

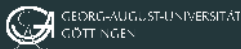
# The Grimm Brothers: A Stylometric Network Analysis

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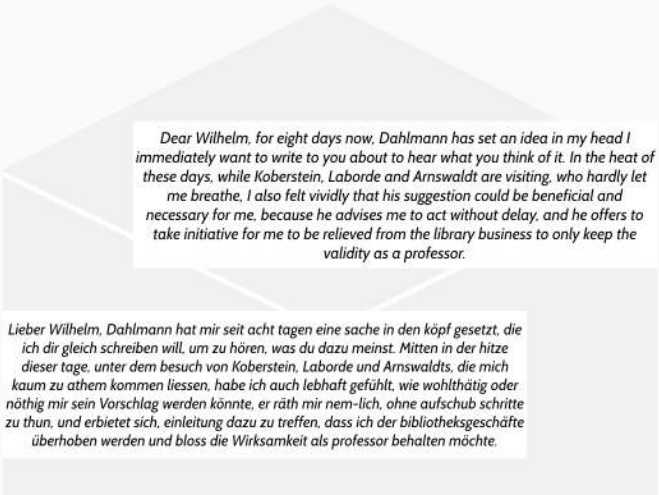
# Introduction

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# THE BROTHERS GRIMM



Figure 1: Wilhelm Grimm and Jacob Grimm.



*Dear Wilhelm, for eight days now, Dahlmann has set an idea in my head I immediately want to write to you about to hear what you think of it. In the heat of these days, while Koberstein, Laborde and Arnswaldt are visiting, who hardly let me breathe, I also felt vividly that his suggestion could be beneficial and necessary for me, because he advises me to act without delay, and he offers to take initiative for me to be relieved from the library business to only keep the validity as a professor.*

*Lieber Wilhelm, Dahlmann hat mir seit acht tagen eine sache in den köpf gesetzt, die ich dir gleich schreiben will, um zu hören, was du dazu meinst. Mitten in der hitze dieser tage, unter dem besuch von Koberstein, Laborde und Arnswaldts, die mich kaum zu athem kommen liessen, habe ich auch lebhaft gefühlt, wie wohlthätig oder nöthig mir sein Vorschlag werden könnte, er räth mir nem-lich, ohne aufschub schritte zu thun, und erbietet sich, einleitung dazu zu treffen, dass ich der bibliotheksgeschäfte überhoben werden und bloss die Wirksamkeit als professor behalten möchte.*

**Figure 2:** Jacob's letter addressed to Wilhelm on the 12th of July 1834.



**Figure 3:** Wilhelm's letter addressed to S. Hirzel on the 22nd of June 1852.

# RESEARCH QUESTIONS

1. Is there a **difference** in the brothers' writing styles depending on whether they write **to each other** or **friends and colleagues**?
2. Do the brothers' writing styles change **over time**?

- **Stylometric research** on a large letter collection of two brothers with remarkable academic careers.
- No **empirical research** of the brothers' writing styles yet.



## Data-set

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**Grimm Briefwechsel:** contains 2,543 letters (Rölleke, 2001).

We extracted:

Jacob Grimm's letters			Wilhelm Grimm's letters		
Addressees	Letters	Tokens	Addressees	Letters	Tokens
Wilhelm Grimm	134	134,558	Jacob Grimm	141	136,789
Colleagues & friends	117	67,637	Colleagues & friends	33	17,846
N	251	202,195	N	174	154,635

**Table 1:** The data-set size.

Jacob Grimm's Letters			Wilhelm Grimm's Letters		
Addressees	Letters	Tokens	Addressees	Letters	Tokens
Grimm, Wilhelm	134	134,558	Grimm, Jacob	141	136,789
Hirzel, Salomon	21	12,798	Mone, Franz Joseph	6	3,127
Hoffmann, Heinrich	16	8,813	Wackernagel, Wilhelm	4	2,428
Pfeiffer, Franz	14	8,056	Haupt, Moriz	4	1,861
Mone, Franz Joseph	13	7,248	Reimer, Karl	3	1,793
Grimm, Wilhelm & Dorothea	12	6,333	Weigand, Karl	3	1,645
Weigand, Karl	12	5,976	Riedel, Gabriel	2	1,178
Wackernagel, Wilhelm	8	5,484	von Fallersleben, Heinrich Hoffmann	2	956
Hildebrand, Rudolf	4	2,578	Grimm, Jacob & Dorothea	2	863
Grimm, Dorothea	4	2,356	Grimm, Dorothea	1	909
von Karajan, Theodor Georg	4	1,991	Hirzel, Salomon	1	683
Wyttenbach, Johann Hugo	3	1,787	Grimm, Auguste & Dorothea	1	640
Reimer, Karl	2	840	Pfeiffer, Franz	1	500
Weidmannische Buchhandlung	1	1,528	Grimm, Jacob & Dahlmann, Friedrich Christoph	1	446
Haupt, Moriz	1	714	Karajan, Theodor Georg	1	422
Zacher, Julius	1	647	Freytag, Gustav	1	395
Bartsch, Karl	1	488			

**Table 2:** List of letters written by Jacob and Wilhelm Grimm.

# Methodology

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**stylo** R package (Eder, M., Rybicki, J. and Kestemont, M. 2016)

- Suite of algorithmic tools for **textual clustering**, **stylo-chronological analyses** and **visualisation**.
- Function: **stylo()**  
⇒ MFWs: 50-150 → Cosine Delta → .csv file

## What is a **network**?

- **Nodes** and **links**: representation of relationships and communication.
- **Gephi** (Bastian, M., Heymann, S., Jacomy, M., 2009)
- Force-directed layout: **ForceAtlas2**.
- First colour-code visualises two groups of recipients:  
**the brothers** and **colleagues**
- Second colour-code visualises decades from early to late:  
dark green → green → light green → yellow → orange → red → purple

# Networks

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# THE CORRESPONDENCES

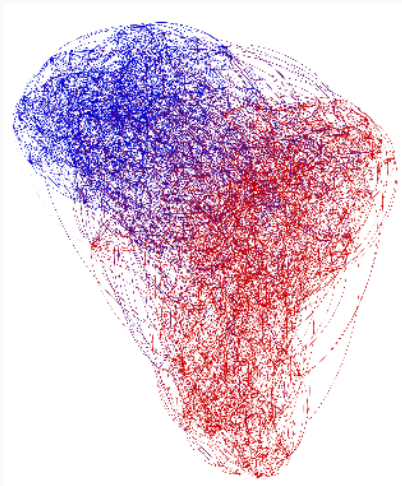


Figure 5: Jacob's correspondences.

Letters sent to the brother. Letters sent to other people.

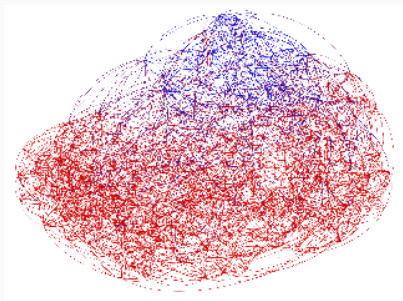


Figure 6: Wilhelm's correspondences.



**Hypothesis 1:** The writing style adapts to the **addressee**.

- Clear separation between letters the brothers sent to **each other** and those sent to **colleagues**.  
⇒ There must be certain **stylistic markers** in the texts. Those need investigation.

# THE CHRONOLOGIES



Figure 7: Jacob's chronology.

Colour code by decade:

dark green (1800) → green (1810) → light green (1820) → yellow (1830) → orange (1840) → red (1850) → purple (1860)

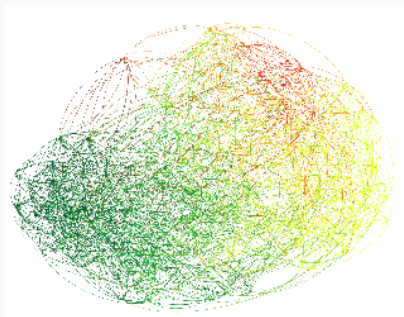


Figure 8: Wilhelm's chronology.

**Hypothesis 2:** The writing style changes **over time**.

- Jacob: even distribution of letters over time ⇒ **Bottom-up direction**.
- Wilhelm: many early letters (sent to Jacob); few late letters (sent to Weigand) ⇒ **Left-to-right-to-top direction**.

## Conclusions

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# THE STYLISTIC MARKERS MATTER

- Jacob's personality: hard-working scholar whose relationships were primarily **work-related**.
- Wilhelm's personality: family man who made a distinction between **professional** and **personal** matters.

⇒ What are the **stylistic markers** representing these personalities?

# STYLISTIC MARKERS: JACOB

Letters sent to **Wilhem**:

Time Span	Personal Pronouns			Relative Frequencies		
1805-1809	ich	du	wir	2.74 %	0.81 %	0.28%
1810-1815	ich	du	wir	1.72 %	0.28 %	0.23%
1816-1852	ich	du	wir	1.64 %	0.14 %	0.00%
1853-1863	ich	du	wir	0.94 %	0.00 %	0.23%

Table 3: Personal Pronouns used by Jacob in letters addressed to Wilhem.

Letters sent to **others**:

Time Span	Personal Pronouns			Relative Frequencies		
1805-1809	ich	du	wir	0.00 %	0.00 %	0.00%
1810-1815	ich	du	wir	2.55 %	0.00 %	0.07%
1816-1852	ich	du	wir	1.73 %	0.02 %	0.16%
1853-1863	ich	du	wir	2.31 %	0.02 %	0.20%

Table 4: Personal Pronouns used by Jacob in letters addressed to others.

# STYLISTIC MARKERS: WILHELM

Letters sent to **Jacob**:

Time Span	Personal Pronouns			Relative Frequencies		
1805-1816	ich	du	wir	2.66 %	0.70 %	0.27%
1817-1837	ich	du	wir	1.81 %	0.44 %	0.30%
1838-1856	ich	du	wir	1.54 %	0.33 %	0.49%
1857-1863	ich	du	wir	0.00 %	0.00 %	0.00%

Table 5: Personal Pronouns used by Wilhelm in letters addressed to Jacob.

Letters sent to **others**:

Time Span	Personal Pronouns			Relative Frequencies		
1805-1816	ich	du	wir	0.00 %	0.00 %	0.0%
1817-1837	ich	du	wir	3.05 %	0.00 %	0.44%
1838-1856	ich	du	wir	2.59 %	0.05 %	0.28%
1857-1863	ich	du	wir	1.46 %	0.00 %	0.55%

Table 6: Personal Pronouns used by Wilhelm in letters addressed to others.

# STYLO-CHRONOLOGICAL ANALYSIS

To sum it up:

- Writing styles change according to the **recipient** and **time period**.
- The same holds true for the **personal pronouns**.

What's next?

Manual investigations.

- **Stylistic markers**: What do they reveal about the letters' contents?
- **Outliers**: Why do some letters not group together according to their addressee and date?



**Thank you!**

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