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# Three Minute Thesis presentations: Recontextualisation strategies in doctoral research

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Abstract

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The trend towards the democratisation and sharing of academic research has brought about numerous changes in the type and number of genres researchers have to navigate. One recent addition to the palette of university genres is the Three Minute Thesis presentation (3MT). The primary purpose of this article is to identify the principal features of 3MT presentations and examine the recontextualisation strategies that doctoral students need in order to adapt their research to the non-specialist 3MT audience. Basing our study on a corpus of 30 presentations in the sciences and humanities, our analysis of these recontextualisation strategies is divided into two main categories: a) strategies to tailor the scientific information to the audience's knowledge base, focussing on the rhetorical structure and the explanatory strategies used to make the topic

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comprehensible, and b) strategies to engage the audience's interest using various personalisation and interactional strategies as well as attention-getting devices such as catchy titles, pictures and jokes. Results suggest that 3MTs possess a very stable cluster of features, with their own rhetorical strategies, register, and overall generic structure. The article ends with a discussion of the impact of some modern societal and media trends on 3MTs.

Keywords: Three Minute Thesis (3MT) presentations; PhD students; recontextualisation; non-specialist audience; genre analysis

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## Abstract

The trend towards the democratisation and sharing of academic research has brought about numerous changes in the type and number of genres researchers have to navigate. One recent addition to the palette of university genres is the Three Minute Thesis presentation (3MT). The primary purpose of this article is to identify the principal features of 3MT presentations and examine the recontextualization strategies that doctoral students need in order to adapt their research to the non-specialist 3MT audience. Basing our study on a corpus of 30 presentations in the sciences and humanities, our analysis of these recontextualisation strategies is divided into two main categories: a) strategies to tailor the scientific information to the audience's knowledge base, focussing on the rhetorical structure and the explanatory strategies used to make the topic comprehensible, and b) strategies to engage the audience's interest using various personalisation and interactional strategies as well as attention-getting devices such as catchy titles, pictures and jokes. Results suggest that 3MTs possess a very stable cluster of features, with their own rhetorical strategies, register, and overall generic structure. The article ends with a discussion of the impact of some modern societal and media trends on 3MTs.



## Keywords

Three Minute Thesis (3MT) presentations, PhD students, recontextualization, non-specialist audience**,** genre analysis

## 1. Introduction

Today's graduate students need to be able to master and navigate their way through a number of very different genre repertoires. In addition to the traditional genres of the PhD dissertation and the viva, they are increasingly expected to give conference presentations, write articles and/or proceedings papers, master digital genres (for example, academic home pages and blogs), and also be at home with more overtly promotional genres such as personal statements (Chiu 2016) and Three Minute Thesis (3MT) presentations. Starfield and Paltridge (2019) highlight the challenges doctoral students face in an increasingly fast-changing, complex and market-driven landscape where they are obliged "to engage in a diversity of ways with a diversity of people as they develop their academic literacies" (2019: 2). A command of all these genres requires a considerable amount of prior knowledge and socialisation and also "rhetorical dexterity" (Paré 2019) on the part of doctoral students.

The problem is compounded by the fact that students (and their supervisors) also need to be aware of a wide range of disciplinary and cultural norms and constraints. Despite the internationalisation of doctoral research and high student mobility, some genres display considerable variation. The way the PhD viva is conducted, for example, differs not only across disciplines but also cross-nationally (Mežek & Swales 2016). An arguably greater challenge is linked to the changing face of research communication. The digital evolution of the research world has led to profound changes in the way research is carried out and reported. Research is no longer the preserve of a small number of scientists and academics but has become potentially shareable with a huge indeterminate audience (see e.g. Gross & Harmon, 2016; Luzón & Perez-Llantada 2019), leading to a blurring of the boundaries between the scientific community and the general public, with what has been termed "context collapse" or the merging of different

audiences into one (Marwick & Boyd 2011). Students therefore need not only to take these transformations on board but also to be able to adapt their discourse accordingly.

It is in this context that 3MT presentations have developed and flourished. Doctoral students from all over the world now participate in contests to communicate their PhD research to a non-specialist audience in three minutes, in front of a panel of judges. Although displaying a very different rationale from the prestige genres of the PhD and viva (Rowley-Jolivet & Carter-Thomas 2019), it could be argued that the 3MT helps train doctoral students in acquiring the adaptability and rhetorical dexterity necessary for dealing with the range of genres and audiences they may encounter in their university careers and in other professional contexts. 3MT presentations give the candidates an opportunity to showcase their research to a wide public. Participating in and especially winning a 3MT can moreover provide a formidable boost for a PhD candidate's career (Bandler & Kiley 2018). As pointed out by a University of Queensland 3MT organiser, "oral and presentational skills are often marginalized in an RHD [Research Higher Degree] culture with more emphasis on writing and production of a thesis. 3MT is the most visible activity that aims to address this issue" (Skrbis, MacDonald, Miscamble, Tustin, Stoddart & Kiley 2010: 39).

In addition to these research and career oriented concerns, participating in a 3MT contest has a number of related psychological advantages. Writing a thesis is generally a very stressful experience, beset by doubts, discouragement, and questions of self-worth: "the dissertation is a profound rhetorical, linguistic, intellectual, emotional, and psychological challenge" (Paré 2019: 81). Participating in a 3MT competition gives students confidence in public speaking, helps them crystallise their thoughts, and is an opportunity to communicate the social value or relevance of their work. As one (successful) 3MT candidate said, realizing that people were interested in his research "was particularly timely for me because I was well and truly in the midst of my PhD

psychosis. The intellectual despair had well and truly set in and I was really wondering 'Why am I doing this, why do I sit here and do this?'" (Skrbis et al. 2010: 42).

It is also legitimate to wonder, however, whether the 3MT should only be seen as a positive development. The transmission of specialised research to a non-specialised audience raises a number of complex questions. The risk of "dumbing down" some issues and of disregarding subtleties needs to be kept in mind (Ciapuscio, 2003). As well as targeting the immediate non-specialist multi-disciplinary university audience, 3MT talks are also potentially available through online media to a (secondary) indeterminate global audience. All this makes the recontextualisation issues very complex for student speakers and requires some sensitive prior training, if speakers are to understand and meet audience expectations. Similarly the differences with other university genres, such as the viva for example, need to be understood and problematized, if the promotional style of the 3MT is not to constitute negative training for the more formal viva.

This article proposes to analyse the way the 3MT functions within the university landscape. To the best of our knowledge, with the exception of the study on 3MT move structure by Hu and Liu (2018), there have been practically no full-length descriptions of 3MTs as a university genre. Given the immense popularity of the 3MT competition and the growth of genres to communicate academic research in the aftermath of the internet revolution, our study appears therefore useful and timely. We will examine both the content and the communicative strategies selected by 3MT speakers to convey their research to a non-specialist audience and to convince the jury of their communication skills, whilst respecting the competition rules. As modern rhetoricians of science have underlined (cf. Calsamiglia & Van Dijk 2004; Myers 2003), popularising does not simply involve "translation" of scientific knowledge, but its recontextualisation from one specialised context to a less specialised one. Different aspects of discourse can be recontextualised, linguistic

expressions as well as knowledge and values, in order to better fit the expectations of the intended addressees. According to Bondi et al. "recontexualisation is aimed not only at making specialist knowledge available to the wider public […], but also at making it relevant or interesting for the non-specialist reader" (Bondi, Cacchiani & Mazzi 2015: viii). In this article we focus on how PhD students go about recontextualising their doctoral research for the 3MT audience.

Following Luzón (2013), the recontextualising strategies examined are classified into two main types: a) strategies to tailor information to the assumed knowledge of the audience, and b) strategies to engage the audience, by arousing their interest and creating proximity with them. Our tailoring category includes an analysis of the rhetorical structure of the presentations. We use move analysis (Swales 1990) to help identify the principal types of information that are highlighted or on the contrary backgrounded in the talks. We also consider the explanatory or illustrative strategies that are used to tailor the content and terminology to the audience so as to make the topic comprehensible. Among the strategies used to engage the audience, we include the analysis of various personalisation and interactional strategies as well as attention-getting devices such as the use of catchy titles, pictures and jokes. In order to highlight the scope of the transformations adopted, our study will make use of comparisons with other academic genres and in particular the PhD abstract.

The plan of the article is as follows. We begin by explaining the context of development of the 3MT competition and its main aims. Section 3 presents the corpus and details our methodological procedure. In section 4 we focus on the recontextualising strategies used to tailor the information to the audience's knowledge base. Section 5 focuses on the strategies used to engage the audience, to attract and maintain their interest in the topics. The article concludes with a discussion of the findings.

## 2. The 3MT contest

This section gives a brief description of the emergence, aims and evaluation criteria of the 3MT competition.

The 3MT contest was launched in 2008 by the University of Queensland, Australia, and was very rapidly taken up by universities worldwide: at the time of writing, it is organised in almost 1,000 higher education institutions in over 85 countries[1]. This rapid uptake and continuing success appear to illustrate the phenomenon pointed out by Miller (2016: 15) whereby a new, emergent genre is successful "because it satisfies an exigence that had been latent, unrecognized, but in retrospect, quite powerful". The concept has been translated into many languages to suit local needs (see for example the French "Ma Thèse en 180 secondes" [My Thesis in 180 seconds] competition), but the University of Queensland exerts strong control over the competition: 3MT is a registered trademark of UQ, any institution wishing to organise a competition must first obtain permission from UQ, use the official logo and promotional literature, and abide by the rules laid down by UQ.

The aim of the contest is defined as follows on the UQ website:

> The University of Queensland (UQ), 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.

Several features of this definition are important to bear in mind: it is a *competition*, with winners, losers, in some cases substantial prize money and a jury whose decision is final; what is at stake are the candidates' *communication* skills, not the intrinsic value of the research or their

[1] Source : https://threeminutethesis.uq.edu.au/participating-institutions, last consulted 19 March 2020

potential as novice researchers; the criterion on which the candidates are judged is their ability to tailor the presentation to a *non-specialist audience*; lastly, a draconian *time-limit* of three minutes is imposed. The original idea behind this time limit appears to have been highly serendipitous, according to the UQ website:

> The idea for the Three Minute Thesis (3MT®) competition came about at a time when the state of Queensland was suffering severe drought. To conserve water, residents were encouraged to time their showers, and many people had a three minute egg timer fixed to the wall in their bathroom. The then Dean of the UQ Graduate School, Emeritus Professor Alan Lawson, put two and two together and the idea for the 3MT competition was born.

With hindsight, however, it can be seen to partake of a more general recent trend[2] in research communication outside the academy that we have called "scholarly soundbites" (Rowley-Jolivet & Carter-Thomas 2019), i.e. the production of very brief video clips or podcasts adapted to mobile media and to the worldwide web audience, to promote research.

The time limit is not the only constraint imposed: speakers must also do without the customary 'warrants' (Toulmin 1958) used to support research claims. The communicative situation is characterised by a high degree of knowledge asymmetry as although the immediate audience is an educated one, speakers and audience members do not share the same disciplinary knowledge. The use of specialised terminology, references to the literature and theories of the field and its established methodologies, would therefore be counter-productive. Moreover, speakers are allowed only a single, static slide to illustrate their topic, and no other props, and are thus deprived of a highly valuable – or, particularly in science, even essential – means of supporting their arguments, namely visual communication (Rowley-Jolivet 2002). A further limitation is the research stage reached by the contestants: their doctoral research is, in almost all cases, still

[2] An anonymous reviewer also pointed out the similarities with 'elevator pitch' speeches where employees have only a very limited time (the elevator ride) to attract the CEO's attention.

ongoing and they have not yet any definitive results to present. The scientific evidence that will be required in the thesis and at the viva to convince the jury of the value of their work cannot be provided here.

In the absence of these academic warrants, what, then, are the criteria by which 3MT talks are judged? The Handbooks made available to organisers lay down three, equally weighted, criteria (Table 1).

**Table 1**. Judging Criteria of the 3MT contest

| *Judging Criteria* | *Did the presenter....* |
|---|---|
| **Comprehension** | help the audience understand the research?<br>clearly outline the nature and aims of the research?<br>bring out what is significant?<br>follow a logical sequence? |
| **Engagement** | make the audience want to know more?<br>convey enthusiasm for their work?<br>capture and maintain their audience's attention?<br>not trivialise or dumb down their research? |
| **Communication style** | communicate in language appropriate to a nonspecialist audience?<br>use sufficient eye contact and vocal range, keep a steady pace and a confident stance?<br>avoid scientific jargon?<br>use a clear, legible, and concise slide? |

(abridged from: https://www.latrobe.edu.au/research/downloads/CoordinatorHandbook3MT.pdf)

On similar lines, the contestants are given advice on preparing and giving their talks:

**Table 2**. Advice to 3MT contestants

| *Main recommendation* | *Detailed advice* |
|---|---|
| **Write for your audience** | Avoid jargon and academic language<br>Highlight the desired outcome of your research<br>Convey your excitement and enthusiasm for your subject |
| **Tell a story** | Present your 3MT as a narrative, with a beginning, middle and end: an opener to catch the audience's attention → main points → summary to restate the importance of your work |
| **Have a clear outcome in mind** | Leave the audience with an understanding of what you're doing, why it is important, and what you hope to achieve |
| **Practice, practice, practice!** | |

Source : https://threeminutethesis.uq.edu.au/resources/3mt-competitor-guide

As both tables make clear, the stress is on audience: the content, delivery, and personal involvement of the speaker should all be geared towards recontextualising their research so as to make it clear, interesting, and meaningful for their audience; oratory and communication skills

are of prime importance[3]. Lastly, contestants are strongly recommended to 'practice, practice, practice!' until word perfect.

## 3. Corpus and Method

### *3.1 Corpus*

The corpus collected for this study comprised 30 3MT talks given between 2011 and 2016, 15 in scientific disciplines (biotechnology, chemistry, mechanics, engineering, biology, and medicine) and 15 in Social Sciences and Humanities (sociology, psychology, linguistics, didactics, philosophy, theology) (Table 3). We also collected the Abstracts of the corresponding PhD theses published, with a timelag of about 2 years on average, between 2013 and 2018. All the speakers were carrying out their doctoral research in an English-speaking country (Australia, Canada, United Kingdom, United States) and the majority were native English speakers. The talks were downloaded either from the respective university websites or from YouTube. In selecting from among the large number of 3MT talks available online, an additional criterion was that speakers had to be the winner or runner-up of their competition, in order to ensure that the talk was considered by the jury an excellent example of the genre. Among the 30 participants, only 4 (2 in Science, 2 in SSH) defended their thesis in the same year as they gave their 3MT talk; the remaining 26 had not yet completed their doctoral research.

The resulting oral corpus, after transcription of the videos, comes to 14 419 words. Speakers in science have a slightly higher speech rate than in SSH, with an average of 494 words / 3 minutes versus 464. A similar difference is observed in the respective lengths of the thesis Abstracts (430 words in Science *vs*. 344 in SSH).

[3] For an analysis of 3MTs in terms of classical rhetoric, see Rowley-Jolivet & Carter-Thomas (In press).

**Table 3.** The 3MT corpus

| | Number of 3MT talks | Length of talks (in words) | Number of Thesis Abstracts | Length of Abstracts (in words) |
|---|---|---|---|---|
| **Science** | 15 | 494 | 15 | 430 |
| **SSH** | 15 | 464 | 15 | 344 |
| **Total** | 30 | 14 419 | 30 | 11 597 |

*3.2 Method*

Presenting a 3MT talk requires not only radically recontextualising expert knowledge for a non-specialist audience but also capturing the interest and attention of the live audience, two aims that are very similar to those of science communication in new online media such as blogs. To analyse the various strategies used by 3MT speakers we therefore adopted the two broad categories proposed by Luzón in her analysis of scientific blogs (2013), i.e. strategies to tailor information to the audience's needs, and strategies to engage the reader, but adapting them to our 3MT data. We discarded strategies that were specific to blogs (hyperlinks, positive and negative evaluations of research findings, references to the blogger's public life, informative visuals, the hybrid conversational style of CMC) and included others that emerged from our observation of the data as being specific to 3MTs (e.g. content selection through comparison with the PhD Abstracts, scenarios, visual impact). To analyse the content selection, we drew on the move analysis of 3MT talks proposed by Hu and Liu (2018) and a close reading of the Abstracts. This analysis was done independently by each of the two authors, followed by discussion until agreement was reached. For certain quantitative analyses (e.g. pronouns, questions) the concordancer AntConc 3.4.0[4] was used, followed by manual post-editing of the output files.

Concerning the scope of the study, the composition of our corpus enabled us to make two kinds of comparison: between the 3MT talks and the PhD Abstracts, and between the two disciplinary areas (Science vs SSH), depending on the particular feature studied. The examples

[4] https://www.laurenceanthony.net/software/antconc/releases/AntConc340/

quoted from the corpus are codified according to these 4 parameters as follows: Sc / SSH for Science or Social Sciences and Humanities, respectively, T / A for Talk or Abstract respectively, followed by the number (1-15) in each disciplinary subset. Thus (ScT1) means talk number 1 in science, and (SSHA1) refers to Abstract number 1 in SSH. Although it was beyond the scope of the present study to attempt a full multimodal analysis of the talks, the role of the speakers' paralanguage and kinesics in engaging the audience is also briefly touched upon in the sub-section *Visual impact* (Section 5).

## 4. Strategies to tailor the information

The first effort at recontextualization that 3MT presenters need to make concerns the content of their research, in order to make the topic clear and meaningful for the audience (see judging criterion 1, "Comprehension", Table 1). This is no mean task: doctoral research focuses on highly specialised, cutting-edge topics, as evidenced by some of the thesis titles in our corpus: e.g. "Coordination of meiotic recombination in diploid and tetraploid Arabidopsis" (ScA2) or "The Sideways Hourglass: Establishing the Lemniscate as a Narrative Structure for Writing and Reading Non-Linear Stories" (SSHA3). Getting the gist across in three minutes involves decisions about which aspects of the research topic to underline and which to downplay or exclude, how to explain key terms, concepts and processes, and how to frame the research so that it becomes accessible to the audience. In this section, we examine first the content and structure of the talks, then the reformulation or explanation of concepts, and lastly the use of scenarios and visuals, to determine how the information is tailored to the knowledge and interests of the audience.

Content selection can be addressed by carrying out a move analysis of the talks, as proposed by Hu and Liu (2018) in their study of 142 3MT talks in science and SSH. They identified 8 recurrent moves: 1. Orientation, 2. Rationale (or Motivation for the research), 3. Theoretical Framework, 4. Purpose, 5. Method, 6. Results, 7. Implications, and 8. Termination. Six of the moves were classified as obligatory by Hu and Liu (2018) as they occurred in over 80% of the talks, while moves 3 (Theoretical Framework) and 6 (Results) were considered optional as they occurred in only 5% and 57% of talks, respectively. Despite some variability in the order of the moves, and some disciplinary differences in the Framework, Methods and Results moves, the talks were found to exhibit a high degree of homogeneity, indicating that this new genre has rapidly developed its own rhetorical structure. On applying this model to our corpus, we obtained very similar results (see Figure 1).

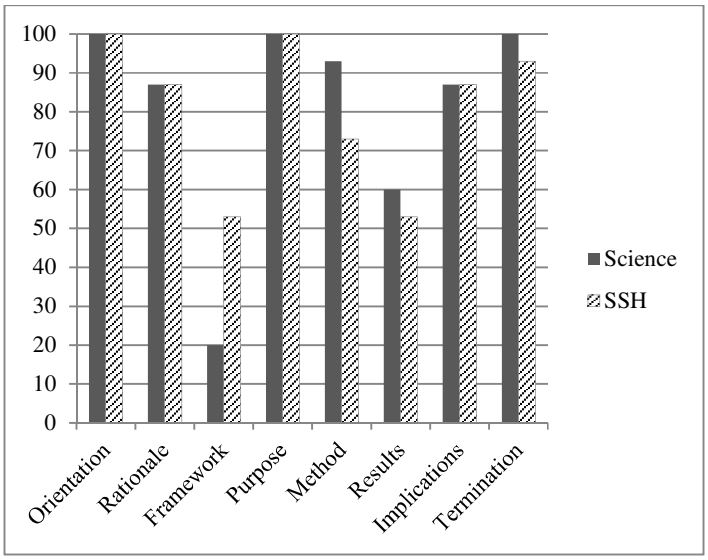


Fig. 1. Move analysis of 30 3MT presentations (15 in science, 15 in SSH)

The opening and closing moves (Orientation and Termination), used in all the talks,[5] bookend the talk by engaging the audience's attention at the outset and concluding the presentation, and are examined in Section 4. Here, it is the intervening moves (2 to 7) that interest us as they reveal the content selection carried out. The least frequent move is the theoretical framework, present in only one-third of the talks overall; this is hardly surprising, given the time constraint and the conceptual complexity at this level. There is also an appreciable interdisciplinary difference: while the theoretical framework is mentioned in over half the SSH talks, it occurs in only one-fifth in science. Hu et Liu (2018) found the same disciplinary variation and attributed it to the difference between a knowledge epistemology (science) and a knower epistemology (soft disciplines such as the humanities) (Maton, 2007), to which we would add that it would be an impossible task, in a 3MT, to explain a scientific theory such as free enthalpy, immunocytochemistry, or lattice Boltzmann methods, to a non-specialist audience, whereas many concepts in SSH, such as mindfulness or language patterns, are far more accessible or familiar. The second least frequent move is Results, which again is unsurprising: as the research is still ongoing in most cases (see section 3.1), many contestants do not yet have any firm results to present.

The Method move appears to occur frequently in both disciplinary subsets (93% of talks in science, 73% in SSH). However, these figures give a rather misleading picture and mask one of the important specificities of the 3MT genre, namely that the "explanatory depth" (Maier & Engberg, 2019) of 3MT talks is extremely shallow. Both theory (when present) and methodology are dealt with cursorily and expressed in primarily evaluative terms (*crazy phenomena*, *very clever experimental techniques, a brand-new method*). On the other hand in the corresponding thesis abstracts, the theoretical framework and methods are discussed in considerable detail. As

[5] With one exception for the Termination move, probably because the speaker ran out of time.

the abstracts and talks are very comparable in terms of total word count (see Table 3), this superficial handling of method and theory in 3MTs cannot be attributed solely to the time limitations. Rather, it is evidence that these aspects have been deliberately deselected by speakers in order to better recontextualise their work for the non-specialist audience. To illustrate this point, we give in Table 4 parallel passages from the 3MT talks and the corresponding thesis abstracts (same author and topic).

**Table 4**. Theory and Method moves: Comparison between the 3MT talk and the corresponding thesis Abstract

| Move | 3MT talk | Thesis Abstract |
|---|---|---|
| **Theoretical framework (ScT/A12)** | Now how do quantum theory and information theory connect? If we zoom into a computer we see that it's built from lots and lots of atoms. Atoms are ruled by the crazy phenomena of quantum theory. Did you know that quantum particles can be in two places at the same time? Quantum particles of light photons can even pop into existence out of nowhere for a short time and vanish again. By controlling single atoms, we can use those quantum effects for information processing. | It has been known that in general curved spacetimes, and also in odd-dimensional Minkowski space, signals can propagate slower than light even in a massless field. Here it is shown that the energy-to-information ratio of these classical timelike signals can approach zero. [*3 sentences on 2D Minkowski space follow*] Technically, sender and receiver are modelled as basic first-quantized systems coupling locally to the relativistic quantum field, i.e., as Unruh-DeWitt particle detectors. This gives rise to a standard quantum channel from the sender to the receiver. Thus, the tools of quantum information can be applied to investigate the combined impact of relativistic and quantum effects on the propagation of information. |
| **Method (ScT/A2)** | So, what I've been doing is to use a series of very clever experimental techniques to get inside these cells undergoing meiosis and to tweak and tinker with the amounts of different proteins. | Using immunocytochemistry coupled with super-resolution microscopy, we have further investigated the role played by the meiotic axis protein ASY1 in stabilising meiosis in the established autotetraploid Arabidopsis arenosa. We have also used Arabidopsis arenosa as a model for studying how meiotic interference might operate within an autopolyploid context. Alongside this, experiments using transgenic lines of the model plant Arabidopsis thaliana have helped to shed light on how crossover formation and synapsis are affected by reduced expression of ASY1 and ASY3 and to determine what effect limiting meiotic crossover numbers might have on neopolyploid meiotic stabilization. |

Unlike with the viva and thesis where the candidate's mastery of theory, the rigour of the method, and the robustness of the results are essential examining criteria, 3MT contestants choose *not* to elaborate on these aspects. As theory and method are glossed over and handled in layman's terms, and results are often not available, the aspects of the research that *are* selected

for the talks are its Rationale, Purpose, and Implications, in other words aspects that answer the three questions: what is the problem or need? what am I doing to solve it? what will the outcome be? As shown in Figure 1, these three moves occur in all or nearly all talks, and in exactly the same proportions in science and SSH. Moreover, while it is clear from the Abstracts that many of the theses have, in addition to more practical applications, a theoretical purpose – advancing theoretical knowledge in the field, questioning existing theories – 3MT speakers choose not to highlight this dimension of their work. Instead, they relate the aim and implications of their research to the general public's direct concerns (health, improving crop yields, reducing pollution, catching criminals, stress at school, etc.). By orienting the three main moves in this way, the information conveyed can quite easily be expressed in non-technical terms that the audience will understand and find relevant. This supports Bondi et al.'s (2015: 3) point that making specialist knowledge relevant or interesting for non-specialists is often accomplished by stressing the social dimension of knowledge rather than by delving into the scientific content. The following examples from our corpus (see Table 5) illustrate this feature:

**Table 5**. Examples of the three main moves in 3MT talks

| ***Move*** | ***Extract from 3MT talks*** |
|---|---|
| ***Rationale*** | Any of you with a smartphone which I presume is most of you will know that lithium ion batteries aren't very good at powering it for a long period of time. Normally you'll only get a day's power out. But Lithium ion batteries are also used in electric vehicles at the moment. So, the question is why are we using these bad batteries in electric vehicles? (ScT13) |
| ***Purpose*** | What I'm looking to investigate with my research is exactly how these live blogs are making us care more than traditional news articles do (SSHT8) |
| ***Implications*** | Now if I can find a way of manipulating this [DNA] recombination then this could unleash this hidden potential, allowing breeders to breed bigger, better yielding, hardier crops and thus feed the world. (ScT2) |

In addition to selecting the content, speakers also have to tackle the question of terminology. The official 3MT instructions advise contestants against using the specialised terminology of their field, but as terms represent concepts, speakers have to find ways of conveying these key concepts with minimal recourse to terminology. This appears to be particularly an issue in

science, due to the importance of complex technical taxonomies, where our speakers are faced with the problem of explaining meiosis, mesenchymal stem cells, a phylogeny, thermal electronics, or anti-angiogenesis, to name but a few, but it can also occur in SSH, with terms such as tone language, heritage speakers, or cognitive reserve. Several strategies are used: definitions or explanations of terms in layman's language (Ex. 1 & 2), paraphrases (Ex. 3 & 4), analogies or examples from everyday life (Ex. 5 & 6):

(1) Meiosis. The special form of cell division which produces the cells required for sex. (ScT2)

(2) I study thermal electronics. What does that mean, well thermal it's about temperature and in particular it's about temperature differences, hot sites and cold sites. Electronics it's about producing electricity. So, what we have is a temperature difference producing electricity. (ScT10)

*(3)* Cantonese is a tone language, which means it uses pitch to convey the meaning of different words. (SSHT9)

(4) So, the industry is also looking at something called engine downsizing. Now this is brilliant. This is about getting the power of a big engine but from a much smaller engine. (ScT6)

(5) [*to explain light metal hydrides*] Now, these metals work quite a lot like a shoe rack. (ScT7)

(6) [*to explain a drug delivery system*] This process is very similar to trying to send an item through the mail. You can't send an item without first packaging it into a suitable container, in this case nanoparticles. This way your item is easier to deliver, won't get damaged on the way and more likely gets to its destination. (ScT3)

These strategies are very similar to those used in scientific popularisation (Calsamiglia, 2003) and blogs (Luzón 2013). An additional strategy, however, that appears to be a particular feature of the 3MT genre[6], is the use of scenarios. Following Ciapuscio, we use this this term to refer to the way speakers create "a possible yet imaginary situation that allows them to explain a complex event" (2003: 212). The audience are asked to imagine a particular scene or situation: *Just imagine, Think of me as a molecule of water, Picture….* Some of the contestants make use of fairly elaborate scenarios in order to stage their talk. In a talk on natural language processing, for example, the speaker sets out a scene for the audience as if it were a scene from a science fiction film:

(7) Okay, so let me set the scene for you. You're driving in the desert. It's the middle of the night. There's no one but you on the road and then suddenly "bang" you see this thing crash landing in front of you. You decide to explore, so you take out your torch and you walk towards it and then you see these strange markings in the ground. (SSHT2)

The discovery of the strange patterns on the ground enables the speaker to introduce his topic: finding patterns in languages that correspond to parts of speech. The scenarios are obviously carefully chosen so as to be as striking as possible, whilst at the same time corresponding to an experience or situation that is within the audience's grasp or likely range of interests. Another speaker, for example, sets up a very dramatic situation based on the analogy of cancer as a monster:

(8) Picture a monster that can attack at any time, that can change itself to evade the weapons used against it and can come back to life from the dead. It sounds like something from a horror movie but this monster is real. (ScT9)

[6] In a previous study comparing four types of brief audio/video recordings to communicate scientific research online (Rowley-Jolivet & Carter-Thomas 2019), we found that scenarios were characteristic of 3MTs only.

The explanations concerning the mutations that cancers can go through are presented against the backdrop of a horror film, another familiar film genre for many university students.

A final resource that speakers can call on to tailor the information to the audience is visual representation. As they are allowed only a single slide, this resource is very limited compared to many other research genres in which visuals are abundantly used; moreover, as with terminology, they cannot use the specialised visual language of their field but need to redesign the visual to make it comprehensible to non-specialists. This is done by using ordinary photos or cartoon-like schematics[7] rather than the complex constructed visuals (graphs, scatterplots, SEM images, etc.) that feature in the PhD theses. Most speakers, however, exploit their sole visual not for informative purposes but for audience engagement, which is the focus of the following section.

## 5. Strategies to engage the audience

The second major type of strategies used to recontextualise the doctoral research is audience engagement, arousing their interest and creating proximity in order to capture and hold their attention in the topic. In 3MTs, many of the engagement strategies used by speakers are very different from those commonly found in established research genres such as RAs (Hyland 2005), but bear some similarity to those found by Luzón (2013) in scientific blogs. The main strategies observed in the data are the titles, visual impact, various personalisation devices, questions, humour and what we have called "street cred".

[7] See for example the following talks in our corpus:
https://www.youtube.com/watch?v=OPuvzuR30Fs
https://www.youtube.com/watch?v=q0kXeo7OeIE
https://www.youtube.com/watch?v=ha1IQWygWa4

*Titles*

The title of the presentation can be considered as the first hook used by speakers to arouse audience interest before the talk even begins, as a catchy, intriguing or humorous title is likely to generate in the audience a desire to hear more. The importance of the title is officially acknowledged by the fact that when candidates enroll for a 3MT, the organisers ask them to submit a title for the presentation that is "free of technical jargon and understandable to non-specialist judges" (Bandler & Kiley, 2018: 117). As the contestant already quoted in the Introduction points out, this involves a radical reformulation of the thesis title:

> To give you an idea of the steps required to transition between the thesis and the three minute thesis, my official thesis title is 'The Morphology and Behaviour of the Lumbar Paraspinals in People with Chronic Recurrent Low Back Pain'. The title of my three minute thesis is 'Why do some people keep hurting their back?' (Skrbis et al., 2010: 40).

On comparing the titles of the theses and those of the talks in our corpus, only two showed very minor adjustments, while the other 28 had all been significantly or completely reworded, using various rhetorical and linguistic devices. A selection is given in Table 6.

**Table 6**. Comparison between the titles of the 3MT presentations and those of the corresponding PhD theses

| | **3MT title** | **Device** | **Thesis title** |
|---|---|---|---|
| **a)** | Suspects, Science and CSI (SSHT1) | Alliteration<br>Ternary sequence | *On Expertise in fingerprint identification* (SSHA1) |
| **b)** | Cracking the Code with Computers (SSHT2) | Metaphor<br>Alliteration | *An Iterated learning framework for unsupervised part-of-speech induction* (SSHA2) |
| **c)** | Learning to breathe, breathing to learn (SSHT4) | Chiasmus | *Learning, breathing, and well-being: Teachers' reflections on pedagogical possibilities through mindfulness* (SSHA4) |
| **d)** | Spell write…Right? (SSHT6) | Play on words<br>Interactive syntax | *An Examination of spelling acquisition in the middle and upper primary school years* (SSHA6) |
| **e)** | Blood, Sweat and Ears (ScT4) | Play on words<br>No terminology | *Identifying polymers that support the growth and differentiation of adipose derived pericytes for use in auricular reconstruction* (ScA4) |

| | | | |
|---|---|---|---|
| **f)** | Improving vehicle efficiency – using springs! (ScT6) | Interactive syntax<br>No terminology | *Simulations and experimental characterization of the torque converter damper system* (ScA6) |
| **g)** | Survival of the stillest: predator avoidance strategies of shark embryos (ScT11) | Play on words<br>No terminology | *The role of electroreception in elasmobranches* (ScA11) |

Compared to the thesis titles, 3MT titles are shorter (7.5 words vs. 11 words on average), frequently use an interactive syntax (questions and exclamations) and a range of literary and rhetorical devices such as alliteration, metaphor, chiasmus, ternary sequences and play on words, but practically no specialised terminology. The only 'specialised' knowledge required of the audience is familiarity with certain aspects of Western culture in order to grasp the allusion to a TV series in (a) (CSI – Crime Scene Investigation), to the wartime speech by Winston Churchill in (e) (Blood, Sweat and Tears), and to Darwinism in (g) (Survival of the Fittest).

*Visual impact*

In established research genres, particularly in science, visual communication has a rhetorical and argumentative purpose – to support the research claim being made – by providing evidence that cannot be expressed in the verbal semiotic (Rowley-Jolivet 2002). In 3MTs, where only a single static slide is allowed, speakers cannot rely on the visuals for this argumentative and evidential support; while a few of the slides contain some simplified information (see Section 4), the majority seek to create the maximum visual impact in order to attract the audience's attention, acting, like the title, as a hook at the start of the talk. Most of the slides contain no text and include striking visual images, often using the techniques of advertising images such as saturated colours, naturalistic images, or 'demand' pictures that address the viewer directly (Kress & van Leeuwen, 2006)[8].

[8] See for example the following talks in our corpus:

The second visual resource that speakers can draw on is their physical presence on stage. In 3MT talks, unlike for instance conference presentations, speakers use no notes, do not stand behind a podium or turn their back on the audience to flash their laser pointer at the screen. Instead, they are on a bare stage, with their slide projected as a backdrop, and move around freely to occupy the space, making expressive hand and arm movements to illustrate their commentary and keeping constant eye contact with the audience. Some even dress the part to illustrate their topic: in a talk on how to deliver drugs to the brain, the speaker chose a hairdo in psychedelic colours that attracted attention to her head[9], while a speaker whose topic was heat wore a T-shirt showing red flames[10].

*Personalisation strategies*

In 3MT presentations the personality of speaker plays an important role. This personal tone begins with the smiles and gestures speakers make at the beginning of the opening orientation move (see Section 4): *Hello, I'm Jamie G. I'm from the university of (….), I'm here to talk to you about* …. Speakers present themselves not only as budding academics but as real, approachable people with concerns that many in the audience will be able to identify with, exploiting their own personalities and backgrounds in order to create this relationship of proximity:

(9) I'm a teacher myself and a mother and an academic and through these various roles I've spent a lot of time in schools. I've noticed a problem: Our schools are filled with stress and anxiety. (SSHT4)

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https://www.youtube.com/watch?v=-kUHFfCRpg4
https://www.youtube.com/watch?v=a9QVe34B9Oc
https://www.youtube.com/watch?v=ha1IQWygWa4
https://www.youtube.com/watch?v=Paqhfih3cCk

[9] See: https://www.youtube.com/watch?v=XMB5CpvESK0

[10] See: https://www.youtube.com/watch?v=oGmLu1cOrpo

One of the most explicit linguistic signs of this personal involvement of speakers is in the use of the first person pronoun, corresponding to a conscious choice to portray a particular stance and authorial identity (Hyland 2005). Even if contributing to a larger collective project, as is sometimes the case in science, the actual thesis is single-authored. Personal reference is therefore a clear indication of the perspective from which a statement should be interpreted, enabling writers and speakers to emphasize their own contribution to the research field concerned. A comparison between the 3MT talk and the PhD abstract can therefore be revealing. As shown in Table 7, in the talks there are almost 4 times as many occurrences of the 1st person pronoun as in the PhD Abstracts (13.6 vs. 3.6 per 1000 words). Moreover, the subject pronoun occurs in all the talks regardless of discipline, whereas in the Abstracts, it is only used to any extent in SSH (8 abstracts *vs* 1 in Science).

**Table 7.** Distribution of first person subject pronouns in the abstracts and 3MT presentations

| | **Science** | | **SSH** | | **Totals** | |
|---|---|---|---|---|---|---|
| | Occ. of *I* | Coverage | Occ. of *I* | Coverage | Total occ. *I* | Occ. per 1000 words |
| **3MT** | 83 | 15/15 | 114 | 15/15 | 197 | 13.6 |
| **PhD abstract** | 5 | 1/15 | 37 | 8/15 | 42 | 3.6 |

While the PhD abstract has also been considered a promotional text (Bordet 2014) as it is often the first and primary access other researchers have to the research carried out, the way the writers portray themselves is however more muted than in the presentations and does not necessarily involve self-mention. As the following parallel extract illustrates, in the Abstract it is the research work itself that is highlighted in the subject role, rather than the person of the researcher.

**Table 8** Use of *I*: Comparison between the 3MT talk and the corresponding thesis Abstract

| **3MT talk** | **Thesis Abstract** |
|---|---|
| My research has 2 components. **I compare** how Aboriginal and non-Aboriginal parents understand and define their role in schooling processes and how different perspectives shape academic achievement. **I** | **This thesis argues** that the examination of family-school relationships is crucial to understanding educational achievement gaps between Indigenous and non-Indigenous Canadians. Using social and cultural |

| | |
|---|---|
| **also examine** the effectiveness of educational strategies that aim to reduce existing achievement gaps by way of enhancing family-school relationships (SSHT7) | capital theory **this thesis examines** the dynamics of educational inequality associated with Indigenous family-school relationships to understand family and school-based mechanisms that are seen to limit or encourage Indigenous student achievement (SSHA7) |

In the 3MT talks the presenters speak in their own name, stressing their participation, and explicitly take responsibility for their actions:

(10) So, in my PhD I developed and tested an assessment tool. (SSHT6)

(11) To collect the data for the grammar I spent fifteen months in Northeast India. (SSHT10)

First person pronouns are also used to ground or validate claims. Instead of the traditional scientific warrants (Toulmin, 1958), such as references to previous literature or other scientific proof, it is personal conviction that is put forward:

(12) **I think** that that's wrong. **I think** we can make [sic] do an easy experiment. (SSHT11)

(13) Therefore **I believe** there must be a better solution. (ScT4)

On several occasions speakers do not hesitate either to share very intimate details with the audience. One speaker explains how cancer caused the death of her mother and triggered her own interest in cancer research. Another uses the story of her own child's trauma when beginning infant school as lead-in to her motivations for her choice of PhD topic:

(14) I'd like to begin today with a story, a story about a little boy starting grade 1. He got sick, very sick. He ended up in the hospital. He lost his voice. He lost his ability to speak. He lost his ability to breathe. […] The story of this little boy, my little boy, […] is a true one and it's the catalyst for my research. (SSHT4)

The use of stories is also explicitly mentioned in the 3MT competition guidelines for contestants as a means of organising their talks and creating a structure for themselves and the audience to follow. However it would seem likely that by adding such intimate and dramatic details as these, speakers are also engaging the audience's sympathy and enhancing their own reputations as caring (brave) individuals.

*Questions*

Questions are engagement markers that seek a response from the addressee, either by direct answer in conversation and dialogue, or by indirectly soliciting interaction in the case of writing and spoken monologue. As many studies have shown (e.g. Hyland 2002), they are widely used in academic genres to arouse interest, raise issues, and structure the discourse, albeit with very different frequencies depending on the genre. Table 9 gives the frequencies in our two datasets and shows that whereas they are totally absent in the PhD Abstracts, they are a prominent feature of the talks, with a frequency of over 50 per 10,000 words, and are used by three-quarters of the speakers (23 out of 30).

**Table 9**. Questions in the 3MT talks and corresponding PhD Abstracts

| | | **Science** | **SSH** | **Total** |
|---|---|---|---|---|
| **Presentations** | Number of questions | 35 | 41 | 76 |
| | Per 10,000 words | 47.2 | 58.5 | 52.7 |
| | Number of talks where they occur | 11/15 | 12/15 | 23/30 |
| **PhD Abstracts** | Number of questions | 0 | 0 | 0 |

Not only are the titles of several talks formulated as questions (cf. above, *Titles*), some speakers also choose to open their talk with a question addressed directly in the second person to the audience, involving them in a pseudo-dialogue:

(15) Can you remember learning to write at school? (SSHT6)

(16) Would you believe me if I told you this was my brain on drugs? (ScT1)

Moreover, questions, like stories, can be used to bookend the talk, as the question asked in the orientation move at the outset is returned to in the termination move at the end, where it is answered by the speaker. The initial question triggers the audience's memories and appeals to their personal experiences and thoughts, turning the talk into a joint effort at exploring the question at issue until an answer can be proposed at the end of the talk:

(17) [*Opening words*] Remember the last time a cold went around your office? Has it ever bothered you that some people get completely wiped out where others just get the sniffles? (ScT5)

(18) [*Closing words*] So, do some strains of HIV make people sick more quickly than others? In the UK HIV epidemic the answer is no. (ScT5)

Questions in the opening and closing moves of the talks account for 30% of the total but they are also liberally scattered throughout the talks to present the scientific content of the research in an interactive way by asking (and answering) the questions the audience is likely to want to ask at the point in the talk. In these question-and-answer pairs the speakers show their awareness of the audience's needs by foreseeing their queries and forestalling their reservations:

(19) So how do we find them? Well, we compute them. (ScT9)

(20) So, you might think why on earth is she talking about this, why is she going round in circles? Well actually, this can prove to be quite a helpful reaction. (ScT7)

(21) Now you might be thinking, with such swift improvement, won't the results disappear just as quickly? Well, that depends. (SSHT15)

*Humour and Street Cred*

As underlined in Section 4, the 3MT speakers' authority is not based on the same criteria as those that will be used by the examiners at the thesis viva – namely a command of theory, rigorous research methods, reliable and significant results. These aspects of the research are either downplayed or glossed over. In other words, establishing their authority as researchers is not the main priority. In order to attract the attention of their audience and put them in a receptive frame of mind, 3MT speakers appear to rely more on non-technical arguments, making use of various personalisation and interactional strategies. Another approach involves the use of humour and "street cred".

To establish a rapport with their immediate audience, speakers need to create a common ground. As it cannot be one based on expertise or scientific know-how, they therefore try to create a common framework based on shared cultural values, a procedure we refer to as "street credibility" or "street cred". Speakers frequently include references for instance to popular films or TV series as in the two examples below:

(22) Okay this is actually a scene from a film called "Thor" which is a really good film, you should watch it. There is some stuff like alien gods fighting. (SSHT2)

(23) Contrary to what you see on CSI, it's not computers that match prints, it's humans. (SSHT1)

In this way speakers show their solidarity with the student audience, their peer group. Whilst serious and keen about their research, they are young and approachable (and not arrogant). This enthusiasm and approachability is expressed through the use of evaluative adjectives and is underlined by the fairly informal register of language employed:

(24) Now this is brilliant. (ScT6)

(25) Am I excited about my project? Yeah I really am. (ScT4)

Running though several of the talks as well are various humorous remarks, often displaying a rather self-deprecating humour:

(26) When I was studying for my undergraduate degree I went to a small Liberal Arts college in Holland, and you may have met some small liberal arts students before, we tend to be quite pretentious and want to know a little bit about everything. (SSHT8)

(27) And you're all looking at me and thinking one thing. Ouf he's hot and you're right. I'm radiating heat all the time. (ScT10)

In (26) the speaker makes fun of the arrogant reputation that that some liberal arts students have among other student populations. In (27), playing on the word "hot" (radiating heat and reference to his sex appeal), the speaker shows that he is capable of making a joke at his own expense, before going on to the topic of his talk, thermal electronics. This technique is appreciated by the audience as there is considerable laughter following the jokey remarks. These small touches of humour all contribute to creating an atmosphere which the speakers hope conducive to a receptive listening environment.

## 6. Discussion and Conclusion

The primary purpose of this article has been to identify the principal features of the 3MT genre, an increasingly popular addition to the university genre repertoire. Using a qualitative approach we have analysed the recontextualisation strategies employed by speakers to adapt their doctoral research to the non-specialist 3MT audience, within the strict constraints imposed by the contest. The analysis reveals that speakers make use of a number of recurrent strategies to adjust to the information needs of their audience and arouse their interest in their research. Following

Luzón (2013) we have divided these strategies into two main types: a) recontextualisation strategies to help tailor the scientific information to the audience's knowledge base, and b) recontexualisation strategies to engage the audience's interest. Speakers firstly need to tailor the content of their specialised doctoral research to a mixed audience, all within the draconian three-minute time limit. Through an in-depth move analysis we have shown how certain categories of content are highlighted - the rationale for the study, its purpose and implications for the future, particularly societal. Other categories, such as the theoretical background or the methodology, are omitted or only very shallowly evoked. In order to help the audience better understand the scientific concepts and terminology, 3MT speakers also employ strategies typical of popularisations, for example, paraphrases and analogies from everyday life, as well as more genre-specific devices such as the use of scenarios.

The recontextualistion strategies used to engage the audience's interest include a number of interactional procedures designed to create proximity with the audience, as well as various personalisation strategies and attention-getting devices. From the very beginning of the presentation the attention of the audience is directly drawn through, for example, catchy titles, striking pictures, surprising facts and anecdotes, question raising and empathetic stories. Several of these devices exploit features typical of informal discourse such as casual language, an interactive syntax, jokes and references to popular culture. Speakers are at pains to present the scientific content of the research in the most appealing and stimulating way possible, and to portray themselves as approachable people with concerns that many in the audience will be able to identify with. To this end speakers do not hesitate to exploit their own personalities, smiling, joking and even recounting very intimate details of their lives, rather than appearing as simply distanced knowledge-holders. In opposition to many other university genres, for example PhD abstracts, personal implication in the research project is underlined. Presenters speak in their own

name, explicitly take responsibility for their actions and overtly express their opinions. Overall, what we have termed 'street cred' plays a much greater role than that of researcher credibility, with 3MT speakers relying more on non-technical arguments to convince the audience and jury.

The results of the in-depth analysis of the 30 presentations suggest that 3MTs possess a very stable cluster of features, with few notable differences between disciplines. Although only officially launched in 2008, 3MTs have rapidly established their own rhetorical strategies, register, and overall generic structure. They are now a frequent addition to the palette of university genres that doctoral students all over the world are expected to be familiar with and master and are obliging students to develop a different skillset from that needed to master the more traditional university genres. This is arguably a positive point, as in a research world where international and disciplinary research boundaries abound, doctoral students need to be able to adapt their discourse to a variety of situations. Furthermore, it is important to underline that genres do not emerge *ex nihilo*, but are rooted in the society of their time and its values (cf. Miller 2016). Accordingly 3MTs can be seen as part of a much more general evolution towards the democratization and sharing of academic research with a large audience.

The present societal context which has witnessed the emergence of 3MTs appears to have directly conditioned their main features. The media logics of marketisation and the pursuit of publicity and visibility now permeate the way higher education institutions function (Pallas & Wedlin 2013), and the promotion of intellectual "products" such as the doctoral thesis can be seen as an example of this. Linked to this is the current trend towards the gamification of research (Hammarfelt, de Rijcke & Rushforth 2016). The 3MT contest applies the typical elements of game-playing (strict rules of play, scoring with winners and losers, prizes) and through their participation doctoral students are also actively encouraged to adopt a highly competitive approach towards research. The accompanying growth of digital genres in research

and higher education has led to a blurring of the boundaries between the scientific community and the general public, and a corresponding increase not only in popularisation but also in "disintermediation", with the researchers themselves frequently engaging in this popularisation of their research directly. Another current tendency is towards the use of very brief snippets of information on the Internet to communicate research findings. In a previous study (Rowley-Jolivet & Carter-Thomas 2019) we have seen how "scholarly soundbites" – scientific podcasts, author videos, YouTube recordings –, all characterised by their brevity, are indicative of the need for users accustomed to zapping between sites to be able to process bite-sized pieces of information rapidly. There is also the phenomenon of lightning talks at some conferences, with their brevity reinforcing the promotional intent. We can finally mention the increasing popularity of public speaking or eloquence competitions in higher education, where again the emphasis is on spectacularisation and rhetoric, rather than on the substance (or informational content).

The influence of all these general societal trends is very visible in 3MTs. They are competitive, very brief and share several of their interactional and personalisation features with popularisations. They are above all promotional and appear in many ways closer to a stage performance than to an academic talk. Should their features be considered a cause for concern? Will media logics continue to gain force and affect research communication? At a time when the traditional dichotomy between information and entertainment appears to be collapsing, opinion is divided. Some regret the superficiality of 3MT content and the valuing of these marketing and promotional skills at such an early stage in the researchers' careers. The fostering of such a highly competitive approach towards research can also be seen in a negative light. While competition has always been an element in research activity, the emphasis placed on individual performance in the 3MT also appears at odds with the collaborative nature of many modern research projects. However, we can also underline the increasing openness and democratisation of research, and see

the emergence of new genres such as 3MTs as an opportunity for doctoral students to benefit from this development. Participating in a 3MT contest can help equip young researchers with the skillset and rhetorical dexterity they may need for dealing with a range of genres and audiences in their later university careers and in other professional contexts. The psychological benefits are also undoubtedly important. Doctoral students themselves seem very enthusiastic about the benefits of participation in 3MT contests, as this blog post by a winner illustrates:

> It is raw. It is real. It is one of the most challenging and taxing experiences a researcher can undertake, and presenting my Three Minute Thesis completely redefined my approach to research. [...] The competition was a game changer for me. I learned how to share my research with a general audience in a manner that was both factual and engaging. [...] This experience was invaluable[11].

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Figure 1

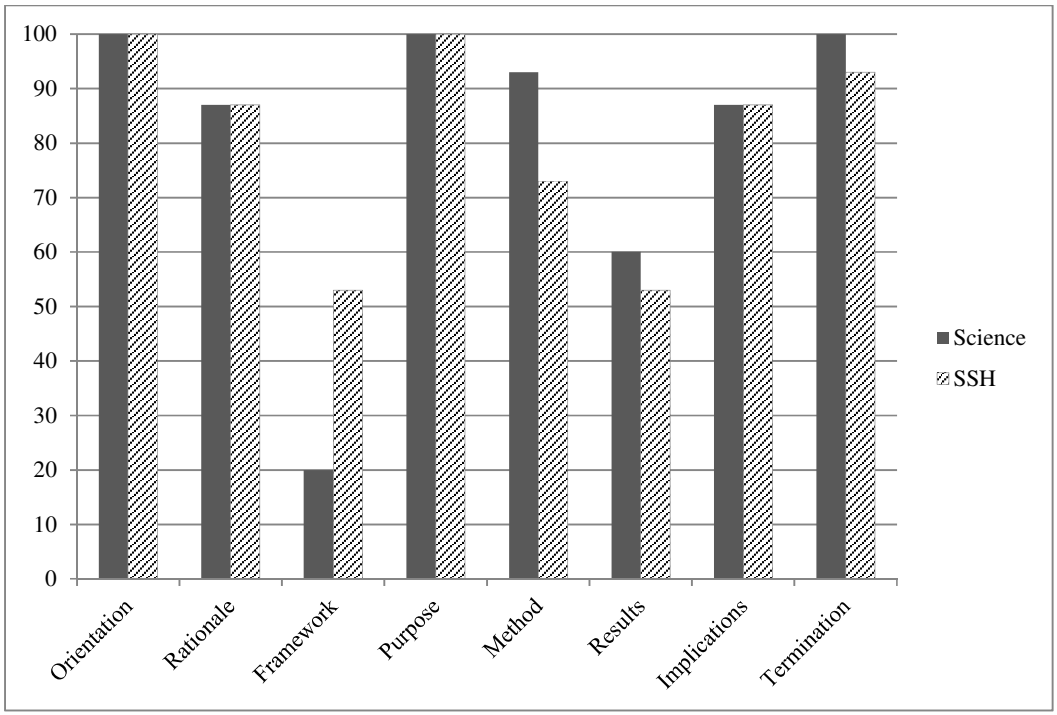
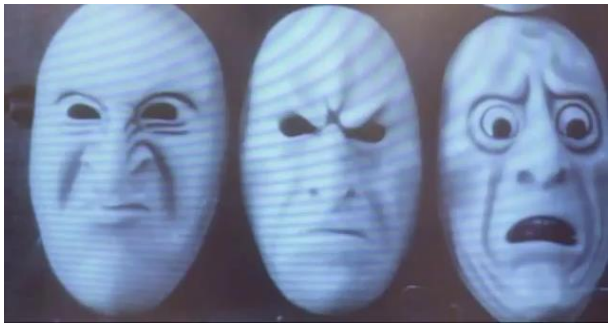
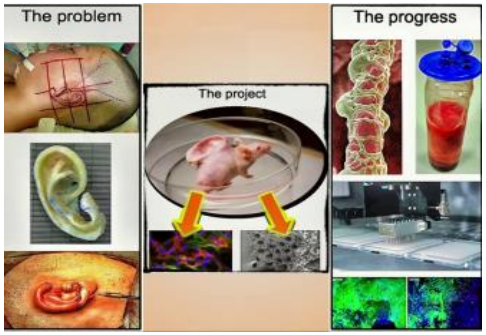



Fig. 1. Move analysis of 30 3MT presentations (15 in science, 15 in SSH)



(a)


The problem
The project
The progress

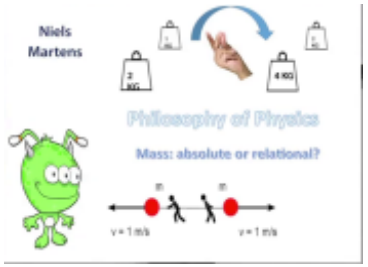
(b)

(c)

(d)

WHY ? ASK

(e)


Niels
Martens
Philosophy of Physics
Mass: absolute or relational?

(f)

(g)

Language, learning and society:
how can population structure shape the way you speak?

(h)

EYEWITNESS
BBC
GLOBAL
NEWS

(i)