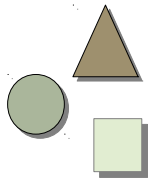


50. Microthreading Chains for Coherence

1

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- 1) Microthreading
- 2) Different micropattern chains for microthreading
- 3) Revision for coherence



(revision numbers > 1.0 contain improvements after the lecture)
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References from Books

- 3
- ▶ [CraigArmee] Gordon A. Craig. Die preußisch-deutsche Armee 1640-1945. Staat im Staate. Athenäum Droste Taschenbücher Geschichte 1980.
 - ▶ [SchmidtMoral] Helmut Schmidt. Auf der Suche nach einer öffentlichen Moral. Deutschland vor dem neuen Jahrhundert. Goldmann.
 - ▶ [ConteJalta] Arthur Conte. Die Teilung der Welt. Jalta 1945. dtv 1967
 - ▶ [King] Stephen King. The Horror Market Writer and the Ten Bears. In: The Writer's Digest. Guide to Good Writing. Writers Digest Books, Chikago

Literatur

2

- ▶ [Thiele] Albert Thiele. Die Kunst zu überzeugen. Faire und unfaire Dialektik. Springer.
- ▶ [WiCo] Joseph M. Williams, Gregory G. Colomb. Style – Toward Clarity and Grace. The University of Chicago Press.
- ▶ [Bünting] Karl-Dieter Bünting. Axel Bitterlich, Ulrike Pospiech. Schreiben im Studium. Ein Trainingsprogramm. Cornelsen-Scriptor.
- ▶ [Parks] A. Franklin Parks, James A. Levernier, Ida Masters Hollowell. Structured Paragraphs and Essays. Bedford/St. Martins. (A wonderful basic book about writing.)
- ▶ [Rotter/Bendl] Your Companion to English Texts. Comprehension Analysis Appreciation Production. Manz-Verlag, 1978

References from Gutenberg

4

- ▶ [Abbott-Writing] Edwin A. Abbott. How to Write Clearly. Rules and Exercises on English Composition. <http://www.gutenberg.org/cache/epub/22600/pg22600.txt>
- ▶ [Abbot-Airplanes] Willis J. Abbot. Aircraft and Submarines. The Story of the Invention, Development, and Present-Day Uses of War's Newest Weapons <http://www.gutenberg.org/ebooks/30047>
- ▶ [Abbot-Appeal] Francis Ellingwood Abbot. A Public Appeal for Redress to the Corporation and Overseers of Harvard University. Professor Royce's Libel. <http://www.gutenberg.org/ebooks/19768>
- ▶ [Barnes-Women] Earl Barnes. Woman in Modern Society, 1912, B.W. Huebsch, New York. <http://www.gutenberg.org/ebooks/15691> This is a nice book full of comparison and contrast (dialectic discussions)
- ▶ [Bernstein] Eduard Bernstein. Der Sozialismus einst und jetzt. Streitfragen des Sozialismus in Vergangenheit und Gegenwart <http://www.gutenberg.org/ebooks/24523>
- ▶ [Dalton] Frank Eugen Dalton and Louis C. Dalton. Swimming Scientifically Taught. A Practical Manual for Young and Old. <http://www.gutenberg.org/ebooks/19065>



5

- ▶ [Rathenau] Walther Rathenau. Die Organisation der Rohstoffversorgung. Vortrag in der Deutschen Gesellschaft 1914, am 20. Dez. 1915. <http://www.gutenberg.org/files/21031/21031-0.txt>
- ▶ [Russel-Problems] Bertrand Russel. The Problems of Philosophy <http://www.gutenberg.org/cache/epub/5827/pg5827.txt>
- ▶ [Sieveking] H. Sieveking, Moderne Probleme der Physik. TU Karlsruhe, 1913 <http://www.gutenberg.org/files/38157/38157-pdf.pdf>
- ▶ [Stowe] Harriet Beecher Stowe, Onkel Tom's Hütte. <http://www.gutenberg.org/cache/epub/31459/pg31459.txt>
- ▶ [Stresemann] Gustav Stresemann. Die Entwicklung des Berliner Flaschenbiergeschäfts. Inaugural-Dissertation, Universität Leipzig, 1900 <http://www.gutenberg.org/cache/epub/33418/pg33418.txt>
- ▶ [Treitschke] Heinrich von Treitschke: Die Gründung des Deutschen Zollvereins. <http://www.gutenberg.org/files/23065/23065-0.txt>
 - Achtung. Treitschke schreibt gut, aber er disqualifiziert sich durch seinen Antisemitismus http://de.wikipedia.org/wiki/Heinrich_von_Treitschke
- ▶ [Twain-Sawyer] Mark Twain. The Adventures of Tom Sawyer. www.gutenberg.org/cache/epub/74/pg74.txt
- ▶ [Wagner-SimpleLife] Charles Wagner. The Simple Life. GROSSET & DUNLAP Publishers, New York, 1901 <http://www.gutenberg.org/2/3/0/9/23092/>



Devlin on Microthreading

7

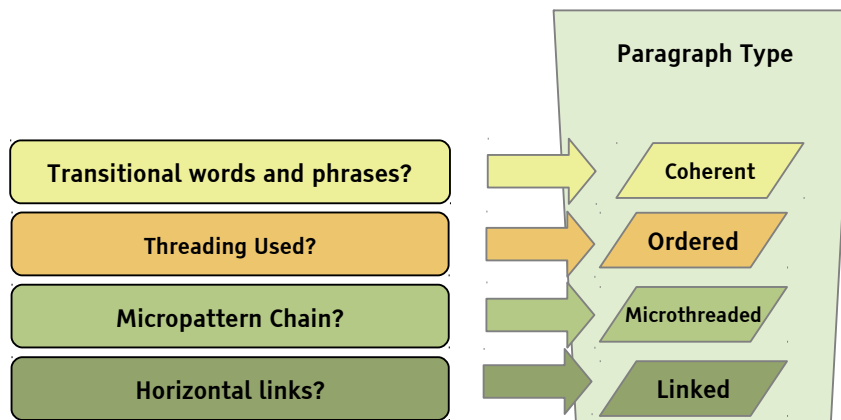
- ▶ [Devlin-Writing]
- ▶ Throughout the paragraph there must be some connection in regard to the matter under consideration,—a **sentence dependency**.
- ▶ For instance, in the same paragraph we must not speak of a house on fire and a runaway horse unless there is some connection between the two. We must not write consecutively:
- ▶ "The fire raged with fierce intensity, consuming the greater part of the large building in a short time." "The horse took fright and wildly dashed down the street scattering pedestrians in all directions." These two sentences have no connection and therefore should occupy separate and distinct places. But when we say—"The fire raged with fierce intensity consuming the greater part of the large building in a short time and the horse **<synonym link in backgrounding>taking fright at the flames </>** dashed wildly down the street scattering pedestrians in all directions,"—there is a natural sequence, viz., the horse taking fright as a consequence of the flames and hence the two expressions are combined in one paragraph.



Writing for Coherence (Overview-Only)

8

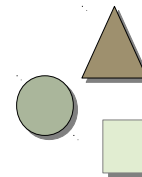
- ▶ **Microthreading analysis** is the process of investigation whether a sentence reminds on the previous sentences



50.1 Microthreadings/Chains: Threadings Based on MicroPatterns

9

Mikrofädelungen



Why Does This Text Read Well?

- 10
- ▶ Einstein's text does have a controlling subject, but not a development scheme.
 - ▶ How does he achieve coherence?
 - ▶ [Einstein The Meaning of Relativity. Four lectures delivered at Princeton University, May, 1921 <http://www.gutenberg.org/files/36276/36276-pdf.pdf>]
 - ▶
 - ▶ The experiences of an individual appear to us arranged in a series of events; in this series the single events which we remember appear to be ordered according to the criterion of "earlier" and "later", which cannot be analysed further.
There exists, therefore, for the individual, an I-time, or subjective time. This in itself is not measurable.
I can, indeed, associate numbers with the events, in such a way that a greater number is associated with the later event than with an earlier one; but the nature of this association may be quite arbitrary.
This association I can define by means of a clock by comparing the order of events furnished by the clock with the order of the given series of events.
We understand by a clock something which provides a series of events which can be counted, and which has other properties of which we shall speak later.



Microthreading By Micropatterns

- 12
- Microthreading** achieves coherence by threading all sentences step by step with the help of micropatterns.

Microthreading is writing without controlling idea.

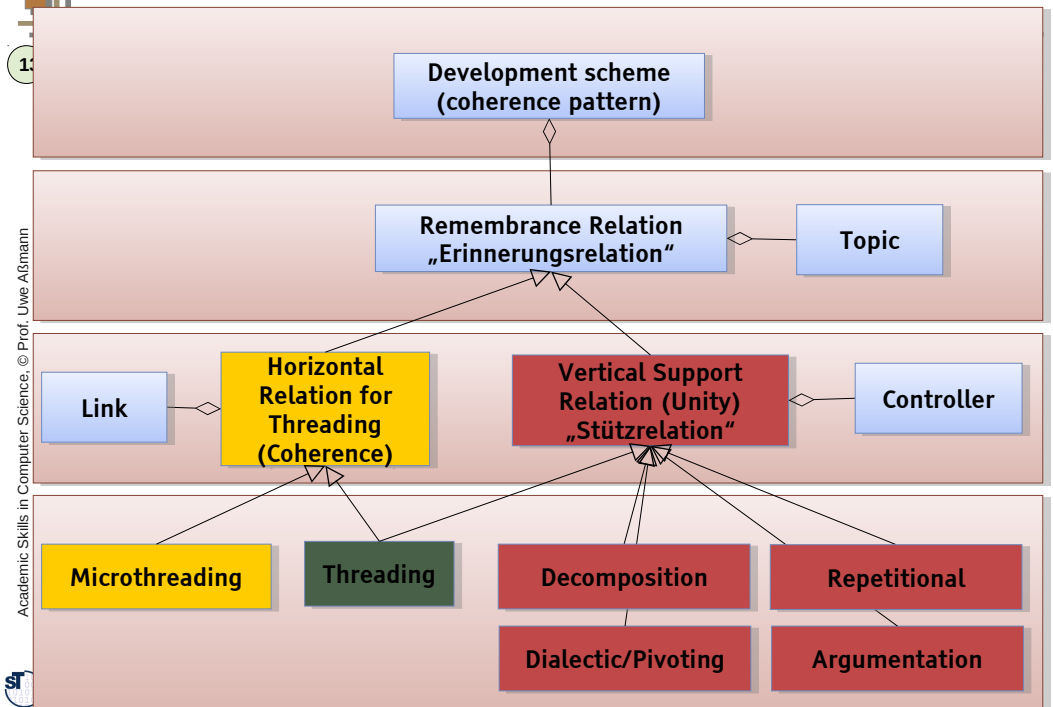


Microthreading: Answer to Exercise

- 11
- ▶ [Einstein The Meaning of Relativity. Four lectures delivered at Princeton University, May, 1921 <http://www.gutenberg.org/files/36276/36276-pdf.pdf>]
 - ▶ The experiences of an individual appear to us arranged in a series of events; **in this series** the single events which we remember appear to be ordered according to the criterion of "earlier" and "later", which cannot be analysed further. There exists, **therefore**, for the individual, an I-time, or subjective time. **This** in itself is not measurable. I can, indeed, associate numbers with **the events**, in such a way that a greater number is associated with the later event than with an earlier one; but the nature of this association may be quite arbitrary. **This association** I can define by means of a clock by comparing **the order of events** furnished by the clock with the order of the given series of events. We understand by a clock something which provides a **series of events** which can be counted, and which has other properties of which we shall speak later.

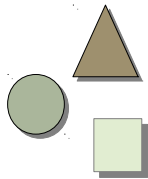


Development Schemes (Overview)



50.2. Different Micropatterns for Microthreading

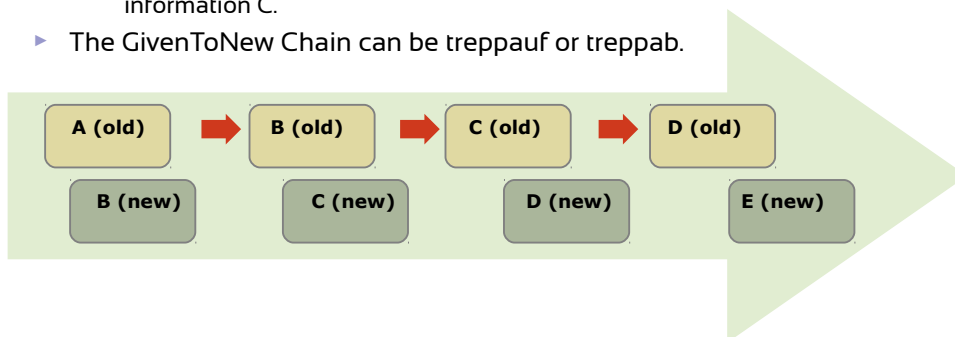
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Given-To-New Chain (Alt-Neu-Kette)

- ▶ This chain builds on the micropattern *GivenToNew*, and chains it over a paragraph [WiCo]
 - The chain uses horizontal links in the Old part (summary links, commenting links, subject links, etc.)
- ▶ **Old things first, new things later:**
 - Starting from a given information A, often represented by a link, new info B is introduced later in a sentence
 - Then the information B is taken as given, and used to introduce a new information C.
- ▶ The GivenToNew Chain can be treppauf or treppab.



Micropattern Chains

15

- ▶ Threadings can be based on *global threading schemes*, but also on micropatterns.
- ▶ A **micropattern chain (Kette)** is a threading pattern relying on micropatterns.

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Microthreading with Horizontal Demonstrative Links; a partially controlling point, and Given2New Chain

17

- [Ledderhose] There is a point, but it is not used everywhere in the paragraph; instead, microthreading with Given2New and horizontal links is used.
- <general point>At that time great darkness reigned in Cologne. <specific point>The Theologians, as well as the Dominican Monks of that place, had demanded that all Jewish writings should be burned.</> When the Emperor called upon Reuchlin for his opinion in this matter, he defended most of these writings. This enraged the people of Cologne, who were led by the baptized Jew Pfefferkorn and the inquisitor Hochstraten. They appealed to the Pope. It gave Reuchlin much trouble, and caused much correspondence to and fro. Melanchthon also became involved in the matter, together with a large number of the most distinguished men, who entered the lists in Reuchlin's defence, and were obliged to bear the name of contempt, Reuchlinists. We here already meet the well-known knight, Ulrich von Hutten, who wielded a sharp pen, as well as the brave and noble Francis Von Sickingen with the knightly sword.

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Microthreading in Curie's Experiment Description

- 18
- ▶ [Curie] No controlling idea. Where are the links? Where is Old-New micropattern?
 - ▶ Da die Pechblende ein kostbares Mineral ist, haben wir darauf verzichtet, große Quantitäten davon zu behandeln. In Europa geschieht die Verarbeitung **dieses Minerals** im Bergwerk von Joachimsthal in Böhmen. **Das zerkleinerte Mineral** wird zuerst mit Soda geröstet und das Produkt dieses Verfahrens zuerst in warmem Wasser, dann in verdünnter Schwefelsäure ausgelaugt. **Die Lösung** enthält das Uran, dem die Pechblende ihren Wert verdankt. **Der unlösliche Rückstand** wird fortgeworfen. **Dieser Rückstand** enthält die radioaktiven Substanzen, seine Aktivität ist 4,5 mal größer als die des metallischen Urans. Die österreichische Regierung, **der das Bergwerk gehört**, hat uns freundlicherweise eine Tonne dieses Rückstandes zu unsrer Untersuchung zur Verfügung gestellt und das Bergwerk angewiesen, uns noch mehrere Tonnen der Substanz zu liefern.
 - ▶ Es war durchaus nicht leicht, den Rückstand in der Fabrik mittels eines laboratoriumsmäßigen Verfahrens zu behandeln. Herr Debiegne übernahm es, diese Frage zu studieren und die fabrikmäßige Behandlung zu organisieren. Der wichtigste Punkt **der von ihm angegebenen Methode** besteht darin, daß man durch Kochen der Substanz in konzentrierter Sodalösung die Sulfate in Karbonate verwandelt. **Dieser Vorgang** umgeht die sonst notwendige Schmelzung mit Soda.

Microthreading of Arguments

- 19
- ▶ Microthreading can use stereotypical **multi-sentence patterns with modifiers** which link larger groups of sentences
 - ▶ Comparison and contrast:
 - Einerseits ... Andererseits...
 - Ersteres hat zur Folge, ... Letzteres dagegen führt zu...
 - On the one hand, ... On the other hand, ...
 - One could say that... More important is, however, Alas, the primary reason is...

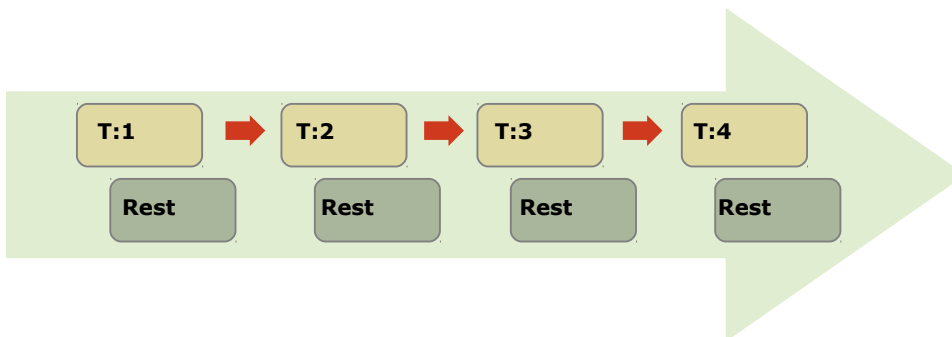
Einesteils war der Ring derjenigen Brauereien, welche ihr Bier in Flaschen absetzten, zu stark, **anderenteils** stand die tonangebende liberale Presse **ebenso** wie die öffentliche Meinung den Versuchen der Bierverleger **entweder** teilnahmslos **oder** direkt gegnerisch gegenüber. [Stresemann]

TopicFirst Chain (ThemaZuerst-Kette)

- 20
- ▶ This chain specializes the Given2New chain. It builds on the micropattern *TopicFirst* and chains it over a paragraph [Williams, Ch. Cohesion]
 - ▶ **Topics first, rest later:** Start every sentence with an reference T:i to an already known topic T
 - The T:i must appear in the first words of the sentence
 - The topic is the "Old" part and forms a link
 - ▶ The topic-chain pattern works uphill (treppauf) or downhill (treppab).

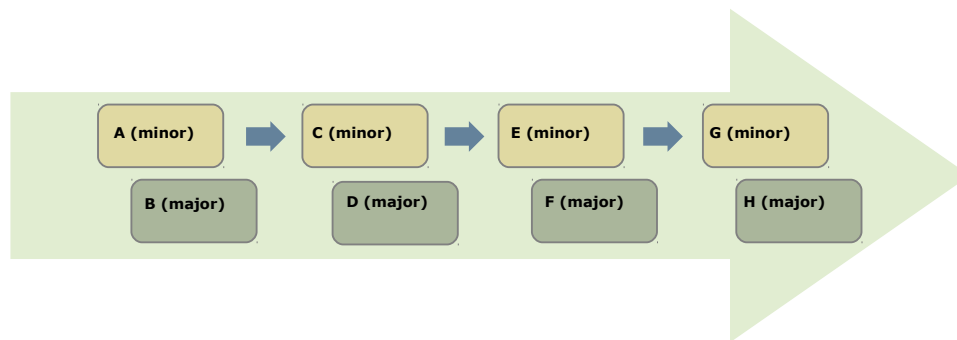
Topic-Chain Analysis (Slicing)

- 21
- ▶ In a paragraph, underline in each sentence the first 5-7 words
 - ▶ Read this slice loud
 - ▶ If you find a sentence not sticking to the topic, revise it.



Stress-Last Chain (Betonungskette)

- 22
- ▶ This chain builds on the micropattern *StressLast*, and chains it over a paragraph
 - ▶ **Stress to the end:**
 - ▶ The Stress-Chain can be uphill or downhill
 - ▶ Uphill, however, is powerful



Microthreading Pattern „Implicit Sequence“

- 24
- ▶ An **enumeration** can be defined in a hidden way by adding horizontal links for sequence markers (enumeration markers) to the text [Ross]:
 - ▶ A **start marker** marks the first element of a sequence (enumeration)
 - To begin with,
 - First,
 - Initially,
 - As a basis,
 - ▶ A **middle marker** marks middle elements. It may also introduce repetitions.
 - Moreover,
 - Likewise,
 - Furthermore,
 - ▶ A **concluding marker** marks final elements
 - Finally,
 - At last,

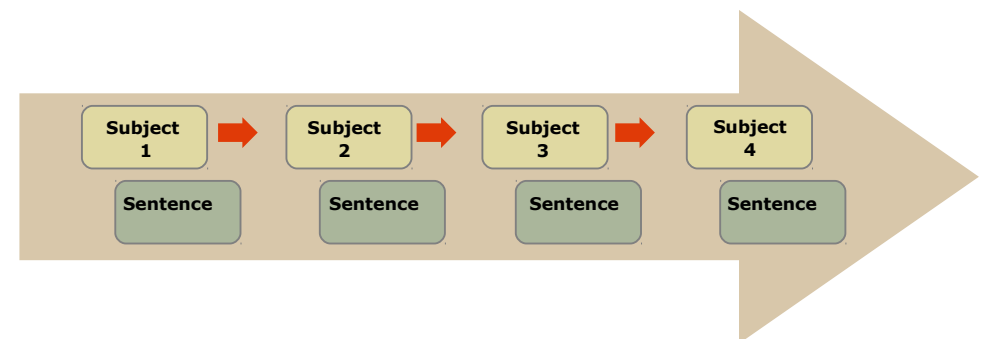
Stress Last Can Support a Thesis Very Well (Microthreading with Uphill Chain and Controlling)

Russell-Mysticism] In the essay "A free man's worship", Russell systematically places important things in the *end of sentences, uphill*, supporting a thesis statement:

The answer to this question is very momentous, and **affects profoundly our whole morality.** The worship of Force, to which Carlyle and Nietzsche and the creed of Militarism have accustomed us, is the result of failure to maintain our own ideals against a hostile universe: it is itself a prostrate submission to evil, **a sacrifice of our best to Moloch.** If strength indeed is to be respected, let us respect rather the strength of those who refuse that false "recognition of facts" which **fails to recognize that facts are often bad.** Let us admit that, in the world we know there are many things that would be better otherwise, and **that the ideals to which we do and must adhere are not realized in the realm of matter.** Let us preserve our respect for truth, for beauty, for the deal of perfection which life does not permit us to attain, though none of these things meet with the approval of the unconscious universe. If Power is bad, as it seems to be, **let us reject it from our hearts.** In this lies Man's true freedom: in determination to worship only the God created by our own love of the good, to respect only the heaven which **inspires the insight of our best moments.** In action, in desire, we must submit perpetually to the tyranny of outside forces; but in thought, in inspiration, we are free, free from our fellow-men, free from the petty planet on which our bodies impotently crawl, **free even, while we live, from the tyranny of death.** Let us learn, then, that the energy of faith which enables us to **live constantly in the vision of the good;** and let us descend, in action, into the world of fact, **with that vision always before us.**

SubjectChange-Chain with Subject Links

- 25
- ▶ In a chain of subject links, subjects can be changed from sentence to sentence
 - ▶ By changing an object of the first sentence to be the subject of the next sentence, a new „controlling“ subject or concept can be introduced.
 - In a third sentence, a third subject may be introduced



Multiple Change of Controlling Subject

- 26
- ▶ [CraigArmee, S. 122-123]
 - ▶ „Am Abend des 18. März begab sich **Georg von Vinke**, ein gemäßigter Konservativer, der im ersten Vereinigten Landtag Führer der Oppositionspartei gewesen war, ins Schloss, um dem **König** zu bewegen, alles in seiner Macht stehende zu tun, um die Kämpfe zu beenden. **Er** drängte darauf... Der **König** fragte Vincke, was aber dann werden sollte. **Vinke** stellte die **Gegenfrage**: „Was, wenn das Volk siegt?“
 - **Subjekt 1**
 - **Objekt 1 => Subjekt 2**
 - **Objekt 2 => Subjekt 3**
 - **Subjekt 2**
 - **Objekt 2**
 - **Objekt 4 => Subjekt 3**
 - **Subjekt 4 => kontrollierende These mit Argumentation**
 - **Es** war eine quälende **Frage**, und zweifellos musste der **König** an sie denken, als **er** um Mitternacht eine lange Besprechung mit (**General von Prittwitz** hatte. Der **General** schien nun die Beute weiterer Zweifel und Ängste zu sein. Wie **er** dem König ausführte, plante **er**, ... Allerdings würden **seine Truppen**, fügte **er** hinzu, entschieden im Nachteil sein, wenn der Aufstand mehr als nur ein Tage dauern sollte.
 - **Sie** seinen nicht zahlreich genug.
 - Die **Barrikadenkämpfer** seien mit dem Gelände völlig vertraut.
 - Wenn es nicht gelänge, den Aufstand innerhalb einiger Tage niederzuschlagen, solle man zur Belagerung übergehen...”

Two Thematic Strings with Subject Links

- 27
- ▶ [Abbott-Writing]
 - ▶ What are the thematic strings?
 - ▶ The **rules** are stated as briefly as possible, and are intended not so much for use by themselves as for reference while the pupil is working at the **exercises**. Consequently, there is no attempt to prove **the rules** by accumulations of examples. The **few examples that are given**, are given not to prove, but to illustrate the **rules**. The **exercises** are intended to be written out and revised, as exercises usually are; but they may also be used for **_vivâ voce_** instruction. The books being shut, the pupils, with their written **exercises** before them, may be questioned as to the reasons for the several alterations they have made. Experienced teachers will not require any explanation of the arrangement or rather non-arrangement of the **exercises**. **They** have been purposely mixed together unclassified to prevent the pupil from relying upon anything but his own common sense and industry, to show him what is the fault in each case, and how it is to be amended. Besides references to the **rules**, notes are attached to each sentence, so that the **exercises** ought not to present any difficulty to a painstaking boy of twelve or thirteen, provided he has first been fairly trained in English grammar.

Multiple Thematic Strings: Relationship of 2 Main Persons

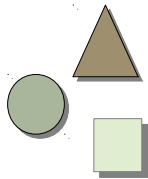
- 28
- ▶ [Harriet Beecher Stowe, Onkel Tom's Hütte.
<http://www.gutenberg.org/cache/epub/31459/pg31459.txt>]
 - ▶ What are the thematic strings?
 - ▶ Mistress Shelby war eine Frau von hoher geistiger und moralischer Bildung. Mit jener angeborenen Hochherzigkeit, welche so häufig als ein charakteristisches Merkmal der Weiber in Kentucky gefunden wird, verband sie ein religiöses Gefühl, welches sich in allen ihren Handlungen praktisch kund gab. Ihr Mann, der keinen Anspruch auf besondere Religiosität machte, achtete und ehrte nichts destoweniger diese Seite in ihrem Charakter, und hegte vielleicht sogar eine Art Scheu vor ihrer Meinung. Gewiß ist, daß er ihr unbegrenzte Machtvollkommenheit in allen ihren Bestrebungen für das Wohl und den Unterricht ihrer Dienstboten gab, obgleich er selbst keinen direkten Antheil daran nahm. In der That, wenn er auch nicht an die Lehre von der Wirksamkeit der =besondern= guten Werke der Heiligen glaubte, so schien er doch gewissermaßen anzunehmen, daß seine Frau Frömmigkeit und Wohlthätigkeit genug für zwei besitze, -- und die schwache Hoffnung zu hegen, durch Vermittlung derjenigen Tugenden in den Himmel zu gelangen, welche seine Frau in so großem Maaße besaß, obgleich er selbst darauf keinen besondern Anspruch machen konnte.

Ex.: Central Subject “Dopplereffekt” with Additional Microthreading

- 29
- ▶ [Sieveking]
 - Der **Dopplereffekt** tritt bei allen oszillatorischen Vorgängen auf. Die Frequenz einer Schwingung wächst, wenn die Schwingungsquelle sich in der Richtung auf das wahrnehmende Organ zu bewegt; sie nimmt dagegen ab, wenn sich der Abstand beider vergrößert. **Diese in der Akustik leicht wahrzunehmende Erscheinung** ist auch bei den Lichtstrahlen beobachtet, und zwar bei einigen Fixsternen, deren Spektrum infolge ihrer Relativbewegung zur Erde Verschiebungen zeigt. **Ferner** hat Stark bei den Kanalstrahlen den **gleichen Effekt** beobachtet. **Endlich** haben wir noch den Versuch von Fizeau zu nennen, bei dem sich ergibt, daß das Licht in einem bewegten Körper eine andere Ausbreitungsgeschwindigkeit besitzt, als in einem ruhenden. Die Geschwindigkeiten addieren sich **freilich** nicht einfach; es tritt nur eine Veränderung um den sogenannten Mitführungskoeffizienten auf. Als **letzte Erscheinung** gehört hierher der Versuch von Morley und Michelson. Wir wollen diesen etwas ausführlicher behandeln.

50.3 Revising for Coherence

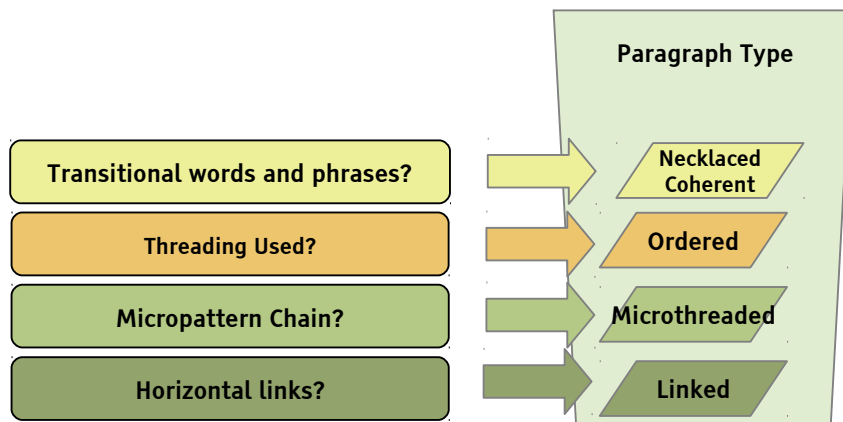
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Writing for Coherence

- 32
- ▶ **Microthreading analysis** is the process of investigation whether a sentence reminds on the previous sentences



Coherence of Paragraphs

31

- ▶ A paragraph is *coherent*, if all its sentences are linked well with the previous
 - For instance, *if all sentences are near sentences*
 - Horizontal links must be inserted (noun links, summary links, generalization links, conjunctive links)
 - Threading patterns can be used, like climatic importance, or marker-based enumeration
 - Microthreading can be used with micropatterns like Topic-First, or Stress-Last
- ▶ Transitional words and phrases (markers) can be used
 - Moreover, additionally, Furthermore, More significantly, ...
- ▶ Vertical links can be used
 - Summary links
 - Subject links
 - Q+A links
 - Anaphora links, climatic anaphora links

31

Devlin on Spiced Paragraphs

33

- ▶ [Devlin-Writing]
- ▶ The paragraph may be defined as a group of sentences that are closely related in thought and which serve one common purpose. Not only do they preserve the sequence of the different parts into which a composition is divided, but they give a certain spice to the matter like raisins in a plum pudding. A solid page of printed matter is distasteful to the reader; it taxes the eye and tends towards the weariness of monotony, but when it is broken up into sections it loses much of its heaviness and the consequent lightness gives it charm, as it were, to capture the reader.

33

34 Courtesy Florian Heidenreich, Christian Wende, Matthias Schmidt, Sebastian Cech



Microthreading with Horizontal Demonstrative Links

36 [Stifter]
Gott lenkt es schon so, daß die Gaben gehörig verteilt sind, so daß jede Arbeit getan wird, die auf der Erde zu tun ist, und daß nicht eine Zeit eintritt, in der alle Menschen Baumeister sind. *In diesen Gaben* liegen dann auch schon die gesellschaftlichen, und bei großen Künstlern, Rechtsgelehrten, Staatsmännern sei auch immer die Billigkeit, Milde, Gerechtigkeit und Vaterlandsliebe. *Und aus solchen Männern*, welche ihren innern Zug am weitesten ausgebildet, seien auch in Zeiten der Gefahr am öftesten die Helfer und Retter ihres Vaterlandes hervorgegangen.



35 [Sieveking] Die Röntgenstrahlen. 82

Wir haben diese Tabelle so ausführlich wiedergegeben, weil sich aus ihr ein sehr wichtiges Resultat ablesen läßt. Der *in der dritten Reihe stehende* Quotient ist mit einer einzigen Ausnahme, die bei Wasserstoff eintritt, konstant. *Daraus* folgt der Satz, daß, wenn man die Intensität der Sekundärstrahlung durch die Gasdichte dividiert, stets der gleiche Wert herauskommt. *Mit anderen Worten*: Gleiche Massen von den angeführten Gasen emittieren gleiche Sekundärenergie. Auffällig ist, daß das Atomgewicht aller in Frage kommenden Gase unter 32 liegt. Es deutet *dies* für diese leichten Gase auf eine Verwandtschaft zwischen dem Bau des Atoms und der Strahlung. Der Zerstreuungsfaktor läßt sich in Beziehung bringen zu der Energie der Primärstrahlung. Aus *dem gemessenen Wert* kann man dann ableiten, wieviel Elektronen in jedem einzelnen Atom der zerstreuenden Substanz vorhanden sein müssen. Bei dem großen Interesse, das der Chemiker heute den Theorien vom Aufbau der Atome verschiedener Stoffe entgegenbringt, speziell bei der Wichtigkeit der Rolle, die *dabei* die Elektronen spielen, mag es gestattet sein, hierauf etwas näher einzugehen. Wir folgen *dabei* der Darstellung von Pohl, der ein äußerst lesenswertes Buch über die Physik der Röntgenstrahlen vor kurzem erscheinen ließ. *In diesem Werk* hat der Verfasser, der zusammen mit Walter und anderen auf diesem Gebiet selber erfolgreich tätig war, alles Wissenswerte in knapper aber doch erschöpfender Form dargestellt. *Dadurch* wird ein Überblick über den augenblicklichen Stand der Forschung auf diesem Gebiete ungemein erleichtert.

