COMPARISON OF MELODIC PORTRAITS
OF ENGLISH AND RUSSIAN
DIALOGIC PHRASES

Борис М. ЛОБАНОВ
(Lobanov@newman.bas-net.by),

United Institute of Informatics Problems NAS
BELARUS, MINSK
The present work is a follow up study to the previously introduced model of universal melodic portraits (UMP) of Accent Units* for representation of phrase intonations:

*Accent Unit often referred to as Accent Group (AG)
Definition-1

- An utterance (sentence) can consist from **one or more intonation phrases (IPh)**
- An **IPh** can be represented by **one** or **more** of **AUs (AGs)**
- An **AU** can be composed of **one** or **more** phonetic words (PhW)
- If there is more than one PhW in an AU, than only **one word** bears the **main stress (MS)** (strong accent) while **other words** carry a **partial stress (PS)** (weak accent)
Each AU consists of

- **nucleus** (center or head) – the main stressed vowel (syllable),
- **pre-nucleus** – all phonemes preceding the main stressed vowel, and
- **post-nucleus** – all phonemes following the stressed vowel.
The UMP model assumes that topological features of melodic contour for particular type of intonation do not depend on a quantity or quality of phonemic content of AUs pre-nucleus, nucleus or post-nucleus, nor on the fundamental frequency range specific for a given speaker.
The **UMP model** represent different intonation constructs as a set of melodic patterns in normalized space \{**Time – Frequency**\}.

- **Time normalization** is performed by bringing pre-nucleus, nucleus and post-nucleus elements of AU to standard time lengths.
Fundamental frequency normalization is performed by calculation of

- $F_{\text{min}}$ and $F_{\text{0 max}}$,
- or $M$ and $\zeta$ - statistical values within the ensemble of melodic contours for different types of intonation produced by a certain speaker.
Fundamental frequency normalization is calculated by using the formulas:

\[ F_{0n} = \frac{(F_0 - F_{0\ min})}{(F_{0\ max} - F_{0\ min})} \]  

or

\[ F_{0n} = \frac{(F_0 - M)}{\zeta} \]

- \( M \) is mathematical expectation,
- \( \zeta \) is standard deviation.

\( M \) can be interpreted as a register and \( \zeta \) – as a diapason of speaker’s voice.
The intervals on the abscess:

- [0 - 1/3] – pre-nucleus,
- [1/3 - 2/3] – nucleus,

The intervals on the ordinate:

- [0 - 1/3] – low level,
- [1/3 - 2/3] – mid-level,
- [2/3 - 1] – high-level.
ILLUSTRATION-1 (special question)

Male voice:
1. What do you suggest for sunburn?
2. Whereabouts?

Female voice:
1. What time’s the next train to Victoria?
2. How much would it cost?
ILLUSTRATION-2 (normalization types)

Male voice:
1. What do you suggest for sunburn?
2. Whereabouts?

Female voice:
3. What time’s the next train to Victoria?
4. How much would it cost?
It is no distance at all.

It is only a couple of hundred yards.
Female voice:

What time’s the next train to Victoria?
PHONOCOLONATOR
Situations relevant to those studying or travelling in England, including

- eating out,
- entertainment and travel, as well as more general functions such as
  - greetings,
  - complaining,
  - apologizing.
The manual includes:

• 44 everyday situations, each containing four dialogues in natural conversational English;
• All dialogues consist
• 1051 sentences, spoken by
• male and female speakers.

In the present study we have restricted ourselves to three major types of phrase intonation:

• Special questions
• General questions
• Affirmative statements.
SITUATIONAL DIALOGUES
Interrogative sentences. Statistics

Special questions
Total: 157

General questions
Total: 140
## Examples of English and Russian Phrases

*(affirmative intonation of statements)*

<table>
<thead>
<tr>
<th>English</th>
<th>Russian translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Is it far?</td>
<td>- Далеко ли это?</td>
</tr>
<tr>
<td>- <em>It is only about five minutes walk.</em></td>
<td>- Это всего в пяти минутах ходьбы.</td>
</tr>
<tr>
<td>- Will it take me long to get there?</td>
<td>- Долго ли мне придётся идти?</td>
</tr>
<tr>
<td>- <em>It is no distance at all.</em></td>
<td>- Это вообще не расстояние.</td>
</tr>
<tr>
<td>- Should I take a bus?</td>
<td>- Мне нужно подождать автобуса?</td>
</tr>
<tr>
<td>- <em>You can walk it in under five minutes.</em></td>
<td>- Вы сможете дойти за пять минут.</td>
</tr>
<tr>
<td>- Is it too far to walk?</td>
<td>- Долго ли идти пешком?</td>
</tr>
<tr>
<td>- <em>It is only a couple of hundred yards.</em></td>
<td>- Это всего в паре сотен шагов.</td>
</tr>
</tbody>
</table>
The differences of English and Russian affirmative statement UMPs:

- the most changes are found in pre-nucleus and nucleus regions;
- in the pre-nucleus region, maximum of the Russian UMP curve falls closer to the middle of the region, whereas the English UMP curve peaks at the end;
- in the nucleus region, the English UMP curve is characterized by a sharper decline in comparison to the Russian UMP curve.
- in the post-nucleus region, both Russian and English MP curves show an identical low level steady decline.
# EXAMPLES OF ENGLISH AND RUSSIAN PHRASES
*(special question)*

<table>
<thead>
<tr>
<th>English</th>
<th>Russian translation</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>What</em> can I get you drink?</td>
<td><em>Что</em> Вам налить выпить?</td>
</tr>
<tr>
<td>- A black coffee for me, please.</td>
<td>- Чёрный кофе, пожалуйста.</td>
</tr>
<tr>
<td><em>What</em> are you going to have to drink?</td>
<td><em>А что</em> Вы желаете выпить?</td>
</tr>
<tr>
<td>- I’d like something cool.</td>
<td>- Хотелось бы чего-нибудь прохладного</td>
</tr>
<tr>
<td><em>What</em> are you going to have?</td>
<td><em>Что бы</em> Вы хотели сейчас?</td>
</tr>
<tr>
<td>- A half of bitter, please.</td>
<td>- Полкружки горького, пожалуйста.</td>
</tr>
<tr>
<td><em>What</em> is it to be?</td>
<td><em>А что</em> будете Вы?</td>
</tr>
<tr>
<td>- The same again, please.</td>
<td>- То же самое, пожалуйста.</td>
</tr>
</tbody>
</table>
The differences of English and Russian special questions UMPs:

- The most significant changes are found in the pre-nucleus and nucleus regions;
- In the pre-nucleus region, the averaged Russian UMP is characterized by considerably higher level than the English UMP;
- In the nucleus region, the English UMP curve is characterized by a sharp rise in tonal frequency whereas the Russian curve remains on a steady high level;
- In the post-nucleus region, both Russian and English UMP curves demonstrate identical sharp interval decline.
# Examples of English and Russian Phrases

(General question)

<table>
<thead>
<tr>
<th>English</th>
<th>Russian translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>- <em>Does this bus</em> go to the station?</td>
<td>- Этот автобус идет на вокзал?</td>
</tr>
<tr>
<td>- No, you'll have to get off at the bank.</td>
<td>- Нет, он идёт к банку.</td>
</tr>
<tr>
<td>- <em>Am I OK for St Marys Church?</em></td>
<td>- Я правильно иду к церкви?</td>
</tr>
<tr>
<td>- No, we only go as far as the park.</td>
<td>- Нет, вы только дойдёте до парка</td>
</tr>
<tr>
<td>- <em>Do you go to the sea-front?</em></td>
<td>- Вы идёте к приморскому бульвару?</td>
</tr>
<tr>
<td>- No, you're going the wrong way.</td>
<td>- Нет, Вы пошли неправильным путём.</td>
</tr>
<tr>
<td>- <em>Have we got</em> much further to go?</td>
<td>- Должны ли мы ещё дальше ехать?</td>
</tr>
<tr>
<td>- It's the next stop.</td>
<td>- Ваша остановка – следующая.</td>
</tr>
</tbody>
</table>
The differences of English and Russian special questions UMPs:

- The most significant changes are found in the pre- and post-nucleus regions;
- In the pre-nucleus region the English UMP curve is characterized by a steady low level, whereas the Russian UMP follows a substantial rise;
- In the post-nucleus region the English UMP curve is characterized by sharp decline with a subsequent rise towards the end of the phrase.
- In the nucleus region, the English UMP curve shows a sharper rise in comparison to the English one.
F0-Statistics

F0-Diapason

Male Male Female Female
English Russian English Russian

A Statem S Quest G Quest

Male English
Male Russian
Female English
Female Russian
FO-STATISTICS

F-- Mean value

Male
English

Male
Russian

Female
English

Female
Russian

A Statem
S Quest
G Quest
The UMP model of the phrase intonation allows to investigate the **differences between languages** *(for instance, English and Russian)* by applying precise quantitative assessments.

The UMP model could potentially find an effective application **in foreign language studies**:

*Using the appropriate software that realizes the described stages of UMP construction, a learner could be able to visually compare the intonation of the pronounced phrase with its target intonation portrait and work to eliminate a foreign accent by proper training.*