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Elaborating Explanations during OpenCourseWare Humanities Lectures: The Interplay of Verbal and Nonverbal Strategies

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7.1 Introduction

In instructional contexts, academics are called upon to explain theories and concepts, as well as their own thoughts and opinions as experts in their particular field. Explanation is therefore a crucial component of the learning process where language is used to transmit information in a way that enables novices to comprehend. According to the Merriam-Webster online concise encyclopedia, explanations are a “set of statements that makes intelligible the existence or occurrence of an object, event, or state of affairs”.¹ From a linguistic perspective, explanations are complex phenomena that may take the form of definition, exemplification, reformulation, and argumentation (e.g., discursive patterns based on a claim followed by a justification, or cause and effect sequences). These discourse functions may also be combined to produce elaborate explanatory passages. With particular reference to the argumentative dimension of explanations, Weimer (1977, p. 5) affirms that “explanation is inherently a matter of argument”. A typical argumentative pattern is seen in what von Wright (1971) characterizes as *causal explanation*. Here the relationship between two events is explained in terms of the second event being a

consequence, result or effect of the first.² Causal explanations are encoded on a linguistic level by lexical items such as *because*, *so*, *in order to*, *as a result*, and *the reason why*. Sbisá (1987) mentions other types of linguistic markers associated with explanation, including items such as *namely*, *that is* and *for example*, which are used to elaborate and exemplify propositional content. The explanatory role of such items, also called *code glosses* by Hyland (2005), is evident in their metadiscursive function through which writers and speakers interact with readers or listeners in order to clarify intended meanings and guide comprehension. Explanations have also been studied in terms of speech act theory (Sbisá, 1987, p. 11), where the verb *explain* could be interpreted as a performative verb used to “metacommunicatively present a speech act” that will then be uttered by the speaker, e.g., *now I will explain it*. Thus, we see that explanation is a multifaceted feature of discourse that may manifest itself in numerous ways and can be investigated from diverse theoretical and analytical perspectives.

Some studies in the area of academic discourse have provided insights into how explanations emerge in both written and spoken texts used for teaching purposes. In a corpus based on extracts from introductory level textbooks from different academic disciplines, Hyland (1999) found that code glosses were the second most frequent explanatory device after logical connectives. Furthermore, Bondi’s (1999) study of economics textbooks showed that writers in this discipline make frequent use of discursive patterns based on general statements supported by exemplification in explanatory passages. In addition, argumentative patterns of the type claim→justification-of-claim and claim→counterclaim were also prominent. For spoken academic discourse, and with particular reference to the lecture genre as the focus of this chapter, some small-scale studies have shown that repetition and reformulation are important features of

university lectures found in the context of explanation (Bamford, 2002; Giménez-Moreno, 2012). Similarly, exemplification that helps learners understand by providing a concrete ‘connection’ to the real world has been shown to be characteristic of academic lectures (see Young, 1990; Crawford Camiciottoli, 2007). A study on discourse functions in lectures by Deroey and Taverniers (2011) revealed that exemplification could be encoded explicitly through lexical items that incorporated *example* or *instance*, but could also be signaled in a more ambiguous way using discourse markers such as *so* and *you know*. Nesi and Basturkmen’s (2006) large-scale study of lexical bundles in a corpus of 160 university lectures across a range of disciplines found that *if you look at* used to signal an upcoming exemplification was among the most frequent.

From the above discussion, it is clear that the process of explanation is a vital component of the learning experience in university classrooms. However, a lecture is obviously much more than just a verbal message delivered to students by the speaker. In fact, today’s lectures typically include images or audio-visual input that can be easily incorporated by means of presentation software such as PowerPoint. Brabazon (2006) goes so far as to describe lectures as “multi-modal formations, using sound, vision, gestures, and often scent and touch”. In the following section, I shift my focus to the multimodal dimension of academic lectures, with particular reference to its role in the context of explanation.

7.2 Multimodality and lectures

The important contribution of other communicative modes beyond the verbal message in human interactions has long been recognized, dating as far back as Darwin’s (1890/1989) studies of

facial expressions and gestures. In more recent times, some systematic accounts of communication from a multimodal perspective have been offered. For example, Poyatos (2002, p. 103) defines communication in terms of a “Basic Triple Structure” that comprises verbal and nonverbal modes, i.e., “language-paralanguage-kinesics”. There has also been some pioneering work by linguists who have focused on how semiotic resources beyond language contribute to meaning in social practices. Kress and van Leeuwen (2006) describe a ‘grammar’ of visual images that analyzes their unique features such as compositional arrangement of elements and colors in a way that is inspired by Hallidayan systemic-functional grammar. Similarly, Baldry and Thibault (2006) propose an innovative approach for the analysis of multimodal discourse, i.e., discourse that integrates different semiotic systems that may comprise linguistic, visual, audio and gestural resources, also in this case from a systemic-functional perspective. They describe the multimodal transcription of discourse as “a way of revealing both the codeployment of semiotic resources and their dynamic unfolding in time along textually constrained and enabled pathways of trajectories” (Baldry & Thibault, 2006, p. xvi). For instance, a multimodal transcription of a television commercial may be structured into a series of frames from the video recording, which are described in terms of the corresponding image, action and sound, and then interpreted in terms of their metafunctions within the communicative context (Thibault, 2000). In the same way, a video-recorded academic lecture may be transcribed using a multimodal format where visual images extracted from the streaming video are accompanied by the corresponding verbal text, as well as functional descriptions of the co-occurring nonverbal behaviors (Crawford Camiciottoli, 2007). Thus, multimodal analysis and transcription enables discourse analysts to capture a multiplicity of communicative modes that are simultaneously woven together to create meaning in a particular context (Norris, 2004).

Especially in the last few years, there has been growing interest in multimodal discourse analysis (see Jewitt, 2009; O'Halloran, 2011; O'Halloran & Smith, 2013). This trend has likely been impacted by the rapid acceleration in digital technology that has led to the development of software designed specifically for the multimodal annotation of texts. However, advances in technology have also greatly expanded possibilities to gain access to multimodal texts. Indeed, forms of multimodal discourse in digital format which were previously beyond the reach of many analysts are now increasingly available on Internet platforms. Thus, we can expect to find an increasing amount of language research with a multimodal focus, as aptly expressed by O'Halloran and Smith (2013, p. 3): "The ongoing development of interactive digital techniques, along with the increasingly collaborative nature of research in the 21st century, points to a period of further growth in coming years within this field".

Moving closer to the focus of the present study, the multimodal dimension of communication that takes place in instructional settings has been the topic of a number of pedagogically-oriented discourse studies, highlighting "the complex ways in which image, gesture, gaze, interaction with objects, body posture, writing, and speech interact in the classroom production of school subject knowledge" (Jewitt, 2008). Much of this research has been carried out in mathematics or science education at the level of secondary education, providing insights into how nonverbal communicative modes may be integrated with speech during explanations (see O'Halloran, 1998; Kress et al., 2001; Weinberg, Fukawa-Connelly & Wiesner, 2013). With particular reference to the role of gesturing during explanation, Pozzer-Ardenghi and Roth (2005) analyzed the gestures that accompanied explanations of the scientific content represented in visual images

during both secondary school and university-level ecology lectures. Their analysis was based on McNeill's (1992) descriptive and functional classification of hand and arm gestures which includes: beats (vague rhythmic hand movements used to accent words), iconic gestures (spatial descriptions of content or specific lexical items), metaphoric gestures (representations of ideas or abstract concepts) and deictic gestures (indication of some referent that may be present or removed from the context). The authors concluded that gestures are an important meaning-making resource in science discourse that can enhance understanding. In instructional settings, gestures may also co-occur not only with speech, but also with gaze directed outward towards the student audience as a way to nonverbally focus their attention (Coleman, 2006; Crawford Camiciottoli, 2007).³

Because research on the nonverbal aspects of explanations of concepts in classroom discourse has been limited mainly to scientific fields, it seems important to expand the focus to include other disciplinary areas. In the humanities, for example, knowledge is often derived from philosophical, historical or critical reflections rather than empirical evidence. This could result in different approaches to explanation that are based on diverse verbal patterns and nonverbal cues. In an effort to address this gap in the literature, this study aims to acquire a better understanding of the interplay between the linguistic expression of explanation and the nonverbal signals that may co-occur with it during humanities lectures. More specifically, I seek to answer the following research questions:

1. Which linguistic markers of explanation are used by the lecturers?

2. Which nonverbal features are used to accompany the linguistic markers and what are their functions?
3. How do nonverbal features interact with verbal expressions of explanation to construct meaning and reinforce understanding?

7.3 Methodology

7.3.1 The dataset

The lectures utilized for this study were digital recordings collected from Yale University's Open Courses website.⁴ Among the many institutions of higher education that now provide OpenCourseWare resources, Yale University offers a particularly rich and well-articulated selection of lectures, in addition to related learning materials from complete introductory courses across a range of academic disciplines that broadly represent natural sciences, social sciences and the humanities. The materials include video and audio recordings, the corresponding transcripts, syllabi, reading materials and lesson handouts. All the lectures were video/audio recorded on the Yale University campus and were transcribed by people, rather than by machine transcription software.⁵ They are offered as free and accessible to the general public. Indeed, their website states that "the aim of the project is to expand access to educational materials for all who wish to learn."

Five lectures dedicated to topics in the field of humanities were selected to comprise the dataset of the study. In particular, the lectures represent the disciplines of philosophy, history, English,

religious studies and African American studies. The decision to focus the analysis within this particular disciplinary area was based on two considerations. First, as previously noted, because most research has looked at multimodal features of classroom discourse in the sciences, a shift to a disciplinary area with a different epistemological tradition and pedagogical aims has the potential to offer fresh insights. Second, among the various courses and lectures available on the Yale Open Courses website, with respect to other disciplinary areas, those dealing with the humanities offered greater choice and variety to compile a dataset that would be more representative of the field. At the same time, the fact that all the lectures dealt with humanities topics assured that what emerged from the analysis would not be impacted by radically different types of content, and could thus be more accurately linked to the features of interest to this study.

To identify the specific lectures to be included in the dataset, I carried out preliminary viewings in order to select those recordings that had high-quality images of lecturers who were kept in the focus of the video camera for most of the time. In other words, lectures in which the video camera panned away from the speaker to accompanying visuals for extended periods of time were excluded since they would not permit systematic observation of the speakers' nonverbal signals. Table 7.1 provides an overview of the five lectures that conformed to these criteria.

Lecture	Course	Lecture Title	Lecturer	Duration
1	Philosophy 176: Death	The Nature of Persons: Dualism vs. Physicalism (Spring 2007)	Male	41 min
2	English 310: Modern Poetry	Robert Frost (Spring 2007)	Male	46 min
3	African American Studies 162: African American History: From Emancipation to the Present	Public Policy and Presidential Politics (Spring 2010)	Male	46 min
4	Religious Studies 145: Introduction to the Old Testament (Hebrew Bible)	Critical Approaches to the Bible: Introduction to Genesis 12-50 (Fall 2006)	Female	48 min
5	History 116: The American Revolution	Outraged Colonials: The Stamp Act Crisis (Spring 2010)	Female	41 min

Table 7.1 The Yale lecture dataset

As can be seen, the five lectures had roughly the same duration, and the speakers included 3 males and 2 females. All of the lecturers are described on the Yale Open Course website as distinguished professors and scholars with extensive teaching experience, as was also evident from the biographical information presented on their course homepages.

The five lecture videos were downloaded in mp4 format, along with their corresponding transcripts files that are also available on the courses homepages. From the digital recordings, it was possible to clearly hear the vocal production of all the lecturers and thus determine that they were all native speakers of US English. To verify the accuracy of the transcripts, I listened to each lecture while following along with the transcripts. The lectures were delivered using a “conversational style” (Dudley-Evans 1994, p. 148), with lecturers appearing to speak spontaneously, while only occasionally referring to notes. In this type of lecture, the content has been planned, but not the actual sequences of words used to discuss it, resulting in a natural-

sounding delivery. On the whole, the transcripts were highly accurate representations of the verbal content of the lectures, even if normal speech dysfluencies such as filled pauses, false starts and repetitions had not been transcribed in most cases. However, this lack of transcription detail is not problematic since the focus of the present study is on other features.

All five lectures can be described as frontal and essentially monologic with very little input from students, thus reflecting a noninteractive style (Morell, 2004). Only the philosophy lecture contained two questions posed by students to which the lecturer responded. The noninteractive format implemented here seems to be at odds with current trends in higher education that encourage greater instructor-student interaction (see Ernst & Colthorpe, 2007; White, 2011). However, noninteractive lectures may have been deliberately selected for the OpenCourseWare platform as likely the most viable format for a remote Internet audience.

All the lecturers were positioned at the front of what appeared to a large lecture hall that was equipped with podium, blackboard and screen for projecting visuals. Some supporting images were projected during the English lecture, while a short video clip was shown to the audience during the African American studies lecture. The philosophy and religious studies lecturers made use only of the blackboard using the “talk and chalk” format (Mason, 1994, p. 203), while the history lecturer did not integrate any type of visual modalities during the delivery of her lecture.

7.3.2 The analysis

The first step was to determine which verbal features could be interpreted as manifestations of explanatory processes within the lecture dataset. Given the complexities of explanation as a discursive phenomenon and the variety of forms through which it may be encoded, methods of corpus linguistics were implemented to both identify and extract potentially corresponding linguistic features. The transcripts of the five lectures were compiled into a single file and then processed with text-mining software program *WMatrix* (Rayson, 2008), a powerful corpus analysis tool which is capable of performing automatic semantic tagging. More specifically, each word is annotated or tagged according to pre-established semantic categories based on 21 overarching domains (e.g., *General & Abstract Terms, The Body & the Individual, Education, Money & Commerce, Emotional Actions, States & Processes*), which are further articulated into over 200 specific tags. In corpus linguistics, this approach can be described as inductive or *corpus-driven* as linguistic features of interest emerge from the data itself, rather than deductive or *corpus-based*, which starts from a list of predefined list of features to be analyzed in the data (Tognini-Bonelli, 2001, p. 2). This procedure led to the identification of three key types of verbal explanation across the five lectures, i.e., the linguistic elements that encode (a) the speech act *explain*, (b) exemplification and (c) argumentation (von Wright, 1971; Sbisá, 1987; Weimer, 1997). This semantic tagging process will be illustrated in further detail in the next section. All instances of the three types of explanation were then marked in the five lecture transcripts.

Once the instances of explanation had been identified, it was necessary to identify potentially meaningful nonverbal signals of the lectures that might accompany the verbal explanations. For this purpose, I used the software program ELAN which allows for complex multimodal annotations in digital audio and video resources.⁶ The software permits users to create and insert

annotations that are synchronized with streaming videos. Annotations may include the transcript of the speech production, as well as any number of user-defined annotations that code and mark particular verbal and/or nonverbal features of interest. The annotations are organized and displayed in multiple layers or tiers under the streaming digital resource (Wittenburg et al., 2006), which allows for complete visualization of the resources that contribute to the multimodal dimension of the speech event.

Annotation in ELAN of each of the five lecture videos was undertaken in various phases. First, a *Transcript* tier was created directly under the sound wave viewer of the corresponding .wav file that had been extracted from the .mp4 video files and uploaded separately into ELAN. This tier served to display the lexical items that corresponded to the three types of explanation coded in the transcripts, which were inserted in alignment with the corresponding speech production of the streaming videos. A second tier labeled *Explanation* was created to annotate each instance of verbal explanation according to one of the three previously identified types: *speech act_explain*, *exemplification*, or *argumentation*. Thanks to the audio waveform viewer, it was also possible to identify prosodic stress used by the lecturers during stretches of discourse in explanatory passages, thus calling attention to them and prioritizing information for listeners.⁷ Therefore, an additional tier labelled *Prosody* was inserted to annotate any paralinguistic stress that occurred during verbal explanations.

In a second phase, each video was viewed again in ELAN to pinpoint nonverbal features that accompanied the previously annotated verbal expressions of explanations. From the preliminary overview of the lecture videos, I found that I was able to observe most clearly hand/arm gestures

and the direction of the speaker's gaze. However, because lecturers had not been filmed to show facial close-ups, the analysis of gaze was limited to whether the speaker was gazing downwards (e.g., towards the podium or notes) or outwards towards the student audience. As a result, the analysis of the nonverbal dimension of the lectures will focus mainly on these two features which were then annotated in three separate tiers: *Gaze*, *Gestures-description* and *Gestures-function*. The *Gaze* tier was associated with two possible annotations, i.e., 'Down' or 'Out'. For gestures, it seemed important not only to provide a physical description, but also an interpretation of its function in the context of explanation. Thus, a parent tier *Gesture* was created to annotate, first of all, the presence of a gesture, to which two referring tiers were then associated. First, the *Gesture-description* tier provided for a wide range of different descriptions that emerged during the analysis of the lecture videos. Following Querol-Julián (2011), annotations were created based on abbreviated descriptions of the gesture in terms of hand and arm movements. PalmUMUp (palm up and moving upwards), HandsRotOut (hands rotating outward) and FingRing (fingers forming a ring and moving outward) are examples of descriptive annotations inserted into this tier (see Appendix A for the complete list). Then, for the *Gestures-function* tier, I created a series of annotations that were inspired by two previous studies. Kendon (2004) identified three pragmatic functions of gestures in conversational data, namely *modal* (to express certainty/uncertainty), *performative* (to illustrate the type of speech act that the speaker is doing) and *parsing* (to demarcate different units within a stretch of speech). Weinberg, Fukawa-Connelly & Wiesner (2013) classified the function of gestures in classroom discourse as *indexical* (to indicate a position), *representational* (to represent an object or idea) and *social* (to emphasize the message or increase the speaker's immediacy with the audience). In an effort to interpret the functions of gestures in the lecture videos as accurately and exhaustively as

possible, I opted to utilize both classifications and thus created annotations corresponding to all six functions. For illustrative purposes, a screenshot of Lecture 1 (Philosophy) as elaborated in ELAN is provided in Figure 7.1.

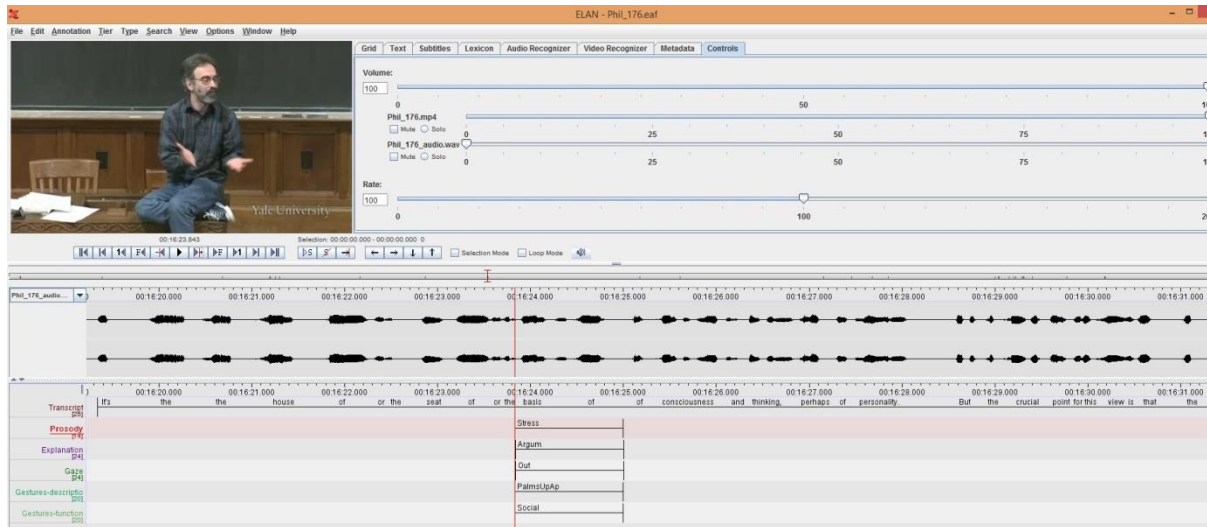


Figure 7.1 Screenshot of multimodal annotation (Source: ELAN software)⁸

The figure above shows the point in the streaming video where a series of annotations have been inserted to classify the verbal expression of explanation and the accompanying nonverbal features. In particular, the explanatory expression *on the basis of* is accompanied by prosodic stress as shown by the audio wave above the words, which was annotated in the Prosody tier (1=stress). In addition, the lecturer gazes outwards towards the audience (Gaze tier - out). At the same time, the presence of a gesture was identified in the Gesture tier (1=gesture). It was then further described as palms up and moving apart (Gesture-description tier - PalmsUpAp), which was interpreted as having a social function (Gesture-function tier - social) to give greater emphasis to the explanation and highlight its importance for the audience.

7.4 Results and discussion

7.4.1 Linguistic features of explanation

As previously mentioned, the dataset compiled from the five lecture transcripts was processed with the software *WMatrix* (Rayson, 2008). This procedure generated a key semantic domain cloud, i.e. a visual representation of which semantic domains are significantly frequent in the dataset.⁹ The key semantic domain cloud is reproduced in Figure 7.2.

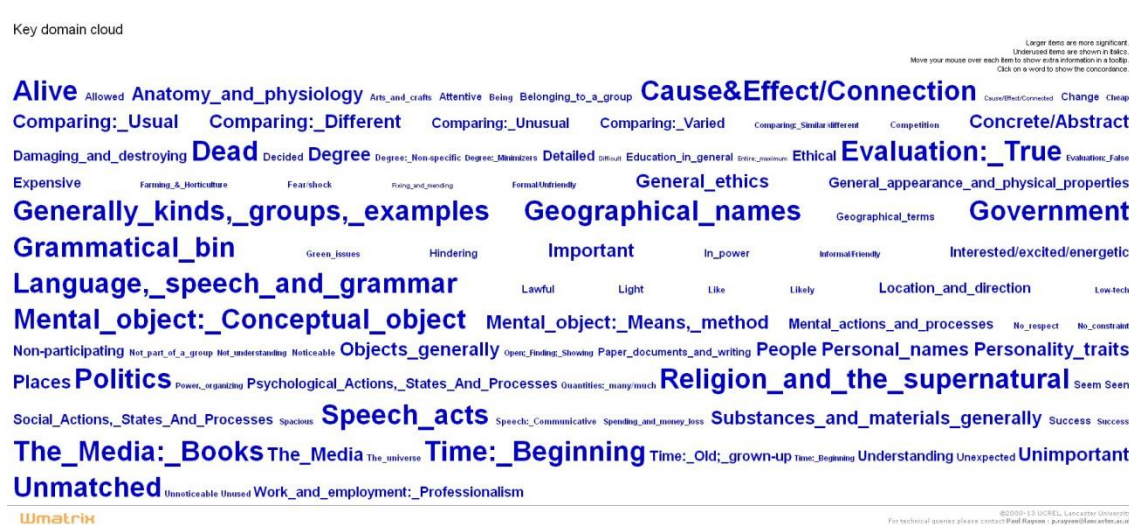


Figure 7.2 Screenshot of key semantic domains (Source: WMatrix, Rayson, 2008)

Although all the semantic domains displayed in cloud are frequent across the five lectures, those in larger fonts have particularly high frequencies. By clicking on each semantic domain in the cloud, it is possible to see all the various lexical items that have been assigned to it by the software. These items can then be displayed in lists or concordances to facilitate further scrutiny. Through this procedure, I determined that there were three semantic domains whose lexical items could be conceptually mapped onto the previously identified types of explanation:

1. *Speech_acts* which contained items based on the lemma *explain* → the speech act *explain*
2. *Generally_kinds_examples* which contained items based on the lemmas *example* and *instance*, as well as *such as* → exemplification
3. *Cause&Effect/Connection* which contained a range of lexical items linked to reasoning processes → argumentation

Not surprisingly, all three of the above-described tags appear in the largest font size, suggesting that the lexical items contained within them are highly characteristic of the lecture genre. This was the basis for my decision to focus the analysis on these three types of explanation.

While the items associated with the speech act *explain* and exemplification could be easily attributed to explanatory discourse on the part of the lecturers, the wide range of items contained in the *Cause&Effect/Connection* tag linked to argumentation were not as straightforward. More specifically, it was necessary to examine each of these items in its context of usage to distinguish those that reflected explanations of concepts, events, situations or entities from those that did not, and therefore needed to be removed from the data. This process is illustrated in examples 1 and 2 in which the lecturers used the item *reason*. In example 1, *reasons* is clearly being used to explain a particular situation. In contrast, in example 2, *reason* is used as a verb in a descriptive capacity and not in an explicitly explanatory sense. Items of this type were eliminated from the dataset.

- (1) So for all of these *reasons*, these acts are problematic, threatening, frightening and get people thinking. (Lecture 5/History)

(2) We are bodies that can think. We are bodies that can plan. We are bodies that can *reason*.

We are bodies that can feel. (Lecture 1/Philosophy)

Following this procedure to filter out *Cause&Effect/Connection* items that were not used in an explanatory context, a total of 34 different items remained that could be classified as explanation in the form of argumentation. The complete list is shown in the Appendix B, with items ranked according to their frequencies indicated in parentheses. It is interesting to note that the most frequent item that encoded argumentation (*why*, N=12) was sometimes used in the interrogative form as a sort of interactional rhetorical question that the lecturer then proceeded to answer in the context of the explanation, as shown in example 3.

(3) The construction of Marduk's ziggurat is represented as displeasing to God. *Why?* There are very many possible interpretations [...]. (Lecture 4/Religious Studies)

Table 7.2 shows the distribution of the three types of verbal explanation across the dataset. As can be seen, overall the speech act *explain* was used rarely by the lecturers and verbal expressions of *exemplification* were also rather infrequent with the exception of Lecture 3 where they accounted for 40 percent of the speaker's explanations.

	Lecture 1		Lecture 2		Lecture 3		Lecture 4		Lecture 5	
	N	%	N	%	N	%	N	%	N	%
Speech act <i>explain</i>	1	4	1	10	-	-	-	-	-	-
Exemplification	1	4	1	10	4	40	7	20	1	5
Argumentation	22	92	8	80	6	60	28	80	18	95
Total	24	100	10	100	10	100	35	100	19	100

Table 7.2 Types of verbal explanation in the Yale lecture dataset

Because exemplification has been found to be a relatively prominent feature of lectures in other disciplines (see Young, 1990; Nesi & Basturkmen, 2006; Crawford Camiciottoli, 2007), the low frequencies here could be impacted by the humanistic content of the lectures that appears to require more elaborate and complex types of explanation. In fact, the majority of the explanations in this dataset were encoded through various lexical items associated with argumentation, accounting for 60 percent in Lecture 3, 80 percent in Lecture 2 and Lecture 4, 92 percent in Lecture 1 and 95 percent in Lecture 5. Examples 4-6 below illustrate some of the interesting ways the lecturers used such features to formulate their explanations.

- (4) He actually was protesting against the *implications* of the Stamp Act. (Lecture 5/History)
- (5) Today literary criticism has a slightly different *connotation* from what it was in the nineteenth century, so people prefer the term source criticism. (Lecture 4/Religious Studies)
- (6) There's this always lingering *connection* between African Americans and the "Jewish question" in the Middle East and Palestine. (Lecture 3/African American Studies)

7.4.2 Nonverbal features in explanations

Table 7.3 illustrates the co-occurrence of prosodic stress, gaze towards the audience and gesturing with the verbal expressions of explanation, reflecting Poyatos' (2002, p. 103) model communication base on "language-paralanguage-kinesics". The figures report the frequency counts of the nonverbal features that occurred in each lecture (N), and the percentage of (N) that

was used simultaneously with verbal explanations. In addition, the table shows the percentage breakdown for the functions of the gestures produced by each lecturer according to categories illustrated in the Methodology section.

	Prosodic stress		Gaze outwards		Gesturing		Gesture function
	N	%	N	%	N	%	
Lecture 1	14	58	22	92	20	83	- social (75%) - representational (20%) - indexical (5%)
Lecture 2	4	40	5	50	9	90	- social (67%) - unclassifiable (22%) - representational (11%)
Lecture 3	4	40	8	80	9	90	- social (78%) - parsing (11%) - unclassifiable (11%)
Lecture 4	22	63	27	77	32	91	- social (63%) - unclassifiable (16%) - representational (9%) - parsing (9%) - indexical (3%)
Lecture 5	10	53	17	89	17	89	- social (82%) - indexical (12%) - parsing (6%)

Table 7.3 Co-occurrence of nonverbal features with verbal explanations

As is evident from the figures reported in the table, hand and arm gestures co-occurred very frequently during verbal explanations, accounting for roughly 80 to 90 percent of all the explanatory episodes across the dataset. Gaze directed out towards the audience also co-occurred in relatively high percentages, with the exception of Lecture 2 which registered only 50 percent co-occurrence. The general tendency of these lecturers to accompany their verbal explanations with gesturing and outward gaze suggests that these nonverbal signals play a key interactional role in explanations (Hyland, 2005). More specifically, they could reflect an attempt to engage with the audiences as much as possible, and also to offset to some extent the distance imposed by

the physical setting in which the lecturers are positioned remotely from the audience. The following examples illustrate patterns of co-occurrence that emerged from the multimodal analysis. In example 7, the lecturer incorporates two types of verbal explanation into this passage, i.e., exemplification (*example*) and argumentation (*cause*), and reinforces his explanation by gazing outwards towards the audience while gesturing with one hand chopping into the other (HandChop) to depict the action of ‘pricking’. In example 8, the lecturer emphasizes her explanation of why the text’s focus changes by gazing directly at the audience and gesturing with palms up and moving outwards (PalmsUMOut) when posing the question *why?* before she proceeds to provide the answer.

- (7) I gave the *example* pricking my body. That's a physical process that *causes* sorts of changes in the mental processes occurring in my soul. (Lecture 1/Philosophy)
- (8) So God's focus has shifted dramatically, the text's focus has shifted dramatically. *Why?* When you get to the end of Genesis 11 [...]. (Lecture 4/Religious Studies)

Thus, when gaze and gesturing are combined with verbal explanation, they reflect a multiplicity of semiotic resources that are used to create meaning in the instructional setting.

Prosodic stress instead did not accompany verbal explanations at such high percentages, ranging from a minimum of 40 percent to a maximum of 60 percent co-occurrence. Further analysis revealed that prosodic stress did not accompany either of the two instances of verbal explanation encoded by the speech act *explain* and only 4 out of the 14 instances of exemplification (see Table 7.2). Thus, prosodic stress tends to be a strategy favored by the lecturers when using more

complex argumentative forms of explanation, as shown in the examples below where the lecturers prosodically stress the words *entail* (example 9), and *reasons* and *painfully* (example 10) within these explanatory passages.

- (9) Now, this guile of his, because that's what it *entails*, this guile is something temperamental, I think. (Lecture 2/English)
- (10) Civil rights activists are horrified, for *reasons* I hope are *painfully* obvious to you at this point. (Lecture 3/African American Studies)

As can be seen from Appendix A, a wide range of annotations was necessary to kinesically describe the gestures that co-occurred with explanations. The gestures also varied considerably in terms of how they were used by the five individual lecturers. For example, some had what could be described as an understated style of gesturing, i.e., mostly smallish hand gestures with palms in different positions and a restricted range of motion. Others were more 'exuberant' with extended repertoire of hand and arm movements and a wider range of movement. However, for reasons of space, I will not discuss all the various gestures that emerged on a purely descriptive level, but will instead focus mainly on their functional dimension, which will be illustrated by some of the most interesting cases.

Referring again to Table 7.3, we see that four of the six lecture functions outlined in the Methodology section emerged from the analysis. While *social*, *representational*, *indexical*, *parsing* functions could be interpreted from the lecturers' gestures, *performative* and *modal* were instead absent. A possible explanation for this absence could be linked to the nature of the

communicative event itself. During lectures, expert academics aim to transmit factual knowledge to novices, and would therefore seem to have little use for modal gestures that communicate personal assessments certainty/uncertainty during explanations. In addition, the lack of performative gestures to illustrate the speech act that is being performed could be linked to the fact that only two explanations in the entire dataset took the form of the speech act *explain*. Moreover, in an instructional setting that is routine for participants, there would seem to be little reason to use gestures to reinforce the act of explaining. Finally, in three of the five lectures there were some gestures that did not have a clearly interpretable function in the communicative context and were thus categorized as *unclassifiable*. Weinberg, Fukawa-Connelly and Wiesner (2013) noted similar issues of ambiguity in gestures which may prove difficult even for expert observers to interpret.

Table 7.3 also shows that gestures classified as *social* accounted for a large majority across all five lectures, ranging from a minimum of 63% to a maximum of 82%. This type of gesture is used to reinforce the message by accompanying speech with vague movements of the hands in various positions, e.g., palm(s)/up/down/sideways and moving up/down/out/apart. These gestures are essentially those described as beats or underliners by McNeill (1992).

An example of gesturing with the *social* function is visible in Figure 7.3. Here the English lecturer gestures with hands rotating at the center of the body to call attention the argumentative item *results from* when explaining the reason for a particular feature of a poem by Robert Frost: *The special sound of Frost's poems results from the tension between these pairs of opposing forces*.



Figure 7.3 A social gesture (Lecture 2/English)¹⁰

Although less frequent, gestures performing a *representational* function appeared in four out of the five lectures. In these cases, the lecturer produced a gesture that in some way represents an object or an idea, corresponding to McNeill's (1992) *iconic* or *metaphoric* gestures that may be either *pictographic* to depict the shape of the referent, or *kinetographic* to describe a movement or action. Figure 7.4 provides an illustration of a representational gesture. Here the lecturer is using the argumentative term *link*. Her hands form a square space that oscillates right and left (HandsSqSpM) to represent the kinetic action of linking two entities together in the following explanation: *All of those sections very often that link stories are attributed to the P source.*



Figure 7.4 A representational gesture (Lecture 4/Religious Studies)¹¹

Indexical and *parsing* gestures were rather infrequent, each occurring during verbal explanations in only three out of five lectures. Figure 7.5 shows how an indexical gesture, corresponding to McNeill's (1992) *deictic* category, was used by a lecturer to indicate the discourse deictic 'this' in the explanatory passage based on the argumentative element *reasons*: *For all of these reasons, this would not be a popular thing.*



Figure 7.5 An indexical gesture (Lecture 5/History)¹²

Parsing gestures are instead used to separate a stretch of discourse into separate units. An example is shown in Figure 7.6, where the lecturer gestures with hands sweeping away from the body (HandsSwOut) to visually distinguish ‘African Americans’ from ‘the Jewish question’ when using the argumentative device *connection* in the following explanation: *There’s this always lingering connection between African Americans and the Jewish question in the Middle East and Palestine.*



Figure 7.6 A parsing gesture (Lecture 3/African American Studies)¹³

The above analysis suggests that the use of gestures to enrich the verbal message is often linked to explanations of the argumentative type, rather than the speech act *explain* or exemplification. Because the former tend to be more complex, they may be perceived by speakers as requiring additional semiotic resources to clarify meaning.

To conclude this section, I would like to briefly comment on the proxemic dimension of the five lectures. Proxemics refers to how people use body posturing and spatial positioning in a physical setting to communicate nonverbally (Hall, 1966). Although this aspect of nonverbal communication was not the focus of the present study, it nonetheless contributed to some interesting differences that are worth mentioning. As illustrated by the figures above, most of the lecturers positioned themselves at the lecture podium and remained there for the duration of the lecture, at most moving a few feet away to the right or to the left, or to the blackboard behind

them. However, one lecturer positioned himself closer to the audience, at times sitting on the desk (see Figure 7.1), or often walking back and forth at the front of the lecture hall with a wide range of movement. Thus, even among the limited number of participants in this study, there was considerable variation in their nonverbal behaviors at various levels. It is important to recognize that all types of nonverbal communication depend very much on individual style and proclivity. As Galloway (1972:11) notes, “a nonverbal cue may manifest itself because of a personal characteristic, perceived role and situation”.

7.5 Concluding remarks

The multimodal analysis implemented in this study has shed some light on the characteristics of verbal expressions of explanation and their accompanying nonverbal signals in humanities lectures. The first finding of interest emerged from the analysis of linguistic markers of explanation. These humanities lecturers seemed to prefer more complex argumentative forms over simpler explanatory strategies, e.g., exemplification that is common in other disciplinary areas (see Young, 1990; Crawford Camiciottoli, 2007). This could be linked to the epistemological tradition of humanities disciplines in which the construction of knowledge often involves philosophical, historical, cultural or critical reflections that require more elaborate patterns of verbalization. In addition, the fact that all five lecturers often accompanied their explanations with gaze directed towards the audience and with various types of gestures, and sometimes also with prosodic stress, suggests that nonverbal communication is an important component of explanatory passages in humanities lectures. Most of the gesturing corresponded to the social function with the aim to better engage the audience while highlighting particularly

salient aspects of the explanation. However, there were also gestures that elaborated explanations in a more explicit way, performing also representational, indexical and parsing functions. Thus, the linguistic expressions of explanation and the co-occurring nonverbal signals seemed to work synergistically on an interpersonal level to reinforce meaning in order to enhance comprehension, but also to promote a classroom atmosphere that facilitates learning.

From a methodological perspective, this study has shown how multimodal annotation software can be used to achieve highly articulated descriptions of verbal and nonverbal interplay during lectures. Although I have offered some interpretation of the multimodal dimension of the explanatory episodes, this should be viewed as tentative since it is based on my perceptions as an observer of the recorded phenomena. More interpretive insights could perhaps be gained by eliciting feedback from the participants in an effort to understand more about the explanatory role of nonverbal cues during lectures. Yet, according to McNeill (1992, p. 72), most speakers are “largely unaware” of the gestures they use to accompany their speech, so input from the lecturers themselves may actually have limited interpretive value.

Perhaps a more useful way to further develop this research would be to extend the sample in quantitative terms to include more speakers, as well as other disciplinary areas. As Adolph (2013) points out, research on the interaction between verbal and nonverbal communicative modes has traditionally been done on a very small scale and often in experimental contexts. However, new technologies that facilitate both the collection and analysis of multimodal corpora have the potential to upgrade this type of research to a larger scale that would result in more generalizable findings.

To conclude this chapter, I would like to point out some pedagogical applications that can be inspired by this study, with particular reference to the medium of instruction that was analyzed. In fact, the widespread availability of OCW digital lectures can be exploited at different levels. On one hand, they could be utilized in educational training programs to help aspiring lecturers become more cognizant of the important contribution of nonverbal signals to reinforce explanations in lecture discourse. On the other hand, OCW lectures could be integrated into academic listening skills courses designed for nonnative speakers of English who must cope with the challenges of comprehending lectures in a language that is not their own. Because there is evidence to suggest that the presence of nonverbal signals is linked to improved listening comprehension in ESL learners (see Wagner, 2010), OCW lectures are a valuable multimodal resource to help learners become more aware of the nonverbal features of lectures and how they can enhance their understanding. Moreover, OCW digital lectures provide a strong connection to the increasingly multimodal world of today's learners that requires multiliteracy competence beyond verbal language.

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Appendix A: Gesture-description annotations

FingBunUD	fingers bunched moving up and down
FingClose	fingers closed into a ball
FingForehd	finger to forehead
FingPtUD	finger pointing moving up and down
FingPtUpMOut	finger pointing up moving out
FingRing	fingers forming a ring moving forward
FingSmSp	fingers forming a small space
ForefingHand	forefinger on fingers of opposite hand
HandChop	one hand chopping into the other
HandGlss	hand touches glasses
HandLftVert	hand lifted in vertical position
HandRotOut	hand rotating outward
HandsSwIn	hands sweep inwards towards body
HandsSwOut	hands sweep outwards away from body
HandsApFace	hands apart moving up to face
HandsClsp	hands clasped in front of body
HandsOpSp	hands forming a round open space
HandsRotCtr	hands rotating at the center of the body
HandsRotHd	hands rotating at the sides of the head
HandsSqSpM	hands forming a square space moving right and left
PalmDMDn	palm down moving down
PalmDMSd	palm down moving sideways

PalmFwUD	palm forward moving up and down
PalmInw	palm moving inward towards body
PalmSMOut	palm sideways moving out
PalmSMUp	palm sideways moving up
PalmUMDn	palm up moving down
PalmUMOut	palm up moving out
PalmUMSd	palm up moving sideways
PalmUMUp	palm up moving up
PalmUpThUp	palm up with thumb up
PalmsFwdMFwd	palms forward moving forward
PalmsSdAp	palms sideways moving apart
PalmsUMOut	palms up moving out
PalmsUpAp	palms up moving apart
PalmsUpApUD	palms up and apart moving up and down
PalmsUpFing	palms up with fingers touching

Appendix B: *Cause&Effect/Connection* items used in explanations

- (1) why (12)
- (2) because of (10)
- (3) reasons (7)
- (4) based on (4)
- (5) connection (4)
- (6) depend on (3)
- (7) basis (3)
- (8) implication (3)
- (9) implications (3)
- (10) prompted (3)
- (11) causes (2)
- (12) depending on (2)
- (13) in light of (2)
- (14) link (2)
- (15) reason (2)
- (16) results (2)
- (17) causal (1)
- (18) cause (1)
- (19) caused (1)
- (20) combine (1)
- (21) combined (1)
- (22) connotation (1)
- (23) connote (1)

(24) depended on(1)

(25) derive (1)

(26) entails (1)

(27) evoke (1)

(28) gave rise to (1)

(29) influence (1)

(30) lead to (1)

(31) linking (1)

(32) result (1)

(33) resultant (1)

(34) resulting in (1)

¹ <http://www.merriam-webster.com/dictionary/explanation>

² The complex philosophical issues of causality and its role in argumentation are beyond the purview of this study. For more on this topic, see von Wright (1971) and van Eemeren, Grootendorst & Snoeck Henkemans (1996).

³ Gaze has been studied extensively in the context of Conversational Analysis, by means of detailed microanalysis of eye movements during interactions between interlocutors. It plays a key role in the management of turn-taking and occurs in relation to other communicative aspects, including speech and nonverbal actions of the participants. For more on gaze, see Goodwin (1981) and Heath (1984).

⁴ <http://oyc.yale.edu/>

⁵ This information was gleaned from a summary of an online interview concerning the Yale Open Courses initiative available at <http://christytucker.wordpress.com/2007/12/11/open-yale-courses-good-media-traditional-pedagogy/>.

⁶ ELAN was developed at the Max Planck Institute for Psycholinguistics, The Language Archive, Nijmegen, The Netherlands. It is freely available at <http://tla.mpi.nl/tools/tla-tools/elan/>.

⁷ According to Silipo and Greenburg (2000), prosodic stress is an integral part of speech that derives from a complex combination of factors linked to duration, amplitude and fundamental frequency of syllabic sequences. Together with other features (e.g., intonation, rhythm, pitch), stress reflects the paralinguistic dimension of speaking. Because an in-depth analysis of the prosodic patterns of the lecturers' speech is clearly beyond the scope of this study, the analysis will be limited to the presence or absence of stress as illustrated by ELAN audio waveform viewer.

⁸ Shelly Kagan, Death (Yale University: Open Yale Courses), <http://oyc.yale.edu> (Accessed December 14, 2013). License: Creative Commons BY-NC-SA.

⁹ The software automatically compares the dataset with a normative corpus (in this case, the sampler of spoken English of the British National Corpus). This enables the identification of which semantic domains appear in statistically higher frequencies in the dataset as compared to the normative corpus. Statistical significance is calculated at the .01 level of confidence using the log-likelihood measure.

¹⁰ Langdon Hammer, Robert Frost (Yale University: Open Yale Courses), <http://oyc.yale.edu> (Accessed December 14, 2013). License: Creative Commons BY-NC-SA.

¹¹ Christine Hayes, Introduction to the Old Testament (Hebrew Bible) (Yale University: Open Yale Courses), <http://oyc.yale.edu> (Accessed December 14, 2013). License: Creative Commons BY-NC-SA.

¹² Joanne Freeman, Outraged Colonials: The Stamp Act Crisis (Yale University: Open Yale Courses), <http://oyc.yale.edu> (Accessed December 14, 2013). License: Creative Commons BY-NC-SA.

¹³ Jonathan Holloway, Public Policy and Presidential Politics (Yale University: Open Yale Courses), <http://oyc.yale.edu> (Accessed December 14, 2013). License: Creative Commons BY-NC-SA.