Slavic Languages in the Black Box
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Schalter, šapka, šaška

Coactivation in the bilingual lexicon of Russian heritage speakers and methodological problems of its investigation

Introduction: Aim of our project

- Bilingual mental lexicon
- Heritage speakers of Russian in Germany
  - Russian as home language and L1, usually weaker
  - German as environmental language and L2, usually dominant
- Joint project of Tanja Anstatt & Christina Clasmeier (Slavic linguistics) with Eva Belke & Jessica Ernst (Psycholinguistics)

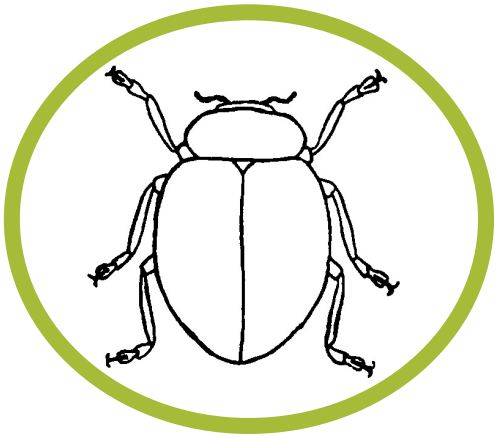
1. Coactivation in the bilingual lexicon: Method

Method

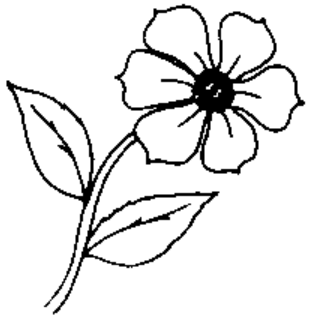
- Background: Competition between words with the same beginnings (cohort model)
- Technique: Eye-tracking with acoustical word presentation
  - Allopenna et al. 1998, overview: Prestin 2003

„[bi:tl]“

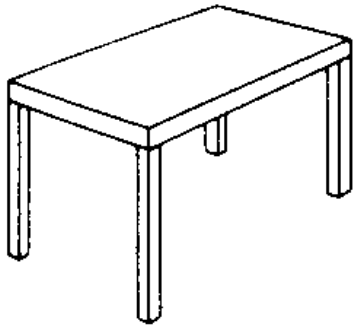
Lexical competition within one language



(***target**: beetle)*



(filler: flower)



(filler: table)

*(**competitor**: beaker)* (Allopenna et al. 1998)

„[spikə]“

Lexical competition between languages

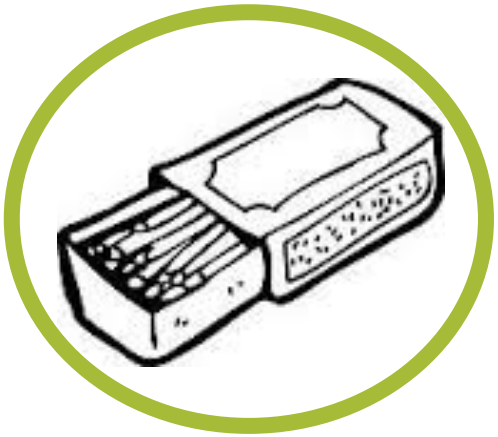
(***target:*** *speaker)*

Conducted in 2 parts:

- Russian part with Russian targets and English competitors
- English part with English targets and Russian competitors

(filler: cup / chashka)

(filler: doll / kukla)



*(**competitor:** spichki)*

(Marian & Spivey 2003)

Our study (in progress)

- Extending this method to the investigation of Russian as a heritage language
  - Different types of speakers of Russian
  - (1) German targets, (2) Russian targets
- Hypothesis: Strength of coactivation depends on the age of immigration
  - H1: Considerably weaker coactivation of Russian in second generation immigrants (heritage speakers of Russian)
  - H2: Little weaker coactivation of German in first generation immigrants
- Current state:
  - Selection of 396 stimuli in each language finished
  - Pretests conducted

2. Methodological considerations and pretests

Problem 1

Phonological and phonetic differences

Phonological & phonetic differences

- Large phonological and phonetic differences between Russian & German (and Russian & English)
  - Phonology: e.g., palatalization: Russ. /t/ vs. /t'/ – Germ. /t/
  - Phonetics: e.g. in Russian
    - Reduction of vowels
    - Floating articulation of stressed vowels
    - Minor differences nearly in every sound

      » cf. Potapova & Potapov 2011
  - Marian & Spivey 2003:
    - Counting of overlapping phonemes

Phonological & phonetic differences: Marian & Spivey 2003

	Russian Competitor	
English Target	Item	No. of Overlapping Phonemes at Onset
1. Speaker [spikəɹ]	Спички [spitʃki]	3
2. Boot [but]	Бубен [bubʲɛn]	2
3. Shark [ʃɑɹk]	Шарик [ʃɑrik]	2
4. Chair [tʃeɪ]	Черепаха [tʃʲɛrʲɛpɑhə]	1[a,b]
5. Marker [mɑɹkəɹ]	Марка [mɑrkə]	2
6. Barbed wire [bɑɹbd waiɹ]	Бархат [bɑ rhət]	2
7. Plug [plʌg]	Платье [plɑtjɛ]	2[a]
8. Gun [gʌn]	Гайка [gɑjkə]	1[a]
9. Card [kɑɹd]	Картошка [kɑrtoʃkə]	2
10. Lock [lʌk]	Лак для ногтей [lɑk dlʲa nɑgtei]	1[a]

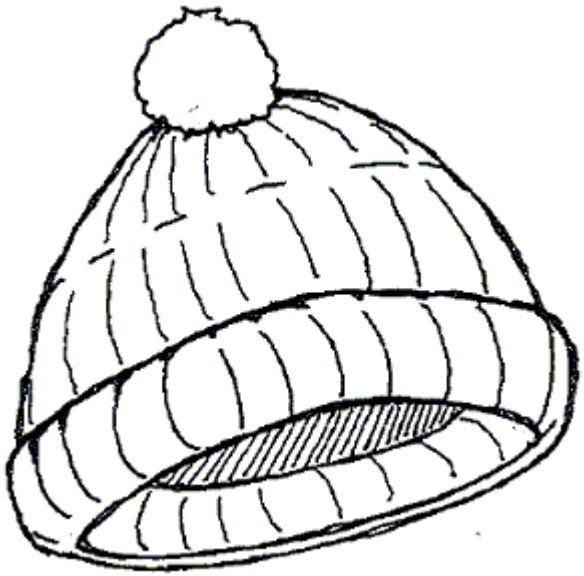
Marian & Spivey 2003, 179

Phonological & phonetic differences: Our study

- All stimuli: two syllables, stress on first syllable
  - cf. *Faden* (‘thread’) – *fartuk* (‘apron’)
- More fine grained calculation of phonological and phonetic differences in two onset phonemes
  - e.g., *Schalter* (‘switch’) – *shapka* (‘cap’): slight difference in articulation of sibilant [ʃ]
  - *Robbe* (‘seal’) – *roshcha* (‘small wood’): great differences in articulation of consonant and vowel (although not phonological)

The pretests

shapka / *Mütze* ‘cap’



Picture & word corpus for English:
Snodgrass & Vanderwart 1980

Mütze: 14 ipm (instances per million)

shapka: 40.6 ipm

Pretest

- Naming
- Picture-word-mapping
- Frequency estimation

- 396 stimuli

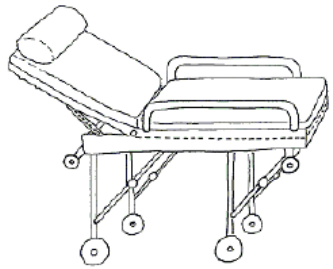
- German test: 36 participants, adult German native speakers
- Russian test: 54 participants: Russian-German bilinguals of the first generation (immigrated as adults), 18-55 years old

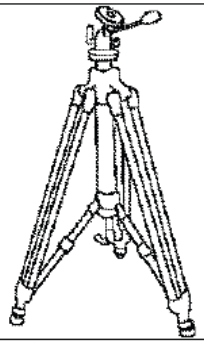
Problem 2

Picture-Word-Mapping and Naming-Task

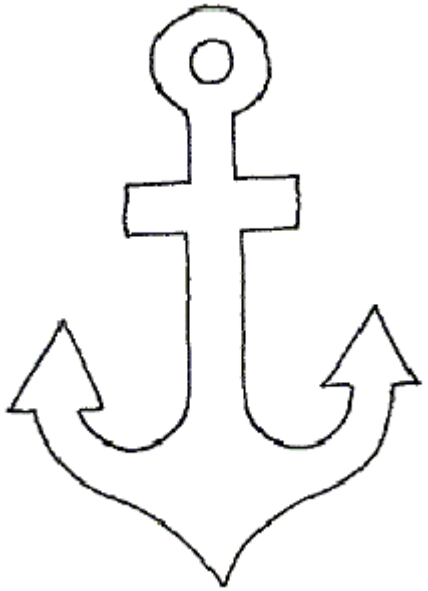
Naming

Укажите для каждого изображенного объекта название, которое на ваш взгляд ему лучше всего соответствует. Пожалуйста, укажите только одно название.

Изображение	название
	
	

Изображение	Название
	
	

jakor’: 100 %



listik ‘small leaf’: 28 % (n=18)

list ‘leaf’: **67 %**

lipovyj list ‘leaf of a linden tree’: 5 %

nasmork ‘cold’: 0 % (n=18)

bol’noj (chelovek) ‘ill (man)’: **44 %**

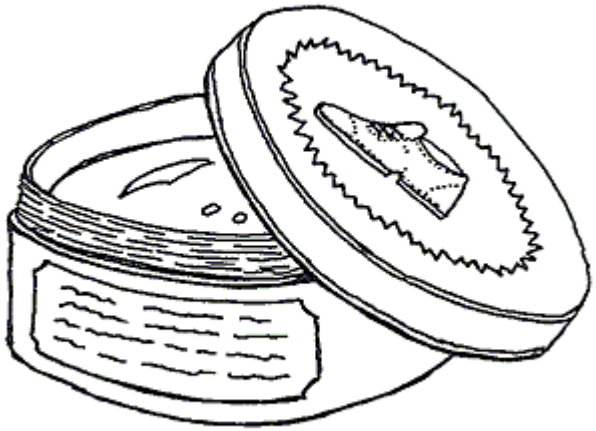
bolezn’ ‘illness’: 5 %

gripp ‘flu’: 5 %

prostuda ‘cold’: **33 %**

prostudivshijsja / prostuzhennyj ‘having a cold’: 11 %

vaksa ‘shoe polish’: 6 % (n=18)



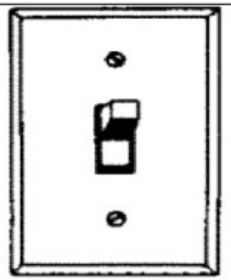
krem dlja obuvi
‘shoe polish’: **72 %**

gutalin
‘shoe polish’: 22 %

Picture-word-mapping

Пожалуйста укажите, используя шкалу, насколько каждое обозначение соответствует изображенному объекту. (1= категорически не соответствует, 7 = соответствует полностью)

картинка	шкала						
	Не соот. ветствует						Соот. ветствует
 мусор	1	2	3	4	5	6	7
 мужчина	1	2	3	4	5	6	7

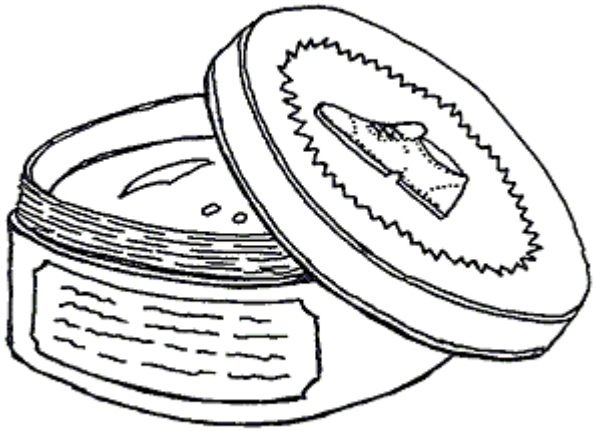
картинка	шкала						
	Не соот. ветствует						Соот. ветствует
 переключатель	1	2	3	4	5	6	7
 пинцет	1	2	3	4	5	6	7

Picture-word-mapping

Judgement	Frequency (in %)
1	2.5
2	0.9
3	1.1
4	2.0
5	2.5
6	3.8
7	**87**
Missing	0.2
total	100

Russian

Picture-word-mapping



vaksa

Judgement	Frequency (in %)
2	5.6
3	5.6
5	16.7
6	5.6
7	61.1
Missing	5.6
total	100

Problem 3

Frequency measurements in two different languages

Word frequency

- Frequency as construct
  - “Real frequency” not measurable
  - Corpus frequency
  - Representative for frequency of encounterings of speakers?
    - » Brysbaert & New 2009
- Yet missing information on reaction times for Russian words

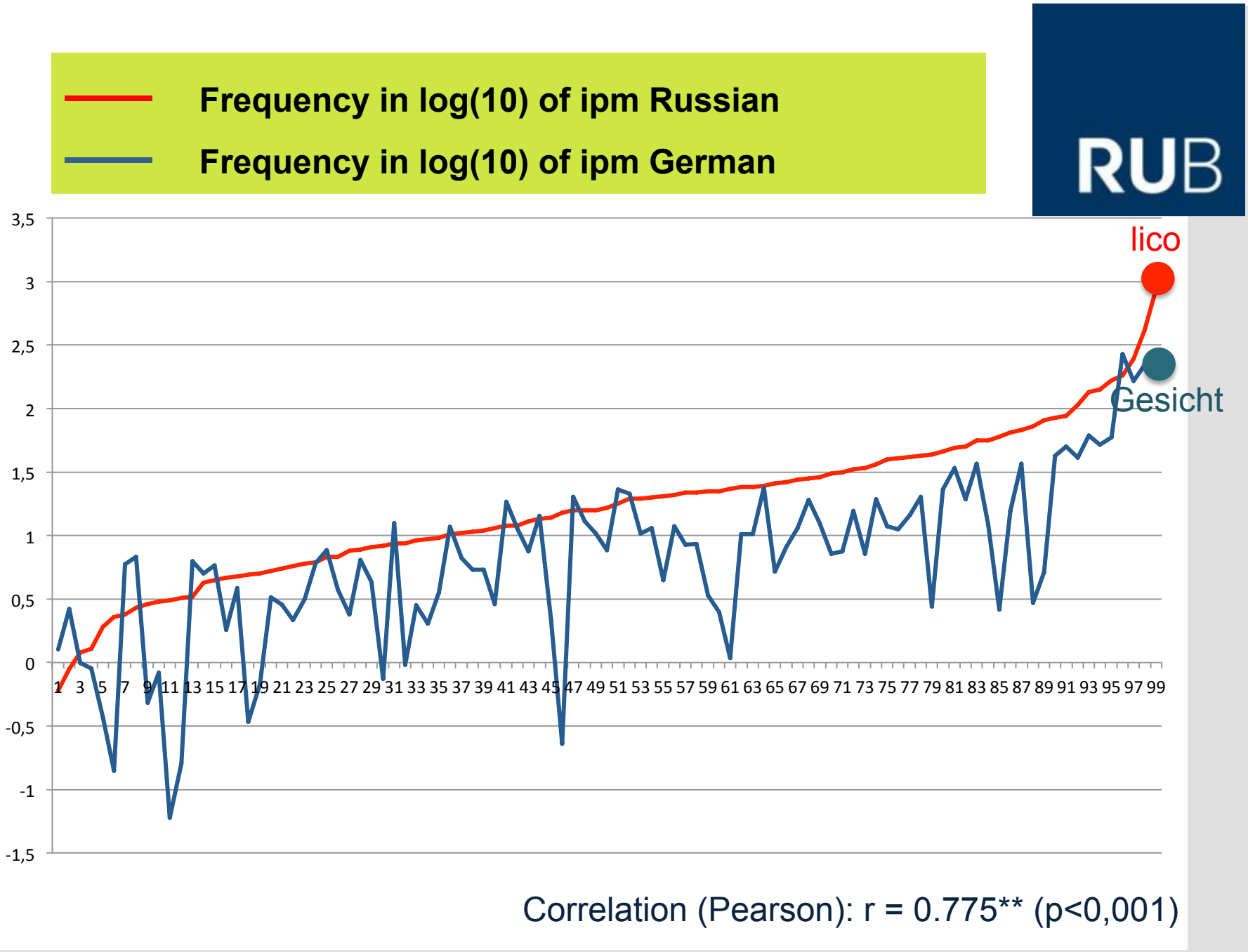
Word frequency: Marian & Spivey 2003

- Data basis
  - Russian: Lönngren 1993 (based on corpus of 1 mio tokens)
  - English: Zeno et al. 1995 (based on corpus of 17 mio tokens)
- Control for frequency of target and competitor items
  - Test items as well as their translation
  - No statistically signficant differences of all items between languages found
- Problems:
  - Mean difference not necessarily informative as for single pairs
  - In many cases large differences between equivalents
    - Russ. *sapog* 'boot': ipm 106 – Engl. *boot:* ipm 8
    - Russ. *tarelka* 'plate': ipm 31 – Engl. *plate:* ipm 65

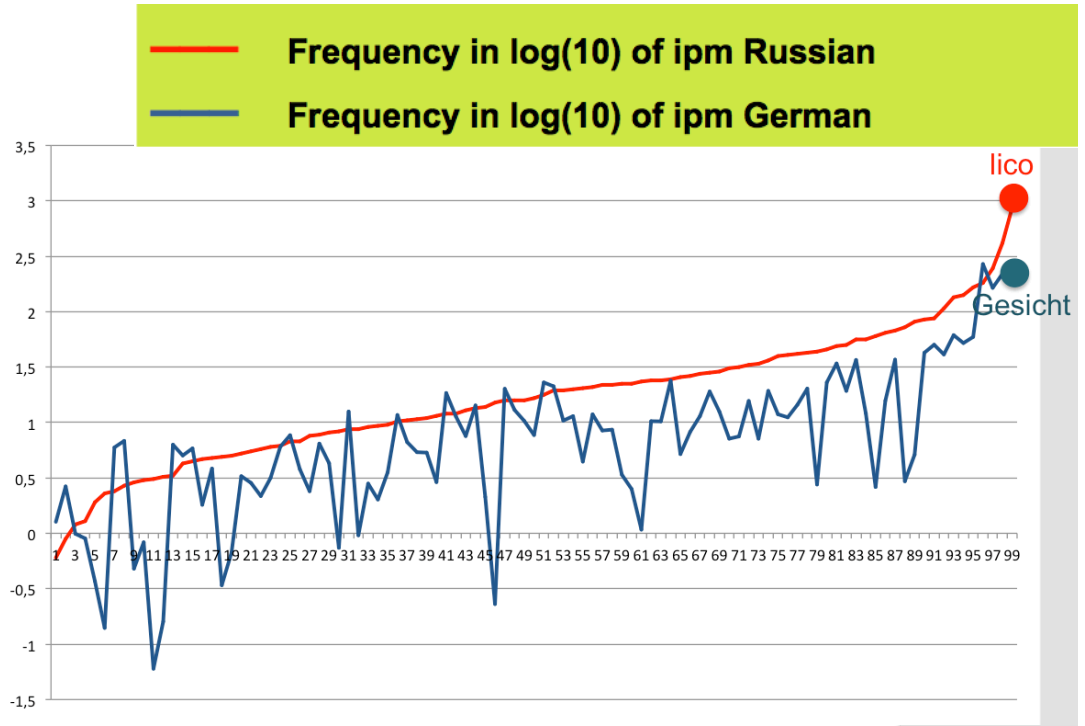
ipm – instances per million words

Word frequency: Our study

- Data basis increased
  - Russian: „Novyj častotnyj slovar' russkoj leksiki“ (http://dict.ruslang.ru/freq.php)
  - German: dlexDB (www.dlexdb.de)
  - Both based on corpus of 100 mio. tokens


Frequency in log(10) of ipm Russian
Frequency in log(10) of ipm German
RUB
lico
Gesicht
3,5
3
2,5
2
1,5
1
0,5
0
-0,5
-1
-1,5
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87 89 91 93 95 97 99
Correlation (Pearson): r = 0.775** (p<0,001)

Word frequency: Our study



- Strongly influenced by
  - Semantic structure
    - cf. Russ. *lico* (ipm 878, log 2.9) vs. Germ. *Gesicht* (ipm 239, log 2.4) 'face'
  - Morphological characteristics of the language
    - cf. 'fried fish':
    - Russ. *zharenaja ryba* ⇒ counts as *ryba*
    - Germ. *Bratfisch* ⇒ counts as *Bratfisch*

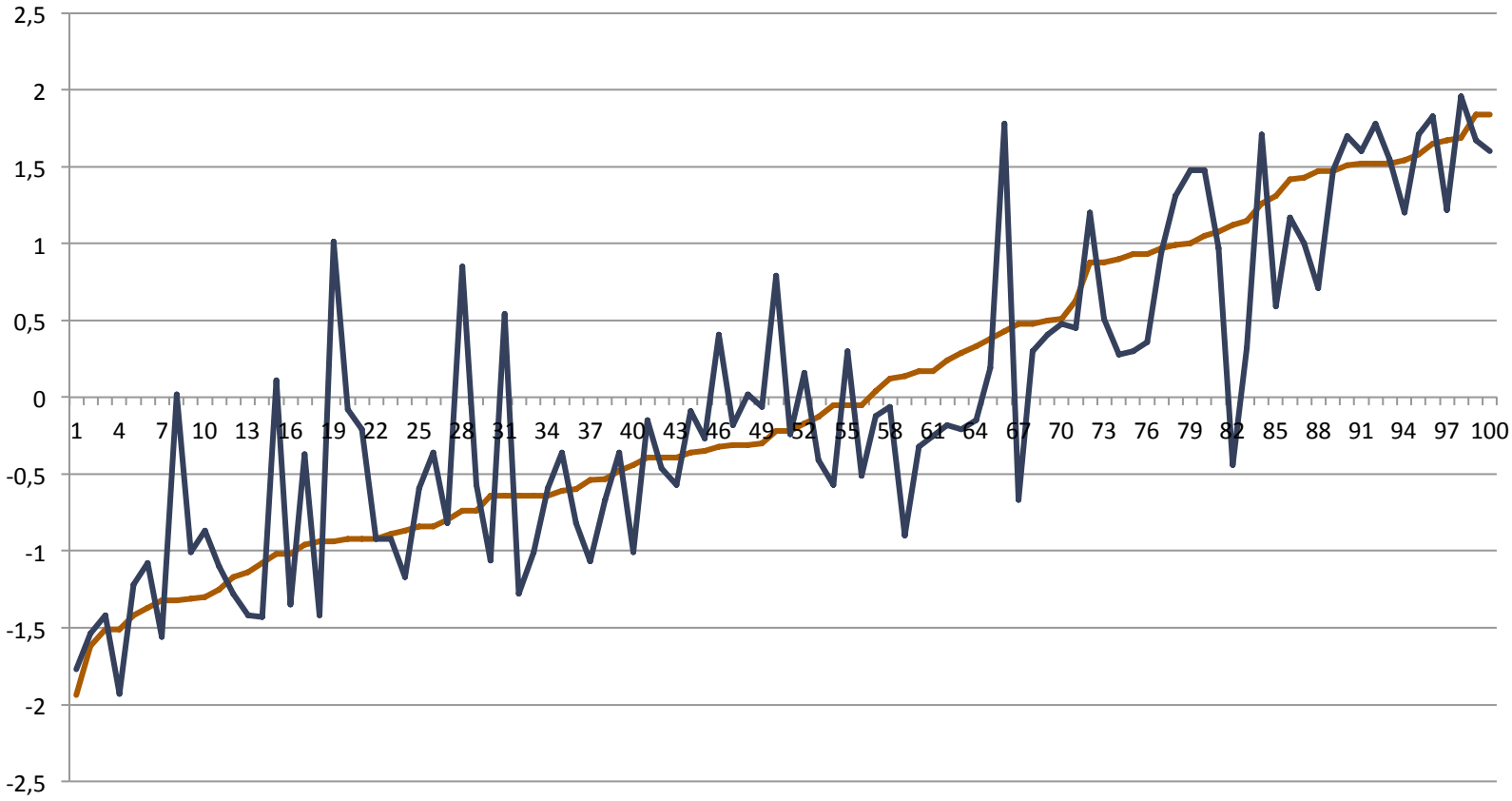
Estimated frequency

- Estimation of occurrence of words by speakers of the respective language
- Proven to provide reliable results (in terms of statistical correlation to reaction times)
  - » Cf. Frumkina 1966, Frumkina & Vasilevič 1971, Krause 2002, Reid & Marslen-Wilson 2003, Brysbaert & Cortese 2011, Anstatt & Clasmeier 2012
- Method
  - Paper-pencil task as part of pre-test
  - List of words in a table
  - Instruction: “Please assess on scale from 1-7 how often you do encounter the given word in everyday life (when speaking, reading, watching TV, etc.)”
  - Calculation of median of grouped data

» Krause 2002

Estimated frequency Russian (z-transformed)

Estimated frequency German (z-transformed)



Correlation (Pearson): r = 0.845** (p<0,001)

3. Conclusion

Problems and solutions

1. Pragmatic problem: Lack of databases
   - Solution: Pretests

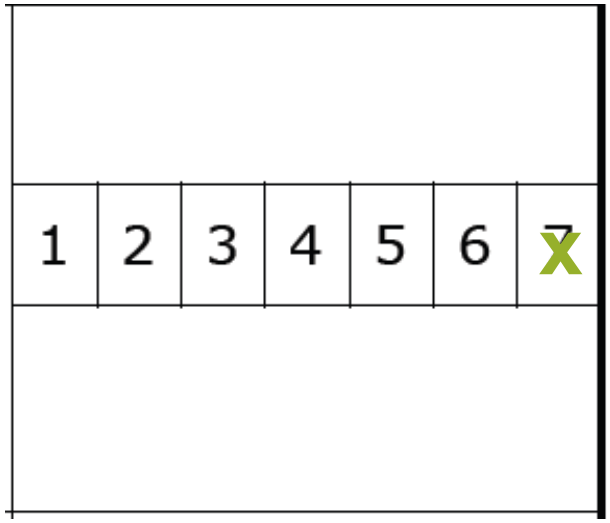
2. Linguistic problem: Differences between Russian and German (phonology/phonetics, frequency)
   - Solution: Number of parameters to make the stimuli comparable

Relevant parameters for linguistic material

- Only two-syllable words
- Stress on the first syllable
- Good results in the naming- and picture-word-mapping tasks
- Comparable estimated frequency

- Enough stimuli??

- Statistical calculation of anavoidable differences



Thank you for your attention!

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