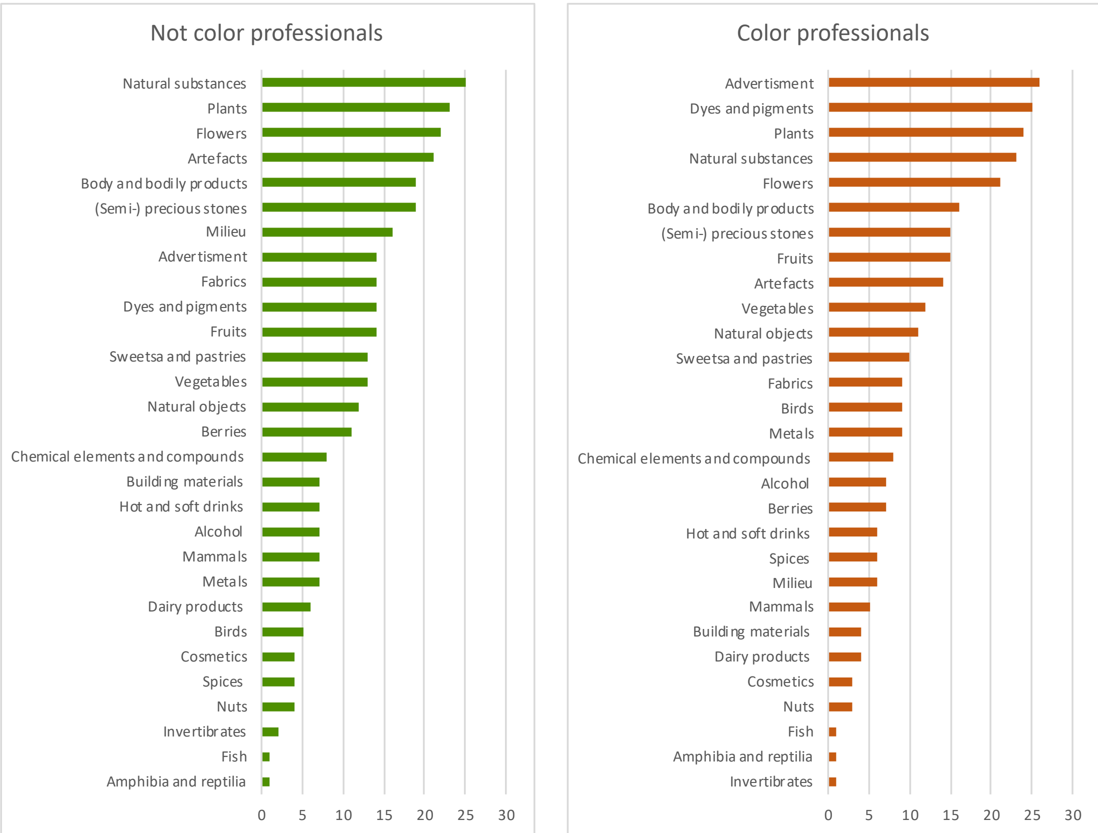
3.**Inanimate nature**: natural substances, natural objects, milieu, precious and semiprecious stones, chemical elements and compounds, metals;

4.**Food and beverages**: sweets and pastries, spices, dairy products, alcohol, hot and soft drinks;

5.**Man-made objects**: dyes and pigments, building materials, artefacts, fabrics, cosmetics, advertisement referents;

6.**Body and bodily products**.

For the beginners, among the most common object categories as color-term referents were natural substances, plants, flowers, artefacts, and bodily substances. Color professionals, in addition, frequently referred to paint brands or exotic terms appearing in modern advertisements, as well as to specific dyes and pigments (Figure 9).



(**a**) (**b**)

Figure 09. Frequency of occurrence (%) of objects from different categories in the subsamples of the beginners (not color professionals) (**a**) and color professionals (**b**)

The number of objects used as color-term referents constitute a significant number in inventories of all respondents, wit: 301 objects offered by the color professionals, compared to 320 objects offered by the beginners.

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Although the number of object referents is only slightly greater for the beginners, the inventories vary substantially between them and color professionals (see Table 3). Noteworthy, 132 referents offered by the beginners and 113 offered by the color professionals were unique to each of these subsamples, with differences being particularly prominent in the categories "Dyes and pigments" and "Advertisement" within the class of "Man-made objects" (Table 3).

Table 03. The inventory of frequent referent objects stratified by the level of color expertise (beginners vs. color professionals) and the object class and category

Class	Category	In both subsamples	Only by beginners	Only by color professionals
Flora	Flowers	Amaranth, cornflower, cyclamen, fuchsia, lavender, lilac, orchid, pion, rose, tulip, violet, wisteria	Campanula, chamomile, forget-me-not, hyacinth, lily, pansy, periwinkle (*pervanš*), rape, viola	Carnation, dahlia, gentian, heather, heliotrope, iris, periwinkle (*barvinok*), sakura, thistle
	Plants	Ash, birch, fern, fir-needle, foliage, grass, hay, linden, mint, moss, pine, potherbs, seaweed, spruce, straw, tobacco, wheat	Apple tree, oak, rye, shamrock, willow	Aspen, cedar, lemongrass, lichen, myrtle, reed, sagebrush
	Fruits	Apple, lemon, lime, mandarin, olive, orange, peach, pear, plum, pomegranate, watermelon	Apricot, citrus, fruit	Apricot, dried apricot, fig, olive (*maslina*)
	Vegetables	Beetroot, carrot, cucumber, eggplant, lettuce, maize, potato, pumpkin, zucchini	Asparagus, green bean, paprika, pea	Cabbage, pepper, tomato
	Berries	Berry, blackberry, bilberry, cherry, cowberry, grape, raspberry	Blueberry, cranberry, rowan, sweet cherry	
Inanimate nature	Natural substances	Anthracite, ash, clay, coal, dust, electricity, foam, graphite, ice, mud, murk, rust, sand, smoke, soil, soot, ultraviolet, water	Ambergris, chalk, diamond, fire, flame, gravel, stone	
	(Semi-) precious stones	Amber, amethyst, aquamarine, coral, emerald, garnet, ivory, malachite, nacre, nephritis, pearl, ruby, sapphire, turquoise	Carnelian, lazurite, marble, obsidian, topaz	Opal
	Natural objects	Forest, lake, moon, sea, sun, swamp, wave	Beach, jungle, mountain, ocean, polar star	Desert, iceberg, meadow, sky
	Milieu	Breeze, fog, night, sunset	Cool, dawn, freshness, mist, puddle, shadow, sky, spring, storm, summer, sunrise, twilight	Frost, winter

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	Chemical elements and compounds	Acid, brilliant green, menthol, neon, poison, sulfur	Chromium oxide, rubber	Strontium, lime
Fauna	Mammals	Frog, mouse, pig, swine	Hare, mink, rat	Bear
	Birds	Canary, chick, egg, flamingo	Crow	Bird, bluebird, dove, thrush, yolk
	Invertebrates		Caterpillar, shrimp	Grasshopper
	Amphibian & reptilian		Crocodile	Toad
	Fish	Salmon		
Food and beverages	Sweets and pastries	Bubble gum, caramel, chocolate, custard, honey, ice cream	Bread, chewing gum, cookie, Hubba bubba, jam, marshmallow, Plombir	
	Spices	Mustard, saffron, vanilla	Cinnamon	Coriander, curry, mayonnaise
	Dairy products	Cream, milk, yoghurt	Butter, cottage cheese, sour cream	Cheese
	Alcohol	Bordeaux, burgundy, champagne, marsala, wine	Port wine, punch	Chartreuse, liquor
	Hot and soft drinks	Cappuccino, cocoa, coffee, mocha	Cocktail, green tea, juice	Espresso, starchy fruit jelly (*kissel*)
Body and bodily products		Baby's poo, blood, blush, diarrhoea, flesh, nude, piece of shit, skin	Asian, ass, bile, burn, corpse, fainting, hemagglutination, nails, puke, snot, vomit	Blonde, booger, depression, frozen hands, shiner, poo, soul, vanity
Man-made objects	Dyes and pigments	Azure, carmine, ceruleum, indigo, madder dye, ocher, purple, quinacridone, sepia, sienna, ultramarine, umber, viridian, white		Alizarin, RGB blue, Brilliant Blue FCF, cinnabar, green wax, Klein blue, mars, minium, paint from a can, primary color in paint.net, red oxide, red varnish
	Building materials	Asphalt, brick, wood	Mahogany, priming, slate, wenge wood	Concrete
	Artefacts	Barbie, bottle, ink, crayola, pastel, signal, terracotta	Blanket, cartoon car, doll, floor, Lotus car, Mormon, pill, pink elephant, Pink Panther, platter, porcelain, school blackboard, traffic light, Winnie the Pooh	Billiard, corridor, felt-tip pen, hospital, iPhone, Red Gate, Santa Claus's nose
	Fabrics	Denim, jeans, khaki fabric, marengo, uniform	Camouflage, cloth, corduroy, ecru, fabric, mélange, military, shagreen, widow's clothes	Feldgrau, fur, linen, velvet
	Cosmetics	Powder, rouge	Concealer, nail polish	Lipstick

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6.7. Models "cveta X" and "X"

To name the color stimuli, color professionals more frequently than the beginners implemented two specific models of formation of object-derived color terms:

(1) model "cveta X" ("color of X") (e.g., *cvet sukhoj travy* "color of dried grass");

(2) as a compound or modifier, the object noun, or model "X" (e.g., *limon* "lemon"), instead of the traditional Russian-language suffixed adjectival forms (e.g., *limonnyj* "lemon-colored") (Figure 10).

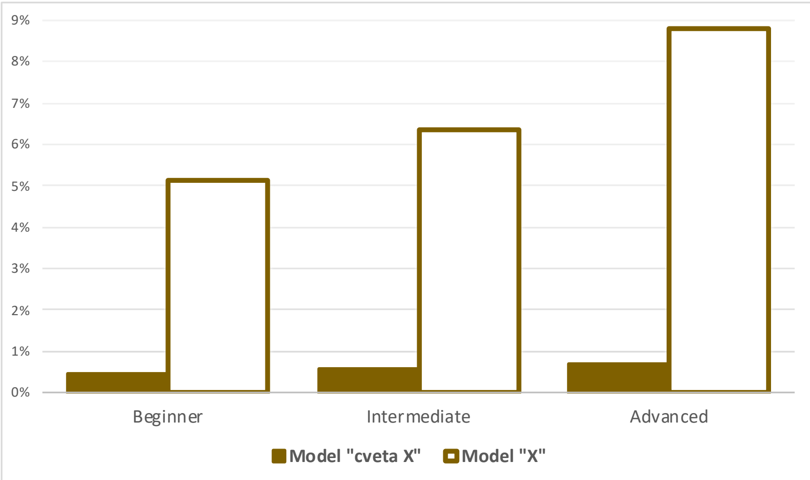

Figure 10. Frequency of occurrence (%) of terms with the model "*cveta X*" ("color of X") and model "X" (object noun) in descriptors of participants with different levels of color competence

7. Conclusion

Our study demonstrated that color vocabulary and linguistic patterns of naming color considerably change with respondents' increasing color competence.

Participants with no professional color competence reveal lexical shortage of color terms for a large number of nonprototypical colors ("no man's land" of color space), the shortage they appear to circumvent by employing idiosyncratic comparisons (e.g., with a cartoon car, pink elephant, Pink Panther, Winnie the Pooh) or random associations with objects that they probably are observing in their immediate environment during the experiment (e.g., a blanket, platter, floor). Further, along with naming the color as such, nonexperts frequently accompany color names by an innocent emotional and/or aesthetic appraisal of color by using descriptors such as *krasivyj* "beautiful", *nekrasivyj* "unattractive", *priâtnyj* "pleasant", *nepriâtnyj* "unpleasant", *radostnyj* "joyful", *mračnyj* "gloomy", *vesëlyj* "cheerful", *unylyj* "cheerless", etc.

In comparison, advanced color competence is reflected by increase in specificity of naming colors, as well as by complex patterns of BCTs with a greater number of nonBCTs and greater variety of modifiers, and in using emotionally-laden components. Crucially, the evolving color competence is reflected in color-descriptor components that refer to technical aspects of dye or pigment production, as well as in emergence of naming patterns containing professionally-specific object referents, such as dyes, pigments, and brand names of paints surfacing in modern advertisements.

The influence of professional education and professional culture is most clearly manifested in the choice of specific referent objects alluded to in color descriptions. This is illustrated by color descriptors of

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chemists who participated in the experiment: for naming various shades, they frequently denoted colors of various chemical elements and compounds rarely used in everyday communication (e.g., chromium oxide, sulfur, cobalt, cadmium, etc.), and, in our dataset, were not found among responses of participants from other professional fields. In the same vein, biologists and medical practitioners compared color shades with those of different body secrets (e.g., snot, bile), with those observed in laboratory reactions (e.g., hemagglutination), or caused by damage to body tissues (e.g., burn, hypothermia, cadaverous stains).

Furthermore, more often than beginners, color professionals used the models "X" and "color of X". Both models are not widespread, from the view point of Russian word-formation norms (cf.: Rakhilina, 2000, 2007). The model "X" appears to have emerged in Russian very recently, under the influence of English (where it is the norm) in the process of trade globalization (cf.: Paramei, et al., 2018). The model "color of X" is commonly used in cases, when, to "capturing" linguistically, the color of a transient, short-lived event ("X"), unconventional, idiosyncratic, or exotic terms are used (Rakhilina, 2000, 2007). We observe that color professionals used both models as a way to create new, emotionally expressive color terms (e.g., *nebo utrom* "sky in the morning", *more vdali* "faraway sea", *perespelyj vinograd* "overripe grapes", *suxoj asfal't* "dry asphalt", *ûžnaâ noč'* "southern night", *magičeskaâ mâta* "magic mint", *mokraâ glina* "wet clay", *pyl'naâ roza* "dusty rose"), whereby the color itself is not named as such, but is alluded to (metonymy) or implied in the meaning of qualifying words (adjectives and adverbs).

The vocabulary of color professionals contains fewer BCTs, and BCT-derivatives that they use are predominantly hue modified ones, in the form of adjective constructions with color terms built according to the model "*A-yj X*", where A is an adjectival form of a color term and X is an object name (cf.: Rakhilina, 2000). In such constructions, semantic interpretation of the color name depends on culturally-specific (allowed) collocations of A and X, where *A-yj* describes color variant, known to language speakers, of an object *X* (e.g., *sinij barxat* "dark blue velvet", *rozovyj jogurt* "pink yoghurt") or alludes to speaker's mental image of color forming half-phraseological collocations (e.g., *sinââ laguna* "dark blue lagoon").

Such adjectival constructions suggest an interesting way of color-descriptor production at color category boundaries or in color-space "no man's land". Specifically, in the minds of native speakers, the spectrum is not just divided into non-overlapping percepts corresponding to particular wavelength ranges, but is represented by a range of cognitive entities, or abutting color categories with graded membership of their denotata (Douven, Wenmackers, Jraissati, & Decock, 2017). Therefore, color terms at category boundaries may have not one, but several competing meanings, which, in communication, are specified by the term's combination with modifiers or compounds (cf.: Rakhilina, 2000, 2007). Due to the chosen components in the adjectival construction, interaction of their meanings triggers semantic flows that are likely to mediate the color percept – as a specific case of perception penetrated by cognition.

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