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Are Computational Literary Studies Structuralist?

Evelyn Gius¹ , Janina Jacke²¹ Technical University of Darmstadt, ² University of Göttingen

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In this contribution we discuss what we call the “digital humanities-as-structuralism” narrative for the case of computational literary studies. To better understand the entailed criticism, we start with some background for the non-computational aspects in this narrative. First, we single out major criticisms against structuralism. We then introduce a general and theory-independent model of literary text analysis and discuss hypothesis development and justification in literary studies. This builds the ground for our analysis of structuralism criticisms in computational literary studies. In our discussion of the “digital humanities-as-structuralism” narrative, we examine the use of computational methods for the exploration and confirmation of interpretation hypotheses and its potential relation to structuralist issues.

We argue that the “digital humanities-as-structuralism” narrative may be productive where it cautions against reductionist approaches, but it is not appropriate for describing exploratory or partial approaches and the presentation of their findings. There, the computational approaches should rather be seen as enabling connectivity and fostering the joint endeavor of understanding.

1. Introduction

With this contribution we try to shed some light on the question of whether computational literary studies work in a structuralist way. This is a claim that is typically made by researches from (non-digital) literary studies and it is intended as a criticism of the computational approaches. For example, James Dobson claims the following about digital humanities approaches:

Yet all these different approaches can be understood to be part of a retrograde movement that nostalgically seeks to return literary criticism to the structuralist era, to a moment characterized by belief in systems, structure, and the transparency of language (Dobson 57).

In a more specific perspective, Nan Z. Da states in her critique of computational literary studies approaches:

It is easy to see the problem with structuralist arguments that are at bottom tied to word frequency: word frequency differences show up in all kinds of texts and situations that do not match what you want them to represent (613–614).

While many criticisms of digital approaches in the humanities are based on less informed views, such specific and detailed criticisms should be taken seriously from a literary studies point of view, whether computational or not. Therefore, we will take a closer look at the structuralism allegation. The designation of computational literary studies as structuralist, positivist or empiricist seems to conceal a similar idea in each case: the idea that computer-aided approaches to texts reduce literary works to formalistically describable and objectively countable objects. This can be read as a theory narrative, since computational literary studies would thus, from the perspective of its critics, be based on a highly inadequate or false textual or literary theory.

In what follows, we will be concerned with examining this theory narrative with regard to structuralism. To this end, we will first take a brief look at literary structuralism in order to specify and theoretically contextualize the criticisms. In the next step, we will sketch the traditional literary interpretation practice prototypically – this lays the ground for identifying important differences and similarities between established, non-computational and computational approaches to (the interpretation of) literary texts. Subsequently, we will take a closer look at different ways of using computational methods in computational literary studies in order to identify and analyze potential problems with reference to the criticisms, models and approaches outlined above.

With this, our examination of the “digital humanities-as-structuralism” narrative goes beyond the question of whether or not this narrative is adequate and thus provides a (hopefully helpful) perspective on the use of digital methods in literary studies.

2. Structuralism

The criticism that computational literary studies are structuralist implies that computational literary studies have inherent flaws which are also attributed to structuralism. In order to work out these issues, we start by taking a look at structuralism and its criticisms in this section.

So, what is structuralism? While it is probably undisputed that structuralism is the investigation of all kinds of literary structures, so many different variants of structuralism are advocated in literary studies that a uniform characterization of structuralism is not possible beyond a minimal definition (Spoerhase). Instead of trying to define structuralism, we therefore would like to point out the core elements of structuralism as well as their critique as presented in introductory works in literary studies and literary theory. We focus on introductions, anthologies and encyclopedias because they highlight

the essential assumptions of a literary theory. We consider this relevant for understanding the critique of structuralism for at least two reasons. Firstly, the criticism of a theoretical approach in literary studies is often based on the rejection of one or more of its basic assumptions (which are represented in introductory works). Secondly, these foundational works themselves often present points of criticism against the theories they feature.

In introductory works, structuralism is invariably considered to be adopted into literary studies from linguistic structuralism and in particular from the work of Ferdinand de Saussure (Gottlieb 11; Rowe 26; Leitch 21; Rivkin and Ryan 5; Culler 74; Titzmann 537). Saussure's distinction between *langue* and *parole* is central for structuralism: "The former is a system, an institution, a set of interpersonal rules and norms, while the latter comprises the actual manifestations of the system in speech and writing" (Culler 74). Here, the distinction between rule and behavior is crucial for studies of the production or communication of meaning (Culler 75). Whether for Ferdinand de Saussure's linguistic theories, Claude Levi-Strauss's structural anthropology or Roland Barthes's approach of applying semiotics to literary criticism: in all approaches "structuralism importantly recognized that meaning – whether of a sentence, a kinship web, or a short story – is produced at least as much by the relations between elements as by the elements themselves" (Gottlieb 11; Schulenberg).

Structuralism, like every type of formalism¹, conceives of "culture in general as constituted by the same rules of operation that one finds in language" (Rivkin and Ryan 5). Cultural meaning, therefore, "is determined by a whole system of constitutive rules: rules which do not regulate behavior so much as create the possibility of particular forms of behavior" (Culler 73). Or, as Levi-Strauss puts it: "particular actions of individuals are never symbolic in themselves; they are the elements out of which is constructed a symbolic system, which must be collective".²

With regard to its reception and relevance, structuralism is particularly important in France in the 1960s. From there, it was also influential for German literary studies (Titzmann 535), while it has received relatively little attention in the North American area. The "well-known story" is that "the North American reception of structuralism was complicated by the simultaneous arrival of post-structuralism" (Gottlieb 11). This is mainly due to Derrida's lecture "Structure, Sign, and Play in the Discourse of the Human Sciences", which he delivered at Johns Hopkins University in 1966.

1 Generally, 'formalism' has two connected, but different meanings: it is used i) as a kind of umbrella term for form-oriented approaches in literary studies or ii) as a short form, for Russian formalism, (For a discussion of similarities and dissimilarities of the three formalist approaches Russian formalism, French structuralism and New Criticism, see Schulenberg). Unless otherwise specified, we use the term in the first, broader sense.

2 Cf. Claude Levi-Strauss "Introduction à l'oeuvre de Marcel Mauss," p. xvi, as quoted in Culler 73.

There, Derrida did not establish structuralism in North America as planned, but instead “radically challenged structuralism’s basic claim that systems of signs, properly interpreted, produced stable and ahistorical meanings” (Gottlieb 11). Since the critique of structuralism thus in a sense preceded its introduction, one can assume that this did not exactly promote the acceptance of structuralism in northern America.

But let us now take a short look at how structuralism is criticized in contemporary accounts, both by the authors of the introductory works and in the context of criticisms they refer to. According to Rowe, the “[c]ommonest criticism of the structuralists” is that they do not take their own explanatory models into account (Rowe 25). The reason, in his view, is that in practice structuralists mostly study a system rather than structure in the sense that system means a “whole organization”, which makes full explanation possible. This is also essentially the charge Lee Patterson makes against formalism (Patterson). Another aspect frequently represented as criticism is that, in the further course of the 20th century, the post-structuralist conception of meaning was clearly more important than the structuralist one. Even beyond deconstruction, meaning is seen as a process rather than a final product and it is assumed that “seemingly stable linguistic and conceptual oppositions and hierarchies are in fact always unstable and even self-contesting” (Gottlieb 12). In the last decades of the 20th century, this led to structuralism being regarded as reductionist. This not only occurred insofar as Marxist critics attested to all literary theory accounts that “teaching [them] frequently involves little more than imparting sets of vocabularies and frameworks for their enunciation”.³ Within these 20th century literary theories, the structuralist was also specifically criticized because “paying attention to form was frequently viewed as old-fashioned at best and dangerously naive at worst” (Gottlieb 12). From the perspective of more context-oriented approaches, this naivety was specified as ahistorical: “structuralism’s tendency to make everything a matter of language or signs is both dangerously idealizing and naively ahistorical”.⁴

However, the accusation of ahistoricity brought against structuralism is not always as comprehensive as in the aforementioned cases. Rather, the ahistoricity criticism is also relativized in two ways: firstly, structuralism is considered to build – at least theoretically – on “a set of *relations* among *elements* shaped by a *historical* situation” (Rowe 25, emphasis in original). In this view, structure is characterized as historically specific. It is important to note that this historical specificity is not connected to historical change.

3 Gottlieb referring to the criticism expressed by Terry Eagleton: “Literary theorists, critics and teachers, then, are not so much purveyors of doctrine as custodians of a discourse. Their task is to preserve this discourse, extend and elaborate it as necessary, defend it from other forms of discourse, initiate newcomers into it and determine whether or not they have successfully mastered it.” (Eagleton, 1983: p. 201)” (Gottlieb 15).

4 Gottlieb on Fredric Jameson’s critique of structuralism (Gottlieb 19).

The reason for this is that structuralism does consider language at a particular time but is not interested in historical change, that structuralism is concerned with the synchronic (and probably current) and not the diachronic, changing over time (Leitch 21). Secondly, ahistoricity is limited by the fact that structuralism builds on a formalist conception of literature. It conceives of literature as “bearer of permanent truths about the human condition” (Patterson 24). Accordingly, structuralist approaches are ahistorical in the sense that they assume no local historical relevance of literature, at the same time assuming literature to contain truths that “were, on the contrary, true for all time” (Rowe 254).

Next to ahistoricity, the critique of textual immanence and a connected reductionist concept of meaning is often put forward as a criticism of structuralism. Structuralism considers “literary texts and how they worked rather than authors’ lives or the social and historical worlds to which literature refers” (Rivkin and Ryan 6). Here again a formalist conception of literature is the object of criticism: “To the formalist, literature is about itself: novels are made out of other novels; all poems are about language” (Mitchell 16). Now, this view is in principle unproblematic. In the 20th century, questions of form were considered central not only to the process of interpretation, but also to the specifically literary quality of a text. The Russian formalists abolished the dichotomy of form and content that had prevailed since Aristotle. Form was content in that the defining elements of a text were thoroughly formal and structural (Gottlieb 10). The problematic point about this understanding is rather the related structuralist view already quoted above that “systems of signs, properly interpreted, produced stable and ahistorical meanings” (Gottlieb 12). This is also accompanied by the criticized understanding that structuralism can “chart” and thus explicate the “not-quite-explicit conventions and rules of reading” of authors and readers (Leitch 22). Moreover, while most (other) approaches to literary studies relate literary texts to specific extratextual contexts, structuralism generally proceeds in a purely text-immanent manner. One of the reasons for this is that structuralism does not presuppose ‘object-external’ theories as true (Titzmann 536).

Beyond ahistoricity and the reductionist concept of meaning there is another, more general aspect at stake in the “digital humanities-as-structuralism” narrative which is more difficult to tackle. Structuralism is sometimes presented by both structuralists and non-structuralists as incompatible with the majority of current literary theories. At the center of this is the claim that structuralist analysis satisfies scientific demands, that is, that it can be explicated (Titzmann 536). Thus, structuralism (together with system theory) is conceived of as being in opposition to literary theory approaches conceived since Dilthey as ‘humanistic’. Structuralism postulates the possibility of rational, intersubjective analyzability and theorizing even with respect to objects such as literature (Titzmann 535). This counter-narrative is

strengthened with two positions that originate in New Criticism but are also attributed to structuralism: the criticisms labeled as the intentional fallacy and the affective fallacy. According to the critique of the intentional fallacy, meaning lies in the verbal design of a literary work and not in the statements the author makes about his or her intent. The critique of the affective fallacy holds that the subjective effects or emotional reactions that a work evokes in readers are irrelevant to the study of the verbal object itself, since the meaning of the work lies solely in its objective structure (Rivkin and Ryan 6). With this, authors and recipients are practically excluded from literary criticism and thus many theories are indirectly labelled unscientific.

These differences stated between structuralism and most other theories are reinforced by the fact that theories of literature are often connected to specific theories of reading. While the formalist conception of literature corresponds to the notion of reading as careful explication and evaluation of dense poetic style, other conceptions of literature rather elicit a biographical approach, an exegesis or decipherment or a cultural critique as the adequate approach to literature (Leitch 6).

This binary perspective of structuralism as opposed to practically all other literary theories is not helpful when discussing the question of whether computational literary studies are structuralist or not. Considering it would mean discussing structuralism on a general level. This goes far beyond the scope of our contribution and therefore we will mainly leave this aspect out of our considerations. It is, however, helpful to keep in mind that, in practice, structuralism-oriented approaches like (structuralist) narratology are often applied in literary studies without the presented assumption that the text's meaning is fully determined by explicating its structures (and thus without excluding contextual references, e.g. to authors and readers). On the contrary, structuralist-narratological concepts and analysis are viewed as neutral towards theories of interpretation (and thus meaning) (Kindt and Müller, "Narrative Theory and/or/as Theory of Interpretation" 215).

In what follows, we will concentrate on the process of literary text analysis. More precisely, we will assess computational literary studies approaches to literary text analysis with regard to the structuralist flaws highlighted in this section, i.e. the question of the ahistoricity and the reductionist concept of meaning.

3. Text analysis and interpretation hypotheses in literary studies

In this section, we provide the background for the further discussion of the "digital humanities-as-structuralism" narrative by looking at the process of (non-computational) literary text analysis (a process that also encompasses interpretation, see subsection 3.1). We will develop a general model for it and discuss the procedure of (again: non-computational) development and justification of interpretation hypotheses. Based on this, we will discuss

computational literary studies approaches with regard to two major structuralism criticisms in the next section. This procedure entails that we do not believe that the reason for the computational literary studies criticism is merely based on the argument that computational literary studies typically focus on the literary analysis of *texts*. On the contrary, we generally assume that even literary studies approaches concerned with aspects beyond the very texts in some way relate to the literary analysis of texts. Therefore it is rather the computational literary studies' *way* of literary text analysis that their critics consider flawed.

3.1. Literary text analysis

So, how can literary text analysis processes be described prototypically? In literary studies, there are many approaches to literary text analysis and most of these methods or theories lack precise specifications of individual steps of interpretation. Therefore there is too much overall diversity and too little specificity in the individual approaches for allowing to aggregate concrete but at the same time general rules for literary text analysis. Nevertheless, attempts at a general description of literary text analysis can be found in introductory works or specialized lexicons. However, descriptions in introductions to literary studies often expound the problems of the concept of literary text analysis rather than explicating it. The major aim is to help students to develop an understanding of the diversity of approaches in literary studies, which distinguishes itself from non-scholarly procedures. Instead of detailed descriptions, procedures are outlined by way of example and supplemented with general observations or references. An additional challenge is terminology since central terms like “text analysis” as well as “interpretation” are used in different contexts as well as in everyday life and thus may be sources of misunderstanding. Especially the ambiguity of “text analysis” cannot be resolved completely without the introduction of new and probably artificial terms. Nevertheless, with our model we hope to be able to give a sufficiently clear overview of the process of literary text analysis, and we will provide definitions of the way in which we use central terms.

For our model of literary text analysis, we draw on the definition in the *Reallexikon der deutschen Literaturwissenschaft*, in which (literary) text analysis is defined as a generic term for the scholarly study of literary texts that includes both description and interpretation. In this understanding, (literary) text analysis and interpretation are synonymous (Winko; for the definition of the term we referred to, see 597). Thus, the understanding of texts is at the essence of literary text analysis, a process that is usually captured in literary studies by the term “interpretation.” This understanding of (literary) text analysis differs from that of other, typically non-literary approaches which do not aim at a comprehensive understanding of the text in the analysis procedure. We are trying to avoid this confusion by calling the literary studies process aimed at a comprehensive understanding “*literary* text analysis” and the operation of descriptively dissecting a text “text analysis”. The concept of

literary text analysis is relevant to all literary studies efforts at understanding text, regardless of which literary theory, literary studies method or reading theory underlies it.⁵

Activities related to the study of literary texts include both text analysis, which encompasses description and analysis (we use “analysis” without any additions for the operation of arranging text descriptions and putting them in relation to one another), and interpretation of texts (i.e. acquiring an understanding of the text as a whole, which usually includes the consulting of extratextual contexts). Text analysis can be seen as the precursor and condition of interpretation, although the boundaries between text analysis and interpretation are blurred from an epistemological point of view. In principle, however, assignments of meaning are more elementary or closer to the text in the context of text analysis than in the case of interpretation and are thus easier to verify. Moreover, assignments of meaning in the context of text analysis focus on intratextual contexts and draw only on those extratextual contexts that are necessary for primary understanding. The results of textual analysis in turn serve as the basis for interpretation, with inter- and extratextual contexts being drawn upon in this step to generate hypotheses about the meaning of the text as a whole. Thus, both the text analysis step and the interpretation step involve the inclusion of additional contexts. We add to these two reading as a third (and, actually, preceding) activity which is also typically used in practices designed to reconstruct meaning.⁶

Accordingly, the three central activities of literary text analysis are reading, analyzing and interpreting. Especially for text-oriented approaches, two additional sub-activities can be differentiated within the activity ‘text analysis’: description and analysis (see [Figure 1](#)). The description contains mostly purely descriptive procedures which aim at the quantifiable factors as well as linguistic surface phenomena of a literary text. Analysis, on the other hand, aims at structure formation and accordingly examines more global structural features of a text such as isotopies or other internal semantic relations between textual elements (Winko 598). This distinction between text analysis and interpretation as well as the additional inclusion of reading as a typically preceding activity allow for a more differentiated description of activities in literary studies.

⁵ Because it is about text comprehension as a goal, this concept could also be called “hermeneutic”, although this is potentially misleading. Such a broad understanding of hermeneutic analysis also underlies other contributions of ours (Gius and Jacke, “Informatik und Hermeneutik. Zum Mehrwert interdisziplinärer Textanalyse”; Gius and Jacke, “The Hermeneutic Profit of Annotation: On Preventing and Fostering Disagreement in Literary Analysis”). While the specific hermeneutic method of textual interpretation is also included in our considerations, it is by no means seen as central. Instead, the focus of our theoretical contributions is placed on interpretation, irrespective of a specific theory.

⁶ Köppe and Winko state that the steps of reading and text analysis are – though described differently in detail – adopted by most theories of interpretation in literary studies (308).

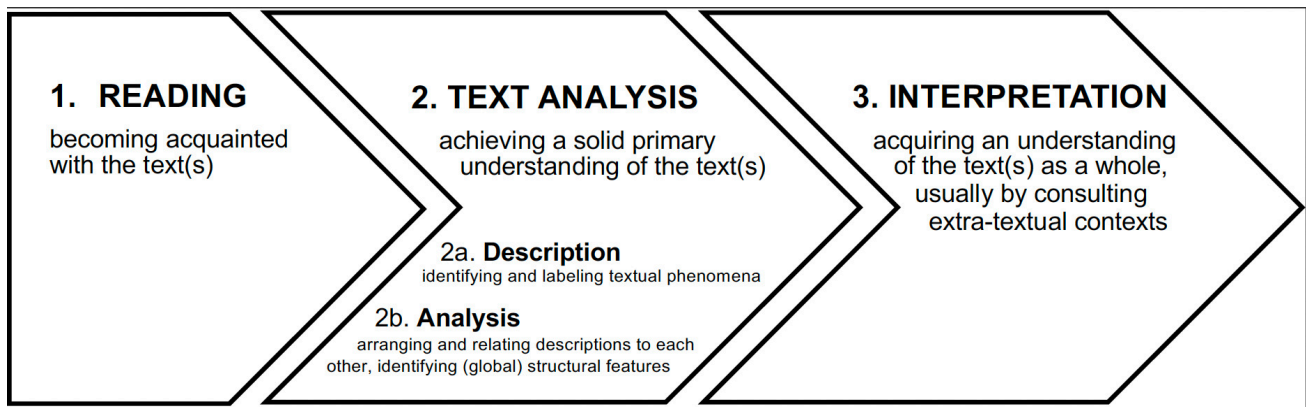


Figure 1. The ideal-typical process of literary text analysis

However, this model is ideal-typical and thus it is in practice implemented in various ways. Firstly, literary text analysis is usually not a linear but an iterative process. Secondly, the sequence of the stages and the focus on them may vary according to its goals. For example, during the first reading, an initial interpretive hypothesis may emerge that is already based on (i) the linguistic understanding of the text (although neither step 2a nor step 2b necessarily take place), (ii) literary-theoretical knowledge or assumptions (e.g. implicit or explicit literary theories of meaning), and (iii) contextual knowledge (e.g. knowledge of epoch, genre or intertext, biographical knowledge of the author, knowledge of contemporary society or intellectual currents, etc.). Or, if reference is made to conceptual text fixations or text structures (2a and 2b) in the context of interpretations, then this is usually done selectively on the basis of the interpretation hypothesis: those text passages or descriptive findings are selected which are judged to be exemplary (i.e. typical and generalizable) and which fit to the interpretation hypothesis.

For the following considerations, the process of textual analysis is conceived of as a three-stage engagement with texts in the form of reading, text analysis, and interpretation, whereby the second stage can be further differentiated into purely local description and analysis focused on structural saliences. This model is supposed to be independent of a specific theory or method and thus adaptable to all kinds of literary text analysis, both with regard to its iteration, sequentiality and the extent to which the single stages are present.

3.2. Interpretation hypotheses in literary studies

The general model of literary text analysis that was introduced in the last subsection gives an impression of the different steps or operations that are executed when analyzing and interpreting literary texts. What it leaves open is the question of where in this process (interpretation) hypotheses are developed and argued for. The reason for this might be that the notion of research as the finding and testing of hypotheses is more established in the natural and social sciences (Schickore par. 5) and only rarely applied to

the humanities (and literary studies in particular).⁷ Mapping these notions onto the general model of text analysis, however, can help to understand how computer-aided methods are put to use in computational literary studies and how their use relates to established practices in non-computational approaches.

Typically, in non-computational/established approaches to literature, interpretation hypotheses will be generated gradually while reading a text for the first time (step 1), based on contextual knowledge (e.g. about the socio-cultural circumstances of its genesis, the author, relevant discourses or theories of literature/interpretation) and descriptive observations concerning the text itself. This process can be described as mutually influencing in the way that a scholar's interpretation hypotheses have an effect on the kinds of descriptive observations they will make in a text, and the observations will also impact their hypotheses and might lead to modifications.⁸ The different steps (or the gradual progression) of hypothesis development will usually remain implicit and undocumented. Once a hypothesis is formed, selected text analytic procedures (step 2) may be performed that highlight and interconnect the textual features that are relevant against the background of the hypothesis. These analyses can serve as a basis for testing/justifying the hypothesis.⁹ However, the part of hypothesis justification that is typically more dominant in non-computational, established approaches is the contextualisation of the text (step 3) where the text as a whole and/or the results of selective text description and analysis are related to relevant (extratextual) knowledge, e.g. about the generation or reception of a text, its socio-cultural background etc.¹⁰

4. Computational literary text analysis as structuralism?

We will now turn to discussing the “digital humanities-as-structuralism” narrative against the background of the model of literary text analysis and the question of hypothesis development discussed in the previous section with regard to the criticisms against structuralism elaborated in section 2. We will focus our inquiry on approaches in which computational methods are applied to literary corpora and the results are analyzed in order to gain new insights into these texts.¹¹ The two main ways of using computational

⁷ For an application to the digital humanities, see Owens, Gerstorfer.

⁸ Cf. the “hermeneutic circle” (Schleiermacher) or “hermeneutic spiral” (Stegmüller).

⁹ It seems safe to say that ‘text adequacy’ is widely regarded as one theory-independent criterion for supporting the plausibility of an interpretation (Strube). Kindt and Müller list different assumptions about the concrete relation between text description/analysis and interpretation (Kindt and Müller, “Narrative Theory and/or/as Theory of Interpretation”; Kindt and Müller, “Wieviel Interpretation enthalten Beschreibungen? Überlegungen zu einer umstrittenen Unterscheidung am Beispiel der Narratologie”).

¹⁰ On different notions of “context” in connection with literary interpretation, cf. Danneberg.

¹¹ It is important to note that from all digital humanities approaches with a literary studies background those approaches involving the use of computational methods are more often criticized from a literary studies perspective than, e.g., manual annotation approaches, since the latter show a greater methodological proximity to established, non-digital approaches to literature (Jacke 18, 21–22). The same holds for approaches directed towards the edition of text or the efforts for building repositories or archives.

methods in these contexts are (1) to use them in an exploratory way, i.e. as a heuristic support in developing interpretation hypotheses, and (2) as an analytic device, i.e. to test and/or justify interpretation hypotheses. Following an established distinction in data analysis, we call this second case “confirmatory”. The use of computational approaches is typically restricted to steps 1 and 2 of the model introduced in subsection 3.1.¹² Step 3, the actual interpretation (i.e. the contextualisation of the text for the purposes of hypothesis specification and justification) is usually not based on (automated) computational procedures. The reason for this is that a computational implementation of step 3 would require to computationally model the literary interpretation process as such. While it is not inconceivable to do this, we are not aware of approaches that have implemented this so far. Instead, the necessary additional operations for interpretation such as a close reading of potentially relevant texts or text passages, manual annotation, or the integration of interpretation-theoretical assumptions and extra-textual knowledge are up to now performed by scholars.

We now proceed to discussing the exploratory and the confirmatory use of computational methods in computational literary studies approaches in detail. In this context, we will also comment on whether and, if so, how ‘structuralism allegations’ as identified in section 2 apply in the discussed cases.

4.1. Exploratory approaches in computational literary studies

Typically, when computational methods are used in an exploratory way in computational literary studies, existing algorithmic procedures are applied to a corpus in an exploratory manner in order to identify conspicuous results that could be eligible for developing an interpretation hypothesis. One possibility for such a result would be that a text strikingly differs from the other texts in a corpus concerning one feature. Other possibilities include cases where one or more textual features turn out to be remarkably frequent (or infrequent), unevenly distributed between or within texts or cases that point to (seeming) relations between certain features and one or more subgroups of the texts. Based on such observations, an interpretation hypothesis about the text’s meaning is formed that is able to explain (the origin, the effect and/or the function of) the features in question. In this approach, the step of reading in the model from subsection 3.1 (step 1) is replaced or supported by computational methods.

¹² Many algorithmic methods can be used for both exploratory and analytical purposes. For example, it is possible to use topic modeling procedures to obtain a kind of overview of the topics in a corpus and, based on this, develop a research question. However, topic modeling can also be used for a specific research question. For example, one could cluster a corpus of texts based on the assumption that the topics are genre-specific and then consider the clusters as possible genres.

Naturally, the selection of methods to apply to the text(s) cannot (in a strong sense) be driven by a hypothesis, because the purpose of their application is exactly to find a hypothesis in the first place. Neither do the texts have to be known in detail before the methods are applied. Thus, the selection of computational procedures will be driven mostly by practical concerns, e.g. which methods are available and, maybe, easy to apply. However, it is indeed reasonable for scholars to carefully think about whether the applied methods make any suppositions like a specific concept of ‘text’ that forms the basis of a computational procedure. For example, many current computational methods conceive of text as a “bag of words”, not as a linear structure, which is not compatible with the text conception of all approaches in literary studies.¹³ While it is possible to apply methods whose presuppositions are not in line with the literary scholar’s assumptions, it is important to keep these peculiarities in mind to be able to interpret the outcome of the exploration adequately.¹⁴

Especially in the context of the exploratory use, the application of selected computational methods to a literary corpus typically results in a large amount of data and, even more, qualities of this data that need to be identified. This is a peculiarity in which computational approaches to literature differ from non-digital (even structuralist) approaches. This is, on the one hand, due to the fact that, traditionally, descriptive observations are made far more selectively against the background of and in the interplay with interpretation hypotheses. Thus they are already to a greater extent integrated in a system of sense making. On the other hand, the sheer number of outcomes in terms of data and its properties is cognitively impossible to integrate at once in a meaningful way. Because it is much less clear in the exploratory approach what exactly the scholar is looking for, they will look for salient properties that are exposed by the computational method, e.g. with regard to the frequency or distribution of text features, or similarities/dissimilarities between different texts that are analyzed in comparison. This activity is often supported by visualizations that help to explore the data.¹⁵ Findings from this exploratory process will then serve as a basis for developing interpretation hypotheses – we will elaborate on this step later in this section.

Now, in which ways can such exploratory uses of computational methods be confronted with ‘structuralism allegations’ – and in which (if any) regards do these allegations apply? When computational methods are used for hypothesis development, the choice of methods is rarely inspired by

¹³ Actually, the “bag of words” concept is probably not in line with most text concepts in literary studies. Think, for example, of rhizomatic concepts or of text concepts based on sequentiality – or most of the text concepts relying on defined relations between the parts of text.

¹⁴ For example, for a discussion of topic modeling from a literary studies’ perspective, cf. Uglanova and Gius.

¹⁵ Next to the use of visualization options that are available within text analysis tools or provided by packages of programming languages, this also includes visualizations developed for specific analysis, such as LDAvis for topic modeling or t-SNE for word2vec analyses (Sievert and Shirley; Maaten and Hinton).

contextual information and thus “ahistorical”. Due to the nature of computational text analysis, the focus lies on text immanent data and the results can only be descriptive. Based on this, critics could allege that exploratory computational approaches only produce a large amount of (entirely or mostly) irrelevant data that is not fit to provide meaningful insights into literary texts.

However, a number of replies can be made against such claims. The first one is that exploratory computational approaches can, should and often do consider minimal contexts. For example, minimal theoretic contexts are included whenever the theoretic presuppositions and implications of a computational method are considered (as in the above-mentioned example of the concept of ‘text’), and often additional contextual information is included in the metadata of digital texts.

Also, the exploratory use of computational methods is typically embedded in the larger process of literary text analysis as described in subsection 3.1 and supplemented with many non-computational operations. Thus, when the descriptive output of the computational approaches is evaluated and significant findings are pinned down, the actual development of hypotheses that might be able to explain these findings will have to consider (theoretical and historical) contextual knowledge to be plausible¹⁶ – a necessary minimal criterion would be to consider linguistic change.

It must be noted, however, that in many cases the initial choice of methods is not inspired by contextual/historical knowledge even though this may be desirable. Still, this cannot plausibly be held up as criticism, because there are no explicit rules prescribing specific procedures for the development (as, sometimes, opposed to the justification) of interpretation hypotheses in literary studies. Therefore, as long as an approach helps a scholar to find interesting hypotheses (that can, then, plausibly be argued for), it should be deemed legitimate.

Let’s now turn to the reductionist concept of meaning allegation. A crucial point to keep in mind in this context is that no actual claim about the meaning of a text is made in the context of exploration/hypothesis development. The formulation of a hypothesis is not equal to the attempt to argue for it.¹⁷ It is merely to be regarded as an idea, as “food for thought”. As indicated above, the finding of interpretation hypotheses in literary studies is not something that is possible in a strictly rule-governed way. Instead, it is sometimes mystified (e.g. when hermeneuticists like Schleiermacher

¹⁶ An example would be a study Schwan et al., where annotations of narrative levels and temporal phenomena in texts are explored with the help of visualisations. Narrations with a conspicuous distribution of embedded narrations are singled out, and hypotheses concerning their function are developed and tested with the help of close reading and reference to relevant contexts.

¹⁷ As Trevor Owens aptly notes: “If you aren’t using the results of a digital tool as evidence then anything goes”.

speak of “divination”) or at least seen as complex interplay between textual knowledge, (personal) experience, historical and theoretical knowledge etc. that is difficult or impossible to analyze and understand in detail. The finding of interpretation hypotheses (as, sometimes, opposed to their justification) seems to come with a genuine “anything goes” – so there seems to be not much speaking against a computational approach that targets the linguistic material of the text. However, while nothing can be said against a method of hypothesis development as long as it helps scholars to find plausible and insightful interpretations, the chances of producing plausible and insightful hypotheses can, of course, be significantly increased if a bit of thought is put into the process. This is true for both computational and non-computational approaches to hypothesis development. As mentioned, this could mean for the computational approach to analyze the concept of text underlying computational methods and to choose one that can be aligned with one’s own concept. In the context of non-computational approaches, this could mean that (depending on a scholar’s text/interpretation theory) the first reading of a text should not be informed by anachronistic contexts.

Actually, in the case of the exploratory use of computational methods, the required assumption concerning the relation between the linguistic material and the text’s meaning is probably little contentious. Rather, the exploratory use of computational methods can operate on the minimal assumption that linguistic or formal peculiarities of a text can have an origin, a function or an effect that contributes to the meaning of the text. This is why the finding of these peculiarities and the attempt to explain their origin, function or effect may help to develop interpretation hypotheses. It is not necessary to assume that *every* linguistic peculiarity contributes to the text’s meaning or that every relevant aspect of a text’s meaning can be uncovered starting from its linguistic material.

If not all the data generated in the context of exploratory computational approaches is relevant, it is indeed a special challenge to identify the data that *is* actually relevant or fruitful for hypothesis development. However, this puts a finger on a general theoretical or methodological deficit in literary studies: literary studies does not offer any procedures to assess the relevance of (and select from) larger amounts of data or descriptive findings in a theoretically and methodologically sound way. Established/non-computational approaches usually circumvent this problem by only considering and referring to a small amount of descriptive observations that is regarded as “exemplary”. The exemplariness, however, is rarely argued for – instead the observations gain their value for the individual scholar because they are in line with their interpretation hypothesis. This not only sweeps the problem of selection under the carpet – it also circumvents the necessity of explaining the relationship between quantitative conspicuousness and exemplariness.

We would like to discuss another aspect that can also be considered a case of reductionism, namely the fact that exploratory computational approaches may not fully or explicitly perform the step of hypothesis development. It is, for example, possible to simply run computational procedures on a corpus of literary texts and conclude with the compilation of selected (i.e. conspicuous) descriptive observations. In this case, the hypothesis would be both implicit and not very contentious. The claim would merely be that the identified peculiarities (qua their comparative conspicuity) *might* be relevant for the text's meaning. It is also possible to form a more elaborate interpretation hypothesis based on the computational results (plus textual/contextual knowledge), but not to engage in the testing or justifying of this hypothesis (i.e. to leave out steps 2 and 3 of the model). In these cases, it could be criticized that a "formal" type of relevance is the only ground for suggesting possible relevance in the literary studies sense (especially: relevance for the meaning of the text).

However, digital humanities research in general (and with it also computational literary studies research) seems to come with a different research culture and attitude than non-computational literary studies. Research does not always aim at comprehensiveness – instead, it is more common to present modest or preliminary results, to present hypotheses without testing them or to report extensively about the process and progress of research, including failure.¹⁸ From this perspective, it is more than legitimate for researchers to present modest hypotheses and/or not to engage in testing them. This can be seen as providing a mere building block to research on texts as joint venture. It is just important to make clear or, respectively, understand the status of these research contributions (i.e. their limited claims of validity or coverage).

Finally, it is, of course, possible that the attempt to develop an interpretation hypothesis with the help of computational procedures fails, e.g. because no conspicuous/interesting findings are revealed, because it is not possible to find a plausible explanation for the findings or because the explanation is not in any way connected to questions of meaning or interpretation. However, it is equally possible for an established, non-computational way of hypothesis development to fail: there is no guarantee that a scholar will come up with an interpretation hypothesis when reading a text, and if they take more specific efforts to develop an interpretation hypothesis, it is equally possible that several paths will fail. Unfruitful attempts, however, will rarely be documented in established, non-computational literary studies research – which is not necessarily an asset.

¹⁸ For a comparison of research cultures, see Schruhl; for a discussion of the digital humanities' way of dealing with failure, see Dombrowski.

Summing up, requirements for exploratory uses of computational approaches to literary text analysis are to think about possibly relevant presuppositions inscribed in the applied methods, to consider minimal contexts like linguistic change and to clarify the status of the results. Apart from that, these approaches should not be criticized for ahistoricity or a reductionist concept of meaning: there are no rules for the development of hypotheses (which should not be confused with the arguing for their plausibility). The computational exploration of literary texts can thus be regarded as a supplementing/alternative approach to hypothesis development that offers its own assets, such as a broader and more open view on text(s) and descriptive data.

We will now move on from exploratory to confirmatory computational approaches to literary text analysis and look at how the allegations and possible replies differ.

4.2. Confirmatory approaches in computational literary studies

According to our literary text analysis model, after a hypothesis has been formed in step 1, computational methods can help to test it in step 2. The hypothesis can be formed in the established, non-computational way or with the help of exploratory computational methods. It can either be a relatively vague hypothesis concerning the relevance of specific features in literary texts under investigation or a (rich) interpretation hypothesis that is tested here. We call the use of computational methods to test a hypothesis in the process of literary text analysis “confirmatory”.¹⁹

For the confirmatory use of computational methods, in contrast to the exploratory approach, the selection of computational methods should be hypothesis-driven. Since the hypothesis directing the selection of methods is usually closely tied to a literary studies perspective, the applied methodology needs to be aligned with the theoretical or conceptual background.²⁰ This may entail developing new computational methods, but this is not necessarily the case. The challenge – and thus also the problems – for computational literary studies approaches lies in the operationalization of the question it tackles. For this, a lot of decisions have to be made and the resulting research design can be defined in a more or a less complex way with regard to the operationalization of phenomena of interest, the texts that are analyzed as well as the way computation is used for gaining insights.²¹ Even though there

¹⁹ This terminology is based on the distinction between exploratory and confirmatory data analysis, but it should be mentioned that the result of the confirmatory approach can also be a falsification or weakening of the hypothesis. In this, the computational approach differs from the established, non-computational approach, where publications rarely mention hypotheses that have been dismissed after an attempt to justify them failed.

²⁰ The need to treat separately the theory of a phenomenon and “the formal model of an indicator, which is used to test hypotheses derived from the theory and which are assumed to be directly or indirectly related to the phenomenon” is frequently overlooked by critics of computational literary studies (Jannidis).

²¹ For a discussion of the complexity of the five dimensions in concern of computational text analysis (Gius).

is a wide range of possibilities for designing the computational approach, the challenge in the steps of the literary text analysis model is typically reduced by the mere fact that computational approaches are (or should at least be) aligned with the theoretical background guiding the analysis. Since the applied computational methods have been chosen in a more targeted way and there is an already developed (interpretation) hypothesis that is being tested, the evaluation of the generated data can be more straightforward.

When computational methods are used in a confirmatory approach, the allegation of ahistoricism and a reductionist concept of meaning (amounting to the irrelevance of the analyses) can be made in a way comparable to the case of the exploratory use. However, while we have argued that, basically, “anything goes” in the context of exploration and hypothesis development, the necessary claims of validity are stronger in the case of confirmatory uses of computational methods – so the allegations might be less easy to refute.

When it comes to confirmatory approaches, the allegations of ahistoricism and a reductionist concept of meaning might, again, be based on the fact that computational analysis is usually only applied to the literary text itself and can only consider its linguistic features. However, if the application of computational methods is embedded in a “complete” process of literary text analysis, the hypothesis that is tested in step 2 was most likely developed by drawing upon the text’s (historical) context(s), and the descriptive analysis results are discussed in relation to contextual information in order to argue for their relevance for the text’s meaning. Therefore, even though the very analysis (i.e. steps 2a and 2b) may be ahistorical and text-immanent, this does not hold for the overall literary text analysis. Rather, it is the researchers who are in control of the process and should ensure the adequacy of their approach.²²

Even though it is, in our view, a central issue, this contextualizing of the computational outputs does not touch upon the question of whether computational literary studies analysis (in the sense of step 2) conceives of meaning as deducible from the linguistic material of texts. It is probably little controversial to say, as we mentioned earlier, that computational literary studies are indeed relying on the assumption that the linguistic material of a literary text is crucial in determining its meaning. But this does not entail the idea that meaning can be reliably derived from the linguistic material of a text (and from this alone). Still, in the context of the confirmatory use of computational methods, the assumed relation between linguistic material and text meaning is a bit more contentious than for the exploratory use. The idea here is that formal features of a text can generally serve to test

²² This holds for practically every activity performed in the digital humanities (and of course also beyond) as Katherine Bode points out: “Constructing and curating, or modeling, literary datasets – including any interventions we make in existing ones – involves political, social, and ethical decisions, the outcomes of which are neither inevitable nor inevitably justified” (Bode 122).

an interpretation hypothesis, and thus strengthen or weaken a hypothesis about the meaning of a literary text. It is not necessary to assume that all linguistic features of a text can (always) serve this purpose – this is why specific computational procedures are selected, namely those that the scholar deems fruitful in connection to his or her interpretation hypothesis for a text. Neither is it necessary to assume that linguistic or formal features (alone) can as much as *prove* an interpretation hypothesis. Generally, the criteria for good interpretations (i.e. the justification of an interpretation hypothesis) are relatively rarely discussed in literary studies, and if they are, it is often assumed that the criteria vary according to different theories of literature/interpretation. Some features, however, could possibly be considered theory-independent minimal criteria for good interpretations (i.e. interpretation justifications), for example consistency, coherence, explanatory power or – and this is relevant here – compatibility with the linguistic material of the text (Strube; Kindt 35), even if the exact relation between textual description and interpretation still remains unclear.²³

From this perspective, the “structuralism allegation” that computational literary studies are basically incompatible with all other approaches to literature/interpretation does not hold. On the contrary, if computational approaches do not claim that descriptive analysis fully determines the meaning of a literary text, it is not only compatible with but also potentially relevant for all other approaches. However, against this background of theoretical half-blind spots, computational literary scholars should make the exact relation between the target features of the employed computational methods and the relevant literary concepts explicit, and they should put the results into perspective if necessary. This means that one should start with a research question or hypothesis and have reflected on and tested to some extent the suitability of the procedure for the analysis. It is important that one can assume a certain validity of the results, i.e. that the procedure measures what one wants to measure.

Taking up our discussion of only partial hypothesis development as supposedly reductionist practice from subsection 4.1, we would like to conclude by elaborating on “incomplete” text analysis in computational literary studies. In which regard can the confirmatory use of computational methods (i.e. when computational methods are used as text analytic tools to test a hypothesis) be incomplete, in the sense that it is not embedded in a complete process of literary text analysis as pictured in [Figure 1](#)? One case of partial text analysis is characterized by basing the computational analysis on a relatively weak hypothesis that does not necessarily have to be interpretive,

²³ At least four perspectives seem possible (cf. in part Kindt and Müller, “Wieviel Interpretation enthalten Beschreibungen? Überlegungen zu einer umstrittenen Unterscheidung am Beispiel der Narratologie”): Descriptive findings can (a) suggest certain interpretations, (b) support the plausibility of interpretations in the context of testing hypotheses, (c) reveal interpretations as false or implausible in the context of testing hypotheses, (d) inspire interpretive hypotheses in a heuristic fashion.

e.g. that a specific text phenomenon is especially conspicuous in a text or a text corpus. Other partial text analyses may start with an interpretive hypothesis and then target only the textual features that are connected to this hypothesis in the context of a computer-aided text analysis, but not additional contexts that would be necessary to fully justify the hypothesis.

In cases like these, the allegations of ahistoricism and a reductionist concept of meaning, again, do at first seem to apply. If the hypothesis is not an interpretive one, then contexts are most likely entirely ignored – and critics could complain that nothing “meaningful” has been said about the text, even if the hypothesis can successfully be justified with the help of computational analysis. If the hypothesis is an interpretive one, and only descriptive computational text analysis is used in an attempt to justify it, a valid point of criticism would be that such endeavors can never be (fully) successful because interpretations concern the meaning of a text, and that this meaning is never constituted by the text alone.

While critics could label such approaches irrelevant or incomplete because the actual relevance of the findings has not been argued for (completely), this position reveals a debatable notion of literary studies practice and progress (Kindt). The assumption behind this seems to be that scholarly contributions concerning a literary text need to be exhaustive and attempt a holistic interpretation of the text in order to be valuable. However, this attitude tends to make an interwoven, joint research culture where contributions are building on each other virtually impossible. In our view, it is not to be regarded as a shortfall when a research contribution on a literary text only provides selected perspectives. On the contrary: the polyvalence of literary texts and the inconclusiveness of sense-making processes in literary studies make all contributions necessarily selective. Research contributions should ideally provide connectivity and foster the joint endeavor of understanding texts with new perspectives. In this vein, even approaches in which computational methods are applied to literary texts without engaging in interpretation cannot convincingly be accused of ahistoricism and a reductionist concept of meaning – because they do not aspire to provide a holistic understanding of the text but only potential building blocks in sense-making. Their claim is therefore far more modest than is often assumed by critics.

In summary, confirmatory computational approaches need to carefully choose their methods based on a theoretically and methodologically well-founded operationalization of the relevant research question. Though the validity claim is stronger than for the exploratory use, it is important to note that computational confirmatory approaches rarely strive to tackle the whole task of text analysis (as in step 2 of the model), let alone the whole process of literary text analysis including interpretation (step 3). Hence, it can contribute an important part of hypothesis testing that is compatible

with different interpretation approaches, which can be used to complement it. Its assets can be to provide a broader and more secure descriptive basis of interpretation.

5. Conclusion

In the previous sections we have tried to shed some light on the question of whether computational literary studies work in a structuralist way. What we have not considered in this approach is the evaluation of structuralism as a literary theory. While this is probably at stake in most debates concerning the “digital humanities-as-structuralism” narrative, we cannot address such a substantial concern in this paper. This is not only because of the complex argumentation lines one would have to follow and then relate to computational literary studies approaches, but also because there are probably basically only two, very contrary positions with regard to it. While the possibility of computational literary studies being structuralist might be seen positively or even indifferently by pro-structuralists, anti-structuralists will see this as its fundamental flaw. Therefore we concentrated our discussion on criticism of structuralism.

In order to do this, we singled out two major criticisms against structuralism, its ahistoricity and its reductionist concept of meaning, in section 2. As we have pointed out, there are also general arguments that relativize these criticisms. Nevertheless, we based our subsequent discussion of structuralism in computational literary studies on the questions of ahistoricity and the reductionist concept of meaning. Before discussing them, in section 3 we introduced a general and theory-independent model for literary text analysis consisting of three steps (reading, analysis and interpretation) and elaborated on hypothesis development and justification in literary studies. This built the ground for our analysis of structuralism in computational literary studies in section 4. Here, we examined the use of computational methods for the exploration and confirmation of interpretation hypotheses and its potential relation to structuralist issues. Thus we were able to explore the entire process of literary text analysis both with regard to the use of computational methods and broader activities in which these are embedded. For these, we tackled the questions of ahistoricity and the reductionist concept of meaning as well as the related issue of presumably “incomplete” processes of exploratory hypothesis development or the testing of hypotheses in the context of text analysis.

As we have argued, what can be seen as structuralist is that computational literary studies produce descriptive results, fix text elements conceptually and emphasize text structures. But since one can assume that literary text analysis (as a process including interpretation) always builds to a certain extent on text analysis (i.e. non-interpretive, mainly descriptive operations), this can hardly be criticized. Computational literary studies are structuralist in a negative sense only if it goes hand in hand with a literary theory that reduces textual

meaning to intratextually describable findings. This is inadequate from the point of view of literary studies. The remedy for this kind of – ignorant – structuralism lies in the operationalization an approach is based upon. While this holds generally for literary studies, the modelling of a phenomenon in terms of its textual indicators is a bigger challenge for computational literary studies, since it has a stronger, or more direct, impact on the methodological process.

Nevertheless, it should be a general goal of literary textual research (whether traditional or computational) that its results equally meet standards of comprehensibility and the demand for relevance. To ensure this, the steps of analysis and interpretation must be linked in meaningful ways. This requires a more detailed exploration of the quality criteria for interpretations, which includes the relationship between analysis and interpretation. This exploration is up to both traditional and computational literary studies.

This is where the “digital humanities-as-structuralism” narrative is productive, because it cautions against reductionist approaches. Computational literary studies should continue to strive for the adequacy of its approaches. It must reflect on and explicate the relationship between algorithm goals and phenomena of literary interest.

Nevertheless, the exploratory as well as the (from an interpretation perspective) only partial approaches in computational literary studies should not be seen as reductionist. Computational exploration is purposeful when it produces interesting hypotheses and questions. The same holds for the practices of presenting partial findings and explicating the process of analysis that are established in computational literary studies. They could serve as an (additional) model also for non-computational literary studies, providing connectivity and foster the joint endeavor of understanding.

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