

## INTRODUCTION

In Russian, as in other languages, a significant number of color terms are derived from names of objects. From a diachronic perspective, an emerging object-derived color term enters initially as the pattern *cveta X* ‘color of *X*’ (Baxilina 1975). In modern Russian color nomenclature examples of this are *cveta speljoj višni* ‘color of a ripe cherry’ or *cveta mokrogo asfalta* ‘color of wet asphalt’. The ensuing entrenchment of the color meaning of the referent object manifests itself by developing of a proper adjectival derivative *X-yy*, followed by emancipation of color denotation from other object meanings. Typical examples are Russian denominal adjectives *malinovyj* ‘raspberry-colored’ or *kirpičnyj* ‘brick-colored’.

According to linguistic analysis based on the *Russian National Corpus* (<http://ruscorpora.ru/index.html>), common for native Russian speakers are colored object referents from certain categories: fruits and berries; artefact fluids; dyes and pigments; gems and semi-precious stones; or (very recent category) construction materials (Rakhilina 2000; Rakhilina and Paramei 2011).

In the present study, we employed a psycholinguistic method to further investigate object referents of color terms for Russian speakers and, to identify categories of object referents that are culture-specific, i.e., reflect Russians’ natural environment, social practices and cultural context.

## METHOD

### Color stimuli

Russian color terms were elicited in a web-based psycholinguistic experiment by employing a subset of the Munsell Renotation Data set (N=600 in total) specified in sRGB and an unconstrained color-naming method (Mylonas and MacDonald 2010; <http://www.colournaming.com>). The Munsell system was selected because it corresponds directly to human perceptual judgements of difference and similarity and its five-basic-hue model fits better with empirical data of the basic psychological hues compared to a four-basic-hue model.

### Data analysis

A refined dataset included 14,260 responses from 713 native Russian speakers (380 females and 333 males), who entered their responses using the Cyrillic alphabet, revealed normal color vision and were aged 16 years or older.

Among 1,422 unique color words we identified 518 terms (36%) derived from names of objects.

Basic color terms *fiioletovyj* ‘purple’, *rozovyj* ‘pink’, *oranževyj* ‘orange’ and *koričnevyy* ‘brown’ were excluded from the analysis: Although object-derived when they entered Russian (18th century), in modern Russian they are deeply entrenched, with the meaning emancipated from the original object referents.

Among object-derived color terms we

- identified most frequent ones and estimated their occurrences;
- estimated derivational productivity, i.e., the number of unique monolexemic and polylexemic descriptors derived from each object name, and frequency of each descriptor’s occurrence;
- identified categories of objects, functioning as color-term referents.

In addition to analysis of the full dataset, we also examined differences in color naming between speakers of different age groups, educational-level and social groups, as well as compared associative series of females and males.

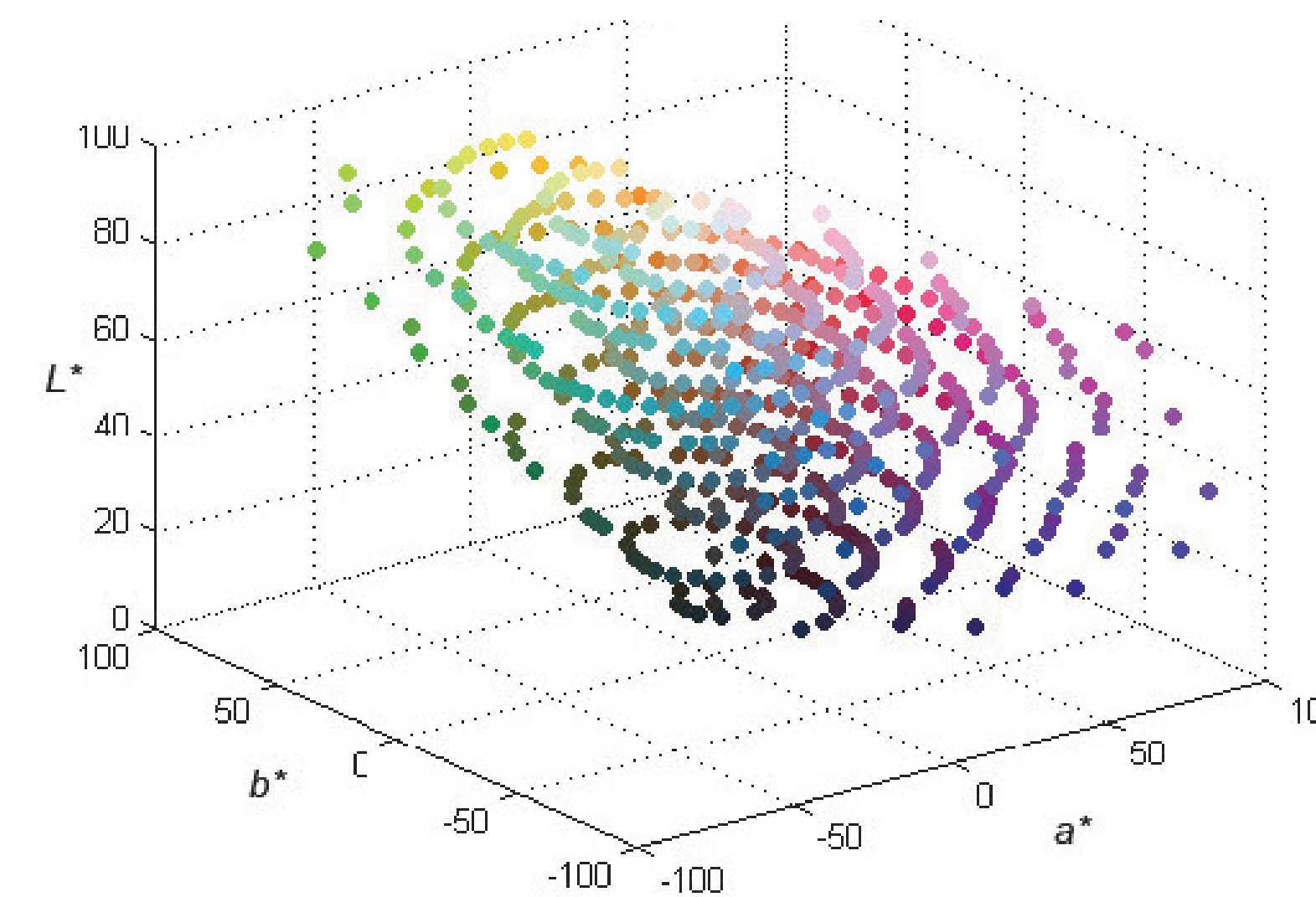


Figure 1. 600 stimuli of colour naming experiment, constrained within sRGB gamut, plotted in L\*a\*b\*.

## CONCLUSIONS

The most frequent object-derived color names were *sirenevyy* ‘lilac’ and *birúzovyy* ‘turquoise’; both also had the richest derivational productivity (e.g., *neonovyy sirenevyy* ‘neon lilac’ or *bledno-birúzovyy* ‘pale turquoise’). *Fioletovyy* ‘purple’ was the most frequent color term; together with *sirenevyy* ‘lilac’, its denotata covered most of the characteristic fifth primary hue region of the Munsell system.

As expected, females revealed a richer object-derived color vocabulary, reflected by the number of unique color descriptors. Males, in comparison, offered more idiosyncratic or exotic compounds.

To assess culture-specific features of object-derived color names in Russian, the outcome was compared to data for English speakers (Mylonas and MacDonald 2016). Results enabled ascertaining of reference lacunae in Russian color naming: Specific to the language is a reference rich category of gems and semi-precious stones and category related to natural substances (e.g., *bolotnyj* ‘marsh-colored’ or *snežno-belyj* ‘snow white’). Further, we identified a very recently emerged category of color-terms that are (transliterated) English loanwords alluding to color of prestigious or socially desired objects since recently recorded in advertisement.

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# Objects as Culture-Specific Referents of Color Terms in Russian

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## RESULTS

Table 1. Object classes

Object classes	Number of objects	Number of derivatives	Percentage of cases
Flora	67	237	11.02%
Inanimate nature	57	218	7.69%
Man-made objects	49	116	2.22%
Food and beverage	23	84	3.47%
Fauna	10	19	0.19%
Body and bodily products	9	24	0.36%
Total	215	698	24.95%

Table 2. Categories of objects

Class	Category	Number of objects	Number of derivatives	Percentage of cases
Flora	Plants	19	52	0.93%
	Flowers	16	67	4.34%
	Fruits	12	54	2.10%
	Vegetables	9	50	3.50%
	Berries	8	17	0.27%
	Nuts	3	14	0.47%
Inanimate nature	Natural objects and substances	23	100	2.75%
	(Semi-) precious stones	13	61	4.06%
	Chemical elements and compounds	10	17	0.15%
	Millieu	7	25	0.53%
	Metals	4	15	0.19%
Man-made objects	Dyes and pigments	10	39	1.16%
	Artefacts	10	20	0.25%
	Advertisement	10	11	0.08%
	Fabrics	7	8	0.06%
	Cosmetics	7	8	0.07%
	Building materials	5	30	0.60%
Food and beverage	Sweets	6	14	0.32%
	Alcohol	5	29	2.23%
	Dairy products	4	17	0.23%
	Spices	4	16	0.54%
	Hot and soft drinks	4	8	0.15%
	Birds	5	7	0.05%
Fauna	Mammals	4	4	0.03%
	Fish	1	8	0.11%
Body and bodily products		9	24	52
Total		215	698	24.95%

### Frequent object-derived color terms in Russian

The first five most frequent color names (ranks 1–7) are identical for Russian females and males, although the ranking order differed slightly. These frequent names include *salatovyy* ‘lettuce-colored’, *bordovyy* ‘claret’, *malinovyj* ‘raspberry’, *persikovyy* ‘peach’, and *bolotnyj* ‘marsh-colored’. The repertory of the other most frequent color names (ranks 8–20) demonstrates noticeable gender differences. 4 terms in women’s lexicon, *fuksiá* ‘fuchsia’ (rank 8), *gorčičnyj* ‘mustard-colored’ (rank 10), *tëmno-sirenevyy* ‘dark lilac’ (rank 17), and *baklažanovyy* ‘aubergine’ (rank 18), were not among the most frequent terms used by men. Conversely, 4 terms, *kremovyy* ‘creamy’, *tëmno-bordovyy* ‘dark claret’, *telesnyj* ‘flesh-colored’, *indigo* ‘indigo’, were high in frequency for men (ranks 10, 15, 17, and 20, respectively), but did not occur among women’s frequent names. It is worth noting that the list of the most frequent object-derived color terms offered by Russian speakers includes terms with achromatic modifiers *svetlo-* ‘light’ and *tëmno-* ‘dark’ in combination with *sirenevyy* ‘lilac’ and *bordovyy* ‘claret’.

### Derivational productivity of Russian object names

The most frequent object-derived color names *sirenevyy* ‘lilac’ and *birúzovyy* ‘turquoise’ also had the richest derivational productivity (e.g., *neonovyy sirenevyy* ‘neon lilac’ or *bledno-birúzovyy* ‘pale turquoise’). *Fioletovyy* ‘purple’ was the most frequent color term; together with *sirenevyy* ‘lilac’, its denotata covered most of the characteristic fifth primary hue region of the Munsell system.

Prompted by the unconstrained method, respondents produced multiple combinations of monolexemic terms with modifiers or varying suffixation, as well as compound terms.

### Categories of objects, functioning as color-term referents

In data we focused on specific categories of objects, functioning as

color-term referents (Table 1, Figure 3), and grouped them into six classes (see e.g. Vasilevich et al. 2002):

- (1) **Flora**: fruits, berries, vegetables, nuts, herbs, flowers;
- (2) **Fauna**: fish, animals, birds;
- (3) **Inanimate nature**: natural objects, natural substances, milieu, precious and semiprecious stones, metals, chemical elements and compounds, pigments and colorants;
- (4) **Food and beverage**: sweets, spices, dairy products, alcohol, hot and soft drinks;
- (5) **Man-made objects**: building materials, artefacts, fabrics, cosmetics, advertisement;
- (6) **Body and bodily products**.

Among categories of color-term object referents most common for Russian speakers were flowers, gems and semi-precious stones; followed by vegetables, natural objects and substances, alcohol and fruits (Table 2, Figure 3).

### Consistency of object-derived color descriptors

To estimate response consistency one randomly selected color sample was presented to each participant twice.

To visualize denotata of the most prominent Russian object-derived color names, we trained a colour-naming model based on Maximum a Posteriori (MAP) – which favours more frequent colour names over less common and inconsistent – solely by colour names related to food (cf. MacDonald and Mylonas 2010). Figure 7 presents an outcome for the most frequent “edible” colour names in projection on the Munsell array, i.e. surface of most saturated colours. It is apparent that among the 12 most frequent terms, *salatovyy* ‘lettuce’ and *olivkovyy* ‘olive’ denote the largest areas, followed by *malinovyj* ‘raspberry’ and *persikovyy* ‘peach’.

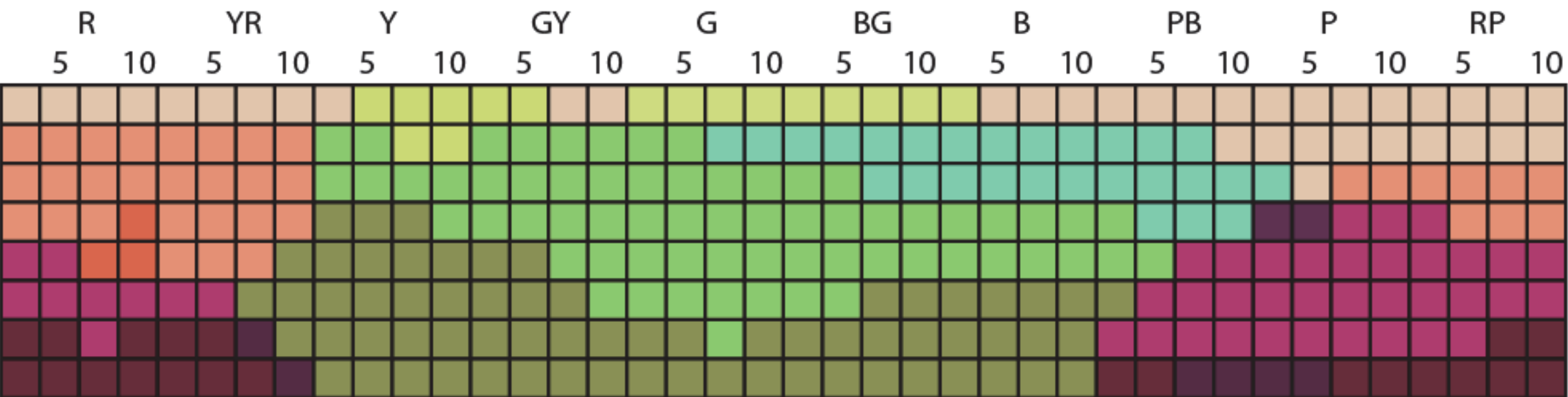


Figure 7: Denotata of 12 Russian most frequent “edible” colour names mapped onto the Munsell array (Mercator projection): *olivkovyy*, *salatovyy*, *mätnyj*, *limonnyj*, *lajm*, *kremovyy*, *persikovyy*, *morkovnyj*, *malinovyj*, *bordovyy*, *baklažanovyy*, and *slivovyy*. An area paint mimics colour of sRGB centroid of the samples that elicited the colour name in question.

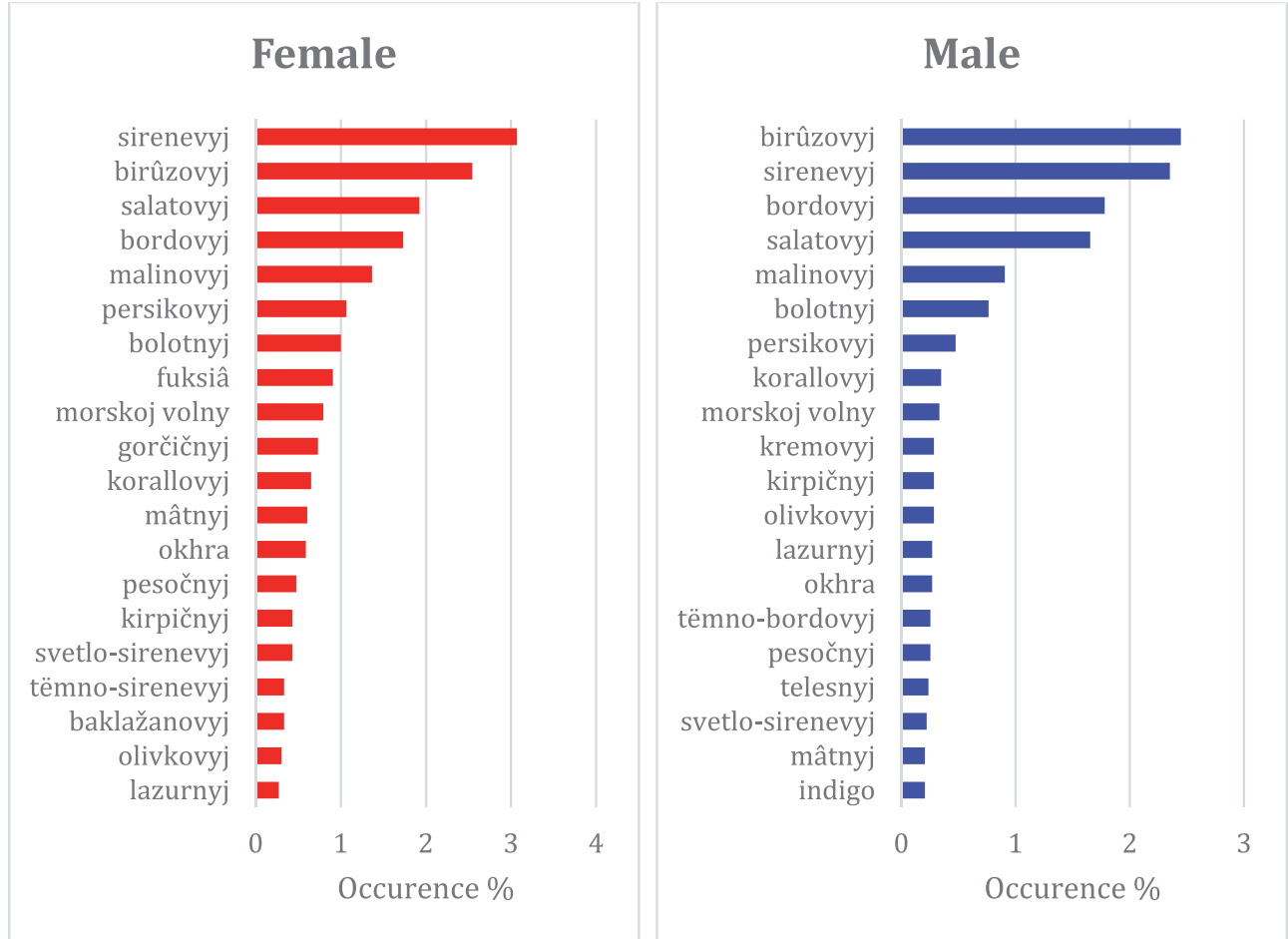


Figure 2. Percentage of occurrence of 20 most frequent Russian object-derived color names elicited in females (left) and males (right).

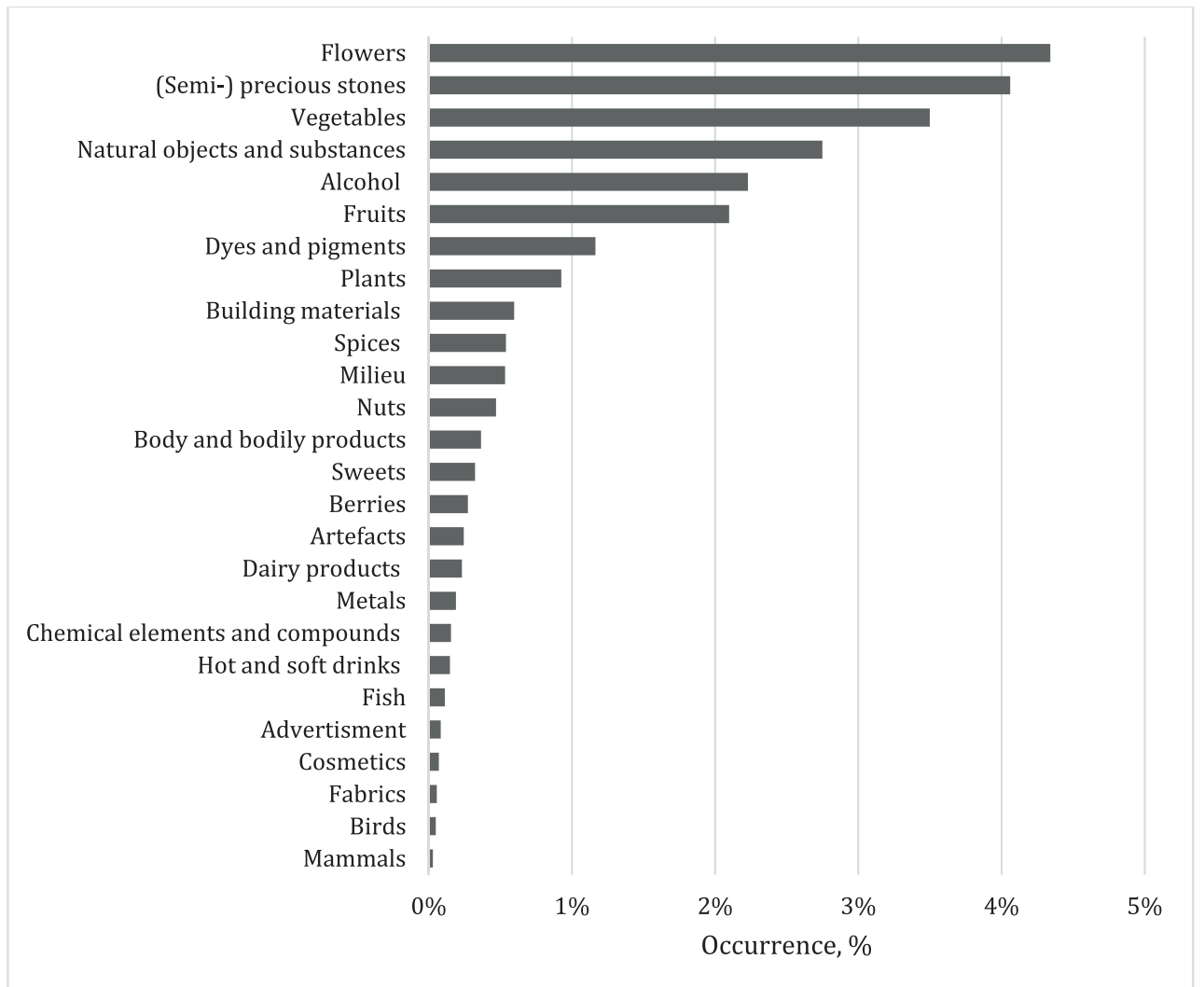


Figure 4. Percentage of occurrence of objects from different categories in Russian color naming.

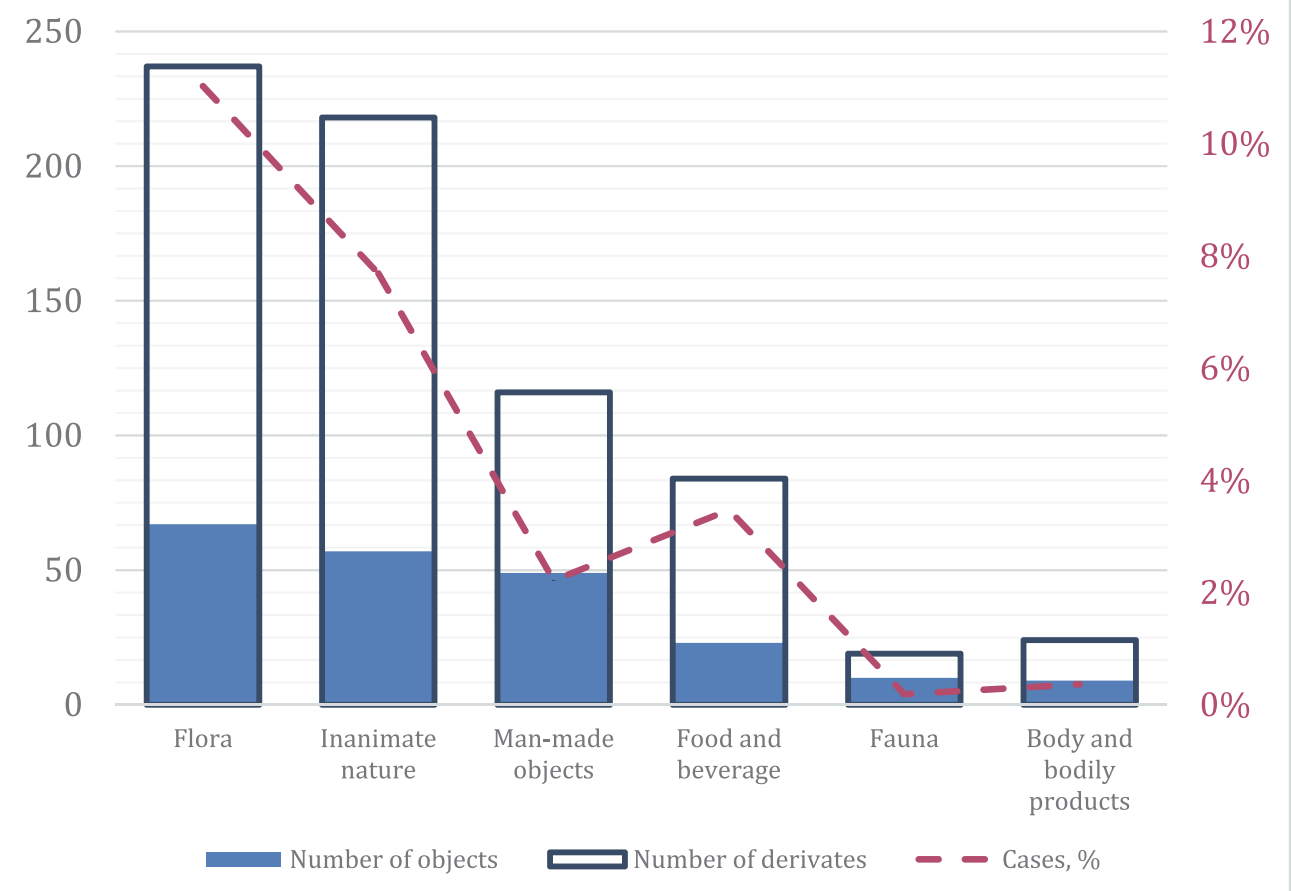


Figure 3. Number of objects and derivatives in classes (the primary axis); percentage of occurrence of object-derived color names elicited in each class (the secondary axis).

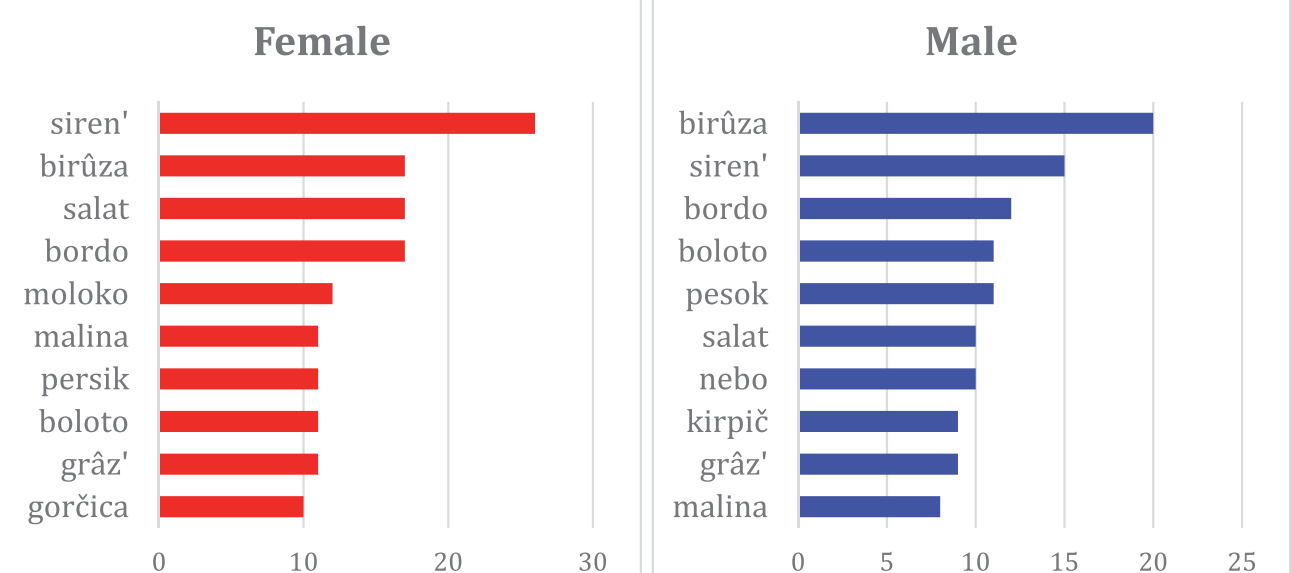


Figure 5. Objects with the greatest derivational productivity, for females (left) and males (right).

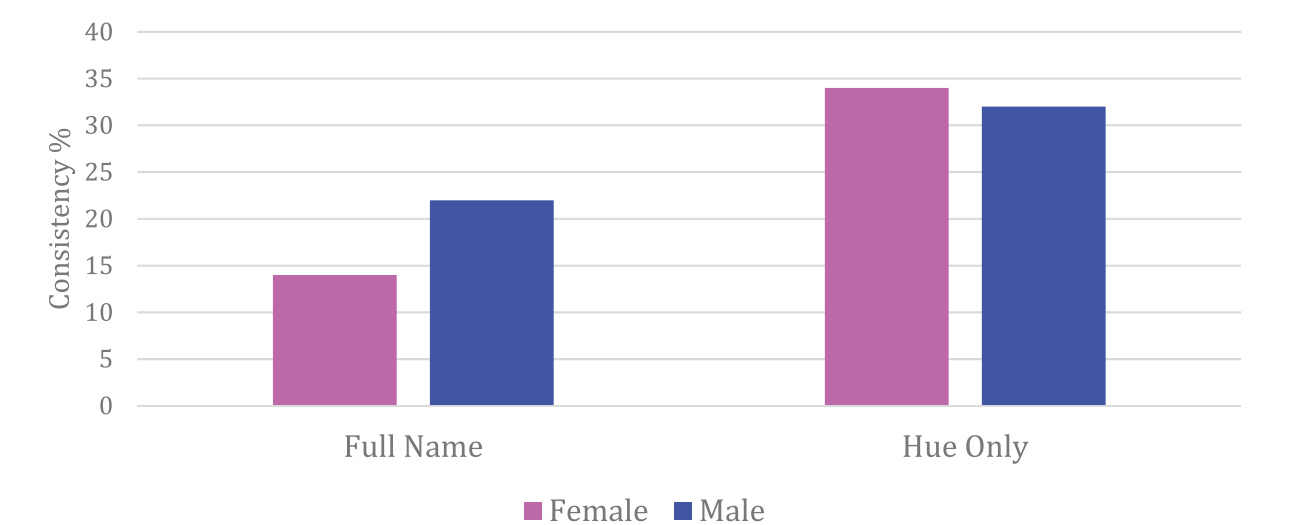


Figure 6. Consistency of object-derived responses to repeated color samples for females and males.



