Pithy persuasion: engagement in 3 Minute Thesis presentations

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1. Introduction

Academic communication crucially involves readers, or hearers, buying into an argument. The audience has to be hooked, involved and led to a desired conclusion, whether this is in a monograph or a blog, but it is perhaps no more vital than in the restricted context of a Three Minute Thesis presentation (3MT). In this artificially controlled, competitive environment, doctoral students present their research, using only one static slide, in just 180 seconds. Condensing an 80,000-word written text in a way which will appeal to a non-specialised audience is a considerable challenge, especially as it has to be done by avoiding jargon and, as far as possible, murky academic language. Speakers are often advised to present their research as a 'story' but they still have to draw on tried and tested ways of ensuring their hearers can understand the connections they are making and the argument they are presenting. In writing this is done using engagement markers in the model proposed by Hyland (2005) and in this paper we apply this framework to a corpus of 120 3MT presentations from the physical and social sciences to answer the following questions:

1. How do 3MT presenters connect with their audiences?
2. Are there disciplinary differences in these methods?
3. How can we account for these differences in terms of 3MT genre features?

2. The 3MT genre

The 3MT is a rapidly growing genre which has emerged in response to the modern competitiveness of academia in general and higher education in particular. Based on an idea developed by the university of Queensland in 2008, it is now held as an annual competition for PhD students in 86 countries and over 900 universities worldwide. As the name suggests, it challenges students to squeeze their research into a 3-minute speech without the assistance of visual aids and in a form that can be understood by an intelligent audience with no background in the research area. The University of Queensland (UQ) website[1] defines it like this:

[1] https://threeminutethesis.uq.edu.au/about

> The 3MT competition cultivates students' academic, presentation, and research communication skills. Presenting in a 3MT competition increases their capacity to effectively explain their research in three minutes, in a language appropriate to a non-specialist audience.

The huge success of these contests has meant that UQ has copyrighted and branded the 3MT idea and manages world-wide standards of competition.

Underlying the 3MT competitions, then, is a desire to counterbalance a perceived overemphasis on post-graduate writing and to better prepare students for future academic or non-academic careers. It has become even more apparent in recent years that graduates need the particular skills to communicate with non-experts (e.g., Copeman 2015; Feak 2016). Not only are short presentations important in many viva or defence formats around the world (e.g., Mezek and Swales 2013), but graduates are often required to give short talks when presenting conference poster sessions (D'Angelo 2013) and in professional settings after they graduate (e.g., Evans 2013). More informally, students are often called upon to explain their research extemporaneously with outsiders to answer, 'so what are you working on then?' type questions from family and friends. In each of these situations, speakers need to develop a convincing speaking style that enables the audience to see a logically developed argument, attend to that argument, and to ultimately accept both its direction and outcomes.

Like most presentations, then, the 3MT is a display of the speaker's expertise in presenting information clearly and effectively, but here it also involves the ability to 'translate' his or her research so that a non-expert can understand and appreciate it (Skrbis et al. 2010). The UQ Graduate School (2012) puts this goal front and centre, stating that students must:

> present a compelling oration on their thesis topic and its significance. 3MT is not an exercise in trivialising or 'dumbing-down' research, but challenges students to consolidate their ideas and research discoveries so they can be presented concisely to a non-specialist audience.

This emphasis on the ability to inform and persuade an audience of disciplinary outsiders is also apparent in the three judging criteria:

1. Comprehension: did the presentation help the audience understand the research?
2. Engagement: did the oration make the audience want to know more?
3. Communication style: was the thesis topic and its significance communicated in language appropriate to a non-specialist audience?

This is therefore a genre which goes beyond the skills required for a conference presentation to people who might be expected to have a background in the topic of the talk. Instead, the speaker has to design a presentation which explains the research 'to a close friend or fellow student from another field' without devaluing its meaning or importance.

In this context, the usual advice in public speaking guides about voice projection and showing enthusiasm is insufficient and "superficial" (Copeman 2015: 78). Yet, despite its growing importance and popularity with university administrators, supervisors and graduate students across the world, the 3MT has attracted surprisingly little attention from applied linguists or EAP practitioners. Feak (2016), for example, laments the fact that very little research on speaking is applicable to the needs of postgraduates to talk about their research and give presentations. Much of the work in EAP speaking focuses on the characteristics of (e.g., Zareva 2011) or training for (Bankowski 2010) undergraduate presentations. Studies of specific graduate presentation genres are rare, although the features of conference presentations (e.g. Wulff et al. 2009) and thesis defences (e.g., Recski 2005; Mezek and Swales 2013) have been explored.

We are aware of just a handful of papers dealing specifically with the 3MT genre. Skrbis et al, (2010) and Bandler and Kiley (2018) offer their reflections of the experience of organising and participating in competitions, and just two describe the genre. Hu and Liu (2018) identify the typical genre structure of 142 presentations, finding rhetorical patterns reflecting the dominant move structures of different fields which have been observed in written texts (e.g., Hyland, 2004). The unfinished status of the reported research, however, meant a results move was often omitted. More recently, Carter-Thomas and Rowley-Jolivet (2020) have examined a corpus of 30 presentations in the sciences and humanities to determine how speakers adapt their research to the non-specialist 3MT audience. They identify rhetorical structure and explanatory strategies which are used to make the topic comprehensible together with various personalisation strategies and attention-getting devices to engage the audience's interest.

The internet, however, is not short of tips for neophyte 3MT presenters, with many universities advising speakers to follow a narrative not unlike the structure described more formally by Hu and Liu in the genre model above. The university of Edinburgh[2], for example, suggests:

> You may like to present your 3MT like a story, with a beginning, middle and an end…. Try writing an opener to catch their attention, then highlight your different points, and finally have a summary to restate the importance of your work.

Past winners and finalists also have plenty to say about how to effectively engage an audience, generally mentioning an opening hook, often an analogy or example that the audience can relate to, the need to contextualise results, and to share experiences or scenarios that non-experts can understand.[3] There are also admonishments about using "shorter words, shorter sentences and shorter paragraphs (without) dumbing down your presentation" (University of Sussex website)[4]. But beyond this, students lack any systematic guidance on how to use language to engage an audience or how to employ disciplinary specific argument patterns to do so. Such differences have been observed in research articles (Hyland 2004), thesis abstracts (Bunton 1998), student presentations (Morton 2009), PhD defences (Mezek and Swales 2016) etc. Disciplinary influences on 3MT presentations have not previously been studied. We now turn to our analytical framework.

3. Our analytical approach: engagement

Engagement concerns the ways speaker and writers rhetorically acknowledge the presence of their audience. The model originated in Hyland's (2005) attempt to address a research bias towards the author/speaker's perspective in concepts such as *stance* and *voice*, balancing the writer's rhetorically expressed attitude to the propositions in a text with the ways they recognise and include their reader/hearers. Engagement are the devices that tell an audience we know they are there and that we are communicating with them. Hyland defines it as follows:

[2] https://www.ed.ac.uk/institute-academic-development/postgraduate/doctoral/3mt/entrants/tips

[3] Taylor Francis has several such recounts at https://authorservices.taylorandfrancis.com/three-minute-thesis-competition/

[4] http://www.sussex.ac.uk/internal/doctoralschool/researcherdev/threeminthesis/preparing3mt

> This is an alignment dimension where writers acknowledge and connect to others, recognising the presence of their readers, pulling them along with their argument, focusing their attention, acknowledging their uncertainties, including them as discourse participants, and guiding them to interpretations. (Hyland 2005: 178)

It, therefore, turns on the degree to which writers present themselves as sharing, or perhaps failing to share, attitudes, interests and experiences to manage solidarity and affiliation.

This view of engagement as the use of language to bring readers along with a text contrasts with Martin and White's (2005) use of the term to refer to how writers position themselves to other voices. Instead, it is closer to Sacks and Schegloff's (1974) concept of *recipient design*, the notion of *relevance* (Sperber and Wilson 1995) and, to some extent, Brown and Levinson's (1987) work on *face*. In various ways, each of these perspectives highlights the role of the receiver in any communication and the strategies employed by communicators to address this. We are not concerned with cognitive frameworks for understanding utterance interpretation, but with how text producers engage in behaviours which might be expected by addressees. Writers and speakers make assumptions about their hearers and anticipate how they are likely to respond to what they are saying, producing texts which they hope will be relevant and accessible to their interlocutors. At the same time, they seek to create an interpersonal rapport which allows them to present a point of view while not overwhelming any alternative interpretations they may have.

For those working with an engagement model, what is of interest are the interpersonal and rhetorical choices writer/speakers make to attract and hold interest and command attention. Some of these devices, such as choice of method or referencing certain theorists can convey highly contextualised meanings opaque to all but experts and community insiders (Hyland 2004). Others, especially in speech, involve paralinguistic and gestural features such as those used to communicate enthusiasm and proximity and are not captured in transcripts. A great deal of affiliation, however, is conveyed linguistically; in the moment-by-moment choices speakers and writers make as they construct their texts.

The notion of engagement, then, focuses on the surface features of texts. These features are the tangible projection of the presenter's efforts to communicate. They are the points at which

writer/speakers intervene to involve listeners as real players in the discourse, rather than merely as observers and build a connection with them. A number of lexico-grammatical devices have been identified as enabling writer/speakers to actively project an orientation and sensitivity to their audience (Hyland 2004). Hyland (2005) argues that there are five main ways which academics explicitly intrude into their texts to connect with readers directly:

- ***Reader mentions*** bring readers into a discourse through second person pronouns, particularly inclusive *we* which identifies the reader as someone who shares a similar perspective to the writer.
- ***Directives*** are instructions to the reader, mainly expressed through *imperatives* and *obligation modals*, which direct readers a) to another part of the text or to another text, b) how to carry out some action in the real-world, or c) how to interpret an argument.
- ***Questions*** invite direct collusion because they address the reader as someone with an interest in the issue the question raises and the good sense to follow the writer's response to it. These questions function to check understanding, evoke a response or seek agreement.
- ***Appeals to shared knowledge*** are explicit signals asking readers to recognise something as familiar or accepted. They assume tradition, logical reasoning or routine.
- ***Personal asides*** briefly interrupt the argument to offer a comment on what has been said, adding more to the writer-reader relationship than to propositional development.

Hyland (2005) suggests that users employ these devices to anticipate a reader's response by displaying his or her assumptions about the beliefs and expectations of those who are being addressed. He further argues that there are two main purposes for doing so:

1. The first is primarily interpersonal and acknowledges the need to sufficiently meet readers' expectations of inclusion. Here then, we find readers addressed as participants in an argument with reader mentions and asides to effect solidarity and membership of a disciplinary in-group.
2. The second purpose is to rhetorically position the audience, recognising the reader's role as a critic and potential negater of claims by predicting and responding to possible objections and alternative interpretations. Here the writer pulls the audience into the discourse to guide them to interpretations with questions, directives and references to shared knowledge.

As this description suggests, most discourse analytic research conducted into engagement has focused on academic writing, particularly research articles (Hyland 2001; Hyland and Jiang 2016), but also in academic blogs (Zou and Hyland 2020), doctoral confirmation reports (Jiang and Ma 2019) and final year undergraduate reports (Hyland 2006). The model has, however, been used to illuminate how speakers explicitly seek to relate to readers in a variety of spoken contexts. Camiciottoli (2019), for example, shows how professional financial analysts use deontic modals (*should, must, have to*) and second person (*inclusive we, you*) to foster greater engagement with executives in earnings call Q&A sessions. Similarly, Fogarty-Bourget et al (2019) look at how questions and 'gestural silence' by teachers act as engagement devices to involve students in doing mathematics. In both cases, the use of these devices are shaped, as in written genres, by the cultural settings and communities in which they are used (Hyland 2005).

Some research has also been done into a presentational genre which is, in some ways, analogous to the 3MT, looking at the ways speakers engage an audience in TED (Technology, Entertainment, Design) talks. Like 3MT presentations, these are a popularizing format where authors recontextualise their research for a non-specialised, often lay, audience and use various discursive strategies to negotiate their role as experts and to establish a closer relationship with their audience. So, in a study of 2,135 TED Talks, for example, Liu et al (2017) found that sentences with speaker self-mention and second person pronouns are most likely to generate audience applause. They also found that rhetorical questions have a similar effect. In another study, Scotto di Carlo (2014) explored 1131 TED talks and found that inclusive pronouns helped speakers breach the expert/audience barrier and establish an 'alignment' with them. Hearer pronouns were used to re-introduce what had been stated earlier or to involve the audience (*You can imagine that, We are lucky that*). She also found a significantly high use of directives, especially 'have to' (*you have to see that*) as a means of involving the audience in the talk.

There is, therefore, some evidence that speakers giving monologic presentations draw on the same repertoire of rhetorical devices as writers. This is because successful communication always involves others. A successful text, written or spoken and in any register, needs to assess its readers or listeners, reaching beyond individuals to the community and context to which the text contributes and forms a part of. Because of this, engagement has been found to differ across

disciplines (e.g., Hyland and Jiang 2016; Zou and Hyland 2020; McGrath & Kuteeva 2012), as writers represent themselves, their work and their readers in different ways. Reaching out to an audience involves making assumptions about what it is likely to know and how it might be interested and persuaded, seeking to create some alignment with the beliefs, experiences, expectations, and values it might be expected to hold. Listeners, like readers, are not only better able to follow an argument set out in a way they expect but want to feel that they are being taken into consideration.

In sum, the concept of engagement locates participant relationships at the heart of communication, suggesting that every successful text must display the producer's awareness of both its receivers and its consequences. 3MT presentations are characterised by a certain hybridity, involving the formal respect for peers and alternative views found in research writing and the active involvement of face to face communication. Speakers are required to demonstrate their research via direct participation, taking care to preserve the face of an audience which is likely to be less informed than the speaker and which would presumably not welcome too stark a reminder of this. It is also important to point out that non-verbal signals such as eye contact, gestures and facial expressions can increase trust, clarity, and interest among an audience. Presenters armed with non-verbal persuasion techniques, however, are not necessarily more effective than those who lack such skills. Audiences tend to rely more on verbal aspects of a presentation (Nagel et al. 2012) so that nonverbal cues exert a moderating, rather than decisive, influence on an audience's uptake (Jackob et al. 2016).

We now describe our corpus and procedures before going on to explore how engagement is achieved in 3MT presentations.

4. Method and Procedures

Our corpus comprises 120 3MT presentations, taken equally from the hard and social sciences, and transcribed from videos posted on public domain sites such as YouTube, threeminutethesis.org and university websites. We ensured that the selected presentations

exemplified the key features of the genre such as the time limit, live audience and the use of only one static slide. Our criteria were that the 3MT presentations were:

1) presented between 2012 and 2020 to ensure currency
2) presented in English
3) presented by PhD students
4) the top three finishers of university sponsored competitions to ensure consistency of quality

This process resulted in a corpus of 120 3MT presentations of nearly 54,000 words (Table 1).

Table 1. Corpus size and composition

3MT sources	Number of texts	Number of words
Social sciences	60	25,901
Hard sciences	60	28,009
Total	**120**	**53,910**

The corpus was separated into hard and soft science talks and searched for Hyland's (2005) list of 320 common engagement features using AntConc (Anthony 2018). Additional items were added after a thorough reading of the data. All the examples retrieved by this method were then concordanced and manually checked to ensure that they performed the engagement function assigned to them. Agreement was reached by each author independently coding a 25% sample of each corpus. An inter-rater agreement of 95% was achieved through discussion. Intra-reliability tests were also conducted by the second author re-categorising 20% of the cases two weeks after the initial coding with full agreement between the two. Finally, the frequencies of each engagement feature were calculated after normalising the results to 1,000 words to allow for cross-corpora comparison. We used the student's t-test from the SPSS package (Statistical Package for the Social Sciences) to determine any significance in the differences. We discuss the results in the following sections.

5. Overall results

Overall, we found 2,357 engagement devices in the corpus, with 1,499 of these in the hard science presentations. When normed to 1,000 words, this amounted to 33.3 in the social

science talks and 53.7 in the hard fields with the difference being statistically significant (df = 115.46, log Likelihood = 45.19, $p < 0.0001$). This result came as a surprise as, in contrast to these findings, research into other academic genres shows a strong preference for engagement features among writers in soft knowledge fields. Research articles (Hyland and Jiang 2016), academic blogs (Zou and Hyland 2020) and student reports (Hyland 2006) all demonstrate that social scientists take more explicitly involved and personal positions than those in the science and engineering fields. This is because writers are less able to rely on the explanatory value of accepted procedures and have to work harder to involve and persuade their readers with the force of their discourse (Hyland 2005). Clearly there are other motives at work in these presentations, involving a need to enliven what may be dry and highly specialised material which is likely to be far outside their everyday experience or interest.

The results show that all speakers are conscious of the need to engage with their audiences, but do so based less on their considerations of discipline than their assumptions about the knowledge and interests of their audiences. Rhetorical practices are always guided by the purposes at hand, and, in this case, these are to reach, involve and persuade a heterogeneous audience with uncertain, but often limited, knowledge of the topic.

Table 2 shows that speakers from the physical and life sciences used more of every feature except questions, and that questions were only marginally more frequent in the social science presentations although with no significant difference (df = 116.80, log Likelihood = -3.14, $p < 0.83$). Hearer mentions, which directly refer to the audience, were the dominant feature in the talks in both fields, although with 1.6 times more cases per 1000 words in the hard sciences (df = 115.20, log Likelihood = 35.82, $p < 0.0001$). Directives (df = 91.36, log Likelihood = 27.74, $p < 0.0001$), shared knowledge markers (df = 89.29, log Likelihood = 21.77, $p < 0.0001$) and personal asides (df = 83.71, log Likelihood = 3.37, $p < 0.1$) were also used significantly more by the science students.

Table 2. Engagement features by discipline (per 1,000 words and %)

	Social sciences		Hard sciences	
	per 1,000 words	%	per 1,000 words	%
Hearer mention	23.7	71.4	38.8	72.4
Directives	2.6	7.7	6.3	11.7
Questions	5.7	17.1	5.5	10.2
Shared knowledge	1.1	3.3	3.0	5.6
Personal asides	0.2	0.5	0.1	0.1
Total	**33.3**	**100.0**	**53.7**	**100.0**

In the following sections, we discuss each engagement feature in turn, focusing on the high-frequency items.

6. Hearer mention: fostering familiarity

Hearer mentions are the most explicit ways of bringing hearers into a discourse as they refer directly to them (Hyland 2005). They also account for the largest proportion of engagement markers in each corpus. Openly addressing an interlocutor fosters familiarity with the topic and with the audience. It helps create intimacy by suggesting the proximity between speaker and hearer and creating involvement in a matter of immediate concern:

(1) What if I told ***you*** that there's a way to go back in time and see if the water flea survived during the 1930s Dust Bowl? (HS3)[5]

(2) They are all around ***us***, interacting with ***us***, sometimes resulting in diseases. (SS1)

The Longman Grammar suggests that *you* is about 30 times more common in conversation than in academic prose (Biber et al. 1999: 334). The highly interactive nature of the 3MT presentation means that speakers exploit this association with informal chatting, implying a faux intimacy and creating solidarity. The use of *we*, referring jointly to the speaker and hearer is also common, although the less personal, and more formal, while the general

[5] HS refers to the hard sciences 3MT presentation corpus and SS refers to the social sciences. The number identifies the text.

reference *one* occurs infrequently.

There are differences across the two sub-corpora, however, and these are significant for every feature. Table 3 shows the frequencies and distributions.

Table 3. Types of reader pronouns by discipline (per 1,000 words and %)

	Social sciences		Hard sciences	
	per 1,000 words	%	per 1,000 words	%
you/your	12.3	52.0	18.3	47.2
we/our/us	10.8	45.6	18.3	47.2
one	0.6	2.4	2.2	5.6
Total	**23.7**	**100.0**	**38.8**	**100.0**

Inclusive *we* is an interesting choice as it explicitly pulls hearers into the orbit of the speaker, implying a shared experience or joint exploration of a research issue:

(3) For ***us*** in ***our*** generation, in the era of fake news, ***we*** tend to see this as something new. (SS21)

(4) Language shapes ***our*** thoughts and expectations. (SS7)

This was far more heavily used by the hard scientists ($df = 111.41$, log Likelihood = 21.26, $p < 0.0001$), who often used this form strategically to show positive politeness towards the audience by rhetorically acknowledging their status as expert equals:

(5) What if ***we*** were to take one of the most complex collective action problems of our time? (HS5)

(6) To deal with it, ***we*** need to understand it. ***We*** need to predict the climate change in the future. How do ***we*** do that? Luckily, ***we*** have weather climate prediction models. (HS48)

This deference towards hearers not only meets their expectations of inclusion but helps promote speaker goals. Working within strict time limits, the students must quickly pull the audience onside and persuade them that what is perhaps a dry and obscure topic is actually

interesting and meaningful. Indicating that both hearers and speakers have a shared interest in it is the most immediate way of achieving this.

Second person *you* and *your* are prominent in all the presentations in our corpora and, as we have mentioned, are clear markers of informal intimacy. Hearers mention can enhance persuasiveness and strengthen interpersonal bonds by expressing concern with the audience's assumed needs and expectations (Polo 2018). The scientists, however, were significantly more likely to employ this strategy (df = 117.19, log Likelihood = 11.99, p. < 0.0025) with nearly 50% more cases per 1,000 words. We surmise that these speakers recognise that their PhD studies are highly specialised, complex and potentially inaccessible to an audience which probably lacks a background in the issues. Hearer mentions may encourage this heterogeneous group of educated non-specialists to connect with the talk and help them follow it more easily.

Various functions of *you* have been proposed in studies of conference presentations (Rowley-Jolivet and Carter-Thomas 2005; Polo 2018). There is certainly a blurring of meanings between *you* referring to members of the physical audience and portraying that audience as imaginary joint researchers (Webber 2005), although studies of academic lectures show most cases refer to the former category (Cheng 2012; Polo 2018). Both uses, however, seek *involvement* and engaging hearers in the presentation, and we identified four main categories of *you*-usage in our 3MT corpora. In every talk, speakers thanked their audience, but they also employed *you* to refer to common experiences, to guide their understanding of ideas and connections, and to invite them to share an interpretation. Table 4 shows the frequencies and only the thanking use of *you* showed no statistical difference between the corpora, with scientists overwhelmingly referring to common experiences (df = 101.82, log Likelihood = 16.57, p < 0.001) and the social scientists inviting the audience to share interpretations more (df = 89.48, log Likelihood = 5.72, p < 0.054).

Table 4. Functions of you by discipline (per 1,000 words and %)

Functions	Social sciences		Hard sciences	
	per 1,000 words	%	per 1,000 words	%
Shared experiences	4.6	37.4	10.1	55.0
Guiding understandings	3.5	28.2	5.4	29.2
Thanking audiences	2.1	17.2	1.7	9.6
Inviting interpretations	2.1	17.2	1.1	6.2
Total	**12.3**	**100.0**	**18.3**	**100.0**

Both social scientists and hard scientists overwhelmingly preferred to engage readers with *you*-mention, claiming experiences and ideas are part of a communal knowledge base, to make it easier for hearers to understand. To some extent, this is more straightforwardly done by social scientists:

(7) For example, ***you*** may have heard recently about Taylor Swift's outrage when the back catalogue of her albums was sold to another label. (HS18)

(8) Each one of ***you*** has an identity form throughout the course of ***your*** life based on what ***you*** have experienced, … (HS46)

However, invoking sharedness in this way is perhaps more important to the science students who are seeking to make the unfamiliar familiar, invoking presumed prior knowledge to stress not only immediacy but also relevance:

(9) ***You*** know that if a spider's web is damaged, it's not going to be very good at making the flies stick. (HS51)

(10) As ***you*** know, Alzheimer disease can be caused by rare mutations. (HS56)

Drawing on everyday experience, then, the speakers seek to arouse the audience's interest and assume they will bring pertinent information that can be used to finesse acceptance of the argument.

The next most frequent function of second person is to guide hearers towards the speaker's favoured interpretation of the data. This purpose, of course, is closely related to the first but

differs from it by more directly crafting agreement rather than laying foundations for it. Here speakers seek to convince the audience of the argument's validity. The underlying message is that the data or reasoning indisputably support his or her view and this should be clear:

(11) If ***you*** look at the mosquito infection trends, we see almost no West Nile virus activity early in the year. (SS1)

(12) Now I want ***you*** to open your eyes to a world where this baby is laughing with joy simply because his pain has been managed properly. (HS312)

(13) I would like ***you*** to imagine you are in a room full of strangers. ***You*** feel anxious because you don't know anyone. (HS56)

So hearers are brought to agreement with the speaker by the need to follow a particular line of reasoning towards one possible outcome. The proportionate use of this function is similar in both corpora, about 29% of all *you*-mentions, but again the scientists used significantly more ($df = 99.4$, log Likelihood = 8.34, $p < 0.02$) and essentially for the same reasons as before. They express a need to convince hearers of the importance, relevance and logic of the case and building solidarity with them as intelligent co-constructors of the argument.

Finally, presenters invite their audiences to agree with an interpretation, and this function was more frequent in the social science talks. It is unclear why there is a disciplinary disparity here, but it may be because the scientists feel less confident about assuming their audience may be able to draw a direct connection from argument to claim in this way. Typically, scientific written argument is conducted in a highly standardised and succinct code which draws on considerable insider knowledge to decipher. These students are perhaps seeking to spell out the links more clearly and drawing on allusions to proximity and familiarity to do so.

(14) So ***you*** see, many factors have counted for a grade so the grade becomes an indicator of everything instead of indicators of achievement only. (SS8)

(15) ***You*** can see human oversight is not without flaws. (SS14)

(16) And in closing I am sure that ***you*** all can see the importance of risk research in protecting the health of ourselves, our next generation and our environment. (HS16)

Overall, directly addressing the audience may help make a presentation more convincing and relevant by insinuating intimacy. *You* suggests that the speaker understand the hearers'

needs and can speak to them directly to ensure they see what is salient and bring them to the preferred conclusions.

7. Directives: instructing hearers

The second engagement feature is directives. These instruct the audience to perform an action or to see things in a way determined by the speaker and therefore help manage its understanding and processing of a text (Hyland 2002a). They are generally expressed through obligation modals (*must, should have to*), imperatives (*note, consider, imagine*), and predicative adjectives expressing the writer's judgements of necessity or importance.

(17) Now, ***think back to earlier*** when you were queuing at the boarding gate. (HS36)

(18) So, ***don't let*** anyone tell you that sheep are boring. (HS25)

(19) You ***should*** think carefully about this. (SS10)

Hyland (2002a) argues that directives instruct hearers to carry out one of three possible actions. They guide them to another part of the text or to another text using *textual act*s (e.g., *see Smith 1999, refer to the slide*); instruct them how to carry out some action in the real world through *physical acts* (e.g., *open a bottle, put it in the oven*); or lead them through a line of reasoning using *cognitive acts (*e.g., *note, concede* or *consider*). Table 5 shows that these were, once again, more frequent in hard science talks, although only cognitive acts represented a significant difference (df = 67.15, log Likelihood = 37.28, $p < 0.0001$). Due to the short length and time constraints on the texts, textual acts did not occur at all.

Table 5. Functions of directives by discipline (per 1,000 words and %)

Functions	Social sciences		Hard sciences	
	per 1,000 words	%	per 1,000 words	%
Textual act	0.0	0.0	0.0	0.0
Physical act	2.1	80.3	1.9	29.7
Cognitive act	0.5	19.7	4.4	70.3
Total	**2.6**	**100.0**	**6.3**	**100.0**

Directives have much lower frequencies than the hearer-mention features we have just

discussed. As reported elsewhere, directives are a potentially risky strategy (Hyland 2005; Zou and Hyland 2020). While they can closely engage the reader, suggesting familiarity and the kind of connection that allows one person to advise another, they can also seem too blunt and didactic, claiming the authority to instruct an audience. This comes close to violating friendly interactions and democratic peer relations. It is particularly hazardous in the context of 3MT competition, where breaching general etiquette and threatening the positive face of a live audience might be counter productive.

Physical directives attempt to push the audience into some action, and in the 3MT talks they seem an effective way for speakers to create immediacy and proximity. Unlike their use in research articles, physical directives in 3MTs are less concerned with motivating the audience into some real-world action than with encouraging active involvement with the argument:

(20) ***Let us*** move our lens to Southeast Asia and ***let me tell you*** about James. (SS44)

(21) ***Let's*** take a step back from this for a moment***. Close your eyes and imagine*** this baby crying and screaming at the top of his lungs…. (HS12)

(22) you ***have to read*** the quoting context straight after he tells David this … (HS43)

These speakers are trying to involve hearers in the unfolding argument by requesting physical involvement in the research, but there is not a significant difference in their use by speakers across the two fields.

The main difference between social science and hard science presentations is how speakers use cognitive directives. These signal how the speaker wants hearers to understand the argument or grasp a certain point. This is a potentially risky tactic as it can appear as too bald-on-record. We can see in these examples, for instance, that cognitive directives can make a serious imposition on hearers:

(23) Y***ou need to know about*** the internal activity of the pipeline. (HS20)

(24) So***, just keep it in mind*** for now, ok? (HS7)

(25) ***Take a moment and consider*** the last time you made a donation to charity. (SS34)

Cognitive directive imply not only that the speaker has superior knowledge about something, but also a right to instruct hearers to see things in the speaker's way. It claims a relationship of unequal power.

As we have said, there is a statistically significant difference in frequencies with speakers from the hard sciences. Interestingly, the science speakers preference for cognitive directives reflect those found for writers of research articles (e.g., Hyland 2005) and academic blogs (Zou and Hyland 2020). The disciplinary fondness for this form of expression is related to a desire to ensure their views are understood and their convictions recognized, and this desire exceeds any concerns about face threats. They are engaging because they expect the audience to reflect on, recognise or concede an argument to ensure the speaker's viewpoint is understood and, hopefully, accepted (Hyland 2002a). The fact they carry a strong sense of conviction and degree of imposition does not seem to concern hard science speakers. They are more familiar with the strategy and, apparently, more relaxed about using it.

8. Questions: creating connections

Questions are the main strategy of dialogic engagement, inviting hearers into the discourse as participants and leading them to agreement (Hyland 2002b). In academic writing, questions are a useful resource for creating a gap to justify research (Lim 2012) and capturing readers' attention (Chang and Schleppegrell 2011). In spoken discourse, their effect lies in allowing speakers to apparently move away from a one-sided exposition and present a monologue as a dialogue in which hearers are considered and their opinions respected. It is, then, a perfect rhetorical strategy for speakers in the 3MT competition who must hook the audience within the first 20 seconds and then rapidly reel them in within 3 minutes.

(26) ***Guess what?*** Females are more visible in these narratives than they were 50 years ago. (SS5)

(27) ***So, which would you choose? Probably the former, right?*** (SS26)

As in conversation, questions help manufacture immediacy, intimacy and informality, and in this genre can also help make specialised knowledge more interesting, available and easier to digest.

The importance of questions in spoken interaction means that both social scientists and hard scientists used them roughly equally, with about 5.6 questions per 1,000 words and no statistically significant difference between the groups. We did, however, distinguish variations in how they used questions. Following Thompson (1998), we identified three sub-categories:

1. Check comprehension – tags to ensure the audience's understanding of the message, (e.g. *OK*? *Right*? *Get it?*)
2. Evoke audience response – an ostensibly open question to provoke hearers to consider a possible answer (e.g. *what would you do?*)
3. Seek audience agreement – polar interrogative tags (e.g. isn't it? Wouldn't you?).

Table 6 shows that 'the seek agreement' type was only used by speakers in the physical sciences (df = 59, log Likelihood = 7.98, $p < 0.018$) and that the check questions predominate in that field (df = 99.61, log Likelihood = 4.42, $p < 0.099$). The overwhelming purpose of questions, however, was to evoke a response, and there was no significant difference between fields in their use (df = 113. 91, log Likelihood = 1.301, $p < 0.342$).

Table 6. Functions of questions by discipline (per 1,000 words and %)

	Social sciences		Hard sciences	
	per 1,000 words	%	per 1,000 words	%
Check	0.2	4.1	0.6	10.5
Evoke response	5.5	95.9	4.6	84.3
Seek agreement	0.0	0.0	0.3	5.2
Total	**5.7**	**100.0**	**5.5**	**100.0**

Check questions are common in casual spoken encounters and so add a degree of informality and closeness to a presentation, but more importantly, they indicate a speaker's sensitivity to the potential knowledge gap with the audience and the need to ensure they are

following along. This is particularly true for the hard scientists, seeking to convey possibly unfamiliar and complex material to an audience. So, facing hearers with an uncertain knowledge of the topic, speakers continually checked comprehension, or at least they affected to, in order to win support:

(28) So, just keep in mind for now, ***ok?*** (HS7)

(29) That's extremely unnatural, ***right?*** (HS55)

(30) It could happen after any type of stimulating course, ***right?*** (HS13)

The opportunity to throw in comprehension checks not only offered speakers access to a feedback loop but also a way to intimate a dialogue, and this was particularly common in the social science talks:

(31) ***Not really a polite response, right?*** (SS19)

(32) So, just trust me. ***Ok?*** (SS33)

(33) So, which would you choose? Probably the former, ***right?*** (SS26)

Whatever the primary purpose, periodically entering the discourse to refer to hearers' understanding and agreement can not only anticipate possible comprehension problems, but also offer a guarantee that the speaker is fully in control of the topic.

Questions which attempt to evoke a (virtual) response were overwhelmingly the most popular type with speakers in both fields and with no significant disciplinary difference. These questions attempt to genuinely involve the hearer in the discourse and share the students' perplexity and trajectory in the research. Generally, however, these are pseudo or 'rhetorical' questions as the speaker answers immediately, giving the illusion of interactivity without relinquishing control to the audience:

(34) ***So why is this important?*** Well, the more we know, the more we can do to support teachers and consequently to provide the best education for our children. (SS9)

(35) If you see my name, I'll no longer exist. ***Any guesses?*** I'm a trade secret. (SS16)

(36) ***Why is that the case?*** Well, the reason is simple. (HS8)

We also find that questions which seek to arouse a response in these presentations are often combined with direct reader mention to construct a more interactive discourse:

(37) ***How do we face climate change?*** (SS50)

(38) ***Have you ever felt like this? Voiceless? Silenced?*** I have. (SS45)

(39) ***So, what do you do?*** My dissertation explores this problem by examining**…** (HS28)

This then is a strategy to engage the audience and make them feel that their personal experience or views count.

Finally, questions which engage the audience by requesting their agreement with a statement are rare in these presentations and do not occur in the social science texts at all. Following a statement with a tag question can seem a particularly aggressive form of engagement as it represents a direct attempt to influence the reader's thinking. Thompson (1998) and Hyland (2002b) suggest that they carry a considerable face threat by applying pressure on the audience to agree with the speaker.

(40) It's a scary thought, ***isn't it***? (HS56)

(41) You love a fast smartphone, ***don't you?*** (HS21)

(42) It's not all that bad, ***is it***? (HS45)

So, while they pull hearers into the discourse by ostensibly displaying an interest in their position, these questions can be seen as an overt display of authority. It is this invasiveness which accounts for its low use in the presentations.

9. Remaining features

The final two engagement features, appeals to shared knowledge and personal asides, have very low frequencies in both corpora, as shown in Table 2 above. Claiming an idea is shared works on the assumption that an audience can best be brought to agreement by building on what is already tacitly accepted, and that by explicitly referring to this agreement, speakers might progress their case. Directly claiming sharedness, then, is a way of bringing readers on board, of flattering their knowledge of the topic, and of moving them towards agreement.

(43) This, ***obviously,*** is a big problem, and people are becoming increasingly reliant on importing food. (HS4)

(44) Let's take a ***familiar*** example, low cost carriers. (SS36)

This is more easily achieved in research articles, of course, where writers can be more confident of what disciplinary insiders know (Hyland 2005). In the 3MT talks, however, speakers are not usually addressing a homogeneous community but a diverse and uncertain group whose knowledge cannot be taken for granted.

The strategy moves the focus of the discourse away from the speaker to shape the understandings of the audience, but it may be underused in this genre as too transparent a means of positioning hearers. Student presenters seem reluctant to foreground a common frame for seeing the world. Not only might they misjudge the audience's ability to recover shared understandings, but a miscalculation may mean that hearers will see the attempt as a cheap rhetorical ploy, attributing sharedness where none exists. This explicit manoeuvring of hearers into agreement is also a strategy which can slow down the forward momentum of the argument by encouraging hearers to pause and consider how far they are prepared to accept a claim.

Reference to shared knowledge does occur in these texts, however, and we can categorise these into three types of appeals: referring to logical reasoning, which concerns the coherence of the argument (e.g., *obviously, of course*); to routine condition, concerned with usual circumstances or behaviours in the real world (e.g., *normally, regularly*); and to familiarity with tradition, concerned with usual community practices and beliefs (e.g., *common, traditionally*) (Hyland and Jiang 2016). Table 7 shows these distributions.

Table 7. Types of appeals to shared knowledge (per 1,000 words and %)

	Social sciences		**Hard sciences**	
	per 1,000 words	%	per 1,000 words	%
Tradition & typicality	0.4	35.7	1.5	48.8
Logical reasoning	0.1	7.1	1.1	35.7
Routine conditions	0.6	57.2	0.4	15.5
Total	**1.1**	**1100.0**	**3.0**	**100.0**

Surprisingly, these appeals to shared knowledge are significantly more common in the hard science talks (see Section 5), and it is equally surprising to find that scientists rely most heavily on appeals to tradition and typicality ($df = 79.52$, log Likelihood = 15.82, $p < 0.001$). However, we can see from these examples that hearers are not being asked to acknowledge that they share knowledge with the speaker, but to accept the speaker's word that the information is shared by those who know about these things:

(45) You have the rapidly dividing cells that we most ***commonly*** associate with the word disease. (HS27)

(46) ***It is well known that*** it's very much like a piece of string that lives in an album itself. (HS26)

(47) What if we could identify the types of chatter also ***known as*** communicative behaviours that most strongly shaped language learning? (HS42)

Logical reasoning is also significantly more frequent in the hard science presentations ($df = 66.44$, log Likelihood = 21.01 $p < 0.0001$). This may be because the scientists are more anxious to make connections explicit:

(48) ***Naturally***, this leads to further questions. (HS11)

(49) Now to do so, ***obviously*** you have to stop production. (HS20)

(50) I refer, ***of course***, to our increasing population of older houses. (HS3)

By spelling out the implications and conclusions of arguments, presenters can make possibly unfamiliar material clearer to the 3MT audience. Social scientists, on the other hand, tend to refer to the routine conditions under which statements are accepted. Appealing to the audience's assumed familiarity with wider everyday understandings helps to engage them as cooperative participants, so examples such as these are common:

(51) Cold water or ice baths is ***normally*** a popular recovery strategy given we know it reduces muscle soreness. (SS42)

(52) ***Normally*** when you take drugs, they get into your blood stream and from there target particular organs. (SS3MT 10)

(53) I find that this is driven by ***a common perception*** of how easy it is to move with the

device. (SS34)

The final engagement feature, personal asides, also present negligible frequencies (Table 2). These are interruptions to the argument which allow speakers to break off from their monologue to address the audience directly, commenting on what they have said (Hyland 2005). It is therefore a means of indicating intimacy with the audience and conveying a sense of confidence, the assuredness to go off-script and make a personal remark. These comments, for example, are not directly related to developing the ongoing text, but pause the discussion and focus on the writer-reader relationship:

(54) ***By the way, I believe my work is important because it directly addresses questions about global food security***. (SS3)

(55) ***Incidentally, I believe this is one of the great gifts we can give children***. (SS9)

(56) ***By the way, I believe understanding history can change the future***. (SS41)

Such asides, however, take a certain flair to pull off, and may sound like brashness. They also eat into the precious 180 seconds speakers have to get their ideas over and, for these reasons, 3MT speakers tend to avoid them in favour of other strategies.

10. Conclusions

In this paper, we have explored the relatively little studied, but increasingly important, genre of the Three Minute Thesis presentation, focusing on the ways speakers seek to engage a non-specialist audience in a competitive and time-constrained context. Concentrating on effective presenters (those who have reached the finals of university competitions), the study underlines the view that communication is only successful to the extent that we are able to create an appropriate relationship with our interlocutors. This involves crafting a text, whether written or spoken, which establishes solidarity, or at least a connection, to support a credible identity and head-off objections to arguments. It requires engagement.

The results contribute to a growing understanding of how academic writer/speakers manage their relationships with their audiences. As a result, the engagement framework also offers a way of characterising the 3MT genre and identifying one way in which it is distinct from

others. We found, for example, 43.7 instances every 1000 words of speech in our corpus and this exceeds figures given for research articles (39.2) (Hyland and other 2019), academic blogs (25.3) (Zou and Hyland 2020), undergraduate reports (23.9) (Hyland 2006) and doctoral confirmation reports (23.1) (Jiang and Ma 2019). The spoken mode, competitive environment, time constraint and heterogeneous audience combine to encourage a more urgently persuasive and intimate style of argument. 3MT presenters, more so than the writers of the genres just mentioned, draw on conversational as well as academic registers to quickly hook their hearers from the start and then keep them involved throughout. This is a genre of quickfire persuasion which demands a heavy investment in engagement.

While the engagement model helps to illuminate something of the distinctiveness of the genre, it also reveals internal patterns of disciplinary specificity. We have shown, for example, that hard science presenters used more engagement resources overall and especially those features which seek to bring the audience into the discussion by mentioning them explicitly, which direct them to think in certain ways, and which attract them with intimations of shared knowledge. We have suggested that this may be due to the fact it is harder to convey unfamiliar scientific complexities to a disciplinary uninitiated audience as these are generally further from their everyday experience and require more work to enliven. Hearer mention, both inclusive *we* and *you*, are particularly heavily used by both groups, comprising over 70% of all features, presumably to intimate cordial relations and sense of shared interest in the topic.

We admit our study has limitations. We would, for example, like to confirm some of our conjectural explanations with interviews regarding the speakers' rhetorical choices, and to undertake more fine-grained analysis of the engagement categories. There is also the possibility that the model overlooks key aspects of engagement which the voices of participants might bring to light. Are there, for example, subtle choices of topic framing or selection of examples which help hearers connect more closely with the presentation? It is also the case that an examination of the disciplinary, rather than broad field, differences would yield a more nuanced picture of this genre. Most importantly, perhaps, we are aware, as we have mentioned, that engagement might be promoted through tone, facial expression,

posture and gesture which are not available to us in the transcripts. The extension of the framework to incorporate these multimodal elements of spoken genres would obviously add richness and detail to the description of these 3MT talks. Research suggests, however, that these non-verbal features only temper an audience response rather than sway it (Nagel et al. 2012; Jackob et al. 2016). It is also unlikely that the results produced by analysis of these features would add considerably to our understanding of the what the speakers are seeking to achieve through linguistic means.

We feel, however, that our work has strengthened the use of engagement as a discourse analytic tool and shed light on how interpersonal resources are employed in this genre. We hope that our analyses can offer some benefit to those graduate students who are considering entering a 3MT competition and are looking for useful advice on how they might effectively do this. We also believe our study may assist others in preparing presentations for non-specialist audiences, both inside and outside academia. Finally, our work has implications for EAP teachers in helping to raise students' communicative awareness and the features of academic speech, providing learners with effective strategies to participate in this genre.

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