TYPOGRAPHY
DAY ~ 2012

Typography in Publication Design

Challenges in multilingual type design

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Abstract: When designing multilingual type families, designers face challenges on the crossroads of linguistics, typography, and computer science. Type design is not only drawing nice lettershapes, it also deals with their optimisation for output, that is, with typographic layout, and demands of target media. Some of the challenges lie in extending the typographic repertoire of one script (i.e. writing system) with tools similar to those of another. Other challenges lie in adapting the scripts to typographic system or to the limitations of certain kind of media. The central question behind new typefaces should be: How can we improve the contemporary typographic tools in a respectful and meaningful way so designers tomorrow can communicate better than we could? Standing on the shoulders of giants, type designers are trying to extend the possibilities of the typography of world scripts today.

Key words: multi-script, world script, typography, type design, Arabic, Armenian, Cyrillic, Devanagari, Gujarati, Bengali, Oriya, Malayalam.

1. Introduction

Type design is a discipline which adapts writing systems to typographic technologies. Therefore, its objectives are not only in re-styling of existing forms, but it also deals with the optimisation of these forms for output and their use in visual communication.

Following paragraphs show several case studies in different writing systems (a shorter term “script” is used below). The point is to illustrate the current challenges connected with typographic improvements in mentioned scripts. These improvements are generally of two kinds. They either adapt the script for a new situation caused by technology and/or they expand its linguistic and expressive repertoire.

Yet clearly there is an important meta-consideration. Multi-script typography challenges us by juxtaposing scripts with different visual character and cultural and historical contexts. Scripts which developed in different environments also require different typographic solutions. Thus sensitivity is a prerequisite for good multi-script designers. And not only type designers, but also typographers and graphic designers. One should never take for granted that what works in one script will be applicable and equally effective in another.

It is important to note that the text is supported by illustrations using mostly works of the Rosetta Type Foundry. This is not to say that these typefaces are the only acceptable solutions to the issue described. They only illustrate one from a multitude of possible approaches, and one shall be concerned mainly with the methods and ideas behind the solutions, not with the final designs themselves.

2. Cyrillic small capitals

How should Cyrillic small caps look like?

There are comparatively few alphabets that are bicameral, that is they make use of two different cases (lowercase/minuscules vs. uppercase/capitals/majuscules) in order to aid clarity of text. Most known examples are Latin, Cyrillic, Greek, Coptic, and Armenian (see some of them in figure 1). Yet, each one of them uses its bicameral nature differently. Where Latin mixes both cases easily in one text, Armenian uses either lowercase or capitals, but never both in the same sentence.

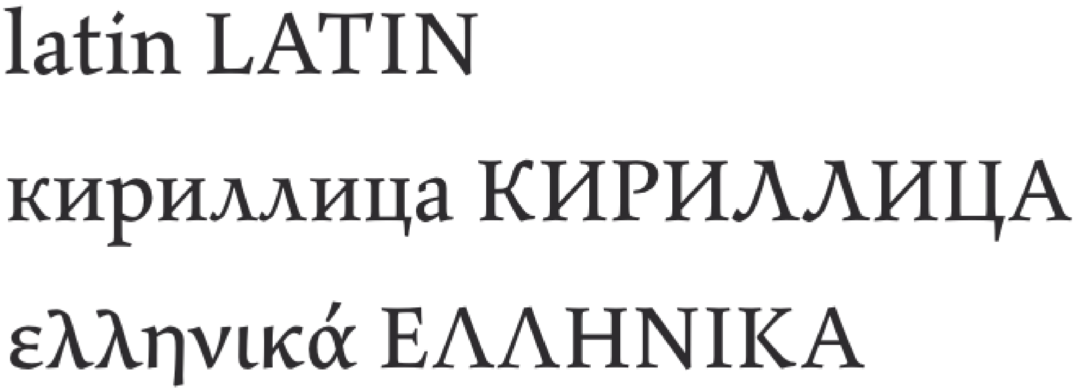


Figure.1 Lowercase and uppercase examples in Latin, Cyrillic, and Greek scripts.
(Typeface Maiola by Veronika Burian)

Yet another chapter is the Cyrillic script where most of the letters share the same underlying structure in both, lowercase and uppercase, forms (see figure 2). It creates an intriguing obstacle in creating properly working small capitals (small caps). And this has become one of the central problems of Cyrillic typography today.

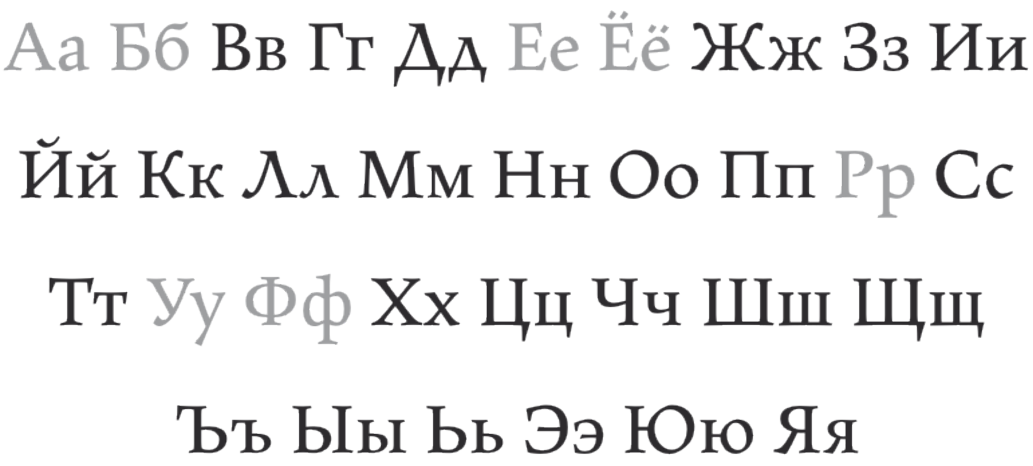


Figure.2 Comparison of Cyrillic lowercase and uppercase. Letters with significantly different underlying structure in lowercase and uppercase are marked grey.
(Typeface Maiola by Veronika Burian)

Small caps are usually described as uppercase forms drawn to match the height and colour of the lowercase. In fact, they are often slightly taller than the base character height (e.g. x-height in case of Latin script) in order to gain an equal look next to the lowercase.

Small caps have essentially two roles—although they turn out to be somewhat intertwined—and that is to emphasize within the lowercase text, not unlike italic, and to improve the appearance and readability of a text which is meant to be set all in uppercase (e.g. in running headlines). For that reason small caps possess wider proportions compared to capitals and their spacing is also more loose.

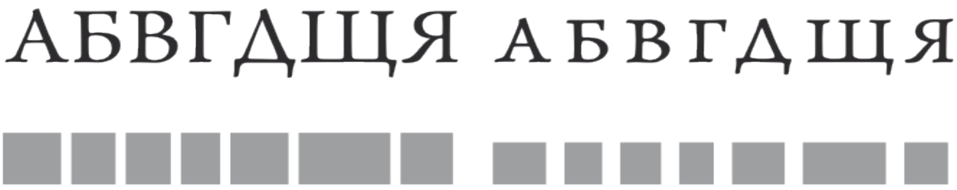


Figure.3 Comparison of uppercase and small caps proportions and spacing.
(Typeface Neacademia by Sergei Egorov)

Small caps in Cyrillic might look too similar to lowercase. In order to avoid that, designers came up with several methods of differentiation which may be combined to achieve an ideal result. First method is to amplify the main characteristics of small caps: their wider proportions are made significantly wider, their spacing is significantly more loose. Another method is to make them perceptibly taller than lowercase base height (e.g. x-height). Yet another method is to differentiate the lowercase and uppercase letter constructions better.

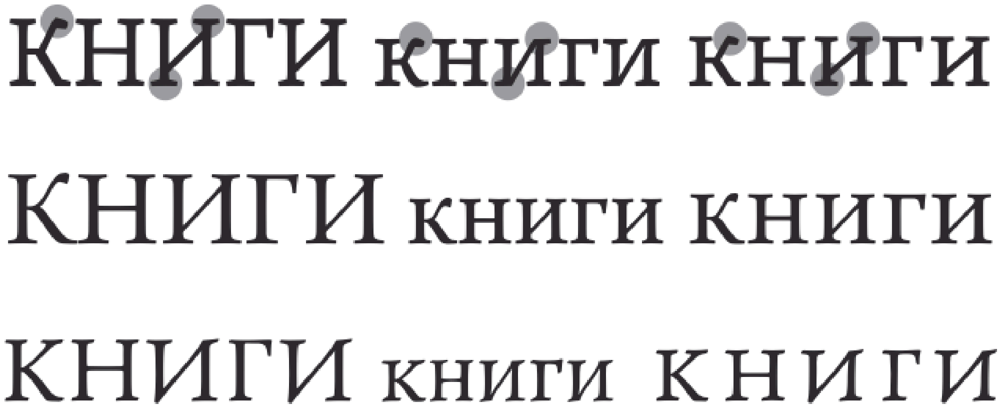


Figure.4 Different approaches to designing of Cyrillic small caps. (Top to bottom: Skolar by David Březina, Arno by Robert Slimbach, and Neacademia by Sergei Egorov)

All of these solutions modify the basic type design parameters (i.e. proportions, spacing and rhythm, letter constructions) with a view to avoid mistaking lowercase and small caps letterforms. Yet, is not there too much of a distinction in such small caps? Perhaps their role is mainly to perform better in headlines than uppercase would, but their use in the text instead of italic is somewhat limited?

3. Armenian italic

Can Armenian script have an italic?

First, one needs to clarify what is understood by the term *italic*. This word can represent at least three different styles: slanted, oblique, and cursive. *Slanted* typically refers to automatically slanted upright forms. These forms have an unpleasant appearance and are generally regarded as bad typographic practice. *Oblique* refers to slanted upright forms yet with optical corrections. *Cursive* (also true italic) refers to styles which use letterforms different from uprights, letterforms which are somewhat derived from fast, informal handwriting and not necessarily inclined (see figure 5 for examples). Noordzij (2006) abstracts the cursive letterforms as letters written with one stroke of a pen using uninterrupted (returning) construction. One could question whether this distinction exists or works for every world script. Nevertheless, it illustrates the point of different letter construction nicely (figure 6).

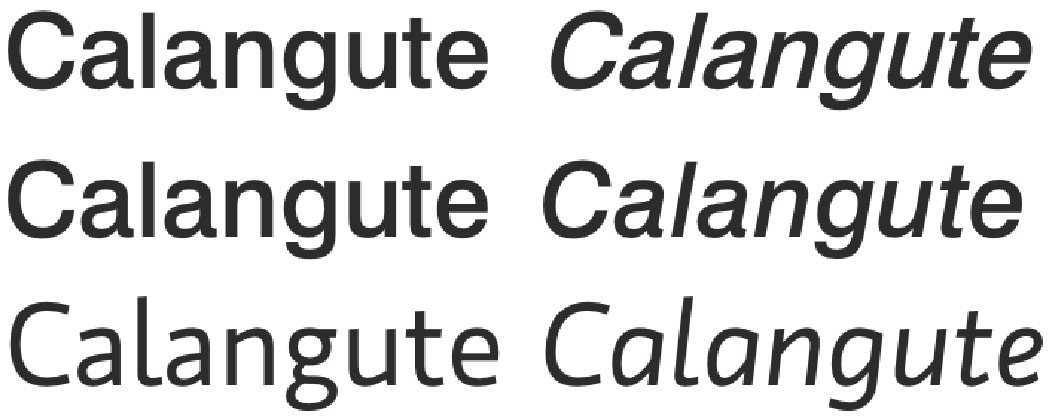


Figure.5 Top to bottom: artificially slanted, oblique, and cursive letterforms. Typefaces Swiss/Helvetica by Max Miedinger and Gloriola by Tomáš Brousil.

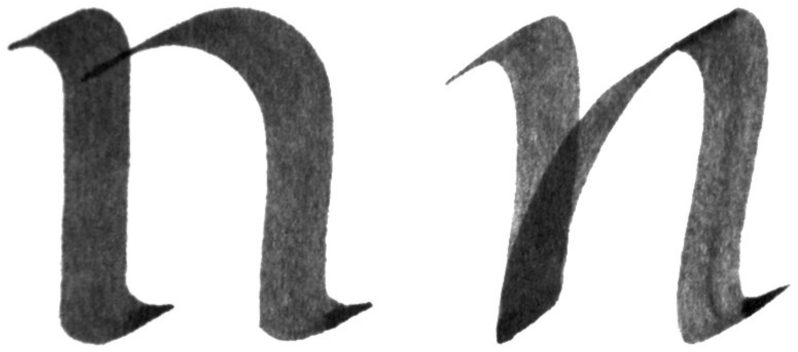


Figure.6 Noordzij (2006) shows the difference between interrupted and uninterrupted letter construction.

Armenian script has one peculiar characteristic. It is very often written (even in typographic environment) at an angle and thus the slant of the letters does not bear much significance for its readers.[1] Therefore if one was to come up with a complementary style with a role similar to italics in Latin the slanted or oblique styles as defined above would not perform very well. The most feasible alternative in this case is the cursive.

The issue with the cursive alternative is where to find a model to follow. In the case of the Armenian it is natural to look at plentiful resources of manuscripts containing informal writing. For other scripts, such as Arabic for example, the difference between formal and informal (or fast) writing might not be so apparent.

[1] Tamil is yet another example of a script with similar characteristic.

Type family Arek designed by Khajag Apelian (figure 7) is the first type system which incorporates upright as well as cursive style of the script in one typographically coherent whole. This is not to say that this type family has an invented italic or that it is the first digitalized italic. Certainly not. It is the first typeface which includes a complementary style which is balanced with the main style in terms of proportions and typographic colour. Thanks to its different construction it creates a different rhythm and texture but that is desired.

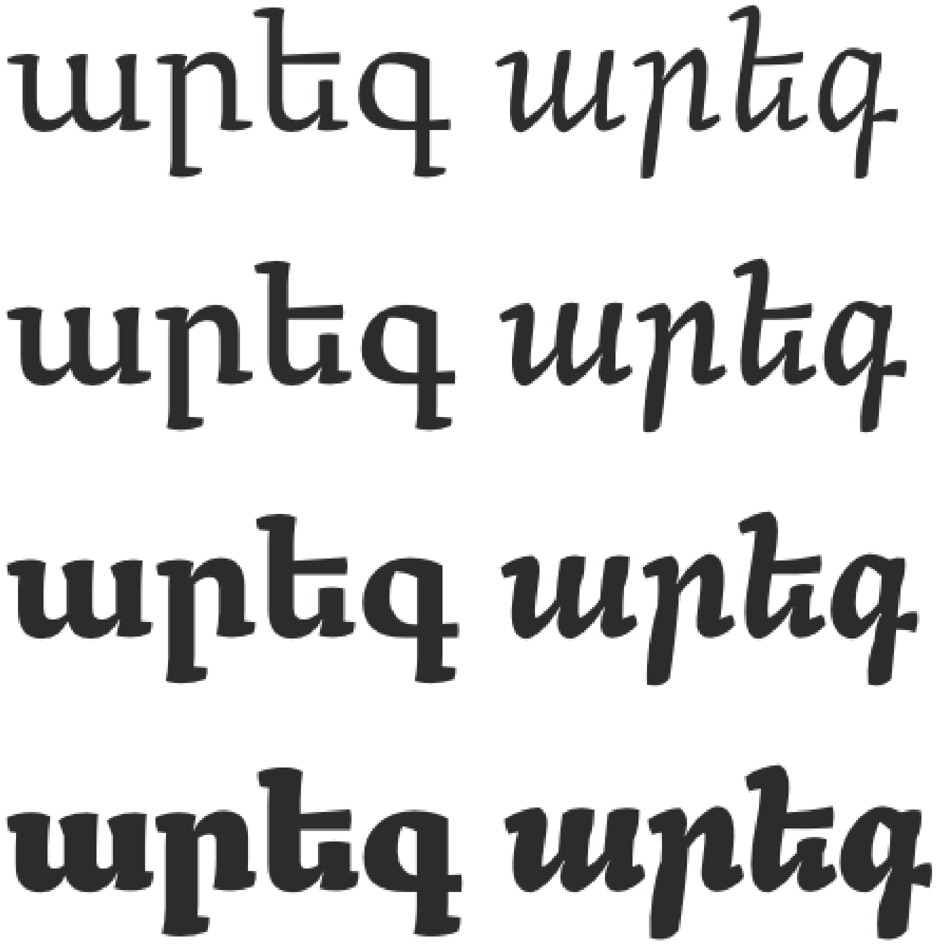
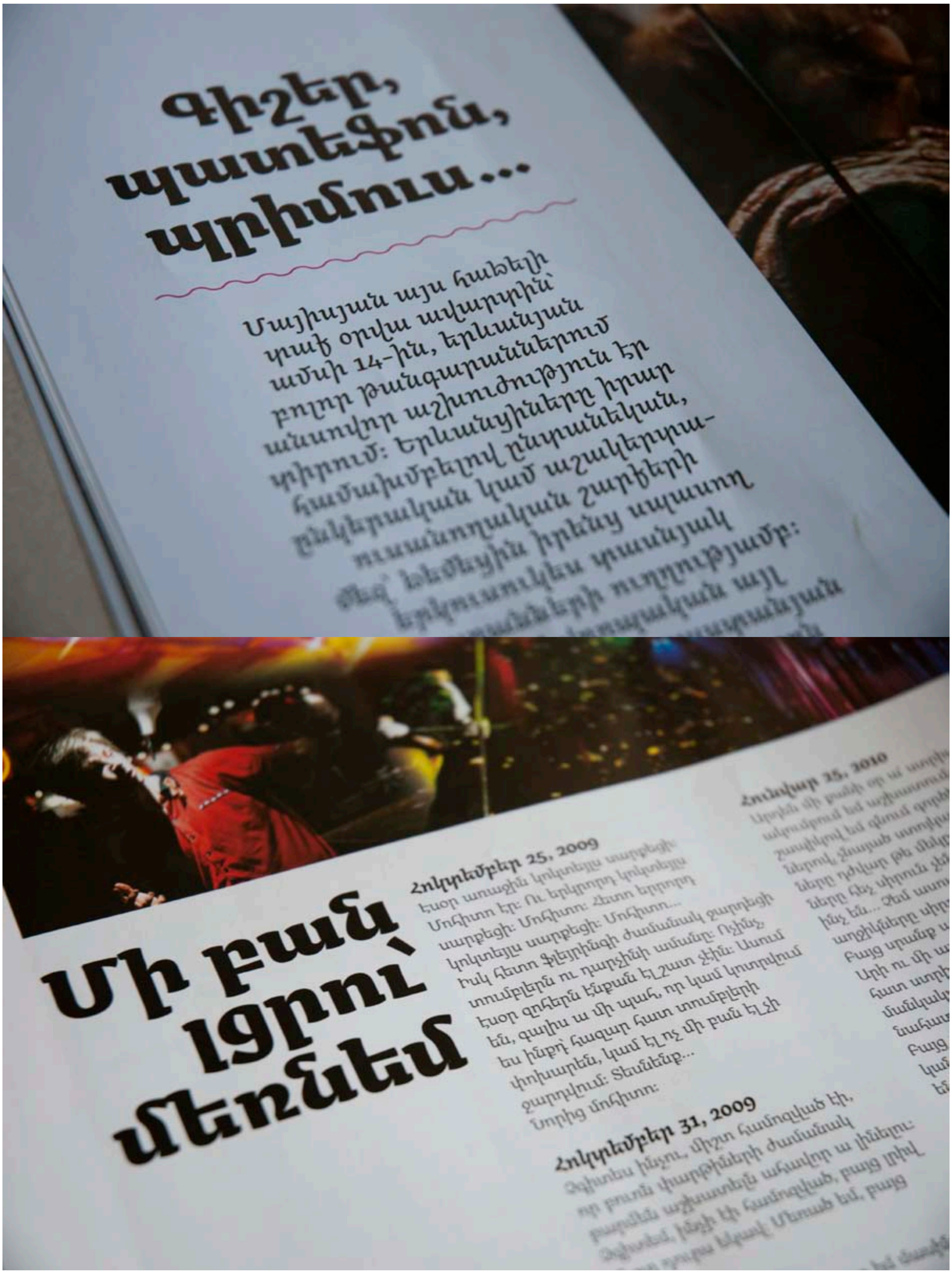


Figure.7 Type system Arek by Khajag Apelian

The recent application of the typeface in Yerevan magazine (figure 8) shows nicely that this additional style is not used for in-sentence emphasis.[2] Instead, it is used to create aesthetic effects in headlines and drop quotes.

[2] Correct use of italics is tightly connected with a language. Even its use in English and say Czech (which both use Latin script) differs significantly.



Գիշեր, պատեֆոն, պրիմուս...

Մայիսյան այս հաճելի
կած օրվա ավարտին՝
ամսի 14-ին, Երևանյան
բոլոր թանգարաններում
անսովոր աշխուժություն էր
տիրում: Երևանցիները իրար
համախմբելով ընտանեկան,
ընկերական կամ աշակերտա-
ուսանողական շարքերի
[illegible] ճեմելյին իրենց սպասող
երկուսուկես [illegible] ուղղությամբ:
[illegible]

Մի բան լցրու՝ մեռնեմ

Հոկտեմբեր 25, 2009
Էսօր առաջին կոկտեյլս սարքեցի:
Մոհիտո էր: Ու երկրորդ կոկտեյլս
սարքեցի: Մոհիտո: Հետո երրորդ
կոկտեյլս սարքեցի: Մոհիտո...
Իսկ հետո ֆլեյրինգի ժամանակ ջարդեցի
տումբլերն ու դարչինի ամանը: Ոչինչ
էսօր զոհերն էնքան էլ շատ չէին: Ասում
են, գալիս ա մի պահ, որ կամ կոտրվում
ես ինքդ՝ հազար հատ տումբլերի
փոխարեն, կամ էլ ոչ մի բան էլ չի
ջարդվում: Տեսնենք...
Նորից մոհիտո:

Հոկտեմբեր 31, 2009
Չգիտես ինչու, միշտ համոզված էի,
որ բոլոր փարթիների ժամանակ
բարմենի աշխատանքն ահավոր ա լինելու:
Չգիտեմ, ինչի էի համոզված, բայց լրիվ
[illegible] եկավ: Մեռած եմ, բայց

Հունվար 25, 2010
[illegible]

Figure.8 Arek as used in the Yerevan magazine

4. Arabic webfonts

Can one make the Arabic script work on the web?

Arabic is one of the so-called complex scripts. Hudson (2000) defines complex scripts as writing systems that require processing of both characters and glyphs beyond logical order input. Perhaps most importantly, Arabic fonts rely on glyph substitution to build ligatures and contextual forms, but they also make use of mark positioning, kerning and sometimes even vertical kerning. Without some of these features the words would not be readable, without others they would not look as intended (figure 9).

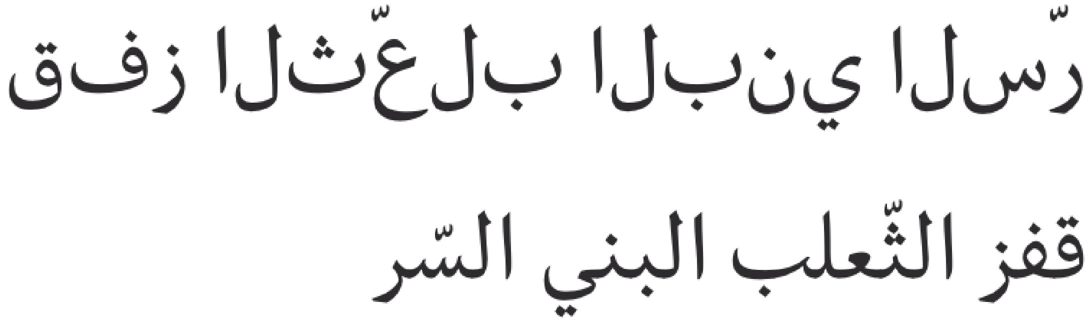
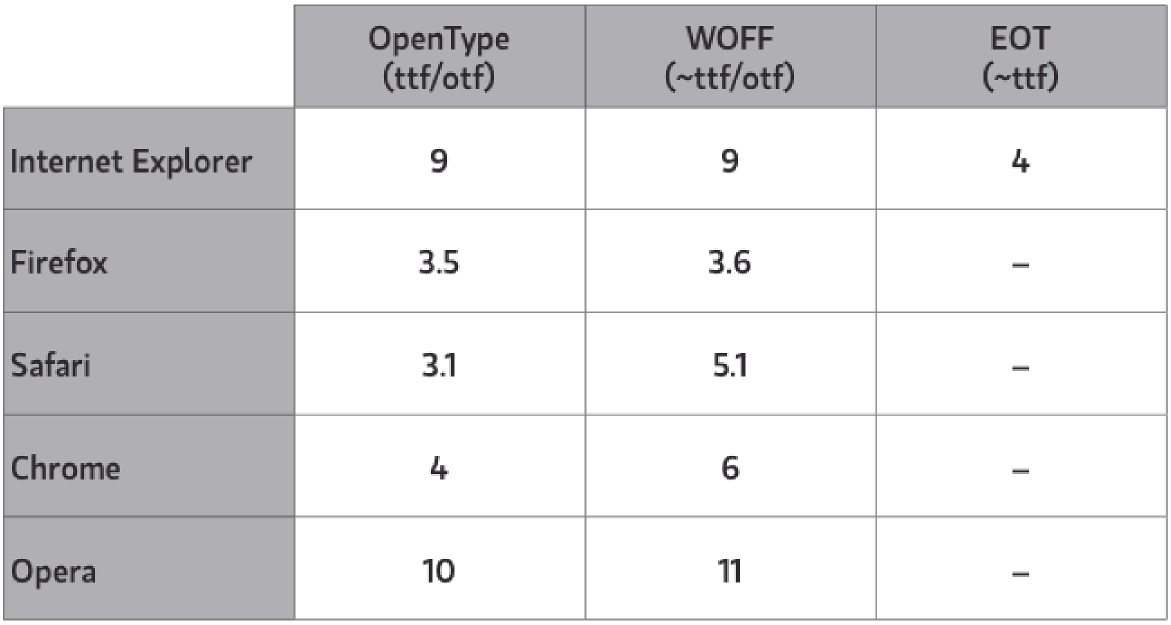


Figure.9 Same text with essential Arabic layout features off (top) and on (bottom).
Typeface Nassim by Titus Nemeth.

The Web was for a long time without any widely acceptable solution which would allow loading non-system fonts to user browsers. Thus users had to use only widely available, but unsatisfactory, system fonts on their website. This changed a few years ago with the introduction of the @font-face rule to the CSS2 specification. Using this technique developers can attach non-system fonts to their websites and use them in their design. These fonts are commonly referred to as webfonts. There are several aspects to the webfont environment which deserve to be mentioned here.

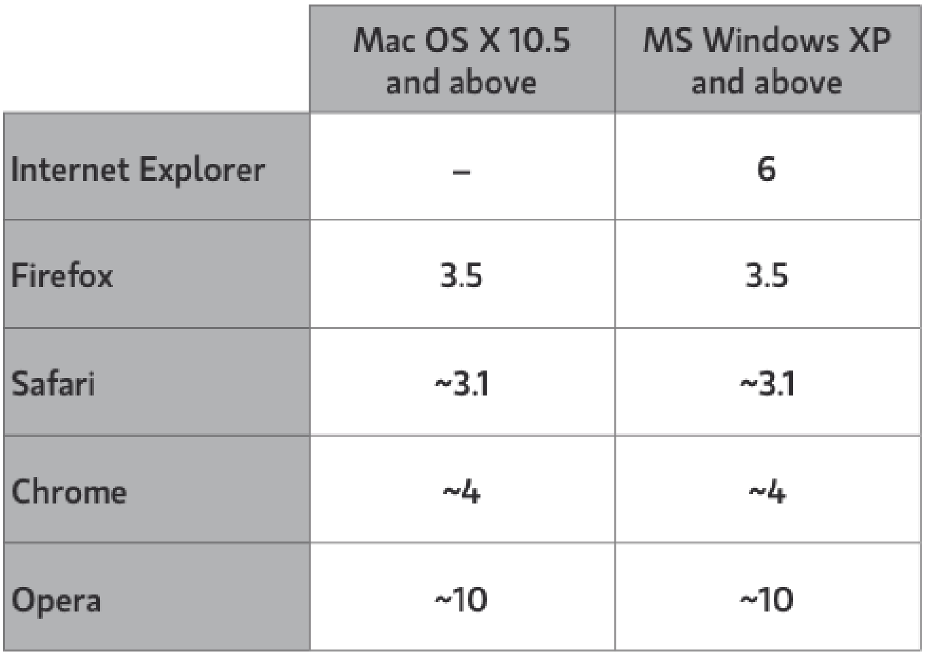
First of all, these fonts need to be served in different formats (TTF, EOT, WOFF, SVG) accepted by different browsers (table 1). It does not go without saying that these formats support Arabic. Fortunately, most of them are encapsulations or forms of the OpenType format which provides this support. Only the SVG font format, sometimes used for handheld devices, offers a very basic, and to our knowledge, somewhat haphazard support for the Arabic script. Conversion between these formats may not be trivial and extra care has to be taken to preserve the Arabic OpenType layout and its functionality.



	OpenType (ttf/otf)	WOFF (~ttf/otf)	EOT (~ttf)
Internet Explorer	9	9	4
Firefox	3.5	3.6	–
Safari	3.1	5.1	–
Chrome	4	6	–
Opera	10	11	–

Table 1. Web font formats and their support in major contemporary browsers.

Similarly to webfonts for non-complex scripts, the in-browser support is limited to more recent versions. The support for Arabic needs to be present either in the browser itself, or in the system libraries it uses (table 2).



	Mac OS X 10.5 and above	MS Windows XP and above
Internet Explorer	–	6
Firefox	3.5	3.5
Safari	~3.1	~3.1
Chrome	~4	~4
Opera	~10	~10

Table 2. Arabic support depends on the system platform and the browser.

An important issue of all webfonts is rendering on screen. Webfonts which are aimed at text sizes are often optimised for the screens' crude resolutions by means of hinting or

TrueType instructions. This topic is far beyond the scope of this article; however the issues are common to all of the world scripts.[3]

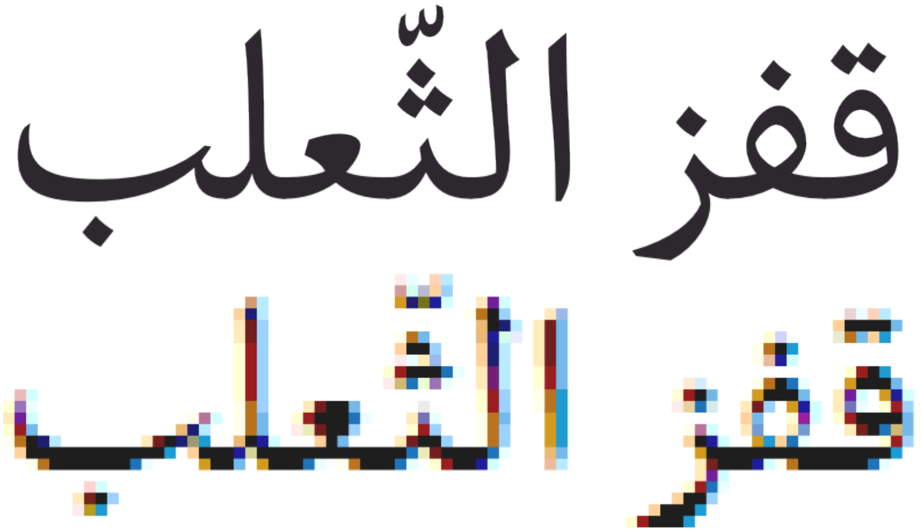
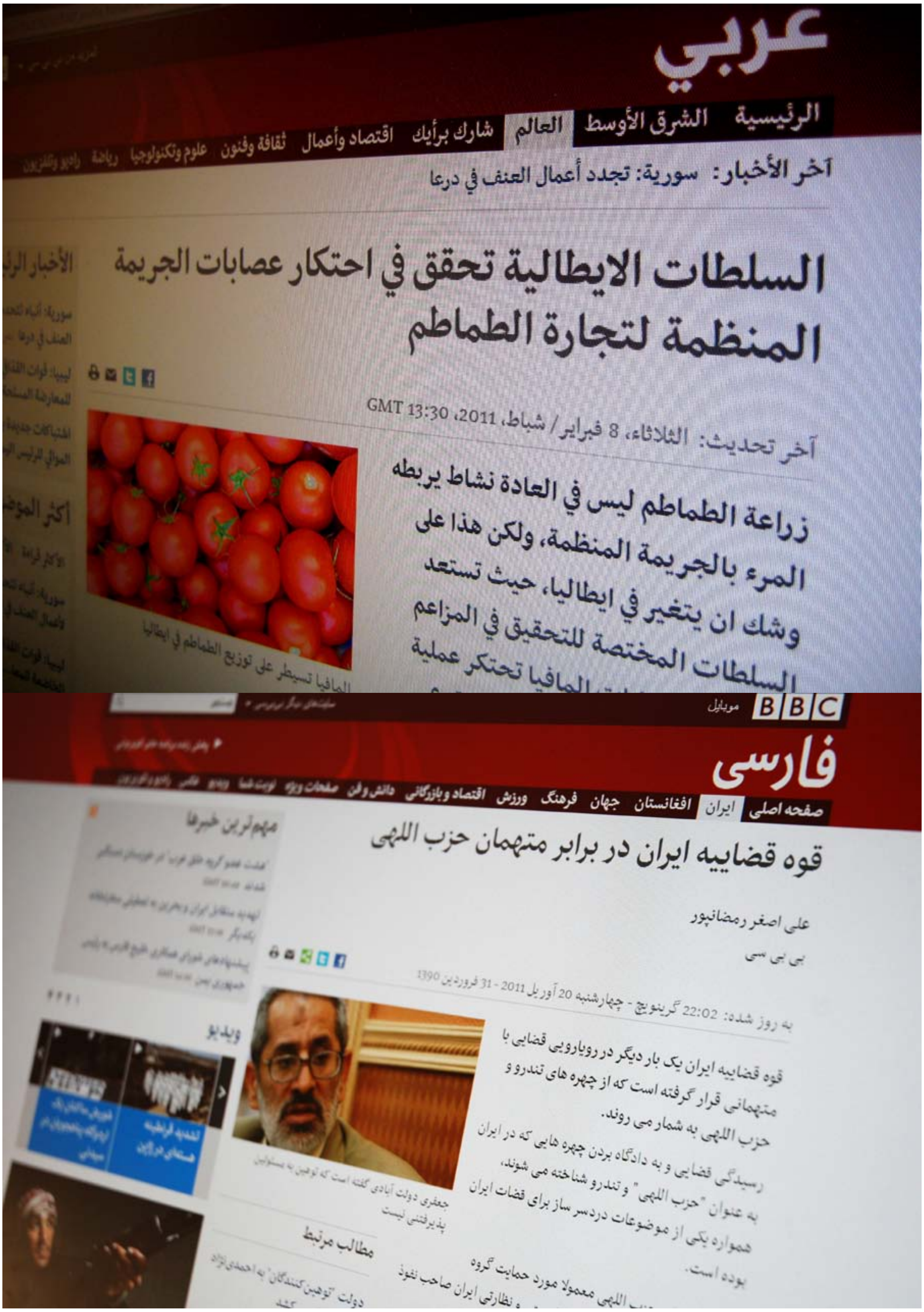


Figure.10 Typeface Nassim by Titus Nemeth in high-resolution (top) and rasterized on screen using MS ClearType™ subpixel anti-alias technology (bottom).

When the design team at BBC under the directorship of Kutlu Çanlıoğlu decided to use the typeface Nassim designed by Titus Nemeth they had to solve several obstacles with the designers. First of all some of the browsers deactivated all of the fonts' OpenType features in order to avoid any security threat from downloaded webfonts. This obviously included features necessary for correct appearance of the Arabic script. The team had to convince the developers to allow these features in order to make the webfonts work in their browsers.

Another obstacle was the size of the webfonts. Various techniques were employed to minimize the time needed for the font download. Most obviously, these fonts were subset per language. In the end, there are separate fonts for Arabic, Persian, and Urdu on BBC servers nowadays. This also helped to avoid limited support for language-specific OpenType features in the browsers and it allowed the designer to emphasize local characteristics of the Arabic script. There are different conventions in the Arabic typography in the aforementioned language areas. While Nassim was originally designed with Arabic in mind, for BBC it was made to support—and also to look more—Persian and Urdu in its respective variations (figure 11).

[3] It is perhaps worth noting that several auto-hinting procedures seem to perform better on Latin than on Arabic script.



آخر الأخبار: سورية: تجدد أعمال العنف في درعا

السلطات الايطالية تحقق في احتكار عصابات الجريمة
المنظمة لتجارة الطماطم

آخر تحديث: الثلاثاء، 8 فبراير/ شباط، 2011، GMT 13:30

زراعة الطماطم ليس في العادة نشاط يربطه
المرء بالجريمة المنظمة، ولكن هذا على
وشك ان يتغير في ايطاليا، حيث تستعد
السلطات المختصة للتحقيق في المزاعم

قوه قضاییه ایران در برابر متهمان حزب اللهی

علی اصغر رمضانپور

بی بی سی

به روز شده: 22:02 گرینویچ - چهارشنبه 20 آوریل 2011 - 31 فروردین 1390

قوه قضاییه ایران یک بار دیگر در رویارویی قضایی با
متهمانی قرار گرفته است که از چهره های تندرو و
حزب اللهی به شمار می روند.

رسیدگی قضایی و به دادگاه بردن چهره هایی که در ایران
به عنوان "حزب اللهی" و تندرو شناخته می شوند،
همواره یکی از موضوعات دردسر ساز برای قضات ایران
بوده است.

جعفری دولت آبادی گفته است که توهین به مسئولین
پذیرفتنی نیست

Figure.11 Nassim as used on BBC Arabic and Persian websites.

5. Indian typefaces on screen

Can Indian scripts survive the low screen resolution?

It would not be correct to talk about all Indian scripts at once. It would involve too many generalisations. But perhaps there is one characteristic they all have in common, that they are visually complex. This causes considerable problems when they need to be rendered at small sizes on screen with low resolution (e.g. about 72 dpi).[4] Figure 12 illustrates how characters in Latin and Devanagari render into different relative proportions on screen.

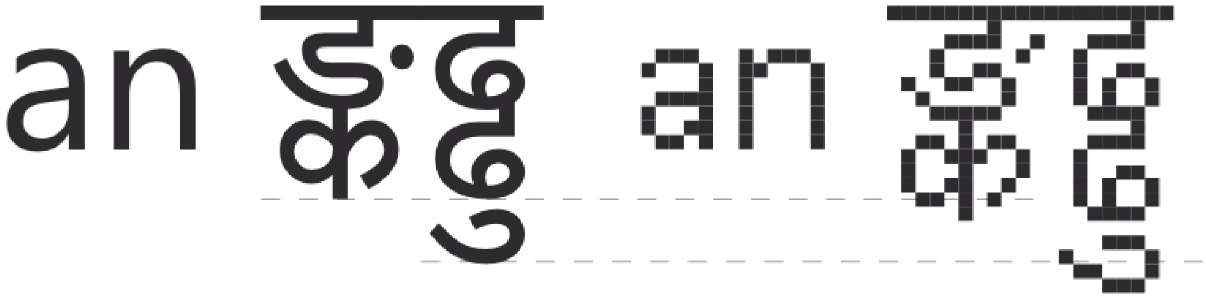


Figure.12 Latin and Devanagari characters in typeface Nirmala by Tiro Typeworks (left) and in its hypothetical screen rendering by the author (right). Respecting natural script proportions results in different mutual proportion of the Latin and the Devanagari part.

When for technical reasons, e.g. in graphical user interfaces, the vertical metrics of Latin and Devanagari need to be the same, designers have to make compromises. Tiro Typeworks recently finished their Nirmala project for the interface of MS Windows 8 (figure 13). There they had to deal with a very limited vertical space which required some contextual handling in the shaping of deeper forms (figures 14 and 15).

देवनागरी **देवनागरी**

ગુજરાતી લિપિ **ગુજરાતી લિપિ**

বাংলা লিপি **বাংলা লিপি**

മലയാളലിപി **മലയാളലിപി**

ଉତ୍କଳାକ୍ଷର **ଉତ୍କଳାକ୍ଷର**

[4] Similar problems are known from Chinese, Japanese, and Korean typography. For example, see Larson (2007).

Figure.13 Nirmala type family by Tiro Typeworks. The designs were art-directed by Fiona Ross, produced by John Hudson, hinted by Ross Mills, and drawn by John Hudson (Devanagari, Oriya), David Březina (Gujarati), Valentin Brustaux (Telugu, not shown here for technical reasons), Jo de Baerdemaeker (Bengali), Fernando de Mello Vargas (Malayalam).

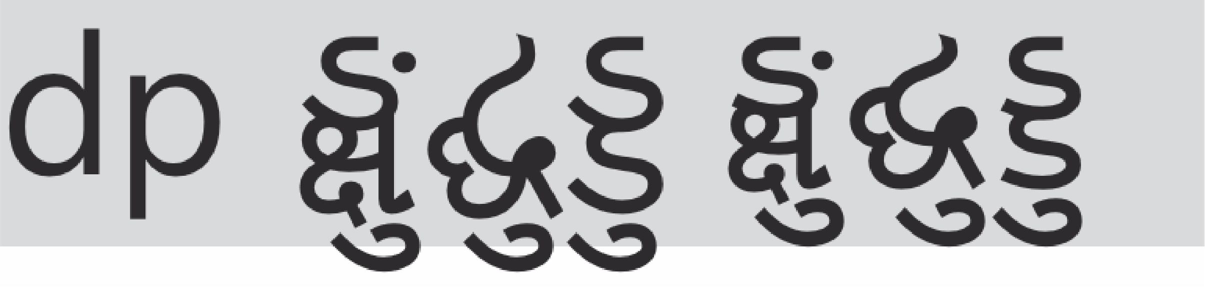


Figure.14 In order to fit withing limited vertical space (grey) the Gujarati part of the Nirmala type family includes shorter forms for some of the deep conjuncts. These are used when the conjuncts take any below marks (e.g. vowel marks).

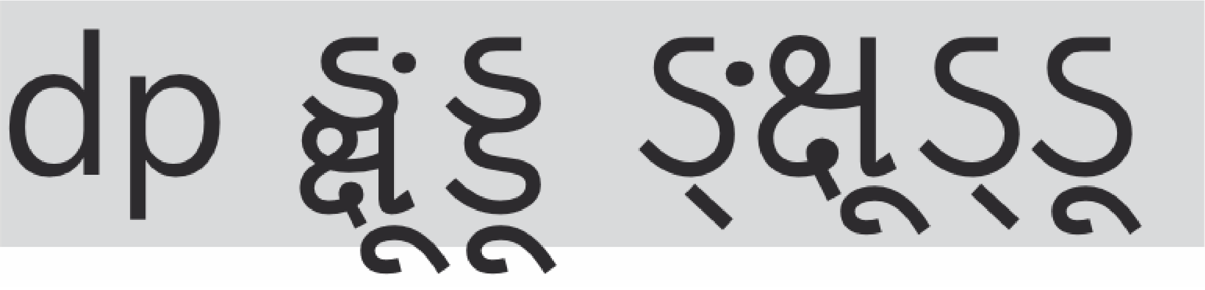


Figure.15 In cases where screen resolution does not allow for the solution described in figure 13 the conjuncts have to be automatically dissolved.

6. Conclusions

The case-studies discussed above show that there are improvements possible in the typography of world scripts. Type designers extend the typographic repertoire by adding complementary styles, widen the character sets to cover more languages, or adapt their typefaces for low resolutions.

Design for world scripts is often challenged by the limits of the current typographic technologies. But challenge is a call for invention! Type designers should work in an innovative manner and not aim only to restyle existing models. The ability to identify and understand former as well as current technological demands before solving design problems is essential. Typefaces are solutions for both: long-standing as well as the most recent problems in typography.

With an understanding of the limitations and contexts we should also extend our respect toward previous generations of designers who not only had much less flexible technologies in front of them, but also did not have as many educational resources as the current generation.

The central question behind new typefaces should be: How can we improve the contemporary typographic tools in a respectful and meaningful way so designers tomorrow can communicate better than we could? Type designers today are standing on the shoulders of giants and can extend the possibilities of the typography of world scripts even further.

Acknowledgement

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