READ THIS…FOR YOUR HEALTH: EXAMINING (MIS)COMMUNICATIONS BETWEEN SCIENCE, JOURNALISM, AND MASS MEDIA THROUGH A MISTAKEN "CANCER CURE" STUDY

by

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(Under the Direction of Michelle Ballif)

ABSTRACT

Using a Rhetorical Genre Studies (RGS) lens and borrowing from uptake theory, this project examines miscommunication between various reports on Le Trionnaire et al.'s study in medicinal chemistry, a study that is infamous in some scientific communities as the piece that spawned a "farts cure cancer" debacle in 2014. The outlandish nature of this claim does not naturally lend itself towards what is generally considered serious scholarly work, yet this case, with its movement through multiple genres and communities, is a prime case for observing how miscommunication occurs between scientific and public communities, an issue that has become more prominent in technical communication and medical rhetoric studies. The Le Trionnaire et al. article is reported in three main forms: scholarly scientific article, university press release, and journalistic news article. These forms are examined individually and comparatively to track changes in presentation of the original information across online spaces.

INDEX WORDS: Rhetorical Genre Studies, Uptake Theory, Science Writing, Journalism, Rhetoric, Technical Communication, Biochemistry

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INTRODUCTION

On July 11 of 2014, TIME published an article titled "Ridiculous Study of the Day Says Smelling Farts Might Prevent Cancer" as a featured story on their website's Newsfeed section (see Fig. 1). The article made the soon-to-be infamous claim that new scientific research came out stating that, yes, "smelling farts could actually prevent cancer, among other diseases" (Schwitzer; Stampler). The problem? Not only does the original journal article not focus on cancer treatments, the text never even *mentions* cancer. So, other than opening the door for a long stream of unfortunate jokes, the TIME piece was a severe misinterpretation of almost all aspects of the original study by Le Trionnaire et al. out of *Medicinal Chemistry Communications* (*MedChemComm*).[1] Unlike TIME's article reports, the focus of Le Trionnaire et al.'s research is on testing mitochondrial function in health and disease; the research suggests that using a compound called AP39 to release very small doses of hydrogen sulfide into targeted mitochondria may benefit cell health. In other words, the study shows that hydrogen sulfide may have properties useful in health therapies and disease prevention/recovery, so it warrants further pharmacological investigation. On July 14 of 2014, three days after its initial publication, TIME replaced their story on Le Trionnaire et al.'s work with a newly edited version re-titled as "A Stinky Compound May Protect Against Cell Damage, Study Finds." The new title, while more accurate than its predecessor came too late; the damage was already done. Within the three day span it took for TIME to correct their misinterpretation a variety of other news outlets jumped on the click-worthy story, and many used TIME's initial article as the direct source and expert basis

[1] See Le Trionnaire, Sophie et al. "The synthesis and functional evaluation of mitochondria-targeted hydrogen sulfide donor, (10-oxo-10-(4-(3-thioxo-3H-1,2-dithiol-5-yl)-phenoxy)decyl)triphenylphosphonium bromide (AP39)." *MedChemComm*, 2014. DOI: 10.1039/c3md00323. Accessed 14 January 2020.

for their pieces. A number of articles and online responses on popular social media sites suggest that many people at the time saw this weird storyline as a joke that was fun to circulate for a fleeting moment; however, a number of people in scientific communities did not take the misinterpretation so lightly.

Fig. 1. Screen-grab from Gary Schwitzer of the original title of TIME's article reporting on Le Trionnaire et al.'s work.

I first learned about the "farts cure cancer" story sitting in a biology research methods course during my junior year of undergrad, three years after the original TIME article was published. To introduce it, my instructor gave the class copies of Le Trionnaire et al.'s article directly from *MedChemComm*, and had us create write-ups on the study's purpose, methods, results, and implications; after that the instructor showed a since-deleted video from a news station claiming exactly what TIME's first article did -- there could be some medical advantages to inhaling flatulence. Those of us in the class, however, were not aware of the underlying connection. We, as a class, did not think that there was any connection between an article unpacking the potential of hydrogen sulfide in mitochondrial physiology on health therapies and the news spoof claiming farts could be a panacea. But, as I have illustrated, the work by TIME and all following connected news pieces lives *because* of the academic journal article by Le Trionnaire et al. My research methods instructor and the majority of the remaining biology department members all collectively knew this event as the "farts cure cancer debacle" -- a

situation they recall and use as an example of gross scientific misinterpretation. The question to ask now is how did news reports drift so far away from the original research matter?

The TIME article, though it spawned a stream of mass media responses, was not the first outlet to take-up Le Trionnaire et al.'s article and transform it from one textual form into another. The Le Trionnaire et al. article in *Medicinal Chemistry Communications* came out in April 2014, but the research piece did not pick up much general attention until the University of Exeter provided their own translation of the original journal article in a press release titled "Rotten egg gas holds the key to healthcare therapies" on July 9, 2014. This University press release is the most cited source among texts from the debacle.[2] The press release is meant to communicate specialized information to a non-specialized audience (in this case scientific to general), so it theoretically takes care of the majority of translation needed in order to turn science into main-stream news -- theoretically. The issue with this understanding of the press release is that it suggests a neutral and accurate stance; everything it reports is exactly what the scientists from the original piece are testing and claiming.

[2] Sixteen of the twenty-five articles in my corpus quote Dr. Mark Wood directly from the University of Exeter's press release. These sixteen articles reference Wood saying "Although hydrogen sulfide is well known as a pungent, foul-smelling gas in rotten eggs and flatulence, it is naturally produced in the body and could in fact be a healthcare hero with significant implications for future therapies for a variety of diseases" in Exeter's press release ("Rotten egg").

SECTION 1

THEORETICAL FRAMEWORK

In order to examine the "farts cure cancer" debacle as an example case of scientific (mis)communication in a way that will be academically productive, this project will work with ideas from Rhetorical Genre studies (RGS), focusing specifically on how information is taken up and transformed through shifting as a complex process. First, it is important to acknowledge that genres operate in an environment of give and take despite conventionally being perceived as stable rule sets. While making rules readily apparent by teaching genres as categorizations can be an attractive idea because it makes an end product easier to work towards, this reductive conceptualization is counterproductive because genres are not actually "stable entities that can so easily be classified, defined, and taught" (Herrington and Moran 11). Instead, as Carolyn Miller suggests, the nature of genre is to "change, evolve, and decay…[depending] upon the complexity and diversity of the society" (Herrington and Moran 11-12). This definition suggests that genres operate as association loci that "can tell us things about how individuals define recurrence and acquire social motives to act in certain ways" (Bawarshi and Reiff, *Genre and the Performance,* 3). When situated as a socially recognized strategy, many scholars see genres as "system[s] for getting things done" through recognition of similarities perceived across social situations (Russell 84). In this light, genre reaches beyond the limited definition of stabilized patterns and forms to meet specific ends and becomes a dynamic entity with great diversity for actions (Russell 84). Because people are able to "perform an activity in terms of how [they] recognize it, it can be argued that genre reproduces conventions for enacting social activity rather than genre

serving only as a regulator of pre-existing actions (Bawarshi, *Genre and The Invention*, 24-25). Genres are thus ways of being; they assist us with experiencing, learning, constructing meaning, organizing, and interpreting situations (Bawarshi, *Genre and The Invention*, 25).

Perhaps best put by Charles Bazerman, "Genres shape the thoughts we form and the communications by which we interact. Genres are the familiar places we go to create intelligible communicative action with each other and the guideposts we use to explore the unfamiliar" (Bazerman 19). It is this idea of creating "communicative action *with* each other" that is a vital aspect of studying (mis)communication, especially as genres move between disciplines. This study of dialogical interactions, or interactions where a text in one genre "elicits a responding text in another genre," is more commonly referred to as the process of uptake (Freadman quoted in Smart 162). However, in some of her later works, Anne Freadman expands this definition of uptake by suggesting the process does not necessarily require a response where one text is responding directly to another; instead, she explains that uptake may also include "a situation in which the use of a genre may prompt subsequent, though not necessarily immediate, semiotic events and related human actions" (Freadman; Smart 162). Rather than limiting textual interaction to observable dialogues that showcase how genres and their texts cohere within systems, this extended conceptualization of uptake in genre theory provides more theoretical space for operation and suggests that there is valuable work to be done in examining the communication processes happening between different genres.

I am interested in the ways some genres coming out of the university are revised/mediated and taken up by the general public (defined, for the purposes of this study, as the groups of outside the academic institution). Because genres function in a socio-rhetorical way, this mediation conceptually frames "what its users generally imagine as possible within a

given situation, predisposing them to act in certain ways by rhetorically framing how they come to know and respond to certain situations" as well as functioning through the creation of material consequence between everyday exchanges (Bawarshi, *Genre and The Invention*, 22). In recognition of these generic functions, the "rules and resources of a genre provide reproducible speaker and addressee roles, social typifications of recurrent social needs or exigencies, topical structures (or 'moves' and 'steps'), and ways of indexing an event to material conditions, turning them into constraints and resources" (Bawarshi, *Genre and The Invention*, 40). In the university as a social institution, the research article is one genre that sees tremendous recognition and reproduction; however, there are many tweaked versions of this overarching genre that occur due, not only to different goals and needs across disciplines, but to the hyper-specialization of disciplines in the university system which causes even more change from journal to journal that frame changes at the specialization level.[3] Regardless of which discipline an academic journal article comes from, this genre always requires specialized language from the writer that reifies the expectations of their discipline. These specially encoded expectations, however, are just that – specially encoded. If a non-specialist of the general public were to read an academic article, the specialized language will not translate the same way. While the general public is not likely to access journal articles, there is often a lot of information coming out of those articles that may be useful if translated into more lay terms.[4] Studies that cover new medical breakthroughs and

[3] As an example: Many upper level research classes (i.e., Biology Research Methods seminars), there is a brief acknowledgement of the generic micro-shifts between different specializations within the same discipline. In my own experience taking upper level research classes, shifts surrounding the academic research article as a genre only cover citation style differences. In this scenario, the instructor may tell the class that APA citation is correct, but that it is rarely accepted as online citation generators or websites structure it; rather, scientific researchers need to observe the APA citation style according to the journal they want to submit their works to.

[4] In my use of "general public," those who have access to higher education and connected academic resources like library and journal subscriptions are not included. For the general public, paying for subscriptions to academic journals is not the norm nor is it financially possible. By this nature, my so-called "general public" is not likely to ever pick up a peer-reviewed journal to read over.

treatments are often taken up by journalists or other university external writers and translated for lay audience members so they are up to date on scientific news. The problem is that even when experts in fields like journalism transform scientific journal articles on behalf of the public, they may not understand the specialized terminology of the original article either and the end result might be a botched presentation of the original article's results.

In fact, a lot of blame for miscommunication often falls upon journalists who are presented as unable to distinguish "bad" from "good" research design reported in scientific research (Soumerai and Koppel). When journalists report on sciences blindly, as Stephen Soumerai and Ross Koppel suggest, it is generally considered a fault or consequence of the "breathless reporting" that comes with growing number of reporting sites and apps in the digital age. Blind reporting, as one would expect, can wreak havoc on policies at the national level; so, it becomes more vital to look at news in a variety of forms. The problem with news reporting in the sciences is not so simple as revealing that journalists are "unable" to "comprehend" science – there are spaces of tension across the reporting process, and many of the issues which end up placed on the journalists' list of wrongdoings are actions and textual choices that occur well in advance of them getting to the scientific materials they report on. Soumerai and Koppel rightly point out that even experts in health fields have misinterpreted scientific articles, failed to recognize flaws in experimental design, or used findings from problematic studies. They do not bring up this point to shift blame from one party to the next, but to emphasize the ways in which miscommunication is a network with various points of issue as fault points and suggest that experts across disciplines should work together to better the communicative process. The question now is how does communication get fixed? What tools and processes are used to improve tactics from different disciplines? There are a lot of potential and valuable answers to

these questions, answers that many scholars in areas like writing across the curriculum (WAC), the rhetoric of science and medicine, and technical rhetoric have been working with in increasing numbers over the last couple of decades. What I want to do here is look at what I am considering undervalued instances of (mis)communication in order to highlight the transformative process through a rhetorical lens (RGS).

As Brechman et al. point out, there are relatively few studies that cover the whole procession of movement(s) of scientific knowledge as it is transformed and delivered to the lay public through intermediary genres like the press release (497). With the press release genre functioning as "a direct means of communication" between primary scientific journals and public news media, it is important to examine how it functions within the knowledge transformation process, especially when it is framed as a genre that gives "journals (or research institutions) [the opportunity] to influence how the research is translated into news" (Brechman et al. 497). Of course, this does not mean scientific researchers use the intermediary genre as a way of purposefully transmitting incorrect information; rather, this comment by Brechman et al. attempts to pinpoint one of the understudied areas that leads to miscommunication and illustrates the often uneasy public relationship between science and written communication. In other words, the questions worth asking are how does this genre function and why is it worth examining for various disciplines? If we continue with the lens presented by Brechman et al., then it is logical to suggest the danger of the press release rests in its ability to screen terminology, thus allowing it to misrepresent information to outside parties from the very beginning. However, the press release is just one step in the process; studying this genre without also putting pressure on both the academic journal and the following news articles would be a poor study. Examining this process highlights ideas from RGS and public sphere work, and sifting through their interactions

will provide information of the "complex, dynamic, situated, normalized as well as improvised ecologies of uptake that mobilize public life" through critical rhetorical analysis (Bawarshi and Reiff, *Genre and the Performance,* 10). For the remainder of this project, I will look at the Le Trionnaire et al. situation as a single case study tracing rhetorical transformation of the original scientific journal article to press release to news articles in order to examine miscommunication as a process rather than the often reported single event or one-to-one change from academia to journalism.

Methodology

My intention with this project is to take the so-called "farts cure cancer debacle" and examine how the transformation between genres occurred by applying genre and uptake theories that showcase transformation as a networked process rather than a one-to-one and final response. In order to do this, I collected a group of news articles to compare with Le Trionnaire et al.'s original piece as well as the University of Exeter's press release. Some of the articles I have gathered were reposted to websites other than their original sites of publication as well, but because they saw no change between versions, none of the re-posts have been accounted for in this corpus. Once an article was added to the corpus, I checked all of its links and citations. If there were additional news articles linked or referenced which focused on Le Trionnaire et al.'s research, they were also brought into the corpus. It should be noted though that there were a number of links that did not lead to new texts for the corpus because the articles of interest were deleted shortly after TIME's initial news piece was re-written, so they could not be added onto this project (see Fig. 2).[5] However, not all of the news sites/authors that recognized their

[5] The Guardian Liberty Voice's "Cancer Risk Reduced by Smelling Farts, Study Suggests" (Schwitzer); KROQ-FM Los Angles's "Pull My Finger! This Fart Might Cure Cancer." (Schwitzer); and "Fart smells have health benefits, according to Exeter University researchers" (SunnySkyz; Siriwongsup) have all been removed by their publishers and are no longer available for viewing.

misinterpretation of Le Trionnaire et al.'s research study went as far as deleting their pieces. Some publications made a few simple changes to better reflect their newly informed/corrected state. Laura Stampler changed the title and information in her TIME article, transforming the name from "Ridiculous Study of the Day Says Smelling Farts Might Prevent Cancer" to "A Stinky Compound May Protect Against Cell Damage, Study Finds" (Schwitzer). The majority of articles though still have their original titles and bodies of text. A few news reports chose to add addendums to their pieces rather than delete or completely re-write their articles, but the vast majority have remained unchanged all the way into 2020. I will observe these articles based on three specific areas of transformation as they go from journal article to press release to news article: word choice, abstracts/introductions, and titles.

Fig. 2. A screen-grab of the original article by Western Daily Press that was referenced by *SunnySkyz* and Siriwongsup. Image taken from @VsauceTwo. "Smelling farts could prevent cancer, strokes and heart attacks. Apparently. [source] http://bit.ly/1q3eNK5." *Twitter*, 12 Jul. 2014, 12:30a.m., https://twitter.com/VsauceTwo/status/487816245509500928.

SECTION 2

SHIFTING LANGUAGE SHOWN THROUGH WORD CHOICE AND FREQUENCY

In academic schemes, the research article as a whole genre is a form of cultural capital for those in university systems. It is important to note the unequal status and values that genres and their users possess, especially in the transformative uptake process from academic institutional pieces into general public pieces. In both instances, a large portion of value arises from the positional status of the original user/creator. However, speaking more specifically on the academic positionality, there tends to be greater value placed on the research projects done in STEM disciplines, like biology and chemistry. Ashley Mehlenbacher argues that, in the contemporary publish or perish culture of academia, competing for research funding pushes academics (she discusses those in the scientific community specifically) to create or showcase greater exigence for their own projects (128). Establishing an exigence, in this scenario, is a rhetorical move made by scholars to "[perform] a specific communicative function" recognized by those in a shared community (Mehlenbacher 128). Though I am not looking into crowdfunding genres here, Mehlenbacher's emphasis on the creation of exigence ties into a great body of work by those in rhetorical genre studies who suggest that exigence is a "situation or event that [people] recognize as requiring immediate attention or response" and is inseparable from the concept of genre (Bawarshi, *Genre and The Invention,* 40-41). To be published in an academic journal, scholars (experts in specific academic areas) must possess clear understandings of their operating genres as well as know how to employ conventions of the

generic forms; being published suggests that the author owns such generic knowledge and gain the "influence on [their] field" (Bawarshi and Reiff, *Genre,* 78).

With this in mind, there is another, more specific question to ask: with neither Le Trionnaire et al. nor the University of Exeter mentioning it, why discuss cancer? Why claim that the research is reporting a cure for one disease it did not mention when there are eleven other medical issues mentioned by name which could be chosen from? The answer is multi-fold, but it always comes back to exigence. When *MedChemComm* published their article in 2014, around 14 million Americans were living with cancer, and reports suggested that another 1.6 million could be diagnosed by 2015 (Riles 1019). These statistics situated cancer as America's second leading cause of death and one of the "most frequently sought [out]health topics (Riles 1019-1020). If cancer was a leading disease and cause of death during Le Trionnaire et al.'s publication period, then it is not shocking that the vague use of "disease" in the original article and in the press release were taken out of context in order to create more buzz. Of course, this does not mean that all journalists reporting connections between cancer and Le Trionnaire et al.'s research did so with malicious intent, but it does suggest how one of the few diseases not mentioned in either piece out of the University of Exeter ended up at the forefront of this debacle.

Table 1: Word Count Across Genres

Word/Term Appearing in the Text:	**Number of Appearances in Le Trionnaire et al.**	**Number of Appearances in Exeter's Press Release**	**Number of Appearances across Twenty-five News Articles**
Disease	5	6	71
Cell States (e.g., death/fate)	4	4	10
Hypertension	3	0	0
Therapeutic/Therapies	3	4	25

Atherosclerosis	3	0	0
Health	2	2	46
Pre-Eclampsia	2	0	0
Arthritis	2	1	14
Diabetes	2	2	15
Neurodegenerative Disease	1	0	0
Hepatitis	1	0	0
Anti-inflammatory	1	0	0
Stroke	1	2	28
Sepsis	1	0	0
Obesity	1	0	0
Heart Attack/Failure/Disease or Myocardial Infraction	1	3	31
---	---	---	---
Aging	0	1	5
Dementia	0	2	28
Inhale/Smell/Sniff(ing)	0	2	108
Fart/Flatulence	0	2	84
Cancer	0	0	57

This table (Table 1) showcases and compares the number of times specific terms revolving around health, disease, and gas came up Le Trionnaire et al.'s *MedChemComm* article, the University of Exeter's press release, and the twenty-five articles in this project's news corpus. The arrangement of terms is determined by their number of appearances in the original research paper, with the most common words from Le Trionnaire et al.'s piece at the top of the

table and least common words at the bottom.[6] The comparisons highlight the importance of word choices across genres through observing their differences in frequency. Terms like "disease," "health," and "therapy/therapies" occur with high frequency across all three genres, suggesting a shared understanding that the main point of Le Trionnaire et al.'s research, loosely, is improving human health conditions. Terms like "cancer" and "flatulence," however, do not share a high frequency of appearance across the three genres, and they only show up in the press release ("flatulence") and the news articles ("cancer" and "flatulence"). Simultaneously tracking the occurrences of terms both within a given genre and across genres helps illuminate various patterns, like which terms are being carried from genre to genre and which words are being transformed, or even created, as the original article is taken up.

As one can see, though many specific health issues are named, especially in the original journal article, the word "disease" comes up with greater frequency across all three genres than any specifically named aliments in the corpus; this allows disease to operate as an umbrella term of sorts that stands in for any possible illnesses not specifically named in the primary scientific text. As an umbrella term, "disease" takes on extra lives where it acquired the definition desired most by any given reader -- thus is the potential of vague terminology. Considering "disease" with the second most frequently occurring term, "cell death,"[7] it appears to be less of a stretch making one of the possible routes for therapies to be curing (in some way) cancers in particular; "cancer," never even appears in the introduction or conclusions of the Le Trionnaire et al. article,

[6] It should be noted that the word counts for Le Trionnaire et al.'s and University of Exeter's individual pieces were compared to the word counts across multiple news articles (twenty-five). Instead of choosing one piece to represent each genre, I included word frequency from all twenty-five news articles in my corpus. This is done to showcase patterns of movement, to see which words are most likely to be taken up from Le Trionnaire et al. and to see which words appear to have shifted in their genre transformation (so the importance is not on volume of occurrences, but on which changes are most likely moving when taking the original scientific material and the press release's material into news media).

[7] In a general sense, all cancers occur when there are issues with cell creation/deletion/monitoring in a body. The Mayo Clinic states that cancer is a "diseases characterized by the development of abnormal cells that divide uncontrollably and have the ability to infiltrate and destroy normal body tissue" ("Cancer").

but it occurs 87 times across twenty-five collected new articles. Cancer became *the* disease attached to Le Trionnaire et al.'s piece through the process of translation.

SECTION 3

INSPECTING ABSTRACTS AND INTRODUCTIONS

When moving research out of academic genres and into more public places, specialized knowledge must be redressed in new terminology to make it more accessible to nonspecialized readers. Such recontextualization of information for popular reception is often "characterized by its lack of discussion…of new scientific knowledge added to the discipline's conceptual base" which appears in a variety of public genres that respond to scientific institutional genre (Bhatia 33). With the immediate online circulation as an affordance for journal article, press release, and news article genres, the patterns of movement created by their interplay assist in highlighting the ways knowledge is made available to a variety of publics. For this segment, I will break down some changes that are made when the original scientific article is transformed into a press release. This comparison is interesting for a variety of reasons, but two aspects are valuable here: 1) the two genres come out of the same university, and 2) the press release takes advantage of online presence to shape its genre actions.

Table 2: Comparison of Journal Abstract and Press Release Introduction – This table compares the abstract in *MedChemComm* by Le Trionnaire et al. and the "abstract"/introduction from the University of Exeter's press release.

The MedChemComm Abstract:	**Exeter "Abstract"/Introduction:**
"Synthesis and bioavailability of the endogenous gasomediator *hydrogen sulfide (H2S) is perturbed in many*	*"It may smell of flatulence and have a reputation for being highly toxic*, but when used in the right

disease states, including those involving mitochondrial dysfunction. There is intense interest in developing pharmacological agents to generate H2S. We have synthesised a novel H2S donor molecule coupled to a mitochondria-targeting moiety (triphenylphosphonium; TPP+) and compared the effectiveness of the compound against a standard non-TPP+ containing H2S donor (GYY4137) in the inhibition of oxidative stress-induced endothelial cell death. **Our study suggests mitochondria-targeted H2S donors are useful pharmacological tools to study the mitochondrial physiology of H2S in health and disease.**"	tiny dosage, hydrogen sulfide is now being being found to offer **potential health benefits** in a range of issues, **from diabetes to stroke, heart attacks and dementia.**"

The Press Release Introduction

I suggest that it is important to realize nodes in the network of communication are not always falling specifically into institutional or non-institutional (i.e., public) categories. Rather, genres like the press release are constantly reshaped by the expectations of its audience(s); for the press release, it is simultaneously institutional and public. Serving as the go-between for science journals and popular news media, the press release is another node within the public network that invites intergeneric uptakes (Bawarshi and Reiff, *Genre and the Performance*, 12). With intergeneric uptake becoming more likely in public spheres because of the "more rhizomatic" translations and less strict following of genre rule, it makes sense that the movement from an intermediary source like a press release into a news article would be more "subject to mistake, abuse, and recontextualization" (Bawarshi and Reiff, *Genre and the Performance*, 12).

The movement from primary journal article into press release also sees a significant change that occurs because of a shift to a public audience; while the press release was written

and published through a large institution (University of Exeter), the purpose is not specifically institutional. When the University of Exeter created and published original Le Trionnaire et al. study to the academic journal *MedChemComm* their intention remained within the institution of academia – the circulation of articles is closed and the audience is fellow researchers who belong to the institution as well. This institution to institution translation is changed when the original article is transformed for the press release genre, a genre that comes from the institution of academia, but is meant to reach people groups within and outside of that structure. It is this translation that tends to be overlooked even though it takes on the public sphere intergeneric uptake idea that Bawarshi and Reiff discuss. As suggested in the genre's name, press releases are also meant to present information to the public, information ready to be taken up by journalists. The release is perceived as an expert go-between that "filter[s] and translate[s] scientific information" on behalf of the scientific journal, and because the release often comes from the institution, it wears the title of "expert" (Brechman et al. 497). However, many press releases, just like general news articles, are not written by the scientific journal article's authors, or even writers that might be considered part of that specified scientific group. Because of these misconceptions of the press release and its function as an intermediary genre, press releases are often overlooked in studies on miscommunication in the sciences, though as Brechman et al. suggest, the flow of scientific information often finds key points of distortion in this intermediary genre (497).

An apt place to begin observing this flow of changes from journal to press release is in looking to the shifts made in the press release's introduction section as it moves away from the highly specific language of Le Trionnaire et al.'s abstract (see Table 2). The University of Exeter's press release on Le Trionnaire et al.'s article, "The synthesis and functional evaluation

of mitochondria-targeted hydrogen sulfide donor, (10-oxo-10-(4-(3-thioxo-3H-1,2-dithiol-5-yl)-phenoxy)decyl)triphenylphosphonium bromide (AP39),” opens as follows:

> **Rotten egg gas holds key to healthcare therapies**
>
> It may smell of flatulence and have a reputation for being highly toxic, but when used in the right tiny dosage, hydrogen sulfide is now being being found to offer potential health benefits in a range of issues, from diabetes to stroke, heart attacks and dementia (University of Exeter “Rotten egg”; double “being” is original).

Though the expectation with scientific research is that it deals with special jargon, the Exeter press release replaces the original “hydrogen sulfide” terminology from Le Trionnaire et al.’s article with the simpler term “Rotten egg gas” (“Rotten egg”). The press release is attempting to more appropriately communicate its scientific coding to a less specialized audience, but the shift in terminology represents a larger issue at hand: over-simplification in the name of relation. In other words, the switch from scientific terms to extremely mundane replacements is an attempt to translate one idea through another term that is only loosely related to the original. This practice is risky, especially in health related fields where research is often taken-up and spread rapidly online either as it is or by being put into “do it/learn it yourself” communities in different online forums/platforms.[8] Here, the attempt at relation-based simplification suggests that the terminological shift creates a hot space for breeding misunderstanding, which works against the press release’s intent to provide scientific research institutions (and their journals) with “an opportunity…to influence how research is translated into the news” (Brechman et al. 497). Instead of helping the institution create a more informed audience within the general public, the

[8] Johanna Hartelius suggests that the “blurring of traditional distinction between experts and laypersons” is one of the ways dot/learn it yourself communities have become so popularized; as an example, she lists this blurred boundary as one of “*Wikipedia’s* defining characteristic” (25). The website *WebMD* is another example platform which takes advantage of scientific genre uptake in order to present lay audiences with “expert” information repackaged in an everyday language set.

textual transformation of specialized scientific terminology as it was taken from journal article into press release has distorted the original research and opened doors to further misinterpretation as the press release genre gets taken up by nonscientific publics. The changes, even in this one key phrase, highlight how complex translation across genres is and suggests the scientific to nonscientific translation is particularly complicated because the "scientific process does not straightforwardly lend itself to reporting" (Soumerai and Koppel).[9]

The University of Exeter, however, did not stop its transformation of scientific terms into everyday concepts with the opening recontextualization of "rotten egg gas" for "hydrogen sulfide." In the line immediately after its header, the release reverts back to scientific terminology from the journal article and uses "hydrogen sulfide" by name. This code switch is more problematic than beneficial to the release though because of the earlier switch where hydrogen sulfide is rebranded as rotten egg gas. Though the release uses "rotten egg gas" as a quick way to intrigue readers, the connection is further embedded in the readers conceptualization of hydrogen sulfide when the phrase "It may smell of flatulence and have a reputation for being highly toxic" as a preceding descriptor for the chemical compound ("Rotten egg"). By placing this descriptor before the proper noun subject, the release emphasizes the association more than the actual entity of the study, and in doing so, consequently opens the door for more misinterpretations of the study's focus and actual findings. The placement of subjects in the opening two sentences shift the attention of readers – not only does the descriptor preceding the piece's first use of "hydrogen sulfide" take away from the term's importance, the use of

[9] Soumerai and Koppel discuss the direct translation of scientific research articles into news reports in their article and suggest that "Researchers may have weeks or months to structure their papers, which include complex statistical analyses and dense scientific jargon. Journalists often have only hours to convey the findings, and newspaper editors are generally not aware of scientists' failure to acknowledge important limitations of their research — even fatal flaws that can debunk their studies." Their point about the complexity of uptake is important across more genres than the two they focus their report on.

"rotten egg gas" instead of hydrogen sulfide in the first sentence, creates a new meaning for the pronoun "It" in the second sentence. Now, rather than "it" referring to the "hydrogen sulfide" in the same sentence, "it" is read as referential to the "rotten egg gas" subject of the first sentence, the same gas that is meant to stand-in for hydrogen sulfide. These are small patterns, yet they boast extreme importance to studies of miscommunication.[10]

As introductory or topical sentences, the two sentences I have been working with here are meant to serve as guides for the reader, telling them what to expect for the rest of the piece – this is the general purpose of perceived "topic/intro sentences"; but, if we are going to discuss why these particular terms have been taken up and misconstrued so greatly, we must look, again, at the genre in which they appear. This will reveal the functions of employment and arrangement, and the changes from our primary chemistry piece (the original article) as it transforms into the press release and, as I will show now, into news articles.

The Introductions of News Articles

As a genre, news articles do not have an abstract or introduction in the same way journal articles or press releases do; however, many news articles do have introductory/topical sentences that function in the same way as abstracts/introductions. News articles generally place their introductory sentences directly under their article's title. This sentence will often be set off from the main article's body as well, just as we see with abstracts in academic genres. Unlike academic genres though, with their strict regulations on what an abstract looks and is structured

[10] The press release and article faced so much backlash over the "Fart cure cancer" headlines that an addendum has been added to the bottom of the press release on the University of Exeter's website. It read as follows: "Note from the study authors: In light of misleading headlines on the above press release, the authors would like to stress that neither the papers (http://pubs.rsc.org/en/Content/ArticleLanding/2014/MD/C3MD00323J#!divAbstract, http://www.ncbi.nlm.nih.gov/pubmed/24755204, http://www.ncbi.nlm.nih.gov/pubmed/25960429, http://www.ncbi.nlm.nih.gov/pubmed/26513708, and http://www.ncbi.nlm.nih.gov/pubmed/25555533) nor the accompanying press release above make any reference at all to cancer or to any health benefits from inhaling (sniffing) hydrogen sulfide. The research is an early stage drug development project and has not yet been trialled in humans." (9 July 2014)

like, the news genre has a lot of flexibility in how their pieces are introduced. Dean Burnett's "Silent, not deadly: how farts cure diseases" article employs a longer introduction that states "A recent study from the University of Exeter has been reported as showing that smelling farts can cure cancer, as well as many other diseases. Although the study itself doesn't actually say this at any point, if farts do have healing powers it would have numerous wide-reaching implications" (Burnett). In his article, this section of text takes advantage of both spacing and text coloration in order to create its identity as separate from the main body. Burnett's introductory lines are slightly smaller in size than the "Silent, not deadly: how farts cure diseases" title, but the introductory lines appear directly under the title in the same boldface font that contrasts the main body's lighter, non-bolded text. These visual cues operate in the same way an academic abstract does – they allow readers to get a broad idea of what information is soon to follow. Looking at other opening news lines like "Can smelling farts cure cancer? No, right? Right. But also: maybe!" and "Scientists at the University of Exeter claim that the smell of farts can offer health benefits when it comes to cancer, diabetes, stroke and other diseases" illustrates how, even with their similar function, the transformation of information across genres changes the meanings and possible perceptions of Le Trionnaire et al.'s findings (Conaboy; Co). Like the press release, all of the news releases hone-in on a general lexicon and exaggerate it in order to create a point of interest where more uptakes by the general public may occur.

SECTION 4

WHAT'S IN A NAME? -- EXAMINING TITLES

Perhaps even more attention grabbing than the abstracts/introductions, the function of titles cannot be pushed aside in a discussion of the transformative process across genre. Titles are positioned and meant to garner initial interest, making the reader decide at first glance if they have enough interest to invest in moving towards reading more developed parts of each genre piece (like the abstract/introduction). The full title of Le Trionnaire et al.'s article in the journal of Medicinal Chemistry Communications is "The synthesis and functional evaluation of mitochondria-targeted hydrogen sulfide donor, (10-oxo-10-(4-(3-thioxo-3H-1,2-dithiol-5-yl)-phenoxy)decyl)triphenylphosphonium bromide (AP39)." As expected with the academic journal genre, the article's title is extremely specific, not only stating what the project is focused on ("synthesis and functional evaluation of mitochondria-targeted hydrogen sulfide donor"), but by writing out the targeted chemical donor specifically engineered by scientists in this study (Le Trionnaire et al.). Being almost completely composed of specialized terminology only recognizable to other scientists in this area of specialization, the article's title reiterates its position as a "high-brow" piece of work, an academic genre that is not readily approachable for the public majority. Unlike academic journal articles which focus on producing highly specified pieces, both the press release and news article genres serve as generalized texts meant for public intake and have many similarities in title design and function.

Titles in the Press Release and News Articles

There is some overlap between the patterns of uptake that occur with both press release

and news reports when they both take up from primary journal articles. Things like reading pattern (i.e., what parts of the initial report are considered "vital" or "key-in" points that should be focused on),[11] and the general end goal of transforming terminology owned by a scientific specialty into a language that general audiences[12] can understand are extant in both uptake genres. These patterns of uptake remain much the same even when the news report takes up the press release of a primary article rather than the primary article itself. The press release, in this function as an intermediary, is treated by the journalist as the primary source in most ways. The differences? Being an intermediary genre, the press release has already done a lot of work to communicate specialized science to a non-institutional audience by translating its specialized language and formatting – this process, in theory, relieves the news writer of the pressure of higher level misinterpretation. The problem with this idea (that the pressure of misinterpretation is lessened), is that it may actually create more opportunity for misrepresentation of the initial article. Much like when someone plays the game telephone,[13] participants who are not working with the original information instead take on different iterations of the original piece, and each iteration is simply a different translation of the previous information. When this is the pattern, accidental distortion becomes a seemingly inevitable result. However, the extent to which the distortion occurs is dependent on a variety of other factors.

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[11] See Wolfe, Joanna et al. "Knowing What We Know about Writing in the Disciplines: A New Approach to Teaching for Transfer in FYC." WAC, vol. 25, 2014, pp. 42-77; and Berkenkotter, Carol and Thomas N. Huckin. *Genre Knowledge in Disciplinary Communication: Cognition, Culture, Power.* Erlbaum, 1995 for more on reading and stylistic writing patterns within the sciences.

[12] It is important to note here that "general" is an umbrella term that includes the lay audience (i.e., non-scientists) as well as others in the larger arena of scientific practice who do not work with terminologies from the primary article's field and, by extension, do not have the full knowledge base to be considered "specialist" in this scenario. As Berkenkotter and Huckin state, "when reading articles out of their specialty, most of [scientists] read" in a different way than they might to examine work in their own area of expertise which suggests the need to consider this a specialist-nonspecialist scheme of relation to the text rather than a fully scientist-nonscientist dynamic (30).

[13] One person tells X to someone and asks them to pass that message down the line, but as more and more people try to transmit X to those after them, the message is distorted so X may become Y and Z and H before reaching the last person as K. I argue that the same thing happens often in the transformation of scientific genres as they work towards public spaces.

Like both scientific journal articles and press releases, the news media writes with an agenda: sell science, make the science something the audience needs in some way. For the news, one dominant method of capitalizing on scientific research is to sell it through intrigue. Even when transforming press releases, the task of the journalist is "economizing and glamorizing science" by presenting research in a simplified and greatly shorted form that lay readers can understand (Brechman et al. 507). Though their work focuses on traditional newspaper reading patterns, Berkenkotter and Huckin's suggestion that news readers "typically look for the most surprising, most newsworthy information first" still holds today when journalists attempt to draw in an audience through headline statements or internet click baiting practices (31).[14]

There are many small tag lines in the title and opening line of the University of Exeter's press release covering the school's earlier publication in *Medicinal Chemistry Communication*. The press release almost feels like click-bait, a title made just to induce interest and drag in potentially larger audiences to read the article, which is a genre strategy typically employed by news media[15]; of course, there are many potential problems with click-baiting. The baiting concept is one many internet consumers are familiar with, as it appears in a variety of "news" presentations across platforms and domains. Some platforms, such as DailyMail, employ this method across their media presences and the quick titles they present before a given article can

[14] Berkenkotter and Huckin provide a more detailed account of the similarities and differences in newspaper and scientific journal article reading in their *Genre Knowledge in Disciplinary Communication: Cognition, Culture, Power* (1995). They suggest that "Whereas the textual layout of news reports mirrors almost exactly the anticipated top-down reading pattern, the textual layout of scientific journal articles, of course, is quite different. The traditional sequence of Introduction- Method-Results-Discussion reflects the chronology of idealized Baconian scientific procedure (Gross 1990, chap. 6) or "narrative of science" (Myers 1990), not necessarily the chronology of reading. This discrepancy between what we might call a narrative, writer-based text- schema on the one hand and a highly selective, purpose-driven reading schema on the other is not seriously dysfunctional. Because the text schema is quite standardized, experienced readers know where to look for certain information and can skip around quite efficiently." (Berkenkotter and Huckin 31-32).

[15] While Oxford English Dictionary supports the definition of "clickbait" as a piece online that is designed with the purpose of attracting page visitors and enticing them to click on it or its links to another online page, there are many sources that also draw attention to (or exclusively use) the pejorative sense of the word which suggests that clickbait is simply false advertisement.

be read is often misleading information that does not capture or match up with the apparent message of the article in full; with platforms like Instagram and Snapchat, the DailyMail body uses click-bait as a way to attract more potential viewers/readers thus giving their reported stories more value. Appropriately, this popular "news" site also jumped on the Exeter story with a captivating article by Julian Robinson titled "Could sniffing flatulence be GOOD for you? Potent gas can help prevent cancer, strokes and heart attacks, claim scientists." Not unlike the University of Exeter's press release, the DailyMail report takes advantage of the term "flatulence" and creates a connection between the smell of (or the act of smelling) hydrogen sulfide and potential for healthcare ("Rotten Egg"; "Could Sniffing"). Of course, in the change between genres, we also have to consider potential motivations behind transformative choices.

With these examples of "click-bait" structures, both the press release and DailyMail's news article are vying for attention from their audiences; however, the press release employs this technique in order to relay specialized information in a general way, while the news article may be more concerned with click-rates. Though more popular news sites like DailyMail and Reader's Digest sometimes change their titles in order to garner more clicks and create more site-wide revenue, other articles from sites like Health News Review take tag terms like "fart" without the expense of inaccurate reporting.

Whether or not they are used for accurate scientific reporting or simply for click-value, both types of click-bait structuring showcase a shift from the original journal article's method of using the hydrogen sulfide's actual chemical symbol (H_2S), moving towards just hydrogen sulfide or "gas" in an appeal to more general audiences who are not thought to be familiar with chemical compound abbreviations; yet, the further delineation, the move from hydrogen sulfide to "rotten egg gas," "smell of flatulence," and "one of a number of smelly gases" feels almost

insultingly simple, so simple that the a vast majority of the social media reactions online are people claiming disbelief and calling bull on most news presentations. Some public reactions were expressions of disbelief, and sometimes, more interestingly, expressions of anger at the suggestion that scientists are receiving funding to conduct such ridiculous research in the realm of healthcare.[16] I specifically mention health care here because there are various statements that reflect a culturally held respect for scientific fields, but the realm of health tends to appear even more close-to-the-vest to the majority of Americans.[17]

Table 3: Titles of Various News Articles Reporting on Le Trionnaire et al.'s Research -- I gathered the titles and publishers of twenty-five extant articles reporting on Le Trionnaire et al.'s research (and the University of Exeter's press release) for this corpus – all are listed here.

Year:	***News Article Title:***	***Publisher:***
2014 (Revised)	"A Stinky Compound May Protect Against Cell Damage, Study Finds"	*Time*
2014	"Silent, not deadly: how farts cure diseases"	*The Guardian*
2014	"No, Farts Don't Prevent Cancer: Claims Don't Pass the Smell Test"	*NBC News*
2014	"Journalists jump at chance to say 'fart' in a story; botch what study and news release said"	*Health News Review*
2014	"No, Smelling Farts Can't Cure Cancer"	*IFL Science*

[16] A good sampling of public reactions on social media platforms can be found through the following: SillyShepherd. "The Health Benefits of Smelling Farts." *MetaFilter*, 13 Jul. 2014, https://www.metafilter.com/140876/The-Health-Benefits-of-Smelling-Farts and McAteer, Oliver. "Smelling farts is good for you: Here's how we've reacted to the news." *Metro UK*, 13 Jul. 2014, https://metro.co.uk/2014/07/13/smelling-farts-is-good-for-you-and-this-is-how-weve-reacted-to-the-news-4796649/.

[17] In rhetorical studies, Christa Teston has work that analyzes presentations/perceptions of cancer and the ways treatments/testing is communicated between practitioners and more general public (i.e., patients). See her book *Bodies in Flux: Scientific Method for Negotiating Medical Uncertainty.*

2014	"Scientists say sniffing farts could prevent cancer"	*UPI*
2014	"Can Smelling Farts Cure Cancer? Scientists Say Yes-ish"	*Gawker*
2014	"Study says smelling farts may be good for you"	*Fox News*
2014	"Smell of flatulence may reduce risk of cancer, stroke, heart attack and dementia, experts find"	*Huffington Post UK*
2014	"Smelling farts is good for you: Here's how we've reacted to the news"	*Metro News UK*
2014	"No, Smelling Farts Won't Actually Cure Cancer"	*Mic*
2014	"Study Claims Smelling Farts Could Prevent Cancer and Other Diseases"	*The Escapist*
2014	"Fart gas may help prevent dementia, heart disease: study."	*New York Daily News*
2014	"Smelling farts could be the best thing you do today."	*CNET*
2014	"Could sniffing flatulence be GOOD for you? Potent gas can help prevent cancer, strokes and heart attacks, claim scientists"	*DailyMail*
2014	"Study: Smelling farts may be good for your health."	*The Week*
2014	"Smelling flatulence could help you live longer, scientists claim."	*Yahoo!News*
2014	"Smell of fart, rotten eggs hold key to treating cancer, stroke?"	*TechTimes*
2014	"Rotten egg smell could help battle heart disease and Alzheimer's."	*Independent*
2014	"Scientists Say Smelling Farts Prevents Cancer."	*SunnySkyz*
2015	"Cancer-Curing Flatulence – A Medical Breakthrough?"	*Catalyst*
2015	"Farting Helps Fight Cancer, Scientists Claim"	*Inquisitr*
2017	"Sorry, But Your Husband's Most Disgusting Habit May Have an Upside."	*Reader's Digest*
2019	"No, Your Husband's Farts Aren't Actually Helping You Live Longer."	*Rare*
2019	"Is Smelling Farts Healthy: Research Says Maybe"	*Healthline*

The above table of news article titles (Table 3) displays the variety (or, perhaps, the lack-thereof) in the patterns of interpretation concerning the University of Exeter's press release; most of the new articles do not take into account any of the information presented in the original scientific publication, only the theoretical high or key points that have been filtered through the press release. Again, when looking at all of these titles placed together in a collection, we are able to see grand appeals to ethos through the use of phrases such as "Study says," "Scientists say," "Research says," "experts find," and "Scientists claim" (see Table 3). While there is some variation in their incorporation, all of these phrases stress the same idea: you, as a reader, can trust *this* news source because the content discussed comes right from the people who know science, who know their stuff.

The phrases simultaneously suggest that expertise is a multifaceted entity, one that is exchanged and created through exchange. Applying the ethos of the expert source also bolsters the position of the news source taking it up. By reporting the "facts," the news sources suggest they too are experts of a sort, experts on bringing the latest truths to the cultural forefront. Still, the number of experts here is not limited to two: the news articles are also subtly suggesting that by consuming "expert" research and reporting, the reader is playing the role of informed actor, and an actor who is able to distinguish the "expert" facts for themselves is also a type of expert in comparison to their neighbors who have not consumed the same materials.

Some titles reveal more culturally held beliefs that occur due to our current hyper-specialized culture that presents and perpetuates the compartmentalization of fields, especially those believed to be polar opposites of one another. The *Health News Review* article titled "Journalists jump at chance to say 'fart' in a story; botch what study and new release said," more so than any other example in this study's corpus, showcases this tension between polar fields (Schwitzer). It

is the journalists versus the chemists; the humanities versus the sciences; and in this framing, the careless versus the careful. The title supports the popular idea that the reason we, as a culture, see so many outlandish cases of "bad science," is largely because journalists misinterpret scientific works. However, as Soumerai and Koppel situated earlier, the problem with what might be considered "bad science" is not so much that the actual experiments are poorly designed, but that journalists are unable to spot bad science and this leads to poor policies and dangerous public misunderstanding ("How bad science").

While it would be unwise to dismiss Soumerai and Koppel's claim that bad reporting on science can lead to harmful headlines and a host of other repercussions, there has to be push back on who holds the blame for bad science reporting. Their piece falls into a tradition of choosing one side to blame without giving ample look into the other. One of the ways we can look into both sides with as little bias as possible, is to observe the genres in play and the way primary information moves along the chain. In breaking down the misrepresentation of the Le Trionnaire et al. piece, we are able to trace the progression of communication from primary work through news and social media interpretations. By doing this work, one may note that the Le Trionnaire et al. work is not "bad science" – it is a solid, replicable, and thus reputable experiment; the purpose, methods, and results of their study, however, changed meaning from the original academic article to its press release, a press release written and published by a scientific specialist in the University of Exeter, not a journalist without the background knowledge to understand entirety of the original piece. Rather than place blame on any one party, it is important to recognize that the networked environment of cross disciplinary work and of genre uptake itself work in a process that spawned an onslaught of misrepresentations in every step.

CONCLUSION

Scholars in the sciences and humanities should consider how understanding miscommunication impacts their work. I emphasize the need to expand the range of "worthy" academic topics into areas beyond policy; if we are able to deploy rhetorical strategies that highlight patterns of transformation and (mis)communication in more "lower-stakes" but note-worthy cases, then it may be easier to investigate prominent works in areas that will more greatly affect policies and have more immediate physical consequences when misinterpretations occur. For scholars across fields, this also re-emphasizes the necessity of viewing communication as a fluid, networked entity rather than a one-to-one single transmission.

The conversation should not always fall into questioning and condemning a single person or step at fault, but must expand into a conversation about the nebulous process of communication and what happens at each node, and how those nodes affect each other. While there was not adequate space to do so in this study, in thinking through how genre nodes work with each other, investigations must also consider how the online social media sphere influences and is influenced by (mis)communication as a process rather than as a stationary one-to-one response. Considering how and where miscommunication occurs becomes especially important with the growing speed of news reporting and scientific publication; even with the "farts cure cancer" debacle, the majority of spread took place within a five-day period. How much faster and farther reaching will miscommunication be when the general public receives information on a more serious sounding event? When they hear new "cures" for pandemics, it will be vital to

study communication as a breathing network full of players and pieces worth following as they move.

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