Strategy of incremental parsimony

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**Abstract**

Translational evidence from popular-scientific English/German texts suggests that English uses 'short' sentences more often than German because English sentences lack an appropriate point of attachment more often than German sentences. German translations integrate the original short sentence into an adjacent sentence by coordinating or subordinating forms of structural attachment. In some cases, only part of a sentence is attached to an adjacent sentence (to the left or to the right) in order to secure an appropriate filling of the structural focus position at the end of a German sentence.

1. One or two sentences?

In her paper on information packaging and translation, Fabricius-Hansen (1999) describes various forms of sentence splitting in translations between German, English and Norwegian. She speaks of the incrementality of a text, viewing sentences as the individual increments in which the information of a text is 'portioned out'. Identifying, in discourse representational terms, progress in discourse with new discourse referents and their conditions, Fabricius-Hansen formulates three principles of informational discourse organization, PIDO 1-3, which limit the number of new referents and conditions/accommodations per increment. Comparing translations from German into English/Norwegian, she describes forward and backward information extraction from complex sentences as specific ways of incremental discourse organization which lower the informational density of sentences.

Fabricius-Hansen does not look in detail at the opposite option of increasing the informational density of sentences/lowering the incrementality of a text by linking independent sentences into fewer more complex ones. But if we choose German as the target language, it is the opposite direction that seems to dominate discourse organization. Let me therefore add a strategy of discourse organization alternative to PIDO (1-3) and call it the Strategy of Incremental Parsimony, SIP. SIP can be formulated somewhere along the lines of Frazier's Principle of Minimal Attachment:

\[\text{SIP: Attach incoming information to an appropriate point of attachment in the current partial phrase marker (CPPM)}.\]

In contrast to Frazier's principle, which relates to language perception, SIP is a strategy which controls language production. (The 'incoming' material comes from the 'conceptualizer', the module which provides the syntactic processor with the thoughts to be verbalized; see Levelt, 1989.)

SIP competes with PIDO, and it is obvious that the trade-off between the two strategies is regulated by Sperber and Wilson's Principle of Relevance, which secures an optimal balance between processing effort and cognitive effect. SIP wins out only if there is an easy-to-process point of attachment available in the sentence under construction; otherwise it will be PIDO which complies with the Principle of Relevance.

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1Minimal Attachment says “assign minimal grammatically permissible syntactic structure to an input sentence as the words are encountered” (Frazier, 1988).
The fascinating questions are, of course, what determines the availability of attachment points? And: are there any language-specific constraints on SIP? We have looked for answers to these questions in a translation seminar (with eighteen participants) as contribution to a research project on different beginnings of sentences in translations between English and German (sponsored by the DFG from October 2000 to October 2002). The method applied consisted in comparing German translations of popular-scientific texts with their English originals, assessing their discourse appropriateness by means of control paraphrases. That is, we compared sets of paraphrases meeting PIDO or SIP within the discourse of the original sentence and assessed each paraphrase as to processing ease and discourse appropriateness (see the following discussion). The empirical data underlying the generalizations presented in this paper have been confirmed by the majority of the participants.²

Most of the SIP cases turned out to be relatively short sentences. They could be distinguished by their discourse relation with the preceding or following sentence. Short sentences following their potential 'mates' were attached more often, short sentences preceding their potential 'mates' less often. As we can view analogous sentence borders in the original and the translation as the default case, the paper will ignore analogous cases and concentrate on examples with differing sentence borders. However, one property of analogous short sentences deserves mentioning. Their discourse relations as a rule did not only involve the adjacent sentence but a discourse segment consisting of more sentences. Thus, in a segment with a short sentence like (1), which is elaborated by (2) and (3):

(1) The images are not simply pictures.
(2) Each image is made up of 800 by 800 picture elements (pixels), and in computers back on Earth each pixel is held in a "word" of eight binary digits ("0" or "1").
(3) Each word represents up to $2^8$, or 256 levels of intensity-"grey" levels-in a particular wavelength band. (j50-52)

(1) was not attached to (2) in the German translation:

(4) Die Aufzeichnungen selbst sind keine gewöhnlichen Fotos.
(5) Sie setzen sich aus jeweils 800 mal 800 Einzelelementen (Bildpunkten) zusammen, von denen jeder in den Bodencomputern als ein "Wort" aus acht binären Ziffern ("0" oder "1") gespeichert wird.
(6) Jedes Wort entspricht bis zu $2^8$ bzw. 256 Intensitätswerten, "Grau"-Abstufungen, in einem bestimmten Wellenlängenbereich.

Compare for example a causal link between (4) and (5), which blocks the elaborating discourse relation between (4) and (6):

(7) Die Aufzeichnungen selbst sind keine gewöhnlichen Fotos, da sie sich aus jeweils 800 mal 800 Einzelelementen (Bildpunkten) zusammensetzen, von denen jeder in den Bodencomputern als ein "Wort" aus acht binären Ziffern ("0" oder "1") gespeichert wird.
(8) Jedes Wort entspricht bis zu $2^8$ bzw. 256 Intensitätswerten, "Grau"-Abstufungen, in einem bestimmten Wellenlängenbereich.

Unless they belong to a larger discourse segment as in the example above, short sentences will present information extracted from the preceding increment for lack of an

²The outcome is of no statistical significance, but demonstrates the intersubjective agreement possible in assessing target language appropriateness.
appropriate point of attachment. This seems to occur more often in English than in German, which raises the question whether there is any language-specific reason for the difference.

In the following, I will first illustrate the phenomenon by a number of typical examples of information extraction in English, 'reintegrated' into their 'Principal Counterparts' (Fabricius-Hansen, 1999) in the German translations following SIP. The examples will be subdivided into coordinating and subordinating cases of attachment (sections two and three). Section four will then present combinations of attaching and splitting/separating, section five pure cases of separating.

2. Coordinations

Discourse relations between the sentences subjected to SIP may be of a coordinating nature. The resulting coordination will, as a rule, undergo coordination reduction after various structural adaptations. Cf. a segment like

(9) This energy does not vary with latitude, so that it cannot produce changes in temperature between equator and pole.
(10) The absence of such a temperature gradient prevents the banded flow patterns from developing. (j81-82)

where the consecutive relation of the first sentence was relinked in the translation as a causal relation with a shifted perspective (produce/sich herausbilden, entstehen), which allowed the translator to economize on the verbs and add the following sentence as a second conjunct, sharing the verb of the first conjunct:

(11) Da diese Energie für alle Breitengrade gleich ist, entstehen keine Temperaturunterschiede zwischen dem Äquator und den Polen und ohne ein solches Temperaturgefälle auch keine Bänderstruktur.

An analogous discourse organization would be unnecessarily repetitive:


The different perspective of the English original does not meet the conditions of coordination. Whether there are other paraphrases in English promoting SIP instead of PIDO will have to be left open.

In German, coordinations may be appropriate in cases where even more rephrasing is necessary. Compare the translation of

(13) To understand atmospheric processes in the detail that is required for future predictions of OUR weather and climate needs a greater understanding of all atmospheric systems.
(14) This cannot be achieved by studying the Earth in isolation. (j8-9)

where the second conjunct is adapted to the first by highly 'generous' paraphrases of both sentences:

basically the adjacent sentence, which contains the main predicate of the pertinent discourse segment.
(15) Um das für die Vorhersage unserer zukünftigen Wetter- und Klimaentwicklung notwendige Verständnis von atmosphärischen Prozessen zu verbessern, muß man mehr über alle diese atmosphärischen Systeme wissen und darf sich nicht auf die Untersuchung unseres Planeten beschränken.

The analogous version:

(16) Um das für die Vorhersage unserer zukünftigen Wetter- und Klimaentwicklung notwendige Verständnis von atmosphärischen Prozessen zu verbessern, muß man mehr über alle diese atmosphärischen Systeme wissen. Dies kann man nicht erreichen, wenn man sich auf die Untersuchung unseres Planeten beschränkt.

is clearly redundant.

So far, the examples suggest that SIP or PIDO is simply a question of the idiosyncratic properties of the individual examples. It is not even clear whether the structural adaptations of the translations are chosen in the interest of SIP or are necessary anyway. But there are examples like the following where the latter is the case. Consider a sequence like

(17) It is very likely that the Great Red Spot behaves in a similar way, as this feature is now only 24000 km long compared with 46000 km a century ago.
(18) Perhaps the Great Red Spot may disappear one day too. (j100-101)

where the clauses of the first sentence were reordered in the translation, so that the main clause follows the causal clause. This allowed the translator to attach the short sentence as a second conjunct, sharing its subject with the first:

(19) Da der Große Rote Fleck im Vergleich zu 46000 km Länge vor 100 Jahren heute nur noch 24000 km mißt, verhält er sich wohl ähnlich und wird vielleicht auch eines Tages nicht mehr da sein.

The analogous version:

(20) Der Große Rote Fleck verhält sich wohl ähnlich, da er im Vergleich zu 46000 km Länge vor 100 Jahren heute nur noch 24000 km mißt. Vielleicht wird auch der Große Rote Fleck/er eines Tages nicht mehr da sein.

is more difficult to process in German, as it places the subclause with less relevant information after the main clause with more relevant information (see section four), disrupting the progress towards the climax, the total disappearance of the famous Red Spot.

The immediate context of this example presents an interesting counterpart, which demonstrates how subtle the preconditions for attachment by coordination can be. As Lang (1991, 2000 a.o.) has shown exhaustively, coordinations presuppose a common integrator, CI, and the semantic and pragmatic conditions for the CI may be a highly complex affair. Thus, although the discourse relation looks rather similar to that in (17f), the German translation of (22) in

(21) Originally these ovals formed from a white region that extended around the planet and, in the ensuing 40 years or so, they have gradually contracted to their current size of 11000 by 500 km.
(22) They may well disappear in the next decade. (j98-99)
is not attached to (21):

(23) Sie entstanden aus einem weißen Gebiet, das sich ursprünglich um den ganzen Planeten erstreckte und zogen sich in den folgenden 40 Jahren allmählich zu ihrer heutigen Größe von 11000 km mal 500 km zusammen.

(24) Es ist durchaus möglich, daß sie innerhalb der nächsten zehn Jahre ganz verschwinden.

The alternative structure would be possible, though, if the first coordination were expressed asyndetically:

(25) Sie entstanden aus einem weißen Gebiet, das sich ursprünglich um den ganzen Planeten erstreckte, zogen sich in den folgenden 40 Jahren allmählich zu ihrer heutigen Größe von 11000 km mal 500 km zusammen, und könnten innerhalb der nächsten zehn Jahre durchaus ganz verschwinden.

But it is obvious that this asyndetic 'sandwich' contradicts the informational relevance of the second phase, which has to prepare the ground for the hypothetical prediction of (24).

The difference between (24) and (19) suggests that SIP is more strongly constrained in recursive coordinations, and there is no question that a difference in information structure will affect the choice between SIP and PIDO.

3. Subordination

Discourse relations between sentences attached to each other by SIP may also be of a subordinating nature. Again, most cases involve short sentences; but whether they follow or precede their potential mate, we cannot predict which of the sentences will be subordinated to the other or which form of subordination will be appropriate unless we take account of the individual conditions. Let me illustrate some of the structural options.

Attachment by subordination could mean using a relative link, as e.g. in the translation of

(26) Two classes of progenitors seem to fulfill these conditions.
(27) One is a white dwarf in a binary star system.
(28) It would typically consist of a carbon-oxygen core and a helium outer envelope, just like a single white dwarf. (n66-68)

Although the first sentence is short, its discourse relevance covers more than the immediately adjacent sentence (even in the translation). But the second sentence is elaborated only by the third sentence: The fourth sentence begins with but, changing the discourse to an adversative relation. The translation follows SIP, attaching the third sentence to the second sentence as a relative clause (where the comparative phrase and the object have exchanged places in line with the German focus expectations):

(29) Diese Bedingungen sind offensichtlich bei zwei Klassen von Ausgangssternen gegeben.
(30) Zu ihnen gehören weiße Zwerge in einem Doppelsternsystem, die ebenso wie einzelne weiße Zwerge durch einen Kohlenstoff-Sauerstoff-Kern und eine Heliumhülle charakterisiert sind.
The analogous version is needlessly 'chopped up':


The English original is a clear case of information extraction for lack of an appropriate point of attachment. The relative clause could not be used in English because of its ambiguity: Even if we used a plural subject in (27) (one class of progenitors are white dwarfs in a binary system, which...) the relative pronoun attaching (28) to (27) would be interpreted as related to the lower NP (and have to be reanalyzed afterwards). This is different in the German version, where the relative pronoun relates to the higher NP unambiguously.

Together with the subordination, a great variety of additional changes may, again, be necessary - especially in the interest of target language appropriate information structures. Thus, also subordinations may occur with structural reductions transforming sentences of lower discourse relevance into phrases. This is the case in the translation of

(33) The banding terminates at about 45° latitude in each hemisphere. (34) At this position, the effects of energy from the Sun become negligible, so that Jupiter's internal energy becomes the dominant heat source. (j79-80)

where the first sentence was reduced to a prepositional phrase subordinating the predicate of the original as a relative clause:

(35) Jenseits 45° nördlicher und südlicher Breite, wo die Bänderstruktur endet, wird der von der Sonne zugeführte Energiebetrag so unbedeutend, daß die Energie aus dem Planeteninneren zur bestimmenden Wärmequelle wird.

An analogous version with its 'dummy' adverbial at the beginning of the second sentence is assessed as unnecessarily repetitive:

(36) Die Bänderstruktur endet jenseits 45° nördlicher und südlicher Breite. An dieser Stelle wird der von der Sonne zugeführte Energiebetrag so unbedeutend, daß die Energie aus dem Planeteninneren zur bestimmenden Wärmequelle wird.

Subordinated clauses may even have their point of attachment earlier in the embedding sentence; cf. the following example, where the assumption expressed in the first conjunct of (37) is justified by a short afterthought in (38):

(37) Of the historically-recorded supernovae − those near to us in the Milky Way which have exploded in the past 2000 years − the 1054 supernova was probably Type II, and the 1572 and 1604 supernovae (recorded by Tycho Brahe and Johannes Kepler respectively) were probably Type IIs. (38) Type IIs are the more likely to leave pulsars, we think. (n28-29)

The German translation uses a conditional paraphrase of (38) as a parenthesis after the first conjunct:

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4That there is a bias for a lower NP of some informational relevance, like an indefinite NP, has been demonstrated extensively in psycholinguistic experiments (cf. Frazier and Clifton, 1996, and Hemforth et al., 2000)

The analogous translation with its 'intervening' second conjunct is difficult to process:


Attachment may even be associated with a subordination of the longer, first sentence. Compare the German translation of

(41) At Jupiter's distance from the Sun a perfect absorber would have a temperature of 105 degrees Kelvin (105 K or -168°C).
(42) But measurements indicate that Jupiter has a temperature of 125 K. (j28-29)

where the attached sentence - due to its discourse relevance - became the main clause, while the preceding sentence was subordinated as an adversative adverbial:

(43) Während in der Entfernung des Jupiter von der Sonne sogar ein "schwarzer Körper" eine Temperatur von lediglich 105 K (-168°C) hätte, weisen die Meßdaten für den Planeten 125 K aus.

The point of attachment may, again, lie earlier and the subordinated clause itself may function as a matrix clause for the clause following it:

(44) However, modern theories of the deep interior of Jupiter, which we cannot probe by direct measurements, suggest that the temperatures and pressures there are not sufficiently high for the thermonuclear reactions that fuel stars to take place.
(45) Jupiter would seem to be a "failed" star. (j31-32)

(46) Aus neueren Annahmen über das Jupiterinnere, das ja direkten Messungen nicht zugänglich ist, folgt aber, daß der Jupiter eigentlich ein "verhinderner Stern" ist, weil die dort herrschenden Temperaturen und Drücke für thermonukleare Reaktionen, die einen Stern erst mit der nötigen Energie versorgen, nicht hoch genug sind.

The causal clause is obviously used at the end because German, unlike English, dislikes stacking of connectors like daß, weil ...

Summarizing attachment by coordination and subordination, we can say that German avoids 'short' sentences if they are in a discourse relation with the adjacent sentence and the adjacent sentence offers an appropriate point of attachment - structural adaptations included. Translating the SIP version back shows that a comparable point of attachment is not available in English. The lexical, syntactic or pragmatic differences responsible are properties of the individual example. But there is one domain which allows more global generalizations.
4. Shifting sentence borders

SIP may also promote attachment of structural material in the interest of an appropriate focus structure. This condition will often be met by a part rather than the whole of an adjacent sentence, so that the translation combines attachment with information extraction or separation. The result amounts to a shift of the full stop to the left or to the right within the adjacent sentence.

German expects the most important information at the end of a sentence; in English, the focus of a sentence will often be followed by less relevant information. The difference is due to the verb adjacency of the structural focus exponent in an SVO vs. an SOV language. Thus, a great number of English sentences end on less relevant appositions, as in (47):

(47) But the four-carbon products are then transported to specialised cells which surround the vascular bundles in the leaves, the tubes and columns of cells that convey water and nutrients through the plant.

(48) In these specialised bundle cells CO₂ is released from the four-carbon molecules, and then re-fixed with ribulose bisphosphate. (ph53-54)

The German translation secures end focus in the first sentence and shifts the final apposition to the subsequent sentence, integrating it as part of the subject:

(49) Das so erzeugte Oxalazetat wird dann in C4-Malinsäure oder Aspartate umgewandelt und zunächst in besondere Zellen transportiert, welche die Gefäßbündel der Blätter umgeben.
(50) Erst in diesen speziellen Bündelzellen, jenen Röhren und Säulen, in denen Wasser und Nährstoffe durch die Pflanze geleitet werden, wird Kohlendioxyd aus den C4-Molekülen freigesetzt und wieder mit Ribulose-Biphosphat gebunden.

Unlike English, German resents less relevant material at the right periphery but can easily cope with it within the topic position at the left periphery. In English sentences, the preverbal position is already filled by the subject, so that topicalization means additional material before the subject. The additional processing effort will only be licensed by extra conditions. Adding yet more material to the topicalized constituent makes processing even harder:

(51) In these specialised bundle cells, the tubes and columns of cells that convey water and nutrients through the plant, CO₂ is released from the four-carbon molecules, and then re-fixed with ribulose bisphosphate.

The different structural conditions on word order mean that in German there are fewer points of attachment available at the right periphery and in English at the left periphery.

The reason for a leftward shift of the sentence border is more difficult to describe linguistically. There are sentences where an analogous German translation ends in a focus lacking relevance. Thus, the information in the first sentence of

(52) The images we obtained were in various colours, corresponding to the filters contained in the narrow- and wide-angle cameras on the spacecraft.
(53) Furthermore, at times when the spacecraft was close to the planet so that the narrow-angle images contained only a very small part of the planetary disc, the simultaneous wide-angle image provided the essential, additional details for localising the measurements. (j47-48)
seems to be not informative enough to deserve a sentence of its own and has been strengthened in the German translation by a conjunct from the following sentence:

(54) Die Aufzeichnungen waren entsprechend den Filtern in den Tele- und Weitwinkelobjektiven der Raumsondenkameras verschiedenfarbig und wurden bei geringer Entfernung durch die Aufzeichnungen der Weitwinkelkameras ergänzt. Wo die Teleobjektive nur einen sehr kleinen Teil des Planeten erfassen, lieferten die Weitwinkelkameras die für die Einordnung der Meßdaten notwendigen Zusatzinformationen.

The analogous version was unanimously rejected as an unbalanced piece of discourse organization with a 'weak focus' in the first sentence:

(55) Die Aufzeichnungen waren entsprechend den Filtern in den Tele- und Weitwinkelobjektiven der Raumsondenkameras verschiedenfarbig. Sie wurden bei geringer Entfernung, wo die Teleobjektive nur einen sehr kleinen Teil des Planeten erfassen, durch die Aufzeichnungen der Weitwinkelkameras ergänzt, welche die für die Einordnung der Meßdaten notwendigen Zusatzinformationen lieferten.

The preference for the shifted sentence border may be partly due to the differences between the original and the translations in terms of structural explicitness and word order. They, too, secure an appropriate information structure in German.

When a chunk of a sentence is attached to the adjacent sentence to provide an appropriate focus filling, the original sentence is split into two parts, one of them remaining an independent sentence. This can also become necessary if the adjacent sentence is a short sentence, as in the following example. In a text about supernovae, answering a far-back question about which stars become supernovae, there is a very short sentence followed by a highly complex one which elaborates the short sentence:

(56) The Sun is safe.
(57) Single stars of its mass evolve peacefully as their nuclear reactions use up successively their central supplies of hydrogen and helium, then shed their outer envelopes and fade slowly and dimly away as white dwarfs. (n48-49)

The short sentence does not introduce a larger discourse segment since the next sentence, (58), changes the topic from safety to frequency:

(58) Not surprisingly, the measured birthrate of white dwarf stars is just about the same as the rate of formation and death of Sun-like stars – about one a year in our Galaxy.

Thus, instead of translating the sequence analogously, the German translation links (56) and (57), using a causal form of attachment and later on a (semi-)split. The causal relation within the original, (57), is reduced to an asyndetic relation by way of a colon:

(59) Für unsere Sonne besteht keine Gefahr, da die Entwicklung von Einzelsternen dieser Masse ruhig verläuft: Nachdem sie in den Kernprozessen nacheinander ihre Vorräte an Wasserstoff und Helium abgebaut haben, stoßen sie ihre äußeren Hüllen ab und verlöschen ganz allmählich als weiße Zwerge.

Let me present a last example of sentence border shift to demonstrate how a 'weak focus' may promote attachment and, in its wake, splitting. The following is the beginning of a text on supernovae. The first three sentences describe an extraordinary event; but while (63)
seems to confirm the report, (64) mentions a weakness which could raise doubts about the truth of the report. The adversative relation indicated by the conjunction *but* in (65) is meant to dismiss these doubts:

(60) "On a chi-chhou day in the fifth month of the first year of the Chi-Ho reign period, a guest star appeared at the south-east of Thien-Kuan, measuring several inches. (61) After more than a year, it faded away."
(62) So said the Chinese historian Toktaga in his Records of the Sung Dynasty.

(63) Students of Chinese history tell us that the chi-chhou day of that month and year was 4 July, 1054, and that Thien-Kuan was a region of sky near Zeta Tauri (the 6th brightest star in Taurus the bull).
(64) It is not quite so clear how Toktaga measured "inches" in the sky.
(65) But if you look through a small telescope on a clear winter’s night to a point about 1° (two Moon-diameters) north-west of Zeta Tauri, you will see a faint, untidy nebulosity.
(66) Closer study shows that this is an expanding cloud of hot ionised gas, magnetic field and high-speed electrons: at its centre is a pulsar, a rapidly spinning compact neutron star, which sends out regular pulses of electromagnetic radiation. (n4-10)

An analogous translation of (65) would produce a discourse inappropriate increment in German, as *der blasse, unregelmäßige Nebelfleck/the faint, untidy nebulosity* is a 'weak focus', which does not match the high expectations raised in the context. The focus position of the German version of (65) can be filled appropriately if we adhere to SIP and attach the first part of the subsequent sentence as a relative clause. This reduces (66) to the information after the colon:

(67) In hellen Winternächten kann man aber durch ein kleines Fernrohr 1 Grad (2 Monddurchmesser) nordwestlich von Zeta Tauri einen blassen, unregelmäßigen Nebelfleck sehen, der sich bei näherer Betrachtung als eine immer größer werdende heiße, ionisierte Gaswolke mit einem Magnetfeld und schnellen Elektronen bestimmen läßt.
(68) Im Mittelpunkt dieser Wolke befindet sich ein kompakter, rasch rotierender Neutronenstern, ein Pulsar, der regelmäßige Impulse elektromagnetischer Strahlung aussendet.

The attachment is, again, associated with structural reductions. But an analogous translation of the original first sentence, with all its adverbials localized in a conditional clause, would 'weaken' the focus of (67) even more:

(69) Blickt man aber in hellen Winternächten durch ein kleines Fernrohr 1 Grad (2 Monddurchmesser) nordwestlich von Zeta Tauri, kann man einen blassen, unregelmäßigen Nebelfleck sehen.

The puzzling aspect of examples like this is the conjecture that English does not mind 'weak foci'; examples like (52), (56) and (65) raise the question whether there is any systematic reason for the difference between the German and the English sensitivity regarding focus fillings. The answer is far from clear, but the phenomenon may be related to the lower discourse sensitivity of English: Where word order is in general more constrained, positional clues to discourse relevance can play only a minor role in language processing.

5. Separation
The most general constraint on SIP is the case where the embedding sentence lacks an appropriate point of attachment for the next piece of information, which then has to be integrated into the next sentence. But the piece of information may also form a sentence of its own. Sentences with decreasing discourse relevance, for example, will not always be followed by sentences which can absorb the less relevant part. The German translation will then simply apply PIDO and extract the less relevant material, using it as a sentence of its own. Cf. (70):

(70) Near the equator a train of between 11 and 13 giant storms - like plumes - have been seen during the Voyager encounters, and these also seem to be related to the meteorology of the Earth.
(71) These convective storms move in a westerly wave pattern whose zonal speed is about 100-120 m/s.
(72) The vertical velocities of the most active system are about 40 cm/s, and they perturb temperatures throughout the troposphere. (j108-110)

which ends on a comment, interrupting the description of the discourse topic of giant storms introduced in (70) and elaborated upon in (71) and (72). Within the segment of (70)-(72), the comment is clearly a side structure, and thus of lower relevance than the first conjunct of (70). Unlike English, German resents information of lower relevance at the right periphery and will look for an appropriate point of attachment somewhere else. But as there is no appropriate point of attachment in the German translation of (71), the comment is used as an independent sentence.

(73) In der Äquatorialregion registrierten die Voyager-Sonden eine Kette von elf bis dreizehn gewaltigen Stürmen.
(74) Auch sie sind mit meteorologischen Erscheinungen der Erde vergleichbar.
(75) Es sind Konvektionsstürme, deren Wellen sich mit ca. 100 - 120 m/s in westlicher Richtung bewegen.
(76) Sie erreichen Vertikalgeschwindigkeiten bis zu 40 cm/s und verursachen Temperaturschwankungen in der gesamten Troposphäre.

If there is no appropriate point of attachment, information may also be presented in a semi-attached way, separated from the main structure of an increment by punctuation, like dashes, colon, semicolon or brackets. Thus, the translation of

(77) The massive stars that become Type IIs have a central core which grows up to a critical mass, and then collapses suddenly and catastrophically to neutron star densities.
(78) The core shrinks to 100,000 times its previous size, and the collapse releases about 10^{45} joules of gravitational energy. (n80-81)

attaches (78) by coordination, reducing the repetitive parts of the structure and adding the second conjunct of (78) after a dash:

Graphic forms of semi-detachment/attachment are largely a matter of personal style, but English, which does not mind right peripheral 'addenda', uses these forms more frequently than German. In German, right peripheral focus expectations make us avoid less relevant information at the end of a sentence even at the cost of an extra sentence. Thus, cases like the above are comparatively rare in German.5

6. Summary

What does the discussion of the various classes of different sentence borders in German and English tell us about the question whether there are language-specific constraints on SIP determining appropriate points of attachment? The answers are restricted to written language use and the popular-scientific register we have looked at, concentrating on the direction from English into German. The phenomenon of 'short sentences' occurs in both languages if their discourse relations comprise larger segments of the adjacent context; if not, short sentences in German are attached to adjacent sentences by coordination or subordination, associated with a variety of additional structural changes. Parts of sentences are shifted to adjacent sentences in the interest of appropriate focus structures. If the adjacent structure does not contain an appropriate point of attachment, the detached part is used as an independent sentence. While the appropriate point of attachment is determined by the individual lexical and syntactic conditions of the adjacent sentence, the difference between English and German information structures concerning focus and topic fillings promotes a shift from right to left peripheral attachment in the case of less relevant material, and a shift from left to right peripheral attachment for more relevant material strengthening weak foci.

Literature:


5And even in this case, a short, independent sentence after a full stop is felt to be almost equally appropriate: