Expressions of Knowledge in Early Modern English- and German-Language Midwifery and Gynaecological Texts (ca. 1500-1700): On the Use of Pronominal Subjects and *that*-Complement Clauses

Abstract

This paper presents the results of a corpus-based study of *that*-complement clauses and their pronominal subjects in early modern English- and German-language midwifery and gynaecological texts published from circa 1500 to 1700. These two centuries witnessed many changes in the fields of medicine and midwifery, namely the abandonment of scholastic-based models of medicine in favour of more empirical ones, as well as the appearance of the first female-authored midwifery texts during the eighteenth century. As these major changes involved one of shifting priorities concerning sources and types of knowledge, complement clauses are a key grammatical construction where such changes can be realised linguistically. In addition, the discussion of (pro)nominal subjects (within and outside of complement clauses) contributes to on-going debates concerning texts with unknown or contested authorship, namely the German-language *Frauenbüchlein* (published ca. 1500) and Jane Sharp's *The Midwives Book* (1671).

1. Introduction

This paper provides an overview of the use of complement clauses as markers of stance and evaluation in the earliest vernacular writings of midwifery and women's medicine in English and German. The early modern period witnessed the abandonment of scholastic-based models of learning and medical study in favour of more empirical approaches. This epistemological shift was accompanied by the vernacularisation of specialised scientific discourses across Europe: Latin was slowly discarded as the language of learning and scientific communication, while the number of texts written in vernaculars such as English, German, French, Dutch, Spanish, and Italian increased tremendously. Examining the domain of midwifery and women's medicine illuminates a further change to the study of early modern medicine and authorship. The earliest vernacular texts were written by learned doctors (such as Eucharius Rösslin) who took no part in childbirth at all during their career, or by surgeons who only intervened in medical emergencies (such as a baby dying *in utero*); their texts are mostly based on synthesising the gynaecological views expressed by the medical writers of antiquity such as Hippocrates and Galen. During the seventeenth century,

practising midwives such as Louise Bourgeois, Jane Sharp, and Justina Siegemund become the first women to author midwifery manuals actually written by practising midwives. That such a profound disciplinary change should manifest itself in the language of scientific and medical seems highly probable. Yet the domains of midwifery and women's medicine have received little, if any, coverage in the literature on changes in scientific and medical writing, even though they contribute the additional variable of gender, vis-à-vis medical knowledge and authority, into the sociohistorical context. By examining complement clauses, which are a prototypical stylistic device used for expressing knowledge and information source, this study of early modern English- and German-language texts on midwifery and gynaecology will shed some light on the subject. Comparing texts in English and German allows a wider range of seminal texts of the period to be covered, and language-specific vs. discipline-specific tendencies can be revealed.

The analysis of textual building blocks (*Textbausteine*) or specific lexical and grammatical constructions, such as complement clauses, that serve specific discourse functions such as indicating episode or text segment boundaries, providing instructions, connecting a sequence of events, or indicating information source is well established in historical German linguistics (Hundsnurscher 2003, Gloning 2007, 2010, 2011, Habermann 2014: 22-27), although analysis of complement clauses is generally restricted to how reported information is marked (Gloning 2011: 308-309). Complement clauses have also been much discussed in grammaticalisation research (for both English and German), where there is currently a debate as to whether they provide the source constructions for epistemic parentheticals (Thompson & Mulac 1991, de Haan 2007, cf. López-Couso & Méndez-Naya 2014, Author 2015).[1] Within the history of scientific or medical discourse, their significance as a grammatical construction has been implicitly acknowledged in work focusing on verbs of knowledge (Hiltunen & Tyrkkö 2009, 2011) and evidentiality (Gloning 2011, Alonso-Almeida & Lareo 2016, Author 2016), but they themselves have never been the focus of investigation. In a similar vein, their value as markers of averral and attribution in present-day academic writing has been discussed extensively (Hyland & Tse 2005, Charles 2006, Hiltunen 2010: 111ff.).

A brief word must also be said about subject pronouns. It has been claimed – at least for English – that scientific writing became more "involved" during the sixteenth and

[1] Complement clauses are themselves generally held to be the product of grammaticalisation, arising from the use of the demonstrative pronoun in paratactic environments (e.g. *I know that: Mary is sick. > I know that Mary is sick*; Nordström & Boye 2015: 134-136, cf. Hopper & Traugott 2003: 190ff.), although this diachronic account is not undisputed (Axel-Tober 2013: 259-261, cf. Fischer & van der Wurff 2007: 171-172).

seventeenth centuries because of an increase in the use of first-person pronouns and a decrease in the frequency of third-person pronouns (Dorgeloh 2005a: 305-307, 2005b: 88-91, Moessner 2008: 80-81). To what extent this holds exclusively for complement clause constructions in either English or German, as well as the effect of practising midwives – who were much more involved in childbirth than learned physicians and surgeons – in the development of midwifery writing,[2] is another aspect of this investigation.

Because of the general tendency of the early modern period to abandon scholastic-based models of medicine (where the emphasis is on understanding and synthesising the ideas of learned doctors) in favour of more empirical approaches to medicine and new discoveries, it was predicted that complement clauses indicating reported information would decrease through the sixteenth and seventeenth centuries, whereas complement clauses indicative of perception and mental processes increase to reflect the changing disciplinary priorities. In addition, it was predicted that those texts authored by women will demonstrate a more involved style through the use of first-person grammatical subjects of complement clauses, compared to the texts written by men, who were less involved in assisting with childbirth.

The paper is structured as follows: Section 2 provides an historical overview of the state of midwifery and women's medicine in the early modern period, while Section 3 provides a typological and functional overview of complement clauses, as well as the rationale used for the categorisation of complement clauses in this study. An overview of the corpora used as the bases of the current study is present in Section 4. The results of the corpus study are discussed in Section 5, and some concluding remarks are made in Section 6.

2. Midwifery and Women's Medicine in Early Modern Times

The early modern period saw a number of sociocultural and linguistic changes that altered millennia old practices and beliefs.[3] In the domain of medicine, the dominant paradigm since antiquity had been that of humoral theory, articulated first by Hippocrates (460-370 BC) and the basis of Galen's (130-210 AD) influential writings (Temkin 1973, Nutton 1995: 175ff.).

[2] Fife (2004) has found noted discursive differences in male-authored vs. female-authored seventeenth and eighteenth century midwifery texts in English.

[3] The early modern period is generally held to have begun in the German-speaking realm in the latter half of the fourteenth century (von Polenz 2000: 99-102) and around 1500 for English-speaking Great Britain (Nevalainen 2006: 1). These dates are those generally assigned to linguistic epochs, i.e. the division between Middle High German and Early New High German on the one hand, and the division between Middle English and Early Modern English on the other hand. The current study begins circa 1500 for both languages, however, as there are no vernacular texts on midwifery and women's medicine to appear in print before this date. Historians' periodisation of the early modern era is fairly similar: Wear's (1995) overview of early modern medicine is from 1500 to 1700, while Park and Daston's (2006) volume on early modern science covers the years 1490 to 1730.

In humoral theory, maintaining the balance of the body's four humours – blood, phlegm, black bile, and yellow bile – was held to be the key to good health. Medical learning at university consisted primarily of studying and synthesising the medical writings of antiquity, a model of learning dating from twelfth-century medieval Scholasticism (Keil & Reinecke 1987: 221-224, Siraisi 1990: 1-16, Lindemann 2010: 84ff.). During the early modern period, numerous scientific discoveries, European exploration and colonisation, increasing scepticism of previously uncontested authority (fuelled by the Reformation), and the plague (mass outbreaks of disease which were not explainable under the individualised focus of humoral theory) led to the gradual abandonment of scholastic-based models of medical learning and humoral theory in favour of more empirical models (Grafton et al. 1992, Crombie 1995, Shapin 1996).[4]

There have been women dedicated to helping other women give birth since antiquity (Gubalke 1975: 21-56), even if for much of that history, midwifery as a profession has not enjoyed the formal recognition bestowed upon doctors and surgeons. Throughout Europe, midwives as a designated group of birth assistants have been formally recognised at least since the fifteenth century. They were usually subject to strict civic or ecclesiastical oversight and did not enjoy the security offered to surgeons by the trade guilds, nor the prestige accorded to university-trained physicians, however (Green 2008: 118ff.; see also Flügge 1998 for a comprehensive overview of the legal status of urban midwives in the early modern German-speaking realm). There were no formal training procedures for midwives, who generally learned the profession from other midwives, often their mothers, and only midwives living in cities could generally sustain themselves financially through this practice (Evenden 2000). In more rural areas with fewer births, midwives had to find other means to supplement their income (Lindemann 2010: 124-128, cf. Labouvie 1999: 62). The midwife's "monopoly" has always been confined to normal birth (Green 2008: x); complicated births, on the other hand, generally demanded the involvement of a (male) surgeon or physician (Lindemann 2010: 124-128, cf. Flügge 1998: 214ff.). It has often been asserted that medieval and early modern midwives found themselves frequently subject to accusations (or at least suspicion) of witchcraft and devilry (Forbes 1962, Ehrenreich & English 1976, Dieterich 2007), but the most comprehensive historical studies of midwives during these periods either make little or no mention of this connection (Gubalke 1975, Flügge 1998, Labouvie 1999,

[4] Admittedly, humoral theory was not completely abandoned until Rudolf Virchow ushered in the era of cellular pathology in the mid-nineteenth century (Eckart 2013: 182ff.).

Evenden 2000, Green 2008), or discredit the belief outright as an historically uninformed myth (Harley 1990).[5]

In contrast to the gynaecological writings of antiquity, which although written by men, were at least partly influenced by women and intended for a female audience (Green 2008: 29ff., cf. Dean-Jones 1995), gynaecological writings of the medieval period were generally inaccessible to women because most texts were written in Latin. More significantly, because the majority of women were illiterate, medical manuscripts written in the vernacular were equally inaccessible.[6] After the invention and spread of the printing press in the mid-fifteenth century, however, the number of available texts increased substantially, thus enabling broader access to medical knowledge for literate lay audiences (and even fostering literacy itself; see Nevalainen 2006, Roelcke 2010: 187ff.); this also allowed vernacular languages such as English and German to displace Latin gradually from its monopoly as the language of learned discourse and to become scientific languages in their own right (McKitterick 2003, Green 2008: 163ff., Schiewe 2007, Klein 2011).[7] Two of the earliest midwifery texts to be printed in a vernacular language were the German *Frauenbüchlein* (ca. 1500) and Eucharius Rösslin's *Rosengarten* (1513), and they are explicitly addressed to midwives, evidence that at least some midwives were literate by this time and had access to printed materials.[8] In addition, the fact that some cities in the German-speaking realm required midwives to be proficient in Rösslin's teachings on midwifery and childbirth (Flügge 1998: 362ff.) suggests that by the end of the sixteenth century, literacy and access to the relevant specialised texts were not out of the question for practising midwives (at least for those based in the cities). Unfortunately, it is impossible to gauge how these texts were received by the midwives who read them, or to what degree their teachings were actually put into practice. It is not until the

[5] Midwives were expected to comply with church ordinances concerning relevant matters such as baptism, care of the poor, and the use of magic (Flügge 1998: 132ff.), but this was also expected of anyone working in a capacity where such issues were considered relevant (see, for example, Wear 2000: 334-335). Harley (1990) has shown that midwives were never (as a group) suspected of witchcraft during the medieval or early modern periods.

[6] The one exception appears to be early medieval Italy, when there is at least some evidence that women were involved in teaching and learning (women's) medicine at the University of Salerno (Green 2008: 29ff.).

[7] Latin never completely lost its position as a scientific language during this period. It continued to be used in highly specialised or theoretical texts (Klein 2011: 500-501), and in the case of *materia medica*, the names of herbs and other remedies were often given in Latin so as to avoid dialectal or inter-lingual confusion (Rankin 2013: 144-145, cf. Habermann 2001, 2011).

[8] The first English-language vernacular text to be published in the domain of midwifery and women's medicine was Richard Jonas' 1540 translation of Rösslin's *Rosengarten*, titled *The byrth of mankynde*, which was quickly superseded by Thomas Raynalde's 1545 revised and expanded translation of Rösslin's work (Hobby 2009: xxxi-xxxvii). In contrast to the source text, these translations targeted a general readership rather than midwives in particular. In addition, these translations were composed during a time of turbulent medical reform in England, which certainly bore upon the translators and the text's composition (Fissell 2004: 29ff.).

seventeenth century, when the midwives Louise Bourgeois, Jane Sharp, and Justina Siegemund wrote their own midwifery manuals, that scepticism about these earlier, sixteenth-century writings appears in print (Gubalke 1975: 81ff., Flügge 1998: 377). Rösslin's *Rosengarten* was criticised by Siegemund, for example, because of its highly learned, scholastic style synthesising the writings of antiquity rather than offering any useful or accurate instructions.

3. Complement Clauses: An Overview

Complement clauses can be particularly revelative as to how different sources of knowledge are expressed in language, and how the value placed on particular sources may change over time. The focus here is exclusively on complement clauses that begin with the complementiser *that* in English and *dass* in German. In such constructions, the propositional content of the complement clause functions as the direct object of the verb in the matrix clause. Consider the following:

(1) Some think **that** Hermaphrodites are only women that have their Clitoris greater, and hanging out more than others have, and so shew like a Mans Yard, and it is so called, for it is a small exuberation in the upper, forward and middle part of the share, in the top of the greater slit where the wings end. (EMEMT[9]: Jane Sharp, *The Midwives Book* (1671), p. 44)

(2) So aber mann spůret/ **daß** das kindlin wol das leben erhaltẽ kůnde biß an Pfarherr darzu kompt/ soll es derselbige ordenlicher weise/ mit gebett vnd ermanungen in dem hause Tauffen. (GeMi: Adam Lonitzer, *Reformation/ oder Ordnung für die Heb-Ammen* (1573), pp. G.r-G.v)

'Yet if one senses that the child could probably remain alive until the priest arrives, then in the same orderly manner there is to be a home baptism with prayer and exhortations.'

In (1), the nature of hermaphroditic genitalia – the propositional content – is linked to a belief held by contemporaries of the author, expressed in the matrix clause by *some think*. Similarly in (2), the possibility that a child may remain alive falls within the scope of the perception and subsequent inference signalled by *mann spůret* 'one senses'. Such complement clauses are common in languages across the globe (Dixon 2006, Noonan 2007, Boye & Kehayov 2015), although not all embedded sentences of a similar structure can necessarily be

[9] The corpora used in this study are discussed in detail in Section 4.

considered complement clauses; in both English and German, as in many other languages, locative and temporal clauses, relative clauses, and purpose and manner clauses can take an outwardly similar structure (introduced by *that* or *dass*[10]), but they are not complements of a verb in a matrix clause and therefore not to be considered complement clauses (Noonan 2007: 53). These uses fall outside the purview of the current investigation. The one other type of construction that remains within our scope is that of the appositive complement clause, i.e. when the propositional content of the clause introduced by *that/dass* is "given status" by a noun (or adjective) in the matrix clause; that is, it is "evaluated" in a manner similar to how the verbs *think* and *spůret* in (1) and (2) above elaborate on the propositions over which they scope (Hunston & Sinclair 2000: 88-89, Hyland & Tse 2005: 40-41, Charles 2006: 496-497, Hiltunen 2010: 122-126, Hunston 2011: 92ff.; cf. Gray & Biber 2015). Consider examples (3) and (4):

(3) For it is verie certaine, **that** there are many Children, which are diseased or deformed, either in bodie, or mind, whose parents are verie healthfull, and well featur'd . . . (EMEMT: Jacques Guillemeau, *CHILD-BIRTH OR, THE HAPPY DELIVERIE OF VVOMEN* (1612), trans. unknown, p. 2)

(4) Es seind jhr viel vnter den Gelerten der meinung/ **das** die gemeine wolbekandte Wermut/ vnd dann das Romanum oder Montanum ein ding sey/ vnd allein in dem zu vnterscheiden/ das es an einem ort schöner/ besser vnnd krefftiger wachse/ als an dem andern. (GeMi: Johannes Wittich, Preface to *VADE MECVM* (1596), pp. a iij.v-a iiij.r)

'Many of the learned are of the opinion that the common well-known wormwood, and then *Romanum* or *Montanum* are one and the same thing, and solely to be differentiated insofar as it grows better, stronger, and more beautifully in one location than in another.'

In (3), Guillemeau expresses a strong epistemic commitment to the proposition concerning diseased children and their parents with the adjective *certaine*, while in (4), Wittich is reporting on the beliefs of others with the noun *meinung* 'opinion, belief' preceding the complement clause. Because of how functionally similar these appositive complements are to the standard object complement clauses above (consider, for example, how both (1) and (4) focus on the belief in the propositional content), they will be considered here as well.

[10] In present-day German, the complementiser *dass* is orthographically distinct from *das*, which can serve as the (neuter) definite article, demonstrative pronoun, and relative pronoun, although this orthographic differentiation was not necessarily the case during the sixteenth and seventeenth centuries.

There is no consensus in the literature on exactly how such complement constructions should be categorised semantically. Dixon (2006: 10) categorises complement-taking verbs into four broad semantic domains: Attention (*see, notice, recognise, find,* etc.), Thinking (*think, suppose, remember, know, believe*, etc.), Liking (*like, fear, enjoy*, etc.), and Speaking (*say, report, describe, threaten, persuade,* etc.). In addition to these, a number of "secondary concepts" such as negation and modality – that is, concepts that "link" to other verbs – are proposed (11-14). Noonan (2007: 120-145) offers a more detailed and nuanced categorisation with twelve discrete categories of complement-taking predicates.[11] Since this study examines how changes in the domains of midwifery and women's medicine during the sixteenth and seventeenth centuries manifest themselves in language, particularly in regard to the use of complement clauses, we are primarily concerned with three broad categories: Perception (information acquired through immediate experience, perception, and observation, i.e. Dixon's Attention category and Noonan's Immediate Perception domain); Mediated Information (knowledge mediated through others, or information acquired via reports and hearsay, i.e. Dixon's Speaking and Noonan's Utterance category); and Knowledge (knowledge/belief that is either pre-existing or arrived at through mental processes, i.e. Dixon's Thinking and Liking categories and Noonan's categories relating to knowledge, attitude, and belief states).[12] This tripartite division is illustrated by the following examples:

1. Perception

(5) Now the causes are many; as the corruption of the milk, for being either too hot or too cold, it turns into ill humours, and so hinders the breeding of good blood; or it may come for want of suck, from whence we **see** many times that when a childe consumes and pines away with sucking one Nurse, if it suck an other, it soon thrives and growes. (EMEMT: Robert Pemell, *De Morbis Puerorum* (1653), p. 29)

[11] Noonan's twelve categories are Utterance (equivalent to Dixon's Speaking category), Propositional Attitude (similar to Dixon's Thinking category, but only including tentative concepts like *think* and *believe*), Pretence (*imagine, pretend*), Commentative (*regret, odd, significant that . . .*, etc.), Knowledge and Acquisition of Knowledge (*know, realise, forget*), Fearing (*worry, anxious that . . .*, etc.), Desiderative (*want, wish,*, etc.), Manipulative (*cause, force, threaten*, etc.), Modal (*can, may*, etc.), Achievement (*manage, remember, avoid*, etc.), Immediate Perception (similar to Dixon's Attention category), and Negative (when the complementiser indicates the predicate is negated – this does not occur in English or German).

[12] I intently avoid the term 'evidentiality' (Aikhenvald 2004, Boye 2012) because my focus is not solely on clauses that indicate the writer's evidence for the proposition, but also on expressions of pre-existing knowledge or mental states without recourse to their epistemological foundations, as well as on the perceptions and knowledge of second and third persons (i.e. the thoughts, beliefs, and perceptions of someone other than the writer).

(6) **Scheinet** also/ wenn dieses geschiehet/ daß derselben Frau gar leichte hå̊tte durch die Wehe-Mutter kő̊nnen geholffen werden. (GeMi: Justina Siegemund, *Die Chur-Brandenburgische Hoff-Wehe-Mutter* (1690), p. 138)

'It thus seems, when this happens, that the same woman could easily have been helped by the midwife.'

2. Mediated Information

(7) Rasis a solempne practicioner amõg phisicions, **affirmeth** that he healed a greate multitude of this dysease onelye wyth the practyse folowynge which he taketh to be of great effecte in all lyke cases. (EMEMT: Thomas Phayer, *THE KEGIment of life* (1546), p. X6v)

(8) Es **schreibet** Bonifacius/ ein Cardinal zu Rom/ daß die Brunnen/ so von grosser Hitze außgedrucknet seyn/ durch reiner Jungfrawen Gesang mő̊gen wieder bracht werden/ Sonderlich wenn sie bey dem Vrsprung des Brunnen mit Stim̃en vnd Instrumenten von reynen vnd Geså̊ngen/ eine liebliche Musicam halten. (GeMi: Severin Pineau, *Probier vnd Kunstkå̊stle in der Jungfrawen* (1624), trans. unknown, pp. G ij.r-G ij.v)
'Bonifacius, a Roman cardinal, writes that the springs that have been dried up due to great heat may be restored through the pure song of virgins, especially if they stand at the source of the spring and make sweet music with pure instruments and voices.'

3. Knowledge

(9) Also ye must **vnderstande** that generallye the byrthe of the man is easyer then the byrth of the female. (EMEMT: Eucharius Rösslin, *The Byrth of Mankynde* (1540), trans. Richard Jonas, pp. 14v-15r)

(10) Ich **glaub**/ daß es wol ein kleiner Eymer voll gewesen sey. (GeMi: Louise Bourgeois, *Hebammen Buch* (1652), trans. Matthäus Merian, p. 164)
'I believe that it was a small bucket full.'

In (5) and (6), a sense of first-hand observation is being indicated, although in (6), there is the additional subsequent inference that results from this perception expressed as well.[13] Examples (7) and (8) indicate that information is being mediated through other sources, while in (9) and (10), the content of the proposition is linked to the mental state of the subject of the matrix clause.

[13] It is common for items that indicate perception to simultaneously mark mental processes that result from such perception (Sweetser 1990: 32-34, Harm 2000, Author 2010, 2015). In the current study, all such uses remain classified as perception constructions since the immediate perception precedes any subsequent mental processes.

4. Data Sources and Methodology

Data for this study were taking from two corpora. For English, the Corpus of Early Modern English Medical Texts (EMEMT), in particular the sub-corpus on Midwifery and Children's Medicine, was consulted (Taavitsainen & Pahta 2010, Pahta & Ratia 2010: 89-95). This sub-corpus totals 102,923 words and is comprised of ca. 10,000 word extracts from ten sixteenth- and seventeenth-century texts devoted to midwifery, obstetrics, gynaecology, and paediatrics. The earliest text dates from 1540 and the latest text was published in 1684, and there are no texts dating from the latter-half of the sixteenth century (very few texts on these subjects were printed in sixteenth-century England). Table 1 presents an overview of the texts in the Midwifery and Children's Medicine sub-corpus of EMEMT[14]:

Author	Title	Date	Extract Length (in words)
Eucharius Rösslin	*The byrth of Mankynde* (trans. Richard Jonas)	1540	9,511
Thomas Phayer	*The KEGIment of life*	1546	10,260
		1500-1599	19,771
Edward Jorden	*A BRIEFE DISCOVRSE OF A DISEASE CALLED THE Suffocation of the Mother*	1603	11,633
Jacques Guillemeau	*CHILD-BIRTH OR, THE HAPPY DELIVERIE OF VVOMEN* (trans. unknown)	1612	10,593
Jacques Guillemeau	*THE NVRSING OF CHILDREN* (trans. unknown)	1612	10,269
John Sadler	*THE SICKE VVOMANS PRIVATE LOOKING-GLASSE*	1636	10,680
		1600-1649	43,175
Nicholas Culpeper	*A DIRECTORY FOR MIDWIVES*	1651	9,355
Robert Pemell	*De Morbis Puerorum, OR, A TREATISE OF The Diseases of*	1653	10,129

[14] Within the architecture of both corpora, texts were assigned to four discrete, fifty-year time categories (1500-1549, 1550-1599, 1600-1649, 1650-1699) in an attempt to have a representative balance across the two centuries, and the results will be presented in similar fashion here.

	Children		
Jane Sharp	*THE MIDWIVES BOOK*	1671	10,025
Anonymous	*ARISTOTELES MASTER-PIECE*	1684	10,468
		1650-1700	39,977
		1500-1700	**102,923**

Table 1. The Midwifery and Children's Medicine Sub-Corpus of EMEMT.

For German, the Nottingham Corpus of Early Modern German Midwifery and Women's Medicine (GeMi) was consulted (Author 2016).[15] Its size totals 119,802 words and like EMEMT, text samples are roughly 10,000 words in length. It is comprised of twelve texts, with the earliest dated ca. 1500 and the latest one appearing in 1690. Unlike EMEMT, however, there is also a front matter (*Titelei*) sub-corpus which features all prefaces, dedications, etc. included in these texts, and it is 16,968 words in length (the main corpus is comprised of 102,834 words). Table 2 presents an overview of the texts in the GeMi Corpus:

Author	Title	Date	Extract Length (in words) (main text + *Titelei*)
Anonymous	*„Frauenbüchlein"*	ca. 1500[16]	3,010
Eucharius Rösslin	*Der Swangernẽ frawen vnd Hebammẽ roszgartẽ*	1513	12,618 (10,534 + 2,084)
		1500-1549	15,628 (13,544 + 2,084)
Jakob Rüff	*Ein schön lustig Trostbüchle von den empfengknussen vnd geburten der menschen*	1554	10,785 (9,440 + 1,345)
Adam Lonitzer	*Reformation/ oder Ordnung für die Heb-Ammen*	1573	9,482 (8,474 + 708)
Oswald Gabelkover	*Artzneybuch*	1595	10,758 (9,672 + 1,086)
Johannes Wittich	*VADE MECVM*	1596	12,484 (9,620 + 2,864)
		1550-1599	43,209 (37,206 + 6,003)
Christoph Meurer	*Pest Regiment Dessen SChwangere Frawen*	1607	4,954

[15] The GeMi Corpus is available at the Oxford Text Archive: http://ota.ox.ac.uk/desc/2562.

[16] It is unclear when exactly the *Frauenbüchlein* was published, although it is presumably sometime near the end of the fifteenth century. Green (2008: 269) places the publication date close to 1495. Even though it is substantially shorter than most of the other corpus texts, it is included here because it is one of the first – if not the first – texts on pregnancy and childbirth to be printed in a European vernacular (Green 2008: 345).

David Herlitz	*New Frawen Zimmer*	1612	10,406 (9,624 + 782)
Severin Pineau	*Probier vnd Kunstkästle in der Jungfrawen* (trans. unknown)	1624	9,453
		1600-1649	24,813 (24,031 + 782)
Louise Bourgeois	*Hebammen Buch* (trans. Matthäus Merian)	1652	12,401 (10,154 + 2,247)
Nikolaus Hassert	*Nothwendig- und nützlicher Unterricht*	1682	7,771
Justina Siegemund	*Die Chur-Brandenburgische Hoff-Wehe-Mutter*	1690	15,980 (10,128 + 5,852)
		1650-1700	36,152 (28,053 + 8,099)
		1500-1700	**119,802 (102,834 + 16,968)**

Table 2. Overview of the GeMi Corpus.

Both corpora contain a combination of original compositions and translations from other languages; indeed, the earliest EMEMT is a translation (via Latin) of Rösslin's work, and there is even some overlap between the two extracts. Because there is no equivalent sub-corpus in EMEMT, the *Titelei* in the GeMi Corpus were excluded from the current investigation.

The WordSmith 6 concordancer programme (Scott 2012) was used to extract complement clauses from the corpora. In the first instance, this involved searches for the complementisers *that* and *dass*. For EMEMT, the problem of spelling variation was mitigated by searching through the normalised version of the files (although examples here are given in the original spelling).[17] No such normalised version of GeMi exists, so the wildcard *da** was used to search for almost all possible spelling variants of the complementiser (*das, daz, dass, daß;* a separate search was made for *dz*). Such searches expectedly resulted in much superfluous data being collected (e.g. relative pronouns, demonstratives, etc.), so a substantial amount of manual culling was necessary to isolate the complementiser constructions. After this, complementiser constructions were categorised into the three categories discussed above in

[17] EMEMT spelling was normalised using the Variant Detector (VARD) software programme (Lehto et al. 2010).

Section 3: Perception constructions (P), Mediated Information constructions (M), and constructions indicative of Knowledge (K).[18]

5. Results and Discussion

In this section we will discuss the results and implications of the searches through the EMEMT and GeMi corpora. Given that not all extracts were of exactly the same length and that not every period is represented by the same number of words, results have been normalised to rate per 10,000 words (for raw figures of the data presented in this section, please see the Appendix). Figures 1 and 2 present the normalised frequencies for the different types of complement clause constructions in EMEMT and GeMi, respectively:[19]

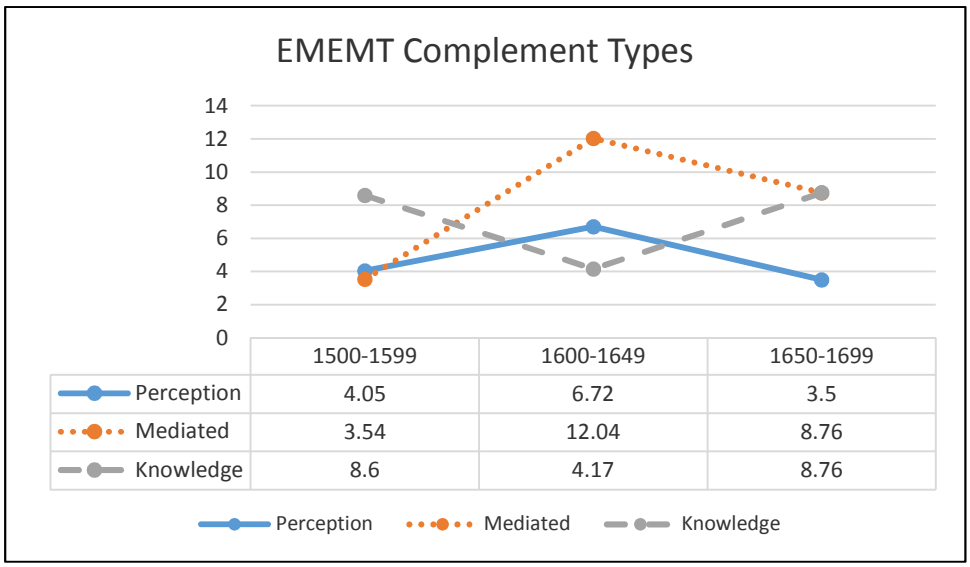

Figure 1. Normalised frequencies (at rate per 10,000 words) of complement clause construction types in the EMEMT midwifery sub-corpus.

[18] The obvious limitation of this search method is that is fails to capture complement constructions in which the complementiser is absent, for which there is no fool-proof way to find every instance of such constructions in corpora that are not tagged syntactically. It has been argued that the absence of the complementiser in such constructions can have prosodic and pragmatic effects in present-day usage (Thompson & Mulac 1991, Kaltenböck 2009), although the picture is not as clear-cut with diachronic data. According to Fischer and van der Wurff (2007: 171-172), for instance, complementiser deletion was much less frequent in earlier stages of English and only began to increase in frequency after 1500. What motivated this increase, at what rate it progressed, and what prosodic and/or pragmatic effects (if any) complementiser deletion had during the early modern period remains beyond the scope of this study. It is nonetheless a topic worth further investigation: 3,000 word extracts from Sadler's *THE SICKE VVOMANS PRIVATE LOOKING-GLASSE* (1636) and Bourgeois' *Hebammen Buch* (1652) – representative of the periods during which complementiser use was at its highest in each language according to the current data – were manually scanned for Ø-complement clauses (e.g. *it is a signe she hath conceived*). 12 such clauses were found in the Bourgeois text and 2 in Sadler's text.

[19] As pointed out earlier, there were no texts on midwifery published in English in the late sixteenth century, so the entire sixteenth century is represented with a single point in the figure.

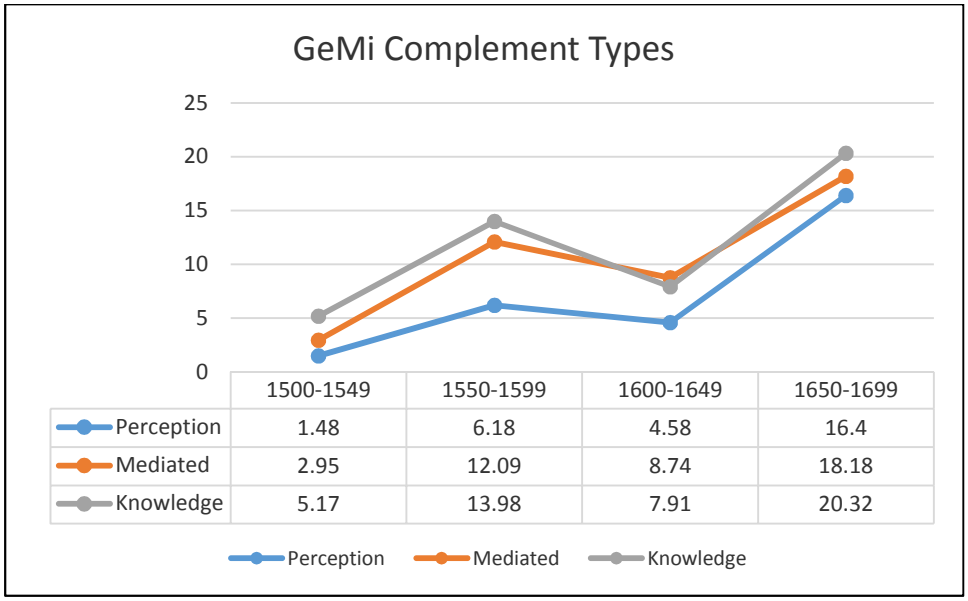

Figure 2. Normalised frequencies (at rate per 10,000 words) of complement clause construction types in the GeMi corpus.

Contrary to expectations, complement constructions indicating perception ultimately decrease in frequency by the end of the seventeenth century (even though an increase is recorded for the period beforehand) in English. On the other hand, constructions of knowledge ultimately increase in frequency by the end of the seventeenth century (even though there is a decrease in usage in the early part of the same century). Constructions marking mediated information also increase through the period, even though they were used more frequently at the beginning rather than the end of the seventeenth century. The picture is quite different with the German data, where complement clauses generally appear to occur more frequently than they do in EMEMT. The diachronic trend is similar among all three types: there is an initial increase in usage through the sixteenth century, then a slight decrease at the beginning of the seventeenth century, followed by substantial increases in all three categories towards the end of the century. In addition, the most frequent type of complement clauses – those indicating knowledge and mental processes – remains in the lead throughout most of the periods, whereas perception constructions remain the least frequent type of complement clause throughout. But their usage, too, increases quite substantially during the seventeenth century.[20] Indeed, another way to look at the data is to examine the proportion at which each complement clause type is used in each of the periods, and whether certain types of information become more or less favoured as time progresses. These proportions (percentages) can be seen in Figures 3 (for EMEMT) and 4 (for GeMi):

[20] There is naturally the question of what effect, if any, Ø-complement clauses would have on this data.

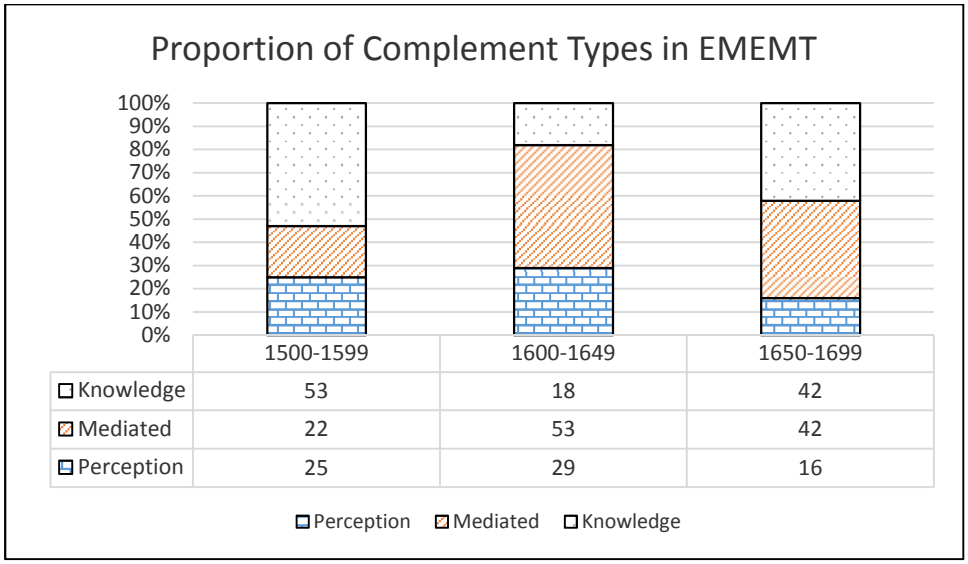

Figure 3. Proportion of complement types in the EMEMT midwifery sub-corpus.[21]

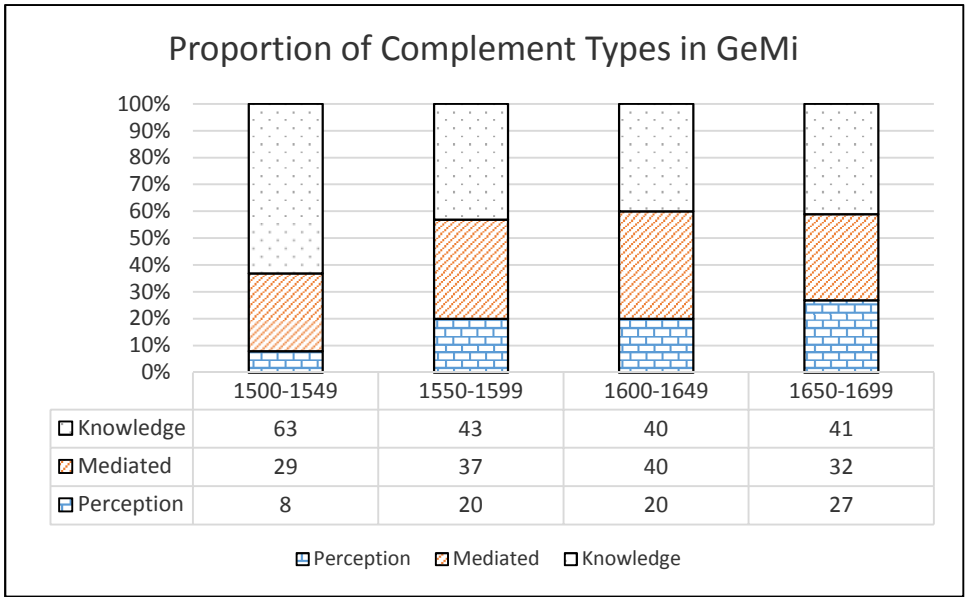

Figure 4. Proportion of complement types in the GeMi corpus.

For the English data, the proportion of perception complement rises slightly at the beginning of the seventeenth century, but then declines by the end of the century, whereas the proportion of knowledge complement clauses decreases quite substantially at the beginning of the seventeenth century but then increases again at the end of the century to 42%. The opposite is true for expressions of mediated information, which enjoy the lion's share of usage – at 53% – at the beginning of the seventeenth century but then decrease later in the century, ending the period as 42% of complement clause types. The case is similar with mediated information in German, which displays a steady increase up to the mid-seventeenth century but then decreases again to near early sixteenth-century levels. Expressions of

[21] All sixteenth-century data is presented in a single column for the EMEMT midwifery sub-corpus.

knowledge gradually decrease up to the seventeenth century but then appear to remain fairly stable. In stark contrast to English, proportional usage of perception constructions in German gradually increases through the periods examined here.

English and German do share some similarities when it comes to the subject of matrix clauses, insofar as third-person subjects dominate through the period under investigation, i.e. the main function of these clauses throughout the period in question is to describe the beliefs and perceptions of someone other than the author or reader. Consider Figures 5 and 6 below:

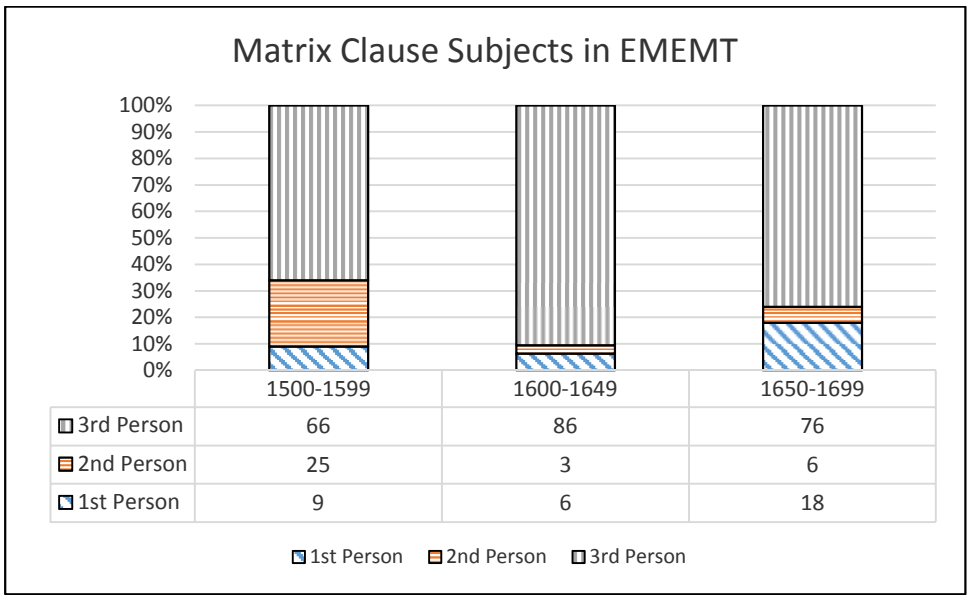

Figure 5. Proportional use of subject types in matrix clauses in the EMEMT midwifery sub-corpus.[22]

[22] The proportions of pronominal subjects for the period 1600-1649 do not actually total 100%. This is due to the presence of a few subjectless complement clauses that contain the present participle *seeing* as the matrix verb, e.g. *Seeing also that wee are made of a fluxible moulde which wasteth and spendeth it selfe many wayes . . .* (EMEMT: Edward Jorden, *A BRIEFE DISCOVRSE OF A DISEASE CALLED THE Suffocation of the Mother* (1603), p. 18-recto). These account for 5% of the complement clauses attested during this period.

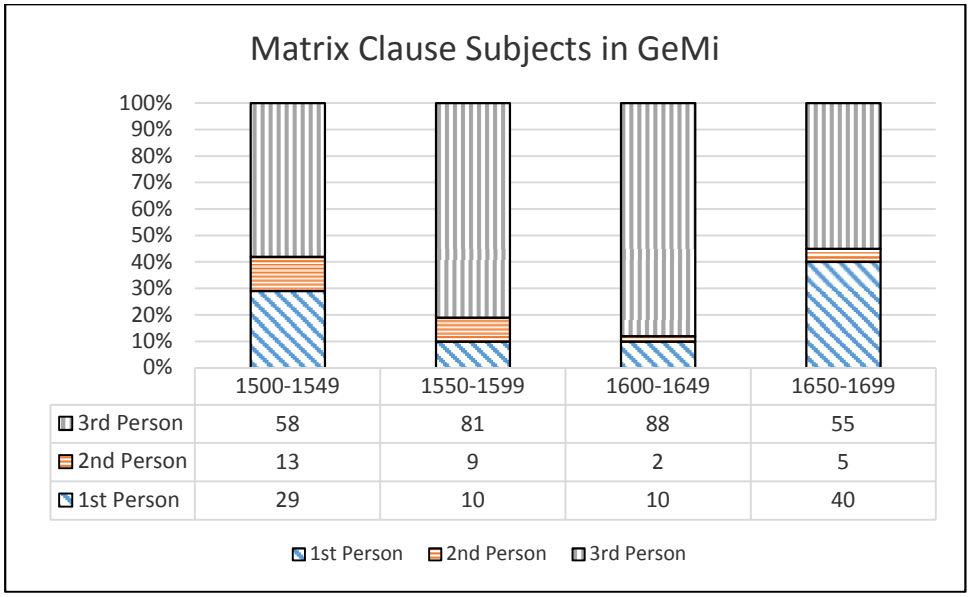

Figure 5. Proportional use of subject types in matrix clauses in the GeMi corpus.

But even though third-person subjects dominate throughout the two centuries, there are some notable developments relating to first- and second-person subjects. Regarding the latter, both languages attest an overall decline in readers being directly addressed by the authors of these texts. Consider cases such as (11) and (12), where the authors directly address the readers:

(11) Likewise for the greatnes of her belly, if it appeare more swollen and bigger then in her other child-bearing, if the sides be higher then the middle of her belly, and from the nauell downeward there appeare as it were a line or separation betweene both sides creasted; if the woman beare her burthen with difficultie, and her belly fall vpon her thighes and hips, then **may you safely say** that she goeth with two children. (EMEMT: Jacques Guillemeau, *CHILD-BIRTH OR, THE HAPPY DELIVERIE OF VVOMEN* (1612), trans. unknown, pp. 12-13)

(12) Dann dise Kunst hat nie gefehlet an ettlichen gestandenen Frawen/ die lange zeit vnfruchtbar seind gewesen/ vnnd die alte Månner haben gehabt/ seind fruchtbar durch dise Kunst worden. Vnd **weiß**/ daß sie gerecht vnd probiert ist. Daß ein Fraw schwanger werde. (GeMi: Oswald Gabelkover, *Artzneybuch* (1595), p. 32)[23]

‘And this art has never gone wrong with several seasoned women who were infertile for a long time, and those who had old husbands were made fertile through this art. And know that it is suitable and tested. That a woman may become pregnant.’

[23] All instances of imperatives were categorised as 2nd person subjects, alongside explict use of the 2nd person pronoun.

In English, these types of constructions are more common in the sixteenth century than in the seventeenth century, comprising at most one-quarter of complement clause constructions in any given fifty-year period. The use of first-person pronouns, on the other hand, shows a clear increase (almost three-fold) in proportional usage during the end of seventeenth century – the period in which Jane Sharp published *The Midwives Book* (1671). The case is similar with the German data: there is a sharp increase (from 10% to 40%) in the use of first-person grammatical subjects during the period in which the works of Louise Bourgeois[24] and Justina Siegemund are published. Indeed, Bourgeois and Siegemund account for all cases of first-person subjects in matrix clauses during the period (all complement constructions in Hassert's 1682 text feature third-person subjects in the matrix clause), and the uses here are a clear indication of direct involvement in midwifery practice:

(13) Ich gab jr die Clyster/ vnd **sahe** doch/ dz sich das Lendewehe nit lindern wolte. (GeMi: Louise Bourgeois, *Hebammen Buch* (1652), trans. Matthäus Merian, p. 163)
'I gave her the enema and yet saw that the lumbar pains were not alleviated.'

(14) Ich **gestehe** gar gerne/ daß ich vor die Nachgeburt/ um selbe zu fo̊rdern/ gro̊ßern Kummer habe/ als bey allen Wendungen der Kinder. (GeMi: Justina Siegemund, *Die Chur-Brandenburgische Hoff-Wehe-Mutter* (1690), p. 115)
'I gladly admit that I take great distress in attempting to stimulate the afterbirth, as I do with all malpresentations of children.'

When male authors use first-person pronouns in matrix clauses, it tends to be to indicate their belief in their claims, or to indicate their attempt to engage the reader through the use of the plural pronoun *we/wir*, but there is little indication – as in (13) and (14) – that they had direct involvement in the matters they were discussing:

(15) Wir **wissen** vnd haben guten bericht/ auß Go̊ttlicher heiliger Schrifft/ das der Ewige/ gůtige Gott/ wegen des jå̊mmerlichen Falls vnsers ersten Vaters Adams/ zu dem Weibe gesprochen . . . (GeMi: David Herlitz, *New Frawen Zimmer* (1612), p. 85)
'We know and have a good report from the divine holy scriptures that the eternal and gracious God, because of the pitiable state of our first father Adam, spoke to the woman . . .'

[24] The original French version of Bourgeois' work, *Observations diverses sur la stérilité* . . ., first appeared in 1609, although it wasn't translated into German until 1619 by Johann Theodor de Bry. The GeMi Corpus contains the 1652 translation by Matthäus Merian the Younger.

Such recourse to the holy scriptures is not uncommon in the midwifery texts of this period, but it is clearly no indication that the authors had any first-hand experience of assisting in childbirth.

The late seventeenth-century texts in EMEMT, on the other hand, give a less clear picture than the German data on this matter. In fact, Jane Sharp's text accounts for only one-third of first-person pronouns used in matrix clauses during the period (5 out of 15; and there are also 5 cases in the anonymous *ARISTOTELES MASTER-PIECE*), and in this small sample, there are no cases similar to Bourgeois or Siegemund's that indicate direct, first-hand involvement in assisting with childbirth. Sharp's uses are no different than those of the male authors writing during the period:

(16) But that Objection is easily answered, by the former example of the Midwives amongst the Israelites, for though we women **cannot deny**, that men in some things may come to a greater perfection of knowledge than women ordinarily can, by reason of the former helps that women want . . . (EMEMT: Jane Sharp, *The Midwives Book* (1671), pp. 2-3)

(17) But I **conceive** that it is not safe to use such a remedy in young and tender bodies; for if the bodies of such young and tender children will not suffer purging or bleeding, how shall they endure burning, when as this must needs bring continual pain and watchings, whereby the strength must also decay. (EMEMT: Robert Pemell, *De Morbis Puerorum* (1653), p. 8)

In (16), Sharp urges her female readers to agree with the following statement through the use of the plural pronoun *we*, while in (17), Pemell expresses his belief (via inference) that a proposed cure of epilepsy in children ultimately would be ineffective because of other problems it would cause. But in neither case do the authors indicate any direct, first-hand knowledge of caring for women and new-borns, as Bourgeois and Siegemund do in their writings. There is also a larger than expected proportion of first-person subjects used in the earliest German-language midwifery writings, accounting for nearly one-third (or 4 out of 13) of all complement constructions (whereas only 9%, or 3 out of 32, of English constructions during this period featured first-person subjects in matrix clauses). All four cases can be found in the anonymous *Frauenbüchlein*, an example of the "Pseudo-Ortolf" tradition, when an author attributes his medical text to the famous thirteenth-century surgeon Ortolf von Baierland in a bid to establish credibility with his readership (Keil 1986: 194ff.). Flügge

(1998: 65-67) even suggests that this work may have been written by a woman on the basis of several references to first-hand experience, references absent both from the text's manuscript precursor and from the earliest midwifery manuals by Rösslin and Rüff.[25]

In an attempt to shed some light on the unexpected results from Jane Sharp's text and the *Frauenbüchlein*, a search for the general frequency of both singular and plural subject pronouns in English and German was conducted.[26] The results are presented in Figures 6 (for EMEMT) and 7 (for GeMi):

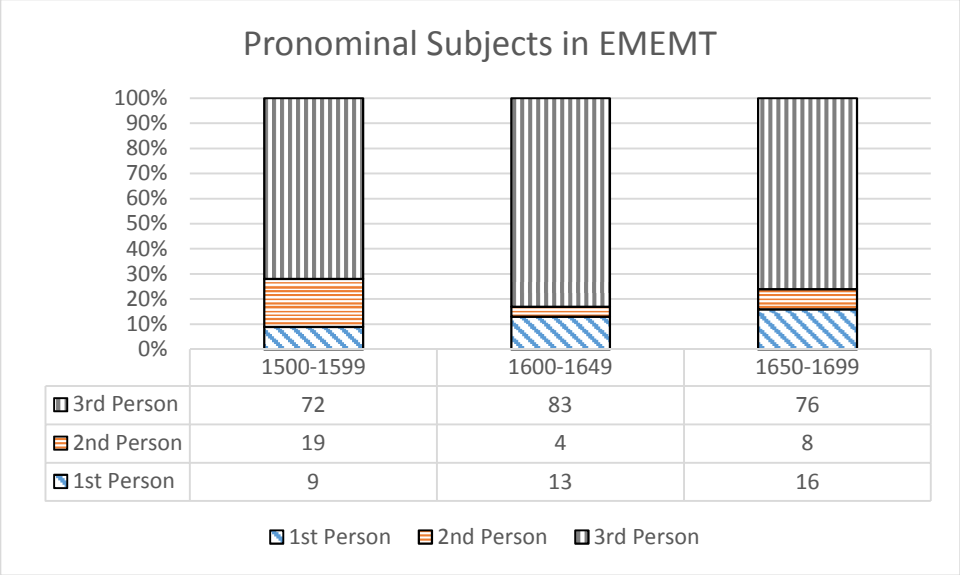

Figure 6. Proportional use of pronominal subjects in the EMEMT midwifery sub-corpus.

[25] The three cases in EMEMT all come from Phayer's *THE KEGIment of life* (1546), and although two of the three appear to indicate genuine first-hand experience, neither of these cases relates to childbirth itself (one relates to epilepsy and one to *styfnes . . . of the lymmes* (in both men and women), p. T6v).

[26] Ideally *all* sentential subjects could have been searched for, but as mentioned earlier, neither corpus is tagged for part-of-speech, so a search for pronominal subjects had to suffice. This does not affect first-person subjects, but this does mean that no imperative forms (for 2nd person) could be searched for, and any 3rd person nominal subjects are also excluded.

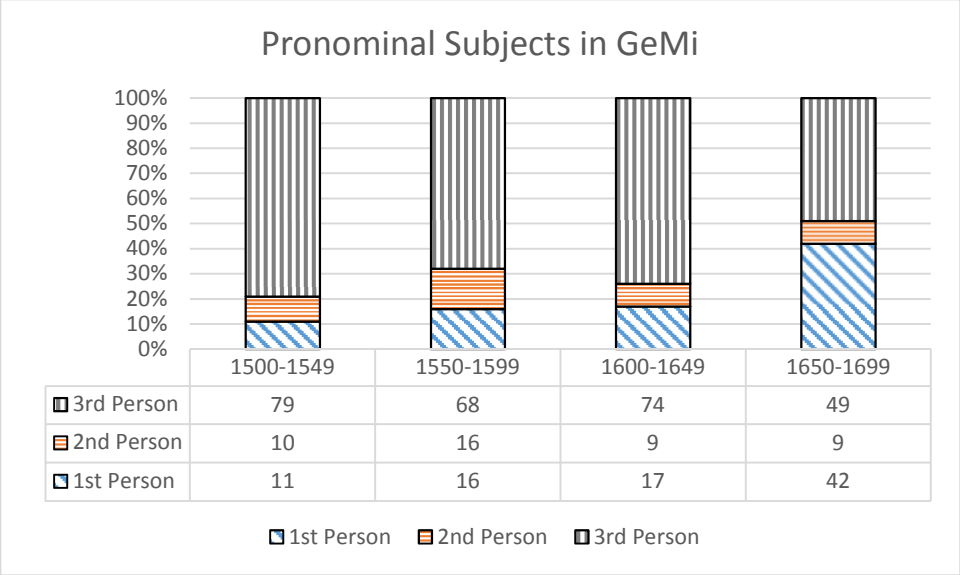

Figure 7. Proportional use of pronominal subjects in the GeMi corpus.

The tendencies here are fairly similar to the trends found among complement clause subjects: 3rd person subjects dominate throughout, there is a general decline in the use of 2nd person subjects, whereas 1st person subjects are on the rise. Hence both midwifery corpora illustrate the broader tendency of scientific writing of the period to head towards a more "involved" style through the increased overt presence of the author in the text via the use of the first-person pronoun (Dorgeloh 2005a 2005b, Moessner 2008), although this is more pertinent to the singular pronoun than the plural pronoun, which tends to be used more as an audience engagement marker than for the mere indication of multiple first-person subjects. This tendency is also more starkly illustrated by the German data, thanks to Bourgeois' and Siegemund's frequent injection of themselves into the discourse (of the 330 uses of *ich* in this period of the GeMi corpus, only one comes from Hassert's text; the rest are from Bourgeois and Siegemund). This is not the case for Jane Sharp and her contemporaries, though, for her use of the first-person (singular) pronoun accounts for only 15% (or 24 out of 157) of uses in the EMEMT midwifery sub-corpus between 1650 and 1700. None of Sharp's uses found in EMEMT necessarily involve direct, first-hand involvement with pregnant women and childbirth, in contrast to Bourgeois and Siegemund as seen in (13) and (14) above. Many of Sharp's uses of *I* indicate how she has structured or will structure the text in question, and this use was also shared with her contemporaries:

(18) **I** shall give onely one observation and so conclude this Chapter . . . (EMEMT: Jane Sharp, *The Midwives Book* (1671), p. 18)

(19) **I** come now to the matter, which is, How proud, though miserable, Man is formed in the Womb. (EMEMT: Nicholas Culpeper, *A DIRECTORY FOR MIDWIVES* (1651), p. 46)

Lack of Sharp's overt presence and involvement in circumstances surrounding normal childbirth lends support to claims recently made by Walsh (2014), who suggests that 'Jane Sharp' was actually a female pseudonym for a male author attempting to lend additional credibility to his text by having it purportedly written by a midwife with decades of experience behind her. In contrast to Bourgeois and Siegemund, there is little concrete historical evidence of Jane Sharp's actual existence (cf. Hobby 1999), and Walsh provides numerous examples of how Sharp took many of her passages from other writers' works (a practice not necessarily uncommon for the period) and was ignorant about several aspects of female anatomy, which would be surprising for such an experienced midwife. The use of pronouns alone – whether in complement clause constructions or not – is not conclusive evidence that Jane Sharp really was a man writing "in drag" (Walsh 2014: 224), nor does it definitively prove that *Frauenbüchlein* was actually penned by a woman (Flügge 1998: 65-67). Such determinations fall well beyond the scope of the present study, as they rest with the domains of corpus linguistics, stylometry (Oakes 2009) and authorship (Frantzi 2006). Nevertheless, the data here do point down these avenues as future possibilities in the study of early modern writings on midwifery.

6. Concluding Remarks

This study has sought to shed some light on expressions of knowledge in an under-studied domain of early modern scientific writing: midwifery and women's medicine. Through examining the use of complement clauses, it was hoped to see if any sociohistorical trends in the fields of midwifery and medicine found themselves realised linguistically in how different categories of knowledge (perception and immediate experience, mediated information, and mental processes) were expressed in complement clauses. The language pair English-German was selected in part because of the extant corpora available, but examining more than one language also provides a broader perspective of the first two centuries of vernacular medical writing appearing in print. If similar corpora for other European vernaculars like French existed, results could be enhanced even further. Regarding the semantics of complement clause types, the English and German data tell quite different stories: in English, there is an overall rise in expressions of mediated information and mental processes throughout the

period in question (although there is a slight decline in the former during the first-half of the seventeenth century). Contrary to our hypothesis, complement clauses that contain information acquired via direct perception and experience decline during this period (which was not the case in scientific writing overall, cf. Author 2016). In German, on the other hand, there is a steady increase in the use of complement clauses in all domains throughout the sixteenth and seventeenth centuries. Perception constructions are never the most frequently used type in any one period, but their proportional usage does increase steadily throughout the period (see Figure 4). Regarding the grammatical subjects of complement clause constructions, third-person subjects dominate throughout, but the use of first-person subjects increases during the two centuries in question. This can generally be ascribed to the trend in scientific writing of the period to become more involved in its style, although in German, the works of Louise Bourgeois and Justina Siegemund also testify to extensive first-hand experience in the care of pregnant mothers and new-borns (contrary to the male authors of the period). This study has also made some observations on authorship questions surrounding the work of Jane Sharp and the first midwifery text printed in a European vernacular, the *Frauenbüchlein*. With the former, there is tentative evidence that supports the possibility that 'Jane Sharp' may not have been a woman at all but rather a man writing with a female pseudonym in an attempt at increased viability and marketability of his text. Contrast this to nearly a century and a half earlier, when a woman may well have penned the *Frauenbüchlein* within the (male) Pseudo-Ortolf tradition for many of the same reasons: increased credibility and viability of the text. In neither of these cases are the data presented here fully conclusive, but they do demonstrate the contribution that diachronic corpus linguistics can make in investigating both the history of midwifery and the history of medicine more widely.

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Appendix

	1500-1599		**1600-1649**		**1650-1699**	
	Raw	*Norm.*	*Raw*	*Norm.*	*Raw*	*Norm.*
Perception	8	4.05	29	6.72	15	3.50
Mediated	7	3.54	52	12.04	35	8.76
Knowledge	17	8.60	18	4.17	35	8.76

Table 1. Raw and normalised (per 10,000 words) frequencies of complement clause types in the EMEMT midwifery sub-corpus.

	1500-1549		**1550-1599**		**1600-1649**		**1650-1699**	
	Raw	*Norm.*	*Raw*	*Norm.*	*Raw*	*Norm.*	*Raw*	*Norm.*
Perception	2	1.48	23	6.18	11	4.58	46	16.4
Mediated	4	2.95	45	12.09	21	8.74	51	18.18
Knowledge	7	5.17	52	13.98	19	7.91	57	20.32

Table 2. Raw and normalised (per 10,000 words) frequencies of complement clause types in the GeMi corpus.

	1500-1599			**1600-1649**			**1650-1699**		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Perception	2	1	5	3	1	21	3	1	11
Mediated	0	0	7	0	1	51	6	0	29
Knowledge	1	7	9	3	1	13	6	5	24

Table 3. Raw frequency of subjects (1st/2nd/3rd person, sg. and pl.) of complement clauses in the EMEMT midwifery sub-corpus.[27]

	1500-1549			**1550-1599**			**1600-1649**			**1650-1699**		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
Perception	1	0	1	2	0	21	1	0	10	16	5	25
Mediated	3	0	1	4	2	39	2	1	18	12	2	37
Knowledge	0	0	7	5	9	38	1	0	18	31	1	25

Table 4. Raw frequency of subjects (1st/2nd/3rd person, sg. and pl.) of complement clauses in the GeMi corpus.

	1st Person		**2nd Person**		**3rd Person**	
	Raw	*Norm.*	*Raw*	*Norm.*	*Raw*	*Norm.*
1500-1599	45	22.76	99	50.07	370	187.14
1600-1649	168	38.91	45	10.42	1059	245.28
1650-1699	199	49.78	102	25.51	958	239.64

Table 5. Raw and normalised frequencies (per 10,000 words) of pronominal subjects (1st/2nd/3rd person, sg. and pl.) in all of the EMEMT midwifery sub-corpus.

[27] The totals for 1600-1649 do not equal the numbers found in Table 1 for this period because of the presence of a few subjectless matrix clauses (see Footnote 22).

	1st Person		**2nd Person**		**3rd Person**	
	Raw	*Norm.*	*Raw*	*Norm.*	*Raw*	*Norm.*
1500-1549	15	11.08	13	9.60	103	76.05
1550-1599	69	18.55	69	18.55	302	81.17
1600-1649	39	16.23	19	7.91	165	68.66
1650-1699	353	125.83	76	27.09	416	148.29

Table 6. Raw and normalised frequencies (per 10,000 words) of pronominal subjects ($1^{st}/2^{nd}/3^{rd}$ person, sg. and pl.) in all of the GeMi sub-corpus.