

GENRE INNOVATION, HYBRIDIZATION AND
MULTIMODALITY:
AN ANALYSIS OF RESEARCH VIDEO ABSTRACTS

By

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Recent advancements in technology have impacted the ways genres are being produced and reproduced for a varied audience, thus fostering genre innovation. Genre innovation is defined as “departures from genre convention that are perceived as effective and successful by the text’s intended audience or community of practice” (Tardy, 2016, p. 9). Genre innovation manifests itself in innovative, multimodal genres in three layers; first a stylistic and modal variation; second, a rhetorical structure level; and third, a discourse level by mixing genres and discourses (Tardy, 2016). Situated within this perspective, this dissertation aimed at investigating genre innovation in the emerging, multimodal genre of Video Abstracts (VA). In study one and via an inductive analysis of VAs, it became clear that VAs are stylistically varied and utilize modes that are typical of both research and non-research discourses. This way they were distinguished into three types of Graphical VAs, Whiteboard VAs and Talking-researcher VAs. Due to modal variation, each VA seems to be an attempt at connecting to a different audience ranging from experts to non-experts. The second study then took a multimodal move analysis approach to the analysis of VAs and showed that VAs contain the typical moves that have traditionally been used in other research genres such as in research articles. However, what seemed to be unique and innovative in this genre is the multimodal realization of those moves, showcasing two types of innovation; dynamic illustration of researchers’ claims and creative mixing of various discourses and genres. The third study then looked closely into the second innovation or “interdiscursivity” in the WVAs of the study. Interdiscursivity is referred to as “creating novel and creative textual constructs by appropriating and exploiting conventions and semiotic resources typical of other genres and social discourses in constructing novel, hybrid genres” (Bhatia, 2010). Interdiscursivity in WVAs was used to achieve some of researchers’ private intentions, such as providing instructions on scientific concepts, evoking slight promotional impacts and entertaining and engaging viewers. The dissertation has both theoretical and empirical implications for both interested genre analysts and genre producers.

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CHAPTER I

INTRODUCTION

Recent advancements in technology have impacted the ways genres are being produced and reproduced for a varied audience, thus fostering genre innovation. Tardy (2016) has defined genre innovation as “departures from genre convention that are perceived as effective and successful by the text’s intended audience or community of practice” (p. 9). Adjustments to traditional genre conventions can be creative and novel (Fairclough, 1992) and therefore, the ways through which genres can achieve such innovations are the critical topics that need further investigation. As Tardy highlights, the departure of a genre from its norms can happen in several layers. A genre can first show some surface-level variation that is stylistic, such as when a smile emoji is used in an email to a professor rather than expressed formally in writing. Beyond these textual innovations, the structure of a genre can be reordered and changed in unconventional ways, or various genres and discourses can be mixed to generate novel ways of communicating (Tardy, 2016). These innovative changes are usually implemented in genres in a process known as hybridization. Genre hybridization refers to “all kinds of blending, mixing, and combining that occur in genres and texts” (Mäntynen & Shore,

2014. p. 738). Hybridization processes appropriate often conventional genres and practices by enabling communication to more varied audiences (Bhatia, 2010; Tardy, 2016). For example, reporting a research article in a blog for a more novice and less-knowledge audience entails changes in the provision and ordering of information and, possibly, addition of informal and easy to access textual elements such as hyperlinks to various resources and communicating private intentions such as self-promotions (Luzón, 2017).

As the example of blogs also shows, technological advancements and a move to digital space have fostered the inclusion of multimodal and hypertextual features in so-called digital, hybrid and multimodal genres (Pérez-Llantada, 2016). Multimodality is defined as “the use of several semiotic modes in the design of a semiotic product or event, together with the particular ways in which the modes are combined” (Kress & van Leeuwen, 2001, p. 20). The multimodal innovations at the textual level afford communication of various scholarly intentions in novel and creative ways. In other words, multimodal resources foster genre hybridity, and genre hybridity is a manifestation of genre change by departure from genre conventions. The resultant creativity and novelty then impact the nature of scholarly and research genres in academia, where departure from conventional norms may come with associated risks such as rejection of produced works in the gatekeeping processes (Tardy, 2016). Despite the rather challenging or risky nature of genre innovation in academia, multimodal affordances of technology have slowly expanded the number of multimodal and hybrid research dissemination genres that can reach a broad audience. These new

genres usually cater to a wider audience via techniques used in their creation that allow combining of various multimodal resources such as words, visuals, and audio (Blanchard, 2011; Coccetta, 2020; Hendges & Florek, 2019; Hyland, 2011; Liu, 2019; Luzón, 2013; Maier et al., 2007; Myers, 2010; Plastina, 2017). In the context of research dissemination genres, hybridization through multimodality occurs when researchers no longer feel bounded by the formal written language of journal articles (Myers, 2003; Ventola et al., 2002; Swales, 2004), and they move across various research-based or non-research modes of delivery (e.g., written, spoken, visuals). This way, they fulfill a variety of communicative purposes and cater to various audiences (e.g., expert to lay) (Hood & Forey, 2005; Rendle-Short, 2006; Rowley-Jolivet & Carter-Thomas, 2019; Ruiz-Madrid & Fortanet-Gómez, 2015; Valeiras-Jurado, 2020).

So far, genre innovation in multimodal research dissemination genres has remained an underexplored area of research (Hafner, 2018; Pérez-Llantada, 2016; Xia, 2020). As Tardy (2016) mentioned, genre innovation always has communicative reasons behind it, such as the necessity for a produced genre to “stand out” (p. 50). However, for genres to stand out, each fulfill some specific communicative goals in ways that creatively depart from the familiar genre norms and purposes. Therefore, each emerging genre that shows signs of such departures and creativity must be explored in depth to identify what specific purposes their producers try to achieve, and how they achieve those purposes (Tardy, 2016). Moreover, since the departures may make it difficult for the digital genres to be “recognizable” by their intended discourse communities, it would be important to see if the creative emerging genres still maintain

traditional genre conventions despite the hybridization (Tardy, 2016, p. 153). For these reasons, it is essential to spark “scholarly conversation on issues of genre innovation and change so as to better understand the new forms of research communication in today’s academic settings” (Pérez-Llantada, 2016, p. 24). Hence, this dissertation is framed by genre innovation theory, guiding the analysis of hybridization of the emerging multimodal genre of Video Abstract (VAs).

Video Abstracts (VAs) as a Hybrid and Multimodal Genre

Recently and as a response to the pressing need for scholarly published articles to stand out in the research world, the Video Abstract (VA) genre has emerged. A VA is defined as “a video presentation corresponding to a specific scientific research article, which typically communicates the background of a study, methods, results and potential implications through the use of images, audio, video clips, and text” (Spicer, 2014, p. 3). VAs often appear next to their corresponding written abstract and article on journals’ websites and are usually also shared on researchers’ personal websites and blogs and on video sharing websites, such as YouTube or Vimeo, to reach a wider audience (Cocchetta, 2020; Plastina, 2017). Researchers have claimed that VAs can impact research reputation and visibility (McGrath & Brandon, 2016; Reupert, 2017; Spicer, 2014; Zong, Xie, Tuo, Huang, & Yang, 2019), provide a new, personal and media-rich medium (Reupert, 2017) that can assist with understanding of research (Spicer, 2014), and reach an audience with less background knowledge on the topic of the research (Bredbenner & Simon, 2019). Due to their increasing popularity and recognition among journals especially in science, VAs caught the attention of several genre analysts’, who

studied VAs using rhetorical structure analysis approaches (Cocchetta, 2020; Liu, 2019; Plastina, 2017). These researchers established that VAs could be considered as a microgenre of research articles as they do follow the conventional rhetorical structure found in traditional abstracts and research articles (Cocchetta, 2020; Liu, 2019; Plastina, 2017). However, influenced by the affordances of web and their video medium, VAs also seem to undergo hybridization as is evident in their multimodal features and creative and novel rhetorical functions (Cocchetta, 2020; Liu, 2019; Plastina, 2017). The existing research, therefore, alludes to the importance of deeper investigation of VAs' multimodal features as there seems to be a strong presence of visualization techniques that foster genre hybridity in VAs. As a result, more in-depth multimodal discourse analysis of VAs is needed so that their innovative nature along with communicative potentials are characterized more effectively both for interested genre analysts and for genre producers.

The Dissertation Goals and Significance

The purpose of this dissertation is threefold: 1) to understand the modal variation in existing science research VAs, 2) to understand the VAs' rhetorical functions as well as rhetorical realization of those functions as a way to establish what innovative departures from norms foster hybridity in VAs and 3) to put forward a close examination of the unique genre innovations observed in the VAs as a way to explain how the innovation could be used for researchers' non-conventional and private communicative purposes. The three goals yield three separate studies that are organized as per the layers of genre innovation introduced in Tardy (2016). In other words, the

overarching aim is to explore the innovation in VAs at stylistic, rhetorical and discourse levels. Accordingly, I address goal one in chapter two by introducing the various techniques and modes that are used to produce VAs and classify the VAs based upon their stylistic and modal variations. In chapter three and to meet goal two, I put forward an inductive analysis of the VAs' rhetorical functions and show the innovations in how the important communicative functions are realized uniquely in VAs with varied multimodal profiles. Finally, I will address goal three in chapter four where I will put forward an in-depth analysis of the most observed innovations in one type of VA at a discourse level. The three studies are then followed by concluding remarks.

Considering that VAs are gaining momentum especially in science, this research would be significant in three important ways. Firstly, it will help characterize the genre for both researchers and journals, who produce and publish the genre, by defining its multimodal features and their communicative potentials as well as the ways the VAs could be utilized to connect with the intended audience. Secondly, it indicates how genre analysis can benefit from multimodal discourse analysis as a way to explore genre innovation in emergent, hybrid multimodal genres. Thirdly, it expands genre theory by showcasing how research dissemination practices are taking new shapes via loosening the boundaries of conventional genres and allowing non-research elements in. In sum, this dissertation intends to expand readers' knowledge on the specific purposes for VAs' creative departures and innovation as well as how such innovation impacts research dissemination practices.

CHAPTER II

STUDY ONE: MULTIMODAL PROFILING OF VIDEO ABSTRACTS (VAs)

Video Abstracts (VAs) are a recent academic and research dissemination genre that are gaining popularity especially in science (Tardy, 2016). A few existing studies on VAs have noted the presence of various visualization techniques and unique and distinguishing features of VAs (Cocchetta, 2020; Liu, 2019; Plastina, 2017). Therefore, influenced by the affordances of web and their video medium, VAs seem to undergo hybridization as is evident in new multimodal, stylistic resources (Cocchetta, 2020; Liu, 2019; Plastina, 2017). These new multimodal and stylistic resources deserve attention as they might impact a genre's communicative functions and connection with a genre's audience in various ways. Examining what techniques and modes are used to create VAs in science can also facilitate any follow-up studies that may look beyond the multimodal variation and stylistic layer of this genre and in other disciplines. In fact, a study of stylistic and multimodal innovation in VAs seems to be necessary since leaving out discussions of what modes and multimodal features are used to create the VAs may result in slippery accounts of the genre's communicative functions and potentials (Bateman, 2017). Anchoring the study of VAs to its stylistic and modal foundation increases the

chances of developing a more robust analytical approach to the study of such a multimodally varied genre (Bateman, 2017). So far, there is no account of such multimodal and stylistic variation in the creation of VAs.

To address the above need, the aim of this study is to generate a multimodal profile for VAs as a way to provide a better understanding of the modal options and variation in this genre. This study looks into various modes that are used in VAs, as the first step in the analysis of innovation in this genre. To do so, the study utilizes a multimodal transcription model that helps identify the various modes of communication and their frequency of occurrence in VAs (Baldry & Thibault, 2006; Hafner, 2018). Then, the study presents a multimodal profile of VAs by showing classification of modes used in their creation. For such classification, this research is theoretically grounded in the previous multimodal categorization of modes and visuals in the literature on multimodal science genres (Myers, 1997, 2010; Rowley-Jolivet, 2002, 2004; Ruiz-Madrid, 2021; Ruiz-Madrid & Valeiras Jurado, 2020).

The Concepts of Mode, Medium and Multimodality

To generate a multimodal profile of VAs, the study examines the modes of communication used in VAs' creation. A mode is defined as a “material resource which is used in recognizably stable ways as a means of articulating discourse” (Kress & van Leeuwen, 2001, p. 25). Multimodality is defined as “the use of several semiotic modes in the design of a semiotic product or event, together with the particular way in which these modes are combined” (Kress & van Leeuwen, 2001, p. 20). Modes are used in combination to create multimodal discourses. VAs are multimodal products where

various modes are used to create different discourses. To put together the modes for communication of research, various media are used. Kress and van Leeuwen (2001) distinguish between production and recording/distribution media. Production media are any resources that are used to produce a multimodal artifact, and recording and/or distribution media are used to record and share the already developed multimodal artifacts. The concepts of modes, multimodality and media are helpful to identify what modes are used in VAs' creation and how. Knowing what modes are used in VAs can help us define the genre with respect to its modal and stylistic options and variation which might influence the genre's rhetorical functions.

Modal Distinctions in Science Genres

VAs are highly visual and their multimodal nature makes them a genre that is different from its predecessors. Genres such as VAs that disseminate scientific information usually include more than just verbal modes because science includes concepts that cannot be easily conveyed using solely one mode. Scientific concepts are usually conveyed using more than just verbal and linguistic modes as they are naturally "semiotic hybrids" and the genres to communicate them are multimedia and multimodal in nature (Lemke, 1998, p. 87). There are a number of studies that have attempted to analyze scientific genres with regards to the modes used in them and introduced the multimodal characteristic of those genres. In an early study, Lemke (1998) analyzed professional print and published scientific genres such as feature articles, research offprints, conference proceedings, book chapters, lengthy journal review articles, and advanced textbook chapters to identify their non-verbal, textual semiotic modes. Lemke

(1998) classified the non-verbal modes into mathematical expressions and graphical modes with the latter including the sub-types of figures, tables, charts, graphs, photographs, drawings, maps and specialized visual presentations. He found that the scientific text included at least one mathematical expression and one graphical mode along with linguistic modes per page in typical scientific genres. Lemke draws attention to the importance of visuals along with spoken and written texts by emphasizing visual's roles as major carriers of meaning. He exemplifies that the photographs of real world phenomena such as trees, salmon, squirrels and etc. in an ecology textbook have the function of providing first-hand experience of what humans see and help relate to the viewer's everyday experience of the world. On the other hand, he observes that diagrams and text in the same textbook render these real-world experiences and present the phenomena in ways that seem to be a bit distant from the viewers' first-hand experiences (Lemke, 1998).

In a closely relevant study, Rowley-Jolivet (2002) analyzed conference presentations with respect to their visual discourse. She analyzed conference presentations from the fields of geology, medicine and physics, selected from international conferences. These presentations were first analyzed for recurrent visual mode in them. Rowley-Jolivet then generated a typology of these visuals which included graphical, figurative, scriptural and numerical visuals. The very first two categories of graphical and figurative are equivalents of what Bertin (1973) had referred to as monosemic visuals such as graphs, diagrams and maps, and polysemic such as photographs. While figurative, polysemic images like photographs showcase the real-

world phenomenon as it is in real world, the monosemic, graphical images are highly constructed and transformed in a way that they are encoded using a single planar x and y variable as well as six retinal variables of size, texture, color, orientation, shape and gray-scale level. These graphical and monosemic images are created using special technologies, and they are meant to represent the phenomena in ways that highlight features of those phenomenon that the genre producers target. For example, when an object's temperature is shown via red and blue colors to represent both hot and cold temperatures along with changing numbers, the transformed picture is probably used to draw the viewers' attention to the temperature features of that object among other features. In this sense, the two graphical and figurative image types represent the types mentioned by Lemke (1998) in his analysis of ecology textbook. In Rowley-Jolivet's (2002) categorization, figurative visuals are distinguished as type one such as photographs and type two, which are lab-produced, such as W-rays, CAT scans, ultrasound, and MRI to name a few. Then, she presented two typological features of the visuals in conference presentations. Firstly, the figurative type one visuals such as human anthropomorphic illustrations are used to serve as popularizations and draw an exoteric audience into the research. However, figurative type two visuals are usually based on highly technical and scientific knowledge that may make research less comprehensible for a non-expert audience. Secondly, scriptural visuals are highly used as framing devices, by being shown in the first and last slides of conference presentations, closing devices, by providing a summary of the presentation, and boundary devices, by showing the onset of a new section. These linguistic and verbal visuals help the presenter to

maintain a coherent talk by acting as metadiscursive devices (i.e., strategies used to structure the discourse in explicit ways for intended audience such as the use of subheadings). Rowley-Jolivet also adds two more visual distinctions; scriptural visuals, which are in essence verbal and linguistic non-numerical images, and numerical visuals that are mathematical formulae and numeral tables (Rowley-Jolivet, 2004).

The third example study is Myer's (1997) analysis of a molecular genetics textbook, that is used for university students. Claiming that genre analysis approaches such as ESP (English for Specific Purposes) have been occupied with the analysis of only verbal genres, Myers aimed at showing how visual and verbal modes connect to create meaning. An interesting insight from Myers' analysis was the way modes and in particular pictures refer to their referents. This happens in three main ways: indexical, iconic and symbolic. Indexical visuals are directly connected to their referent in the sense that they represent a feature or a mark of their referent such as when an autoradiogram of an animal DNA fragments that are created using the actual fragments by gel electrophoresis in a lab. The resultant radiogram does not resemble the DNAs, but it is created using its fragments to only index DNA. Iconic visuals refer to their referent via resemblance such as when a photograph of a human or a drawing of a chromosome resemble the entities in a very recognizable way. Finally, symbolic visuals refer to their referent using some conventionalized arbitrary associations such as when a string of letters is used to show the DNA strand. In the real world, DNA has a helical twisted shape and the string of letters does not resemble or index the DNA in any way. We know it symbolizes the DNA by convention (Myers, 1997). Myers (1997) then points out that

there is a move in science from indexical visuals to iconic visuals such as in popularizations and textbooks to conventionalized symbols.

In a recent study, Ruiz-Madrid (2021) analyzed research pitch videos, whose function is to present one's research in a very limited time and for an audience from a variety of academic disciplines. In research pitches, the researchers present their own research to a live audience, and then they video record their pitches; thus, pitches include both verbal and visual modes. Researchers' presence and the way they communicate with the audience in their videos creates interesting visual mode subcategories that Ruiz-Madrid aimed at investigating. On top of the linguistic modes, Ruiz-Madrid identified four types of kinesics as sub-categories of the visual mode in these videos. The visual modes included gesture, head movement, facial expression (Kendon, 2004), and gaze (Argyle et al., 1981). Her main observation was that these visuals had more of interpersonal and engaging impacts on the audience of the genre.

The studies above show the prevalence of visuals in scientific genres along with verbal modes and the variation in the types of visuals in various genres. They show that both visual and verbal modes have multiple subdivisions, each with distinct communicative potentials and affordances, and their incorporation in genres such as VAs is driven by those affordances. The prevalence of some of these visuals in some genres more than others might be revealing of the communicative purposes of the genre producers. More specifically, the visuals have shown to be distinguishable based upon how they are produced (e.g., using camera, computer and microscope or human body), and the types of relations they have with their referents; iconic, indexical, symbolic

(Myers, 1997). Furthermore, with relation to iconic visuals, whether they are stylized or computationally rendered (e.g., figurative type one versus figurative type two) (Rowley-Jolivet, 2002) impacts the way viewers' might comprehend those as they differ in providing first-hand experiences of the world (Lemke, 1998). Consequently, the choice of modes in the creation of a genre can help characterize a genre with respect to its modal variation and innovation that might as well impact the deeper-level rhetorical functioning of the genre. For this reason, any study on the VA genre would benefit from the identification of modes and their subdivisions used within a VAs' makeup. Thus, this study aims at exploring the various modes and classifying the sub-categories of modes used within VAs and distinguishing them on this stylistic level of genre innovation. Categorizing VAs based upon the modes used in them can help with future in-depth examinations of VAs' functions in both rhetorical and discourse levels.

Methods

The study implements a multimodal transcription model that helps identify the various modes of communication and their frequency of occurrence in VAs (Baldry & Thibault, 2006; Hafner, 2018). For this purpose, the VAs are unitized and an inductive, open coding is carried out to identify the modes used in them. Then, a multimodal profile for VAs is generated that shows the classification of modes used in their creation. To discuss the classifications, this research uses the insights provided by previous multimodal categorization of modes and visuals in the literature on multimodal genres (Myers, 1997, 2010; Rowley-Jolivet, 2002, 2004; Ruiz-Madrid, 2021; Ruiz-Madrid & Valeiras Jurado, 2020).

Preliminary Examination of VAs for Sampling

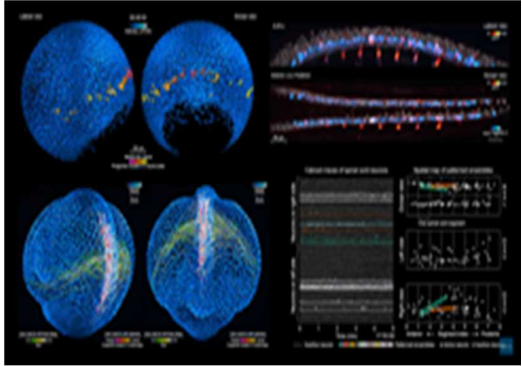


In a preliminary examination of VAs in science, the YouTube channel of the journal Cell from the Cell Press publisher series was examined (Nezami Nav, 2021). The reason for choosing this journal is that it is one of the earliest and perhaps the first journal to publish VAs on YouTube, starting in 2009 (Bredbenner & Simon, 2019; Liu, 2019). Then, all the VAs that were published on Cell's YouTube channel as "Video Abstracts" were viewed. Next, the VAs that ranged between three to around five minutes long and were produced based on empirical research studies (versus review articles) were selected for a closer inspection. These criteria were set to maintain a unified set of VAs for examination. In this round of examination, VAs were checked with respect to the technologic media that were used in their production (Kress & van Leeuwen, 2001). After examination, it was revealed that VAs could actually be distinguished into three main VA categories with distinct modal features. Figure 1 highlights the three main types of VAs that emerged from this examination stage. According to the techniques used in their production, the VAs were named graphical (n=34), whiteboard (n=19), and talking-researcher (n=180).

Unitization of VAs for Identification of Modal Variation

In this stage, 18 VAs (six from each type) were randomly sampled from the three preliminary categories for a closer analysis of their multimodal make up. For this purpose, the VAs were first transcribed using shot as a unit of transcription. Baldry and Thibault (2006) define a shot as "a filmed visual sequence in which there is no spatial displacement of the camera; for example, forwards or backwards" (p. 187). Although this

Figure 1

The Three Types of VAs in the Cell Press YouTube Channel

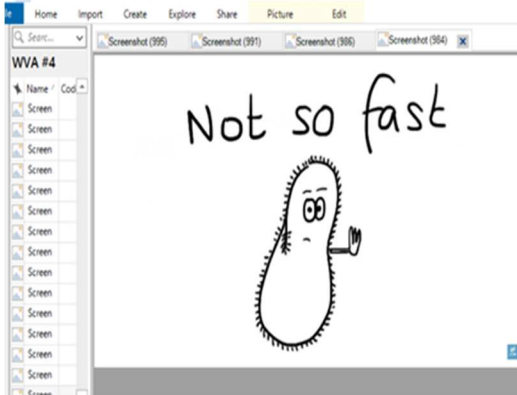
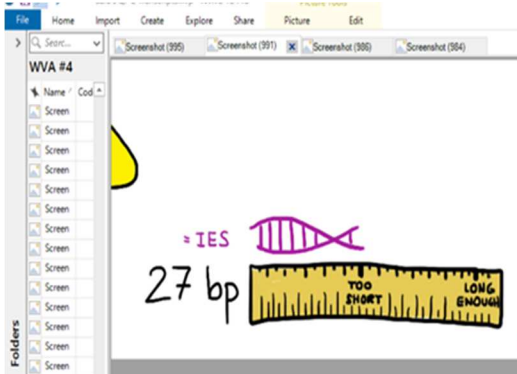
Video Type	Sample Visual Shot	Descriptions
Graphical Video Abstract (GVA)		<p>Graphical VAs (GVAs) are typically created using graphics in motion video creation technology (e.g., figurative, microscopic or 3D imaging techniques).</p>
Whiteboard Video Abstract (WVA)		<p>Whiteboard VAs (WVAs) use a whiteboard and a human hand that draws on the board or arranges objects as the video unfolds.</p>
Talking-Researcher Video Abstract (TVA)		<p>The talking researcher VAs (TVAs) include the camera recorded pictures or clips of researchers along with other visual types including mostly graphical and very rarely whiteboard visuals.</p>

definition of shot is applicable to the TVAs as these VAs are mainly recorded via cameras, the definition of shot had to be modified when unitizing the GVAs and WVAs. Hence, the shots in both GVAs and WVAs were divided based on multiple signals such as editing effects of video cuts, fade-ins or fade-outs, wipes, dissolves, swipes, the appearance and disappearance of some visuals, the change of texts on screen and signals and sometimes by using accompanying speech as a clue such as transitions to new sentences that would accompany a change in visuals (Baldry & Thibault, 2006; Hafner, 2018).

This transcription was primarily done on the qualitative data analysis software, NVivo. The NVivo software enables a concurrent coding and annotation of all the modes since the speech scripts can be placed next to their visual shots and coded as separate segments. However, the software does not allow for direct embedment of videos from websites such as YouTube. Instead, one needs to create a video source that provides a link to the original target video on the source website. This, however, did not impede the current research and the transcription was done manually by taking screenshots of the VAs' Shots on the *Cell* YouTube channel and matching the pertained written transcripts with each shot. Figure 2 showcases how an excerpt of Whitebord Video Abstract (WVA) #4 was unitized into two consecutive shots on NVivo, labeled here as shots A and B. What we see in Figure 2 is a change of the visual shot, which was accompanied by a change of the topic delivered via the spoken text. A visual swipe along with the change in visuals and linguistic mods signified the boundary of the two shots.

Figure 2

Two Consecutive Shots from WVA #4 on NVivo

Shot	Sample WVA Shots	
A	Visual Shot	Spoken Text
	 <p>The screenshot shows the NVivo interface for 'WVA #4'. The visual shot area contains a drawing of a paramecium with a speech bubble that says 'Not so fast'. The spoken text area contains the text: 'However, this discovery led to an interesting conundrum;'.</p>	
B	Visual Shot	Spoken Text
	 <p>The screenshot shows the NVivo interface for 'WVA #4'. The visual shot area contains a diagram of an IES (27 bp) with a ruler below it labeled 'TOO SHORT' and 'LONG ENOUGH'. The spoken text area contains the text: 'IESs, the sequences that are deleted from the genome and then transcribed to form IES RNAs, are usually too short to be Transcribed. Indeed, their most common length is only 27 base pairs which is far too small for an RNA polymerase complex to assemble on.'</p>	

Identifying Modes in VAs' Shots

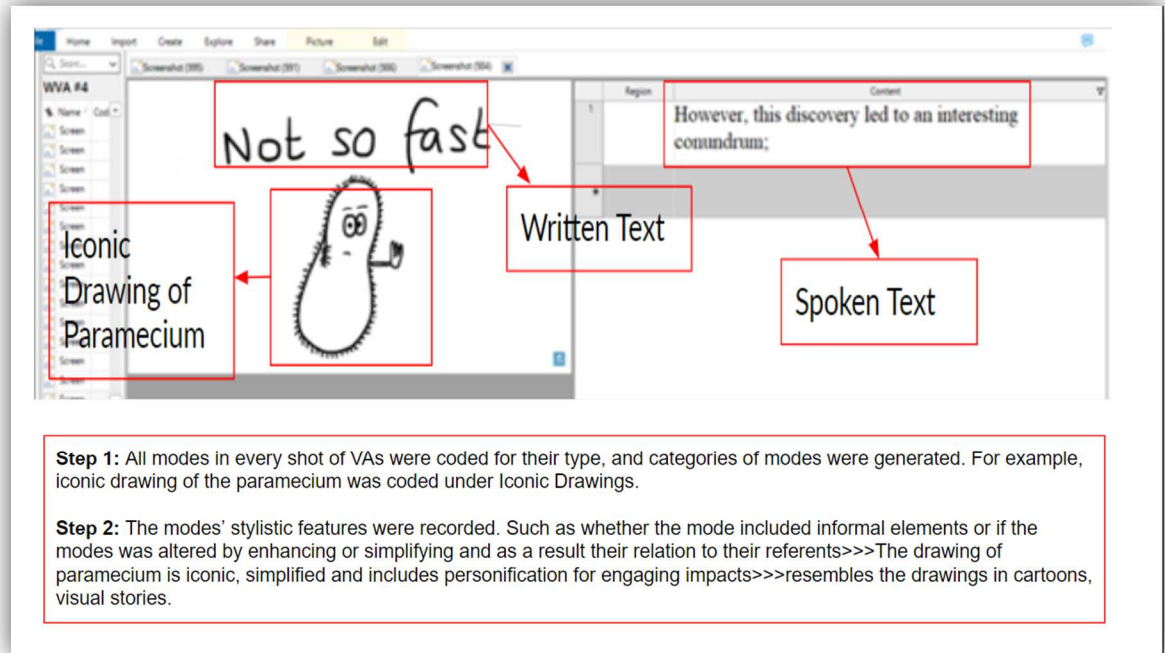
After unitizing the VAs, the shots were examined for the modal distinctions. The modes were sub-classified based upon the relations they have with their referent (i.e., what they depict) as well as their specific functions. For example, both shot A and B in Table 2 above include visuals, written and spoken modes. In more specific terms, the only visual modes in shot A is a drawing of a paramecium, a species of ciliates (Figure

3). This drawing has an iconic relation with its referent in the sense that the drawing resembles the actual paramecium as seen under a microscope. However, this iconic drawing is stylized in informal ways, meaning it is not the actual microscopic image and is simplified. This drawing is not only simplified but also personified (attributed human characteristics) as a way to perhaps engage the viewer of this shot, who might be non-researchers as well. This drawing and other similar drawings in the WVAs were later placed under the category “Iconic Drawings.” The written text includes the words “*Not So Fast*” and was placed under the larger category of “Written Words and Numbers.” Written words and numbers usually enhance comprehension of visuals and make the connection between the speech and visuals stronger. Furthermore, the speech on this visual shot was coded as “Spoken Text.”

In shot B, we also observe both visual and verbal modes. Similar to shot A, shot B includes a magnified drawing of a DNA IES (Internal Eliminated Sequence) that is stylized in informal ways and is simplified. This drawing was also coded as “Iconic Drawings” along with similar visuals that bear the same resemblance connection with their referent but are stylized in drawing. The iconic drawing of a ruler was also coded under “Iconic Drawings.” Next, the written text including both words and numbers were placed under the bigger category of “Written Words and Numbers.” Next, the speech was placed under “Spoken Text.” Once the modes and their categories were determined, their frequencies across the shots were obtained. The unit to measure the frequencies is a shot, and the total frequency of each mode in the 18 VAs was calculated based on the number of shots that contained that mode.

Figure 3

Coding Procedure to Identify Modes in Shot A from WVA #4



Multimodal Profiles of Study VAs

The findings of the modal analysis yielded a relatively distinct multimodal profile for each category of VAs. VAs differed especially in the visual mode categories as was also expected in the early examinations of VAs. In what follows, these variations are introduced and explained for each VA type, and an example shot with distinct modal categories will be illustrated and discussed.

Graphical Video Abstracts (GVAs)

Figure 4 shows the modal variation in the six GVAs of the study. Out of 130 shots, 125 shots included logos. Most of these logos were the Cell Press publisher's logo and several shots also included logos of researchers' affiliated institutes such as their

universities, research and teaching institutes as well as funding agency logos. Logos are publicly recognizable images that are used as brand images for various organizations and companies as well as educational institutions (Koller, 2009; Rajandran, 2020). Logos are used to excerpt some promotional impacts, introduce researchers via their affiliations or introduce funding agencies. The next prevalent images were 3D, SEM, microscopic and tomograms that existed in all 120 shots. Apart from the slight differences in how these images are prepared in labs, they all bear indexical relations to their referents in the sense that they provide an imprint of the referent via direct relation to it (Myers, 1997).

However, these images are altered and transformed by chemical or microscopic and computer processes that make some aspects of the image stand out using techniques such as color coding. The transformations are due to researchers' need to highlight some features and aspects of the image with a high accuracy and focus that is unattainable in non-altered images (i.e., iconic). As a result, these images render the perception of their referents and highlight the aspects of their referent that are the intended focus of researchers (Lemke, 1998). Rowley-Jolivet (2004) also found such visuals in conference presentations and observed that while these visuals kept the spatial/morphological characteristics of their referents, they contained scientifically more useful and relevant information. What Rowley-Jolivet observed is essentially the altered nature of such images. In other words, these images are not iconic and only index and mark their referent so they can highlight the aspects that are under focus by researchers more effectively.

Next, graphs, diagrams, schematics and maps existed in a total of 50 shots in GVAs. Graphs, diagrams, schematics and maps are categorized as a group since they bear more symbolic, agreed upon and arbitrary relation to their referents. For example, in a dotted map of the mouse brain that is used to show density of cells, thicker dots index a higher density, and thinner dots show less dense areas by convention. Graphs and diagrams function in a similar fashion. They are used to visualize the final results of an experiment visually or showcase spatial information (Rowley-Jolivet, 2002, 2004).

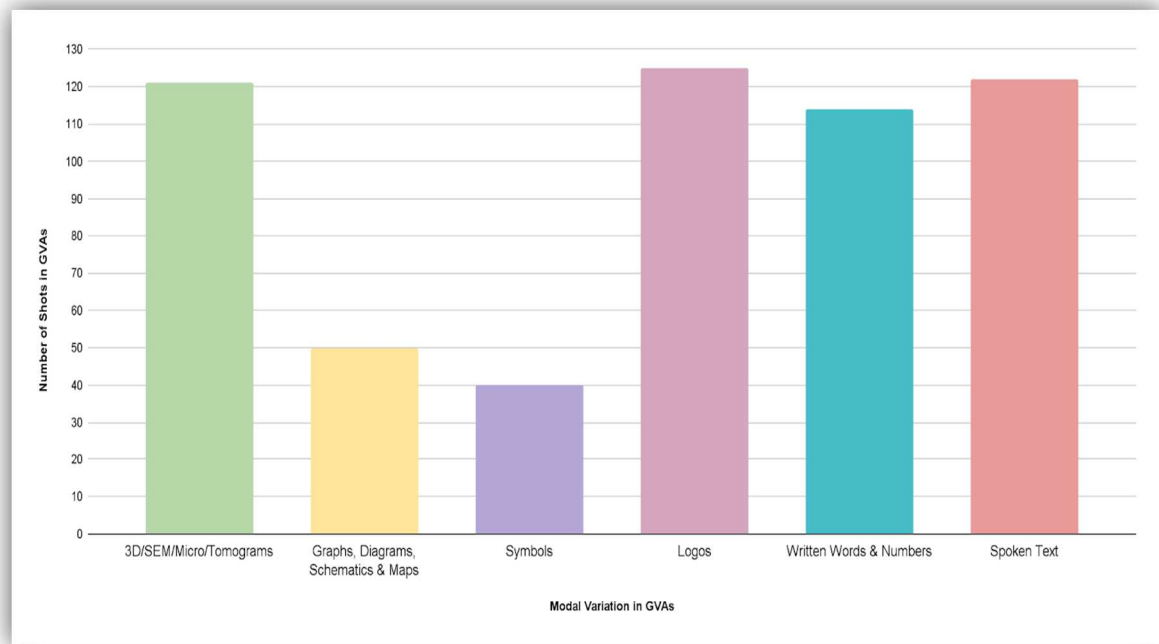
There was a second group of visuals that also had symbolic relation with their referent, hence they are labeled as symbols. Symbols are categorized separately from the previous group because of their specific functions in GVAs. Symbols seem to perform more of a navigating function in visual shots by for example connecting a written label to its visual, or showing directions, time measurements. An example of a symbol would be an arrow that connects a visual to a box that includes a description of the visual in written text.

Due to the altered nature of 3D, SEM, microscopic and tomogram images and the arbitrary connection of graphs, diagrams and maps to their referents, VAs highly depend upon not only symbols but also written words and numbers for delivery of meaning. Written words and numbers usually modified the other visuals and played guiding and navigating roles by labeling images and signifying color coding and various numerical measures that show patterns, measurements, and changes in these visuals. They also made the connection between visuals and spoken text clear.

The spoken text is another most prevalent mode that runs over 120 shots of the six GVAs. In these GVAs, the spoken text is mostly formal and free of conversational style. The linguistic features in both spoken text and written text in GVAs are formal and similar to the types found in the formal research articles. Other than providing a synopsis of a research in verbal terms, the spoken text performed similar functions to written text in these videos, in the sense that it clarified the details such as time, direction, references to various parts of visuals. One of the unique functions of spoken text was to present researchers' evaluations of the novel methods and techniques as well as the significance of findings such as in *we developed a novel technique* or *interestingly, we found that....*

Figure 4

Modal Distinction in the Six Graphical Video Abstracts (GVAs)



Such modes and their connections are described in a sample shot in Figure 5, where I explain an interesting example of how a dynamic microscopic image bears

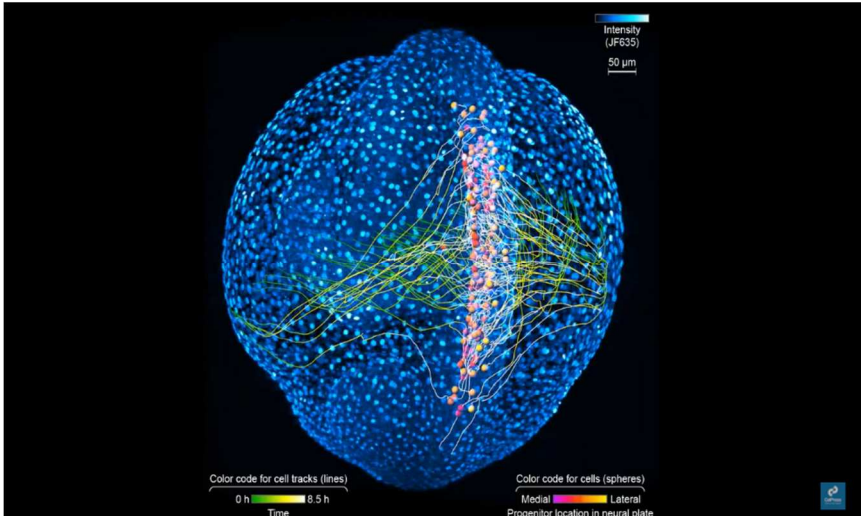
indexical relation with its referent, and how symbols, written words and numbers as well as spoken text relate to help navigate in this visual shot.

The shot that is selected from GVA #6 illustrates an experimental step of a research on how the neural cells form the spinal cord in an embryo of a zebrafish. The visual in this shot is created using the microscopic technique where the organ to be imaged is magnified, and the area of interest is zoomed in under the microscope. Then using an enhanced light, researchers maximize the intensity of the image, and using camera lens adjustments, the image clarity is increased. Then holding the microscopic camera still, the magnified image is taken from the microorganism or the organism of interest (Maude, Koh & Silamut, 2008). The image produced this way is then transformed using color coding to distinguish among the different parts of the image. For example, in the visual shot in Figure 5, we basically see an embryo of a zebrafish that is enhanced and transformed. This dynamic and moving visual is color-coded using different color shades. The dots in different shades of blue represent different cell densities. The lines that move from various parts of the embryo to the progenitor area depict the movement track of cells, with yellow to green indicating variation in time of movement. Also the colors pink to yellow show that the cells that are in the progenitor area are medial or lateral. So, to comprehend the cell types, their movement track and their density, various color coding is used as symbols that represent those by convention. These color shades are selected arbitrarily and to make sense of what exactly they refer to in this indexical visual, the written words and numbers are added. The written words label the colors by what they refer to, and the numbers signify both intensity level and

time. This way, both written text and visual enhance what is delivered via spoken text, which is a segment of the research experimental process. The highly transformed images like the one in the example shot in Figure 5 are typically used to deliver certain claims and messages that need precision. The dynamicity of these visuals enhances delivering the messages that would otherwise be communicated using static visuals in research papers and conference presentations (Rowley-Jolivet, 2002).

Figure 5

The Enhanced Indexical Microscopic Image in GVA#6

Visual Shot	Spoken Text
	<p>... we tracked the neural progenitor cells as they form the spinal cord...</p>

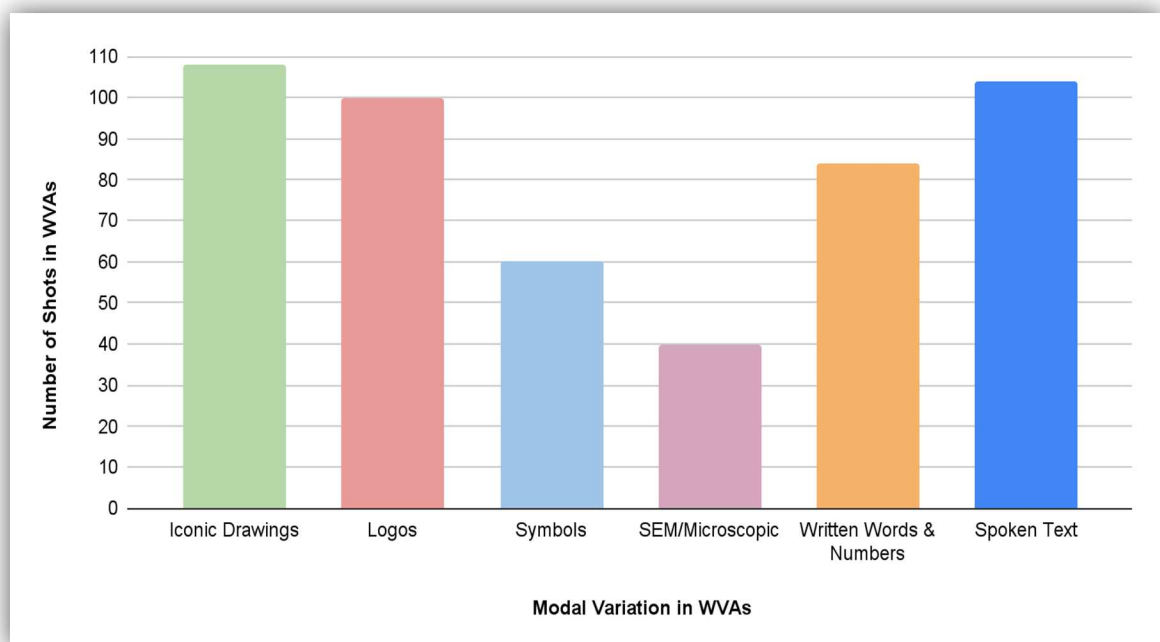
Whiteboard Video Abstracts (WVAs)

With regards to the six WVAs, the total number of visual shots in the six WVA samples was 110. Figure 6 shows the modal distinctions and frequencies in the six WVAs. The most prevalent visual mode in the WVAs were logos and iconic drawings. The logos included the logo of the Cell Press publisher and logos of research institutes

and universities that researchers were affiliated with. The logos of funding agencies were also included. Iconic drawings are what make WVAs distinct from other VA types. Iconic drawings that resemble the entity the researchers explicitly refer to (Myers, 1997; Rowley-Jolivet, 2004). However, these drawings are stylized in an informal and simplified manner by removing the nuances of color and texture and reducing the visual noise to only a simple outline that has lower iconicity than an actual photograph (Rowley-Jolivet, 2004). The iconic drawings in WVAs resemble textbook drawings or even at times cartoonish ones (Myers, 1997).

Figure 6

Modal Distinction in the Six Whiteboard Video Abstracts (WVAs)



Symbols, which existed in 60 shots in WVAs, function the same as symbols in GVAs. They help navigate the viewers in shots by clarifying various relations and connections between and among the visuals such as when an arrow connects the

microscopic images of an intestinal wall cell to the iconic drawing of a mouse to show that the magnified intestinal cell belongs to a mouse.

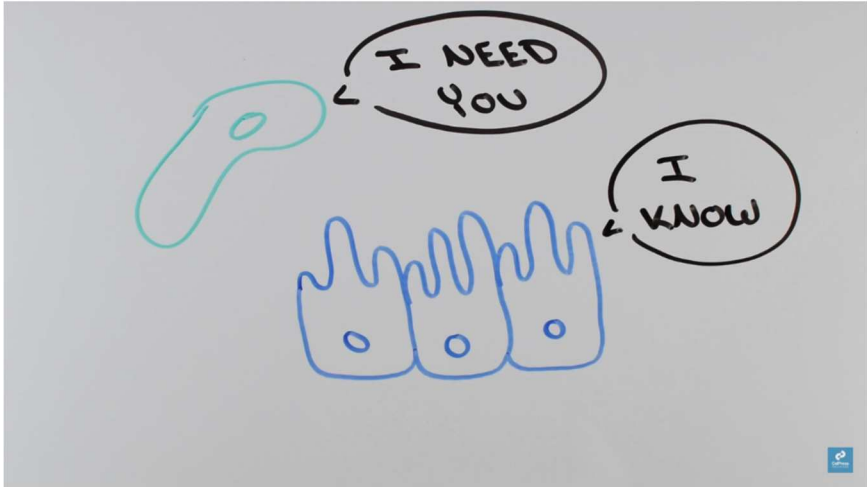
WVAs also include SEM and microscopic visuals in 40 shots. While the spoken mode runs over 104 shots, the written words and numbers exist in 90 shots. Both written text and spoken text were not only used to report the research but also to dramatize the narration of research by adding informal style and engaging features such as conversation-like expressions such as when the researcher says *Yeah! Like what you do with your teeth!* The written text was also used to label various segments of visuals when necessary.

As was mentioned earlier, the iconic drawings are the distinguishing feature of WVAs. The written text and spoken text that are used along with the iconic drawings seem to render the highly technical nature of research by presenting it in an informal, engaging and easy-to-understand manner. The example shot from WVA #6 in Figure 7 shows such innovative modal interplay. In a previous shot to this one in Figure 7, the researchers had indicated how IELs (Intestinal IntraEpithelial Lymphocytes) or immune cells scan the intestinal cells for the presence of pathogens. Here, in this shot, they report a finding that the IELs actually depend on the intestinal wall cells for the scanning. The main visual categories in this visual shot are the iconic drawing of one IEL cell and three wall cells. Although the iconic drawing of the IEL and the wall cells bear resemblance to what they depict, they are stylized and simplified in informal ways that are not typical of formal research discourses such as in research articles. Here, the spoken text clarifies what these visuals are depicting (i.e., IELs & wall cells) when it reports the main finding.

The spoken text also uses a reference to an example from an informal everyday discourse that is reflected in the expression: *like how you can't comfort someone if you don't know if they are sad*. This reference is used to perhaps help the viewers relate to the concept of dependency and make the message more non-technical and engaging. Then, the informal written text inside conversation boxes reflects the same notion of dependency and connects the spoken text and visuals using conversation style. The written text also enhances the connection between the visual shot with its spoken text as we see here in the informal conversation boxes. These informal iconic drawings, written text and spoken text are typical of non-research discourses and genres such as in visual narratives and at times textbooks (Cohn, 2013; Myers, 1997).

Figure 7

The Simplified Iconic Drawing in WVA#6

Visual Shot	Spoken Text
	<p>...it seems likely that IELs actually depend on the wall cells for their scanning behavior, like how you can't comfort someone if you don't know if they are sad.</p>

Talking Researcher Video Abstracts (TVAs)

As Figure 8 shows, there are a total of 180 shots in the TVAs. Similar to the other two VA types, logos were the most prevalent visuals that existed in 170 shots. Logos performed the same functions of representing the Cell Press publisher as well as researchers' academic and research institutes as well as funding agencies. Since the TVAs are created using video recording techniques, the researchers had the chance to participate in their own videos and were present in TVAs. Due to their presence in this type of VA, new visual categories exist in TVAs that are produced by researchers while talking to the camera or collaborating and working in lab environments. The most prevalent of these kinesics based visuals are actions. Actions existed in 160 shots and refer to the lab tasks and procedures done by researchers, such as utilizing tools and objects, carrying out experiments as well as operating surgical procedures. Actions also refer to when researchers collaborate as reflected in their talking and communications in the lab environment while analyzing data on a screen or a monitor and working with lab tools such as microscopes alongside one another.

The other visual modes that researchers produced were distinguished into hand gestures, gaze and smile and head movements (Ruiz-Madrid, 2021; Ruiz-Madrid & Valeiras Jurado, 2020). These visuals were categorized separately from actions as they happened when researchers were sitting in front of the camera to narrate and talk about their own research to the camera. The hand gestures were mainly indexical and sometimes iconic (Kendon, 2004). For example, when a researcher uses fingers to count the number of cancerous mutational signatures, the use of fingers is indexical. However,

when a researcher uses a hand gesture to show the rotating movement of a DNA chromatin, the gesture resembles the actual chromatin movement and is iconic. There were also hand gestures that seemed to be repeated rhythmic movements that were produced along with head movement in the form of nodding (Kendon, 2004). The two repeated head nodding movements along with repeated hand gestures happened for emphasis on certain words as the researchers were talking about their research in front of the camera. One head nod and hand movement happened per word and were used to add stress and emphasis to researchers' messages (Ruiz-Madrid, 2021).

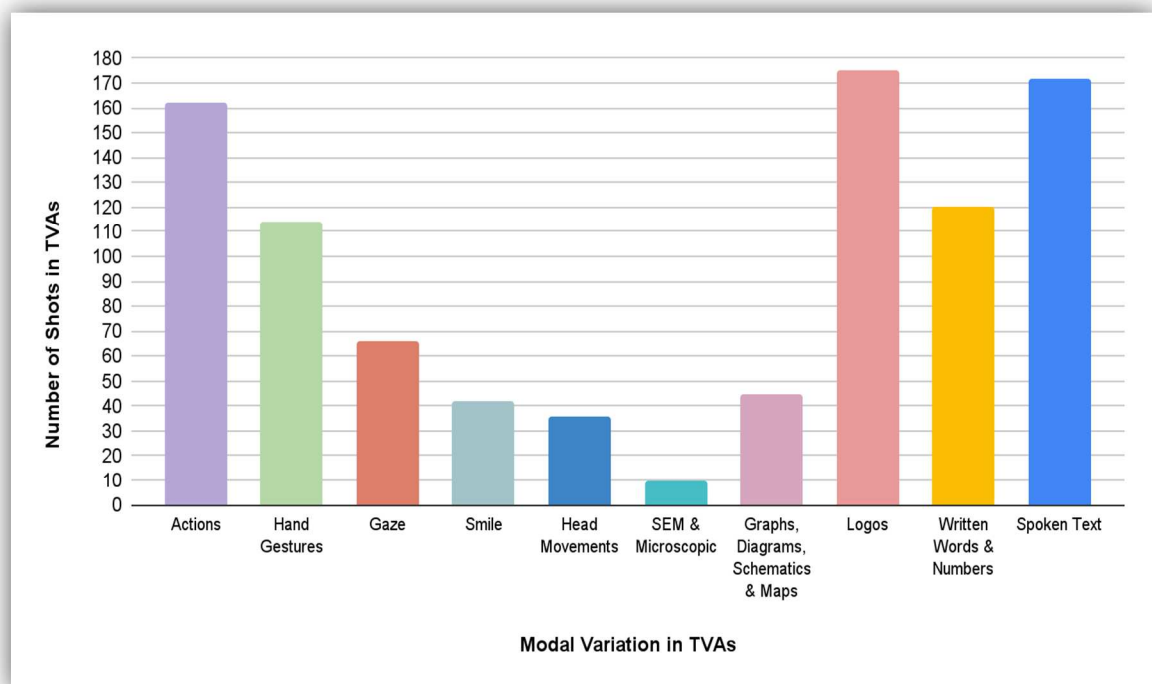
When talking to the camera, researchers also had smiles and gaze. Smiles had some interesting interpersonal functions. Smiles were usually used when researchers made evaluative remarks about the positive aspects of their research such as novelty of methods or significance of their findings. So, researchers' smiles when accompanying the evaluative spoken text seemed to be an attempt at exuding an enhanced, engaging and interpersonal impact on the viewers (Ruiz-Madrid, 2021). Although gaze existed in some shots, they were mostly at the camera and non-shifting. As a result, gaze did not seem to have a major functioning role in TVAs (Argyle et al., 1981; Ruiz-Madrid, 2021).

TVAs also included graphs, diagrams, schematics and maps in only 45 shots as well as SEM and microscopic images in nearly 10 shots (Figure 8). The functions of these visual modes were similar to those found in the other two types of VAs. While the spoken text runs over 172 shots, written words and numbers existed in 120 of TVA shots. Both spoken text and written words were sometimes used to introduce the researchers and their affiliations, labeling various lab tools, machines, objects and procedures and locations.

The written words and numbers also appeared along with some of the dynamic SEM and microscopic images as well as graphs, diagrams, schematics or maps for the same navigating functions that were observed in these images in the other two VA types. Spoken text was mainly used by researchers to casually describe their research in front of the camera, and it resembled interviews, lectures and conference presentations at times. Researchers often used examples and references to the real world to clarify their messages, but these were mainly commuted via spoken text and were not visualized. For example, to show how cancer mutational signatures have unique characteristics, the researcher uses the expression *like a fingerprint* without any visual representation.

Figure 8

Modal Distinctions in the Six Talking-researcher Video Abstracts (TVAs)




A distinguishing feature of TVAs is the physical presence of researchers in their own research VAs (Figure 9). The use of clips of researchers that either talk to the camera and the clips that showcase behind the scenes of research make research sound more personalized and humanistic. These clips are shown for various purposes such as researchers' collaboration on a research or a surgical procedure, working with certain lab tools and objects as well as researchers' communications. An interesting feature of these visualizations is that these clips are mostly used in conventionalized and symbolic ways. They depict the human side of research in a more symbolic way. As Myers (1997) puts it, both indexical and iconic images can become conventionalized as symbols. Myers provides the example of iconic drawings of a mouse and a fly that appear and reappear in the same way whenever there is a reference to standard organisms for genetic experiments. In the same vein, the same clips of researchers in TVAs appear and reappear that are used to showcase behind the scenes of research such as collaborations, institutes, lab procedures etc. The similar clips appear and reappear in a way that their functions with regards to what is delivered via spoken text is symbolic and not that of exact one to one resemblance. Figure 9 shows an example shot from TVA#6, where three researchers are sitting in front of a computer monitor in a lab environment. This image and similar ones reappear sometimes as a way to showcase collaborations among researchers.

The shot in Figure 9 showcases three researchers as representatives of three research institutes namely King's College London, University of Cambridge and the Wellcome Sanger Institute, who collaborated on the research that is portrayed in this TVA. The visual is a clip of the three researchers that are sitting next to one another and

have their gaze at the same monitor in a lab environment. At the same time, the spoken text introduces the collaboration among the three institutes that the three researchers are affiliated with. However, the same visual clip repeats towards the end of the TVA where the lead researcher is referring to future applications of their research findings. The repetition of such a visual shot two times when the researchers refer to collaborations and mutually hope for future applications, such as in *we hope that in the future*, is a symbolic use of an iconic visual in the TVAs. This symbolic use of visuals in TVAs perform more of engaging and interpersonal functions as the research is being narrated.

Figure 9

The Symbolized Action in TVA#6

Visual Shot	Spoken Text
	<p>...So, in this study, a collaboration between King's College London, University of Cambridge and the Wellcome Sanger Institute....</p>

Discussion and Conclusion

Generally, the multimodal profile of the three types of VAs reveals the range of modal and stylistic variation across the three types of Vas, indicating innovation and

creativity in the use of these visualization techniques. GVAs included visual sub-distinctions that had either indexical and symbolic relations with their referents. The indexical enhanced 3D, SEM, Microscopic and tomogram images, which were at times moving and dynamic, seemed to be used to provide tangible evidence for researchers' arguments and claims in their research. The tangibility of such evidence comes from the reproduction and enhancing processes, whereby researchers enhance the points of their claims in the visual image and make the connection between what they describe and the image perceptually stronger. There were also visuals (i.e., graphs, diagrams, schematics and maps) that had symbolic relation with what they depicted. These visuals do not bear any iconic and indexical relations to what they depict, hence are symbolic and arbitrary depictions of their referents. The use of such visuals in GVAs may be a sign of a highly developed field where these visuals rely more on conceptual delivery of information than perceptual, which means that the less iconic the visuals, the more informative they are (Rowley- Jolivet, 2004). Therefore, these visuals are used by researchers as ways to provide evidence for researchers' claims in GVAs. GVAs may be researchers' attempts at establishing credibility via visualization techniques when they make various claims for their scholar viewers (Rowley- Jolivet, 2004). The inclusion of both visual types seems to resonate more with expert biologists and biology researchers' discourse community as they are typically produced for inclusion in published research articles as well as used as necessary attachments to their research. In both cases of indexical and symbolic relations, what seems to happen is that they render the real-world perceptual experiences and present the phenomena in a way that seems to be distant from humans'

first-hand experiences (Lemke, 1998). Consequently, GVAs might be a way to connect with only expert scholars in the field, who can interpret the visuals in ways that are intended by the researchers.

The simplistic iconic drawings along with informal written text and spoken text elements in WVAs seems to be more creative and innovative ways of disseminating research. In other words, such informal modes are not typical of GVAs of this study or even more traditional formal research dissemination genres such as research articles. The informal and simplified nature of modes in WVAs seem to go beyond the expectations of a more expert scholar. In Myers' terms, the simple, and at times, cartoonish drawings are a typical feature of science textbooks aimed at educating students rather than disseminating evidence for research (Myers, 1997). In his investigation of genres that portrayed discovery of split genes, Myers (1997) had seen a move from the genre of article to the genre of textbook from demonstration to illustration in a hybridization process. In other words, the pictures in an article that dealt with split genes tended to demonstrate and provide convincing evidence for researchers' claims whereas the simple drawings in the textbook tended to illustrate by showing, summarizing and defining using simple drawings. Myers (1997) decides that this was due to the change in audience and pedagogical needs of students using a textbook. So, the change that Myers (1997) had observed may hold true within the various types of VA genre, more specifically, GVAs and WVAs, due to possibly varied purposes for their creation and genre innovation. However, this issue needs to be explored in more depth in further studies for a more certain conclusion on this matter. With regards to TVAs, the symbolic use of recurrent

clips of researchers collaborating, interacting and working in their lab environments as well as the use of evaluative spoken text along with kinesics visual mode like smiles seem to be some novel and innovative visual modes that are used as attempts to connect interpersonally with viewers or engage them. The portraits and clips of researchers and the places where research has been carried out are attempts at reifying science and making it more accessible to a popular and exoteric viewer (Rowley-Jolivet, 2004). According to Rowley-Jolivet (2002), these visuals are void of scientific information and serve more of a “popularizations” role to attract the “exoteric” audience by showing the human side of science (p. 29).

The three types of VAs also showed how spoken and written text performed varied functions along with visuals that could also distinguish these VAs on a formal to informal scale. In other research genres such as in conference presentations (Rowley-Jolivet, 2004), the role of verbal modes as metadiscursive strategies was identified. Although the same functions were observed in VAs (such as in research titles), they seemed to play more various functions in the latter. Written text and spoken text were used rather formally in GVAs while they were used informally in WVAs, making the two VAs depart in formality level and how they might connect with a varied audience. Also, it was observed that written text performs more navigational roles along with visuals such as by labeling various segments of visuals. These navigational functions were indeed important in enhancing the multimodal relations between visuals and the spoken text.

In general, it is less certain whether the genre’s stylistic and modal variation, as shown in the three VA types, would be acceptable to researchers in the science discourse

community or not. To uncover such views on VAs, further studies need to explore the discourse community's views on the use of such a novel genre. However, what seems to be more certain is that VAs are produced variously and tend to disseminate research differently. Therefore, it is not far from expectation that such visual creativity impacts the ways researchers' communicative aims are realized in VAs. In other words, the various multimodal profiles of the three VAs showed stylistic, modal and more specifically visual distinctions that impact the rhetorical functions of the VAs. In the follow up studies, I will show the rhetorical functions of VAs and how the varied stylistic and modal features impact VAs' rhetorical functions.

CHAPTER III

STUDY TWO: A RHETORICAL STRUCTURE ANALYSIS OF VIDEO ABSTRACTS

Today, the advancements in digital technologies has expanded researchers' options to use various modes (e.g., visuals, spoken text and written text) to produce genres such as Video Abstracts (VAs) for research dissemination purposes (see chapter two). These multimodal options that are available to researchers in the VA genre allow researchers to communicate various purposes for their intended audience (Cocchetta, 2020; Hafner, 2018; Pérez-Llantada, 2016). Due to varied modal options to create VAs, issues of the choice of mode, modal functions and affordances, modal orchestration and the multimodal ensemble resulting from such orchestration gain particular significance (Kress, 2009; Kress, Jewitt, Ogborn & Tsatsarelis, 2006; Kress & van Leeuwen, 2001). More importantly, how the use of modes influences the communication of researchers' purposes in VAs seems to be an important area of investigation for a better characterization of the genre. In the context of multimodal genres such as VAs, any attempt at discovering the genre's rhetorical functions would fall short of providing a more comprehensive picture of the genre if the role of all modes in multimodal realization of those communicative functions are not considered. Therefore, there is a

need to investigate how the multimodal resources used to create VAs help the important rhetorical functions in VAs to be realized. A responsive analytical framework for such investigations seems to be multimodal move analysis, which is essentially an enhancement of the traditional approaches to genre analysis especially the ESP (English for Specific Purposes) move analysis (Hafner, 2018; Ruiz-Madrid, 2021; Xia, 2020). This approach considers the role of all modes in the realization of a communicative rhetorical move, hence adapts the ESP tradition of rhetorical move analysis to the investigation of multimodal genres such as VAs. As various modal choices may grant researchers options for creative and innovative ways of modal orchestration in VAs, it would be informative to explore how VAs can impact the research dissemination purposes and foster genre innovation.

To meet the above need, this study sets out to fulfill two goals. First, it aims at analyzing the rhetorical structure of the VAs by combining multimodal analysis and ESP move analysis into multimodal move analysis. Second, taking a multimodal approach, it explores how the orchestration of modes contribute to the communicative aims of VAs' moves using sample move analysis. To do so, the study combines rhetorical structure analysis based on the ESP definition of genre and move (Hyon, 2018; Swales, 2004) with a multimodal analysis of VAs' moves using the concepts of functional specialization, orchestration and multimodal ensemble (Kress, 2009; Kress et al., 2014; Kress & van Leeuwen, 2001). More specifically, the study aims at exploring:

1. What rhetorical moves characterize the VA genre?

2. How do the choice of mode and their multimodal orchestration help realize the communicative aims of VAs' moves as multimodal ensembles?

ESP Move Analysis and Multimodality

In the ESP approach to genre analysis, a genre is traditionally defined as “a class of communicative events, the members of which share a certain set of communicative purposes” (Swales, 1990, p. 58). In this definition, a genre is viewed as a conventional way for communication among the members of certain discourse communities. These discourse communities recognize a genre and its communicative purposes via a set of moves that realize that genre. Traditionally, a move is used to refer to a “defined and bounded communicative act that is designed to achieve one main communicative objective” (Swales & Feak, 2004, p. 35). A move is a rhetorical construct that performs a communicative function and can be realized using a clause, a paragraph, or several paragraphs (Hyon, 2018; Liu, 2019). In a more recent modified definition of move, it is considered to be a discursual and rhetorical unit that is functional, non-formal, and flexible in how it is realized (Hyon, 2018; p. 28; Swales, 2004, p. 228). As a functional construct, a move is identified and tagged based upon what it does in a text rather than how it looks in form. Formally, a move can vary in size from one word to a paragraph and may be flexible in its placement in a genre. Then, what really makes a segment of a text to be tagged as a move is its familiar function in the text that is also recurrent in the instances of the same genre. In other words, moves are flexible in their realization and they are determined by what they do rather than by how they do it (Swales, 2004, p. 228). As Hyon (2018) sums it up, moves perform specific mini-functions that help the overall

communicative purpose of a genre to be fulfilled. Also, moves might follow certain conventional patterns in their placement in a genre or their realization, but they can vary in shape and style of realization depending on the text, situation and individuals who produce a genre (Hyon, 2018). The determination of moves based upon what they do rather than their formal aspects, makes it easy to transfer this construct to multimodal texts that may realize a move using more than just linguistic modes. Here, a move is defined as a functional construct that is formally unbounded. The modified definition of a move in the ESP approach allows for the extension of the ESP theory to the analysis of multimodal genres and not just written and spoken genres as was traditionally done. The advancement of the concept of move from purely linguistic genres to multimodal genres entails an adaptation in the analysis of moves, that has enhanced the notion of genre and move analysis in ESP tradition (Xia, 2020).

Following the ESP tradition for move analysis, Hyon (2018) proposes a set of detailed procedures to identify and tag moves in a genre. His proposed procedure seems to be inclusive of the previously suggested analytical frameworks for move analysis that were introduced with regards to purely linguistic written and spoken data (see Hyon, 2018, pp. 32-35 for a full description of move analysis in ESP tradition). However, the proposed procedure must be implemented with modifications in multimodal genres such as VAs. For example, traditionally, one would use the linguistic lexicogrammatical features of a text as cues to indicate various segments of the text with distinct communicative functions. However, when applied to multimodal texts, one needs to be aware that various modes of communication such as linguistic features and visuals co-

deliver in the same move (Xia, 2020). Consequently, in a rhetorical move analysis of multimodal genres, the various modes (i.e. written, spoken and visual) that are used to realize a move must be identified, and their modal relations need to be examined as a way to determine how a move fulfills its communicative function (van Leeuwen, 2005; Xia, 2020). Thus, combining ESP move analysis and multimodal analysis into what is referred to as multimodal move analysis (Xia, 2020) can help provide a more comprehensive image of VAs' communicative intentions and potentials.

A multimodal move analysis entails a discussion on how the multimodality must be analyzed in genre moves. Here, a traditional approach to genre analysis such as ESP can benefit from multimodal theories in genre analysis. Indeed, multimodal scholars have also pointed out the usefulness of multimodal analysis in understanding the rhetorical functions as well as realization of those functions in multimodal texts and genres (Bateman, 2008; Kress et al., 2006; Ruiz-Madrid, 2021). More specifically, a multimodal genre is composed of rhetorical functions (i.e. moves in ESP) that are realized via a combination of various communicative modes (Ex., spoken, written and visuals) (Kress et al., 2006). This way, a move in a multimodal genre may be realized as a multimodal ensemble, where various modes are co-present, and they co-deliver the communicative aim of that ensemble (Kress et al., 2006; Ruiz-Madrid, 2021). When various modes are combined in a move, the issues regarding which mode carries what meaning and how each mode contributes to the overall communicative aim of the move become prominent. To be able to explore in depth and discuss such modal relations, then, several theoretical tools appear to be both useful and necessary namely functional specialization and

multimodal orchestration (Kress, 2009; Kress et.al., 2006; Kress & van Leeuwen, 2001). According to Kress et. al. (2006), communication of science does not solely depend on the verbal and written languages to describe the relation between human and the natural world. Various modes of visuals, linguistic and actional nature have gained meaning-making potential as a result of their recurrent social usage. They refer to the meaning-making potential of each mode as “functional specialization” or “functional specialisms” (Kress et. al., 2006, p. 21). According to this principle, every mode has the potential to communicate certain meanings better than others, and all modes have their own unique and significant meaning-making potentials. So, in what they call “prepared media” such as movies, books and VAs, the modes are selected by choice knowing what meaning they are capable of delivering (Kress et al., 2006, p. 22). Therefore, understanding the mode’s potential in the communication of the overall meaning of a text would potentially reveal the intention of genre producers and may support their choices of modes for their desired intentions.

The discussion on functional specialization is directly related to what is known as multimodal orchestration (Kress & van Leeuwen, 2006). Multimodal orchestration is also referred to as architecture of multimodal ensembles (Kress et al., 2006). Based upon this principle, modes in a prepared media as a whole multimodal ensemble (i.e. multimodal composition as a whole), have a multiplying effect in the sense that their arrangement and integrations help the intended meaning(s) to emerge from smaller multimodal ensembles (i.e., moves in our case). Consequently, the choice of modes, the communicative potential of each mode and the way the modes are arranged to contribute to an overall

communicative aim are the important factors in orchestration of modes (Kress, 2009). Discussions on the arrangement and connection of modes in the process of orchestration demand unpacking several concepts that make such orchestration easy to grasp. When arranging modes in a multimodal ensemble, not all modes play the equal functions. In other words, there may be modes that play a more dominant role than others in co-deliverance of meaning in a multimodal ensemble. These modes will be the main carriers of meaning and they need to be more salient for the desired message to come across. To discuss such a modal relation, the concept of grounding and its sub-distinction of foregrounding and backgrounding seem useful. To make a mode salient and easy to notice, the mode is foregrounded by for example bigger size, contrast in colors or repetitions. However, if a mode has a minimal communicative role, that mode might be subsided or backgrounded for slight meaning impacts by for example moving them to the edges of a screen or making them smaller in size. The foregrounding and backgrounding as well as other meaningful connections are usually signified using techniques such as their placement and sequencing (in time and place) in a genre, color coding, size, linguistic emphasis and other design features (Kress, 2009; Kress & van Leeuwen, 2006). To date, there are very few studies that have attempted to implement such a multimodal move analysis on multimodal research dissemination genres (Hafner, 2018; Ruiz-Madrid, 2021). In what follows, I will provide a brief description of those.

Multimodal Move Analysis in Multimodal Scholarly Genres

In a recent study, Hafner (2018) performed a move analysis on the digital genre of video method articles. The video method article genre is a video that is produced to

mainly demonstrate a research experimental and methodological procedures as performed in research sites and labs to showcase the functions of the advanced technologies and techniques used by researchers in their research methods. The difference between these videos and the VAs is that video methods are mainly focused on the methodological demonstration of research methods as happened for example in lab environments and devote a major portion of video to such demonstrations. Video methods are a response to the need for replication of research in science by addressing the shortcomings that might exist in written research protocols (Hafner, 2018). They are longer than VAs and their length in Hafner's study ranged between 8:01 and 16:11 minutes long. Since video method articles are in video format, Hafner (2018) first provided a multimodal transcription of the videos into the units known as shots (Baldry & Thibault, 2006). To do so, he transcribed the existing modes in the videos including speech, kinesics, soundtrack, camera positioning and settings and participants for each shot. Next and after unitization of each video, he performed an inductive qualitative multimodal analysis to identify the functions performed by modes in each shot as a way to define the video method's functional moves and steps. He found that the macro-structure of the videos included video intro, overview, researchers' introduction, demonstration, representative results, researcher's conclusion, and closing credits, which he called obligatory "sections" (Hafner, 2018). These sections, then, included optional moves that helped these sections to be realized. Next, Hafner chose a video excerpt that contained the important and extended and detailed section of the research, called the "Demonstration" section and showed how the various modes communicate hand in hand to realize this move. In his

example, the research demonstration move was extended over several video shots, and Hafner describes how the analyzed modes show the advanced scientific methodological steps in very precise ways that would not be possible to portray otherwise. Also, he described how this multimodal interplay in the demonstration move of videos can engage the audience (Hafner, 2018).

More specifically, Hafner (2018) showed how the demonstration moves of the videos fulfill their communicative function via functional specialization. As an example, Hafner showed a shot of the video from the demonstration section, describing the step-by-step procedure of the experiment as “...*add a very small drop of bead cell solution onto the inside of a bead beating tube cap, being careful to not put solution into the outside lip of the cap. otherwise, the bead beating tube will not close sufficiently*” (Hafner, 2018, p. 30). Then, while the narrative describes the procedure in spoken text, the visuals provide a concurrent illustration of these steps and reinforce and elaborate on the narration. Hafner explains that, what spoken text can do here is to warn the viewer about the possible situation that demands description to avoid a common mistake (the underlined clause). This is a type of meaning that would be difficult to understand and possibly confusing if illustrated only via a visual, hence functional specialization dictates pairing visuals with words. Then, Hafner adds that the spoken text by itself falls short of communicating the information regarding time and space that could be found in the written protocol. Hafner’s analysis of the video method article’s demonstration move clearly shows the functional specialization complements the multimodal nature of the demonstration section move to help communicate its overall goal effectively. Hafner

(2018) provides insights on how multimodality in the video method article genre brings about genre innovation and change as reflected in innovations and hybridity in the video method article genre. However, his analysis of the selective portions of videos does not seem to follow any specific analytical framework for microstructure, multimodal analysis of the macrostructure sections in video method articles. Hence, what he calls “section” in his analysis can indeed meet the definition of move in the ESP approach, and the moves in his study seem to be what ESP refers to as “steps.” Also, in his description of multimodal realization of moves, no specific multimodal theory is followed. One more issue is leaving the term “hybridity” undefined. So, it is not clear why Hafner (2018) refers to the mixing of genres in the researcher introduction sections as hybrid but does not consider the multimodal nature of the demonstration section as a hybrid. Nonetheless, his findings regarding the mode’s functional specialization offer some insights on why and how the three modes of spoken text, written text and visuals accompany one another in the demonstration section of Video Method articles.

In a more recent study, Ruiz-Madrid (2021) analyzed six examples of the research pitch genre, utilizing the ESP approach to move analysis as well as multimodal analysis. She first introduced the macro-structure of the research pitch genre by dividing the research pitches into optional and non-optional moves and steps. The optional moves included introduction and closing moves, and the non-optional moves were calling the audience’s attention to the problem or the situation that needs researching, review of previous research, explaining the research benefits and advances. She then analyzed each move multimodally to categorize the types of modes used in realization of each move.

Next, she provided a multimodal, micro-analysis of two specific moves in the six research pitches, which she calls “opening” and “closing” moves of research pitches. The opening move was move 2 in research pitches with the communicative aim of drawing the audiences’ attention and move 5 of the genre with the main communicative function of providing take-home messages. She, then, used the concepts of multimodal density, coherence and complexity introduced by Norris (2004) to investigate the multimodal realization of these sample moves. The choice of these two moves for micro-analysis was that both moves appeared to play persuasive functions. The multimodal density of the moves comes from interrelationships among the three modes of language, gestures and paralanguage such as stress and intonation in ways that fulfill the important interpersonal functions of drawing the audience's attention to a research issue and to the take-home message of research. Also, the moves seemed to be coherently used in the sense that the integration of the modes in both moves effectively helped with the attainment of the main communicative aim in those moves. In other words, to perform the two important communicative functions, the two opening and closing moves benefited from a highly orchestrated, coherent modal relations and interplay. Ruiz-Madrid’s study draws attention to the importance of the choice and orchestration of modes in the fulfillment of the communicative intentions in the two important moves in research pitches. This study also reinforces the importance of utilizing a multimodal move analysis for a more comprehensive understanding of how multimodal genres perform important communicative functions. However, this study did not comment on how research pitches might introduce hybridity and innovation for research dissemination purposes, if any.

These example research showcase attempts at combining move analysis and multimodal analysis in ways that can explain how research dissemination genres fulfill some of their main communicative functions. They indicated that the various modes that help realize a move may play either a main communicative function such as precisely illustrating an innovative method, or more peripheral interpersonal and pragmatic roles such as audience engagement or expressing evaluations, which are beyond the main communicative aim fulfilled in a move (Hafner, 2018; Ruiz-Madrid, 2021). Furthermore, they allude to how application of multimodal move analysis to the analysis of research dissemination purposes can open up new ways for discussing genre novelty, hybridity and innovation that may characterize new, digital genres such as VAs.

Existing Research on VAs

The recent research on VAs has established that VAs can be considered as a genre or a micro-genre of research articles, which contain conventional moves similar to those in traditional abstracts and research articles (Cocchetta, 2020; Liu, 2019; Plastina, 2017). Moreover, in a comparative study, Plastina (2017) compared the rhetorical structure of 30 VAs from medical sciences with 30 equivalent written abstracts. She specifically performed multimodal analysis of hypotactic and paratactic relations between the two abstracts and concluded that VAs include the traditional introduction, purpose, method, product, and conclusion pattern. She also showed that, similar to Liu's (2019) findings, VAs included new rhetorical elements such as stating researchers' professional identities and affiliations and addressing the viewers. Plastina's study brings to the fore the VA genre's departure from the traditional abstract to a multimodal abstract and showcases

how the addition of visuals helped with re-articulation of meaning from written abstract in VAs. The purpose of such visual re-articulations is to enhance presentation of research by either clarifying, engaging or combining various genres such as conferences with VAs. Plastina's findings are very insightful for the purpose of the current research by highlighting some new multimodal traits in VAs. However, her study did not provide a closer multimodal analysis of the modes in textual realization of VAs' moves. Also, she utilized a top-down approach to find the moves, and it was not clear how the moves were tagged in VAs as a multimodal genre.

Furthermore, she used Hyland's (2004) framework to investigate mainly the resemiotization of known abstract moves from written abstract to VAs rather than a detailed description of multimodal realization of VAs' moves in inductive ways. Based on her analysis of linguistic features and multimodal rhetorical structure, she suggests that VAs are a standalone, yet flexible and hybrid genre, in that they contain rhetorical moves/steps and multimodal features that are typical of various other genres. However, there is still a need to see how moves are multimodally realized in VAs as a way to have a more comprehensive understanding of VAs' multimodal innovations. This is especially important as VAs are produced using various visualization techniques that can impact their realization of rhetorical functions and communicative purposes in more innovative ways.

Moreover, via rhetorical structure analysis, Liu (2019) found that VAs from the field of biology included moves such as study niche, research intention, research process, procedure, and techniques as well as findings and conclusion. VAs also included new

moves including claiming authorship, or entertaining viewers that are not typical moves of traditional genres (Liu, 2019). Liu's study has useful insights for the current study. First, he identified the necessity of modifying the ESP move analysis by incorporating more than linguistic data as transition markers and boundaries of moves. In other words, in his study, even a graph and a sound effect could be indicators of transition between various moves in VAs. Secondly, the distinction of moves into core and optional showed that VAs may include new and added moves such as providing instruction and entertaining viewers. Although these findings help with the analysis of the macro-structure of VAs, Liu's study did not theoretically engage in the multimodal realization of the innovative moves. Also, it is debatable if the innovations such as entertaining viewers and providing instructions are the overriding features of VAs in realization of various main moves or they really are separate moves distinguishable by various transition markers.

Most recently, Coccetta (2020) investigated VAs using Baldry and Thibault's (2006) phase and subphase textual units for video genre analysis and distinguished between research dissemination subphases, descriptive subphases, socializing subphases and concluding subphases. Although Coccetta did not take an ESP approach to the analysis of the VAs, she uses the phase and sub-phase analysis to account for the various modes used in VAs' make up for different communicative purposes. Moreover, Coccetta highlights the presence of multimodal features and specifically the role of visuals such as 3D scientific animations or visual-graphical images. These multimodal affordances not only make available the information that one must, otherwise, obtain by reading the

whole research article, but also provide a better comprehension of research findings (Cocchetta, 2020). Also, what Cocchetta offers in her study is the value of tagging videos into video units that make it possible to analyze the concurrent use of modes that may change variously within the span of one functional move in VAs. Put differently, since VAs are a video genre, a move might extend over several consecutive visual shots. So the unitization of VAs into shots before identifying the functional moves allows for a more nuanced and precise analysis of interrelationships between and among modes when they interrelate to realize the moves.

Generally, the existing research on VAs suggests the importance of a thorough multimodal investigation of VAs along with an analysis of various communicative purposes they might fulfill via their multimodal affordances. So far, an in-depth analysis of how moves are realized multimodally in VAs is yet to be done. A Multimodal move analysis of VAs can help understand how VAs can be defined as a hybrid genre for genre users such as novice researchers and inform them of the multimodal affordances of the genre for effective realization of research dissemination purposes. This analysis can also inform ESP genre theory by disclosing the degree of genre variation and innovation that is responsible for VAs' departure from their conventional genre set including written abstracts and journal articles (Tardy, 2016) and the possible reasons for such departures.

Methods

The study takes an ESP approach to the rhetorical structure analysis of VAs and combines move analysis with multimodal analysis to provide a comprehensive image of how moves are realized in various VAs of the study (Hafner, 2018; Ruiz-Madrid, 2021).

To do so, the research benefits from the definition of move as a functional unit (Hyon, 2018; p. 28; Swales, 2004, p. 228) and uses sample analysis to discuss the multimodal realization of moves. For these purposes, the analysis also implements the concepts of functional specialization (Kress et al., 2006), multimodal orchestration as well as multimodal grounding (Kress et al., 2006; Kress & van Leeuwen, 2006).

Preliminary Examination of VAs for Sampling

In a preliminary examination of VAs in science, the YouTube channel of the journal *Cell* from the Cell Press publisher series was examined. The reason for choosing this journal is that it is one of the earliest and perhaps the first journal to publish VAs on YouTube, starting in 2009 (Bredbenner & Simon, 2019; Liu, 2019). After examination, it was revealed that VAs can be distinguished into three main VA categories with distinct visual profiles known as Graphical VAs (GVAs), Whiteboard VAs (WVAs) and Talking-Researcher VAs (TVAs). Next, six examples of each type (total=18) VAs were randomly selected for the move analysis. Using NVivo software, the 18 VAs were multimodally transcribed into visual shots for a more in depth move analysis (see Chapter 2).

Identification and Analysis of Moves in VAs

After unitizing VAs into shots and classifying them into three types (i.e., Graphical VAs, Whiteboard VAs and Talking-researcher VAs), all VAs' shots were examined for rhetorical functions or moves in an inductive analysis. To do so, the following procedure, that is partially driven by Hyon's (2018) instructions for ESP move analysis, was implemented:

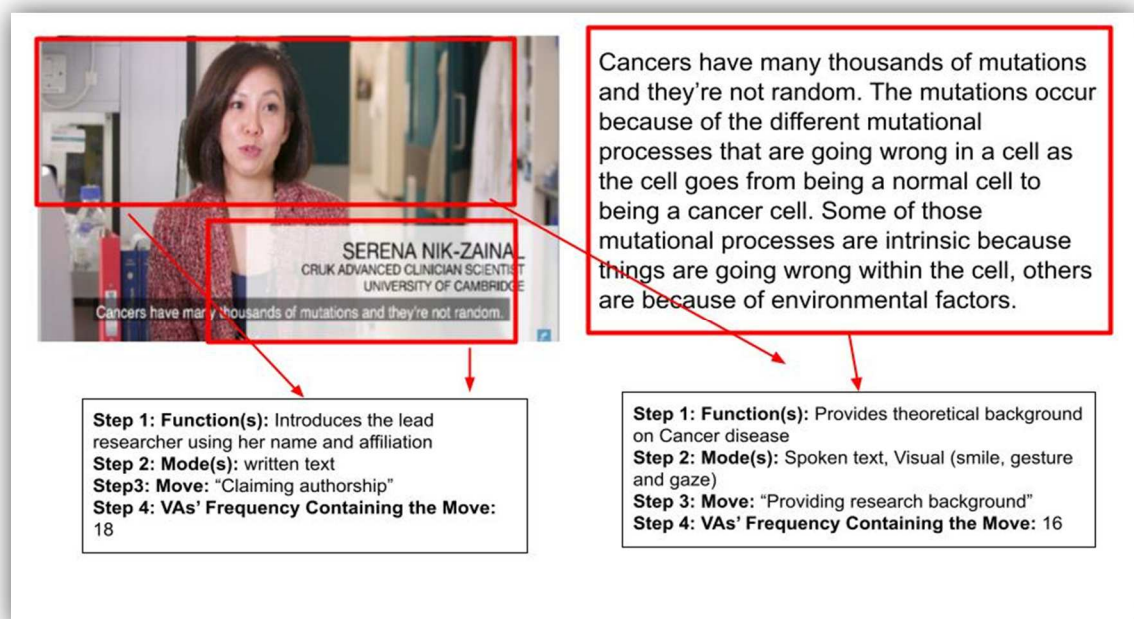
1. Marking and labeling communicative functions: in each VA shot, all distinct and interesting communicative function(s) were identified and labeled.
2. Identification of modes: the mode(s) that are used to contribute to realization of each communicative function (i.e., move) were identified. Here, it was revealed that some moves were being communicated using the affordances of several modes and some moves were realized mainly via one mode.
3. Generating a workable set of moves: here, the identified functional moves in each VA shot were further examined to see if they could functionally be merged as a bigger move or further dissected into separate moves. If several categories comprised one bigger communicative function, then they would be categorized as one move. If a segment that was labeled as one move could be dissected into separate moves, they would be revised accordingly.
4. Finalizing the move categories: finally, all VAs were checked against the observed found move categories and the frequencies of the VAs containing each move were obtained.

The difference between this move analysis and the conventional one is that, to identify the functional units or moves, all the existing modes and their functional relations in each VA shot were examined. This adapted move analysis to the investigation of VAs is illustrated in Figure 10. The coding of moves is indicated using the same step numbers used above. In what follows, I will describe how such coding is implemented along with a brief description of their functional specialization and orchestration (Kress et al., 2006).

The sample shot in Figure 10 is borrowed from TVA #6 of the study. This shot is the second shot in this TVA and its duration is 21 seconds. The shot includes spoken text, visual and written text. Upon coding this shot for the communicative functions, it became clear that the shot contains two main communicative functions. The spoken text provides background for the cancer mutations and introduces their causes. Here, the researcher talks to the camera and her smile and gaze accompany the spoken text while she gives background on cancer. The communicative function here is labeled as “provides theoretical background on cancer disease”. After coding all VAs, this category, along with similar categories from other VAs, was later placed under the label “providing research background” as a functionally recognizable and recurrent move.

Figure 10

Sample Inductive Coding of Shots for Moves



A point to consider is that, although the gaze and smile are the visible visuals in the shot, they bear more of interpersonal function and do not functionally support the main communicative aim of this shot. In other words, the researchers' smile and gaze do not bear any functional relevance to the background on cancer, although they might engage the viewers interpersonally while this background is presented via spoken text. This way, each mode provides this move with different communicative affordances or functional specializations (Kress et al., 2006), with spoken text delivering a recurrent, recognizable communication function that could be identified as a move (Hyon, 2018).

While the shot unfolds and as the researcher continues to give background on the cancer mutations, the written text appears for only 5 seconds to introduce the researcher and disappears before the visual shot ends. As a result, the shot performs one more distinct communicative function that is delivered mainly via written text and is labeled as "introduces the lead researcher using her name and affiliation". This function was later placed under the bigger communicative function named "claiming authorship" with other similar functions in the VAs of the study. The embedment of this temporally short move within the larger move of "providing research background" shows the nonlinearity and freedom in the placement of moves in multimodal genres such as VAs (Liu, 2019). Based on the principles of multimodal orchestration and multimodal grounding (Kress et al., 2006), the short embedment of this move within the larger move "providing research background", may assign a relatively less saliency and importance to this move. It may seem that the move "claiming authorship" is moved to the background as compared to the other longer move "providing research background" that is more extended and salient.

However, since all VAs include the function of “claiming authorship” that is realized via researchers’ names and affiliations, it is labeled as a distinct communicative function that is recognizable and recurrent.

In what follows, I will first introduce the observed moves in the VAs. Next, I will point out the observed genre hybridity and innovation in realization of the VAs’ moves using sample analysis. For this purpose, I will analyze the move “presenting the main finding(s)” in each VA type. For such analysis, I will use the principles of multimodal orchestration (Kress & van Leeuwen, 2006), functional specialism (Kress et al. 2006) and grounding (Kress, 2009) as analytical tools to describe the genre hybridity and innovation observed in multimodal realization of VAs’ moves. I have selected sample shots from the move “presenting the main finding(s)”, since it exists in all VAs, is the most extended in duration and is multimodally rich (number of modes used). Also, the choice of this move for sample analysis was partly due to the Cell Press’ guidelines for VA production. These guidelines have a special focus on clear and engaging presentation of research findings in VAs (See [Cell Press Guidelines for VAs](#)).

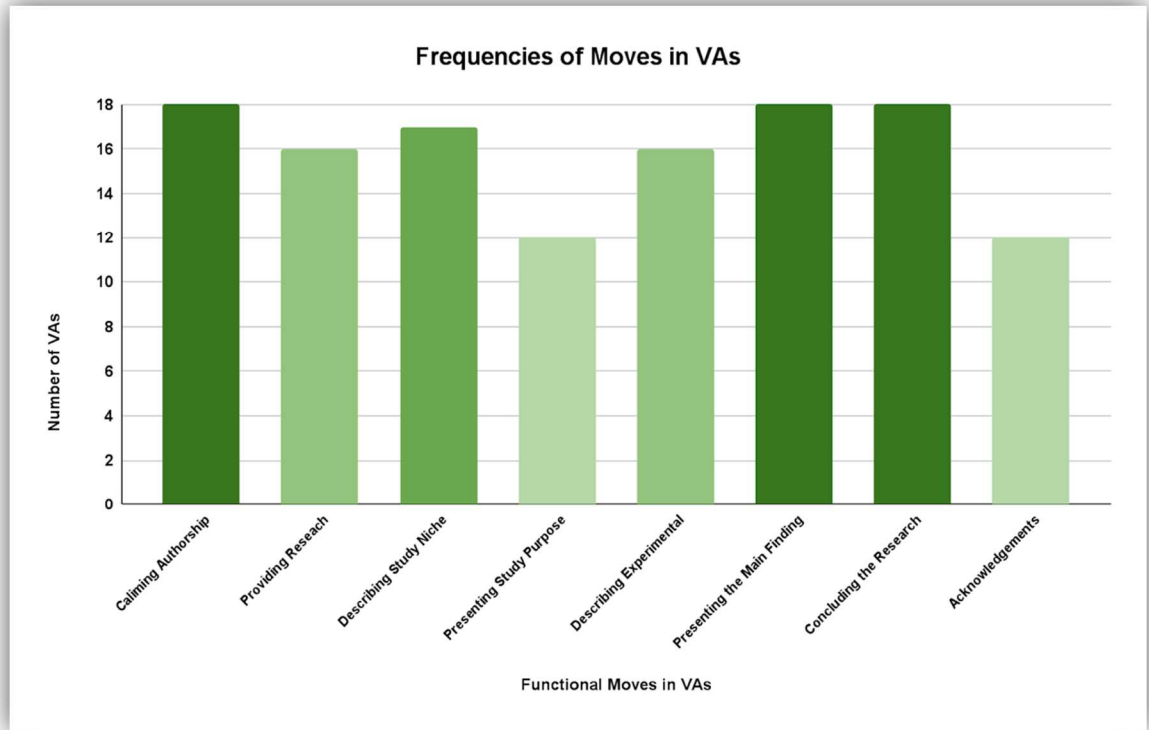
Findings

Moves in VAs

The analysis of the 18 VAs revealed a total of eight moves in VAs (Figure 11). Due to the size of the corpus, I refrain from distinguishing the core moves as is the tradition in ESP approaches. Rather, I will put forward the frequencies of the VAs that included each move. In general, there was variation in the number of moves in VAs (Figure 11).

Figure 11

The Frequencies of Moves in 18 VAs



As is indicated in Figure 11, four moves namely “claiming authorship”, “presenting the main findings” and “concluding the research” existed in all VAs. Seventeen VAs included the move “describing study niche” and sixteen VAs included the moves “providing research background” and “describing experimental processes.” Also, 12 VAs included “presenting study purpose” and “acknowledgements.” The average length of all eighteen VAs was 261 seconds (Figure 12). The most extended moves in duration were “presenting the main finding” with the average length of 75 seconds, “describing experimental processes” with the average length of 60 seconds, and “providing research background” with the average length of 55 seconds. The least extended move was “acknowledgements” with average length of seven seconds.

Figure 12

The Average Length of Moves in VAs (as compared to average length of all 18 VAs)

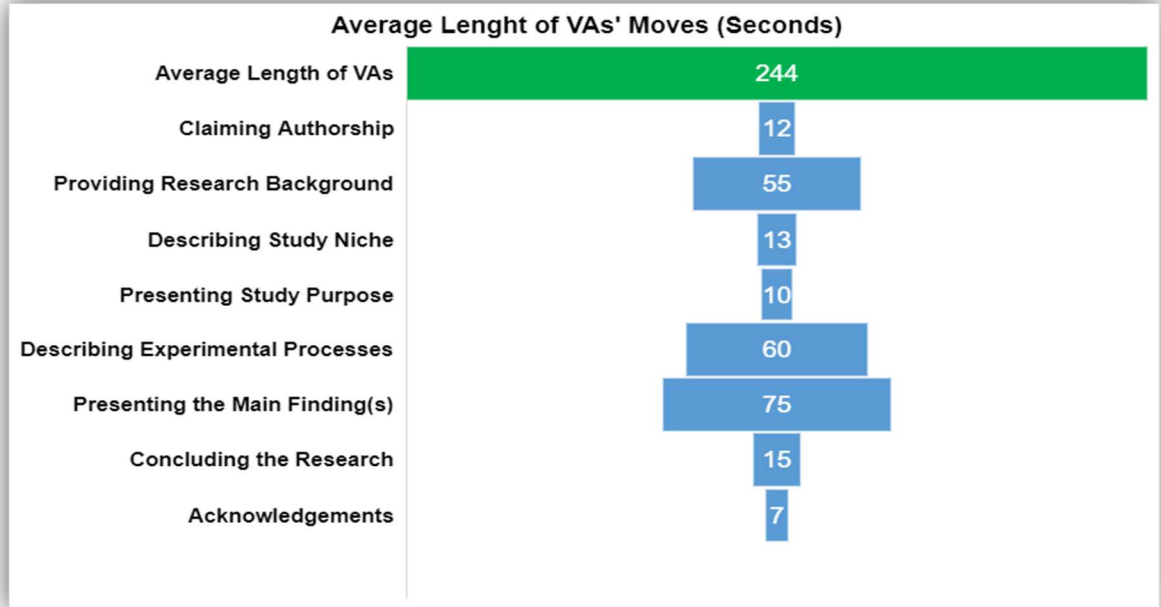
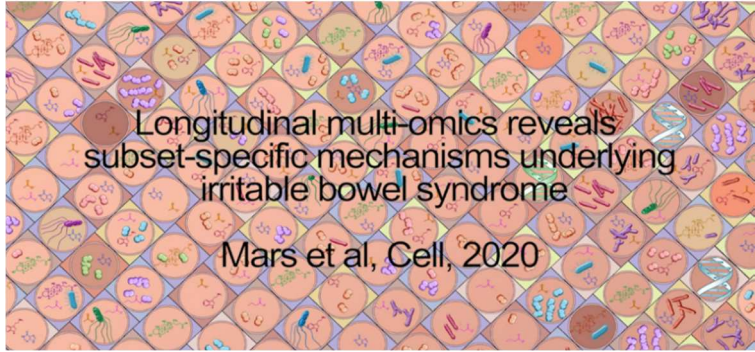
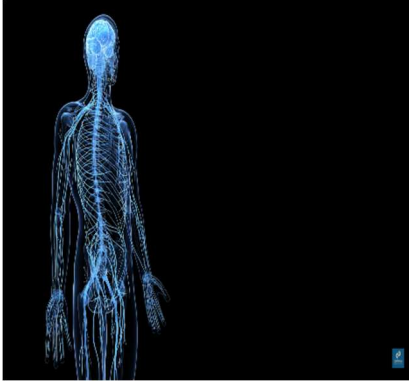





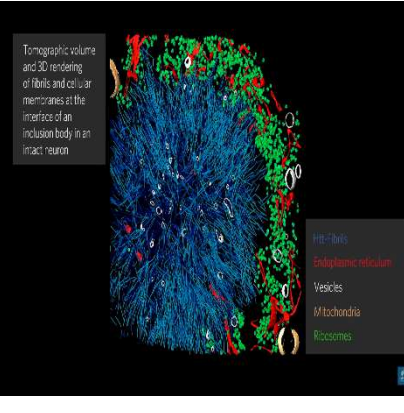
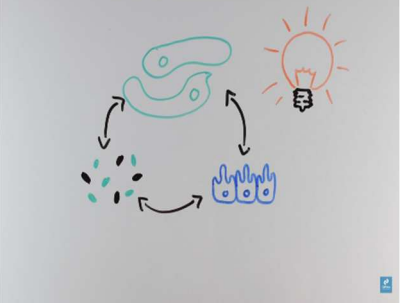

Figure 13 shows the found moves and the example shots representing those in VAs. The description of the moves and their communicative function follows the table.

Figure 13

Example VAs' Shots Representing the Found Moves

Moves	Example Shots	Modes Used
Claiming Authorship		<i>Written Text</i>

<p>Providing Research Background</p>		<p><i>“The nervous system is one of the most complex biological systems in the animal kingdom from the humble fruit fly to human beings and is responsible for coordinating our actions and processing sensory information. It can be thought of as a ...”(GVA #6)</i></p>	<p><i>Written Text & Visual (Static Diagram)</i></p>
<p>Describing Study Niche</p>		<p><i>“...There's an ecosystem in your gut that has the friendly bacteria of your microbiome, the intestinal cells and the immune cells... The problem is that we don't know exactly how they work together...” (WVA #6)</i></p>	<p><i>Spoken Text & Visual (Iconic Drawing)</i></p>
<p>Presenting Study Purpose</p>		<p><i>“We wanted to understand the environmental factors that are causing cancer, that leaves specific patterns in the genome” (TVA #6)</i></p>	<p><i>Spoken Text & Visual (gesture, gaze)</i></p>
<p>Describing Experimental Processes</p>		<p><i>“So we treated cells in culture, these were human stem cells...”</i></p>	<p><i>Spoken Text & Visual (action)</i></p>

<p>Presenting the Main Finding(s)</p>		<p>“...we studied a poly Q inclusion within a mouse brain. It looks very similar to that of HeLa cells with the poly Q inclusion in blue, surrounded by ER membranes in red, with which they interact extensively. Interestingly, large macromolecules...”</p>	<p>Spoken Text, Written Text & Visuals (Dynamic Microscopic Image)</p>
<p>Concluding the Research</p>		<p>“...It's possible that learning more about the immune gut ecosystem could help us understand diseases like Crohn's or celiac ...” (WVA #3)</p>	<p>Spoken Text & Visual (Iconic Drawing & Indexical Arrows)</p>
<p>Acknowledgments</p>			<p>Written Text</p>

M1: Claiming Authorship. The function of this move is to present authorial information as a way to claim authorship for the research (Liu, 2019). Providing authorial information usually at the beginning of VAs can be viewed as an attempt to project certain professional identities to viewers and to introduce the people behind the claims in VAs (Hyland, 2005; Plastina, 2017). This move always includes the research title and author’s names, affiliations and positions, and reference to researchers’ collaborations. In

Graphical VAs, mainly written text realizes this move. There are few cases where collaborations are delivered using spoken text as well visuals. For example, in one GVA shot, photos of researchers were included in a final shot of GVA as a way to visually realize this move. Sometimes, logos representing researchers' research institutes were also used. In WVAs, the same scenario exists but the difference is in the use of informal style of both font types used in written text as well as the informal nature of the visuals. In WVAs, not only logos but also informal drawings that symbolically refer to researchers were also used to fulfill this move. Due to the appearance of authors in TVAs, this move is not only realized using written text and spoken text, but researchers can also be seen in video clips, sitting in front of camera and talking about their research with viewers, communicating with co-researchers and working together in the lab environments, operating lab tools and experimental and surgical procedures etc. So claiming authorship is also realized using video clips of researchers introducing themselves and their research as well as collaborating behind the scenes. In Whitboard VAs and GVAs, there were only references in written text and spoken text to claiming authorship, but in TVAs, authors were introduced also visually as they appeared in their own VAs. Claiming authorship is 12 seconds on average and may recur as many times as new researchers are introduced in the VAs especially in the TVAs.

M2: Providing Research Background. This move sets a background for research and contextualizes research by briefly putting forward the main theories behind or background for research, the most relevant empirical research or in some cases by claiming centrality of the research topic. This move existed in 16 VAs. While five VAs

provided general but necessary facts about the study topic such as the causes of various diseases, 11 VAs set the background by centralizing the importance of the research topic in the real world. A similar finding was reported by Samraj (2005) with regards to traditional conservation biology abstracts that centralized the importance of real-world issues as topics of research. Also, this finding aligns with Plastina (2017) in that 73.4 % VAs found to argue for topic centralization and prominence as a step of introduction in her study. VAs used various visuals to fulfill this move. Visually, the very key concepts that were important in understanding the background of research or are centralized were shown via visuals. The visuals in GVAs usually illustrate the key concepts that are necessary to understand the background of research. For example, in Table 2, the example shot for this move shows a diagram of the nervous system as the main centralized concept that seems to be key in comprehending the background of research. In the same vein, the WVAs included iconic drawing of the concepts or even illustration of key terms and concepts that were needed to understand the research. For example, the iconic drawing of various cell types such as intestinal wall cells of immune cells. In TVAs, this move is mainly realized via only the spoken text delivered by researchers. Sometimes indexical as well as iconic gestures and smiles also accompany the spoken text.

M3: Describing Study Niche. This move in VAs tends to highlight the challenges, problems and vacancies in research that have inspired the main areas of study for the researchers. Study niche existed as a separate move in 17 VAs. The niche was mostly realized by specifying a real-world issue or problem along with a gap in

knowledge and research. Both the real world issue and gap were explicitly communicated in 14 VAs to establish the niche. Only two VAs did not state the gap and one VA mentioned only the gap. Also, one VA did not introduce any niche explicitly. Sometimes the issues and gaps were simply phrased in question formats and at times they were embedded within the study background. Liu (2019) and Plastina (2017) also found a research niche as a separate move in VAs. Platina (2017) found that, in her corpus of VAs, research niche was realized only via gap statement and in only 26.6 % of VAs. However, Liu (2019) mentions that in his VAs, research niche also included outline of study and brief description of methods joined. Visually, the realization of this move in three types of VAs were different. In TVAs, again this move was realized mainly via spoken text as the researchers introduce the real world issue and problem or study gap. In GVAs, this move is normally illustrated using visuals such as diagrams that symbolically refer to the issues and their causes. GVAs usually include written words accompanying visuals that either label organisms that cause the issue or statistics that refer to seriousness of the issues. In WVAs, however, the niche of a study, be it a real world issue or a gap, is fully illustrated using simple iconic drawings that depict cause and effect relations very easily. For example, when an iconic drawing of a cancer cell is connected to an iconic drawing of a human that is suffering from pain, showing the cause and effect in a sequence. These hypothetical situations are visually depicted in WVAs since the visualization technique (i.e., iconic drawings) used in this VA type allow for such illustrations. Also, the use of simple iconic drawings has granted the WVAs an innovative way of realizing this move which is to illustrate the niche of the study using

viewers' real world experiences. In other words, the visuals use humans' real world, tangible experiences as explanation tools for what the issue or a gap is. For example, when the problem of DNA entanglement is explained using the tangible experiences of one's headphone wires getting entangled and that pulling a wire might make the wires even more entangled. WVAs use either visual juxtaposition, connections or also metaphorical connections to connect the two worlds for explanatory purposes. The nature of iconic drawing makes it possible to visually illustrate the two worlds and connect them for a better explanation of the niche.

M4: Presenting Study Purpose. In this move, the study is situated by specifying the researchers' intentions, foci as well as questions. The move helps focus the scope of the research in VAs and existed in 12 VAs. The intentions were delivered variously in different VAs. For example, Some VAs explicitly stated the study purpose(s), while others presented the overall thesis of research, indicated the focus of research, or expressed research hypotheses and questions as alternative ways to communicate the study intentions. In most VAs, the study intentions were expressed mainly in one or two shots and similar to Liu (2019), the move was collated with the movies before or after it. Plastina (2017) also found that purpose statements existed in 100 percent of her VAs although it was not clear if the purpose was stated explicitly. What's more, the placement of study intentions varied greatly in the VAs of the current study. Hence, the inclusion of methodological value in VAs may be viewed as an attempt to highlight the credibility of the research for viewers. Further examination showed that only five VAs communicated the intentions after the niche and before the method. Two VAs

communicated the intention towards the end of the method and merged with it sometimes as embedded moves. In five VAs, the intention was dissected in multiple different smaller study objectives which were communicated step by step throughout the methods. Again, in TVAs, this move was realized mainly via spoken text as the researchers introduced their study focus or purpose. Their talking was sometimes accompanied by gestures. In GVAs and WVAs, the study focus or purposes were also mainly realized using spoken text, written text or both. In these VAs, if the focus and purpose of the study was to examine a certain organism, then that organism would be symbolically represented and sometimes also labeled using written words. For example, when in one WVA, the researchers wanted to specifically study the role of a specific cell type that is called T-Cells in cancer treatment, the iconic image of the cell would appear and be labeled as T-Cells. In general, presenting the study focus or purpose was not a visually rich move.

M5: Describing Experimental Processes. In this move, researchers delineated their research data collection processes and analytical procedures as well as the novel techniques used in their experiments. Sixteen VAs included information on research experimental processes. While all VAs included the step by step description of study methods, nine VAs had infused this information with a strong emphasis on the value and novelty of the method or the technique and its benefits and applications in the study. This move was one of multimodally rich moves where the experimental processes were illustrated using various visuals. Plastina (2017) also found that all VAs in her study

included methodological value as a step of methods but this was not the case in traditional abstracts. Few VAs also included the sampling procedure as well as justification of methodological decisions. As was also found by Liu (2019), in some VAs that have multiple phases and their intentions are manifold, experimental procedure is usually infused within multiple sequences of intention, step-by-step procedure and findings of that phase. However, for the purpose of move analysis, they were identified as belonging to separate moves.

Most TVAs included clips of researchers working in their lab environments with certain tools such as microscopes, imaging technologies as well as samples of cells, DNAs etc. There were also clips that showed researchers' analysis of their data either individually or along with their teams. These clips included various actions. However, most of these actions seemed to be presented symbolically and would recur multiple times throughout TVAs. Hence, they did not seem to bear one to one functional connection with what was delivered via spoken mode in shots where they happened. There were some shots in TVAs, where such a one to one connection could be seen. For example, in one TVA, the researcher said that they treated cell samples and isolated their DNAs. These exact actions were shown in the clip (Figure 13). This example is one of the rare clips from TVAs where the actual experimental steps in one research is illustrated. So, in most TVAs, the purpose of this move is to only give a synopsis of research using clips of researchers' actions in the lab as symbolic visuals. The purpose of these visuals is not to necessarily demonstrate how the experimental procedures are done but rather to give an idea of behind the scenes of research. In GVAs, however, dynamic

visuals such as 3D, SEM, microscopic and tomograms were used to demonstrate the step by step imaging techniques used to research experimental processes. These dynamic images were usually used to illustrate and demonstrate, with precision, the steps involved in data collection and analysis. For example, when the procedures involved in zebrafish embryo's formation are imaged using microscopic technology to precisely record the movement of cells, formation of embryos progenitor area as well as formation of neural networks. This procedure was shown precisely and step by step using dynamic microscopic images. In WVAs, the steps involved in experimental processes were usually illustrated using iconic drawings of those steps and the organisms that were being experimented. The interesting feature of such visualization is that the steps of experiment unfold like a visual narrative and story that has different sequential steps using iconic and symbolic visuals. The symbols like arrows then were used to connect the various steps of the experiment realized via iconic visualization.

M6: Presenting the Main Finding(s). The function of this move is to report the main and major findings and outcomes of a research. Similar to the M5, this move is also multimodally rich and makes use of multimodal orchestration and grounding of various modes to clearly illustrate the main findings using mainly visuals. This move existed in all 18 VAs and presented research main findings by summarizing the main findings of the study, comments on findings' significance and value, and presenting their interpretation of findings. More specifically, 12 VAs highlighted the importance and significance of the findings of the study. Furthermore, nine VAs referred to findings as interesting and unexpected or surprising. In almost half of VAs, the success of the certain techniques and

methodological choices in obtaining certain results were also highlighted. In few of the VAs, the presentation of main findings was followed by some interpretation of what they meant for the field and for the researchers.

In most VAs, the presentation of findings was the most extended move and was usually extended over several consecutive shots. The average duration of this move in all VAs is 75 seconds. Visually, in GVAs, this move was realized using either dynamic visuals of 3D, SEM, microscopic and tomogram types or simply graphs, diagrams, maps and schematics. The dynamicity of visuals in GVAs allowed for a precise illustration of research findings. Due to the enhanced nature of these visuals, they also relied on both written words and numbers as well as spoken text to provide a better comprehension of research findings (Figure 13). In WVAs, the findings were realized via the same explanatory strategy that was used in the move “describing study niche”. In other words, to provide an easier comprehension of findings that are highly technical in nature, the visual enabled the more tangible delivery of such findings by connecting those to the real world, tangible experiences of viewers. In TVAs, there was a mixture of the researcher’s description of their own finding along with other visual types that are not as frequent in this VA type such as SEM, microscopic, or figures and schematics. However, to realize the findings in a more engaging manner, the researchers used gestures and smiles. This move is used as an example move to explain the observed genre innovation and hybridity in the VAs of the study in the next section.

M7: Concluding the Research. The function of this move is to conclude the main content of VAs by summarizing the main take home messages of a research and/or

by putting forward research applications or implications. In few of the VAs, this move included a step where researchers suggested future directions for their research and commented on limitations of their research. This move was mostly realized using spoken and written text and was not visually rich in three VA types.

M8: Acknowledgements. The main communicative function in this move was to give credit to the sponsors and funding agencies that supported the research and/or to the video creation team. This move appeared in 12 VAs and was also found by Liu (2019). However, Plastina (2017) did not point out its presence in the VAs of her study. In the VAs of this study, this move was realized mainly in a single VA shot and was short in duration and multimodally less rich. Visually, this move is realized using only logos of funding agencies or video production team. Also, written words were used to introduce these funding agencies as well as video composers. The spoken text was absent from this move in VAs.

Innovation in the Multimodal Realization of VAs' Moves

After examining the VAs' moves for their multimodal realization, it became clear that the VA genre represents two types of innovation in disseminating research. In what follows, I will show these innovative ways of disseminating research, using *presenting the main finding(s)* move as a multimodally rich sample in VAs.

Utilizing Dynamic Visuals

One of the innovative features of the VAs, specifically the GVA type, is the use of dynamic visualization techniques that are made possible thanks to the affordances of their video media. The dynamic visuals are usually produced and altered by researchers

in order to provide a clear and precise illustration of their findings. Below, I will show a rich example of how the orchestration of such visuals along with other modes helps researchers clearly portray their findings and reach an argumentative stance.

Figure 14 shows a dynamic shot from GVA # 1 that illustrates the move *presenting the main finding(s)*. To show how the dynamic shot graphically changes, I have presented the shot in three frames to show the graphical changes more effectively. The research in this particular GVA investigated how expanded polyglutamine or poly Q sequences in specific proteins result in neurodegenerative disorders. Large inclusion bodies or aggregates of poly Q sequences can be found in the brains of patients who suffer from these disorders. So, the research portrayed in this video is an attempt at uncovering whether these poly Q inclusion bodies are toxic or not. The GVA then showcases how researchers utilize a variety of microscopic techniques to understand the cellular consequences of such aggregations. The shot illustrates how live cell imaging and tomography helped reveal that poly Q aggregates interact with membranes and result in unwanted consequences. To do so, this shot benefits from the interaction of the tomography image, written text, and spoken text (Figure 14).

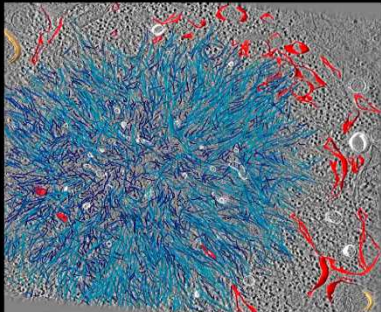
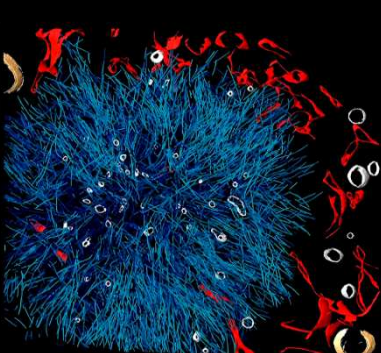
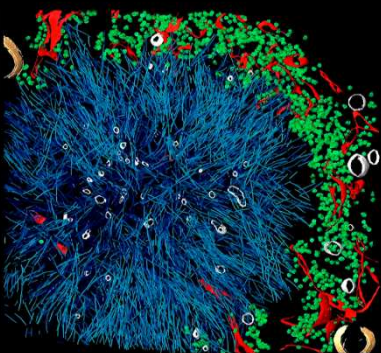
The multimodal orchestration in this shot helps the researchers to present the main finding of their experiment in precise ways. The spoken text in this shot greatly depends on the image to deliver the main message. This is reflected in the phrases *in blue*, *in red*, *in green*, that point at the different segments of the visual. Also, the color coding index reinforces and enhances the connection between the visual and the spoken text by indexing the colors in visuals further. This way, the three modes of spoken text, written

text and visuals integrate well to make the communicative function of this move more salient. Although the spoken text integrates well with the visual and written text to deliver the overall message, it has its own special functions. One of these functions is to further clarify the terms *Htt-fibrils*, *Endoplasmic Reticulum*, and *Ribosomes*, that are delivered via written text. In the spoken text, these terms are referred to as *Poly Q inclusion*, *ER membranes*, and *large macromolecules*. Moreover, the written text on the left side of the image extends the information delivered via visual by adding more details to it. More specifically, the written text clarifies that what we see in the visual is in fact a Poly Q inclusion aggregation in an intact neuron. This information was not delineated in the spoken text or could not be easily inferred from the dynamic visual. Hence, the observed modal relations show rich cases of functional specialization (Kress et. al., 2006, p. 21).

The dynamicity of the visual and the illustration of the poly Q and ER membrane interactional processes, as reflected in the dynamic graphical change, are what make this shot innovative. This visual dynamicity can provide a more tangible and concrete proof for the researchers' observations than a static visual can. What's more, the multimodal integration or orchestration observed in this shot results from a kind of sequenced interdependence of the three modes. In other words, to understand what the visual is exactly illustrating, one needs to refer to the written text on the left side of it and the index on the right side. Next, to better comprehend the main finding delivered via spoken text, one needs to look into the integration of both written text and visual.

Figure 14

Example Shots from the Presenting the Main Finding(s) Move in GVA#1

Visual Shot	Spoken Text
<p data-bbox="331 457 509 575">Tomographic volume and 3D rendering of fibrils and cellular membranes at the interface of an inclusion body in an intact neuron</p>  <p data-bbox="915 638 1094 730">Htt-Fibrils Endoplasmic reticulum Vesicles Mitochondria</p>	<p data-bbox="1143 422 1414 1003">.... we studied a poly Q inclusion within a mouse brain. It looks very similar to that of HeLa cells with the poly Q inclusion in blue, surrounded by ER membranes in red, with which they interact extensively. Interestingly, large macromolecules such as ribosomes shown in green are excluded from the aggregate.</p>
<p data-bbox="331 873 509 991">Tomographic volume and 3D rendering of fibrils and cellular membranes at the interface of an inclusion body in an intact neuron</p>  <p data-bbox="915 1054 1094 1146">Htt-Fibrils Endoplasmic reticulum Vesicles Mitochondria</p>	
<p data-bbox="331 1310 509 1428">Tomographic volume and 3D rendering of fibrils and cellular membranes at the interface of an inclusion body in an intact neuron</p>  <p data-bbox="915 1512 1094 1604">Htt-Fibrils Endoplasmic reticulum Vesicles Mitochondria Ribosomes</p>	

Furthermore, the evaluation of this main finding that is expressed via spoken text using the term *interestingly* is a special function specific to spoken text. This way, all the three modes have functions that are specialized while they integrate well to realize the move “presenting the main finding” in multimodal ways. As a result, the move *presenting the main finding(s)* is a very well-orchestrated multimodal ensemble whose communicative purpose is achieved via a well-orchestrated interplay of the three modes and their functional specializations (Kress et al., 2006; Ruiz-Madrid, 2021). The highly orchestrated nature of this shot and the use of all three modes is partially due to the fact that the microscopic image has been altered and enhanced using color coding. When images are enhanced and altered to make the intended message in this shot salient, the reading of the visual becomes more difficult and needs navigation.

Hybridity via Mixing Discourses and Genres

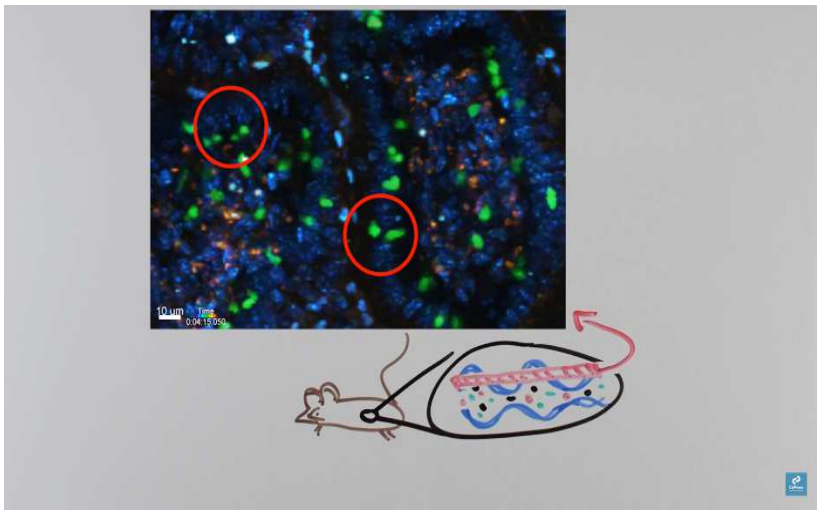
A second observed innovation in the realization of moves in the VA genre is a hybridity that is achieved mainly via mixing of various discourses or genres, which is referred to as interdiscursivity (Bhatia, 2010). Bhatia (2010) defined interdiscursivity as creating novel and creative textual constructs by appropriating and exploiting conventions and semiotic resources typical of other genres and social discourses in constructing novel, hybrid genres. This hybrid feature was mostly evident in the realization of moves in WVAs and TVAs where the types of modes make such discourse and genre mixing more feasible. As Bhatia puts it, mixing discourses and genres in creative ways can help researchers to achieve some “private” intentions while realizing the recognizable, conventional communicative functions or moves. In what follows, I will

describe such interdiscursive innovation using sample shots from a WVA and a TVA and will show how the modes are used to realize the *presenting the main finding(s)* move in a hybrid way in these shots.

Figure 15 portrays a shot from WVA #6 that illustrate presenting the main findings. In this WVA, the researchers attempted at showing the relation between IELs (immune cells) and intestinal wall cells in both absence and presence of pathogens in the gut. These shots in Figure 15, then, present researcher’s observations of such interaction in the presence of pathogens such as salmonella and toxoplasma. With this background on this particular WVA, I will move to show how multimodal interplay realizes presenting the main findings.

Figure 15

Example Shots from Presenting the Main Finding(s) Move in WVA #6

Visual Shot	Spoken Text
 <p>The visual shot consists of two parts. The upper part is a fluorescence micrograph showing a dense field of cells. Some cells are stained blue, while others are green. Two red circles are drawn around specific green-stained cells. In the bottom left corner of the micrograph, there is a scale bar labeled '10µm' and some technical data '0.04 15.00'. The lower part is a schematic diagram of a mouse's body, showing its internal organs. A red arrow points from the diagram's gut area towards the micrograph above it.</p>	<p>... the researchers saw that the IELs didn't just scan the wall anymore; instead they began squeezing between the intestinal wall cells. The researchers called this behavior “flossing”. Yeah! like what you do with your teeth!</p>

In this shot the main finding that is being reported is that, in the presence of pathogens, the IELs' behavior in the gut changes from normal scanning to what researchers called *flossing*. To do so, the spoken text benefits from drawing the viewer in using the pronoun *you*, the informal, conversational expression *yeah*, and a metaphor that are used as engagement strategies in this shot. Flossing in this shot refers to when IELs squeeze between the wall cells, as is introduced in the spoken text. To understand this better, the spoken text contains the linguistic expression *like*, which integrates the IELs flossing behavior with the actual flossing of teeth from the everyday discourse. As a result, a simpler concept from the everyday discourse is used to clarify a more technical and research based observation via similarity relation. This integration and orchestration of the research discourse and everyday discourse is called deliberate metaphor, whose aim is to educate the less knowledgeable viewers on this scientific issue (Cameron, 2003; Moder, 2013). While the spoken text uses metaphor to clarify the concept of flossing, the shot also integrates two different types of visuals that are typical of two different discourses. In other words, we see the iconic drawing of a mouse that is connected to an actual research-based microscopic image using an arrow. The arrows are used to show that the microscopic image is magnifying the mouse gut system where flossing behavior happens, highlighted by red circle lines. Then, the dynamic microscopic image illustrates the flossing movement with precision. The iconic drawing of the mouse is an informal textbook-ish image that is typical of educational discourses (Myers, 1997). The microscopic image, however, was produced for the actual research article and as part of the research process. The two visuals evoke two distinct genres and discourses, thus, they


yield intergenericity. Intergenericity is the combination of the features and conventions of two various genres within a single, hybrid document such as in this shot (Coy & López, 2010). Intergenericity in this sense is a form of interdiscursivity. As a result, the integration of various discourses using visuals and linguistic features typical of those discourses enhances the understanding of the concept of *flossing* in this shot. The various linguistic and visual modes that convey these discourses are delivered via metaphorical relation as observed in spoken text, and intergenericity by juxtaposition of visuals typical of various genres. Indeed, such interdiscursive and intergenericity integrations via metaphor and non-metaphorical connections (i.e. spatial juxtaposition) are a prevalent multimodal feature of the WVAs of the study and they seem to have yielded hybrid realization of the move *presenting the main finding(s)* in this VA type. Overall, this shot uses the functional specialization of the modes and styles that are typical of various discourses and orchestrates them using metaphorical cues and juxtaposition to realize the move *presenting the main finding(s)* while also educating the viewer on a concept. The first is a move as it is a recognizable, recurrent communicative function, and the latter is a creative and private function that is used to fulfill the move. Consequently, this move, as a multimodal ensemble, is a hybrid of convention and innovation.

Figure 16 shows the move *presenting the main finding(s)* in a shot selected from TVA#3 of the study. To understand this move, I will provide some background about the research here. This TVA describes that, prior to cell division in the human body, each DNA molecule must duplicate into two daughter DNA molecules. Then, the two generated DNA molecules separate and attach to different DNA molecules. Since human

survival depends on this cell division process, it would be important for this division to happen in a robust way. However, the problem with this process is that the DNAs have a right-handed, double helical shape, and as the replisome moves forward in DNA, the replisome must rotate around it. This rotation causes a lot of tension and pressure on DNA and causes the DNA to twist. Researchers' concern in this TVA is the question of where this actual DNA twist would go. They focused on chromatin fiber and hypothesized that, if it is easier to twist a chromatin fiber as it is located in front of the replisome, then the twist would go to the front. In this scenario, the two daughter DNAs can easily separate. On the other hand, if it is easier to twist two chromatin fibers as they are located behind the replisome, then the twist would go behind the replisome. In this second scenario, the two daughter DNA molecules would be completely intertwined and would not separate. In the movie *presenting the main findin(g)*, the researcher reports this main finding of the study.

Figure 16

Example Shots from the Presenting the Main Finding(s) Move in TVA#3

Visual Shot	Spoken Text
	<p>Although chromatin is normally considered an obstacle to replication, our results show that chromatin also simplifies replication topology and thus facilitates replication dynamics. This is rather remarkable!</p>

In the shot shown in Figure 16, the researcher presents the main finding of the study by delineating how the chromatin, which was always viewed as an obstacle for replication, can now be viewed as a substrate that *simplifies replication topology and thus facilitates replication dynamics*. This finding is delivered only through spoken text in this shot as the researcher had used the fancy replisome on the table to clearly demonstrate the tension on DNA in a prior shot. In that prior shot, the researcher used the probe and the iconic rotating gesture to show the chromatin movement around the replisome and the direction where the tension would go. Now in this shot, the researcher's evaluation of their research finding is communicated using both spoken text and visual mode. In other words, when the researcher evaluates the finding saying *this is rather remarkable*, she also smiles while communicating this. Smile is a facial gestural mode that is used in this shot to reinforce the communicative effect of the finding in interpersonal ways. Using smile along with the evaluative remark, the researcher takes an evaluative stance, which functions in direct ways to engage the viewers by inviting them to agree with her and find the main finding remarkable as she did (Valeiras-Jurado & Ruiz-Madrid, 2019; Ruiz-Madrid, 2021). What's interesting in this shot is that the researcher is present in front of the camera to comment on her own research. Here, the visual evokes genres such as interview or documentary by ways of resemblance and while the spoken text mostly evokes a research dissemination discourse. The researcher not only draws on an evaluative stance to exude significance of findings, but does so using a smile that enhances such interpersonal and engaging impact. Therefore, what we observe is a hybrid

multimodal ensemble that fulfills the private intention of displaying evaluation and professionalism while realizing the main communicative function of *presenting the main finding(s)* in an illustrative fashion.

Discussion and Conclusion

The communicative functions of the eight moves in the VAs of this study reveals that VAs still hold a connection to research dissemination genre set. This is evident from the existence of moves, such as *providing research background*, *describing experimental processes* and *presenting the main finding(s)*, that perform similar functions in VAs' predecessor genres such as research articles and written abstracts. However, VAs showcase genre innovation in the sense that they use various modes of delivery that would not have been possible in the traditional genres for research dissemination. These modes function to enhance the realization of moves in various ways that either make the research to be presented more clearly and precisely, more understandable or more engaging. The genre's innovative functions are mostly due to the use of dynamic images, the interdiscursivity and the interpersonal connections with the viewers.

It seems like the VAs of the study are a combination of tradition, transition and private intentions, that yield genre innovation and hybridity. Here, genre innovation is the byproduct of genre producer's use of the affordances of the video medium of the VAs to enhance communication of the research as well as their need in fulfilling private intentions. However, it is debatable whether the VAs deviate from the shared discourse community norms in blatant ways (Bhatia, 2004, 2017). VAs are an innovative genre in the sense that their rhetorical structure still shows adherence to the accepted norms in the

researcher's discourse community. However, they show great variation in how the moves are fulfilled in multimodal ways. The analysis of the 18 VAs' rhetorical structure in this research enhances the previous research findings (Liu, 2019; Plastina, 2017). More specifically, the VAs still include the moves that are typical of traditional abstracts or research articles or other scholarly sub-genres. VAs still include the traditional moves of research background, study niche, research intentions, experimental processes, main findings and conclusion. These moves resemble the traditional abstract rhetorical structure of introduction, purpose, method, product and conclusion pattern introduced by previous research on abstract genre (Hyland, 2004; Samraj, 2005; Plastina 2017). These traditional moves might be what make VAs recognizable as a sub-genre of research articles or as a novel variation of traditional abstracts (Plastina, 2017). In other words, the recurrence of these moves is necessary for VAs to be identifiable by researchers in general and the discourse community of biology researchers in particular (Devitt, 2004; Liu, 2019; Morell, 2015).

While maintaining the research-based traditional moves, the VAs of the study included novel moves of authorial information and acknowledgment, with the first one appearing in all the VAs. These moves give VAs a stand-alone status in their research article genre set (Plastina, 2017). This means that the viewers would not need to refer back to the main article to see who the authors are and what the title of research is, as the VAs provide this necessary information. Acknowledgement of sponsors and who funded the research is again a type of information that research articles would include. However,

the appearance of this move once more in a research VA and towards the end of videos boosts the VA's stand-alone status as a genre.

What seems to be the stronger influential factor in VAs' hybridization and variation are the ways the moves are realized in VAs. The analysis of multimodal realization of the *presenting the main finding(s)* move showed a lot of variation in how this move is realized in the sample shots from the three types of VAs. The variation among the VAs of the study is mostly due to the differences in the choice of visualization techniques used in them, impacting the multimodal orchestration of modes and their interplay in move realization. The innovation in the VAs mainly comes from using various visuals as an effort to engage different viewers in various ways. For example, the multimodal structure of GVAs consists mostly of the visuals, written and spoken text that are mainly typical of research discourses. These modes show a high level of multimodal integration and orchestration with the aim of providing support and clarity for researchers' claims and arguments. As a result, the GVAs may be viewed as a way for an expert to expert way of communication, since they seem to use the visuals and linguistic modes that are not new in science researchers' discourse community. Quite differently, both WVAs and TVAs of the study used visuals that are not research-based. In these VAs, the use of visuals and linguistic modes that enable a mixture of genres and discourses are overriding features of the genre. TVAs used interview or documentary style visualizations to report research, and WVAs used drawings that resembled the visuals in classroom lectures or science textbooks. These modal elements in

combination with reporting the main finding of research have brought non-research discourses and genres and research discourses together in innovative ways. One interesting observation was that although the WVAs mix various genre features and evoke various discourses, those genres and discourses are functionally connected and enter a meaningful interplay and orchestration that aim at displaying the moves in simpler and undesirable ways. In other words, they make research concepts easier to understand. However, in TVAs, researchers' professional self-stance is more visible, which may not functionally support the main communicative aim of a move. Thus, based upon the principles of functional specialization and orchestration (Kress, 2009; Kress & van Leeuwen, 2006; Kress et al., 2006), the functional connection of modes in TVAs are debatable, they nonetheless foster genre mixing and hybridity by adding interpersonal impacts (Bhatia, 2010).

Among all three VA types, WVAs appear to represent a very compelling and rich case of genre innovation and hybridity. To present the main finding, the sample WVA shot seemed to integrate various visuals and spoken text styles typical of non-research discourses and use them along with informal spoken text. More importantly, the WVAs seemed to integrate non-research discourses and genres with research reporting discourses to not only realize the research reporting moves, but to do so in ways that connect to their desired viewers in desired ways. Put another way, these VAs report the research in ways that seem to cater to non-researcher and less-expert viewers by making research more relatable and educating. For example, in WVAs, the metaphors connected the various modes and discourses in meaningful ways so that the shot followed a coherent

and meaningful orchestration of modes to deliver its communicative functions multimodally. As a result, the move seemed to have gained the dual function of not only reporting the main finding, but reporting it in more understandable ways for viewers that might not have extended knowledge on the topic with one of functions being recognizable and recurrent as a move. Since interdiscursive practices are a major innovative feature of WVAs, they deserve more in depth studies in these WVAs. More specifically, it would be informative to know how and for what “private” intentions researchers use this innovative genre practice.

Genre hybridity via interdiscursive was also observed in the study by Hafner (2018) with regards to video method article genre. However, the analytical procedure in this study can complement previous studies in the sense that it attempted at clearly showing how a multimodal transcription and coding is implemented when tagging such genre’s for their functions. The use of NVivo as a multimodal coding software enabled the concurrent coding of all the modes in VAs and a clear analysis and demonstration of how each move is realized multimodally.

In conclusion, the three types of VAs seem to vary in the realization of their moves due to various multimodal techniques used in their makeup. In particular, the two types of TVAs and WVAs fulfil the move by mixing both research and non-research genres, styles and discourses that yield genre innovation and hybridity in a more noticeable way. Future research can explore each of the video types with respect to the observed genre hybridity and innovation

CHAPTER IV

STUDY THREE: MULTIMODAL INTERDISCURSIVITY IN VIDEO ABSTRACTS

(VAs)

Technology affordances enable the creation of digital genres such as Video Abstracts (VAs) through combining a variety of modes (e.g., visuals, written text and spoken text) for disseminating scientific research. The availability of various modes grants researchers more creative ways of combining these modes to deliver their various communicative purposes for varied audiences in VAs. This way, VAs show genre innovation through hybridization, which refers to “all kinds of blending, mixing, and combining that occur in genres and texts” (Mäntynen & Shore, 2014. p. 738).

Hybridization at the discourse level is known as interdiscursivity, or the appropriation of genre for various audiences’ needs using the modes that are typical of varied research and non-research (e.g., popular) discourses (Bhatia, 2010). Interdiscursive practices so far remain underexplored in multimodal genres for scientific dissemination (Pérez-Llantada, 2016), yet offer a unique insight into the characterization of emerging digital genres such as VAs.

Considering that the VA genre is still in an emerging stage (Cocchetta, 2020; Plastina, 2017), the communicative purposes of the genre and how it tailors to a wider audience requires more exploration for the genre to be used more effectively in the research world. Moreover, its video format and inclusion of various modes of communication such as varied visualization techniques offers a compelling case for the investigation of genre hybridity and innovation via interdiscursive practices and will have implications on how to utilize the affordances of the digital and multimodal nature of web-based genres to connect with various audiences' needs. Thus, the current study explores interdiscursive practices of VAs taking an inductive approach to multimodal analysis of six Whiteboard Video Abstracts (WVAs) from the Cell journal's YouTube Channel. The analysis in this research highlights the importance of an inductive exploration of interdiscursive practices in the emerging digital genres including VAs as a way to more effectively characterize these genres with relation to the possible, novel communicative purposes intended by their producers to connect with varied audiences.

VAs as an Emerging Research Dissemination Genre

The relation between text, social practices, communicative intentions, and audience has been explored through different theoretical approaches to genre studies, especially the English for Specific Purposes (ESP) approach (Bhatia, 2004; 2010; Swales, 1990; 2004). In ESP, genre is “a class of communicative events” that share a set of communicative purposes, and are similar in their structure, style, content, and audience (Swales 1990, 58). Genres fulfill their communicative purposes via discoursal and rhetorical units known as “moves”. Genre moves are functional, non-formal units that are

flexible in how they are realized (Hyon, 2018; p. 28; Swales, 2004, p. 228). To put more clearly, a move in a written genre is delivered via mainly written words, but in a multimodal genre, speech and visuals are added, which play a major role in fulfilling the communicative aims of each move. The ESP approach has established that the analysis of the modes that are used in combination in genres can give insights into the covert and overt social communicative purposes and intentions of the communities of practices that use those genres (Bhatia, 2010; Pérez-Llantada, 2016). Recent research has established VAs as a flexible and hybrid genre or a micro-genre of research articles since they contain conventional moves found in traditional abstracts and research articles along with some added new moves (Cocchetta, 2020; Liu, 2019; Plastina, 2017) (See also chapter three) . For example, research has shown that VAs include move patterns equivalent to the traditional abstracts, that include an introduction, purpose, method, product, and conclusion (Plastina, 2017). VAs also seem to have added new communicative functions including claiming authorship or entertaining viewers (Cocchetta, 2020; Liu, 2019; Plastina, 2017). However, what seems to make VAs distinct is the multimodal realization of those moves that showcase elements of various discourses and genres such as more popular science and everyday discourses. That is, influenced by the affordances of the web and their video medium, VAs seem to undergo hybridization as is evident in new multimodal interdiscursive features (Cocchetta, 2020; Liu, 2019; Plastina, 2017). that seem to mix the research reporting discourse with everyday communication discourse.

Pérez-Llantada (2016) performed a move analysis on author VAs that are embedded within online research articles and concluded that VAs summarize research

articles and function as screening genres, enabling the reader to decide whether to read the article as a whole. She found that these videos extend the content of traditional abstracts only by providing information about what happens behind the scene of research as well as more details about study rationalization and methodological procedures. Her study suggested that by capturing readers' attention, VAs can better connect to an audience than traditional abstracts can. Although she refers to the visual impact of VAs, her study did not focus on details of how visualization techniques along with other modes might achieve the connection with the audience as well as other possible communicative functions that can characterize VAs as a hybrid genre. Coccetta (2020) alludes to the importance of studies on the hybrid nature of VAs by raising the question about why one would bother watching a four-to-five-minute VA that takes longer than reading a written abstract. Her response to this question refers to the strong presence of multimodal features and specifically the role of visuals that not only make available the information that one must otherwise obtain by reading the whole research article, but also provide a better comprehension of research findings (Coccetta, 2020). Inspired by this literature, the current study argues that through their multimodal make up and visual techniques, VAs fulfill novel and more various communicative purposes, that are mainly achieved via interdiscursive practices that need to be understood and characterized in order to better establish VAs as a hybrid standalone genre.

Interdiscursivity

Interdiscursivity is a traditional concept that has been investigated extensively in earlier genre studies (Bakhtin, 1986; Candlin & Maley, 1997; Fairclough, 1995; Foucault,

1981; Kristeva, 1980). The concept refers to “the use of elements in one discourse and social practice which carry institutional and social meanings from other discourses and social practices” (Candlin & Maley, 1997, p. 212). Put simply, mixing two or more already known genres, styles, or discourses generates interdiscursive spaces in texts (Bhatia, 2010; Fairclough, 1995). The interdiscursive space is an adjustable and adaptable space as it changes depending on the purpose of the discourse community who mixes them (Bhatia, 2010; Fairclough, 2006; Rajandran, 2020). The new discursive spaces can be used for articulating concepts, categories, analogies, metaphors and models (Doty, 1993, p. 302) and for a variety of “private” communicative intentions of genre producers (Bhatia, 2010, p. 36).

Interdiscursivity is sometimes viewed as a sub-category of intertextuality (Bhatia, 2010) and they seem to be closely related concepts. However, for the purpose of the study, it is important to draw a distinction between the two. Intertextuality more specifically refers to “how texts contain within themselves evidence of the histories of other texts” (Candlin & Maley, 1997, p. 203). In other words, intertextuality is the use of past and historic texts in new texts (of the same genre) with the purpose of transforming the past in light of new information, which is typically done in conventionalized ways (Bazerman, 2004; Bhatia, 2010; Fairclough, 1992). In this distinction, then, intertextuality is viewed as more conventional blending and integration of texts in new contexts that may not generate entirely new genres. An example of intertextuality is the integration of other research findings in a new article using direct or indirect quotations (Bazerman, 2004, pp. 88-89). Evidently, this integration is a manifestation of

intertextuality and does not lead to hybridization of genre since the textual resources are conventionally used in research and the social intentions of producers and their research reporting culture remains intact.

On the other hand, interdiscursivity refers to creating novel and creative textual constructs that are hybrid in nature in the sense that they appropriate and exploit conventions and semiotic resources typical of other genres and social discourses in constructing novel, hybrid genres (Bhatia, 2010). Hybrid genres are byproducts of interdiscursive practices that mix, embed and bend various generic norms in novel and creative ways. More specifically, any appropriation of multimodal resources whether textual, semantic, socio-pragmatic, generic and professional may result in novel changes in the genres, practices and/or cultures of a discourse community using those genres. These novel changes normally create a space where authors and genre producers can achieve their new and “private” intentions (Bhatia, 2010, p. 35). For example, Bhatia (2010) shows how an annual report of a company in Hong Kong integrated three discourses of finance, accounting, and public relations to fulfill a variety of communicative purposes; namely, informing stakeholders of annual performances of the company, reporting to the authorities the performance of the company in past years, and presenting company performance with a positive image. Bhatia found that the study of interdiscursive practices seems to be key in understanding the nature of professional genres, including research reporting genres, as they can potentially reveal the various communicative intentions that result in hybridity of the genres. However, interdiscursive practices that result in hybrid genres (i.e., interdiscursive hybridity) have so far remained

underexplored in novel and hybrid research reporting genres, especially in multimodal discourses.

Interdiscursivity in Multimodal Discourses

The multimodal nature of VAs is a key factor in the investigation of interdiscursive practices. Multimodality is defined as “the use of several semiotic modes in the design of a semiotic product or event, together with the particular way in which the modes are combined” (Kress & van Leeuwen, 2001, p. 20). When various modes of communication meet in a genre like VA, one can easily assume that more opportunities for the interaction of various modal resources are granted to the genre users. Generally, studies on multimodal discourses and genres can provide insights for the current research. For example, research on academic blogs have found that blogs tend to be hybrid genres in that they enable the communication between the scientist and their audience via informal, conversational back and forth, and techniques such as hyperlinks, metaphor, and visuals are used to provide better understanding of the science concepts in more engaging ways (Luzón, 2013; Myers, 2010; Zou & Hyland, 2019). These multimodal affordances recontextualize the research in blogs for a more varied audience by integrating traditional scholarly genres with popular science journalism and mixing features of research articles, conference talks and social media discourses (Kuteeva & Mauranen, 2018; Zou & Hyland, 2021). Moreover, 3MT (3-Minute Thesis) presentations use various visual modes such as catchy titles, striking pictures, and verbal modes including surprising facts and anecdotes, question raising and empathetic stories typical

of non-science genres and discourses to portray a research in the most understandable and engaging manner possible (Carter-Thomas & Rowley-Jolivet, 2020).

More recently, video genres have become prevalent media for communication in both academic and non-academic settings. Video genres are byproducts of various layers of styles and discourses as indicated via various modes of language, color, image and sound (van Leeuwen, 2005). Hence, they offer genre producers a plethora of various means for fulfilling private communicative intentions that might not be common within their discourse communities. For example, Rajandran (2020) analyzed Earning videos, as a corporate genre, to understand the interdiscursive hybridity that was achieved as a result of changes in genre, style and discourse which are the components mentioned by Bhatia (2010). Rajandran (2020) found that Earning videos mixed the two genres of interviews and presentations with casual and formal styles (as shown with visuals and linguistic modes) that created interdiscursive spaces where three discourses of financial accounting, strategic management and public relations were mixed. He then concluded that the Earning videos are a genre that not only try to market corporations but persuade prosperous, and potentially public, investors to invest in those corporations.

The above research indicates that digital genres are influenced by the affordances of the web including various modes of delivery such as visuals and sounds. The availability of various modes has led genres to be spaces for the integration of a variety of academic and non-academic discourses in unconventional ways as a way for genre producers to regulate their connections to a wider audience on web. The mixing of various discourses may result in the emergence of new, hybrid genres such as VAs.

Therefore, the current article aims at exploring the multimodal interdiscursivity in the emerging genre of VA as a way to characterize the hybrid nature of the genre more effectively for research dissemination purposes. For the purpose of analysis, the research uses the notion of accessibility in multimodal interdiscursive practices.

Accessibility in Interdiscursivity

Accessibility is an essential notion in understanding interdiscursive practices by genre producers and can be used as an explanation tool for how and possibly why various discourses, genres and styles typical of those discourses are mixed and integrated the way they are (Moder, 2008; 2010a; 2010b & 2013). There is no denying that if the purpose of the interdiscursive practices is to fulfill private communicative intentions and to connect with a desired audience, then the discourses or discourse elements must be accessible for the intended audience and part of their already established conceptual knowledge. This way, interdiscursivity depends on what Fauconnier and Turner (2002) call conceptual integration or conceptual blending. Conceptual integration refers to the process of creating or understanding knowledge and conceptual domains or mental spaces via conceptual relations among those domains and spaces (Fauconnier & Turner, 2002). Since the mental spaces create discourses, understanding a discourse then entails unpacking and comprehending the various mental spaces that are used to create the knowledge that is being transmitted via that discourse. In line with this view, a discourse space refers to the ways the mental spaces within a discourse are structured in both processes of creation and comprehension of the discourse (Moulin, 1995). Where two or more discourses or discourse elements meet, an interdiscursive space is created. In an

interdiscursive space, a discourse may be evoked strongly and more saliently via activation of the entire discourse space or just some of its elements that might represent that discourse. These discourses or discourses' elements need to be grounded (Langacker, 1999) or contextualized using contextual cues or spacebuilders for the recipient to infer their relations in intended ways (Fauconnier, 1994). Spacebuilders are mainly linguistic expressions that cue the integration of various mental spaces in discourses and the integration of the discourses in an interdiscursive space (Fauconnier, 1994). The relation of discourses in an interdiscursive space can be metaphorical or non-metaphorical, and spacebuilders are helpful in their establishment.

In a metaphorical relation, a more relatable and concrete mental space called source input space is mapped onto the more abstract mental space called target input space (Fauconnier & Turner, 2002). Interdiscursivity via metaphor then happens when each of these mental spaces establish or represent two distinct and irrelevant discourse spaces via similarity relations. For example, Moder (2013) investigated the use of the spacebuilder *think of it as* in a deliberate metaphor that teaches the scientific concept of autoreceptors to the public audience of a radio news program. She showed how the spacebuilder *think of it as* was used in the metaphorical construction of *and you can think of it as very similar to how a thermostat works* by a young scientist in that radio news program. The scientist was reporting the findings of research on brain mechanisms that cause impulsivity. However, to make the target research discursive space more accessible, he used the more accessible concept of *thermostat* as an element of everyday popular discourse via similarity between the two discourses. Then, Moder discussed how

both target (i.e., the concept(s) that are metaphorized) and source input spaces (i.e., the concept(s) used to metaphorize targets) were made accessible in prior discourses to this metaphor and how this accessibility helped with saliency of the similarity between the two discourses in the interdiscursive space. Similarly, the connections between or among discourses or discourse elements in non-metaphorical interdiscursive spaces can be made more accessible using proper textual and non-textual cues.

Although the examples of spacebuilders and interdiscursive contextual cues were mostly discussed with relation to purely linguistic data, the same notions can be extended to the multimodal analysis of interdiscursivity. To do so, this study benefits from the multimodal notion of salience proposed by Kress and van Leeuwen (2006). In multimodal discourses, the issue of salience refers to whether various discourse spaces or discourse elements are structured in ways that draw viewers' attention to features that make the interdiscursive connections more accessible. For example, placement of images in the background or foreground as well as their size and color contrasts might assign relatively more or less importance to the discourses that they represent. Also, the placement of modes within the frame of an image such on top or left side might convey the importance and primacy attached to the discourse conveyed by those. Furthermore, the connection of discourses might be made more accessible using same colors for discourse elements or using symbolic visuals such as arrows that connect those (Kress & van Leeuwen, 2006). These multimodal structuring principles serve as equivalents for the discussed linguistic elements and provide the main analytical tools for a detailed

discussion of how some important interdiscursive connections might be fulfilled in VAs of this study.

Methods

This research takes an exploratory, inductive approach to the multimodal analysis of interdiscursive hybridity in the VA genre. For this purpose, Bhatia's (2010) definition of interdiscursivity is used with particular attention to accessibility of interdiscursive intentions realized via linguistic and multimodal contextual cues (Kress & van Leeuwen, 2006; Moder, 2013, 2010a). For the analysis of accessibility in multimodal interdiscursive spaces, issues of saliency as well as notions of modal foregrounding and backgrounding proposed by Kress and van Leeuwen (2006) were implemented. The study follows two phases of exploration. First, a preliminary examination of VAs was needed to narrow down the VAs to a more consistent and representative sample for the study of interdiscursive strategies. Second, an in-depth analysis of the selected samples for interdiscursive hybridity was carried out.

Preliminary Examination of VAs for Sampling

In a preliminary examination of VAs in science, the YouTube channel of the journal *Cell* from the Cell Press publisher series was examined. The reason for choosing this journal is that it is one of the earliest and perhaps the first journal to publish VAs on YouTube, starting in 2009 (Bredbenner & Simon, 2019; Liu, 2019). After examination, it was revealed that VAs can be distinguished into three main VA categories with distinct visual profiles known as Graphical VAs (GVAs), Whiteboard VAs (WVAs) and Talking-Researcher VAs (TVAs). Next, six examples of each type (total=18) VAs were randomly

selected for the move analysis. Using NVivo software, the 18 VAs were multimodally transcribed into visual shots for a more in depth analysis. In Chapter 2, a multimodal move analysis was performed on VAs, and it was revealed that mixing genres and discourses (i.e., interdiscursivity) is an innovative characteristic of the VA genre. As was also discussed in Chapter 2, from among all VAs, the whiteboard types (WVAs) manifested interesting examples of genre innovation via interdiscursivity. Indeed, some of the recent studies on whiteboard creation technologies in science have proposed that this visualization technology is a useful tool for clarification of science for a more public audience and can serve as an educational tool (Douglas et. al., 2017; Li et. al., 2020; Mar, Orodvas-Montanes, Oksenberg & Olson, 2016). For these reasons, the six whiteboard VAs (WVAs) of the study were selected for an in-depth analysis of genre innovations via interdiscursivity.

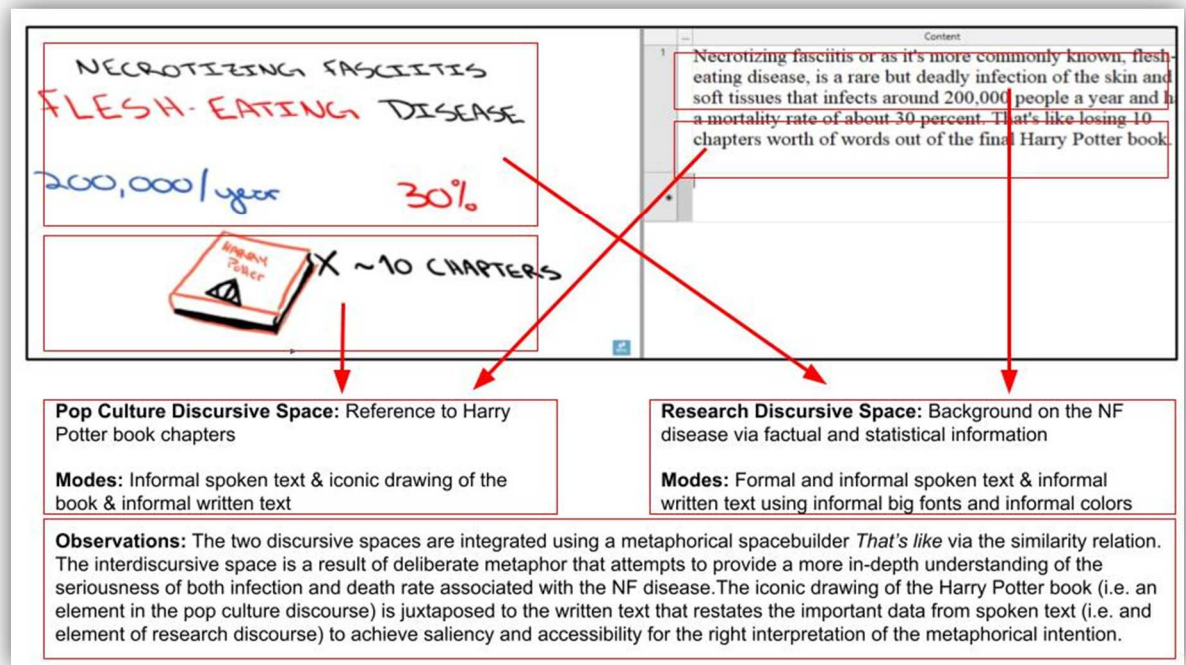
Analysis of WVAs for Multimodal Interdiscursive Strategies

The six WVAs were transcribed and unitized into shots on NVivo software, and their multimodal profile was generated (see chapter 1). For the specific purpose of this study, all the existing modes in all WVA shots underwent inductive coding to identify the discourses and genres they evoked and the functions of identified interdiscursivity. The coding procedure is illustrated in Figure 17. In the shot in Figure 17 that is from WVA #5, the research discursive space and pop culture discursive space are mixed using the spacebuilder that's like, which is a linguistic cue that evokes a similarity between the two spaces. The research discursive space as the target input space of the metaphor is

delivered mostly via linguistic modes of spoken text and written text, while the pop culture discursive space as the source input space of metaphor is delivered via all

Figure 17

Coding an Example Shot for Interdiscursive Relations



three modes of visual, written text, and spoken text. Here, the connection between the two discursive spaces is made more salient by juxtaposing the drawing of the book Harry Potter to the written text in big font size on top of the page that evokes the research discursive space, which gives background information on the Necrotizing Fasciitis (NF) disease. Also, the reiteration and resemiotization of important data from the research discursive space (i.e., the death rate and the disease) in big font size on the top of the page makes the important information become salient. In the same vein, the important information from the source discursive space (i.e., losing ten chapters from Harry Potter's

book) is resemiotized from spoken text into the iconic drawing and the written text. Then, the two equally salient discursive spaces are mapped based upon their similarities and create a deliberate metaphor whose purpose is to educate the viewer on the seriousness of the disease (Cameron, 2003; Moder, 2013).

Findings

The coding of all the WVA shots reveals that WVAs mix the research reporting genre typical of research articles with the lecture genre similar to traditional classroom lectures as well as visual storytelling genres. These genres are mainly evoked via styles that are typical of those genres. Styles in WVAs are a mixture of both casual and informal style (ex., pseudo-dialogues, textbook-ish drawings and visual narrative, causal font type and informal colors) and formal style which is mainly realized via spoken text in WVAs. Also, the coding of WVAs indicated that these videos integrate every day and pop culture discourses with research report discourse which may be viewed as attempts to instruct and educate viewers as well as to entertain them while adding a slight promotional twist. In this section, these innovative interdiscursive functions are introduced using an in-depth qualitative analysis of the most representative example shots from WVAs. These example shots show how multimodal resources in WVAs make various genres, styles and discourses come together to fulfill novel communicative intentions of the scientists.

Example 1: Providing Instruction on Scientific Concepts

One of the prevalent instances of interdiscursivity in the WVAs of the study was the use of deliberate metaphors (Cameron, 2003; Moder, 2013), that are realized via

integration of everyday life and pop culture discourses with the research reporting discourse that seem to serve an instructional role.

Figure 18

Metaphorical Integration of Everyday Discourse and Research Discourse for Instructional Purposes

Visual Shot	Spoken Transcript
<p>The diagram is a hand-drawn illustration. At the top left, it says "THIS IS HARD!" with "HARD" in large, bold, red letters. Below this, a green circle labeled "HESC" has three arrows pointing to three different colored circles (red, purple, orange). To the right, "IDEALLY:" shows a green circle labeled "HESC" with one arrow pointing to a single yellow sun-like circle. Below that, "ACTUALLY: (OFTEN)" shows a green circle labeled "HESC" with three arrows pointing to three different colored circles (red, purple, orange). Further down, there's a drawing of a car labeled "SFO" (San Francisco) on the left and "BOSTON" on the right, with a winding road between them. A hand is shown holding a map, with the text "NEED A MAP!" and "A MIX!" nearby. The central text "SC DIFFERENTIATION" is written in blue. There are also some question marks and a small drawing of a person looking at a map.</p>	<p>it is challenging to direct an embryonic stem cell to become one and only one type of differentiated cell. Indeed, stem cell differentiation has been hard to control; experiments attempting to produce a specific cell type from an embryonic stem cell often result in an impure mixture of multiple cell types that have limited practical use. This is because of our incomplete understanding of the exact developmental processes that guide stem cell differentiation. Stem cell differentiation is akin to getting into your car in San Francisco with a vast array of destinations ahead of you and trying to drive across the country specifically to Boston. It would be impossible to get to your destination without a detailed map of the routes in between and the intermediate stops you need to make along the way.</p>

Figure 18 shows a rich instance of metaphorical interdiscursivity in the sense that two concepts of travel and stem cell differentiation that are representative of everyday discourse and research reporting discourse are integrated via a similarity relation. This

shot, which is selected from WVA # 3, depicts a challenge in research on embryonic stem cell differentiation, where in the experiment process, the differentiation usually ends in an impure combination of cell types and not an intended specific cell type. Then, the narrator relates this problem to the lack of data on the developmental processes that guide the stem cell differentiation. The lack of data makes it difficult for researchers to take control of stem cell differentiation and lead experiments to a desired outcome. The two discursive spaces of stem cell differentiation and travel are juxtaposed visually in the shot and in spoken text via the spacebuilder *is akin to*. This visual and verbal juxtaposition are used to show the similarity relation between the two discursive spaces hence creating a novel, unconventional interdiscursive space. Since the goal of such interdiscursivity is to provide clearer comprehension of the challenge of stem cell differentiation, the interdiscursive space seems to serve an instructional goal. To this end, semiotic resources that are typical of the two discourses are used to help facilitate the integration of the two discursive spaces of stem cell differentiation and travel and their similarity relation. More specifically, the discursive space of stem cell differentiation is activated in this background not only linguistically but also visually.

To understand the discursive space of stem cell differentiation, several important conceptual frames that are building blocks of this discursive space are introduced. These conceptual frames include the stem cell differentiation process itself, the ideal outcome of the differentiation ending in one cell type, the actual, non-ideal outcome where the differentiation ends in an impure mixture of cells, and finally an incomplete understanding of what guides the developmental process. These necessary concepts are

resemiotized using formal spoken text, typical of lectures and iconic textbook-ish images (Myers, 2002; Rowley-Jolivet, 2004). Also, symbols and various color codes are used to make connections among the concepts salient (Kress & van Leeuwen, 2006). As the visual unfolds in this shot, the second discursive space, which is travel, is introduced in the phrase *getting into your car in San Francisco with a vast array of destinations ahead of you and trying to drive across the country specifically to Boston*. This phrase portrays an everyday travel discourse. The travel discursive space is juxtaposed to research discursive space using the space builder *is akin to* (Fauconnier, 1994; Moder, 2013). The travel discursive space is then activated using the casual conversation style including addressing the viewer using the pronouns *you* and *your* to engage the viewer in this research concept by helping them relate to the concept more. Again, to achieve the desired communicative effect, the various conceptual frames that make up the travel discourse are verbally and visually unpacked. These conceptual frames include driving with a car from San Francisco to Boston, multiple and a mix of destinations ahead, and needing a map to identify the correct route. These concepts are all illustrated visually using iconic images of a perplexed human facial gesture, a car, the routes and a map. However, since this integration is metaphorical, it is important to see how the various elements of the two discursive spaces of stem cell differentiation and travel relate. For this reason, the shot benefits from the verbal and visual cues that make the connections between the two discursive spaces salient and perceivable for the interdiscursive effect to be achieved. Verbal cues that make the similarities between the two discursive spaces salient are the key concepts of guide and map, mixture and mix, challenging/hard and

impossible. These concepts are resemiotized in this shot from a research based spoken text to more textbook-ish written words shown in informal fonts. Also, using color coding that match the conceptual frame of cell types and multiple routes in the two discourses makes the integration stronger and salient (Kress & van Leeuwen, 2006). Consequently, the interdiscursive space seems to educate the viewer, who might lack knowledge to understand this specific challenge of research on stem cell differentiation by making the metaphorical integration accessible (Moder, 2010a; 2010b, 2008).

Example 2: Providing Minimal Promotional Elements

The shot in Figure 19 is the continuation of the shot from WVA # 3 in the previous example. In the previous example in Figure 18, the narrator had introduced the challenge of stem cell differentiation being difficult to control by scientists for their desired pure cell generation. Figure 19 continues to report the intent and focus of the current research in dealing with that challenge. The purpose of the shot is to mainly report the research intent and focus. Simultaneously, the research authorship and researchers' affiliations have gained salience both visually and linguistically.

Linguistically, the names of the researchers' institutes are embedded within the purpose statement of the research and are foregrounded by initiating the purpose statement. Next and after specifying the focus of the research even further, the shot ends by embedding the title of the article as well as the information about the journal and date of publication. To make the research discursive space more accessible, the iconic drawing of a road map and the written text (i.e., make a map) connect the purpose of the research to the challenge described in the previous shot (Figure 19). To make the connection of this shot

and prior discourse even more salient, the shot highlights the concept of roadmap, which was the source domain for metaphor in the previous shot. To do so, the source domain roadmap appears both linguistically as embedded within the article title and visually on the top. Then, the research focus is further resemiotized from spoken text into the written text using the word mesoderm that labels the iconic image of the mesoderm itself and the body organs from which it is obtained. Hence, this shot fully unpacks and activates the research and authorial discursive spaces and seems to make them accessible for viewers.

The iconic images of the roadmap, bones, muscle, heart and mesoderm are typical of science textbooks and educational discourse. So, the educational discourse is also invoked, albeit only textually and via a few visual modes that are disguised under the more explicit and salient research and authorial discursive spaces. Next, as scientists' institutes are introduced, we see the iconic drawings of scientists as well as institutes' logos. Logos are visual modes, typical of public relations/affairs and corporate discourses, and are essentially brand images for promotional purposes (Koller, 2009; Rajandran, 2020). Hence, they seem to add a promotional twist to the researchers' intention and focus by adding to the reputation of authors and the research. However, in this shot, they do not seem to fully evoke a promotional discursive space as they are not made salient enough to perform a main communicative role. In other words, they activate the promotional discourse very minimally and via textual elements only. Ultimately, the detection of such discourses and the potential communicative intentions behind those is a subjective decision as sometimes a genre, style or discourse may be marked or evoked by only minimal semiotic features (Fairclough, 1995, p. 78).

Figure 19

Integration of Promotional Discourse Elements to Exert Slight Promotional Impacts

Visual Shot	Spoken Transcript
	<p>To meet this challenge a group of scientists at Stanford University, the genome Institute of Singapore, and other institutions set out to create a detailed map of the routes through which stem cells develop into multiple desired cell types. We focused on mesoderm, a progenitor responsible for creating bone, heart, muscle, and other important tissues. The findings are published in an article titled “a comprehensive roadmap from pluripotency to human bone, heart, and other mesodermal cell types” in the journal, <i>Cell</i> in July 2016.</p>

Although promotional intentions do not seem to be the main communicative intention in this shot, the addition of logos may add a slight promotional twist to the shot. What is centralized and made more salient here is the title of the article that was published based on this research. The title not only appears once in the spoken text but is also resemiotized in written forms using informal font. The color coding of the important terms such as *heart* and *mesoderm* inside the title of the article further connects the promotional public affair discursive space and the research discursive space by making the intent of the research salient (Kress & van Leeuwen, 2006). Here, the novel interdiscursive space is an explicit attempt at reporting the research purpose and

authorship while achieving the private purpose of promoting the research in a rather non-salient manner (Bhatia, 2010).

Example 3: Presenting Science in Engaging and Entertaining Ways

In many of the observed cases of interdiscursivity in WVAs of the study, the interdiscursivity seemed to be an attempt at engaging and entertaining viewers in research by mixing other non-research genres with research reporting. An example of this interdiscursive intention is a shot from WVA #1, shown in Figure 20.

Figure 20

Integration of Pop Culture Discourse and Research Discourse for Entertaining Purposes

Visual Shot	Spoken Transcript
<p>The diagram is a hand-drawn illustration on a white background. At the top, it reads 'TOPOISOMERASE BREAKS ARE DANGEROUS!' in black and red. Below this, it says '★ TOP2 CUTS IN BREAKPOINTS OF COMMON TRANSLOCATIONS IN CANCER ★'. The drawing shows blue and green DNA strands forming loops. A red crab is drawn on the left, labeled 'CANCER'. An arrow points from the crab to a break in the DNA strand labeled 'TOP2 BREAKS'. Another arrow points from a break in the DNA strand to a red crab on the right, labeled 'CANCER'. The text 'CHROMOSOMAL TRANSLOCATIONS' is written above the right crab. Below the DNA strands, it says 'BAD REPAIR' with a downward arrow.</p>	<p>DNA breaks are the most dangerous form of DNA damage because the discontinuity in both strands provides a chance for the creation of chromosomal translocations, deletions, or insertions. Indeed, we observe that DNA breaks at loop anchors were enriched for previously identified breakpoint clusters that are commonly translocated in cancer.</p>

In this shot, the findings of a research on DNA loop formation are described by giving out details on how DNA breaks can be formed in loops that lead to prevalent translocations typical in cancer. To understand this shot, a brief background seems to be appropriate here. In the process of DNA loop formation, it is possible for loose DNA

strands to entangle, and pulling them creates tighter knots. To solve the issue of tight DNA knots, the enzyme topoisomerase 2 or Top2 cuts the DNA strands to untangle them for DNA loop formation. During this process, however, DNAs may be damaged by bad cuts and repairs. In other words, DNA breaks are potential areas for chromosomal translocations, deletions and insertions that can cause cancer.

This finding is reported in both linguistic and visual modes. The spoken text reports the findings conventionally and rather formally as is common in published research reporting genres. However, the very main findings of the shot are resemiotized into written text using big informal fonts that use capitalized letters and are placed on top of the shot. The placement of the research finding on top of the page and with big font size adds to the salience of the research discursive space and foregrounds it (Kress & van Leeuwen, 2006), possibly reminding the viewers of the traditional lecture presentation style. The visual, then, unfolds from right to left and depicts the step by step process of Top2 cutting the DNA strands and resulting in translocations, which make them potential for cancer to develop. The main stages of the process are connected using arrows while written text labels various entities and actions in the process (Kress & van Leeuwen, 2006).

The possible outcome of the process is cancer, which is the most important dangerous scenario in the DNA loop formation process and needs to be avoided. Here, the shot integrates the research discursive space with pop culture discursive space. The integration of the two discursive spaces is realized using enhanced and necessary features of visual narrative style including arrows, connecting the beginning of the narrative to the

end, a clear sequence of events from left to right and identified characters (Cohn, 2012; 2020).

Visual narrative is a style of visualization typical of storytelling genres. Although the elements of visual narrative structure could also be observed in the previous shots, the sequences of events and characters were not as clear as the structure in this shot. So, this shot provides a more effective example of how the textual and structural features of the visual storytelling genres such as visual and sequenced illustration of events, visual and symbolic connectors as well as characters are blended with the research reporting genre to engage the viewers. Consequently, the presence of visual narrative structure appropriates research reporting practices from a research discourse delivered mainly through spoken text to a story delivered through visualization.

On top of this, cancer as the most dangerous character of the story is visualized using the concept of cancer as a zodiac sign via a polysemic relation. Here, the research discursive space is appropriated in a resemiotization process by using visual narrative and zodiac sign as pop culture discursive space. Zodiac signs are a main part of horoscopes and are considered to be a category of pop culture discourse since they have entered the modern media that aims at mass audiences (Campion, 2008). Moreover, the red color coding establishes a salient connection between the research discursive space of reporting findings to the pop culture discursive space of Cancer. The integration is further enhanced through the color contrast between red and other colors in the page that assigns a relatively equal weight and salience to the pop culture discursive space (Kress & van Leeuwen, 2006). Therefore, the resultant interdiscursive space may be viewed as an

effort to report the main findings on cancer, an inherently negative phenomenon, in more entertaining and engaging ways.

Discussion and Conclusion

The WVAs of the study indicated interdiscursive hybridity by mixing various genres, styles and discourses (Bhatia, 2010; Fairclough, 2006). Formal and informal linguistics and visual modes were used to reinforce the construction of meaning by making the intended meanings and discursive practices salient and accessible (Kress & van Leeuwen, 2006; Moder, 2013). While the research discourse may alienate general and non-scientist viewers, the use of informal language where the narrator addresses the viewer using viewers' pronoun *you* and the use of informal font type or textbook-ish iconic images seem to be efforts as drawing wider viewers into research and involve them. Indeed, both informal and casual visual and linguistic modes that include the viewer directly into the research are called "synthetic personalization" introduced by Fairclough (2001, p. 52). The lean towards using more informal modes and styles of representation for reporting published research in science VAs may be viewed as an attempt to draw in heterogeneous viewers in the research. The use of informal style makes research cognitively less demanding on viewers who might not have substantive knowledge on the topic of research (Zou & Hyland, 2021).

Apart from personalization and engagement effects, the analysis also revealed that some of the observed discourse spaces or elements of those spaces are foregrounded or backgrounded in shots depending on the possible intentions of the researchers. More specifically, the study showed that the interdiscursive practices can be used in VAs to

provide instruction via deliberate metaphor, to entertain using engaging genre features as well as to exert slight promotional impacts while reporting research. In each case, the main communicative intention seemed to have gained salience via both visual and linguistic modes. In the example of deliberate metaphor, the interdiscursive space was realized by assigning an equal weight to both every-day and research discursive spaces as they were fully evoked and were salient. These discourses potentially minimize the cognitive demand on the viewers by relating a science concept to a similar but more simplified concept via similarity relations. Therefore, the deliberate metaphors in VAs are a tool for instructional purposes, typical of the kinds that are observed in classroom lectures and instructions (Cameron, 2003; Duff, 2004). Deliberate metaphors are indeed great examples of interdiscursive practices as their purpose is to use a typically simpler and non-scientific discursive space or discourse elements as the source domain and map it onto the scientific discursive space as the target domain of instruction for reducing conceptual alterity (i.e., the gap in knowledge) for a more non-expert viewer (Cameron, 2003; Moder, 2013). These metaphorical interdiscursive practices become more accessible for non-expert viewers when linguistic and non-linguistic cues such as spacebuilders as well as visual connectors and cues make the conceptual relations salient (Cameron, 2003; Moder, 2013). Consequently, the deliberate metaphor in VAs of the study might be directed to an audience who has less knowledge on the complexities and topic of the research such as novice researchers in the field.

WVAs of the study seemed to also serve some peripheral communicative intentions such in the case of institutional logos. In the example where logos are

embedded via only minor textual elements, they do not seem to evoke an entire promotional discursive space and are disguised under the more linguistically and visually salient authorial and research discursive spaces. The minimal textual evocation of promotional discourse can still be interpreted as appropriation of the research abstract genre although the appropriation plays a more peripheral role than the main communicative function and is evoked only via textual reference (Bhatia, 2010). As was observed in the last example, instruction and slight promotional influence were not the only interdiscursive practices. Sometimes interdiscursivity in WVAs resulted from evocation of visual storytelling genre features such as sequences of events, characters, and connectors to report a scientific finding in more engaging ways. This way the research reporting genre that is appropriated by storytelling genre features still maintains the main communicative function of reporting the research but does so using the main components in the structure of the visual story genres (Cohn, 2012; 2020). On top of that, the use of the Zodiac sign as a popular element in pop culture discourse makes the reporting of research findings even more relatable and entertaining. As a result of such interdiscursive practices, the research is more situated within public life (Luzón, 2013).

Overall, the mixture and embedding of the various textual, generic and discourse practices in novel ways within the WVAs have resulted in a creative hybridity that seems to be an effort in drawing a wider audience to the research in science. The observed interdiscursive practices in the WVAs of the study seem to take research outside of the particular interest of the expert academics as a natural response to the needs of the more non-expert viewers. The tailoring of research to more than just academics seems to also

be a natural response to the need for translating the science for the public who possibly funds the research and deserves the right to connect with such research (Zou & Hyland, 2021). This study attempted at showing some of the rich instances of interdiscursivity in WVAs. Future research can engage in additional analysis of the observed interdiscursive functions and evaluate whether the discourses are mixed in intended ways by genre producers for possible pedagogical purposes.

CHAPTER V

CONCLUSION

This dissertation was framed by genre innovation and hybridity theory (Tardy, 2016) for the analysis of the Video Abstracts (VAs) as an emerging, multimodal genre. More specifically, genre innovation in the VA genre was researched by exploring the genre's stylistics (modal) variation, rhetorical functioning and discourse level innovations.

Theoretically, the three studies may increase genre analysts' understanding of how genre innovation is fostered when the research dissemination practices move to the online space and become digitized. Based on the findings of the study, the very first changes are the availability of various modes of communication to create such genres. Then, the variation in the techniques by which the modes are combined in the VAs as multimodal artifacts for research dissemination. The first study showed that VAs do indicate such varied technologies and modes of communication in the dissemination of research in cell sciences. VAs were distinguished into three types of Graphical VAs (GVAs), Whiteboard VAs (WVAs) and Talking Researcher VAs (TVAs) based upon the technologies and types of modes used in their creation. The choice of such varied

technologies and modes for the creation of VAs is a manifestation of genre innovation at the stylistic level. Next, we see how such varied multimodal profiles may impact the genre at a rhetorical level.

In study two, we specifically see how VAs still maintain familiar genre moves that seemed to also be shared in their main communicative functioning with the moves in the same research genre set (e.g., research articles and written research abstracts). However, the realization of the important moves, such as *presenting the main findings*, was highly varied in the types of VAs due to the stylistic differences and choice of modes. The varied nature of modes in VAs granted novel ways of realizing the moves in the three types of VAs. The innovation in the VA genre seemed to be shown in the use of dynamic visuals, which afforded more precise illustration of researchers' communicative purposes. The use of such dynamic visuals seemed to be more prevalent in the GVAs than the other two types. Also, VAs showed mixing or combining of various genres and discourses in creative ways, which is called "interdiscursivity" (Bhatia, 2010). Interdiscursivity is a creative and novel process through which various discourses and genres meet in a hybrid genre for various purposes. The instances of interdiscursivity were observed more in WVAs and TVAs, where visuals were borrowed from non-research discourses and utilized when realizing the moves for research dissemination. As a representative manifestation of genre innovation in the VA genre, the interdiscursivity was examined in more depth in study three WVAs manifested interesting instances of interdiscursivity that were used to fulfill researcher's "private" communicative functions along with the main rhetorical functions. Researchers have shown to not only report the

research in VAs but also use interdiscursive practices in creative ways to provide instructional opportunities, except slight promotional impacts for research as well as engage and entertain the viewers. The three studies showed a transition from convention to innovation in the VA genre in all three modal, rhetorical and discourse levels.

To tie back the first two studies to the genre innovation theory introduced by Tardy (2016), we definitely observe a genre that shows adherence to genre conventions while showing innovative departures from the traditional research articles or abstracts. Although Tardy (2016) refers to the VA genre as a newly emerged genre, it is still debatable if the genre is an entirely independent genre that is newly emerged and only shows some resemblance to other traditional genres or it is the research abstract genre that is undergoing hybridization. Either way, as Tardy (2016) also mentions, the low-stake genres that go through less strict gate keeping processes are more prone to innovation. It seems likely that VAs have provided researchers with a safe, and less strict way to fulfill some of their private intentions such as promoting their research.

Empirically, this dissertation has indicated that, if viewed from a broader perspective, multimodal genre analysis can encompass both the analysis of the rhetorical structure of a genre and a more discourse level exploration of moves as multimodal ensembles. Adopting such an approach serves to add a different angle to traditional ESP (English for Specific Purposes) move analysis (Hyon, 2018; Swales, 1990, 2004), where the verbal or written language used to be the only modes examined. Combining rhetorical move analysis with discourse level analysis of moves helps understand how multimodality of the genres contribute to the communicative aims of moves. The role of

modes other than verbal and written modes in fulfillment of communicative purposes in multimodal genres had been recognized when the definition of move was reintroduced as a unit that is functional and is unlimited in how it is realized (Hyon, 2018). Situated within this view, this dissertation presented an attempt at extending the ESP move analysis to the analysis of multimodal genres. The generated multimodal move analysis contributes to the existing literature on the analysis of digital, hybrid genres in general and VAs in particular. More specifically, this approach not only considers the roles of all existing modes in identifying the functional moves in VAs, but also reveals how research dissemination practices, and genres for that matter, are becoming hybrid by drawing attention to innovative choice of modes and their orchestration in VAs. Taking such an approach, the dissertation showed how the VA genre undergoes hybridization as manifested in the genre's innovations in fulfilling various communicative purposes. Gaining an in-depth understanding of how modes help realize a move in a multimodal genre needs equivalent multimodal theories to explain how modes other than linguistic ones are organized in the multimodal genre to fulfill the communicative purpose of a move. Explaining such modal relation when they realize moves in the VA genre was made possible using the multimodal theories of grounding (Kress, 2009), salience (Kress & van Leeuwen, 2006), modal orchestration and ensembles (Kress, 2009; Kress, et. al., 2014; Kress & van Leeuwen, 2001).

Moreover, innovative tools for multimodal analysis such as NVivo software pave the way for nuanced and concurrent coding and analysis of the modes used in video genres like VAs. More specifically, if viewed in a shot by shot perspective, we can better

understand how each mode evokes a discourse and how the relation of various modes in a shot help structure the discourse of the multimodal shot in ways that help deliver the communicative intentions of the researchers. These ways, each of the various modal categories of visuals, written text and spoken text play more innovative and varied functions than the ones previously found in other research dissemination genres such in research pitches (Ruiz-Madrid, 2021), conference presentations (Rowley-Jolivet, 2004) and video method articles (Hafner, 2018). Since, the various VAs' modes contribute to the structuring of multimodal shots of VAs in different ways, their effectiveness in the evocation of the discourse(s) desired by researchers are subject to critical discourse analysis. Indeed, the efficacy of how modes are orchestrated in VAs with regards to the researcher's communicative aims, conventional or private, are potential factors which impact VAs' acceptability within the science researchers' discourse communities.

Although the dissertation did not study the VA genre for pedagogical goals, the three studies offer useful insights for researchers and genre producers. In other words, the rhetorical structure of VAs, the range of modes available to create such a genre as well as ways to orchestrate the modes in the VA genre can benefit researchers who would like to utilize the affordances of this multimodal genre. However, the genre needs to be studied in pedagogical settings and for pedagogical purposes for it to be usefully and effectively utilized for the purpose of research dissemination. Indeed, some suggestions for future research stem from this angle of the genre analysis that this study did not touch. Some important directions for future research are to explore novice researchers' authorial decisions and agencies in creating novel genres such as VAs as a way to repurpose their

research for a more varied audience by using various modes. The process of re-semiotization of research into VAs, if studied from a social semiotics perspective, can be revealing of the areas where such processes benefit young and novice researchers and the areas of difficulty in composing such genres. One more interesting area of research would be investigating the areas of genre innovation via interdiscursivity. More specifically with regards to WVAs, they included many instances of metaphorical interdiscursivity for instructional and pedagogical purposes. However, not all cases of metaphor seemed to be effective examples for fulfilling such private intentions. The examination of the issues of metaphorical mapping and its efficacy in such instances of genre innovation can bear useful insights for more effective implementation of interdiscursivity in the VA genre.

Future research can also investigate the genre from the perspective of the discourse community of novice researchers, journal editors who promote publishing this genre as well as researchers who have published VAs. Seeking the discourse community's perception about this genre can help establish if the innovative practices observed in the VA genres can potentially meet the approval of the research discourse community. The current dissertation was a first attempt at investigating the VAs and hopefully it can pave the way for more focused future research on this genre and alike.

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APPENDICES

Graphical VAs on YouTube

1. https://www.youtube.com/watch?v=r_mVjaM_cyw&list=PL5AB7CDD2D88F792A&index=67&t=0s&ab_channel=CellPress
2. https://www.youtube.com/watch?v=CxjRJuMVaOU&list=PL5AB7CDD2D88F792A&index=2&t=3s&ab_channel=CellPress
3. https://www.youtube.com/watch?v=zS5SIerLnw4&list=PL5AB7CDD2D88F792A&index=51&ab_channel=CellPress
4. https://www.youtube.com/watch?v=ulQVReHH0wc&ab_channel=CellPress
5. https://www.youtube.com/watch?v=b9EKeGGtoI&list=PL5AB7CDD2D88F792A&index=20&t=0s&ab_channel=CellPress
6. https://www.youtube.com/watch?v=B4gNamS8Ars&list=PL5AB7CDD2D88F792A&index=7&t=31s&ab_channel=CellPress

Whiteboard VAs on YouTube

1. https://www.youtube.com/watch?v=63qqFcQBVI&list=PL5AB7CDD2D88F792A&index=71&t=0s&ab_channel=CellPress<https://www.youtube.com/watch?v=>

2. https://www.youtube.com/watch?v=twseAoALjIU&list=PL5AB7CDD2D88F792A&index=91&t=0s&ab_channel=CellPresshttps://www.youtube.com/watch?v=BcG4pIY7mhY&list=PL5AB7CDD2D88F792A&index=109&t=0s&ab_channel=CellPress
3. https://www.youtube.com/watch?v=twseAoALjIU&list=PL5AB7CDD2D88F792A&index=91&t=0s&ab_channel=CellPress
4. https://www.youtube.com/watch?v=AssLtQ_93zM&list=PL5AB7CDD2D88F792A&index=81&t=0s&ab_channel=CellPress
5. https://www.youtube.com/watch?v=I5kJe0vQNNY&list=PL5AB7CDD2D88F792A&index=51&t=0s&ab_channel=CellPress
6. https://www.youtube.com/watch?v=frsYEt3GAhA&list=PL5AB7CDD2D88F792A&index=53&t=0s&ab_channel=CellPress

Talking Researcher VAs on YouTube

1. https://www.youtube.com/watch?v=pJQ5GnkgZMg&list=PL5AB7CDD2D88F792A&index=51&ab_channel=CellPress
2. https://www.youtube.com/watch?v=U-xUjDAIycI&list=PL5AB7CDD2D88F792A&index=75&ab_channel=CellPress
3. https://www.youtube.com/watch?v=rfHArHymzXI&list=PL5AB7CDD2D88F792A&index=17&t=0s&ab_channel=CellPress
4. https://www.youtube.com/watch?v=iyuzdko_QLk&list=PL5AB7CDD2D88F792A&index=26&ab_channel=CellPressCellPress

5. https://www.youtube.com/watch?v=qT6GapRCY0Y&list=PL5AB7CDD2D88F792A&index=22&t=0s&ab_channel=CellPress
6. https://www.youtube.com/watch?v=kzorkO2rsm8&list=PL5AB7CDD2D88F792A&index=17&t=0s&ab_channel=CellPress

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