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ABSTRACT

This study examined the way medical clinicians speak about numbers in orally presenting the results of research. Presentations by a sample of eight physicians and surgeons were selected and the manner in which numerical data on the slides were referred to was analyzed. Overall in the sample, it was four times more common to speak about data on slides in one of several non-exact ways than to mention them exactly. Non-exact reference appears to have several different functions in these presentations, notably to highlight significant data for the audience. It is suggested that it is also used to convert evidential truth into interpreted truth. The former function is probably more common in the presentation of original research, and the latter in overview-type presentations. In this sample, younger doctors used more unsignalled approximation than their older peers, who in turn used more non-numeric reference (e.g., quantifiers such as "a large number"). To some extent, these differences reflect the type of presentation given, but they may also be associated with the experience of the speaker. Contains 15 references. (Author/MSE)

# Non-Exact Quantification in Slide Presentations of Medical Research

Ron Howard

# NON-EXACT QUANTIFICATION IN SLIDE PRESENTATIONS OF MEDICAL RESEARCH

**Ron Howard (IALS)**

*Abstract*

*This paper examines the way clinicians speak about numbers in orally presenting the results of research. Presentations by a sample of eight physicians and surgeons were selected, and the manner in which numerical data on slides were referred to was analysed. Overall in the sample, it was four times more common to speak about data on slides in one of several non-exact ways than to mention them exactly. Non-exact reference appears to have several different functions in these presentations, notably to highlight significant data for the audience. I suggest it is also used to convert evidential truth to interpreted truth (Skelton, 1997). The former function is probably more common in the presentation of original research, the latter in overview-type presentations. In this sample, younger doctors used more unsignalled approximation than their older peers, who in turn used more non-numeric reference, e.g. quantifiers such as 'a large number'. To some extent these differences reflect the type of presentation given, but they may also be associated with the experience of the speaker.*

## 1. Introduction

The importance of quantification in discourse has been noted by Kennedy (1987) who, in a study of two written texts (an issue of *Newsweek* and a geography textbook), found that 14.46 per cent of the words expressed quantity or degree. One of the most intriguing aspects of this area of language is the use of non-exact quantification[1]. A number of linguists have studied non-exact language, including Channell (1994), who devotes part of her book on *Vague Language* to the subject[2], and who concludes:

> While more work is needed, it begins to look as though vagueness occurs as much or more than precision. It clearly is not the case that most language use is precise, with vagueness being occasionally appropriate. (Channell 1994:195)

Non-exact quantification occurs in scientific discourse as well as in ordinary day-to-day communication. Prince and her co-workers found that in their recordings of medical ward rounds there was 'more than one hedge every fifteen seconds' (Prince, Frader & Bosk 1982:84)[3]. Dubois analysed 52 talks from an international biomedical conference. She also found that non-exact quantification was common: 'There is much measuring, but with results often presented in strikingly casual form' (Dubois 1987: 529).

Non-exact quantification is therefore something that should concern the EST practitioner, and yet scant attention is paid to the subject in textbooks for second language learners. This may be because other matters are judged to have priority, or, as Channell notes, because there is still a belief that 'vagueness, ambiguity, imprecision, and general woolliness are to be avoided' (Channell 1994:1), or even that to be non-exact in science is to be dishonest. The prevalence of non-exact language argues against such beliefs. Forty-two of the speakers in Dubois' study used non-exact quantification ('hedged' is her term[4]), while ten did not. However, she notes that 'some avoid hedges by the simple act of not repeating the numbers projected by slide onto the screen, commenting instead through such relational expressions as *higher*, *lower*, *same*, *longer*, *shorter*' (Dubois 1987: 535). Since this manner

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of referring to numbers is also non-exact, it seems likely that all of her speakers made use of non-exact quantification. Unfortunately, she does not indicate *how much* each of the 42 hedged.

Dubois largely confined her attention to approximation which was signalled by a variety of linguistic devices including *about*. The present study examines the way a group of native-speaker doctors used non-exact language in reporting the results of research. In particular, it determines the ratio of exact to non-exact quantification used, including cases of unsignalled approximation by comparing data on slides with the way the speakers report those data. It also identifies the language expressions used by the speakers for non-exact quantification, and explores the reasons motivating the choices of those expressions.

## 2. The presentations

Six slide presentations which had been previously recorded on videotape for various pedagogic and research purposes were collected. The visibility of slides in these recordings (see section 3.1) ranges from 95% (Speaker A) to 18% (Speaker G). Two short audio recordings, for one of which a duplicate set of slides was available, were added to the six video recordings. All the recordings were made in or near Edinburgh; five of the speakers were working in Scotland (B, C, E, F, and H) and three in England (A, D and G) at the time of the presentations.

I make no strong claim of representativeness for my sample. However, given the difficulty of acquiring this type of data, it seemed worthwhile making use of what was available. The eight speakers (all male) range from the experienced (Speakers A and D) to the relatively inexperienced (Speakers B, E and F)[5]. Speakers E and F were recorded at a rehearsal session during which they received feedback from more experienced colleagues. Four of the recordings were made at two genuine meetings; two were recorded in a studio, one after and the other before a conference. The presentations in the sample are of two types: reports of original research (A, B, E, F and H), and presentations in which the speaker attempts to provide an overview of a particular area for specialists or trainee specialists. In the latter case (C, D and G), data from a number of studies, including the speaker's own, are presented on slides. Table 1 gives details of the eight presentations.

**Table 1: The presentations**

| Speaker | Venue | Mode | Genre | Status | Speciality | Length (words) | Length (mins) | Date |
|---|---|---|---|---|---|---|---|---|
| A | Studio (post-conference) | video | Research paper | Senior lecturer | Paediatrics | 2506 | 20 | 1989 |
| B | Studio (pre-conference) | video | Research paper | Registrar | Paediatrics | 1681 | 15 | 1989 |
| C | Meeting | video | Post-graduate lecture | Senior lecturer | Oncology | 4658 | 30 | 1996 |
| D | Meeting | video | Post-graduate lecture | Consultant | Oncology | 3359 | 30 | 1996 |
| E | Rehearsal | audio + slides | Research paper | Senior House Officer | Surgery | 869 | 6 | 1985 |
| F | Rehearsal | audio | Research paper | Senior House Officer | Surgery | 930 | 7 | 1985 |
| G | Meeting | video | Overview | Senior lecturer | Psychiatry | 4241 | 30 | 1992 |
| H | Meeting | video | Research paper | Consultant | Psychiatry | 3503 | 30 | 1992 |

## 3. Data sampling

### 3.1 Criteria for inclusion

Quantifying expressions referring to the results of research presented on slides were extracted from the talks and entered into a database. Each expression was given an identifying number made up as follows: a letter from A to H indicating the speaker (see Table 1), a number representing the slide referred to and a decimal number indicating order of utterance. Thus C14.04 represents the fourth expression used by Speaker C in referring to his 14th slide.

Kennedy (1987:268) used as the main criterion for inclusion in his study of quantifying expressions 'whether a particular linguistic device in context answered the question *How many/how much/to what extent*?'. This is not as simple as it might seem. Numbers are straightforward, and they were all included together with an approximator if there was one, e.g. *about 4 or 5* (A02.03). But should one include *very elderly* in *What you can see is that this population were very elderly* (H05.01)?

Since the aim of the study was to examine the way speakers report data that appear on their slides, I was able to avoid many such difficult decisions. I included all expressions which clearly refer to visible data. Thus, *very elderly* was included because it refers to a slide which shows the mean age of subjects as 58.6. However, I also included some expressions referring to data which are not visible. Of the total of 376 expressions, 161 refer to data which are not on a slide or are not visible because the slide cannot be clearly seen on the video tape or because the slide itself does not show the data in a precise numerical form (speaker E)[6] or because no visual record is available (speaker F). These 161 expressions include 16 signalled approximations and 78 other overtly non-exact expressions, e.g. *a rather higher number* (F28). In 64 out of 161 instances it was impossible to verify the status of the expression.

### 3.2 Categorisation

Data were categorised as follows:

A. **Numeric**

A.1 **Exact** reference: the speaker says the exact number shown on a slide[7], e.g. *109 [...] of the total figure was seen in 1988* (B02.03 ). Where the slide was not visible, numeric expressions were categorised as unknown, unless internal evidence permitted categorisation, e.g. *The pregnancy was a twin pregnancy: one twin was affected by severe spina bifida and the other was normal and healthy. One (twin)* was categorised as an exact numeric (A13.08) and *the other* (A13.09) as an exact non-numeric expression. In some cases, a number which *was* visible on the slide was not considered to be exact. Some of these are categorised as unsignalled non-exact, and some as unknown. (See A2.2 and C.)

A.2 **Non-exact** reference, or **approximation**, where the speaker refers to the amount or quantity using a rounded number. This is sub-divided into

A.2.1 **Signalled**: the speaker uses one of the set of approximators, e.g. *about*

A.2.2 **Unsignalled**: the speaker gives no indication that he is approximating[8].

B. **Non-numeric**

B.1 **Exact** reference: the speaker refers to the amount or quantity in a non-numeric way, using one of a small set of expressions (*all, both, not... a single, not... any more, the other, the only*, and *another*) which can be used to imply an exact number. There were only nine such cases.

B.2 **Non-exact** reference: the speaker uses a quantifier, e.g. *many of these* (A05.04), or some other expression, e.g. *very elderly* (H05.01). Adverbs of frequency were not included. Non-exact non-numeric reference is also subdivided into

B.2.1 **signalled**: the speaker uses one of the set of approximators. There are only three instances of this: *less than a handful of* [B07.02]; *at least a couple of* [G19.03]; *almost all* [H15.07].

B.2.2 **unsignalled**: the speaker does not use an approximator.

C. **Unknown**: the speaker refers to an amount or quantity using a number for which there is no evidence of accuracy, either directly from a slide or by calculation. The items in this category must, by exclusion, be either exact quantities or unsignalled approximations. The bulk of these expressions refer to data which are not visible on slides, but there are 14 expressions referring to visible data which are of doubtful exactness: 11 of them are percentages, one a common fraction, and the other two average ages (see section 10).

## 4. Presenting results

Speakers present the results of their research in one or more ways corresponding to the categories in Section 3. I will first consider the relative frequency of the techniques used in the sample and then examine each one in more detail.

**Table 2: Speakers' Techniques in Presenting Results**

| | A | B | C | D | E | F | G | H | TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| **NUMERIC** | | | | | | | | | |
| Exact (A1) | 22 | 6 | 3 | 0 | 15 | 0 | 0 | 4 | 50 |
| Non-exact (A2) | 12 | 18 | 8 | 4 | 15 | 2 | 4 | 8 | 71 |
| **NON-NUMERIC** | | | | | | | | | |
| Exact (B1) | 4 | 1 | 0 | 0 | 1 | 1[9] | 0 | 1 | 8 |
| Non-exact (B2) | 17 | 22 | 19 | 26 | 0 | 9 | 38 | 38 | 169 |
| **UNKNOWN (C)** | 1 | 13 | 7 | 0 | 14 | 27 | 4 | 12 | 78 |
| **TOTAL** | 56 | 60 | 37 | 30 | 45 | 39 | 46 | 63 | 376 |

There were 376 references to the results of research, of which 78 (20%) had to be categorised as unknown. Table 2 shows that there was considerable variation in the way speakers presented these results. Speaker A, a senior doctor presenting original research, was non-exact (categories A2 + B2) a little more than half the time, while D and G, who were both presenting overviews, were always or virtually always non-exact. Slides were not available in the case of F, but the probability is that 13 of the unknown category expressions he used were exact and 14 were unsignalled approximations[10], which would mean he used non-exact language 64% of the time. Of the unknown category for B and E, 6 and 11 expressions respectively seem likely to be approximations (non-exact numeric expressions). This would mean that B and E, both relatively inexperienced doctors presenting original research, were non-exact 76% and 60% of the time respectively. Depending on whether the unknown category expressions for C and H were exact or non-exact, these two speakers were non-exact overall between 70 and 90% of the time. This puts the speakers in the following order with respect to use of non-exact language:

**Table 3: Non-exact reference (nnmeric + non-numeric)**

| Speaker | Non-exact (%) |
|---|---|
| A | 52 |
| E | 57 |
| F | 64 |
| B | 76 |
| H | 78-90 |
| C | 73-92 |
| G | 91-100 |
| D | 100 |

The first four speakers in this list were presenting original research, while the last three were presenting an overview of recent research in their particular area. Speaker H also presented his own research, but he spent more time than the A, B, E and F reviewing previous research.

When being non-exact, all speakers except E and F (the most junior doctors) used more non-numeric than numeric reference. Speakers B and A used only slightly more. A, B, E and F were presenting their own data, whereas C, D and G were presenting an overview[11]. Again, H was somewhat intermediate between the two groups.

In the following sections, each category of non-exact language is examined in turn.

## 5. Exact reference

Exact reference can involve whole numbers, decimals, fractions and percentages. One might expect that decimals, because of their precision, would predominate in medical presentations. In fact, in this whole series only one decimal was spoken, (in the introduction to a talk, not in the presentation of results), and it was an estimate: *a population of about 3.1 million people* (A03.01). With regard to spoken fractions and percentages, I will show that these are nearly always approximations (sections 8 and 10). Consequently, exact reference in this series involves whole numbers, plus nine non-numeric expressions such as *both* (See Section 3.2).

Not surprisingly, the reference is almost always exact when the number is small (<10). In the presentation of results, there are 37 references to numbers less than ten, and only five of these are approximations. On the other hand, of the 31 references to integers greater than ten, 15 are approximations, 11 of them signalled.

**Table 4: Whole nnmbers**

| | Exact | Approximation | Total |
|---|---|---|---|
| <10 | 32 | 5 | 37 |
| >10 | 16 | 15 | 31 |
| Total | 48 | 20 | 68 |

## 6. Non-exact numeric reference, or Approximation

Non-exact numeric reference may or may not be signalled by an approximator. Unsignalled rounding has been identified in this study by referring to the slide, which gives either a precise number, or a number from which a precise calculation can be made. Table 4 shows that, overall, unsignalled approximation was used at least 50% of the time, although there was considerable variation in the ratio among the different speakers.

**Table 5: Use of approximation in the presentation of results**[12]

| Speaker | Signalled | Unsignalled | Total | % Signalled |
|---|---|---|---|---|
| D | 4 | 0 | 4 | 100 |
| G | 2 | 0 | 2 | 100 |
| C | 5 | 3 | 8 | 62 |
| A | 7 | 5 | 12 | 58 |
| H | 4 | 4 | 8 | 50 |
| B | 8 | 10 | 18 | 44 |
| E | 3 | 12 | 15 | 20 |
| F | 2 | 0 | 2 | 100[13] |
| **Total** | 35 | 34 | 69 | 50 |

If the unknown category is taken into account (Section 4), speaker F actually used unsignalled approximation 14 times. Thus, the two most junior speakers (E and F) used more unsignalled than signalled approximation. A, B and H used roughly equal amounts of the two forms. Once again this seems to relate to the type of presentation, but in addition the ranking suggests a possible correlation with experience, A and D being the most and E and F the least experienced.

## 7. Approximators

Signalled approximation involves the use of one or more of a set of expressions called approximators. Approximators are generally used with a rounded number but can also be used with non-numeric expressions[14].

Kennedy (1987: 276-278) lists 144 approximators, but admits that his list is probably not exhaustive. Surprisingly, it does not contain the set *over*, *just above*, *just under*, *more than*, or *less than*, nor *a matter of*, all of which were used by the speakers in this study. There were 21 different approximators in the results section of these presentations, some of which are used in variant forms with what I take to be the same or similar meaning (*between / somewhere between*) and some of which have variants with slightly different meanings (*over / well over* versus *only just over*). An additional nine approximators were used in the non-results parts of the presentations.

I divide approximators into three groups: *neutral* approximators, such as *about*; and *maximising* and *minimising* approximators. A maximising approximator, such as *nearly*, is one which seems to indicate that the speaker thinks this is a large number, or "is more than one would expect" (Wierzbicka 1986: 610). A minimising approximator, such as *less than*, suggests the opposite. The addition of *only* to an approximator has a 'downgrading' effect, e.g. changing *about* from neutral to minimising, while *just* has a 'reversing' effect, e.g. changing *under* from minimising to maximising (*just under*), and *over* from maximising to minimising (*just over*). There is one example of the use of both *only* and *just* (*only just over*), which I classify as minimising.

Of the approximators used in this small sample, Table 5 shows that *about* was the most popular, (9 occurrences), with only one or two examples each of other neutral expressions. Maximising expressions were also fairly popular: *almost* (6), *over* (4), *nearly* (4). Minimising expressions were used less. The numbers are too small for cross-speaker comparison.

**Table 6: Approximators used in the presentation of results**

| **Neutral** (n=19) | **Maximising** (n=17) | **Minimising** (n=6) |
|---|---|---|
| (around) about (7) | | only about (2) |
| | almost (6) | |
| approximately (1) | | |
| around (1) | | |
| | at least (1) | |
| (somewhere) between (2) | | |
| (from) ... to .... (1) | | |
| in the region of (1) | | |
| | just under (1) | just above (1) |
| | | less than (1) |
| | more than (1) | |
| | nearly (4) | |
| ... or .... (1) | | |
| | over/well over (4) | (only) just over (2) |
| roughly (1) | | |
| some (2) | | |
| something like (1) | | |
| somewhat (1) | | |

Some linguists (e.g. Wierzbicka 1986) have attempted to make fine distinctions between different approximators. Although this sample is small, it gives the impression that choice of expression is more a question of individual style than semantic nicety. *About* is often used with periods of time: *about 6 months*; *about two years ago*; *about 22 years*. *Approximately* is used only once in the presentation of results and twice in other parts of the presentations, but each time in a fairly loose way, not at all confirming Wierzbicka's claim that, in contrast to *about*, it reveals 'a respect for precision even at times when the speaker feels precision is not called for' (Wierzbicka 1986: 604)[15]. *Nearly* is used with fractions 3 times out of 4, but these instances are all from the same speaker (A). Other examples of a speaker appearing to favour one particular approximator are *some* (F) and *something like* (G). A is the only one to use the more formal expressions *in the region of* and *of the order of*.

## 8. Unsignalled approximation

Speakers may round integers without signalling that they are doing so. There are only three instances of this in my data: *It's interesting* [...] *that in 300 cases* [B07.01: *290 cases* on the slide].[16] *They can quote on 1530 patients* [C16.02: *1526 patients* on the slide]; and *700 patients*[17] [C25.01: *716* on the slide]. F gives the population of two primary schools as 500 each and of two secondary schools 1000 each. Channell (1994: 78) calls such approximation *inherent* (See also Means, Section 9).

Unsignalled rounding of percentages is much more common, as I have already suggested. In one case the speaker rounds a percentage given exactly on the slide: [A12.01] *25 per cent were not suspected antenatally* (25.6% on the slide), but in many more one can establish the approximation by calculation. Percentages account for 24 of the 34 (70%) cases of unsignalled approximation (See Section 10).

## 9. Means

Means are widely used in science. In this series of presentations, however, they are relatively uncommon. Speaker H's paper is an exception: his research involves scores on a variety of psychological tests and he refers to means seven times. Three other speakers (D, E and F) report a mean once or twice[18]. Speaker G does not use the word *mean*, but some of his data are obviously means, given that they are shown with standard deviations. A, B and C do not speak about means at all.

Almost invariably, means are expressed, on paper, as decimals to at least one place. A striking feature of this sample, as noted above (Section 5), is that decimal numbers are almost never spoken in presenting results, even though they appear on slides. Thus, the means here are always rounded: IQ *around about a hundred* (H07.02x: *97.4* and *100.8* on the slide); *a mean of three words* (H14.3x: *2.6 words* on the slide). The approximation may be signalled, or unsignalled.

## 10. Percentages

There are 63 percentages in the presentation of results. Only one is certainly exact: 4 out of 8 patients = 50%, (A06.05). Two other figures of 50% are suspect since the speaker (E) is referring to a group of 134 patients, and it seems improbable that exactly 67 were diagnosed correctly and 67 incorrectly.

Thirteen of the remaining percentages are signalled approximations. In two cases (A19.01 and B08.04) the speakers signal that they are approximating but appear to be giving an exact figure. In other cases the approximation is confirmed by looking at the slide, e.g. speaker A rounds 71.7% to *around 70%* (A09.02), B rounds 52-65% to *somewhere between 55%, 65%* (B12.01).

Speaker A silently rounds 25.6% on the slide to 25% (A12.01), but even where a percentage is not given on the slide a simple calculation often shows that rounding has taken place. Thus, slide B09 shows that 16 out of 30 patients (53.3%) had a rectal examination, whereas the speaker says 53% (B09.04). Speaker F claims that 18% of 151 accidents resulted in head injury. This would mean 27.18 head injuries; since 0.18 of a head injury is not possible, there must have been 27 (17.9%) or 28 (18.5%), and therefore 18% must be an approximation. By such calculations, I arrive at a figure of 24 unsignalled approximations of percentages, equivalent to 70.6%, or 71%, of the unsignalled approximations. It is very probable that percentages classified as Unknown are also in most cases unsignalled approximations.

Channell notes that percentages are often used as inherent approximations (Channell 1994: 79); similarly, Dubois writes that 'unhedged' percents can be rounded (Dubois 1987: 537). This is probably something that is taken for granted by the scientific community. One manual for writers (Matthews, Bowen & Matthews 1996: 92) states that authorities 'recommend that you use decimals in percentages in series only when the percentages are based on more than 1000 subjects.' Since almost none of the data in my sample involve such a large cohort, it could be that the speakers are following this dictum. Paradoxically, they are being more precise by avoiding 'exact' numbers.

There is again individual variation in the use of percentages (Table 6): B and E use them frequently. On the other hand, D, G and H hardly use them at all.

**Table 7: Use of percentages in the presentation of results**

| Speaker | Exact | Signalled | Unsignalled | Unknown | Total | Unsignalled + Unknown |
|---|---|---|---|---|---|---|
| A | 1 | 3 | 5 | 0 | 9 | 5 |
| B | 0 | 4 | 8 | 5 | 17 | 13 |
| C | 0 | 2 | 2 | 6 | 10 | 8 |
| D | 0 | 2 | 0 | 0 | 2 | 0 |
| E | 0 | 0 | 9 | 6 | 15 | 15 |
| F | 0 | 2 | 0 | 6 | 8 | 6 |
| G | 0 | 0 | 0 | 0 | 0 | 0 |
| H | 0 | 0 | 0 | 2 | 2 | 2 |
| **Total** | 1 | 13 | 28 | 21 | 63 | 47 |

Speaker E, who never marks his percentages as approximations, also uses pie charts and bar charts in his presentation.

## 11. Fractions

Much of what has been said of percentages applies also to fractions[19], although they are less common: 19 instances. All speakers except H use at least one in their presentation. The most common fraction is *half* with 9 occurrences (See Table 7). In nine cases (47%), the fraction is used with an approximator: *nearly* (3), *just under* (1), *almost* (1), *just over* (1), *about* (1), *roughly* (1), *something like* (1), *or so* (1). Speaker A converts percentages on his slides to fractions on six occasions.

**Table 8: Use of fractions**

| Fraction | No. of occurrences |
|---|---|
| 1/2 | 9 |
| 1/4 | 2 |
| 3/4 | 3 |
| 1/3 | 1 |
| 2/3 | 2 |
| 1/5 | 1 |
| 4/5 | 1 |
| **Total** | 19 |

## 12. Non-numeric reference

Table 2 shows that overall the speakers in this sample were twice as likely to use non-numeric as numeric non-exact reference. There was of course individual variation. The adjusted figures proposed in Section 4 mean that Speakers E and F (the least experienced) used considerably more approximation than non-numeric reference - they were presenting their own research exclusively. Speaker A (one of the more experienced), who was also presenting only his own research, used slightly less approximation than non-numeric reference. Speaker B used roughly the same amount of each (24:22). Speakers C, D and G favoured non-numeric expressions: they were presenting mixed research. Speaker H presented mainly his own research, but he also referred to the results of other ırchers.

**Table 9: Non-numeric reference versus approximation**

| | Non-numeric | Approximation |
|---|---|---|
| D | 26 | 4 |
| G | 40 | 2 |
| H | 41 | 8 |
| C | 19 | 8 |
| B | 22 | 24 |
| A | 17 | 12 |
| F | 9 | *16 |
| E | 1 | 15 |

*adjusted figure (see Section 4)

The expressions used include quantifiers (and determiners) such as *many*, *a large number of*, etc., as well as a heterogeneous group of other expressions, especially comparatives, and nouns and verbs expressing change in amount or quantity (*reduction*, *increase*, etc.).

### 12.1 Quantifiers

About twenty-five different quantifiers were used. Like approximators, quantifiers can be divided into neutral, maximising and minimising.

**Table 10: Quantifiers used in the presentations**

| **Neutral** (n=9) | **Maximising** (n=18) | **Minimising** (n=11) |
|---|---|---|
| some (2) | many (1) | not very many (1) |
| several (1) | a lot more (1) | very little (1) |
| a couple of (1) | most of (8) | (very very) few (2) |
| the first few (1) | the (vast) majority (2) | the (very) few (2) |
| a number of (2) | a large number (1) | lower numbers of (1) |
| | quite a (significant) number (2) | a small number of (1) |
| not all (1) | a surprisingly high number of (1) | the very low number of (1) |
| a group of (1) | a larger group of (1) | a very small group (1) |
| | a higher proportion (1) | a very small proportion (1) |

**Table 11: Proportion of the three types of quantifier used by each speaker**

| | Neutral | Maximising | Minimising | Max. + Min. | Total |
|---|---|---|---|---|---|
| A | 2 | 10 | 3 | 13 | 15 |
| B | 1 | 2 | 0 | 2 | 3 |
| C | 0 | 0 | 1 | 1 | 1 |
| D | 1 | 2 | 1 | 3 | 4 |
| E | 0 | 0 | 0 | 0 | 0 |
| F | 0 | 1 | 0 | 1 | 1 |
| G | 4 | 3 | 4 | 7 | 11 |
| H | 1 | 0 | 2 | 2 | 3 |
| Total | 9 | 18 | 11 | 29 | 38 |

Speaker A stands out, being responsible for 10 out of the 18 instances of maximising quantifiers - seven of these are *most of*. He uses this expression for the following proportions: 6 out of 12, 4 out 8, 4 out of 7, 30 out of 63. In one case there is nothing on the slide, and once the word *most* itself is there. Only in the remaining case (21/22,) does the use of *most of* seem justified.

## 12.2 Other expressions

Much of the research carried out by the doctors in this series involves comparing an experimental group and a control group. For example, Speaker D says with reference to the data in Figure 1: *there are also significantly fewer [deaths from anal cancer] in patients receiving a combined modality treatment than those treated by radiotherapy alone* (D27.01).

**Fig 1: Extract from Slide D27 - Causes of Death**

| Cause | RT* | CMT** |
|---|---|---|
| Anal cancer | 105 | 77 |

* radiotherapy ** combined modality treatment

In the eight papers, *higher* occurs nine times and *lower* four.

Another major type of research method involves making the same measurement before and after an intervention such as the administration of a drug. In some cases, a control group is used as surrogate for the 'before' group. The results of this type of research are often expressed with the language of change: *no difference*, *increase*, *reduction* being especially common. Speaker G, for example, refers to his 13th slide (Fig 2)[20] as follows: *And here is an example of that in Huntington's Disease [HD], where there is an increase in 5HT* (G13.02). Later, he says: *There is in fact an overall increase in the ratio of metabolites, 5HIAA* (G13.03).

**Fig 2: Extract from Slide G13**

| | 5HT | 5HIAA | Ratio |
|---|---|---|---|
| **Controls** | 320 ± | 794 ± | 2.49 ± |
| **HD** | 632 ± | 1864 ± | 3.18 ± |

Note: The standard deviations are not clearly visible.

## 13. Fnnctions of non-exact reference

The six doctors in this sample clearly use a great deal of non-exact language: those presenting an overview more than those presenting original research (73-100% vs. 52-90%)(Table 3, Section 4). Channell (1994: 194) lists ten possible reasons for the use of 'vague' language:

1. Giving the right amount of information (cf. Grice's Maxim of Quantity)

2. Deliberately withholding information (for reasons other than to conform to the Maxim of Quantity)

3. Using language persuasively

4. Lexical gaps (i.e. not being able to find the right word)

5. Lacking specific information (e.g. lacking the exact number)

6. Displacement (i.e. speaking about numbers which are intrinsically uncertain, as in predictions)

7. Self-protection

8. Power and politeness

9. Informality and atmosphere

10. Women's language.

The fifth reason - being vague because the exact quantity is unknown to the speaker - is not relevant here, because this study focuses on references to data present on slides, but it is valid in other parts of the presentations, as when Speaker A says in his introduction: *The total number of congenital abnormalities which probably occur is probably of the order of 3 per cent* (A05.03). As all the speakers were male, the tenth reason is obviously not applicable either.

Of the remaining reasons for vague language, two seem particularly important with respect to the use of non-exact reference in the oral presentation of research results, namely giving the right amount of information and using language persuasively. If the first were not a guiding principle, speakers would repeat each and every number on the slides, whereas they are highly selective[21]. It is not only how many data but also the form of presentation of the data that has to be controlled: undue accuracy also infringes the Maxim of Quantity. This is seen particularly in the rounding of decimal numbers.

This avoidance of information overload merges with the function of using language persuasively. The overlap area consists in the highlighting of data which the speaker believes to be important. One way of doing this is to avoid mentioning less important data (observing the Maxim of Quantity); another is to make it easier to process the important data. A rounded number is easier to process than a decimal, for example. The use of non-numeric reference also make data more salient. As Zeiger (1991: 141) in a manual for biomedical writers puts it: 'Data can rarely stand alone. The result (= the message) must be stated. To make the point clear, state the result first and then present the data'. The speakers in this sample sometimes present data in two forms, exact and non-exact, numeric and non-numeric e.g. *only 13 and a half percent actually came to operation, which is a very small proportion of the total number* (A14.01); *Interestingly enough, 109 or 30% of the total figure was seen in 1988* (B02.03); *only 25% or a quarter* (B06.07); *79, nearly 80%* (B06.08); *a statistically significant effect [...] an 8% improvement* (C07.06); *19% or roughly one in five* (E04.01); *a very small group [...] 4 or 5* (G12.05); *no difference - around about 100* (H07.02).

One of the doctors in the post mortem of E's talk says: "You must emphasise the points, otherwise it gets, tends to be a bit monotonous". Another recommends the use of *only* and converts E's 60% to *about two thirds*.

These data show that the speakers use what I have called maximising and minimising expressions more often than neutral ones, especially in the case of quantifiers (Tables 6 and 10). Speaker D says: *Only about 55% of patients managed by radical surgery are going to be survivors* (D12.01), and later he makes his point even clearer when he says: *you can see that the survival rate is very poor indeed* (D13.01).

One of Channell's informants puts it: "It's to my advantage to make that number as high as possible" (Channell 1994: 179)[22]. Channell herself says: "vague expressions of quantity are used to present statistical data in a way which favours the argument of the author, but still conforms to academic conventions of truthfulness in presentation of data" (op. cit.:180).

So, far from being slapdash, non-exact reference is usually a deliberate strategy for drawing attention to data and persuading the listener that they are important. Speakers have the option of rounding with or without a marker, of using a whole number, a percentage or a fraction, and of expressing the quantity non-numerically. The factors that determine the choice of the particular mode of expression can only be suggested here. To some extent the use of a neutral marker, such as *about*, in a slide presentation is redundant; it could even be seen as an infringement of the Maxim of Quantity. However, the fact that the precise number is visible on a slide is of course no guarantee that most people in the audience will notice that the speaker has rounded the number in referring to it. I have noted that signalling was more common in the older, more experienced speakers in my sample. It could be that greater experience leads to greater awareness of this fact. Or it may simply be due to chance co-occurrence of age and a particular type of personality. A larger sample of speakers is needed to answer the question.

The preference for non-numeric expressions shown by speakers presenting an overview of research is not due to lack of specific data, since those data are generally on the slides. It seems likely that it is a reflection of their attempt to draw together the results into a generalisation. Thus the use of non-exact language may represent the beginnings of the movement from the specific results of research to generalisation, the movement from evidential truth to interpreted truth (Skelton 1997). Dubois (1987: 539) quotes Ziman (1974) as positing a three-stage model for the production of science: (1) data (empirical work), (2) information (research papers, oral and written) and (3) science (textbook). What appears to be non-exact reference may often be a waystage to generalisation, between empirical work and the textbook. Even when reporting their own research, speakers may wish to make tentative generalisations. This may explain why, in my sample at any rate, the more experienced speakers like A and H tend to use more non-numeric reference than their younger colleagues.

The choice of expression for non-exact quantification could then depend on the strength of the claim to generality being made. The different types of expression may lie on a cline going from the specific to the general (Figure 3).

**Figure 3**

| exact | approximation | | quantifier | other | general |
|---|---|---|---|---|---|
| *109* | *about 100* | *over 100* | *a large number* | *an increase* | *improves* |
| select data | make easy to process | highlight | emphasise | persuade | generalise |

The move from exact to non-exact along this cline could be a move from evidential to interpreted truth (Skelton 1997). One of the functions of non-exact language may be to signal this move.

## 14. Conclusion

I have shown that, in this admittedly small and possibly none too representative sample, the ratio of non-exact to exact language is 4 to 1, that this non-exact language is made up of approximation, signalled or unsignalled with approximators, determiners and quantifiers, and a group of other expressions including comparatives and words expressing unquantified change. I have suggested that the chief functions of this language are probably to highlight what the speaker deems to be important, to persuade the listener of its importance, and to initiate the process of generalising from the particular results of the research to scientific truths. But these are tentative conclusions and a larger sample of both types of presentation needs to be studied, looking at introductions and conclusions as well as at the presentation of results, in order to be confident of their applicability. If they are confirmed, the ESP teacher will then be in a position to point out to learners the function of the different ways of being purposefully non-exact, and thereby help them to improve the quality of their presentations.

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## Notes

1. I deliberately use the term *non-exact* rather than *inexact* or *imprecise* because it seems less pejorative.

2. *Vagueness* is a broader term than non-exact quantification, and includes placeholder names such as *thingumajig* (Channell 1994: 157). There is now an extensive literature on what has been called *purposive vagueness* (Powell 1985). The area I am interested in is a subset of expressions from this field. I give a detailed description of what I mean by non-exact quantification in Section 3.1.

3. Prince et al subdivide hedges into *shields* and *approximators* (Prince et al. 1982: 85-6). I am concerned only with the latter which introduces 'fuzziness *within the propositional content* proper' (Ibid. 85). I reserve the term *approximator*, however, for the words and expressions like *about* and *of the order of* which signal that the speaker is being non-exact. Prince et al. counted both types of hedge in their study. On hedging, see also Hyland 1994 and 1996, and Crompton 1997.

4. Dubois uses the term *hedge* only for what Prince et al. call *approximators* (see Note 3 above).

5. This estimate of experience is based on age and professional status.

6. Speaker E's data were presented mainly in the form of bar charts and pie charts.

7. In a few cases, the number on the slide was itself an approximation, in which case the speaker's expression was considered to be non-exact.

8. Even when data were not visible on slides, it was possible in many cases to establish by calculation that a number was rounded. This applies particularly to percentages (see Section 8).

9. F14 *both (groups)*: the two groups were named earlier.

10. The population of two primary schools is said to have been 500 [F03]. It seems highly unlikely that one school would have a population of exactly 500, let alone two. Similarly, two secondary schools are said to have a population of 1000 [F05]. Speaker F states that the total number of accidents was 151 [F09]. Assuming that this number is exact, the statement that *62% of the accidents were in males* [F11] must be non-exact, since 62% of 151 is not a whole number. Similarly for other percentages. He also gives the mean number of accidents for winter and summer as whole numbers [F12 and F13], which cannot be exact.

11. This is not necessarily because the latter lack precise data - they are non-exact even when the precise figures are available on the slide - but it may be partly due to relative lack of familiarity with the data.

12. This does not include Unknown category expressions, although as already noted (Section 4), these probably include 14 cases of unsignalled approximation in the case of Speaker F.

13. See previous note.

14. In this series the following expressions occur: *almost all, essentially all, less than a handful, about the same, about what is usually ..., at least a couple of, more than twofold, well over twofold, to somewhat less an extent.*

15. According to Roberts (1960: 17) *approximately* 'should be reserved for fine ranges of uncertainty, especially those that are measured. For large and vague ranges *about* is preferable.' Other authors (O'Connor, 1991: 210; Lock, 1977: 108) advocate avoidance of *approximately.*

16. Admittedly, he has already twice referred to the number as *almost 300.*

17. Discussing method.

18. H uses the word *mean* itself. D and E use *average*; F uses *average* once and *mean* twice.

19. Expressions such as 'one in four' have been counted as fractions.

20. The implication is that there is an association between HD and the increase in 5HT, the control group being assumed to have the levels that HD patients would have had before developing the disease.

21. In a preliminary study of Speaker A's paper, I calculated that he referred to only 57 of the 200 data on his slides, and this is probably an unusually high proportion.

22. Goodman & Edwards (1991: 17) urge writers to avoid presenting 'numerical observations in a favourable light.' This prescription like many others is less appropriate for speakers.

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