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Subject:
Date: January 27, 2004 9:13:55 AM PST
5 Attachments, 8.2 MB

Singing the Russian blues:
An argument for culturally basic color terms

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Abstract

The accepted cross-cultural universal inventory of basic color terms (BCTs) is comprised of 11 terms (Berlin & Kay, 1969). The inventory includes, in particular, a single basic term for 'blue' denotata. Russian has two terms for 'blue' – sinij 'dark blue' and goluboj 'light blue', and this exceptional feature has generated a considerable body of research. In the linguistic domain, both terms are argued to be basic; the basic status of goluboj is, however, disputed on grounds of ethnographic studies. The exceptional nature of goluboj, and its proposed status as the 12th basic color term, challenges theory stating an upper limit of BCTs. Indeed, Russian's second 'blue' term opens the possibility of an extension of BCT theory. This article draws on arguments from lexical-semantic analyses and reviews empirical linguistic and psycholinguistic studies of the two Russian 'blues'. The lexical-semantic analysis indicates that sinij and goluboj are used with near synonymy for naming an abstract color of medium-lightness blue; both terms are, however, used differently for a range of properties and objects, in particular artifacts; in addition, they are not interchangeable metonymically. Linguistic studies provide converging evidence that goluboj meets a criterion for a basic color term in psychological salience, as assessed by frequencies of occurrence and derivational elaborations. Psycholinguistic findings reveal for the two 'blue' terms circumscribed best exemplar 'foci', but overlapping ranges. In addition, the findings indicate that goluboj, the term commonly translated as 'light blue', implies dimensions other than lightness; it is also richly symbolically charged, and appears to have emerged as culturally basic in the Russian language. Counterparts of the two 'Russian blues' in other languages, established or emerging, are also considered. Within a context beyond Russian, the potential refinement of the 'blue' area is suggested to follow perceptual-cognitive universals; this is, however, fine-tuned by language and reinforced by culturally-specific semiotics. Finally, by drawing attention to a distinction between denotative and designative meaning, the issue of the 'Russian blues' raises a question regarding the proper definition of a basic color term.

Two Russian color terms for 'blue' – are they both basic?

The Russian language is known to have two contenders for the English-language blue, one of eleven basic color terms (BCTs) according to the theory of Berlin and Kay (1969) and its more recent modifications (Kay & McDaniel, 1978; Kay et al., 1991; Kay & Maffi, 2000). The Russian 'blue' terms sinij and goluboj are commonly translated as 'dark blue' and 'light blue', respectively.

Native intuition of Russians is the viewpoint prevailing in abundant linguistic and psycholinguistic studies, namely that along with indisputable basic sinij, a basic color-term status is also rendered to goluboj – a view that is incompatible with Berlin and Kay's claims. Ethnographic studies revealed, on the contrary, no evidence of goluboj-basicness, bestowing the two Russian 'blue' terms a dominant-recessive semantic relationship.

The two Russian 'blues' have raised a lively debate among linguists, psycholinguists, ethnographers, and psychologists, since they seem to challenge Berlin and Kay's firmly grounded theory of color-term universality. Russian's unusual case of two widely used terms for blue implies the more general question of whether the number of basic color categories (BCCs) is not restricted to eleven and might further evolve, thereby refining a 'grid' of categories that conceptually filter color sensations. This issue, among others, has been raised in Kay and McDaniel's (1978) revision of the theory, wherein the authors leave the potential number of BCTs open.

Another, related question is whether potential color-concept differentiation in other languages develops following a path similar to the Russian one, or if there are alternative areas representing color experience, which might undergo further semantic segmentation – as expressed by the nascent categories hypothesis (Kay & Maffi, 2000).

The last query, but not least, is on impetus and mechanisms that drive evolution of color-term categories. The response to it depends on the view of mechanisms underlying evolution of BCCs, be they grounded in neurophysiology of the human color vision system, as was asserted in the original version of the Berlin and Kay's theory, or, rather, in the relational structure of color sensation representation (Jameson, accepted), social activity pressure (MacLaury, 1997), or cultural system of references (e.g., Dedrick, 1998; Eco, 1990; Hardin, 1993; Kay & Maffi, 2000).

In the present article, linguistic and psycholinguistic aspects of the two Russian terms for blue are considered. An overview comprises a variety of studies, thus extending a short summary of arguments presented earlier (Paramei, 1999). It also invokes socio-historical and cultural considerations on semantics and semiotics of sinij and goluboj. An analysis of findings from different disciplines purports to elucidate the controversial status of the Russian goluboj, thereby addressing a potential of further development of BCTs.

The two Russian 'blues': a diachronic perspective and lexical-semantic analysis.

Russian, as a language of Stage VII according to the Berlin and Kay (1969) classification, is considered to have greatly elaborate color nomenclature. This assertion is justified in particular with regards to lexical variety and semantic refinement of color terms mapped onto the 'blue' area. As stated, Russian appears to differentiate semantically sinij 'dark blue' and goluboj 'light blue' that denote in

Russian distinct colors, not different shades of the same color, as an English translation might suggest (Lyons, 1997).

Interestingly, native Russian speakers take for granted the two 'blues' as phenomenologically distinct and separate 'colors'. As Frumkina (1984) reports, Russians are invariably surprised when they learn that English has only one word for sinij and goluboj. It is also noteworthy that both sinij and goluboj are named by Russians among the seven rainbow colors. (The sequence is coded by the mnemonic "Kazhdyj 'red' Okhotnik 'orange' Zhelaet 'yellow' Znat' 'green' Gde 'goluboj' Sidit 'sinij' Fazan 'violet' " – "Each hunter wants to know where is a pheasant", a loose analogue of the "Richard Of York Gave Battle In Vain" mnemonic that elicits the Newtonian rainbow sequence.)

Slavonic terms sinij and goluboj emerged in Russian as early as the 11th century, i.e., along with the other primary BCTs and much earlier than the secondary BCTs (Baxilina, 1975). A chronicle suggests that both Russian 'blue' terms have been basic as early as 1230 (Srežnevskij, cit. in Corbett & Morgan, 1988). Both adjectives emerged as designations of color; their usage reveals, however, initial difference with regards to objects named by the two 'blue' terms, namely, sinij used for naming color of water, haze, skin, eyes, certain fabrics and precious stones etc., whereas goluboj for naming color of animal hair, bird plumage, or fabrics and precious stones, other than those designated by sinij (Baxilina, 1975).

In addition, in morphology of both terms one can trace other, 'achromatic' meanings, which implicate their opposition along the 'dark-light' semantic dimension. Specifically, collocations of sinij in old Russian texts such as "sinij as soot" indicate a relationship with 'black' or 'dark' (Baxilina, 1975; Pelevina, 1962; Surovceva, 1964). Conversely, goluboj was originally a cognate for 'gray' (Baxilina, 1975) and in this meaning persisted until the 18th century for designation of a horse color (Grebenščikova, 2002). The adjective descends from the Russian noun golub' 'dove'; later, however, it has dissociated from its etymon altogether and attached itself exclusively, in the speakers' linguistic consciousness, to a different, 'blue' modal (Bulaxovskij, 1949).

The ancient 'achromatic' meanings of the terms are still contained in contemporary Russian dialects; for example, sinij in expressions pertaining to dark rain- and snow-bearing clouds, indicating that the word is used in an antonymic relation to 'white and 'light'. By comparison, dialect meanings of goluboj (e.g., naming a gray kitten or the sky) span a gamut of shades from 'gray' to jarko-goluboj 'bright light blue' (Piščal'nikova, 1982).

In modern Russian literary language and parlance, sinij and goluboj are both used in relation to the same objects, for example, to designate color of sky, eyes or flowers. However, semantic context of their usage and collocations of each differ (e.g., Corbett & Morgan, 1988; Rakhilina, 2000). Differential naming of tints of natural blue objects and especially artifacts by the two 'blue' terms reveals their ancient 'achromatic' meanings, i.e., the 'dark-vs.-light' opposition (Alimpieva, 1980).

In particular, sinij is related to 'sea', 'fog', 'haze', 'Neva-river ice' in the corpus of Pushkin's poetry (Arapov, 1986) or, in general, to natural 'extents' – 'ocean' or 'sky' – in the Russian literature of the 19th (Alimpieva, 1982a) and 20th century (Fateeva, 2002). Besides, sinij is associated with a variety of more restricted synonyms that indicate deep, dense, or dark blue – vasil'kovyj 'cornflower blue', indigovyj 'indigo', ultramarinovyj 'ultramarine', sapfirovyj 'sapphire' (Alimpieva, 1982a), or kubovyj, the word locally distributed in Siberian dialects for deep-blue dyes (Piščal'nikova, 1982). Based on lexical-semantic analysis of the adjectives of this group, Alimpieva (1982a) concludes that "sinij constructs its microsystems with a specification in them of the features 'bright', 'saturated' or 'dim', 'diluted' " (p. 58).

By comparison, in the literary language of the 19th and 20th century, goluboj is collocated with 'eyes', 'sky', 'heaven', 'vault', 'heights', 'farness' (Alimpieva, 1982b; Arapov, 1986;Grebenščikova, 2002) or calls forth allusions of frosty winter night (Fateeva, 2002). For goluboj, common loose synonyms, though more restricted in meaning, are nebesnyj 'sky-blue' and lazurnyj / lazorevyj 'azure' (Alimpieva, 1980; Frumkina, 1984). The dominating feature in semantic structure of goluboj is 'serene'; it implies light and clear blue tone, though excludes its high saturation (Alimpieva, 1982a,b).

Apart from the function of direct designation of color experience, the two Russian 'blues' function metonymically. In particular, they invoke quite distinct emotional connotations. In semantics of sinij, realization of extreme degrees of hue intensity ('bright', 'saturated' vs. 'dim') is conceived to call for positive as well as negative emotional associations (Alimpieva, 1983).

By comparison, goluboj conveys positive emotional expressive features and is commonly associated with 'tender', 'affectionate', 'soft' (Alimpieva, 1980, 1982b, 1983). The nuance of 'cloudless, serene' has adhered to goluboj under the influence of German and French 19th-century romanticism. It thence has transferred to its abstract (poetic) connotations implying 'cloudless insouciance', 'unrealistically sanguine' (Wade, 1985) or, at the beginning of the 20th century, the 'unearthly' or 'innocent' (Grebenščikova, 2002).

Finally, adjectives sinij and goluboj have culturally specific and distinct semiotics. As such, they are part of figurative speech, wherein they are in no way interchangeable for native speakers. This can be exemplified by such metaphors as sinij culok 'blue stocking' (an equivalent and perhaps a borrowing from English; Šanskij et al., 1987) as opposed to golubaja krov' 'blue blood'. Among relatively new Russian metaphors based on color terms, goluboj is among those that are particularly common, whereas absence of sinij is noteworthy (Wade, 1985). This observation is in accord with the point made by Corbett and Morgan (1988), who found that goluboj is more frequent than sinij in the 20th-century poetry; whereas the opposite was true for the 19th-century poetry. Both observations indicate further refinement of the 'goluboj' semantic field. In accord with this is a new and socially pronounced meaning of goluboj – as a noun it denotes a homosexual person (Grebenščikova, 2002; Gusejnov, 2000).

The process of refinement of the 'Russian blues' deserves more detailed linguistic and psycholinguistic investigation, especially

taking into consideration intensive elaboration of the Russian language during last decade (Skljarevskaja, 1998) conceivably due to active involvement of the country in international exchange (including consummation of goods with a broad palette of dyes) and globalization.

Linguistic and psycholinguistic studies of the 'Russian blues.'

Grounded in perceptual experience, color categories, as Lyons (1997) notes, are the product of the lexical and grammatical structure of particular languages. Therefore, linguistics is in a position of making the distinction between basic and non-basic color terms. This rests upon a principal structural relation of inclusion (hyponymy) of a non-basic color term by a basic term. For this reason, structural relations between the two disputable Russian terms for 'blue' are in focus of reviewed psycholinguistic studies. Below studies published in Russian, which are not broadly known, are presented in more detail.

Moscow linguists group: Frumkina and associates. In Russia, the problem of the two 'blues' was extensively investigated in psycholinguistic studies of Frumkina (1978, 1979, 1984) and her associates. At a preliminary stage of an experiment, an exhaustive set of Russian color terms was elicited from linguists, experts in Russian philology. The final set included the 11 basic color terms plus goluboj, as well as other frequently used; in total it comprised 110 items. (For Russian glosses and their English translations see Frumkina & Mikhejev, 1996, p. 86, as well as Davies & Corbett, 1997a). In these experiments a group of representative informants were required to sort color terms (printed on separate cards) into separate piles, or groups, based on similarity of meanings. The resulting matrices were processed using an algorithm of multidimensional scaling analysis. Based on degrees of subjective proximities of meanings, this yielded compact "blocks" of color terms. In the present analysis only the 'sinij' block is considered (see Fig. 1).

<INSERT FIGURE 1 HERE>

Quantitative analysis of the structure of the sinij block enabled Frumkina to estimate two distinct 'blue' clusters crystallized around goluboj and sinij. Frumkina emphasizes that the two clusters have a symmetrical relationship, thereby confirming her original intuitively-based hypothesis of goluboj basicness along with that of sinij. By comparison, the terms beyond the two cluster cores obviate their asymmetrical relationship, with one set comparable to the English 'aquamarine' abutting to goluboj and the other, resembling 'indigo' or 'cobalt blue', to sinij.

Another experiment by Frumkina was directed at exploring the relationship between the most frequent Russian color terms and their denotata. The set of words used was comprised of 11 basic color terms, presumably basic goluboj, and eight other terms frequently used, such as sirenevyj 'mauve' or tsveta morskoj volny 'sea-wave colored', altogether totaling 20 color terms. Referents for the color terms were mapped out using the Munsell color array with 330 chips as given in the commonly used Mercator projection of the outer skin of the Munsell color solid (Frumkina, 1984). Each subject was required to point out the best example (i.e., focal color) for each color term. The results were estimated in terms of the denotative uncertainty (the distribution of the focal color for the term across the group of subjects, N=100); the term's focus (the most frequently chosen sample); and codability index (number of informants choosing the focus). Figure 2, my adoption of Figure 1 from Frumkina and Mikheev (1983), indicates that the goluboj-focus is mapped onto 2.5 PB/7, whereas the sinij-focus is mapped onto a darker blue sample, 5.0 PB/4. [For comparison, for a British sample, the focal blue takes on a intermediate estimate 2.5 PB/5 (Sturges & Whitfield, 1995).] The distributions for focal goluboj and sinij are mapped as distinct, non-overlapping entities, with the area occupied by goluboj broader than that by sinij., i.e., goluboj has greater denotative uncertainty. Also, the codability index for goluboj is lower than that for sinij – 11 vs. 22. This may not necessarily pose a problem, when psycholinguistic experiments involve the use of a central example of a color, since, as Morgan and Moss (1988/1989) note, the important criterion would be that the color sample should be readily recognizable to a native speaker as an example of that color, and no other.

<INSERT FIGURE 2 HERE>

In one further experiment of Frumkina and associates, two separate 'blue' series – sinij and goluboj – were employed, each comprising a set of 12 Munsell chips from their respective category regions. For each series, subjects ordered them from best to worst example of the term (Frumkina, 1984; Frumkina & Mikhejev, 1983). The authors found that lightness was the contrasting feature separating goluboj and sinij. However, the best example of each did not have extreme lightness: for goluboj, 10B/6 (although 11 of 30 subjects chose a slightly lighter sample, 10B/7, as the best goluboj); for sinij, Munsell 2.5PB/4, i.e., the difference between the terms' foci yielded only one step in hue and two steps in lightness. The boundary between the two ranges was nevertheless distinct: all 'blue' samples of Value 6 to 7 were referred to as goluboj, whereas those of Value 3 to 5 as sinij.

Data from the latter experiment were processed by Frumkina (1984) using Coombs' algorithm of multidimensional scaling. This enabled the researcher to represent the denotations of each term geometrically – by depicting color samples as points and subjects as areas superimposed on a point configuration. Figure 3, adopted Fig. 22 from Frumkina (1984, p. 137), presents a 2D projection for the goluboj series. In Figure 3, points represent locations of 12 color chips, and shaded areas designate groups of subjects. One can see that the dimension differentiating the samples is lightness: No.1, the lightest sample, occupies the leftmost position of the lightness dimension, whereas Nos. 11 and 12, which have the least lightness within this set, are located rightmost, with the remaining samples tested situated between the two poles. The figure also shows that in their preferences for the best goluboj, the subjects are divided: for

most subjects (N=19) the centroid contour indicated by shaded region 'I' is projected approximately at Value 6, whereas fewer subjects (N=11; shaded region 'II') chose best examples at a higher Value equaling 7.

<INSERT FIGURE 3 HERE>

Based on these results, Frumkina concludes that Russian has 12 basic color terms. She refers to goluboj as the only Russian basic color term whose distinction rests primarily on lightness. She also speculates that seeking a basis for color-term differentiation from a scientific outlook might appear implausible from a naive view, since the latter might rely on subjective dimensions principally different from hue, lightness, or their combination (Frumkina, 1978, 1979).

Ethnographic studies: MacLaury and associates. As part of a large scale research effort known as the 'World Color Survey', a psycholinguistic study of Russian color terms has been carried out by MacLaury and associates, with a particular interest to referents of the 'Russian blues' (see Taylor, Mondry & Maclaury, Appendix IV in MacLaury, 1997). In this study, the Mercator-projection Munsell array with 330 chips was employed and a three-part method of color-term mapping was used (for details see MacLaury, 1997). The point to be emphasized is that, along with the appraisal of samples for focal colors, the method allows subjects to map ranges for each term.

In Taylor et al. (1997), diagrams for four informants are presented. With regards to focal colors for the two 'blue' terms, it is noteworthy that the samples determined for individual subjects in this study are very similar to the dominant focal colors found across subjects by Frumkina (1984): for goluboj, D28 (10 B/6) or E28 (10 B/5) vs. D29 (2.5 PB/6); for sinij, F29 (2.5 PB/4) vs. G30 (5.0 PB/3), respectively. However, the method used by MacLaury and associates revealed an overlap between color-term ranges for sinij and goluboj. Moreover, for some informants the sinij-range included the focus for goluboj, and for others the focus for sinij corresponded to the naming range of goluboj, results at odds with distinct mappings of foci for sinij and goluboj. The authors conclude that the two Russian terms for 'blue' bear a relation, intermediate to coextension and polarized inclusion, with sinij dominant and basic and goluboj recessive and nonbasic. MacLaury (1997) disputes that if goluboj were basic, its core meaning would stand apart from that of sinij, and that appears to not always be the case.

The uncertain relationship between the two 'blue' terms is considered in the framework of vantage theory elaborated by MacLaury (1997). According to MacLaury, a person constructs categories commensurable with his/her reference point and "zooming hierarchy". In this view, a broader sinij category functioning as a near synonym for the whole 'blue' region may be considered as following emphasis on similarity at the expense of perceived differences and, hence, a dominant vantage. Conversely, emphasis on difference curtails the extent of the range of the dominant category, thereby delimiting at its 'lighter' margin goluboj category with the recessive vantage. As MacLaury (2002) emphasizes, the origin of this pattern is entirely cognitive; it begets expansion of the recessive range due to cultural importance. In accord with this view are indeed numerous differential collocations, connotations, and figurative expressions related to goluboj, which for Russian speakers appear to possess intensive culture-specific loadings.

Research from the Surrey group. The status of the Russian sinij and goluboj in recent years was exhaustively explored by a group of linguists and psycholinguists from the University of Surrey, UK. The studies were directed at elucidating whether both Russian 'blues' meet criteria for basic status formulated by Berlin and Kay (1969) and map distinctly onto a color array.

A rationale for linguistic studies of the Surrey group was that the psychological salience of a color term (the fourth criterion of basicness according to Berlin and Kay, 1969) would be evidenced by high frequency of usage, and thereby serves as a basis for estimating lexical quantitative parameters of the two terms for 'blue'. In the study of Corbett and Morgan (1988), the frequency of color terms in texts was investigated. It was found that both sinij and goluboj are high frequency color terms ranking five and six, respectively, albeit goluboj appeared to be a more literary word.

In a list study (Morgan & Corbett, 1989), color terms were elicited from 31 native speakers during a five-minute period. Results were presented in terms of ranking values, as well as of the number of the term's occurrences at the beginning of elicited lists. The authors found that (for the full period) goluboj appeared to be ranked third – followed by sinij as fourth. A follow-up study (Davies & Corbett, 1997a) with more representative subject sample has confirmed high rankings of both 'blue' terms, with sinij ranked third and the disputed goluboj with the rank 4.5 (sharing its place with basic želtyj 'yellow').

One more linguistic test was directed at evaluating the derivational morphology of the two 'blue' terms. This test relates to Berlin and Kay's subsidiary, fifth criterion for basicness referred to as 'distributional potential'. The resulting evidence showed sinij is second-ranked on the number of its derivatives, whereas goluboj is of rank six, also being in the top group of Russian color terms.

The researchers of the Surrey group conclude that both Russian terms for 'blue' meet the linguistic criteria for a basic color term – in frequencies of occurrence and derivational elaborations. (For a discussion of linguistic and behavioral measures of color term basicness see Corbett & Davies, 1995.)

Along with linguistic studies, a considerable number of psycholinguistic investigations were carried out by the Surrey group. Among these were naming experiments in which 219 colored samples of the Colour-Aid Corporation's range (based on the Ostwald Color Solid) were employed. In these experiments, behavioral measures predicated from Berlin and Kay's notion of psychological salience were estimated – reaction times, the frequency of occurrence, and consistency of use of color terms (Moss et al., 1990). Both sinij and goluboj figured among the highest on all behavioral measures: response times – 1531 ms vs. 1509 ms; frequency of the term occurrence – 8.3% vs. 8.0%; consistency of use – 78.8% vs. 69.7%, respectively (see their Table 1, p. 319). The authors note that there was a high degree

of agreement between subjects and few 'split voices' as to with which term, sinij or goluboj, a color sample should be labeled. An additional statistical analysis of the estimates obtained enabled a bestowing of basic status to both 'blue' terms (see also Corbett & Davies, 1995).

Another series of the psycholinguistic experiments was directed at mapping Russian terms onto subsets of the Colour-Aid space covering the 'blue' area. Morgan and Moss (1988/1989) employed 27 samples to estimate the terms' best exemplars and ranges. They found that samples labeled goluboj were typically lighter and greener than those labeled sinij, with an overlapping in naming in only one case of 43. Their best example for goluboj had an estimate closest to Munsell 2.5 PB/6, and for sinij 2.5 PB/4 – samples similar to those found by Frumkina (1984) and Taylor et al. (1997).

In follow-up studies (Davies & Corbett, 1997b; Laws et al.,1995) greater numbers of Colour-Aid chips were used that evenly sampled the 'blue' area of a color space; subjects were asked to name each tile using a single word. Figure 2 in Laws et al. (1995) and Figure 1c in Davies and Corbett (1997b) show distributions of goluboj- and sinij-term mappings onto the 'blue' area. Both plots provide evidence that sinij predominates at low lightness levels, and goluboj is used for lighter colors. The mappings of the two 'blues' are distinct, albeit a minor overlapping between goluboj and sinij was found in ancillary regions. The authors conclude that the two Russian 'blue' terms denote a pattern of nonoverlapping distribution in the color space rather than goluboj being included in the domain of sinij, as Berlin and Kay originally thought.

Finally, a number of cross-cultural psychophysical studies of the Surrey group purported to examine putative perceptual effects of color-term basicness. Russian and English (British) native speakers were enrolled. The rationale of those studies was that for regions of the color space demarking sinij/goluboj distinctions, a categorization effect boundary should show up in the performance of Russian speakers.

A variant of Stroop task, in which for the British sample two terms for 'blue', sky and navy, were used as counterparts for goluboj and sinij, failed to show any differences between the two groups of subjects tested in speed of processing color information (Davies et al., 1991). Also, for Russian speakers, tasks on estimation of perceptual differences between colors provided little evidence for an expected stretching of distances in area covering sinij-goluboj in a reconstructed color space (Davies & Corbett, 1997b, 1998; Laws et al., 1995). It should be noted that in the solution for the Russian sample based on a free-sorting task, the 'blue' cluster revealed splitting into a sinij 'dark blue' region and a goluboj 'light blue' region, with separation pronounced along a 'saturation' dimension; but the two regions merge into each other rather than forming separate clusters (Davies & Corbett, 1997b, Figure 3). An additional ANOVA analysis confirmed a highly significant category boundary effect within the 'blue' area in the Russian group. The findings from the cross-cultural studies indicate that the color grouping by Russian observers reveals a small-scale language modulation due to the availability of the additional 'blue' color category and term.

To conclude, the evidence collected by the Surrey group provides evidence that the two 'blue' terms demonstrate comparable psychological salience, distinct mapping, and category boundary effect, whereby supplying strong support for considering goluboj a 12th basic color term in Russian.

Research from a Moscow psychologists group. In a psycholinguistic study of Russian psychologists (Korzh et al., 1991), denotative meanings of Russian color terms are explored among native subjects. The Natural Colour System (NCS) was used, with 1526 samples varying in the blackness (s), chromaticness (c), and hue. The task seeks coordinates for focal colors, wherefore 30 subjects are required to identify a best example of each named color category. A list of color terms was generated in a preliminary eliciting task and dictionary analysis. The list comprises 260 terms, including monolexemes, as well as terms with modifiers, such as jarko- 'bright', svetlo- 'light', bledno- 'pale', and temno- 'dark'. For the most frequent 24 color terms, focal colors were defined as the means of coordinates of best examples; standard deviations were taken as denotative certainty; and confidence intervals of the mean as semantic boundaries of the terms.

<INSERT FIGURE 4 HERE>

Figure 4, my adoption of Figure 3, Korzh et al. (1991), presents focal colors and semantic boundaries for basic "chromatic" color terms and goluboj mapped on the hue circle of the NCS solid. (Chromatic colors are colors not identified with an 'achromatic' black-gray-white continuum). An inspection of a plot shows that mappings of goluboj and sinij cover distinct areas; their boundaries are abutting and larger for the former. With regards to denotative certainty, the authors report goluboj and sinij to rank five and six, respectively.

On the blackness-versus-chromaticness (s-c) plane (see Fig. 5), the focal sinij is mapped under the plane for the elementary blue ('the full chromatic color'), thereby indicating that, in comparison with the English blue, it has a tint of blackness. Further, the focal goluboj is mapped within the area of sinij-modifiers; whereas goluboj-modifiers are mapped beyond the sinij region and nearest to white.

<INSERT FIGURE 5 HERE>

Following up, Korzh and Safuanova (1994) estimate denotative certainty of the most frequent Russian color terms supplied with 'achromatic' modifiers, like -belyj 'white', -seryj 'gray', serovato- 'grayish', or -černyj '-black'. From the set used, highest denotative

certainty was found for: golubovato-belyj ‘light-bluish-white’, golubovato-seryj ‘light-bluish-gray’, serovato-goluboj ‘grayish-light-blue’, and serovato-sinij ‘grayish-dark-blue’ – all naming tints of ‘blue’. This finding is in accord with conclusions of the lexical-semantic analysis and indicates growing differentiation of the Russian ‘blues’ with regards to their denotata.

The authors assume basicness of goluboj and do not address the issue of two ‘blues’. Their mappings of foci suggest categorical distinction of the two ‘blues’ and are in accord with findings of Frumkina and the Surrey group. The results obtained by Korzh and associates further suggest that overlap of the categories occurs when ‘achromatic’ modifiers are applied; it seems to rest not only on lightness as such, but also on desaturation (both whiteness and grayness).

Discrepancies in psycholinguistic studies: methodological aspects and beyond.

Within the psycholinguistic approach, one stumbling-block for the status of goluboj is its relation to sinij. That is, whether denotata of the two are distinct, or show goluboj and sinij as coextensive. As the review of psycholinguistic studies show, the answer to this question depends crucially on the method employed, even when identical tools (a Munsell stimulus array) are used. For example, tasks designed to identify solely focal colors results in circumscribed denotata of the two ‘blue’ terms imply basic status for goluboj (Frumkina, 1984), whereas estimation of term ranges, in addition to the focal colors, shows goluboj coextension with polarized inclusion (Taylor et al., 1997). Another aspect is whether it is legitimate to relate data averaged for a group of subjects to those obtained for individual respondents (for a discussion of these aspects see Frumkina, 1997).

It is worth noting one further methodological aspect concerning the ‘tool’ used for determining term denotata: While Munsell colors provide a very useful set of samples frequently used in color research, the Munsell array introduces some limitations: (i) Munsell wavelength spectra are not typical of naturally occurring colors, being glossier than in nature; (ii) the Munsell set used is a Mercator projection of the outer skin of the Munsell solid, that is, while Munsell colors cover the most significant and central regions of the color space, they do not cover all color space (Buchsbaum & Bloch, 2002). Reason (ii) alone is sufficient to question the utility of the typically used Munsell array in investigations of Russian ‘blues’ since it would not be a good tool for investigating lexical categories whose differentiation invokes regions of unsaturated denotata represented by internal areas of the Munsell solid.

Indeed, support for this notion is provided by studies of the Surrey group and the group of Korzh and colleagues, in which color samples varying in saturation were used. The findings of both groups concur in that the category boundary between sinij and goluboj is more accurately demarcated in a ‘3D’ stimulus space, implying the need to assess saturation and its interaction with lightness when studying Russian ‘blues’.

Also, there still remain other sources of discrepancy between the reviewed studies. (Including some with significance beyond specifically mapping Russian color terms.) Some factors are related to viewing conditions (not listed here); others are of cognitive origin, for example:

(i) color term usage may differ across generations (Zaręba, 1954; cit. in Pelevina, 1962);
(ii) color term nomenclature may vary contingent upon the social class, rural vs. urban origin, educational level, and vocation of informants (cf. Webster et al., 2002); and,
(iii) the era, when data were collected, should be taken into consideration (e.g., 1950s vs. 1990s): increasing technological control of color and its greater functional load in everyday linguistic communication lead to greater psychological salience of certain color categories / terms (cf. Alvarado & Jameson’s (2002) analysis of color modifiers from Kelly & Judd’s 1976 universal dictionary of color names). This factor might be especially significant in case of an ‘emerging’, or nascent, basic color category (cf. Kay & Maffi, 2000).

These methodological aspects suggest that resolving goluboj's status should follow from the collection of more extensive data, using appropriate color tools, and, crucially, employing a standard and sensitive method for determining color term denotata. This solution pertains, however, not merely to methodology, but is related to epistemological problems. The theoretical problem that the sinij/goluboj controversy represents is the proper formulation of a definition for basicness and ‘basic color terms.’ As was demonstrated, goluboj cannot be separated from non-basic color terms on grounds of psycholinguistic indices, such as denotative uncertainty or codability (Frumkina & Mikheev, 1983). Neither is its basic status and, hence, categorical distinction warranted on grounds of the range overlap with sinij (Taylor et al., 1997). These difficulties call for an elaboration of linguistic operational criteria for separating basic color terms from non-basic, the task that goes far beyond the problem of the ‘Russian blues’. An alternative approach suggests to seek the definitive aspects of basic and non-basic color terms not in the plane of color denotata, but in the cultural-historical plane (Frumkina, 1984, 1999; Vasilevich, 1987).

Nonlinguistic grounds for refinement of the ‘blue’ category.

The extension of the set of basic color categories by inclusion of goluboj appears plausible, on general, nonlinguistic, grounds and not only in view of the specific Russian findings. Support for the potential addition of a category in the ‘blue’ region can be seen through analyses of the relational properties among commonly used color space categories (Jameson, accepted; Jameson & D’Andrade, 1997). The “Interpoint-Distance Model” (IDM) suggests that the emergence of goluboj follows from a natural partitioning of the considerable gap of unnamed colors between basic ‘blue’ and ‘white’ -- one of its longest unpartitioned stretches of perceptual color space. Consistent with IDM theory, the intersection of two primary color categories need not warrant basicness of a derived category, however, since the conjoining of some primary categories also gives rise to nonbasic terms, as pointed out in Paramei (1999). The point

is that there may be other ways to conceptualize category 'basicness'. The IDM's proposal that relational category structure contributes to the lexical partitioning of color space seems a reasonable explanation for the emergence of goluboj, and more generally provides an alternative rationale for how different cultures might arrive at similar color categorization systems (Jameson, accepted).

The foregoing survey of theories and approaches raises the question of what is the best way of determining the 'basicness' of a term. We consider it reasonable to proceed to test a term's basicness -- in this particular case, the basicness of goluboj -- psychometrically, provided that stimulus referents used include the most representative hues in the 'blue' region of perceptual color space. Moreover, sensible criteria would need to be used to define 'basicness'. We suggest that bestowing a term with basic status requires compelling evidence on the category boundary effect on a variety of psychometric measures (e.g., frequency of the term usage, reaction times, response consistency across subjects, and so forth).

As the present discussion indicates, on psychometrical grounds goluboj basicness is currently uncertain. However, additional explanation(s) of development of color categorization may be invoked. In what follows we leave aside 'environmental' explanatory schemes traced to the necessity of communication about perceptual regularities of terrestrial color experience (Shepard, 1997). Instead, our primary interest is in the cultural-historical plane.

Cultural specificity in color categorization.

Several have argued that the process of color categorization gains its primary impetus from socio-cultural mechanisms (e.g., Dedrick, 1997; Eco, 1990; Gage, 1997; Hardin, 1993; Kay & Maffi, 2000; Saunders & Van Brakel, 1997). Particularly important in the abundant literature on this issue is that color categories undergo categorical dynamics. This dynamic aspect can occur, for example, by changing the vantage to emphasize differences among shades in a certain area of the color space results in shrinkage of an initial basic color category, which is complemented by an emerging category (MacLaury, 1997).

Within the 'blue' category, Russian indeed emphasizes the differences along lightness and saturation, though other attributes, such as transparency-versus-turbidity, density, or object texture (faktura) seem to play a role in differentiation of sinij and goluboj (Frumkina, 1979). The idea is that differentiation is encouraged and reinforced by the culture to which native speakers belong, such that speakers encounter special conditions that make certain color differences – which may otherwise be nonsignificant– crucial and behaviorally important (Frumkina, 1999). She argues that goluboj should be considered culturally basic for Russian, because Russians cannot designate blue eye color and the common color of sky without this term.

Frumkina's contention is echoed by Wierzbicka (1990), who intuiting from her native Polish, notes that goluboj is directly likened to the sky, whereas sinij is not 'like the sky' although it can make people think of a dark sky. She considers that description of color is related to locally salient referents; the meanings of color terms reflect culturally-specific conceptualizations that function as cognitive anchors in intelligible communication with others.

Goluboj should indeed be considered a cultural artifact (in Wierzbicka's wording), whose status and meaning are used to illustrate a principle of considerable importance, which allows one to 'make sense' of something seemingly paradoxical, or problematic, in the color vocabulary of many languages. Specifically, sinij is basic in the sense that, when one is referring to abstract color, the term can also be used to denote goluboj colors. But the situation is very different when it comes to the descriptive, or attributive, rather than referential, use of sinij (cf. Lyons, 1997). The distinction is crucial in semantics: for a color term, the reference is related to denotata represented via color samples covering certain area in a color space, whereas the description implies the term's meaning – its collocations, affective connotations, figural usage – and is rooted in shared representation of semiotics within a certain culture (Frumkina, 1999; Jameson, accepted).

It is due to differences in meanings of the two Russian 'blues', that a naming situation changes dramatically, when one is referring not to the color itself, but to objects or substances, that are 'blue' in color, either identifying or describing them. The lexical-semantic analysis above show that in linguistically specific contexts sinij cannot substitute goluboj and the two 'blue' terms are not interchangeable.

This introduces a notion of both sinij and goluboj being context-restricted, the fact that works against Berlin and Kay's third criterion of basic status (a basic color term must not be context-restricted). Lyons (1997) conjectures, however, that Berlin and Kay's third criterion is valid and reliable provided it relates to the referential, rather than the descriptive, use of color vocabulary. He notes that context-restrictedness is characteristic of higher-level, or stylistically specialized, color-terms in any language of rich color vocabulary and further argues that, in any linguistically significant sense of 'basic', being context-restricted should not be thought to make a term less basic than one that is not.

Russian agrees with other languages about the area of 'blue' and yet differs about its number of culturally stipulated basic color terms and about where the boundary lies between adjacent colors. The category and terminological refinement of 'blues' is rooted in the semiotics of Russian and is the subject to socio-cultural pragmatic communication (for a general discussion see Jameson, accepted, p. 17). The point is that goluboj, as singled out from 'blue' by the semantic differentiation of 'lightness-and-saturation' attributes, is conceived as a signifier – of content beyond the range of chromatic discrimination, which includes culturally specific aesthetic and affective meaning.

A Russian rhapsody in blue: Social practices and iconographic precepts.

It is highly probable that socio-cultural meanings of the two 'blues' are rooted in Christianization of Russia (circa 988) that overtook Orthodox Church liturgical doctrine from Byzantium. It is conceivable that with it, social, economic, and aesthetic values were brought traced back to practices and social codes of the East. Notably both Russian terms for 'blue' emerged in the 11th century and established their 'blue' meanings during the following two centuries.

One practical factor contributing to the differentiation of sinij, as designating dark or deep blue, may be related to the social code of fabrics and clothing in Biblical peoples: their blue fabrics were dyed with indigo, which was expensive and applied only to the finest clothing (Pastoureau, 2001). In an analogous way, in Old-Russian sources we find numerous references to 'dark blue' sinij clothing that was expensive and used for the feast days. Later, the meaning of sinij, as the codification for festivity, expanded to designate gorgeous clothing of not only dark blue, but any other color. Goluboj was used, too, for designating color of fabrics, but, by contrast, for those of very light blue, with an affinity to gray, and seemingly with no socially symbolic code (see Baxilina, 1975).

The other, more influential, cause of semiotic differentiation between sinij and goluboj and, hence, sensitization to their differences may be rooted in the spiritual symbolism of the Russian Orthodox Church. Blue is one of the most frequent and semiotically loaded colors found in Orthodox icons and mural paintings. In Russia, the doctrine of icon and fresco painting was imprinted by works of Theophanes the Greek (around the turn of the 13th and 14th centuries) – he stemmed from Byzantium and brought forward to Russia the Byzantine Orthodox color schema (Vzdornov, 1983). With regards to blue, iconographic regimentations – which have hardly changed since then – prescribe painting attires of Virgin Mary in a deep blue (sinij), the color meant to convey suffering and grief. By contrast, goluboj signifies firmament or provides a background color against which sacred figures are depicted; and bledno-goluboj 'pale light blue' stands as a representation of God's epiphany.

The Russian symbolic differentiation of the two 'blues' can thus be sought in Byzantine iconographic color codes. In turn, these can be traced back to the Early Christian era: due to a break-through in technology of transformation of copper silicates, 'light blue' became widespread in stained glass and mosaics to symbolize the color of divine light. As the signifier of divine presence and intervention, celestial blue became the filter, through which Christian liturgical virtues were secretly passed and by which a communal ecclesial identity was silently expressed (Brusatin, 1991).

In the 20th century a vestige of this 'sky blue' signification can be found, for example, in notes of Sergej Eisenshtein (1964/1996), a renown Russian artist: elaborating color leitmotifs for the film "Ivan the Terrible", he refers repeatedly to goluboj as the "majestic" color symbolizing "firmament", "reaching the paradise", or associated with "vault frescoes".

The two 'blues': are they exceptional for Russian?

Category segmentation of the 'blue' area similar to that in Russian is also observed in East-Slavonic languages – Ukrainian and Belarusian (Hippisley, 2001; MacLaury, 2001; Moskovič, 1968). The two languages have been developed under strong influences of Russian and Polish. Interestingly, 'dark blue' is named in Ukranian and Belarusian similarly to the Russian term – synij and syni, respectively; 'light blue', however, is termed blakytnyj (in Ukranian) and blakitny (in Belarusian), i.e., with a Polish borrowing blękitny 'blue'. As Hippisley (2001) notes, this indicates that the Russian 'light blue' category is salient enough to influence the concept of 'blue' in the neighboring languages, though borrowed separately from the term that denotes it.

Intensive language contacts under constraints of socially dominant relations, may strongly influence genetically unrelated languages too, as demonstrated by Moskovič (1968). Converging evidence comes from a recent study of Estonian language which under the influence of Russian has developed, in addition to its basic sinine 'blue', the hele-sinine 'light blue', a term said to clear a hurdle for basic status (Sutrop, 2000).

Across modern languages, the blue area reveals a richness of term diversity (Vasilevich, 1987). Two basic terms for 'blue' are found in Chinese – lan and diann, with the latter representing also colors ranging between blue and purple (Lin et al., 2001). Many languages appear to differentiate between light and dark blue. Possible examples of two BCTs for 'blue' include some Indian languages and Urban Thai (cit. in Saunders & van Brakel, 1997). In some, salient, though secondary, terms emerge. For example, Japanese has misu, a secondary term for 'light blue'; and Japanese basic aoi 'blue' takes the forms of aoi sora 'sky blue' or aoi umi 'sea blue' (Zollinger, 1988). A comparable, though not identical, semantic segmentation exists in Italian and Spanish. There is evidence that celeste 'light blue' may be acquiring basic status in Guatemalan Spanish, Peruvian Spanish, and Catalan. Nepali akashi 'sky light blue' is the most commonly elicited secondary term for 'blue' (cit. in Davies et al., 1998). In Turkish,'blue' has also split into two categories: along with basic mavi, another term laciveri 'dark blue' is apparent, though its status is equivocal (Özgen & Davies, 1998).

In sum, these observations indicate that the 'blue' area of perceptual space is highly prone to further semantic refinement. There is an intriguing possibility that we may be witnessing the formation of a 12th basic color term across many languages. Modern English, under pressures similar to Russian, might have developed two basic 'blue' terms, given that Old English once had two terms designating shades of blue – hauuiblauum 'blue (gray)' and blæwen 'dark blue' (Kerttula, 2002).

Conclusion

In modern Russian 'blue' categories designate an area of the color space with categorical refinement in process, especially in the last twenty years due to globalizing forces. Goluboj appears to undergo further establishment as a basic color term which manifests, as noted

above, extensive usage in poetry and emergence of new metaphors. It is therefore possible that the denotative relation of coextension between sinij and goluboj is in transition or, among many Russians, has already transformed to complementation, though these independent categories overlap at their edges (cf. MacLaury, 2002).

As a litmus test, the issue of the two 'blues' emphasizes perceptual-cognitive universals as a basis for the space separating color categories, and a term's linguistic salience as grounded in a stable system of social references. The 'Russian blues' also underscore the distinction between the color-term denotata (color-in-the-world) and its meaning (color semantics). The distinction has hardly been spelled out and draws attention to the problem of definition of a basic color term. It also prompts the question of whether context-restrictedness of a salient color term is the legitimate argument for contending its basic status.

The problem of the 'Russian blues' can be accounted for by views that advocate social and cultural constraints of color category evolution. Such constraints imply that color names map onto color appearances in a culturally-modal pattern (Frumkina, 1999; Jameson, accepted) and, in certain languages, could emerge as culturally basic. The considerations may be integrated into existing color naming theories as these evolve and are updated.

Acknowledgments

This paper was presented at the workshop "Anthropology of colour: Colour as a phenomenon of culture" at the 7th Biennial Conference of the European Association of Social Anthropologists, Copenhagen, August 15, 2002. I am deeply grateful to Robert E. MacLaury for his numerous valuable suggestions. Comments on and correction of a previous draft of the manuscript by Kimberly A. Jameson and Nancy Alvarado is highly appreciated. Generous help of Alena Anishchenko in supplying me with Russian sources is acknowledged. Figure accomplishments were devotedly supported by my husband, Martin.

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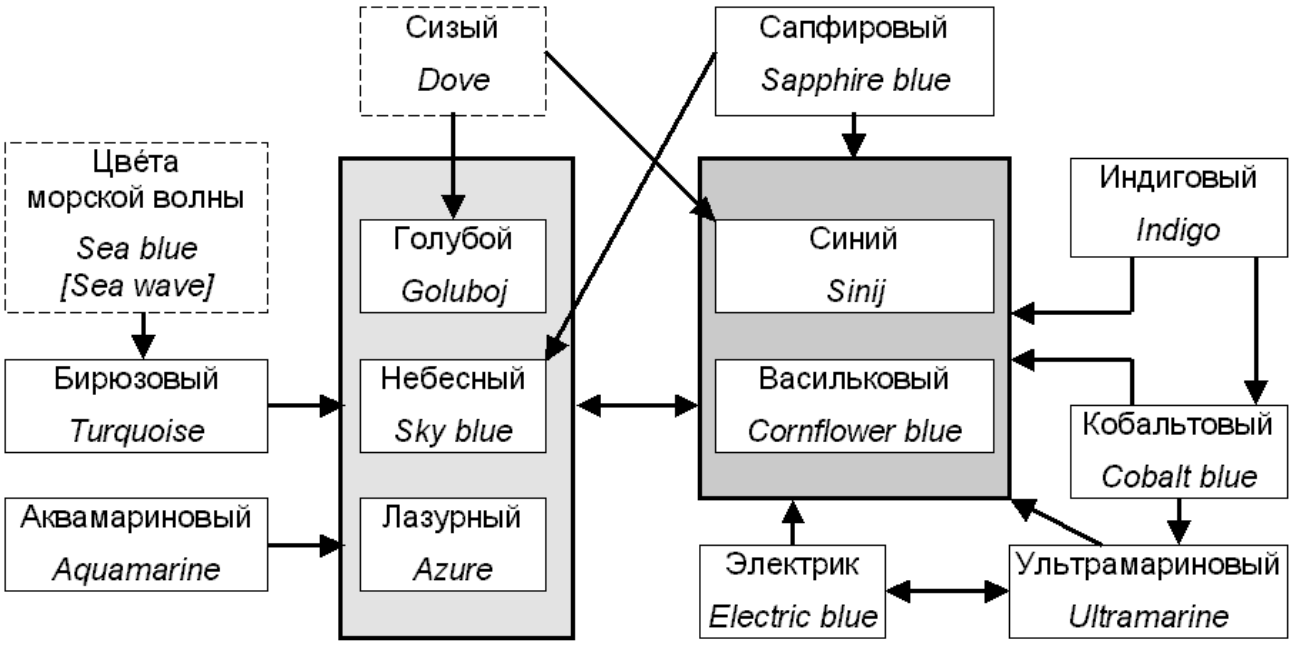

Fig. 1. Structure of Russian 'blue' color terms derived from a free-sorting task. The structure indicates separate clusters for sinij and goluboj. Adopted from: Frumkina R. M. [Color, Meaning, Similarity: Aspects of a Psycholinguistic Analysis.] Moscow: Nauka, 1984, p. 59.

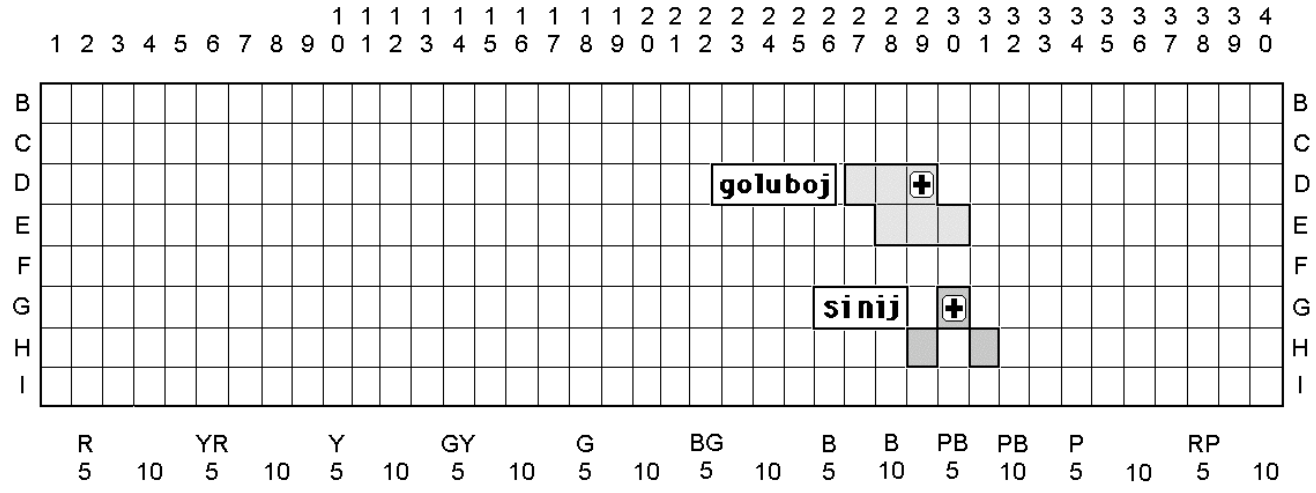

Fig. 2. Mapping of foci of goluboj and sinij on the Munsell Color array (across 100 subjects). Points designate dominant best examples for each term. Adopted from: Frumkina R. M. [Color, Meaning, Similarity: Aspects of Psycholinguistic Analysis.] Moscow: Nauka, 1984, p. 122-123.

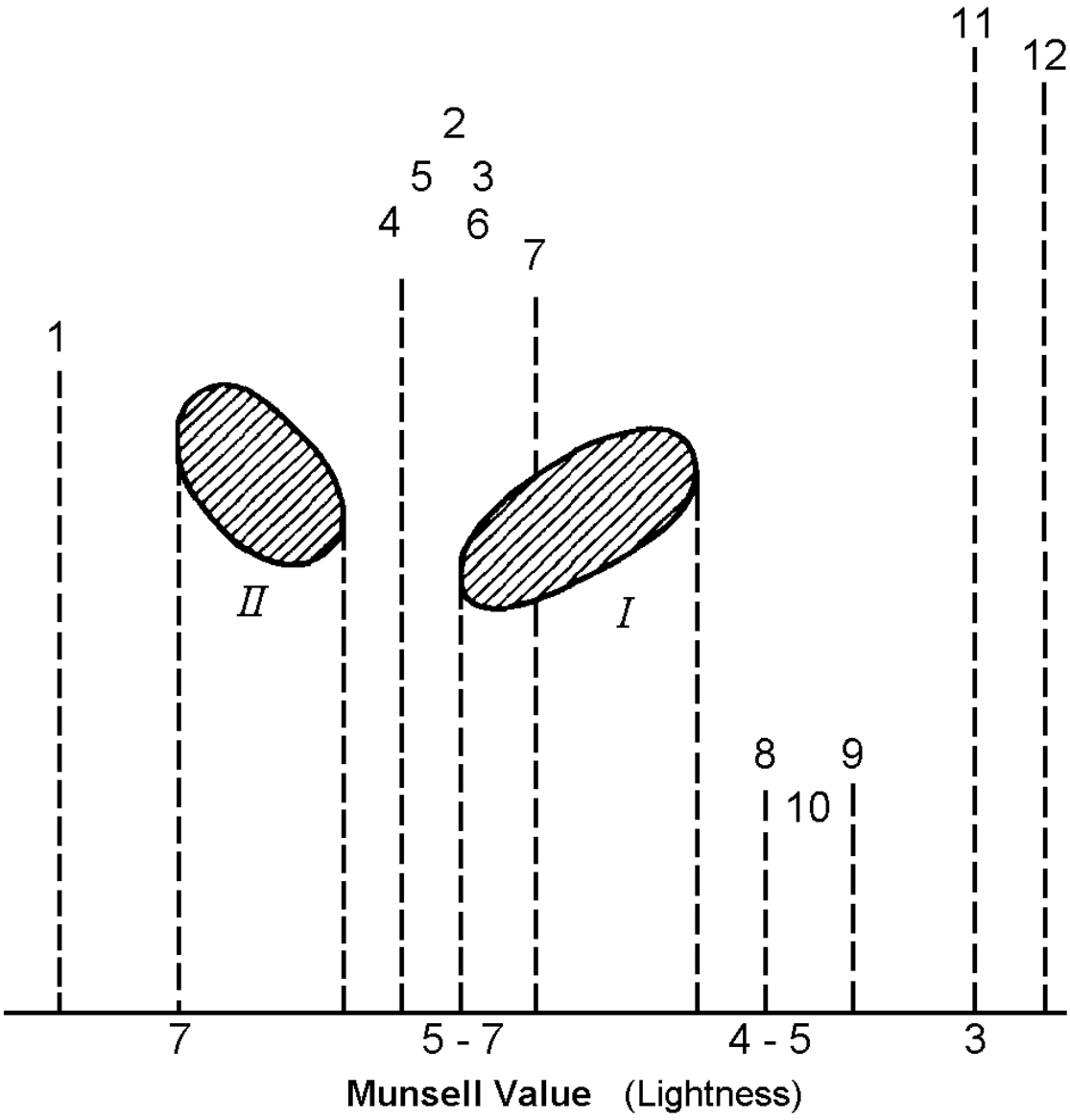

Fig. 3. Ordering of samples from the “goluboj” subset. Adopted from: Frumkina R. M. [Color, Meaning, Similarity: Aspects of Psycholinguistic Analysis.] Moscow: Nauka, 1984, p. 137.

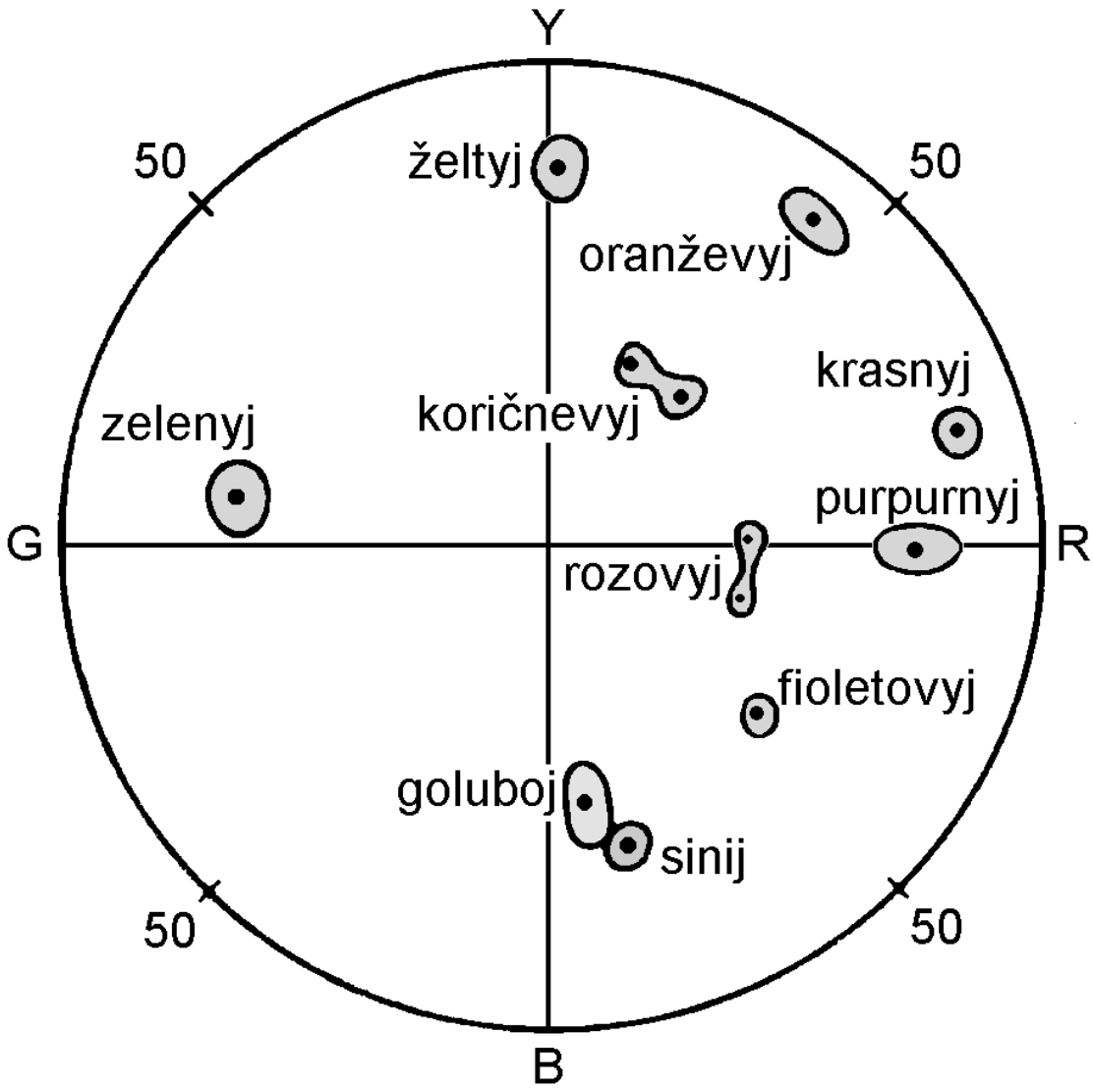

Fig. 4. Mapping of Russian color terms on the chromatic plane of the Natural Colour System. Adopted from: Korzh et al. [Denotative meanings of color terms]. Psikhologicheskij Zhurnal, 1991, 12 (4), p. 75.

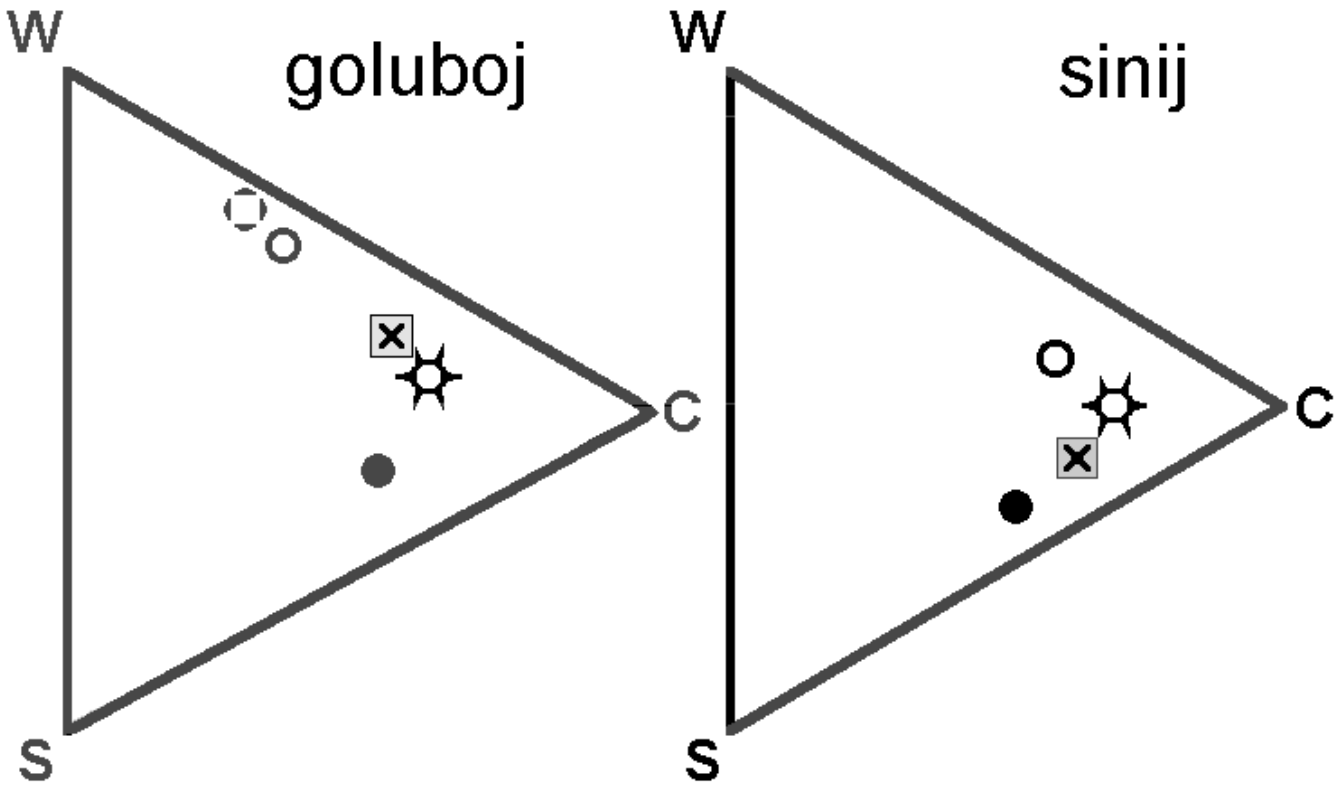

Fig. 5. Mapping of goluboj (left) and sinij (right) on the blackness-versus-chromaticness (s-c) plane of the Natural Colour System. The main term is designated by cross; the term with modifiers: temno- 'dark' – solid circle; jarko- 'bright' – "sun"; svetlo- 'light' – open circle; and bledno- 'pale' – dashed circle. Adopted from: Korzh et al. [Denotative meanings of color terms]. Psikhologicheskij Zhurnal, 1991, 12 (4), p. 78.