# ADVERBIAL MARKERS OF EPISTEMIC MODALITY ACROSS DISCIPLINARY DISCOURSES: A CONTRASTIVE STUDY OF RESEARCH ARTICLES IN SIX ACADEMIC DISCIPLINES

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ABSTRACT

Epistemic adverbs, like other markers of epistemic modality, are concerned with the speaker's assessment of the truth value of the proposition. In other words, they indicate that the speaker considers certain situations as possible, impossible, probable, certain, or uncertain. At the same time, they signal the author's presence in the text, and invite the reader to make his/her own conclusions and interpretations. The use of modal markers has been demonstrated to differ across academic disciplines, but the specific differences concerning the use of epistemic adverbs have not been studied systematically. This paper investigates the use of epistemic adverbs in research articles representing six disciplines belonging to three different branches of science: the humanities (linguistics and literary studies), the social sciences (law and sociology), and the natural sciences (physics and medicine), with the aim of establishing discipline-specific tendencies in their use. The study is based on a corpus of 160 research articles compiled by the author. It begins with an attempt at delimiting the category of epistemic adverbs in English. After that, a list of the most frequent epistemic adverbs in the subcorpora of all the disciplines is established and discussed. The study demonstrates that frequent use of epistemic adverbs is largely a property of research articles in the humanities and social sciences. Medical and physics research articles use them significantly less often. The most frequent epistemic adverbs in the research articles under analysis include *indeed, perhaps, clearly, certainly, of course, arguably, possibly*, and *reportedly*. Some adverbs appear to be associated with specific disciplines, e.g., *clearly* (physics, linguistics, sociology, medicine), *indeed* (linguistics, literary studies, sociology), *possibly, reportedly* (medicine), *arguably* (law). The association of individual adverbs with specific disciplines may serve as an important clue to the understanding of their functions, in particular in the case of the less frequent ones, such as *arguably* and *reportedly*, which remain significantly understudied. The findings may also prove useful in teaching English for academic purposes.

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## 1. Introduction

Academic discourse follows certain rhetorical conventions which determine the ways in which authors signal their presence in a text, express their judgements, and interact with their readers. Both the nature and degree of authorial representation are closely connected with the requirements of specific disciplines: in the natural sciences, the author's presence tends to be minimal, while in the humanities and social sciences, authors mark their presence more explicitly. Authorial presence may be indicated by a variety of devices, such as first person pronouns (cf., e.g., Hyland 2001; Harwood 2005; Fløttum et al. 2006a, 2006b; Ädel 2014). Less directly, it may be signalled by adverbial markers of epistemic modality. As observed by Halliday & Matthiessen (2004: 624), "[m]odality represents the speaker's angle", and markers of epistemic modality express the speaker's knowledge and commitment to the truth of the proposition (cf. Narrog 2012; Palmer 2001). In addition to presenting the speaker's view, modality creates space for negotiation and mediation (Martin & Rose 2003), and can be treated as "a resource for taking up different positionings" (Simon-Vandenbergen & Aijmer 2007: 42). Some modal markers are used to persuade the reader to share the writer's views, while others invite or discourage alternative interpretations.

Contrastive studies have revealed significant differences in the use of modal expressions across scientific disciplines (e.g., Varttala 2001; Fløttum et al. 2006a; Vold 2006), but not all groups of modal markers have been studied systematically. This article focuses on epistemic adverbs, a class which has only recently begun to receive the scholarly attention it deserves (e.g., Nuyts 2001; Simon-Vandenbergen & Aijmer 2007). The study begins with an attempt at delimiting the category of epistemic adverbs in English and identifying their types. It discusses a number of issues which are central to the understanding of epistemic modality, such as its relation to evidentiality, subjectivity, and objectivity. It also investigates the distinction between epistemic adverbs, modal particles, and discourse markers. Then, an attempt is made to examine the use of epistemic adverbs in research articles representing six disciplines belonging to three different branches of science: the humanities (linguistics and literary studies), the social sciences (law and sociology), and the natural sciences (physics and medicine), with the aim of establishing discipline-specific tendencies in their use. The study is based on a corpus of 160 research articles (ca. 1.2 million words), compiled by the author. It attempts to identify the types of epistemic adverbs which are characteristic of each of the disciplines (and

groups of disciplines), on the assumption that such an analysis is likely to offer some insights into both the character of the discourse of each of the disciplines, the ways in which authors representing the disciplines make claims to knowledge, and the properties of the adverbs under analysis, viewed both individually and as a class.

## 2. Epistemic modality and evidentiality

Epistemic modality refers to "matters of knowledge or belief on which basis the speakers express their judgements about states of affairs, events or actions" (Hoye 1997: 42). While this general characteristic raises little doubt, there are a number of problematic issues in the area, such as the distinction between epistemic modality and evidentiality (cf., e.g., Cornillie 2009; Portner 2009: 167–172). Epistemic modality has been said to concern situations when the speaker makes a claim based on his/her "world of knowledge and beliefs", while in the case of evidentiality, the claim is based on the "sources of information other than the speaker" (Narrog 2012: 11). Some languages, such as Quechuan, spoken in South America, have grammatical evidentials which provide the source of information without offering epistemic judgement (Aikhenvald 2004). In such languages, the distinction between evidentiality and epistemic modality is quite clear-cut. European languages, however, do not have grammatical evidentials,[1] which is why the two categories are more difficult to separate. Portner notes that the two concepts rely on similar notions, i.e., "direct evidence, indirect evidence, reported information, and hearsay" (Portner 2009: 170), and Nuyts argues that "some forms might be both epistemic and evidential" (Nuyts 2001: 57). The likeness between the two concepts has led a number of linguists to treat evidentiality as a component of modality (e.g., Willett 1988; McCready & Ogata 2007), and some others – to interpret it as a category encompassing epistemic modality (e.g., Chafe 1986). The problem is, as Boye (2012) puts it, that there is evidence both for the claim that the two notions are distinct as well as for the claim that they are related. Boye introduces a superordinate notion he names "epistemicity", which is equivalent to "the philosophers' notion of justificatory support" (Boye 2012: 3). Epistemicity comprises "epistemic support" (which in Boye's terms corresponds to epistemic modality), and "epistemic justification" (which corresponds to evidentiality). A single notion, inclusive of both epistemic and

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[1]    Diewald & Smirnova (2010) argue that in the case of some languages spoken in Europe, such as German, it is possible to talk about a grammatico-lexical continuum in the area of evidentiality, as some forms, such as *werden* plus infinitive and *scheinen* plus *zu*-infinitive appear to be undergoing grammaticalization.

evidential meanings, is useful for an analysis of English adverbs referring to the speaker's knowledge, because, as observed by Simon-Vandenbergen & Aijmer (2007: 31), they "always have a modal meaning", even those which indicate the source of knowledge. Because of the reported absence of purely evidential adverbs in English, the term *epistemic* will be used here in its broad sense of "pertaining to knowledge" (from Greek ἐπιστήμη 'knowledge') to refer to both evidential and non-evidential (epistemic in a narrow sense) adverbs. Evidential adverbs will be treated as a subcategory of epistemic adverbs, understood broadly as those which express what Boye (2012) terms "epistemicity" and "justificatory support".

3. Epistemic adverbs: Delimiting the category

The epistemic adverbs examined in this study have been excerpted from reference grammars as these contain the most comprehensive listings of the items under analysis. The major English reference grammars differ in their treatment of adverbs referring to the speaker's knowledge. While the items listed tend to be the same, the terminology used to classify them is different. Huddleston & Pullum (2002: 767) group them under the heading of *modal adjuncts*, while Biber et al. (1999) and Quirk et al. (1985) classify them as members of larger categories. In the case of Quirk et al. (1985: 620–621), it is the category of *content disjuncts*; in the case of Biber et al. (1999: 855) – *epistemic stance adverbials*. Overall, the three grammars list the following items which express epistemic meanings: *admittedly, allegedly, apparently, arguably, assuredly, avowedly, certainly, clearly, conceivably, decidedly, definitely, doubtless, evidently, incontestably, incontrovertibly, indeed, indisputably, indubitably, ineluctably, inescapably, likely, maybe, manifestly, necessarily, no doubt, obviously, of course, patently, perhaps, plainly, possibly, presumably, probably, purportedly, reportedly, reputedly, seemingly, supposedly, surely, truly, unarguably, unavoidably, undeniably, undoubtedly, unquestionably.*

Epistemic adverbs are often subdivided according to the degree of certainty they express (e.g., Huddleston & Pullum 2002: 768), which, however, reveals very little about their specific meanings. A useful classification has been adopted by Simon-Vandenbergen & Aijmer (2007: 84) in their study of adverbs of certainty, where they divide the class into (1) epistemic adverbs, which are epistemic in the narrow sense of the word, i.e., they express certainty which comes from the speaker's own judgment of the reliability of truth, e.g., *certainly, indeed, surely*; (2) evidential adverbs, which refer to certainty coming from available evidence, e.g., *clearly, obviously*; (3) expectation adverbs, which relate the speaker's expectations to the state of affairs, e.g., *of course, naturally*;

(4) speech act adverbs, which refer to speech acts which could potentially be used to support the speaker's opinion or raise voices against his/her point of view, e.g., *arguably, unquestionably.* This classification is also applicable to less confident adverbs; *conceivably, probably, possibly, presumably, supposedly, perhaps, maybe* rely on the author's judgement of the situation, so they can be classified as epistemic adverbs. *Apparently, seemingly, allegedly, reportedly* rely on available evidence and appearances, and as such, can be classified as evidential.

While reference grammars classify the items listed above as adverbs, discourse studies have demonstrated that at least some of them function as modal particles and/or discourse markers. The term *discourse markers* (also: *discourse particles*, *pragmatic particles, pragmatic markers*) has been defined in different ways by different scholars (cf., e.g., Aijmer 2002; Traugott 2007; Degand et al. 2013). In English, it is usually treated as a functional category comprising "subtypes of sentence adverbials, parentheticals, conjunctions, or transparent predicates", such as "*well, I mean, so, in fact, though, of course, anyway, actually, on the other hand*" (Lewis 2006: 44), which have "both a contextualizing and an interactional role" (Travis 2006: 219). The category of modal particles and its relation to discourse markers is also a matter of dispute. It also appears to be language specific (Degand et al. 2013). In German and in Scandinavian languages, modal particles tend to be identified on the basis of formal criteria (medial position in a sentence, lack of stress), and treated as a distinct word class (cf., e.g., Weydt 2006; Diewald 2013). In English, however, modal particles constitute a primarily functional category (Aijmer 2009, 2013), and they are treated as such in this study. The function which Aijmer identifies for modal particles (in her study of *of course*) is establishing "interpersonal coherence" (Aijmer 2009: 121), i.e., checking "that the speaker and hearer are on the same wavelength by referring to the background context for the assertion" (2009: 127). Discourse markers, in contrast, "contribute to the integration of discourse" (Aijmer 2002: 13), by signalling topic shifts and new points in argumentation (Aijmer 2009: 127).

Modal particles have been demonstrated to derive from epistemic adverbs by grammaticalization (Traugott 1995, 2012; Traugott & Dasher 2002), or, as some linguists prefer to call it, pragmaticalization (e.g., Erman & Kotsinas 1993; Beeching 2012). In the process, epistemic adverbs develop "procedural" (Traugott 2012: 19) or "post-epistemic" meanings (Cornillie & Pietrandrea 2012: 2111), and acquire interactional functions. Scholars differ in their views on whether epistemic adverbs and modal particles should be treated as distinct categories. Hoye suggests that modal particles should be seen as "a special subset of modal adverbs rather than an entirely separate word class" (Hoye 1997: 212), while Wierzbicka (2006) insists that they should be treated as

separate categories because they have entirely different pragmatic functions. Epistemic adverbs "indicate that the speaker has no wish to 'impose' his or her point of view on the addressee", while "particles build bridges between the speaker and the addressee and often exercise more or less subtle pressure on one's interlocutor" (Wierzbicka 2006: 287). However, even though Wierzbicka argues that epistemic adverbs should be separated from epistemic particles, her own discussion shows that some items function as both speaker-oriented epistemic adverbs and dialogic particles. The polyfunctionality of some adverbs has led Simon-Vandenbergen & Aijmer (2007: 64) to suggest that it may be better to analyse different "aspects or dimensions of meaning" of individual items instead of dividing them into distinct categories. While it is not my purpose to argue for or against the division, Simon-Vandenbergen & Aijmer's (2007) view is generally followed in this study.

4. Subjectivity and objectivity in research on modality

Because of the association of modality with judgement, the notions of subjectivity and objectivity are central to a discussion of modal meanings. The terminological distinction between subjective and objective modality was first applied with reference to English data by Lyons (1977: 797–801). Later, it was discussed by numerous other scholars, who defined the terms in different ways, and viewed their relation to modality from different perspectives (for a summary and discussion of the different views see, e.g., Verstraete 2001; Portner 2009; Narrog 2012). As observed by Verstraete (2001: 1506), the distinction between subjectivity and objectivity essentially corresponds to the distinction between "speaker-related and content-related function". However, there is no agreement as to which types of modality are to be associated with subjectivity and which types with objectivity, or both (cf., e.g., Verstraete 2001; Narrog 2012). Verstraete's (2001) analysis shows the association of epistemic modality with subjectivity, dynamic modality with objectivity, and deontic modality with both objectivity and subjectivity (e.g., Verstraete 2001: 1525). A number of linguists, however, argue that markers of epistemic modality can have both subjective and objective meanings (e.g., Lyons 1977; Coates 1983); the difference being that objectivity is associated with logical inference and logical statements while subjectivity is associated with the speaker's judgement (cf. Coates 1983; Narrog 2012: 24).

   Different degrees of subjectivity have also been related with different types of modal markers. Modal adjectives are usually said to represent a low level of subjectivity because of their association with the content, while first person mental verbs are often considered to be highly subjective because of their relation with the speaker (cf., e.g., Perkins 1983; Hengeveld 1988; Wierzbicka

2006). Modal adverbs are sometimes situated in the middle field between adjectives and verbs (e.g., Wierzbicka 2006; Danielewiczowa 2012). Nuyts (2001: 64) claims that modal adverbs are intersubjective because they express commitment shared by other people (general knowledge). The notion of intersubjectivity can be defined as the speaker's awareness of the addressee (Ädel 2014: 102), or, as Nuyts puts it, the speaker's "assumption about the hearer's knowledge" (Nuyts 2001: 37). The identification of this notion is connected with the recognition of the importance of modality in the interaction between the speaker and the addressee.

Another approach is to associate subjectivity and objectivity with specific adverbs. Ernst (2009: 515–516) associates objectivity with evidential adverbs, such as *obviously* and *clearly*, because they rely on verifiable evidence. Epistemic adverbs can, in his view, have both subjective and objective readings, depending on the context. He argues that *perhaps* is typically subjective, while *possibly* and *probably* may be interpreted as objective, if the context suggests logical inference. In this study, I will make reference to the associations of specific modal adverbs with subjectivity or objectivity as reported in other studies, such as Ernst (2009), and as indicated by the findings from my corpus.

## 5. Epistemic adverbs in academic discourse: Related studies

A number of studies have noted the use of epistemic adverbs in academic discourse, but the potential disciplinary preferences in their use have not been addressed systematically. Biber & Finegan (1988) include academic prose among the texts types ("speech styles") which they examine for the occurrences of specific groups of stance adverbials. They report a more frequent use of *maybe* adverbials, i.e., adverbials "expressing possibility, likelihood, questionable assertions, hedging" (Biber & Finegan 1988: 8) than *surely* adverbials, i.e., those "expressing conviction or certainty" (Biber & Finegan 1988: 7) in academic prose. However, even though the corpus they use comprises texts representing a wide selection of scientific disciplines – "natural sciences, medicine, mathematics, social and behavioral sciences, humanities, and technology/engineering" (Biber & Finegan 1988: 5), the authors do not discuss any differences between different disciplines regarding the use of stance adverbials.

A note on the distribution of adverbs of certainty across academic disciplines can be found in Simon-Vandenbergen & Aijmer (2007), who separate between their frequencies in the humanities, social sciences and natural sciences. They observe that some adverbs show a considerable frequency in the discourse of the humanities and social sciences, but are less frequent in the discourse of the natural sciences, e.g., *indeed*. However, their focus is on the functions of the

adverbs in different text types, rather than their association with specific disciplines. A number of studies have focused on cross-linguistic differences in the use of epistemic and evidential markers within one discipline, e.g., Alonso Almeida & Adams (2012), who have compared the use of evidential markers in medical research articles in English and Spanish.

Cross-discipline studies form a considerable portion of recent research into academic discourse (cf., e.g., Bondi & Hyland 2006; Fløttum et al. 2006a; Soler-Monreal & Gil Salom 2014), ways of marking authorial presence and communicating with the audience being among the most extensively studied issues in the area (cf. Hyland 2005, 2014; Livnat 2012). Epistemic adverbs are usually listed among the devices which are used to mark the author's stance. Using Hyland's (2005, 2014: 4–5) terms, they serve as hedges and boosters. Hedges express caution, while boosters express certainty. "Together they offer the writer a chance to either expand the dialogue by opening up an argument to different viewpoints or contract it by closing off other voices" (Hyland 2014: 5). The use of hedges in academic and popular scientific discourse has been studied by a number of authors, e.g., Varttala (2001), Lewin (2005), Vold (2006), Kranich (2011), Hyland (2014), but none of them has focused on epistemic adverbs as a class. They tend to take specific properties of academic discourse as their starting point and identify the devices by means of which those properties are manifested. Vold (2006), for instance, compared the use of non-confident markers of epistemic modality as hedges in linguistics and medical research articles selecting the most frequent epistemic markers regardless of their grammatical category. The items she found to be the most frequent are *may, assume, suggest, appear, might, seem, perhaps, indicate, could, possible*. Vold's conclusion is that research articles in the two disciplines differ more with respect to the types of epistemic markers used than their frequencies. This is also why one of the aims of this study is to identify the types of epistemic adverbs characteristic of specific disciplines. Recent studies (Wierzbicka 2006; Danielewiczowa 2012) demonstrate that epistemic adverbs have a number of semantic and pragmatic properties which distinguish them from other classes of epistemic expressions. Wierzbicka argues that epistemic adverbs allow speakers "to partly 'objectify' their stand, to hint at some valid grounds for it, to convey an expectation that their stance would be seen by other people as reasonable" (Wierzbicka 2006: 259). Such properties seem to be central to academic debate, which is why an attempt at establishing the functions which epistemic adverbs perform in the discourses of different academic disciplines seems to be worth undertaking.

6. The material and the method

The corpus used in the present study comprises 160 research articles (1,170,205 words) from 6 disciplines: linguistics, literary studies, law, sociology, physics, and medicine. Linguistics and literary studies represent the humanities, law and sociology – the social sciences, physics and medicine – the natural sciences. A corpus of a similar structure, comprising the three branches of science, has also been used by Fløttum et al. (2006a) in their cross-discipline and cross-linguistic study of different parameters of academic discourse, though in their corpus each branch was represented by one discipline: linguistics (the humanities), economics (social sciences), and medicine (the natural sciences). Fløttum et al. (2006a: 20) note that "the three branches represent knowledge bases with different characteristics", which is why claims to knowledge made in research articles representing each of the branches require different linguistic devices. I have decided to examine two disciplines within each branch to compare the tendencies in the use of epistemic adverbs not only across but also within the different branches of science.

As academic journals tend to have their preferences for certain styles of writing (see Vold 2006: 244), in order to limit the potential influence of individual journals' preferences, the articles have been taken from a number of sources. The full list of the journals used is provided in the appendix. All the articles were published between the years 2000 and 2015. While compiling the corpus, effort was made to ensure that all its subcorpora are of a similar size. A preliminary study of 20 articles in linguistics demonstrated that such a body of text provides considerable illustrative material to discuss the tendencies in the use of epistemic adverbs. The same number of articles was used in Vold's (2006) study of epistemic markers in linguistics and medical research articles, thus providing a basis for a comparison of some of the findings. In the humanities and social sciences, articles are of a similar length, so it was possible to compile comparable subcorpora of 20 articles in each of the disciplines. However, medical and physics research articles tend to be shorter, which is why in order to compile comparable subcorpora for physics and medicine, 40 articles representing each of the disciplines were used. Vold's corpus of medical texts (59,410 words) was significantly smaller than her corpus of linguistics texts (170,981 words) (cf. Vold 2006: 229), but the range of epistemic markers she studied was greater than in the present study, making a smaller corpus sufficient. Since this study focuses on one group of epistemic markers, it seemed more reasonable to collect larger corpora of comparable size. The size of the corpus and its structure are described in Table 1.

Table 1. The structure of the corpus used in the study

| (sub)corpus | number of articles | number of words |
|---|---|---|
| linguistics | 20 | 202,007 |
| literary studies | 20 | 201,014 |
| law | 20 | 201,023 |
| sociology | 20 | 185,034 |
| medicine | 40 | 190,015 |
| physics | 40 | 191,112 |
| total | 160 | 1,170,205 |

Cross-linguistic and cross-discipline studies of academic discourse have demonstrated that discipline is a more decisive factor in adopting a specific style of writing than the author's native language (Fløttum et al. 2006a: 54). Nevertheless, to make the corpus relatively uniform regarding the linguistic background of the authors, it was compiled of texts whose authors are affiliated in institutions representing English-speaking countries.

Most of the articles were taken from electronic collections of scholarly publications (EBSCO, ScienceDirect). The texts were copied and saved as document files to establish their size using Microsoft Office Word tools. The word counts given in Table 1 include the main body of the texts and the notes, but only if they are textual in character and comment on the information included in the text. The authors' biograms, references, and acknowledgements were disregarded. Then the corpus was examined for the occurrences of the adverbs under analysis using Microsoft Office Word tools. The relatively small size of the corpus made it possible to analyse all their occurrences individually. As a result of manual analysis, the uses of epistemic adverbs in quotations from literary works, linguistic examples, patients' reports, etc. were disregarded because they all fall outside the domain of academic discourse.

This study begins with an attempt at delimiting the class of epistemic adverbs in English. The texts included in the corpus are examined for the occurrences of the adverbs, then a list of the most frequent adverbs in each discipline is established and discussed with respect to the functions of the adverbs in each of the discourses. A corpus of 20 articles (or 40 – in the case of medicine and physics) makes possible some generalizations concerning the language of research articles in each of the disciplines, but it needs to be remembered that individual variation in academic language is considerable (cf. Fløttum et al. 2006a). Therefore, the findings presented below can only be treated as an illustration of certain tendencies rather than general norms in the language of research articles in the analysed disciplines.

7. Epistemic adverbs in the corpus: Results of the analysis

The 45 adverbs listed in section 3 have been checked for frequency in the subcorpora of the six disciplines. As a result, the twelve most frequent adverbs have been identified, i.e., those with more than 5 occurrences in at least one of the disciplines. They include: *apparently, arguably, certainly, clearly*, *indeed, obviously, of course, perhaps, possibly, presumably, probably,* and *reportedly.* Table 2 presents their distribution across the disciplines. Because the subcorpora differ slightly in size, the frequencies have been normalized.

Table 2. Epistemic adverbs in research articles representing different scholarly disciplines (frequencies per 200,000 words)

|  | linguistics | literary studies | law | sociology | medicine | physics |
|---|---|---|---|---|---|---|
| *apparently* | 8.91 | 12.93 | 4.97 | 7.58 | 2.10 | 6.31 |
| *arguably* | 8.91 | 3.98 | 19.90 | 6.48 | – | 1.05 |
| *certainly* | 13.86 | 35.82 | 24.87 | 25.94 | 4.41 | 8.42 |
| *clearly* | 46.53 | 19.90 | 18.90 | 32.43 | 12.63 | 27.36 |
| *indeed* | 76.23 | 79.60 | 33.83 | 68.10 | 2.10 | 9.47 |
| *obviously* | 12.87 | 11.94 | 10.94 | 5.40 | 2.10 | 1.05 |
| *of course* | 27.72 | 34.82 | 21.89 | 32.43 | 3.15 | 4.41 |
| *perhaps* | 45.54 | 62.68 | 47.76 | 43.24 | 11.57 | 9.47 |
| *possibly* | 14.85 | 5.97 | 8.95 | 6.48 | 17.89 | 4.41 |
| *presumably* | 10.89 | 7.96 | 4.97 | 3.24 | 2.10 | 1.05 |
| *probably* | 10.89 | 6.96 | 8.95 | 8.60 | 8.42 | 6.31 |
| *reportedly* | – | – | – | – | 11.57 | – |
| total | 277.20 | 282.56 | 205.93 | 239.92 | 78.04 | 79.31 |

As illustrated in Table 2, the humanities and social sciences use considerably more epistemic adverbs than medicine and physics. The greatest number of epistemic adverbs was found in the subcorpus of literary studies, followed by the corpora of linguistics, sociology, and law. Their relatively high frequencies in the discourses of the humanities and social sciences allow for more reliable conclusions concerning the preferred adverbs in each of the disciplines than in the case of medicine and physics. The most straightforward conclusion regarding medicine and physics is that epistemic adverbs are not very important elements of research articles in these sciences. This observation confirms earlier reports on the relative scarcity of rhetorical devices in the natural sciences (cf. Hyland 2014). However, some tendencies can be postulated for each of the disciplines (and groups of disciplines) based on an analysis of the most frequent adverbs.

Table 3. The most frequent adverbs in the discourses of the analysed disciplines

| | |
|---|---|
| linguistics | *indeed, clearly, perhaps, of course* |
| literary studies | *indeed, perhaps, certainly, of course, clearly* |
| law | *perhaps, indeed, certainly, of course, arguably* |
| sociology | *indeed, perhaps, clearly, of course, certainly* |
| medicine | *possibly, clearly, perhaps, reportedly* |
| physics | *clearly, indeed, perhaps, certainly* |

As is shown in Table 3, the humanities and social sciences appear to have similar preferences in the use of epistemic adverbs in research articles. The three most frequent adverbs in these disciplines are *indeed, perhaps,* and *clearly, certainly* and *of course* following soon after them. Interestingly, similar preferences can be observed in physics, though the frequencies of each of the adverbs are significantly lower in my corpus of research articles of this discipline. The discipline which displays entirely different tendencies in the use of epistemic adverbs is medicine. In order to make any conclusions concerning the preferred adverbs in the subcorpora of each of the disciplines, it is necessary to establish the properties and functions of those adverbs, both in the corpus under analysis and with reference to other researchers' findings. Such an attempt will be made in the sections which follow.

8. Functions of the most frequent epistemic adverbs in the corpus

8.1. *Indeed*

The frequent use of *indeed* in the discourse of the humanities and social sciences has already been noted by Simon-Vandenbergen & Aijmer (2007). In the ICE-GB (the British component of the International Corpus of English), which they analysed, *indeed* is the fourth most frequent adverb of certainty, after *of course, certainly,* and *obviously*, more common in speech than in writing. In the BNC, which Simon-Vandenbergen & Aijmer (2007: 197) also refer to, *indeed* is more frequent in writing, the ratio being 18.1 to 14.3 per 100,000 words. Simon-Vandenbergen & Aijmer suggest that *indeed* "characterizes persuasive, argumentative discourse and is associated with speaker's authority" (2007: 215). They classify it as an epistemic adverb in a narrow sense, i.e., one without "the core meanings of expectation, evidence or speech act grounding" (Simon-Vandenbergen & Aijmer 2007: 84), but they also note that *indeed* "has a function of referring back, confirming and emphasizing some proposition which is not new in the context" (Simon-Vandenbergen & Aijmer 2007: 215), which suggests that it may also be classified as an expectation adverb (cf. Rozumko 2016). Traugott & Dasher (2002: 159–165),

who have investigated the historical development of *indeed*, demonstrate that it is also used as a discourse marker meaning 'what's more'. Connective uses of *indeed* have also been noted by Wierzbicka (2006: 289) and Simon-Vandenbergen & Aijmer (2007), who observe that *indeed* is often used to signal that the speaker wishes to add something to a proposition. "[I]t picks up a previous point and marks a stronger claim based on the previous one" (Simon-Vandenbergen & Aijmer 2007: 218). Such confirmatory and strengthening uses are frequent in my corpus, e.g., in (1) and (2), where *indeed* introduces a statement which provides observations supporting a more general claim made in the previous sentence.

(1)   From this vantage point, modernism did not conclude so neatly and unceremoniously in 1930, 1940, or even 1950. *Indeed*, many established modernists continued their experimentation with narrative and poetic form long after the 1920s. (LIT 6)

(2)   What is more relevant here is that there are new paths to homelessness. A proportion of the new homeless is *indeed* extremely different from what the common stereotypes suggest, but the plight is similar. (SOCIO 15)

*Indeed* also refers to what may be expected by both the author and the reader in a specific context, in view of the arguments provided, as in (3), where the author first describes a situation which can be predicted by both the writer and the reader familiar with the Whorfian hypothesis, and then, using *indeed,* she confirms that the expectations are correct.

(3)   The Whorfian prediction for speakers of languages such as Mopan, in which intrinsic frames of reference are dominant in speech, is that mirror-image objects and arrays in allocentric space should be treated as similar or identical to one another (cf. Levinson & Brown 1994). And *indeed*, despite prior training that the mirror-images should be classified separately from the originals, Mopan participants persist to a significant degree in classifying as equivalent forms which are left-right mirror-images of one another. (LING 6)

*Indeed* is thus dialogical and reader-oriented. It helps the author to guide the reader through the course of his/her argumentation. Frequent use of *indeed* in the discourse of the humanities and social sciences indicates the importance of dialogue with the reader in research articles of these disciplines. The notion of confidence conveyed by *indeed* serves to increase the speaker's authority in this dialogue. The frequencies of *indeed* are similar in the subcorpora of linguistics,

literary studies, and sociology. It is considerably less frequent in the subcorpus of law, which may suggest that authors of research articles in legal sciences use other rhetorical devices in their dialogue with the reader, or, perhaps, that research articles in this discipline are less dialogical. *Indeed* is also used in the discourse of physics, but in medical discourse it is avoided. Vold (2006) observes that medical discourse aims at the objective presentation of data rather than a dialogue with the reader. Infrequent use of *indeed* in the medical subcorpus seems to support this observation. A comparison with the other disciplines suggests that medicine may be unique in its emphasis on objective, impersonal presentation and avoidance of interactive elements.

## 8.2. *Clearly*

The high frequency of *clearly* in academic discourse is to be expected. It is an evidential adverb suggesting that the speaker's claim is based on verifiable data, a property which seems to be the essence of most scholarly discourse. As Ernst (2009: 514) observes, its "use depends on evidence that is either physically perceptible, or a matter of very easy, transparent inference from publicly available evidence". *Clearly* also functions as an adverb of manner, as in *to see/speak clearly,* but such occurrences have been disregarded in the present analysis. In the discourse of physics, *clearly* (27.36) outnumbers all the other epistemic adverbs: it is 3 times more frequent than *indeed* (9.47) and *perhaps* (9.47). The highest number of occurrences of *clearly* is to be found in the subcorpus of linguistics (46.53), where it is the second most frequent epistemic adverb, after *indeed* (76.23). It is also the second choice in medicine, after *possibly* (17.89)*,* though the actual number of occurrences of *clearly* in the medical subcorpus (12.63) is lower than in the other disciplines. In the sociology subcorpus, *clearly* is also relatively frequent (32.43), though in this discipline *indeed* and *perhaps* are more frequent (*indeed*: 68.1; *perhaps*: 43.24). The adverb is less common in the subcorpora of legal sciences (18.90) and literary studies (19.90). *Clearly* tends to be used in discussions of data to show that the author's conclusions are empirically grounded and to demonstrate the author's way of thinking, as in (4) and (5):

(4)     *Clearly*, a cancellation of the terms on the right hand side is required in order to obtain the measured value of mz (PHYS 8)

(5)     The token of manual CA in (1) (CA: swinging-arms) is *clearly* a representation of action – i.e. the man as he is walking, approaching a campfire. (LING 9)

In (4) and (5), the authors use *clearly* to guide the reader through the process of data analysis. They also invite the reader to accept their conclusions. However, *clearly* does not always refer to the author's data; it is also used to refer to shared knowledge which the author expects to be obvious to the reader, as in (6):

(6)     However, this observation regularly is followed by the claim that rational realism must be wrong because languages *clearly* depend on humans and hence their nature will be revealed by studying human psychology (LING 7)

In both cases – references to the author's data and references to general knowledge – *clearly* is used intersubjectively to involve the reader in the reasoning process (cf. also Nuyts 2001; Ädel 2014), and to signal that the author's claims are grounded in an empirically verifiable basis or shared knowledge. Frequent use of *clearly* in the subcorpora of linguistics and physics may suggest that the tendency to guide the reader through the process of data analysis and to emphasise that the data can be easily verified by the reader is more pronounced in the two disciplines than in literary studies and legal sciences, where *clearly* is less frequent.

### 8.3. *Perhaps*

Another frequent adverb in the present corpus is *perhaps. Perhaps* is also among the twelve most frequent non-confident epistemic markers identified by Vold (2006) in her study of linguistic and medical research articles. It is relatively frequent in the discourses of most of the disciplines analysed. Its frequency is similar in the subcorpora of linguistics (45.54), law (47.76), and sociology (43.24); it is a little higher in the subcorpus of literary studies (62.68). In the subcorpus of legal sciences, it is the most frequent epistemic adverb; in the subcorpus of literary studies – the second most frequent. The frequencies of *perhaps* in the subcorpora of physics and medicine are lower – 9.47 and 11.57 respectively. The primary function of *perhaps* is to soften claims, mitigate criticisms, and make suggestions, as illustrated in (7)–(8) below:

(7)     *Perhaps* better conceptualized is the view Friedman offers of a modernism defined, not from an historical or spatial point *beyond* the event of rupture, change, or radical reordering, but within and at such locations and historical moments where and when they occur. (LIT 10)

(8)     The Oral Histories Project in New Zealand has a narrower scope, in part because the initiator of the project is the New Zealand Association of Women Judges and *perhaps* also because of limitations in funding. (LAW 17)

Both in (7) and (8), the authors make suggestions which are not based on evidence but on their personal assessment of the situation. Ernst (2009: 512, 515) describes *perhaps* as a weak modal marker expressing the speaker's subjective judgement of a situation, and Wierzbicka (2006) classifies it as a dialogic particle. In the research articles analysed here, *perhaps* signals that the author has no empirical evidence for a claim, and in the absence of such evidence, s/he attempts to make a logical inference. In the medical subcorpus, the claim introduced with *perhaps* is in half of the cases further weakened by its combination with a modal verb (*could, may*), as illustrated in (9):

(9)    Thus, the slight rebound in cellular uridine exhibited by the malignant cells would suggest that these cells *could perhaps* salvage uridine from the culture medium. (MED 6)

In (9), the authors offer an explanation which they are not able to support with evidence. The lack of evidence makes a confident claim unwarranted, which is why the authors make a tentative suggestion using *could perhaps* to secure themselves against a potential loss of face. In the subcorpora of literary studies and law, frequent use of *perhaps* coincides with the relatively infrequent use of *clearly* (see Table 2), which may suggest that these disciplines put more emphasis on presenting the author's inferences and conclusions from their data than on involving the reader closely in the process of data analysis. Linguistics has a similar frequency of *clearly* and *perhaps*, which indicates that both strategies are important in its discourse. In the subcorpus of physics, *perhaps* is three times less frequent than *clearly*, which signals the preference of physics researchers' to stay close to their data.

### 8.4. *Certainly* and *of course*

The "confident" adverbs *certainly* and *of course* have comparable frequencies in the corpus. *Certainly* is the third most frequent adverb in the subcorpora of literary studies (35.82), law (24.87), and physics (8.42), where, however, its overall frequency is not very high and almost the same as that of *indeed* and *perhaps*. It is quite frequent in the subcorpus of sociology (25.94), but relatively infrequent in the subcorpora of linguistics (13.86) and medicine (4.41). Linguistics seems to prefer *of course* (27.72), while medical research articles make infrequent use of both (the frequency of *of course* being 3.15). In the subcorpora of literary studies, law, and sociology, *certainly* has a similar frequency as *of course*.

   While both adverbs are usually classified as confident, *certainly* typically "occurs in the context of uncertainty rather than certainty ... where there is a

great deal of hesitation and/or personal qualifications of the truth value" (Simon-Vandenbergen & Aijmer 2007: 211), a tendency strengthened by its co-occurrence with *almost*, as in (10):

(10)　Various difficulties not amenable to a simple solution would *almost certainly* arise in negotiation of a draft Statute for a TCC. (LAW 6)

*Certainly* is often used to present a claim which contrasts with a generally accepted view or a view held by someone else. Simon-Vandenbergen & Aijmer (2007: 95) call such use "concessive": the author agrees (or partly agrees) with the accepted view using *certainly*, and then provides a new argument, as in (11) and (12):

(11)　Philosophy *certainl*y dominated the Western intellectual tradition from Plato to the end of the nineteenth century, but by 1899, Bertrand Russell was suggesting that philosophy was on the verge of losing its title as the Monarch of knowledge and truth (LIT 5)

(12)　[W]hile the territory's dematerialization through its "disembodied" appearance *certainly* qualifies Hardy's own stated desire in 1887 to avoid "scenic paintings" in favor of "see[ing] the deeper reality underlying the scenic, the expression of what are sometimes called abstract imaginings". (LIT 2)

Concessive uses protect both the author's face, if a claim is made against a well-known fact, and the face of the person whose opinion is challenged. *Certainly* also functions as an intensifier, or booster, to use Hyland's (2005, 2014) term, particularly when used in the clause initial position, where it indicates "an endorsement or a partial endorsement of something that one has said" (Wierzbicka 2006: 285). Such usage is illustrated in (13):

(13)　G.P.S. tracking devices seem, at first glance, to be minimally invasive and of little concern when compared to the person being physically detained. *Certainly*, there is more to the concept of liberty than freedom from physical interference or restraint. (LAW 1)

As shown in examples (11)–(13), *certainly* is dialogic. By using it, the authors communicate that they are aware of potential objections/reservations the reader might have when reading their arguments. In fact, both *certainly* and *of course* have been demonstrated to function as interactional discourse particles (Wierzbicka 2006; Aijmer 2013). The semantic component which seems to

make *certainly* different from *of course* is the suggestion of superiority associated with *of course*. Simon-Vandenbergen & Aijmer (2007: 204–210) suggest that *certainly* is frequent in argumentative discourse, while *of course* is more common in demonstrations, i.e., authoritative "monologue genres". *Of course* is an expectation adverb. In the research articles under analysis, it anticipates the reader's criticisms and reservations, and shows that the author is aware of the different conditions and contextual determinants of his/her claims. Such usage is particularly clear in (14), where the author explicitly refers to potential accusations which his statement may bring, using *of course* to demonstrate his awareness of the controversial nature of the claim, and in (15), where the author refers to critical comments made by his reviewers.

(14)   Stating the matter this way risks being accused of simply restating the obvious. Yes, yes, all true *of course*. Now what can you actually say about political elites within their putative rank and files? (SOCIO 20)

(15)   As two reviewers observe, this formulation requires that features be privative, whereas much of the syntactic literature assumes a binary [±] or [attribute:value] feature structure. *Of course*, either of these systems can be reformulated in terms of privative features, though certain feature co-occurrence restrictions may then be required. These complications are purely formal, then, and do not affect the force of the argument here. (LING 10)

Using *of course* to dismiss potential criticisms seems to be motivated by the author's need to maintain his authority and defend themselves against the potential damage a controversial claim may do to their position. It thus has face-saving functions. (16) is less straightforward than (14) and (15), because it does not make an explicit reference to criticism, but the reservation made by the author of (16) ("assuming, *of course*, that such an exact form exists") suggests their awareness that some points may be criticised.

(16)   In short, the philosopher's ability to make razor-sharp distinctions has made him capable of demarcating the exact form of objects in the world (assuming, *of course*, that such an exact form exists) but incapable of seeing or experiencing the wave-like fluidity of an undemarcatable world. (LIT 5)

Both adverbs may thus be used to introduce potentially controversial claims, but while *certainly* builds solidarity with the scholars who have expressed contrasting views, *of course* tends to stress the superiority of the author. The balance between

the frequencies of *certainly* and *of course* in most of the subcorpora suggests that both strategies are important in academic discourse. Among the subcorpora of the humanities and social sciences, only linguistics has a relatively low frequency of *certainly*, which may suggest less emphasis on concessive meanings, and more focus on authoritative presentation of factual information.

8.5. *Possibly*

*Possibly* is the most frequent epistemic adverb in the medical section of the corpus. The number of its occurrences is not very high (17.89), but it is higher than in the other subcorpora, which makes its frequency noteworthy. Medical authors use it to report data which appear to be reliable but need to be confirmed by more research, as in (17) and (18):

(17)   This study suggests a positive association between greater density and proximity of natural gas wells within a 10-mile radius of maternal residence and greater prevalence of CHDs and *possibly* NTDs. (MED 1)

(18)   Steroid/antibiotic irrigations appear to benefit patients with recalcitrant rhinosinusitis and *possibly* those with MBL deficiency. (MED 24)

The functions of *possibly* in (17) and (18) can be summarized with an observation Wierzbicka (2006: 276) has offered: *possibly* "is cautious, reflective, careful, and intellectually responsible. It reflects the speaker's desire not to say more than what one has grounds for saying". *Possibly* is also used to refer to potential flaws in other researchers' work, as in (19).

(19)   The prevalence of RLS reported in these studies varies from 10.1 to 34.6 %, with the wide variability *possibly* related to inconsistent definitions of RLS. (MED 39)

In (19), *possibly* suggests a logical explanation for a problematic point identified in other studies. Instead of formulating an openly critical comment, the author presents a verifiable explanation (the author's statement concerning inconsistent definitions can be verified). The use of this strategy supports Vold's (2006: 246) observation that open criticism of other researchers' findings is uncommon in medical research articles. It also seems to support Wierzbicka's (2006: 276) suggestion that *possibly* implies a detached attitude.

   Wierzbicka (2006: 276) suggests that "scientific and legal language appears to favour *possibly* over *perhaps*". In my corpus, medical discourse is the only one favouring *possibly* over *perhaps*. Vold's (2006) study demonstrates a

relatively high frequency of the adjective *possible* in medical research articles, which, as Vold writes, dresses claims in "a veil of objectivity" (Vold 2006: 234). Frequent use of the adjective *possible* and the adverb *possibly* seems thus to be characteristic of the kind of academic discourse which puts a strong emphasis on caution and objectivity.

8.6. *Reportedly*

*Reportedly* is only evidenced in the medical section of my corpus. Wierzbicka (2006: 283) writes that it "appears to be the latest addition to the class of epistemic adverbs, presumably linked with the role of the media in modern life". *Reportedly* refers to the source of knowledge, which tends to be of a professional character, e.g., "an official… 'someone who can know things of this kind'" (Wierzbicka 2006: 283–284). In medical discourse, the adverb, followed by a footnote, is used to refer to other researchers' findings, as illustrated in (20) and (21):

(20)   For example, IFNc, a mainly T cell-derived cytokine, *reportedly* inhibits LECs in vitro and in vivo [34–36]. (MED 2)

(21)   Although it has relatively low bioavailability [13], uridine is *reportedly* the most abundant salvageable pyrimidine nucleoside in vivo [13, 14]. (MED 6)

Such use of *reportedl*y demonstrates that medical discourse limits not only authorial presence in the text but also references to other scholars (cf. also Fløtum 2006; Vold 2006). Depersonalisation is, as Gil-Salom & Soler-Montreal (2009) note, "one of the most common negative politeness strategies and serves different purposes... In scientific discourse it is the results that are important not the people that bring them about" (Gil-Salom & Soler-Montreal 2009: 183). Medical authors also use *reportedly* to refer to observations made by their informants, thus transforming their opinions into data, and making them more impersonal, as in (22):

(22)   The introduction of nursing and allied health-based referrals was perceived as potentially helpful in overcoming late referrals. This *reportedly* facilitated access for people who were overlooked by medical practitioners or who had not been accessing medical services. (MED 7)

Vold also notes that the results sections of medical research articles are virtually non-modalized, and concludes that "medicine is a discipline where the ideal of

scientific objectivity stands strong" (Vold 2006: 237). Her conclusion finds support in the tendency, documented here, of medical researchers to use *reportedly* to communicate the findings of other researchers and their informants' observations.

### 8.7. *Arguably*

*Arguably* seems to be characteristic of the rhetorical style of research articles representing legal sciences. It has 19.90 occurrences in the subcorpus of law, while in the other subcorpora its frequency ranges between 0 (medicine) and 8.91 (linguistics). Speech act adverbs are generally rather infrequent. Simon-Vandenbergen & Aijmer (2007: 69) report 7 occurrences of *arguably* in the ICE-GB corpus of 1 million words, so a frequency of 19.90 in a corpus of ca. 200,000 words is relatively high. Simon-Vandenbergen & Aijmer (2007: 192) note that the use of *arguably* "suggests that the speaker wishes to defend a particular viewpoint while at the same time recognizing the possibility of disagreement or alternative viewpoints". In my corpus, the authors tend to use *arguably* when they talk about controversial issues, as in (23) and (24):

(23)    [W]hile not every finding of ineffectiveness triggers a duty to report, a finding of ineffectiveness based on the egregious error *arguably* does so. (LAW 10)

(24)    In the wake of these arguments some obvious hurdles remain. *Arguably*, Indigenous women's human rights cannot be asserted against Indigenous polities without in some sense undermining the self-determination of those polities... (LAW 18)

The more frequent use of *arguably* may be interpreted as an indication of a greater emphasis on argumentation and interpretation in the discourse of law than in the other disciplines. The complete absence of *arguably* from the medical subcorpus and its low frequency in the subcorpus of physics situates law and the two natural sciences at opposite poles as regards emphasis on interpretation and personal judgement.

### 9. Summary and discussion of the findings

The findings obtained in this study suggest that the frequent use of epistemic adverbs is largely a property of research articles in the humanities and social sciences. The disciplines whose research articles are particularly rich in epistemic adverbs include literary studies and linguistics, perhaps because they

are both concerned with language and, as such, they are likely to be more language-sensitive than the other disciplines. Sociology also uses epistemic adverbs relatively often. In the corpus of legal sciences, their frequencies are, however, a little lower. The natural sciences, represented here by medicine and physics, appear to make considerably less frequent use of epistemic adverbs in their research articles. Such findings confirm Fløttum et al.'s (2006a: 267) observation that the humanities (represented by linguistics in their study) and the natural sciences (represented by medicine) are situated at "the end points of the continuum", while the social sciences (represented by economics) occupy "a somewhat unstable middle position of the continuum" (Fløttum et al. 2006a: 268). Among the most frequent epistemic adverbs in all the discussed disciplines, confident adverbs (*indeed, clearly, certainly, of course*) outnumber non-confident ones (*perhaps, possibly*), which suggests that one of the functions of this class of epistemic markers in research articles is to add authority to the writer's voice. However, this finding is in disagreement with Biber & Finegan's (1988) data showing that *maybe* adverbials are more frequent than *surely* adverbials in academic prose. The discrepancy may result from the fact that Biber & Finegan (1988) analysed adverbials, not adverbs, so their selection of items was different from the one used in this study. It may also be due to individual authorial preferences, which, as demonstrated by Fløttum et al. (2006a), also play an important role in academic discourse. However, a larger corpus is necessary to verify these hypotheses.

The types of adverbs used in the subcorpora of research papers of the humanities and social sciences suggest a preference for a dialogic style of writing, as indicated by the frequent use of the expectation adverb *indeed,* and the dialogic particles *perhaps* and *certainly. Indeed,* which is the most frequent epistemic adverb in the corpus of the humanities and social sciences, additionally serves to stress the writer's authority. While these general observations are valid for all the disciplines representing the humanities and social sciences discussed in the present study, a number of discipline-specific preferences can also be noticed. Linguistics appears to put considerable emphasis on indicating the empirical basis of research and involving the reader in the process of data analysis, as evidenced by its frequent use of *clearly*. It is similar in this respect to physics. This finding confirms earlier observations concerning common features of linguistics and the natural sciences (Fløttum et al. 2006a: 21). Linguistics discourse, as evidenced by the research articles studied here, is dialogic, authoritative, and data-oriented. As regards sociology, its research articles are also dialogic (much like in linguistics) and involve the reader in the discussion of the empirical basis of the claims made (a little less often than in the case of linguistics). More often than linguistic papers, they include solidarity-building elements (*certainly*) while making claims against established views.

In the research articles of literary studies and law, emphasis on involving the reader in data analysis is less pronounced, as suggested by the relatively low frequency of *clearly* in these disciplines. The corpus of literary studies has the highest frequency of *perhaps* and *certainly*, which suggests orientation towards personal judgement and interaction with the reader. The frequency of the two adverbs is also quite high in the corpus of legal sciences, which differs from the corpus of literary studies in its less frequent use of reader-oriented and authority-building *indeed*, but the more frequent use of *arguably*, which suggests that it seems to be more oriented towards a personal interpretation of data and expectation of disagreement.

Physics and medicine make use of epistemic adverbs less frequently, but the ones used in the discourse of physics are generally the same as the ones used in the humanities and social sciences. Physics research articles seem to be primarily data-oriented, as indicated by the relatively frequent use of *clearly*. They also use dialogic and authority-building *indeed* and cautious *perhaps,* but significantly less often than the humanities and social sciences.

The academic discourse of medicine is remarkably different. It uses few epistemic adverbs and avoids those which signal subjective evaluation and dialogue. The most frequent adverb in the medical corpus is *possibly,* used to express a logical possibility rather than personal judgement. Another relatively frequent adverb is evidential *clearly,* stressing the authors' focus on presenting empirical data. Medicine is the only discipline among the ones analysed using *reportedly* to refer to the findings of other researchers. By avoiding mentioning the names of other scholars, medical discourse minimizes personal elements in the text.

## 10. Conclusions and suggestions for further research

The frequency of epistemic adverbs in research articles indicates the degree to which their authors wish to be present in the text and engage in a dialogue with the reader. Their frequent use in research articles of the humanities and social sciences confirms earlier observations regarding the tendency to indicate the author's presence in the written discourse of these disciplines. Their scarcity in the corpora of research articles of the natural sciences confirms that their authors tend to minimize their presence in the text.

The association of individual adverbs with specific disciplines may serve as an important clue to the understanding of their functions, both in the case of the frequent ones, such as *indeed* (linguistics, literary studies, sociology), *clearly* (physics, linguistics, sociology), and, perhaps even more importantly, in the case of the less frequent ones, such as *arguably* (law) and *reportedly* (medicine), which are relatively understudied. The findings may also prove useful in teaching English for academic purposes.

Further research may focus on establishing the ratio of epistemic verbs, adverbs, and adjectives in the research articles of different disciplines. The three classes of epistemic markers are associated with different levels of subjectivity (see Section 4). It would be interesting to see if their frequencies in research articles of the humanities and social sciences, which tend to allow a significant degree of personal judgement, differ from their frequencies in the natural sciences, which put more emphasis on the impersonality of their discourses.

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APPENDIX

The journals used to compile the corpus:

Linguistics (LING): *Australian Journal of Linguistics; Journal of Language and Social Psychology; Journal of Pragmatics; Language and Communication; Language and Gender; Language Sciences; Lingua; Linguistics; Topoi.*

Literary Studies (LIT): *American Literary History; American Literature; Derrida Today; English Literary Renaissance; Foundation: The International Review of Science Fiction; Journal of Modern Literature; Literature Compass; Science Fiction Studies; Scientific Study of Literature; Studies in American Naturalism; The Faulkner Journal; Twentieth Century Literature.*

Law (LAW): *Boston College Law Review; Canadian Journal of Criminology and Criminal Justice; Criminal Law Forum; Deakin Law Review; Faulkner Law Review; Harvard Journal of Law and Gender; Hofstra Law Review; McGeorge Law Review; Monash University Law Review; New Hampshire Bar Journal; The Advocate; UBC Law Review; University of Miami National Security and Armed Conflict Law Review; University of Michigan Journal of Law Reform; University of Pennsylvania Law Review; UNSW Law Journal; UW Law Review.*

Sociology (SOCIO): *A Journal of Clinical and Applied Sociology; Canadian Journal of Sociology; Canadian Review of Sociology; Health Sociology Review; Journal of Social Distress and the Homeless; Journal of Sociology; Journal of the History of the Behavioral Sciences; The Forum; Social Forces; Social Indicators Research; Social Science Research; Society; Sociological Forum; Sociological Practice; Sociology of Religion; Studies in East European Thought.*

Medicine (MED): *Acta Orthopaedica; Advances in Pediatrics; American Journal of Health-System Pharmacy; American Journal of Public Health; Angiogenesis; Cardiology in the Young; Annals of Internal Medicine; Annals of Otology, Rhinology and Laryngology; Apoptosis; BMC Pregnancy and Childbirth; BMC Public Health; British Journal of Surgery; Diabetic Medicine; Environmental Health Perspectives; International Journal of Surgical Pathology; Journal of Obstetrics and Gynaecology; Military Medicine; Neurological Sciences; Pediatric Anesthesia; Psychiatric Annals; Support Care Cancer; Texas Heart Institute Journal; The Journal of Alternative and*

*Complementary Medicine; The Journal of Infectious Diseases.*

Physics (PHYS): *19th Particles and Nuclei International Conference; AIP Conference Proceedings; Application of Accelerators in Research and Industry; Astroparticle Physics; High Energy Density Physics; Journal of Applied Physics; Journal of Electron Spectroscopy and Related Phenomena; Nuclear Physics; Non-Neutral Plasma Physics VIII; Nuclear Instruments and Methods in Physics Research A; Physica A; Physica B; Physics Essays; Physics Letters; Physics of Fluids; Physics of Plasmas; Powders and Grains; The 8th International Workshop on the Physics of Excited Nucleons; AIP Conference Proceedings; The Journal of Chemical Physics; Unification and Neutrino Physics; Workshop on Dark Matter.*