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Punctuation and text segmentation in 15th-century pamphlets

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Abstract: The use of punctuation in German incunabula is often described as arbitrary, irregular, and unsystematic (cf. Masalon 2014: 54–56). This concerns the inventory, frequency, and function of punctuation marks as well as pragmatic aspects such as how typesetters treated punctuation in their respective target texts. In this paper, punctuation is not seen as an independent linguistic subsystem, but as a means of text segmentation that – along with other measures (e. g. capital letters, pilcrows, and white space) – was used to structure a text with respect to its formal appearance, helping the reader to decode information. This case study is based on a corpus of German pamphlets written by the Bohemian astrologer Wenzel Faber and printed annually beginning in 1481 at various print shops, principally in Leipzig and Nuremberg. The analysis finds significant changes in the editions before and after 1490. These changes include an increasing consistency in the intensity of text segmentation, and a use of capital letters and punctuation marks developed from a polyfunctional to a monofunctional approach. Finally, different types of text segmentation are proposed, each characterized by a specific relationship between its frequency and its function. Despite this overall tendency, one must still take into account that typesetters followed individual punctuation practices in their search for suitable forms of text segmentation.

Keywords: punctuation, capitalization, incunabula, ‘Practica Deutsch’

1 Introduction

The last quarter of the 15th century is an important phase in the history of German punctuation, as basic features of our modern punctuation system were explored and consolidated in printers’ search for suitable forms of text segmentation. While early years of letterpress printing were characterized by technological advances, after initially adopting the layout traditions of handwritten manuscripts, printers gradually began to rethink layout strategies from a strictly typographical point of

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view and started to produce large quantities of uniform texts with more reader-friendly appearances in order to attract additional groups of buyers and readers.¹ The craftsmen involved (e. g. typesetters, correctors, rubricators, illuminators) still drew on structural aids from medieval manuscripts, such as pilcrow signs, illuminated initials, and underlining in red ink. At the same time, they applied new methods, such as different type sizes and indented paragraphs in conjunction with a freer handling of white space, to edit texts in a way that increased comprehensibility.² It seems reasonable to evaluate punctuation and capitalization in line with these developments, as the insertion of punctuation marks and the use of capital letters provided additional semantic, syntactic and/or prosodic information that also helped the reader to facilitate and accelerate the reading process (cf. Lennard 1995). Both features are considered as means of text segmentation – text segmentation being the process of structuring a given text with regard to its formal appearance. Its main purpose is to support the reader in decoding information.³

Several studies on historical punctuation (e. g. Simmler 2003: 2479–2481, Kirchoff 2017: 169–171) have demonstrated that uses of punctuation marks and capital letters can be interpreted syntactically as early as the 15th century.⁴ However, the assumption of a “syntactic principle” of punctuation does not explain why typesetters in print shops pursued individual punctuation practices, deviated considerably from handwritten templates, and inserted punctuation marks in a division of labor e. g. with rubricators (cf. Voeste 2018; Neumann and Voeste 2022).⁵ To some extent, the syntactic perspective obscures the practical problem of printers’ attempts to find purposeful strategies of text segmentation. Before capitalization and punctuation were linguistically differentiated, the structuring of a text had to be consolidated at least in its basic features.

1 For a current state of research on the emergence of the “modern” book, see Rautenberg (2018: 307–318) and Schmitz (2018: 129–144).

2 For a systematic overview of graphical means for reader guidance, see Rautenberg (2018: 298–300). Griese (2017) emphasizes the continuation of layout traditions from the manuscript era in 15th-century printing. For a typology of paragraph forms, see Janssen (2005: 13–14).

3 In this sense, text segmentation is closely related to the French concept of *mise-en-page* and *mise-en-text* (cf. Laufer 1983). On text segmentation in the field of text linguistics, see Stein (2003: 16–19).

4 In these studies, the aspect of text segmentation plays a minor role (cf. only Lemke 2020: 90–94). Simmler (2003: 2473) assumes bundles of features (‘Repräsentationstypen’) comprising means of punctuation, orthography and text segmentation.

5 In a way, printers and editors can therefore be described as “interpreters” and “textual critics” of the texts they presented (cf. Smith 2019: 149–150).

The aim of this paper is to identify the main types of text segmentation on an empirical basis. The case study begins with an introduction of the historical data employed, i. e. pamphlets with astrological prognostications written by Wenzel Faber in the 1480s and 1490s. This includes an analysis of paratextual devices, content structure, and syntactic patterns, as the importance of text segmentation for readers' reception becomes obvious in the context of these textual characteristics. In the main part of this paper, the investigation of text segmentation practices concentrates on two central aspects. First, the intensity of segmentation will be evaluated, considering all methods actually employed in the corpus. Second, the paragraph-internal relationship between capitalization and punctuation will be examined with respect to their frequency and function. This will lead to a classification of different approaches to the treatment of punctuation marks and capital letters in the process of text segmentation.

2 Wenzel Faber and his 'Practica Deutsch'

Despite being one of the most frequently printed authors of his time, Wenzel Faber (c. 1455–1518) belongs to the forgotten figures from the early period of letterpress printing (cf. Milway 2000: 142). Even incunable studies and other historical sciences have taken little interest in him or his work.⁶ Born in Budweis (České Budějovice) into rather modest circumstances, Faber pursued an academic career in Leipzig, and found success as a highly respected astronomer and physician in the German-speaking territories. The *Gesamtkatalog der Wiegendrucke* (GW) lists more than 100 incunable editions with Faber as the author, printed mainly in Leipzig as well as in Ingolstadt, Nuremberg, Augsburg, Mainz, Passau, Magdeburg, and Erfurt.⁷

In the 1480s and 1490s, Faber was the leading author of astronomical-astrological prognostications⁸ containing forecasts of natural phenomena for one year. These pamphlets of eight to twelve leaves were published annually in German and Latin, supposedly intended as Christmas gifts or New Year's greetings (cf. Green 2012: 8). Depending on whether they were printed in the previous or current year of the forecast, the predictions started either in January (*Jenner*) or

⁶ Cf. only Green (2011: 117–199, 2012: 9–10) and Voeste (2020).

⁷ See <https://www.gesamtkatalogderwiegendrucke.de/> (October 2020).

⁸ Faber's influence is well documented in a public feud with Paul Eck over who would reign supreme as author of practicas in Leipzig, at the end of which Eck stopped publishing his texts (cf. Haebler 1914).

Figure 1: Title page of Faber's 'Practica Deutsch' (Nuremberg: Koberger, 1494/95)⁹.

February (*Hornung*). As most pamphlets do not provide any printing information, they are usually cited with both possible years of publication. The oldest available edition is dated to 1482/83, the latest one to 1506/07. When printers began to use title pages, Faber's prognostications were often designated as 'Practica Deutsch' and 'Iudicium lipsense', respectively (cf. Figure 1). While, at the time, *practica* referred to texts of many scientific areas, including law, medicine, and music, it became a proper generic term for prognostications during the first half of the 16th century (cf. Kremer 2017). By contributing to the emergence of characteristic features, Faber influenced the genre decisively.

There are several reasons Faber's practicas are a valuable source for the investigation of segmentation practices. First and foremost, the vast number of copies that have survived until today allow us to examine the practices of various print shops over a period of approximately twenty years. Hence, it can be clarified, for example, to what extent the editions produced by Faber's preferred printers

⁹ Österreichische Nationalbibliothek, Ink 1.G.64 (GW 9612).

in Leipzig differ from reprints in other places. Given their ephemeral nature,¹⁰ the practicas were most likely produced at low cost, with printers not deploying their most qualified typesetters. Thus Faber's practicas reveal the usual, expedient practices in 15th-century print shops, and not the more elaborated ones. From a reader's perspective, practicas were meant more for cursory than for intensive study (cf. Green 2012: 7–8). Text segmentation therefore played an essential role for orientation within the text, especially since practicas were also meant to appeal to inexperienced readers.¹¹ While many early printers adhered to the layout of medieval manuscripts, an adaptation of manuscript practices can be precluded for Faber's practicas: with astrological practicas evolving in the mid-1470s all across Europe, their origin and appearance was strongly linked to letterpress printing.¹²

When compiling the corpus for this study, the aim was to include all 32 German editions listed in the *Gesamtkatalog der Wiegendrucke*.¹³ For a number of reasons, only 25 editions could be procured, along with one additional edition owned by the University of Warsaw Library (cf. the table of corpus texts in the reference section). Of these 26 editions in total, all printed in quarto, 13 copies are fragments of a few leaves, which reflects the condition of many early practicas today.¹⁴ Most editions were printed either in Leipzig or in Nuremberg (10 editions each), but there is also one edition each from Passau, Augsburg, Mainz, Lübeck, Magdeburg, and Erfurt. Besides Martin Landsberg, who was among the most productive and influential printers of his time,¹⁵ Faber's first printers in Leipzig included Martin Brandis and Gregor Boettiger, and perhaps even the famous and success-

10 Since practicas became obsolete after one year, they were not infrequently reused in book-binding. Some editions (e. g. GW 9587) have only survived as fragmentary maculature preserved in the binding of another work.

11 On aids for orientation in Early New High German herbal books, cf. Habermann (2001: 132–167).

12 Apart from Wenzel Faber, German pioneer authors include Johann von Glogau, Martin Polich, and Johannes Virdung. The golden age of practicas was in the later 16th century with 30 or more different authors active at one time (cf. Green 2012: 8–15).

13 GW 9587 and GW 958710N are most likely fragments of the same edition. GW 9586 was published in 1489/90 (not in 1485/86), as a comparison with the respective editions proves. There are no further editions listed in the *Incunabula Short Title Catalogue* (ISTC; October 2020).

14 On challenges for researchers in determining the authorship, printing house and publication date of early German fragmentary practicas, see Green and Duntze (2013).

15 On Landsberg's life and work, see Franck (1883). According to Geldner (1968: 245) and Reske (2015: 557), Landsberg probably printed under the alias of Capotius in the mid-1480s. Thus GW 959310N would be assigned to him.

ful printer, publisher, and bookseller Konrad Kachelofen.¹⁶ Among the reprinters, we find both highly productive, financially prosperous, and distinguished printers (e. g. Anton Koberger and Friedrich Creussner) and printers of whom very little is known (e. g. Moritz Brandis, and Heidericus and Marx Ayler).¹⁷ The enormous number of printers who published Faber's practicas indicates a high demand for prognostications during the incunable era and the great popularity of the genre.

3 Paratexts, content structure, and syntactic units

Paratexts are elements of a book that accompany or frame the main text; examples included title pages, indexes, page headers, marginalia, catchwords and illustrations. Their basic function is to help the reader access the book, or as Genette (1997: 1–2) puts it: “More than a boundary or a sealed border, the paratext is, rather, a *threshold*, [...] a ‘vestibule’ that offers the world at large the possibility of either stepping inside or turning back.” It is generally agreed that while paratexts were not “invented” in letterpress printing, their stabilization, differentiation, and dispersion were greatly enhanced by the new technologies.¹⁸ Faber's practicas, nevertheless, show hardly any paratextual devices. Apart from title pages in later editions (typically with a woodcut in central position)¹⁹ and sporadic indication of section and page,²⁰ the practicas only consist of main text and chapter headings. The sparse paratextual equipment made it more difficult for readers to approach and decode the content of the pamphlet. Accessibility and reader orientation thus had to be achieved mainly by means of text segmentation.

While paratexts were usually created by employees in the print shops,²¹ the content structure and linguistic form of the practicas were certainly predetermined by Faber's manuscripts.²² This becomes evident in the fact that – as re-

16 Cf. the *Gesamtkatalog der Wiegendrucke*. Considering that in his feud with Paul Eck (cf. fn. 8), Faber publicly accused Kachelofen of unfair competition (Haebler 1914: 201), it seems rather questionable that GW 962510 was printed in Kachelofen's print shop.

17 On the role and status of the mentioned printers, see Geldner (1968) and Reske (2015).

18 Cf. Habermann (2001: 77–79) and von Ammon and Vögel (2008).

19 GW 9601 (without woodcut), GW 9602, GW 9608, GW 9609, GW 9611, GW 9612, GW 9617, GW 9619, GW 9620, GW 9622, GW 9623, GW 9624.

20 GW 9606, GW 9608, GW 9612, GW 9619, GW 9620, GW 9622, GW 9623, GW 962510.

21 On the correctors' tasks in early printing, see Grafton (2011: 10–32).

22 As far as I know, no handwritten manuscripts have been preserved. It is difficult to say whether printers outside Leipzig used the author's manuscript as a template or a copy of the first printed

gards structure and language – no substantial changes can be detected between editions printed by different printers in the same year. However, when looking chronologically at all the editions in the corpus, one can see that the content structure of the practicas changed over time (cf. Figure 2). In the first analyzed edition (Leipzig: Brandis, 1481/82), the content is divided into a preface and seventeen chapters or so-called “words” (*Worte*). The “words” are presented in a linear or successive order (type I) starting off with a discussion about the scale of astronomic predictions and the ruling planets for the next year, then moving on to predictions about the weather, finances, and health as regards the four qualities (hot, cold, wet, dry), the four seasons (spring, summer, fall, winter), the moon phases (new moon and full moon of January, February, March etc.), the three religions (Judaism, Christianity, Paganism), agriculture (fruits, animals, fish), pestilence and other illnesses, war and peace as well as sending messages. Faber then continues with predictions for the highest estate (the pope, cardinals, kings, princes), people of various lands, kingdoms and cities (e. g. Meissen, Bohemia, Hungary; Leipzig, Prague, Nuremberg) and certain representatives of urban society (e. g. students and learned people, virgins and women, merchants and clerics). The practica ends with a “word” on ores and metals (e. g. gold, silver, lead) and predictions for the common people.

In the three subsequent editions (type II), the linear order was altered by an implementation of hierarchical elements constituting three chapters, each of which comprise a certain number of “words”. There are no new topics, and the length of the “words” equals that found in type I. But the order of appearance was modified, with e. g. the four seasons and the moon phases being treated more prominently in chapter two. By 1487, another structure was found and kept until the last edition investigated (type III).²³ Here, the preface is followed by two sections. The first section is based on fifteen chapters, mostly containing predictions for specific groups of people, which were previously combined in the “words” on the highest estate and urban society. The second section consists of three chapters with forecasts for the seasons, months, and days of the year, forming a well-balanced counterpart to the first section.

Green (2012: 9–10) evaluates the first two types of content structure as “an exercise in chaos”, and he considers the changes made during the 1480s as “radical”. Therefore, it will be interesting to see whether these changes are congruent

edition. Given its brief utility value, it is quite unlikely, however, that multiple handwritten manuscripts existed.

23 Only one edition (Lübeck: Ghotan, 1491/92) shows an entirely different structure, which was probably due to the transfer from High German to Low German.

Figure 2: Changes in content structure.

with developments in text segmentation. Apart from alterations in the order of the chapters, most content features, however, were kept surprisingly stable. The range of topics, the internal structure of the chapters and also their length were fixed right from the beginning. This is especially true of the chapter on the moon phases. Even though this chapter initially appeared closer to the front and later in the back, its internal structure is characterized by high uniformity. Each month is divided into new moon, full moon, and the days of syzygy, creating a clear and reliable structure. Since this section is the most extensive one, taking up almost half of the whole text, it is especially suitable for further analysis.

A high level of consistency also applies to the syntax of this chapter. At all chronological stages, a recurrence of formulation patterns can be detected, as illustrated for the days of July (*Heumond*) in (1), (2) and (3).²⁴

- (1) *Am tag petri feuchtikeit mit winde in vil enden uff den mor Bei vnſzer frauen tag trub wulkē mit ſtarckem winde kelten nach der bequemikeit d^szeit / in vil enden mit regen* (Leipzig: Brandis, 1481/82)
‘On the day of peter humidity with wind in many points on the sea On mary’s day gloomy clouds with strong wind coldness after the manner of time / in many points with rain’
- (2) *Mōtag vor viti auff die nacht wīdig. Donnerſtag nach viti an vil endē milte regē. Mitwoch vor iohānis baptiſte feuchtikeit. vnd an etlichē endē wirt es vor kūmen.* (Nuremberg: Creussner, 1484/85)
‘Monday before vitus at night windy. Thursday after vitus at many points mild rain. Wednesday before john baptist humidity. and at many points it will happen.’
- (3) *Dornſtag vor Johannis tauffer wind ī vil landen vngeſtūmikeit mit doner vñ regen · in ettlichen landen wirt es vorkūmen · Freytag vor johannis auff die nacht wandlung Am abent iohannis tauffer die nacht wind mit doner ·* (Augsburg: Sorg, 1486/87)
‘Thursday before John baptist wind in many lands storm with thunder and rain · in many lands it will happen · Friday before john at night change In the evening john baptist the night wind with thunder ·’

The examples above show a distinct arrangement: first, a certain day of the liturgical year is mentioned, followed by a description of the expected weather situation. After a few predictions, an established wording occurs, assuring that the predic-

²⁴ The English translations follow the original texts closely. The uses of capital letters and punctuation marks are retained.

tions will prove to be true in many places in the country. This specific composition is reflected in a fragmented syntax lacking in verbs. While the nominal nature of these constructions ensures information density, it poses a potential barrier in the decoding process for the reader, increasing the demand for the text segmentation to provide insight.

In conclusion, content and language of the practicas are very consistent. All texts deal with the same topics, have a largely stable chapter-internal structure, and show stereotypical expression patterns. From this, one can assume that printers (directly or indirectly) reproduced Faber's templates in a quite accurate manner. With regard to text segmentation, however, there was no joint practice common among the printers, as will be discussed in the following section.

4 Practices of text segmentation

The following analysis focuses on the chapter about moon phases. Since this chapter is characterized by homogeneous structure and language, a comparison between the different editions is particularly viable. Also, the chapter is the most extensive one, ensuring that even most (though not all) of the fragmentary editions can be included in the analysis. Overall, the analysis is based on 20 of the 26 editions from the corpus.²⁵ Depending on which excerpts have survived in the copies, the number of words examined is between c. 400 and 3.100 words (36.000 words in total). The analysis begins with an introduction of each method of text segmentation. Then the intensity of heading and paragraph-external segmentation will be measured and compared. Finally, the ratio between paragraph-internal capitalization and punctuation will be examined in order to determine the main types of text segmentation.

4.1 Means of text segmentation

Text segmentation involves various macro- and microtypographic elements.²⁶ In Faber's practicas, the arrangement of white space, the choice of type size, and

²⁵ In the following fragmental editions, no excerpts from the moon phase chapter can be found: no. 5 (GW 9591), no. 8 (GW 959310N), no. 9 (GW 9596), no. 18 (GW 9611), no. 23 (GW 9622), and no. 26 (GW 962510). The editions' numbers, here and in Figures 6 to 8, refer to the table of corpus texts in the reference section.

²⁶ On characteristics of micro- and macrotypography, see Spitzmüller (2013: 12–13).

Figure 3: Means of text segmentation (Leipzig: Landsberg, 1496/97)²⁷.

the use of pilcrow signs²⁸ are very prominent features.²⁹ By applying these methods, the text was divided into headings and text blocks³⁰ (cf. Figure 3). Conversely, however, not all headings were typographically highlighted: the subheadings *Volheymonde* and *Vol augstmōde* (underlined in red) appear together with the preceding and following paragraph in one text block, seemingly without any typographical effort.³¹ Despite the initial pilcrow signs, *Seyne tag/Seyne tage* are not instantly recognizable as headings either.

Capital letters and punctuation marks were also used in the process of text segmentation, both for headings and for paragraph-internal structuring. Typeset-

²⁷ Bayerische Staatsbibliothek, 4 Inc.s.a. 408 f (GW 9619, fol. Biii^r).

²⁸ The pilcrow (or paragraph sign) appears regularly only from 1491/92 onwards.

²⁹ None of the copies examined were edited with red ink.

³⁰ *Text block* here refers to units of text typographically arranged in a rectangular shape. Paragraphs are content units of text separated from other content units. According to Janssen (2005) paragraphs and text blocks did not necessarily coincide in the 15th century.

³¹ In Figure 3, the subheadings coincide with the beginning or end of a line. While line breaks per se must be taken into account as a tool for text segmentation (cf. Neumann and Voeste 2022), the combination in this case seems to be unintentional. The copy contains many examples with the respective subheadings positioned in the middle of a line.

Figure 4: Divergent uses of punctuation marks (left: Leipzig: Landsberg, 1493/94; right: Nuremberg: Wagner, 1493/94).

ters opted for the point (or *punctus*) as their preferred punctuation mark; within paragraphs, they used the virgule (or *virgula suspensiva*) at times.³² Strikingly, the frequency in which punctuation marks and capital letters were employed varies greatly from edition to edition. Figure 4 contrasts the weather predictions for March 1494 in the editions from Leipzig and Nuremberg. The text is almost identical, as are the words marked with capital letters. Yet, the use of punctuation marks (in red) differs significantly (10 : 25). While Martin Landsberg hardly ever used punctuation marks for paragraph-internal segmentation, Peter Wagner regularly employed them in combination with capital letters.

With capital letters matters are quite similar. When comparing the Landsberg edition with an edition printed ten years earlier by Martin Brandis (cf. Figure 5), we can observe a different handling of capitalization. Brandis used capital letters (in blue) not only at the beginning of a new semantic-syntactic unit (e. g. *Am Sonabende*, *Am mantage*), but also for the days of saints (e. g. *Mathie*, *Adriani*, *Greorij*). In Landsberg's edition, all saints' names were printed with lowercase letters (in yellow; e. g. *agathe*, *appolonie*, *valentini*).

It becomes clear that punctuation and capitalization were the central techniques of paragraph-internal segmentation. With respect to their frequency and functional range, printers adopted different approaches. Systematic differences are reflected in the intensity of segmentation.

³² The same is true for late medieval medical recipe books (cf. Almeida 2001: 229). I follow the terminology proposed by Parkes (1992: 306–307).

Figure 5: Divergent uses of capital letters (left: Leipzig: Brandis, 1483/84; right: Leipzig: Landsberg, 1493/94).

4.2 Intensity of segmentation

The intensity of segmentation describes how strong a text is segmented, i. e. how many means of segmentation are applied. To measure this, it is important to look at headings and paragraphs individually. Figures 4 and 5 illustrate different ways in which headings and paragraphs were segmented; the analysis is presented in Tables 1 and 2 (✓ stands for “existing”, ✗ for “not existing”). It is important to notice that different segmentation methods not only apply to the three types of headings within one edition (1. new moon, 2. full moon, 3. days of syzygy), but also when comparing the three editions with each other: in all three editions, the first heading shows more means of segmentation than the second one; only in Brandis’ edition, however, is the third heading segmented as strongly as the first. Paragraphs, in general, display more uniform procedures.

The selected methods are adopted fairly consistently within one edition, even within the early ones. From this, one can conclude that clear decisions on the layout design were made in advance of the typesetting process and were implemented to a large extent afterwards. It is therefore justified to call these procedures *practices of text segmentation*. A first tentative approach to evaluating different practices of text segmentation is to measure the overall intensity of segmentation. For this purpose, all headings and paragraphs in the relevant editions were examined with regard to the presence or absence of the outlined means of segmentation. Figure 6 shows the percentage of methods used in each edition (measured against a potential maximum frequency). The percentages in Figure 6 increase

Table 1: Heading segmentation.

	Leipzig: Landsberg, 1493/94			Nuremberg: Wagner, 1493/94			Leipzig: Brandis, 1483/84		
	1.	2.	3.	1.	2.	3.	1.	2.	3.
separate line	✓	X	X	✓	X	X	✓	X	✓
larger type size	✓	X	X	X	X	X	✓	X	✓
white space/line break	✓	X	X	✓	X	X	✓	✓	✓
pilcrow	X	X	✓	X	X	✓	X	X	X
capital letter (beginning)	✓	✓	✓	✓	✓	✓	✓	✓	✓
punctuation mark (end)	X	X	✓	✓	X	X	X	X	X

Table 2: Paragraph-external segmentation.

	Leipzig: Landsberg, 1493/94			Nuremberg: Wagner, 1493/94			Leipzig: Brandis, 1483/84		
	1.	2.	3.	1.	2.	3.	1.	2.	3.
separate text block	X	X	X	X	X	X	X	X	✓
white space/line break	X	X	X	X	X	X	X	X	X
pilcrow	✓	X	X	✓	X	X	X	X	X
capital letter (beginning)	✓	X	✓	✓	X	✓	✓	✓	✓
punctuation mark (end)	✓	✓	X	✓	✓	✓	✓	✓	✓

from the inside to the outside of the circle. The data are listed in more detail in the Appendix.

What is most noticeable is that in the earlier editions up to 1490 (no. 11) there was quite a lot of experimentation with segmentation intensity. The texts are segmented either weakly or quite strongly (between 27 % and 56 %). From text no. 12 onward, the intensity of segmentation stabilizes at a medium level of about 40 %. In practice, certain preferences seem to have existed for the combination of various methods. For instance, headings in a separate line would usually appear with white space before and after it, and normally start with a capital letter.³³ Most irregular is the use of punctuation marks. In general, it can be said that punctuation marks are used more frequently at the end of paragraphs than headings. Yet in some editions (e. g. in no. 3 and 17) about every second heading ends with a

³³ Some printers apparently did not possess a type for capital *W* (cf. e. g. GW 9577, GW 9582, GW 9584). The months of October (*Weinmond*), November (*Wintermond*) and December (*Wolfsmond*) therefore appear with a lower case *w*. Cf. Dane (2012: 118).

Figure 6: Intensity of segmentation.

point, whereas paragraphs in other editions (e. g. in no. 1, 4 and 21) are hardly ever terminated by a punctuation mark.

Although the intensity of segmentation converged, segmentation practices were still not entirely uniform in the 1490s. In Leipzig, however, a local style had emerged (as illustrated in Figure 4, left), which can be found not only in Boettiger's and Landsberg's editions (no. 12, 13, 15, 16, 21, and 24), but also in the Koberger edition from Nuremberg (no. 19) and (in a slightly modified form) in Brandis' edition from Magdeburg (no. 22). Since the "Leipzig style" was applied more and more stringently and adopted by other (though not all) printers, it is arguably fair to designate this practice as the generic layout or "signature style" of Faber's later practicas. Naturally, it is difficult to assess whether the "Leipzig style" prevailed because it was particularly suitable and effective in terms of reader orientation or because Leipzig was Faber's domain and preferred printing location. Still, it is an important finding that the text segmentation of certain text types gained stability towards the end of the incunable period.

4.3 Paragraph-internal capital letters and punctuation marks

Capital letters and punctuation marks which stand within a paragraph (excluding the beginning or end of a paragraph) can fulfil different functions. As discussed

in Section 4.1, capital letters can be used to indicate the beginning of a semantically and syntactically self-contained unit, cf. (4), and to denote specific nouns, namely *nomina propria* and *nomina sacra*, cf. (5).³⁴ Both functions can overlap, as illustrated in (6).³⁵

- (4) *Am abēt der heyligē drey konig starcke vnd merckliche bewegung der wind mit fchne* **A**m tag der heyligen drey kōnig fchne (Leipzig: Landsberg, 1491/92)
‘In the evening of epiphany strong and noticeable movement of the wind with snow **O**n the day of epiphany snow’
- (5) *Bey dem Sōtag vor Clementis gewulckn mit regē* (Nuremberg: Wagner, 1489/90)
‘On Sunday before Clement clouds with rain’
- (6) *Sunntag nach viti auff die nacht windt · vnd in vil ennden mit meffigē doner* **E**richtag vor Johannis tauffer wandlung · (Augsburg: Sorg, 1486/87)
‘Sunday after vitus at night wind · and in many points with moderate thunder **T**uesday before John baptist change .’

Likewise, there are two main functions for punctuation marks. The first one is to structure a paragraph according to semantic and syntactic aspects. Due to the stereotypical linguistic patterns in the moon phase chapter, three specific cases can be distinguished here: similar to capital letters, punctuation marks can separate two semantically and syntactically self-contained units, cf. (7-a). They can also occur between a specific day and the respective weather description, cf. (7-b). And they are occasionally used in contexts of coordination, cf. (7-c). The second main function is the identification of numbers in conjunction with an abbreviation of units of measurement as in (8).

- (7) a. *Sontag nach der heiligen dry konig tag feuchtnuß · yn etlichen enden den tag darnach* · (Mainz: Schöffner, 1489/90)
‘Sunday after epiphany humidity · in many points the day after .’
- b. *Bei dem dinftage nach vnfer frawen . kalde wint mit trubūg der lufft vnd regē* (Leipzig: Brandis, 1483/84)
‘On tuesday after mary . cold wind with misty air and rain’

³⁴ On different subgroups of *nomina propria* and *nomina sacra*, see Bergmann and Nerius (1998: 49–57).

³⁵ In the analysis, capital letters with both functions were counted separately (cf. the table in the Appendix). In Figures 7 and 8, they are included in the numbers for the structuring of paragraphs.

- c. *Am funtag vor conuerfionis pauli wolken . vnd wind . vñ dar bei feuchtheit.* (Nuremberg: Creussner, 1484/85)
 ‘On sunday before conversion of paul clouds . and wind . and accompanying humidity.’
- (8) *mitwoch vor laurencij vor mittag .v. ftūd .lv. mi. von d^s natur feynes newē nicht tretē wyr̃t.* (Leipzig: Landsberg, 1491/92)
 ‘wednesday before lawrence midmorning .v. hours .lv. mi. will not deviate from the nature of its new [moon].’

The marking of *nomina propria/nomina sacra* and the identification of numbers/abbreviations are functions specifically associated with capital letters and punctuation marks. The function of text segmentation, however, can be fulfilled by both methods. Of great interest is the question of whether typesetters used capital letters and punctuation marks monofunctionally (i. e., *either* for text segmentation *or* for *nomina propria/nomina sacra* and numbers/abbreviations) or polyfunctionally (i. e., both for text segmentation *and* for *nomina propria/nomina sacra* or numbers/abbreviations). Figure 7 shows the percentage of capital letters (in blue) and punctuation marks (in red) that denote *nomina propria/nomina sacra* or numbers/abbreviations. The lower the rate, the less capital letters and punctuation marks were used in the respective functions. Instead, we can assume that capital letters and punctuation marks were increasingly used for purposes of text segmentation. In the medium range (from 33 % to 66 %) a polyfunctional usage can be claimed.

In the majority of editions, capital letters were used monofunctionally for purposes of text segmentation. Only in some editions can a polyfunctional approach be detected. But there are no cases in which capital letters were used mainly for *nomina propria* and *nomina sacra*.³⁶ With punctuation marks, matters are quite to the contrary. Punctuation marks were rarely used for text segmentation only. In most editions, they were used polyfunctionally or monofunctionally for numbers and abbreviations. Overall, there is a strong tendency towards monofunctional usages: while in the 1480s capital letters and punctuations marks were used in all possible functions, a clear distribution became established in the 1490s, with capital letters used primarily for paragraph-internal segmentation and punctuation marks for numbers and abbreviations. In order to find an explanation for this development, the interaction of capital letters and punctuation marks must be examined more closely.

³⁶ Since semantic-syntactic units usually contain at least one *nomen proprium/nomen sacrum* (cf. Figure 5), the overall ratio between the two is relatively balanced.

Figure 7: Monofunctional and polyfunctional uses of capital letters (blue) and punctuation marks (red).

In the following I will only consider capital letters and punctuation marks that are used for paragraph-internal structuring. To define types of text segmentation, it seems appropriate to take two variables into account: first, the frequency, indicated by the ratio of capital letters to punctuation marks; second, the co-occurrence of capital letters and punctuation marks, indicated by the percentage of corresponding usage (cf. Figure 8). These two variables depend on each other in that 100 % co-occurrence (i. e. capital letters and punctuation marks always appear together) requires that the amount of capital letters and punctuation marks are exactly the same (i. e. in a ratio of 1:1). Conversely, however, a co-occurrence of 0 % does not necessarily mean that capital letters and punctuation marks occur at different frequencies. They may also occur equally often but in diverging positions and thus fulfil different tasks in the segmentation process. The division of the grid into even sections verified by at least one edition from the corpus leads

Figure 8: Types of paragraph-internal segmentation.

to the distinction of five types of paragraph-internal segmentation, illustrated by instructive samples in Figure 9.

The most common types are C and D: about half of the editions investigated form a cluster in the intermediate area of these two types. Both types are characterized by the fact that capital letters and punctuation marks rarely appear together in the same linguistic positions. Whereas in C this is primarily due to the dominance of capital letters, which only serve to mark the beginning of a semantic-syntactic unit, type D applies a differentiated principle in various respects. Both capital letters and punctuation marks are equally frequent. They fulfil different tasks in the segmentation process and have therefore become specialized means of paragraph-internal segmentation. In some editions, the inventory of punctuation marks is even larger than in others, deploying the point and the virgule for different purposes of segmentation.

In type A, capital letters and punctuation marks are about the same in frequency and occur mainly side by side, marking the same linguistic positions, namely the boundary between two semantic-syntactic units. This type, which, in the long run, has become established for the demarcation of sentence boundaries, can be described as a system of mutual reinforcement. Type B is

Cöperdis marie vñ in **S**eine tage
vil stät bei den tage wand cläg mit reide vñd schne. **V**reitag
dar nach vñ bei d zeit vñstümig weteret mit wolke Felde vñd
schne mercklich. **D**instag vor lucie oder dar bei schne mit reid
vñd Feld. **D**in tage lucie auch also. **M**itwoch nach lucie auff
die nacht wandelüßig. **V**reitag dar nach auch also. **D**instag
moige. **S**onntag nach lucie schne mit reide. **D**in tage iheni
roädcläg. **D**instag abet schne od da vo. **D**in Crist tage auff
die nacht wolke. **D**in sant iohāns tage mercklich schne mit stät
ken wind. **D**onerstag vor siluſtri roädcläg mit wolke. **D**in
tage siluſtri auff die nacht gleich also.

Type A (Nuremberg: Cressner, 1484/85)

Seine tag. **B**ey dē dinstag nach nicomedis milt regē mit groſſe
tropfen dōner vñ bligē. **D**in tag bonifacij wind. **M**itag nach boni
facij regē in engliche enden mercklich. **V**eyliche land dē tag darnach
dyſi geſchichte vylē werde. **M**itag dinstag mitwoch nach vñt vñ
meſſye die d lufte mit gewulckē wind vñ regē bey dyſen tage vñ lan
de ſtarckē wind mit dōner vylē werden. **B**ey dē dinstag nach vñt
milt regē vñ villeyche an vil endē den sonabē darnach mit merck
lichem wind dōner bligē vñ regē geſcheit vñt vñ welche engliche ab
laſſen der reuim nachuolge wirt. **D**in abent iohānis gogzeuffter ge
ſchichte zu feuchtn. **E**liche ende am tag dieſi vilen werde. **M**itwo
ch nach iohānis gogzeuffter wind. **M**itag nach petri vñ pauli regē

Type B (Nuremberg: Wagner, 1493/94)

Seyne tage Sonabend nach ezechijß dēſi heylißē creutz wind
vñd regē. **S**onntag nach crucis vñſi niſt wind. **D**instag nach crucis
feuchtn mit erlicher felden. **B**ey dē sonabend nach mathei ſun
ſterig der luffte mit mercklicher belben ſtarckem wind vñd regē in
vil landen wechſelig. **D**instag nach mathei geſchichte zu feuchtn.
Din tag michaelis reit. **D**in tag iheronimi vñ vernigij reide vñd
feuchtn. **D**instag mitwoch nach vernigij geſchichte zu feuchtn.
auffſi milt gewulckē. **S**onntag vñ montag nach ſchäſel gewulckē
mit reide. **D**instag nach ſchäſel ſunſterig der luffte mit kalde wind
vñd regē. **D**onstag nach dionisi in vil endē feuchtn vñd windē.
Din abēd calixti vñſi die nacht wind vñd gewulckē

Type C (Leipzig: Landsberg, 1497/98)

Königtag auffſi niſi durch wintē Bewegung der gewulckē. **D**on
ſtag nach der heyiligen drey könig tage auff die nacht feuchtn. **D**es
ſchne: ſi. **E**nglich lād dē tag darnach dyſi geſchichte vylē werde. **D**in
ſtag vor antthonij ader nahe dē bey feuchtn. **D**es ſchne: genugſam
mercklich. **M**itwoch vñ donſtag vor antthonij auffſi niſi reide.
Din tag antthonij reit mit feuchtn. **D**in tag bey dēſen: gen auff
caruung erſcheit reit. **D**in geſchichten ſieten tonne vñd pligen mit
regen. **D**instag nach ſabiani auff die nacht feuchtn. **D**onſtag vñ
ſeytag vor ſeytūg pauli vñ andē tag feuchtn. **D**in kalde endē ſchne
mit reide. **D**onſtag vñ ſeytag nach ſeytūg pauli ab nahen: dō
bey ſeytūg der wint mit feuchtn. **D**in kalde endē dēſchne. **D**in
abent vñd tage der lēchtereung marie auffſi niſi wind.

Type D (Leipzig: Landsberg, 1493/94)

Sein
tag ā aber ſundis vñ dē feuchtn. **K**altē lādē ſie i etzli. auff ten
moige vñ dē ſelbit mit feuchtn. **O**d ſie genügig mēckli. **S**onntag vñd
oy tag dōm. **V**ulkē anſi milt. **B**ey dē dōnſtag na. **A**llē heiligen
feuchtn. **O**d ſie mit wīt. **S**onabē dōm. **A**uf oy nacht ſie mit wīt
mōtag dōm. **V**ulkē dōnſtag vor mazi. **A**ufſi milt wūt. **E**zli. **E**nde
wir es vor. **K**altē aber mazi. **A**uf oy nacht mit mit feuchtn. **A**m
tag mazi. **A**uf oy nacht ſie aufſi milt wūt. **S**onntag dōm. **A**uf
auf oy nacht o. **S**ine mit wīt aufſi milt wūt. **D**instag mitwoch na.
mazi. **M**ēckli. **E**liche mit wīt ā etzli. **E**nde vor by. **S**on
tag vor etzli. **A**ber vñ tag etzli. **A**ufſi milt wūt. **S**onntag
vor katherie. **A**uf oy nacht feuchtn. **E**liche vil endē auf dē mo
ge mit wīt

Type E (Nuremberg: Wagner, 1485/86)

Figure 9: Text samples for types of paragraph-internal segmentation.

a mixed system covering the entire range of possible functions: capital letters and punctuation marks are used together, but also separately for different structuring purposes. When marking sentence boundaries, typesetters differentiate between a weak form of demarcation (use of punctuation marks *or* capital letters) and a strong form of demarcation (use of punctuation marks *and* capital letters).

Type E is a rather unusual case to which only one edition can be assigned. It predominantly uses punctuation marks for various structuring (sub)functions. The text sample in Figure 9 shows that little orientation for the reader is provided when the same characters are used extensively for many different purposes (not even taking into account punctuation marks for indication of numbers and abbreviations). This might also offer a replicable explanation for why monofunctional uses of capital letters and punctuation marks gained ground during the period investigated here. Without coherent, established layout conventions, polyfunctional uses complicate the reading process instead of helping the reader to decode information.

Although no chronological trends can be identified, Figure 8 reveals some interesting printer specifics. While Markus Brandis took a very similar approach in both of his editions, his Leipzig colleague Martin Landsberg varied quite a bit with regard to the ratio of capital letters and punctuation marks. Even more so, the Nuremberg editions by Peter Wagner and Friedrich Creussner differ in almost every respect. Thus one can assume that these typesetters did not reproduce the layout of former editions, but instead tested different possibilities in their search for suitable forms of text segmentation.

5 Conclusion

This case study has shown that segmentation in the early phase of letterpress printing was by no means arbitrary and idiosyncratic; however, the assumption of a syntactic principle, which implies that texts were intentionally structured according to (purely) syntactic aspects using similar methods, does not comprehensively reflect the actual procedures in late medieval print shops either. Kirchhoff's (2017: 169–171) analysis of two 15th-century texts indicates a predominantly syntactically based, albeit inconsistent, use of punctuation marks, with capital letters used primarily to mark the beginning of sentences. However, this usage demonstrates only one of several competing punctuation practices at this time. Using 26 editions of German practices by Wenzel Faber, I have attempted to demonstrate the necessity to take into account that a uniform *modus operandi* among typesetters had not yet become established, and to consider punctuation in a larger context of text segmentation tasks.

Even if the incunable period in general was an experimental phase, substantial differences between the editions before and after 1490 can be observed. These differences are to be seen as independent from changes in the content structure, as incisive changes did not overlap in time. At first, the layout as a whole was involved: it initially showed strong variation in segmentation intensity, but became more and more uniform after 1490. Moreover, the interplay between paragraph-internal capital letters and punctuation marks shifted in favor of a growing preference for monofunctional uses. In this, capital letters were primarily used for text segmentation, and punctuation marks for indication of numbers and abbreviations. Polyfunctional uses, however, were soon abandoned, because without fixed layout conventions, such uses tended to obscure rather than reveal the structure of a text. For the relationship between text segmenting capital letters and punctuation marks, I have distinguished five types of segmentation, each characterized by a specific ratio of frequency and co-occurrence of methods. These types are not

subject to a chronological development, yet printer-specific uses among Leipzig and Nuremberg printers have become apparent. This underlines the assumption that craftsmen in the print shops did not work arbitrarily at all. When examining comparable text samples, one can find many internal regularities and even the beginnings of systematic approaches.

In the future, research must focus more closely on these fundamentals of writing systems. Of particular importance are the effects of typesetting on the linguistic form of printed texts. After all, capital letters and punctuation marks could only develop their full linguistic potential once text segmentation had become settled.

Appendix. Analyzed data

editions		1	2	3	4	6	7	10	11	12	13	14	15	16	17	19	20	21	22	24	25	
1 Segmentation of headings																						
total number of headings		50	37	30	8	6	38	17	9	29	37	19	38	36	37	38	36	38	38	38	38	
Means of segmentation	separate line	44	25	11	0	2	26	12	0	13	13	0	13	12	11	13	12	13	13	13	13	
	bigger type size	40	25	23	0	0	26	6	8	13	13	0	13	11	0	13	0	13	13	13	13	
	white space/line break	50	36	25	6	6	27	12	9	21	26	15	27	24	24	27	17	28	38	27	26	
	pilcrow	0	0	0	0	0	6	0	0	8	13	18	13	12	11	13	12	13	24	13	13	
	capital letter in the beginning	45	37	30	8	6	38	16	9	29	37	19	38	36	37	38	36	38	38	37	38	
	punctuation mark in the end	0	0	18	0	0	1	0	0	3	0	6	1	8	16	4	12	0	0	0	0	
	absolute frequency	179	123	107	14	20	118	46	26	87	102	58	105	103	99	108	89	105	126	103	90	
	maximum frequency	300	222	180	48	36	228	102	54	174	222	114	228	216	222	228	216	228	228	228	228	
	total in %	60	55	59	29	56	52	45	48	50	46	51	46	44	45	47	41	46	55	45	39	
	2 Segmentation of paragraphs (external)																					
total number of paragraphs		50	38	30	8	3	38	17	5	37	37	23	38	36	37	38	36	38	38	38	38	
Means of segmentation	separate text block	45	14	10	0	0	14	7	4	4	2	2	1	0	0	1	0	1	1	1	1	
	white space/line break	5	11	13	5	2	7	3	4	3	2	2	0	2	1	1	2	1	2	1	1	
	pilcrow	0	0	0	0	0	0	0	0	0	0	0	6	11	12	13	12	13	12	13		
	capital letter in the beginning	50	36	24	5	3	35	17	5	28	30	12	32	27	26	32	29	33	29	37	35	
	punctuation mark in the end	2	30	25	0	2	27	8	5	12	24	15	22	28	30	29	29	6	17	12	26	
	absolute frequency	102	91	73	10	7	83	35	18	47	58	37	66	69	70	76	72	54	61	64	76	
	maximum frequency	250	190	150	40	15	190	85	25	185	185	115	190	180	185	190	180	190	190	190	190	
	total in %	41	48	49	25	47	44	41	72	25	31	32	35	38	38	40	40	28	32	34	40	
	1+2 degree of segmentation intensity in %		51	52	55	27	53	48	43	56	37	39	41	41	43	42	44	41	38	45	40	40
	3 Paragraph-internal segmentation																					
total number of words		3106	2445	2440	416	705	1919	798	385	2036	2374	1005	2321	2055	2050	2049	1966	1873	1865	1971	1965	
capital letters	text segmentation	141	173	83	3	24	62	29	16	68	75	20	90	66	79	72	67	66	65	60	55	
	nomina propria/nomina sacra	38	187	22	0	21	142	40	22	0	2	24	2	1	11	4	2	1	14	0	0	
	both of the above	3	2	52	0	24	50	25	21	53	65	27	68	63	56	65	80	70	72	70	66	
	absolute frequency	182	362	157	3	69	254	94	59	121	142	71	160	130	146	141	149	137	151	130	121	
	ratio of nomina propria/nomina sacra in %	21	52	14	0	30	56	43	37	0	1	34	1	8	3	1	1	9	0	0	0	
	text segmentation	70	106	192	42	39	16	14	35	20	7	83	11	20	93	26	95	18	15	0	10	
	numbers/abbreviation	22	52	73	35	0	113	51	20	53	96	55	119	103	112	122	115	111	110	123	126	
	absolute frequency	92	158	265	77	39	129	65	55	73	103	138	130	123	205	148	210	129	125	123	136	
	amount of numbers/abbreviation in %	24	33	28	46	0	88	79	36	73	93	40	92	84	55	81	55	86	88	100	93	
	Ratio of text segmenting capital letters to punctuation marks		2.1:1	1.7:1	1.0:7	1.0:1	1.2:1	7:1	3.9:1	1.1:1	6.1:1	20:1	1.0:6	14.4:1	6.5:1	1.5:1	5.3:1	1.5:1	7.6:1	9.1:1	130:0	12.1:1
Co-occurrence of text segmenting capital letters and punctuation marks in %		6	3	93	0	25	4	2	70	6	1	89	5	6	47	12	57	0	5	0	2	

Corpus

Nr.	Year	Place	Printer	Identification
1	1481/82	Leipzig	Markus Brandis	GW 9577
2	1483/84	Leipzig	Markus Brandis	GW 9582
3	1484/85	Nuremberg	Friedrich Creussner	GW 9584
4	1485/86	Nuremberg	Peter Wagner	GW 9587
5	1486/87	Passau	Johann Petri	GW 9591
6	1486/87	Augsburg	Anton Sorg	GW 959010
7	1486/87	Nuremberg	Friedrich Creussner	GW 959020N
8	1488/89	Leipzig	Priamus Capotius	GW 959310N
9	1489/90	Nuremberg	Friedrich Creussner	GW 9596
10	1489/90	Nuremberg	Peter Wagner	GW 959620N
11	1489/90	Mainz	Peter Schöffner	GW 9586
12	1491/92	Leipzig	Gregor Boettiger	GW 9601
13	1491/92	Leipzig	Martin Landsberg	GW 9602
14	1491/92	Lübeck	Bartholomäus Ghotan	University of Warsaw Library Sd.52.79 adl.
15	1492/93	Leipzig	Martin Landsberg	GW 9606
16	1493/94	Leipzig	Martin Landsberg	GW 9608
17	1493/94	Nuremberg	Peter Wagner	GW 9609
18	1494/95	Nuremberg	Friedrich Creussner	GW 9611
19	1494/95	Nuremberg	Anton Koberger	GW 9612
20	1495/96	Nuremberg	Peter Wagner	GW 9617
21	1496/97	Leipzig	Martin Landsberg	GW 9619
22	1496/97	Magdeburg	Moritz Brandis	GW 9620
23	1497/98	Erfurt	Heidericus and Marx Ayrer	GW 9622
24	1497/98	Leipzig	Martin Landsberg	GW 9623
25	1497/98	Nuremberg	Peter Wagner	GW 9624
26	1498/99	Leipzig	Konrad Kachelofen (?)	GW 962510

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