# Repetition Analysis in Lyrics across languages: A case study on English, Dutch and Italian songs

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# Introduction

Inspired by a TED Talk given by Colin Morris and the mechanisms which make people more inclined to like repetitive music, we decided to use an unusual approach in analyzing song lyrics and how repetitiveness differs among languages and across time.

# Psychology

*Music as a by product of language development: Repetition in music is a cultural universal* [Pinker 1997]

*About 94% of musical passages are repeated at some point later in the music* [Huron and Ollen 2004]

*Repetitive music is more enjoyable and draws our attention* [Margulis 2013]

# Data Mining and Cleaning

| Group | Lyrics # |
|---|---|
| Italian | 548 |
| English | 14779 |
| Dutch | 437 |
| OldEnglish | 304 |
| OldDutch | 220 |

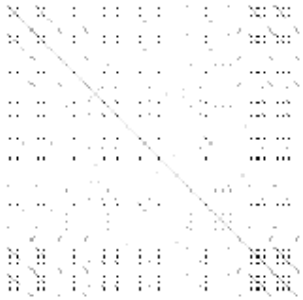
## Old lyrics

Old English songs obtained from Archive.org

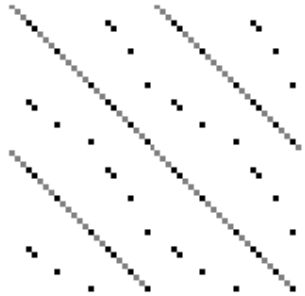
## Modern lyrics

Artists selected from different Top 100 lists.
Python scripts to mine the lyrics and process them.
Modern English ones kindly provided by Colin Morris.

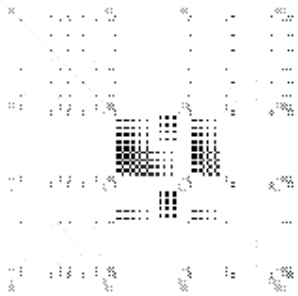
# Dot Matrices



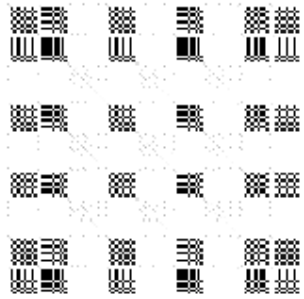
The Killers - Shadowplay



Skrillex - Scary Monsters & Nice Sprites

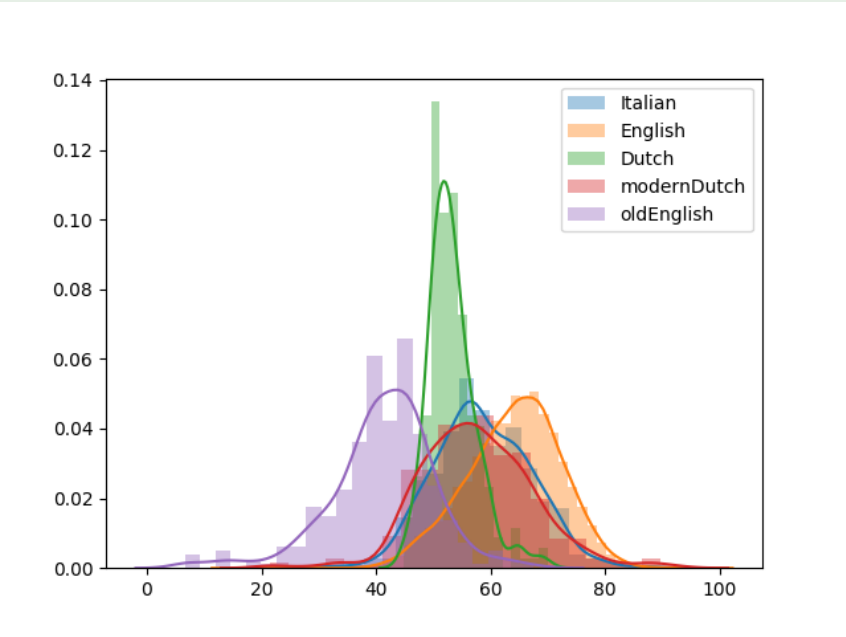


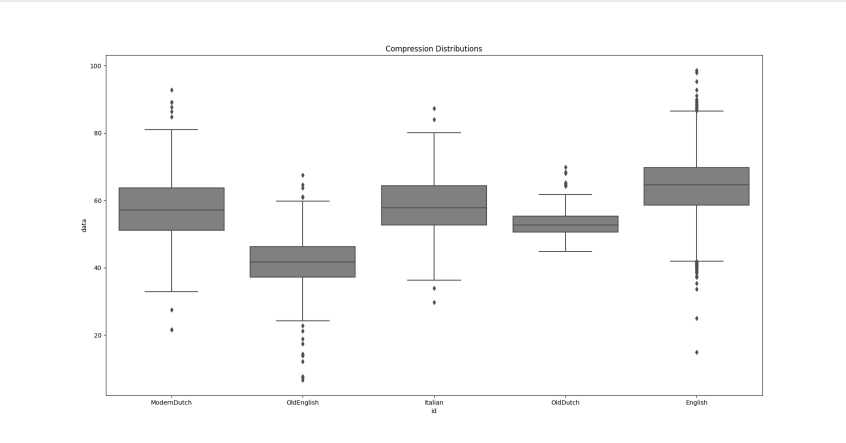
Snap - The Power



The Diamonds - She Say

# Compression and Distributions



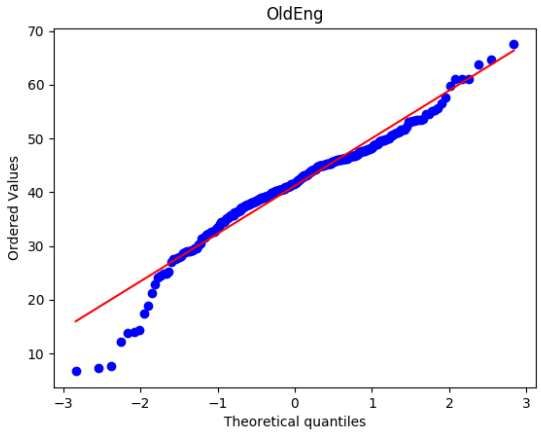

Data processing in 1 simple command

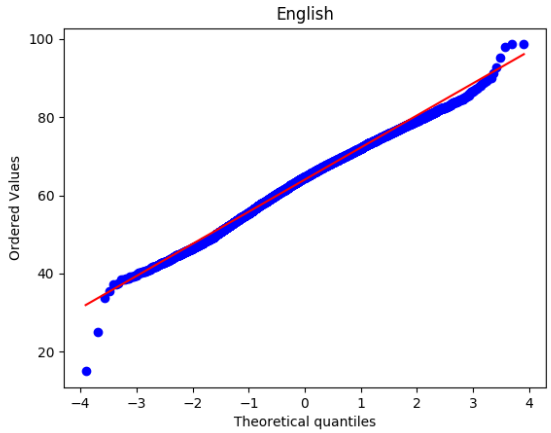
```
gzip -v *txt 2> logfile.log
```

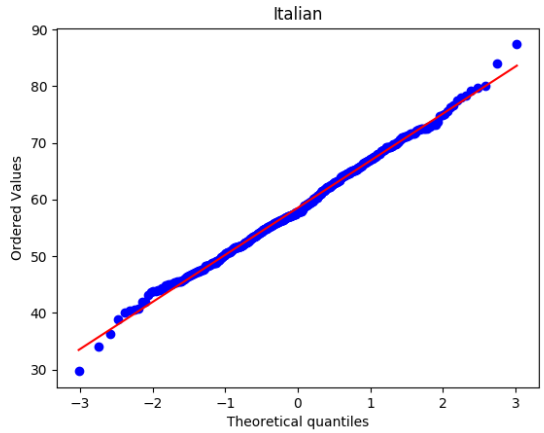
Table: *Shapiro Test results*

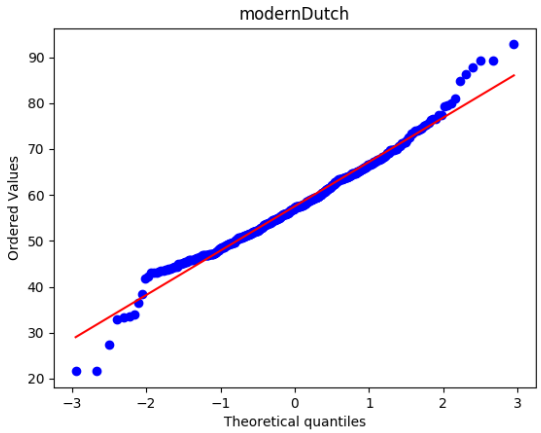
| *Group* | *p-value* |
|---|---|
| *Italian* | *0.42* |
| *English* | *< .001* |
| *Dutch* | *< .001* |
| *modernDutch* | *< .001* |
| *OldEng* | *< .001* |

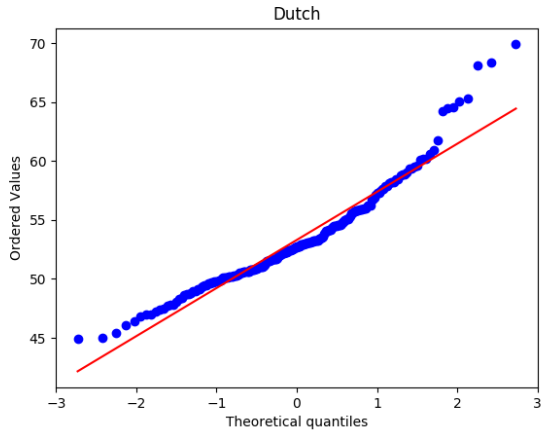
# Compression and Distributions



# Assumption

Compressibility approximates to Repetitiveness

# Difference across time within languages

H1 compressibility is different between time periods within languages

U-Test assumptions:

- ordinal or continuous vars
- independent samples
- independence of observation

2 Sample K-S assumptions:

- Continuous or ordinal vars
- independent samples
- $H_0$: Both samples from same set

Table: *U Test*

| *Groups* | *p-value* |
|---|---|
| *DUTCH MODDutch* | *< .001* |
| *OLDENG ENG* | *< .001* |

Table: *KS 2 Sample Test*

| *Groups* | *p-value* |
|---|---|
| *DUTCH MODDutch* | *< .001* |
| *OLDENG ENG* | *< .001* |

# Difference across languages

H2 Compressability is different between languages

Table: *U Test*

| *Groups* | *p-value* |
|---|---|
| *ITA ENG* | *< .001* |
| *ITA MODDutch* | *0.018* |
| *ENG MODDutch* | *< .001* |

Table: *KS 2 Sample Test*

| *Groups* | *p-value* |
|---|---|
| *ITA ENG* | *< .001* |
| *ITA MODDutch* | *0.06* |
| *ENG MODDutch* | *< .001* |

# Conclusions

There is difference in lyrics compressibility between languages and between time periods.
There seems to be an incresing trend in compressibility from the past until now.

Corpus and Computational linguistics can obtain new valuable insights by approaching things from different perspectives. Interdisciplinarity is a key component in this.

# References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