

Diathesis in comprehensibility-enhanced texts in the medical field

An analysis of layperson summaries of clinical trials

1 Introduction

Accessibility in the medical field has been gaining increasing importance in the last decades. While terminology in specialised texts is the most evident source of issues for non-experts, other linguistic features undoubtedly contribute to text complexity. One of these is diathesis, which will be analysed in a medical text type ascribable to the Plain Language variant, i.e. layperson summaries of clinical trial results.

1.1 Diathesis and active-passive opposition in English and German

Diatheses are defined as grammatical verb conditions such as active, passive, antipassive, middle, reflexive, causative, or applicative (Wunderlich 1993: 730). It goes without saying that not all of these play a major role in every language; for instance, the antipassive diathesis is a characteristic studied primarily in ergative languages, such as Basque (Leiss 1992: 88–96; Cooreman 1994: 50). For the purposes of this paper a suitable definition is provided by Shibatani (1988: 3), according to whom “voice¹ is to be understood as a mechanism that selects a grammatically prominent syntactic constituent – subject – from the underlying semantic functions (case or thematic roles) of a clause”. Similarly,

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1 As will be indicated by the next definition, “voice” is a synonym of “diathesis”. Another synonymous term, more frequently used in German-speaking literature, is *genus verbi*.

König and Gast (2009: 122) state that “the term ‘voice’ (or ‘diathesis’) relates to the argument structure of predicates, i.e. the relationship between thematic roles like Agent, Patient, Instrument and grammatical functions like subject and object, as well as to the alternations found between different argument structures”.

As the authors (*ibid.*: 123) point out, the main voice opposition in German and English, found in traditional descriptions, is active-passive. They also state that the basic diathesis is provided by the active voice. Likewise, Shibatani (1988: 3), discussing accusative languages and therefore indirectly also English and German, points out that the basic strategy for these languages consists in selecting an agent for the subject role, and that the resulting unmarked structure is the active voice, whereas the passive voice is marked. Also, Chomsky (1957), in his transformational-generative grammar (TGG), derives passive sentences from active ones. In their Relational Grammar (RG), an alternative to TGG, Perlmutter and Postal (1983) state that all verbs have several strata of potential syntactic projections (“diatheses”) and changes² that may occur between them. According to this theory, each stratum implies only the relations 1 (subject), 2 (direct object) and 3 (indirect object), as well as potential obliques. In passivisation, a constituent with a lower status in the relational hierarchy may be promoted or advanced. This, in turn, leads to the demotion of another constituent due to the stratal uniqueness law, which does not allow the presence of two arguments for the same function (Wunderlich 1993: 735–736).

The prototypical passive forms in English and German are BE + PAST PARTICIPLE and WERDEN (*Vorgangspassiv*) or SEIN (*Zustandspassiv*)³ + PAST PARTICIPLE, respectively. Beside these traditional forms, more and more researchers are also focusing on alternative structures which may be subsumed under the category of passivity from a semantic (although not always syntactic) point of

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- 2 Terms referring to derivations from the active voice which may be found in literature are “valency change” (or “changing”), “relation change”, “argument shifting”, and “grammatical function changing” (cf. *inter alia* Wunderlich [1993: 730]).
- 3 It should be noted that, according to some linguists (e.g. Alexiadou/Schäfer 2013: 1–2), *Zustandspassiv* is not canonical due to its auxiliary. Leiss (1992: 156–186) goes so far as to situate it between passive and aspect as a resultative.

view (cf. e.g. Lenz 2006). An overview of these passive-related structures will be provided later in the paper (2.2).

1.2 Passive diathesis in Languages for Specific Purposes

While studies concerning Languages for Specific Purposes (LSPs) were initially limited to terminology and phraseology research, in the last decades they have embraced other aspects, too, such as morphosyntax. Nowadays it is widely recognised that technical terms are not the only features of specialised language. However, whereas each LSP is characterised by the presence of its own dominion of technical terms, its morphosyntactic features do not substantially differ from those of general language; what does indeed vary is the frequency of such features as well as their functions (cf. e.g. Scarpa 2008: 40). In this respect, Halliday (1990: 57–58) goes as far as to talk about “a typical syndrome of grammatical features” in LSPs for their increased frequency compared to general language. These morphosyntactic features entail passivisation, nominalisation as well as information condensation. Clearly, in this paper I will focus on the former.

As has been highlighted, the passive diathesis is more frequent in LSPs (in written texts or oral discourse with characteristics of written text types, such as presentations) than in general language. However, this increased frequency is only relative, as the active diathesis still remains more frequent than the passive one in absolute terms within LSPs, too (cf. e.g. Roelcke 1999: 77; Magris 1992: 70). In a corpus analysis regarding diathesis conducted on a wide range of text types, Svartvik (1966: 164–165) found that even in the subcorpus with the highest occurrence of passive forms, i.e. “scientific exposition”, the proportion of passives to actives was not higher than 1:3. Similarly, in Sager et al. (1980: 209) the passive diathesis of technical-scientific texts is compared to that of literary prose, resulting in a percentage ranging from 26 to 32.6 % for the former, and a strikingly – although not surprisingly – low 2.2–3 % for the latter.

Many explanations are provided by scholars and linguists for this increased frequency. Magris (1992: 70) states that passive forms allow information to be provided in a neutral way, i.e. not highlighting the agent – which is often even omitted – but the action itself. Agent omission is discussed also, among others,

by König and Gast (2009: 123), who point out that agents are often omitted if they are not considered to be relevant or are not easily specifiable. This is connected to a tendency towards anonymisation and objectivisation, paramount in specialised discourse. Finally, another frequent explanation in literature is that the passive diathesis impacts on LSP theme-rheme progression.

1.3 Passive diathesis, comprehensibility, and text simplification

In spite of its functions and role in LSPs, the passive diathesis is generally said to be more difficult than the active one, as it implies a higher cognitive load for readers. Evidence of this complexity is provided also by its relative late acquisition in children, shown among others by experiments conducted by Grimm (1975). Likewise, Lenz (2006: 75) states that this phenomenon is particularly difficult to acquire for foreign language learners. Bredel and Maaß (2016: 313–314), referring to the German language, attribute the complexity of the passive diathesis to two main factors: firstly, a semantic reason, since the event representation is more abstract than in active sentences. The agent must be inferred, as it does not appear in the surface structure. In this respect, Maaß (2015: 78–80), in the context of German Easy Language, stated that action orientation is one of the main principles for text simplification, and agents should be explicit to clarify who is performing an action⁴. However, according to Duden (2016: 561), agents are predominantly omitted (in approximately 90 % of cases)⁵ in German passives with *WERDEN*. Secondly, Bredel and Maaß (2016: 313–314) attribute the abovementioned difficulty to morphological factors, given that canonical passive forms (at least in German, English, as well as

4 In this volume, Maaß does not refer only to passives *stricto sensu*, but also to passive-related structures (such as modal infinitives, as may be inferred from an example she provides).

5 Similar estimations are provided by Brinker (1971: 40) and Schoenthal (1976: 124) based on corpus analyses: the former calculated a percentage of 86.32 %, the latter of 84 %. Furthermore, for alternatives to conventional passives agent omission is even more frequent (Lenz 2006: 50). For the English language, estimations were made by Svartvik (1966: 141) and Givón (1979: 58). The former calculated a percentage of 80 % agentless passives, while according to the latter this value reaches 82 % of overall passive forms.

many other languages) are characterised by an analytic structure. In German, particularly, the meaning-carrying part of the verb shifts to the end of the sentence⁶. Similarly, Cutts (2013: 68) states that introducing verbs towards the end of a sentence, as often occurs with passive forms, “forces readers to store large chunks of text in their short-term memory while they wait to discover the doer and what the action will be”. Finally, another explanation for this complexity may be the dichotomy “centrality-peripherality” elaborated by Maaß (2015: 78), who recommends using more frequent – and therefore comprehensible – linguistic resources in simplified texts. Although in the quoted paragraph she discusses only more or less common synonyms as well as grammatical categories like genitive, subjunctive, and preterite, the same principle may be applied to passive forms, since, as already mentioned, they are far less frequent than their active counterparts.

Due to the above-discussed reasons, passive forms are generally not recommended in simplified language variants (Easy and Plain Language). For Easy Language, the *Netzwerk Leichte Sprache* (BMAS 2014: 29) as well as Bredel and Maaß (2016: 313–317) recommend against using the passive diathesis. As far as Easy Language Plus (a slightly less simplified language variant) is concerned, Maaß (2020: 244–245) states that passive forms can be used under certain conditions. The variant of Plain Language is less normed than Easy Language; however, some guidelines or recommendations can be found, such as those by Cutts (2013). This author maintains that passive forms are “fostered by bad teaching in schools and universities that equates good writing with formality, obscurity, and Olympian detachment”, and even uses disapproving expressions such as “passive-infested style” (ibid.: 63). However, he then moves on to state that the passive voice is still valuable in some cases, since it may serve as a hedging or face-saving strategy, it enables the omission of obvious or irrelevant agents, and thematises important information. Other recommendations for Plain Language (2017) are those written with respect to the text genre pertaining to the medical-pharmaceutical field which will be analysed

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6 Also according to Lenz (2006: 74) typical German passive forms are cumbersome due to the verbal bracketing they imply.

here, i.e. layperson summaries of clinical trials; there, it is suggested to avoid the passive diathesis.

In light of these premises, with the passive voice playing an undeniably remarkable role in LSPs but running the risk of affecting comprehensibility, the purpose of this paper is to analyse the aforementioned comprehensibility-enhanced genre in order to point out the frequency of passive forms *lato sensu* as well as their use – and ascertain whether the recommendations are actually followed.

2 Materials and method

The examined comprehensibility-enhanced text genre, i.e. layperson summaries of clinical trials, consists of versions of trial results for non-experts aimed at guaranteeing transparency. These documents, published by pharmaceutical companies in compliance with EU regulation 536/2014, should also be provided with translations in the various languages of the countries that took part in the trial. Clinical trial information for medical experts, by contrast, is only provided in English due to its status of *lingua franca* in science. The present empirical study examines a corpus of English layperson summaries, their German translations, as well as their source texts for experts (trial summaries downloaded directly from the pharmaceutical company websites or, in case these were not published, the analogous information available on the portal ClinicalTrials.gov).

2.1 Automated analysis

The analysis was performed on thirty triplets of texts as indicated above, thus, in total, on ninety texts. The pharmaceutical companies which have produced them are Grünenthal, GSK, Novartis, Bayer, and Boehringer Ingelheim. The rationale for corpus construction was to select texts homogeneously, both in terms of pharmaceutical company and of topic (i.e. pathology to be treated), in order to guarantee that the formulations would be as varied as possible. In this part of the analysis the aim was to pinpoint the frequency of passive sentences.

For this purpose, the software Analyze My Writing⁷ and Ratte⁸ (Regensburger Analysetool für Texte) were employed as a starting point. As a matter of fact, as will be explained more extensively in 3, these tools sometimes provide both false positives and false negatives. Moreover, Analyze My Writing only signals cases of passives consisting of BE + PAST PARTICIPLE, while Ratte solely marks those with WERDEN + PAST PARTICIPLE. Clearly, this is a great limit of the tools in question, as, especially for German, these are far from all passive forms. The second part of the article therefore aimed at integrating the automated analysis. Another limit is that images, graphs, and tables that could not be copied were not considered.

2.2 Manual analysis

As already mentioned, the aim of this section was to complete the automated analysis by considering passive forms that were not identified by the tools Analyze My Writing and Ratte. In German, these include first of all *Zustandspassiv* (or *sein-passive*) as well as the non-canonical *bekommen-passive*⁹ (or recipient passive, also with its variants entailing the verbs ERHALTEN and KRIEGEN); in English, passives with the non-canonical auxiliary GET¹⁰ (or similar verbs like BECOME).

Moreover, I decided to analyse other passive-related structures¹¹, too. Most are specific to German, although some may occur also – or solely – in the Eng-

7 <https://www.analyzemymywriting.com/>

8 <https://www.uni-regensburg.de/sprache-literatur-kultur/germanistik-did/downloads/ratte/index.html>

9 Zifonun (1992: 254; 1997: 1824) refers to it as “peripheral passive” as opposed to the “central passive” made up by the periphrastic forms with the auxiliaries WERDEN and SEIN, as it does not fulfil all passivity requirements.

10 Cf. e.g. Huddleston/Pullum (2002: 1440–1443); it should be noted that the term “auxiliary” was used exclusively for the sake of simplicity, as its status is debated (cf. *inter alia* Haegeman 1985; Wanner 2013; Puckica 2009).

11 Linguistic literature is replete with terms referring to these phenomena, especially for German. They may be translated as “passive reformulations” (Kolb 1966: 178), “competing forms of passive” or “passive paraphrases” (Helbig/Buscha 1998: 183), “passive variants” (Brinker 1971: 117), “passive synonyms” (Gang 1997), “passive alternatives”, “substitute forms of passive” (Puato 2017: 170), and “almost passive constructions” (Weinrich 2005: 163–166). Zifonun (1992; 1997) uses the term “converses” as a hypernym encompassing both standard passives and all other passive-like constructions.

lish language (cf. among others Teich [2012: 213], who underlines that there are fewer passive alternatives in English than in German). The former category encompasses periphrastic structures such as:

- SICH LASSEN + INFINITIVE (“*lassen*-middle” according to e.g. König and Gast [2009: 134–136] and Steinbach [1998: 14]);
- reflexive constructions (called “plain middles” by König and Gast [2009: 134–136] or “middle constructions” by Steinbach [1998]);
- modal infinitives with SEIN¹² (or “tough-movement constructions” according to Steinbach [ibid.: 155], and “modal passives” according to Weinrich [2005: 163–164]);
- GEHÖREN + PAST PARTICIPLE;
- gerundive constructions (also called “modal participles” by Weinrich [2005: 165–166; 542–543]);
- *Funktionsverbgefüge* (empty verb constructions);
- impersonal sentences with the pronoun MAN.

In English, the passive-related forms HAVE + OBJECT + PAST PARTICIPLE and the V-ING passive construction (cf. Puckica 2009 for both) will be considered. Other, more general (non-language-specific) paraphrases include adjectives with a passive connotation and participial attributes.

In Section 4.2, further considerations about passives will be made with respect to agentivity, their functions and translation.

3 Automated analysis results

The total number of tokens of the analysed corpus was 174,002, with the English and German layperson summaries’ subcorpora having 42,309 and 42,108 tokens, respectively, and the trial summaries’ subcorpus consisting of 89,585

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12 As opposed to the ones with the auxiliary HABEN, which have an active rather than a passive connotation. Some scholars also consider verbs such as STEHEN, BLEIBEN, and GEHEN as variants of SEIN.

tokens. Compared to other corpora which consist of millions of tokens, this corpus is rather small; however, since it consists of texts pertaining to a highly specialised (not concerning general language), quite standardised genre, its size already allows detection of some interesting trends.

The number of passive sentences calculated by the software was always cross-checked manually, as both false positives and false negatives were found. For instance, *Analyze My Writing* signals constructions with the verb *BE* + potential *PAST PARTICIPLE* as passive forms; some incorrectly detected passive phrases contained *ADJECTIVES*, as in “being constipated”, or *ADJECTIVES* + *NOUN PHRASES*, as in “There was no excess unmineralized osteoid”, “is an unwanted sign”, “are known adverse drug reactions”, “is a validated instrument”. With respect to false negatives, on the other hand, passive forms with the past participle “found” were often overlooked and had to be added manually¹³.

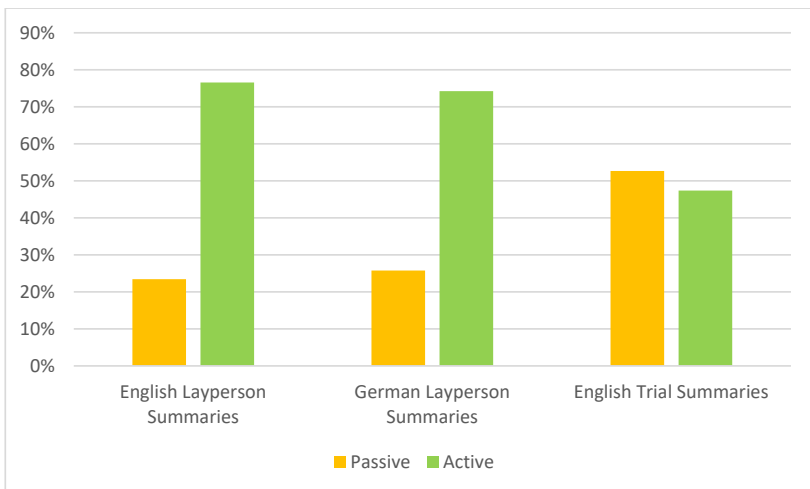


Figure 1: Mean percentages of active and passive sentences

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 13 With respect to German, it was harder to pinpoint which results were false positives and false negatives, since the software *Ratte* only calculates the number of passive sentences without listing them explicitly. However, the final values were always corrected, as well, and it may be hypothesised that false positives were made up by the verb *WERDEN* + *ADJECTIVE*.

Figure 1 shows the average values of passive and active sentences in the whole corpus. In brief, the trial summaries have an average percentage of passive sentences more than twice as high as the layperson summaries. This trend confirms the initial hypothesis that the passive diathesis would be less frequent in the simplified texts (although it is quite common in absolute terms). The level of passive diathesis is only higher in two layperson summaries than in the respective trial summary. However, the difference is not particularly high: in the first instance, the trial summary passive percentage amounts to 25 %, while that of the English and German layperson summaries amounts to 34.33 % and 36.92 %, respectively. In the second instance, only the German layperson summary has a passive percentage higher than the corresponding trial summary, that is 31.88 % against 28.31 %, while the English layperson summary has a passive percentage of 25 %.

An interesting trend shown both by these instances and Figure 1 is the higher proportion of passive sentences in the German texts than in the English source texts. Overall, 21 out of 30 German texts had more passive sentences than the corresponding English version. This is particularly significant considering that – for this part of the analysis – only the instances of *Vorgangspassiv* were counted in German. If the cases of *Zustandspassiv* had been considered, as well, the discrepancy between the German and English texts would have been even higher, since the semantic difference between statal and processual passives is not marked morphologically in the English language – both are rendered through the verb *BE* and therefore counted by the software used in the present analysis. Furthermore, initially the level of passive diathesis was expected to decrease, due to the Translation Universal of Simplification (cf. e.g. Baker 1993; Mauranen/Kujamäki 2004). However, some researchers already found that there is a tendency to passivise active constructions in translation (cf. e.g. Bisiada [2019], who analysed English business articles and their German versions).

4 Manual analysis results

As already mentioned in Section 2.2, this chapter aims at analysing both the features related to passivity which were not considered by the two tools of linguistic analysis, and other aspects deemed to be of interest, such as agentivity and translation of passive structures. With respect to the latter, the purpose was to pinpoint the causes of passive increase in the German texts.

4.1 Missed features in the automated analysis

The first subsection of this chapter examines non-canonical passive constructions as well as alternatives to passives. For the former, the most important phenomenon was found to be *Zustandspassiv*; for the latter, the predominant features occurring in both German and English were attributes (either prenominal or postnominal depending on the language) and adjectives with a passive component. With respect to the German language only, another primary feature was the presence of *Funktionsverbgefüge*.

4.1.1 Passives

As expected, cases of *Zustandspassiv* were extremely frequent (90 occurrences), in particular in metadiscourse and intertextual references, as in “In diesem Abschnitt **sind** die unerwünschten Ereignisse **zusammengefasst**”, or “Links zu den Zusammenfassungen **sind** am Ende dieses Dokuments **aufgeführt**”. It also occurred in other contexts, as is the case in “Die Aufnahme **war abgeschlossen**” or “Unerwünschte Effekte sind gesundheitliche Beschwerden, die nach Meinung der Ärzte durch [...] **verursacht sind**”. A peculiarity of this type of passive, evident in these instances, too, is the absence of an expressed agent, which would be ungrammatical.

The recipient passive (or dative, beneficiary, and addressee passive, cf. Puato 2017: 170–171) was absent in my corpus, both with the verb *BEKOMMEN* and its variants *ERHALTEN* and *KRIEGEN*. This is not particularly surprising considering the constraints of this construction, which may be used if the active sentence from which it stems has both an accusative and a dative object (or a free dative, which may be a *dativus commodi*, a pertinence dative, or even a

dativus incommodi, cf. *ibid.*). Even more importantly, this passive form is also subject to diamesic, diaphasic, and diatopic restrictions, since it is generally regarded as a feature of spoken German (Leirbukt 1997) and, depending on the verb choice, it is perceived to be more or less regional and colloquial (Puato 2017: 170–171). The variant with *KRIEGEN* belongs to a particularly low register, while that with *ERHALTEN* is stylistically more elevated (*ibid.*). Further evidence of the relative marginal importance of the recipient passive in LSPs is provided by the fact that, in her meticulous examination of passive forms and passive alternatives in the juridical field, Lenz (2006) did not devote an analysis section to it.

Turning to the English alternatives to the *be*-passive, only one occurrence of the *get*-passive was detected: “When cartilage **gets damaged**, GAG and collagen are also damaged”. This low frequency did not come as a surprise, since *get*-passives are by no means as common as *be*-passives: they are perceived to be quite informal and are therefore more frequent in spoken language (cf. *inter alia* Wanner 2013: 47; Puckica 2009: 222; König/Gast 2009: 125). Furthermore, they have semantic constraints: among others, these constructions often allow an adversative reading¹⁴ (König/Gast 2009: 126) – which also characterises the instance provided above – and imply a partial responsibility of the patient (*ibid.*: 125; Givón/Yang 1994: 119–121). Another verb commutable with *BE* (cf. Jespersen 1933: 120; Puckica 2009: 222–223) is *BECOME*, although its status is far more debated than that of *GET* (*ibid.*) and it is rarely considered in grammars; in my corpus, only one occurrence was found: “In people with *CRVO*, the main blood vessel that carries blood away from the retina **becomes blocked**”.

4.1.2 Passive alternatives

Starting from passive alternatives specific to the German language, *lassen*-middles did not occur in my corpus. This was to some extent surprising, as it is a rather frequent feature in German (Kunze 1996: 648), especially in the language of science (Puato 2017: 173). With respect to plain middles, on the other hand,

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14 Wanner (2013) revisited this claim. In her corpus, two thirds of *get*-passives actually allowed an adversative reading, but she purports that this high percentage was due to the register in which these forms were used.

seven occurrences with the verb “finden” were detected, as in “Weitere Informationen über die Studienergebnisse **finden sich** in den Zusammenfassungen der wissenschaftlichen Ergebnisse”.

Modal infinitives with the auxiliary SEIN were not rare (18 occurrences). Most cases entailed the verb phrase “zurückführen auf” and referred to drug effects (or adverse reactions), as in “In dieser Zusammenfassung bezieht sich der Begriff ‘Nebenwirkungen’ auf diejenigen Ereignisse, die nach Meinung des Studienarztes **auf** das Prüfpräparat **zurückzuführen sein könnten**”. Other examples were the following: “Knorpel bestehen aus einer Schicht aus festem, geschmeidigem Gewebe, das in den Zwischenräumen bestimmter Gelenke im Körper, beispielsweise dem Kniegelenk, **vorzufinden ist**”, “Manche Arten von Non-Hodgkin-Lymphomen **können schwer zu behandeln sein**”, and “Asthma gilt als schwer, wenn die Symptome auch dann schwierig **zu kontrollieren sind**, wenn die Patienten Asthma-Medikamente anwenden”. Modal infinitives with the verbs STEHEN, BLEIBEN OR GEHEN¹⁵ were not found.

A modal connotation, which characterises *lassen*-middles, most plain middles, and (as the name suggests) modal infinitives, is inherent also in the construction GEHÖREN + PAST PARTICIPLE. However, no occurrences were found in my corpus. According to Pape-Müller (1980), this construction is colloquial, which certainly explains its absence. Also, gerundive constructions (or modal participles) have a clear modal component, but they were absent in my corpus as well.

Another passive alternative found in my corpus consists in a subclass of the so-called *Funktionsverbgefüge* (empty verb constructions), contemplated by several grammars and scholars, e.g. by Duden (2016: 562), Weinrich (2005: 164–165), Lenz (2006: 117–152; 247–272), and Puato (2017: 172). The most thorough examination is that by Lenz (2006). Therefore, her model was followed in the present analysis. For verbs such as KOMMEN, GERATEN, and GELANGEN, only active constructions were detected according to her classification, as in “zu den Effekten kommen”, “zu Ergebnissen kommen”, “zu Ergebnissen gelangen” (18 occurrences altogether). For the verb STEHEN, instead, the pas-

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15 The absence of the latter, in particular, does not surprise, as it belongs to a low register (Puato 2017: 172; Vogel 2009).

sive constructions “in Zusammenhang stehen”, “in Verbindung stehen”, and “zur Verfügung stehen” were quite frequent (35 occurrences), see for instance “Unerwünschte Ereignisse können möglicherweise **in Verbindung** mit den Behandlungen in einer klinischen Prüfung **stehen**”. Other instances entail the verbs *ERLEBEN* (1 occurrence) and *BEDÜRFFEN* (11 occurrences), as in “Ereignisse erleben”, “Es bedarf viel Forschung, um herauszufinden, ob [...]”. In sum, these cases were quite limited, but this may be related to the general tendency towards verbalisation in comprehensibility-enhanced texts as well as to the fact that the majority of nominalised constructions were active.

To conclude the section devoted solely to German passive alternatives, impersonal constructions with the pronoun *MAN* were relatively frequent (21 occurrences), too. Some instances from the corpus under analysis are the following: “Weder die Patienten noch die Studienärzte wussten, wer welche Behandlung erhielt. Dies **nennt man** eine doppelt verblindete Studie” or “**Man konnte** jedoch nicht feststellen, ob sich das Medikament stärker auf den Kollagen- oder GAG-Gehalt auswirkte als Placebo”. Albeit not meeting all passivity requirements (they may even be passivised, cf. Puato 2017: 171; Helbig 1997), these constructions are agent-averted¹⁶.

As far as English is concerned, four instances of the construction *HAVE + OBJECT + PAST PARTICIPLE* were detected in the corpus under analysis: “The participants **had their vision checked** every 4 weeks”, and “**had pictures of their knee taken** using MRI”, just to mention a few. No cases of the *V-ING* passive construction (or “concealed passive”, as in “The house needs painting”, cf. Huddleston/Pullum [2002: 1199–1200]) were found. Indeed, besides having aspectual differences with the canonical passive, this form is far less frequent (Puckica 2009: 226).

Turning to cross-linguistic passive alternatives, adjectives with a passive component – which have a modal connotation, as well (cf. Puato 2017: 173) – were found in both examined languages. In German, the suffixes *-lich* and *-bar* were quite productive. With respect to the former (24 occurrences), instances like “zugänglich”, “erhältlich”, “verträglich”, and “verständlich” were found. As

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16 Unlike for many other passives and passive alternatives, here agent expression is not only superfluous, but even ungrammatical.

far as the *-bar* suffix (19 occurrences) is concerned, some examples are “*tolerierbar*”, “*verfügbar*”, “*vorstellbar*”, “*unschätzbar*”, “*vorhersehbar*”, “*erkennbar*”, and “*vergleichbar*”. Other passive pseudosuffixes listed by Lenz (2006: 169–186) and Puato (2017: 173) are *-wert*, *-würdig*, *-fertig*, *-bereit*, *-bedürftig*, *-pflichtig*, *-fähig*. However, none of these were found, except for *-fertig* (“*gebrauchsfertig*”, 2 occurrences) and *-fähig*, but the latter occurred only in an active adjective, i.e. “*gebärfähig*” (1 occurrence). This distribution approximately corresponds to that detected by Lenz (2006: 170), who noted that the most frequent adjectives are those with the suffixes *-bar* and *-lich*, followed by *-wert*, *-pflichtig*, *-bedürftig*, and *-würdig*. Finally, another suffix detected in the present corpus is *-abel*, as in “*resektabel*”, a technical term found in an intertextual reference from one layperson summary to its corresponding trial summary and its original title. In English, suffixes making up passive adjectives are *-able*, *-ible*, and *-uble* (e.g. Haspelmath 1994: 163; Puckica 2009: 229–233). Of these, only the former occurred in my corpus, i.e. in the adjectives “available” or “applicable” (44 occurrences altogether). This distribution is not particularly surprising, in that *-able* is nowadays the only productive suffix out of this group (ibid.: 230).

As far as participial attributes expressing passivity are concerned, so-called *Linksattribute*, that is prenominal attributes, were frequent in German (137 occurrences). Some of these built quite complex nominal phrases, as in “Nebenwirkungen des **auf den chirurgischen Schnitten und Wunden verwendeten Klebers**”, “Angabe der **mit den vorstehend genannten Hyperlinks verknüpften Websites**”, “die **von Ihnen angewendeten medizinischen Behandlungen**”. In English, such prenominal attributes occurred more seldomly, in only 44 cases (e.g. “total **planned** dose”, “other **commonly used** methods”, “**approved** type”); postnominal attributes (or “bare passives” according to Huddleston/Pullum [2002: 1429–1430]), such as “adverse events **caused by the trial drugs**”, or “condition **brought on by a sudden decrease in blood flow to the heart muscles**”, were far more frequent (228 occurrences). Indeed, these may be considered the English equivalent of German *Linksattribute*, as English prenominal attributes – unlike postmodifiers – cannot be expanded to reach a certain degree of complexity (cf. Fabricius-Hansen 2010: 5). Participial phrases (separated by a comma, signalling their non-restrictiveness) were found relatively often, too (36 occurrences), as in “gastrointestinal stromal tumors, **ab-**

breivated with GIST” or “autologous chondrocyte implantation, **also known as ACI surgery**”; some instances occurred in German, as well, albeit not as frequently (17 occurrences). As a matter of fact, these constructions constitute a common alternative to relative clauses only in English (ibid.: 7). All of them undoubtedly contribute to text concision.

4.2 Further considerations: agents, functions, translation

What was stated in Section 1.3 with respect to agent omission was confirmed in my corpus, as well. The overwhelming majority of analysed passives did not have overt agents¹⁷. This concerns cases where the agent was obvious and inferable on the basis of encyclopaedic knowledge, as in “[...] gastrointestinal stromal tumors, abbreviated with GIST, that had spread to other parts of the body or could not be removed” or “The placebo was taken as a tablet by mouth”, where the implicit agents are doctors or surgeons and trial participants, respectively. Another reason is the expression of the agent in the same sentence or paragraph, but not as an explicit argument headed by the preposition “by” (or “von” in German), as is the case in “**The doctors** did a CT or MRI scan of the participants’ tumors every 4 weeks for the first 3 months, then every 6 weeks for the next 3 months. After that, the tumors were checked every 8 weeks [...]”. Finally, another cause of agentlessness is the general nature of the agent itself in some statements, which makes it superfluous, as in “These medical problems are called ‘adverse events’”. In this instance the agent, if explicit, should have been “doctors” or “all doctors”, which would have been slightly pedantic – although in layperson summaries technical terms are often signalled by expressions such as “doctors call these + TERM” after cataphoric definitions.

When the agent was expressed, it was generally highlighted, i.e. its semantic value was to underline that the action was carried out by it and not by other individuals or objects (cf. Scarpa 2008: 46), as in “All serious side effects were

.....

17 For the sake of simplicity and concision, all instances and considerations at the beginning of this section are in English, the source language, but they are valid also for German, in that, as we will see in the paragraphs concerning translation, this language did not add any agents, but rather tended to *omit* them when it transformed English active sentences into passive ones.

reported by less than 1 % of patients in either treatment group” or “If the study doctor thinks that an adverse event was caused by the study medicine, they record this as a possible side effect (adverse reaction)”. In other – more limited – cases, it was expressed only since it was not omissible (cf. Huddleston/Pullum 2002: 1428), as occurs in this example involving the verb *follow* with a temporal reading: “This 4-week period was followed by 27 days of no doses”.

Overall, the functions of passives were mainly to focus on patients rather than agents, in case these were too obvious or not important, as seen above, or to avoid the repetitive use of excessively similar constructions. Another cause is theme-rheme progression. With respect to the second instance provided in the previous paragraph, for example, *adverse events* makes up the theme, discussed in depth in the previous pages (“Given”), while *the study medicine* is the rheme (“New”). This progression is enabled by the use of a passive form. Furthermore, another stylistic cause consists in the concision allowed by passives, which are frequently found in titles and tables, where there is often no room for wordiness.

As mentioned above and in 1.3, passives are tightly intertwined with depersonalisation and anonymisation, which are often of utmost importance in medicine – and science in general. Frequent exceptions to this principle were detected in my corpus: see, for instance “The researchers randomly assigned the participants [...]”, or even “We did statistical tests on these results” and “We also measured the time from starting the study treatment until the patients died”.

Another interesting feature that I decided to look at was the increase in passives in German highlighted by the automated analysis. Firstly, it was found that the higher number of passives in this language was often due to recourse to relative clauses containing a passive verb to translate English postmodifiers¹⁸, which, as already stated in 4.1.2, are ungrammatical in German. See, for instance, the following translations: “Proteine [...], die als Autoantikörper

.....

18 Another frequent way of translating such postmodifiers, mentioned in 4.1.2, consists in *Link-sattribute*, their German equivalent. See, for instance, the German translation “mit einer **als Schuppen bezeichneten** silbrig-weißen Anhäufung bedeckt” from “covered with silvery white buildup **called scales**”.

bezeichnet werden” (from the source text “Proteins called autoantibodies”) or “die Patienten, die in diese Studie aufgenommen wurden” (from “patients included in this study”). In another excerpt, a postmodifier was translated similarly, although not with a relative clause: “In dieser Studie wurden zwei Medikamente verabreicht” from the source text “The drugs given in this trial were [...]”. Clearly, these English instances had a passive component, too, but – unlike their German translation – they were not subsumable under the category of canonical passives.

In other cases, though, passivity was lacking completely in the source text and was added in the target one. Some instances of this phenomenon, which will be called “passives *ex nihilo*”, were the following: “Medikamente, mit denen Schmerzen und Entzündungen behandelt werden können” from “medicines that can lower pain and inflammation”, “Im Rahmen dieser Studie sollten neue Erkenntnisse über die Wirkung und Sicherheit von [...] gewonnen werden” from “The purpose of this trial was to learn about the effects and safety of [...]”. Here, in addition to the passive transformation, a difficulty is posed by the use of an empty verb construction rather than an easier verb such as “erfahren”. In many cases, passives *ex nihilo* went hand in hand with agent omission, as in “Bei diesem Termin wurden Blut- und Urinproben entnommen” from “Trial staff took blood and urine samples at some of the trial visits” or “Es wird nach einer besseren Möglichkeit zur Behandlung von Patienten [...] gesucht” from “Researchers are looking for a better way to treat [...]”. Agents were kept only if strictly necessary, as in “Das zugewiesene Medikament wurde von den Teilnehmern [...] selbst unter die Haut gespritzt” from “Participants took their assigned treatment by giving themselves an injection under the skin”. However, I suggest that this strategy be avoided. As a matter of fact, beside affecting comprehensibility, it also impacts on the interpersonal function of language, since in the source text the mention of the agent (be it *researchers*, *trial staff* etc.) also helps build trust and increase authoritativeness.

Finally, some instances of passives *ex nihilo* were due to structural differences between English and German rather than translators’ personal – arbitrary – choices, as in “test positive” and “positiv getestet werden”.

5 Conclusions

In sum, the number of passive sentences was lower in the comprehensibility-enhanced texts for non-experts than in the trial summaries, but it was still quite high, despite the recommendations existing in the field. Most of them did not contain overt agents, which conflicts with the action orientation and agent explicitation recommended by Maaß (2015: 78–80); at the same time, though, they were mostly still easily inferable and did not lead to significant interpretation issues. Furthermore, canonical constructions were undoubtedly more frequent than non-prototypical ones or passive alternatives. This distribution may be explained through the dichotomy “centrality-peripherality” by Maaß (ibid.), already mentioned in 1.3, according to which more frequent linguistic resources should be favoured over sporadically occurring ones. A second reason, specific to German translated texts, is interference, that is a certain tendency to repeat constructions found in the source text rather than replacing them with more natural-sounding, idiomatic ones in the target language. As we have seen in 2.2 and 4.1, non-prototypical passives and, even more so, passive alternatives are much sparser in English than in German. Therefore, the majority of passives in the source language are ascribable to canonical passives, and this distribution may have contributed to the high number of prototypical passives in the target language, as well. Clearly, there are plenty of exceptions to this statement, since even in translation, constructions specific solely to the target language may be found (cf. e.g. Kunze [1996: 684–688] and the use of *lassen* middles in German translations from English). In my corpus, too, some peripheral constructions did occur, but without exceeding expectations and respecting all diamesic and diaphasic constraints. In conclusion, a further research desideratum could be to examine users’ reception and elaboration of passive constructions and alternatives to passive in these texts.

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