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Pointing in Science

An Analysis of Body and Linguistic Deixis in Nobel Lectures with PowerPoint Slides

Abstract

Within the last decades, PowerPoint has become a technology and a medium of communication that has contributed to a profound transformation of lecturing and presenting information in academia. However, until recently PowerPoint slideshows have received only limited attention in the fields of discourse analysis and social semiotic research (Djonov and Van Leeuwen 2011; 2012; 2013; Zhao, Djonov and Van Leeuwen 2014). Only a few studies have focused on the design of slideshows (e.g., Campagna 2009; Finn 2010; Rowley-Jolivet 2004) in relation to conference presentations (Degano 2012; Diani 2015; Costa 2017). Moreover, the interplay of speech, pointing, and body formations seems to have been neglected by the discourse analytical literature and has only been considered in the field of sociology (Knoblauch 2008). Pointing, nevertheless, seems to be a peculiar feature of conference presentations supported by PPT slides, allowing knowledge to be located in space. As a consequence, this paper aims to address aspects of linguistic pointing deixis in relation to the PowerPoint slides as well as to the body and gesture deixis of the presenter. To reach this aim, the study adopts a twofold methodology, fusing together Levinson's theory of spatial deixis (1983) with the sociological approach of Knoblauch (2008) for body formation of pointing. The analysis is carried out on a corpus of nine Nobel lectures (i.e., three in economics; three in medicine; three in chemistry) collected from 2010 to 2015, considering their PowerPoints, their videos, and their transcriptions. Results show that knowledge transfer is defined in Nobel lecture PowerPoint presentations by the combination of speaking and showing, thus becoming presented knowledge rather than representing knowledge itself (Knoblauch 2008, 75).

Keywords: *English linguistics, PowerPoint, Nobel lectures, spatial deixis, pointing*

1. Introduction

Conference presentations, in plenaries or regular sessions, play a key role for knowledge dissemination (Räisänen 1999) and, as Rowley-Jolivet (2002, 19) argues, these academic events significantly contribute to the life of a research community, carrying out several key functions such as claim-making, marking research territory, and providing a sufficient record

of the latest developments in the field. This spoken type of academic communication has been the center of increasing scholarly interest in the past years and one of the most significant contributions is the book by Ventola, Shalom and Thompson (2002) which provides a thorough description of the language of conferencing. After that, a number of studies have investigated conference presentations from a variety of perspectives: 1) as genre (Räisänen 2002; Carter-Thomas and Rowley-Jolivet 2003; 2005); 2) as narrative discourse (Thompson 2002); 3) as information design (Tufte 2003); and 4) as speaker-audience interaction (Webber 2005).

Significant attention has also been devoted to the multimodal dimension of conference presentations due to the fundamental role played by the visual semiotic mode in this academic genre (e.g., Dubois 1980; Rowley-Jolivet 2004; Carter-Thomas and Rowley-Jolivet 2003). Moreover, the advent of digital media has led to a massive use of multimedia tools among conference presenters, who are now able to combine a variety of semiotic resources such as images, writing, layout, sounds, 3D realizations (Kress 2010) with the verbal mode. As Tardy (2005, 320) points out, the combination of multiple modes of communication (especially visual and written) has become increasingly common, as "both paper-based and digital texts rely on words and images to create meaning." Furthermore, the visual mode carries a heavy functional load in scientific discourse in which visuals (e.g., tables, figures, graphs) may be the only way to communicate certain types of information. For these reasons, PowerPoint slideshows have demonstrated their usefulness not only in the hard sciences, where visuals with data are often needed, but also in the humanities.

Although PowerPoint has profoundly transformed the way of presenting information in academia, the analysis of conference presentations has focused more on the verbal mode, and the visual mode has received limited attention (Rowley-Jolivet 2004; Campagna 2009; Finn 2010; Degano 2012; Diani 2015; Costa 2017). Moreover, the discussion on the interplay of speech, pointing/body formations, and visuals seems to have been even more limited in the discourse analytical literature, which has mainly focused on the relation with the audience (see for example Morell 2015). To the best of our knowledge, only one study has dealt with pointing in conference supported by PowerPoint slideshows as an element to locate knowledge in space, and it applies a sociological approach (Knoblauch 2008).

Moreover, no research has considered the Nobel lectures as an example of conference presentations so far.

For these reasons, this study explores the topic with a three-fold aim: 1) to address aspects of linguistic pointing (deixis) in relation to the PowerPoint slides and to associate it to body and gesture deixis of the presenter; 2) to investigate the function of gesture deixis connected to the

type of visuals proposed; and 3) to examine the linguistic realisations of spatial deixis used to make reference to PowerPoint slides.

The paper is organised as follows: Section 2 offers a brief literature review of the studies on conference presentations; Section 3 illustrates the data analysed and the methodology used; Section 4 outlines the results of the analysis and, finally, Section 5 draws some conclusions.

2. Studies on conference presentation: an overview of the literature

Research on conference presentation in the academic context has been extensive over the past decades, and various studies have investigated different linguistic peculiarities of this communicative genre focusing on the verbal mode. Some scholars have considered the interactive features of conference talks (e.g., personal deixis and markers, questions and answers) and their role in creating a relationship with the audience (Webber 2005); some others have placed their attention on the narrative features (Thompson 2002), on the rhetorical features (Rowley-Jolivet and Carter-Thomas 2005) or on the pragmatic ones (e.g., use of humor, Frobert-Adamo 2002).

Only a few works in literature have studied the visual mode which, however, plays a fundamental role in conference presentations. One of the earliest studies on this issue is the one on biomedical speeches by Dubois (1980), who highlights the important function of slides in providing "visual interest and reinforcement of key points" as they "carry the crucial information of the body of the speech, information which is often not imparted orally by the speaker" (Dubois 1980, 50). Further research has been carried out on visuals as a powerful means to structure discourse and to explicate logical relations (e.g., Rowley-Jolivet 2002; 2004). Following this research strand, Degano (2012) points out that the synergy between text and talk in PowerPoint-aided conference presentations facilitates the creation of a scaffolding frame for global coherence, on the one hand, and the elaboration on specific points by exploring meaning relations between notions, ideas, and slides, on the other. In more recent days, Wecker (2012) and Rowley-Jolivet (2012) have focused their attention on the integration of oral utterances with written information on slides in the context of educational (Wecker 2012), and academic settings (Rowley-Jolivet 2012). In an additional contribution to this field, Fernàndez Polo (2014) has studied the role of *I mean* as a marker of modification or adjustment, including self-repair, concluding that it seems to be especially prevalent in presenters using English as a Lingua Franca. Diani (2015) makes a further step and sheds some light on the use of PowerPoint in conference presentations in this line of investigation, by exploring the visual dimension of the conference presenter's talk from a genre perspective and she focuses on the IMRD (Introduction,

Methods, Results, Discussion) structure (Swales 1990) of the presentations in association with the structure of the slides projected.

Attention has also been paid to the analysis of visual paralinguistic features in conference talks. Hood and Forey (2005), for example, explore the combination of body language and speech, and they show how gestures can help the audience align with the speaker's utterances. Similarly, according to Querol-Julián and Fortanet-Gómez (2012) paralanguage and kinesic features used in conference talks contribute to create the global meaning of the speech event. Along the same lines, Morell (2015) investigates how different semiotic modes (i.e., spoken and written English, nonverbal communication, and body language) employed in conference presentations contribute to enhancing the comprehension of what takes place during the talk. Interest has also been given to the (inter)personal aspect of slideware discourse. Campagna (2009), for instance, analyses patterns of self and otherness taking into consideration the interplay of referential (endophoric and exophoric) voices involved in the creation of visual reasoning.

Taking a sociological perspective, Knoblauch (2008) investigates the transformation of speech into 'presentations' through the interaction of visuals and body formations. In his study, he demonstrates the creativity of these 'performances,' in which pointing seems to be a particular feature of this kind of presentation, allowing knowledge to be located in space.

All these studies show a variety of possible interconnections between the verbal and visual modes in conference presentations. The present work would like to take a further step in this research strand and focuses on the importance of pointing in speaking and showing that takes place in Noble lectures as instances of conference presentations.

3. Data and methods

3.1 The corpus

The analysis was carried out on a corpus of 9 Nobel laureates' lectures collected from 2012 to 2015: three in economic sciences, three in medicine, three in chemistry. We decided to choose this particular setting of conference presentations because their recordings are easily available on the website of the Swedish Academy for the Nobel Prizes.[1] Due to the mixed communicative modes involved, the corpus is a multimodal one, which takes into account PowerPoint slideshows, video recordings, and transcripts of the talks. The length of each video varies from thirty-five to fifty minutes and textual data were retrieved manually. The transcripts sub-corpus consists of 40,530 words. The PowerPoint sub-corpus comprises a total of 255 slides.

[1] https://www.nobelprize.org. Last visited 25/06/2019.

The following table provides a description of the lectures included in the corpus:

Discipline	Presenter	Title	Length	N° of POWERPOINT slides	Number of words
Economic Sciences	Angus Deaton	Measuring and Understanding Behavior, Welfare and Poverty	37:15	26	5,771
Economic Sciences	Jean Tirole	Market Failures and Public Policies	42:48	37	4,983
Economic Sciences	Eugene Fama	Two Pillars of Asset Pricing	36:40	8	4,785
Medicine	William Campbell	Ivermectin: a Reflection on Simplicity	31:09	16	3,825
Medicine	May-Britt Moser	Grid Cells, Place Cells and Memory	49:48	42	4,358
Medicine	Shinya Yamanaka	A Winding Road to Pluripotency	46:29	38	4,590
Chemistry	Tomas Lindhal	The Intrinsic Fragility of DNA	30:19	18	2,861
Chemistry	Paul Modrich	Mechanisms in E. Coli & Human Mismatch Repair	32:17	23	4,381
Chemistry	Aziz Sancar	Mechanisms of DNA Repair by Photolyase and Excision Nuclease	50:22	37	4,976

Tab. 1: Corpus description: discipline, presenter, title of the lecture, length, n° of slides and n° of words

The importance of the visual channel in the Nobel lectures analysed is evident since the PowerPoint sub-corpus amounts to a total of 255 slides for nine lectures with an average of 28 per presentation. However, from a preliminary observation, there was actually a considerable variety in the number of slides used in each presentation, ranging from a minimum of 8 to a

maximum of 25 per presentation. This difference varies according to the presenter's style and to the type of visuals employed and does not seem to be related to the disciplinary field involved.

3.2 Methods

The study analyses and compares different approaches to the use of PowerPoint presentations in Nobel lectures. The methodology of the research relied on the integration of two approaches, i.e., the sociological one and the discourse analytical one, focusing on the following elements:

a) the setting in which the conference presentation takes place and how it influences pointing and body formations of the presenter, as well as the type of relation between the speaker, the receiver, and the text displayed (Knoblauch 2008, 85).

b) the semiotic resources used in PowerPoint visuals of Nobel lecture presentations following the models proposed by Bertin (1973) and Rowley-Jolivet (2002) for classifying the different typologies of slides: 1) scriptural visuals, presenting text; 2) numerical visuals, covering mathematical formulae and numerical tables; 3) graphical visuals, containing graphs, diagrams, and maps; 4) figurative visuals, including polysemic images such as photographs.

c) the type of pointing including both pointing with body parts (body deixis; i.e., pointing with the index finger) and pointing by means of technical aids (i.e., pointing with laser pointer, mouse-pointing). These elements are considered in connection with PowerPoint visuals, as well as to the meaning performed by the action of pointing (e.g. encircle, circumscribe, underline; waving, creating lines, and movements; static pointing). By taking this into account, it is possible to observe whether the meaning of pointing depends on the sign itself, as gesture studies suggest, or is established in relation to other aspects of communication (Knoblauch 2008, 83-85).

d) the spatial deixis (i.e., proximal deixis, this/these, here; distal deixis, that/those, there) used in the speech to relate to PowerPoint slides (Levinson 1983).

4. Results

4.1 The setting of Nobel lectures

The setting of Nobel lectures is highly institutionalised, with the presenters delivering their speeches on a stage behind a podium with a microphone. They have a wall screen displaying their PowerPoint slideshow on their left, and the audience sitting in the parterre on their right.

Fig. 1: Spatial context of the Nobel lecture

Looking at the positioning of the speaker in Nobel lectures, it appears that the PowerPoint-aided conference presentation differs from other forms of speech: this kind of communication does not imply just a two-sided relation between a speaker, "representing" a text, and an audience, as Ventola, Shalom and Thompson (2002) have shown for conference presentations. Rather, the Nobel lecture represents a relation between three elements in which the screen with the slideshow takes the position of a third party in an interaction. Such a threefold relation entails the de-centring of the speaker (Knoblauch 2008, 85). Whereas screens are often located in the centre of one wall of the room, the podium is moved to the side creating a triangular relation as shown by the graphical representation below:

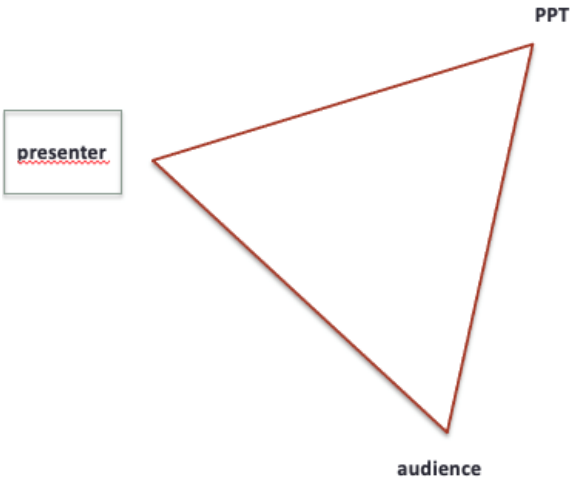


Fig. 2: Triangular relation in Nobel lectures

As is possible to observe, because of this triangular relation, the turning of the body cannot be avoided because of the setting and this position not only supports pointing at the slide, but it also allows to structure the attention of the listeners and of the speaker.

4.2 Classification of PowerPoint visuals

Following Bertin's (1973) and Rowley-Jolivet's (2002) typologies of slides used in conference presentations, I classified the visuals used in the selected Nobel lectures. Table 2 presents the overall distribution of the types of visuals detected in the corpus.

Type of visuals	Raw frequency count	% of total (n = 255)
Scriptural	68	26.66
Numerical	14	5.49
Graphical	82	32.15
Figurative	81	31.76

Tab. 2: Distribution of type of visuals in the corpus

As can be seen in the table, all the semiotic modes are represented in the PowerPoint visuals of Nobel lectures, but of the 255 slides projected by speakers, the slight majority are graphical, immediately followed by figurative ones. If we take a closer look at the distribution of the types of slides for each discipline involved, we discover that each field is characterised by a specific category of visuals, as shown in Table 3.

Type of visuals	Economic Sciences	Medicine	Chemistry
Scriptural	44	14	8
Numerical	11	\	3
Graphical	5	27	50
Figurative	10	55	16

Tab. 3: Distribution of type of visuals across disciplines

Interestingly, every discipline seems to favour a particular typology of visuals: i.e., scriptural for Economic Sciences (44), figurative for Medicine (55), and graphical for Chemistry (50). This

preference may depend on the nature of each field. The different semiotic modes in the slides may be used to accomplish a range of different functions which may vary from discipline to discipline. For example, in soft sciences (e.g., Economic Sciences), speakers may need to give definitions of complex or specialised notions to the audience, to outline the aims of the presentation, or to describe the methods adopted in the research, as shown in Fig. 3:

Fig. 3: A scriptural slide. "Measuring and Understanding Behavior, Welfare and Poverty" (Deaton)

Instead, in Medicine, presenters are more likely to show images of surgical operations, organs, physical consequences of diseases, thus figurative slides best suit the purpose of visually involving the audience in what is being explained. Images help the listener visualise the information the speaker is trying to convey, especially when it is difficult to be sufficiently descriptive by using words. Moreover, images can serve the speaker in achieving the accuracy needed for his/her scientific presentation. These kinds of visuals are sometimes accompanied by a concise caption incorporating verbal language in the form of explanatory notes (Diani 2015, 93). Fig. 4 provides an example of this type of visuals:

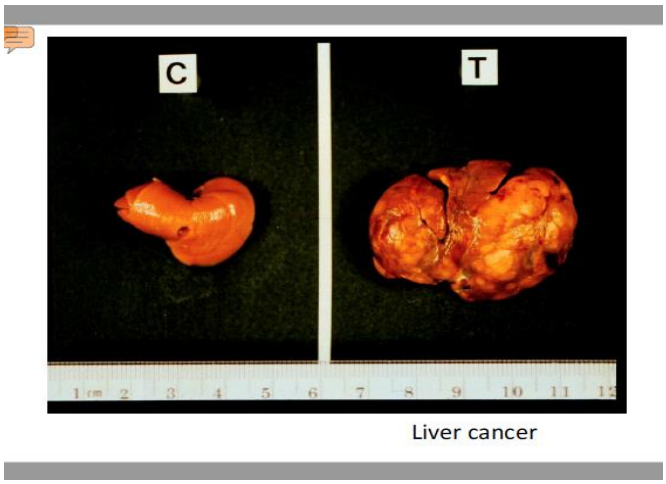


Fig. 4: A figurative slide. "A Winding Road to Pluripotency" (Yamanaka)

Lastly, in Chemistry, graphical slides are the majority, and they are in the most cases data plot of schemes with geometric shapes which mainly represent the chemical structures of the elements studied, as in Fig. 5, or the chemical processes involved in an experiment. This type of iconographic representations is useful to depict patterns of relationships that would be difficult to explain by using the verbal mode. They are often the starting point for the speaker to give a more complete description in a less abstract way, since he/she has the possibility to physically show by pointing concrete elements on the slide.

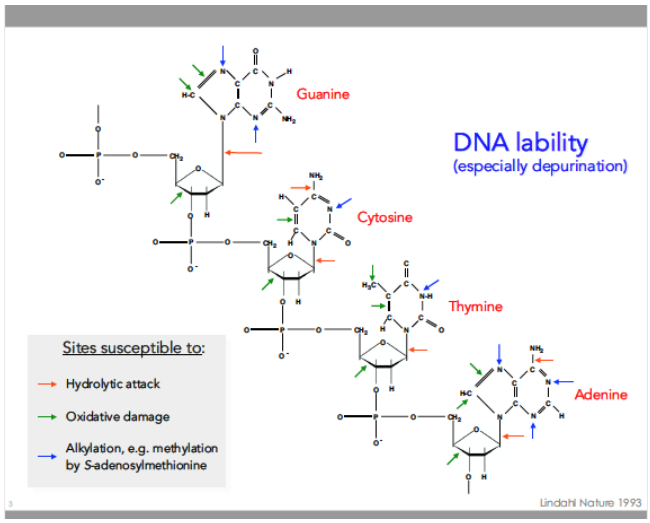


Fig. 5: A graphical slide. "The Intrinsic Fragility of DNA" (Lindhal)

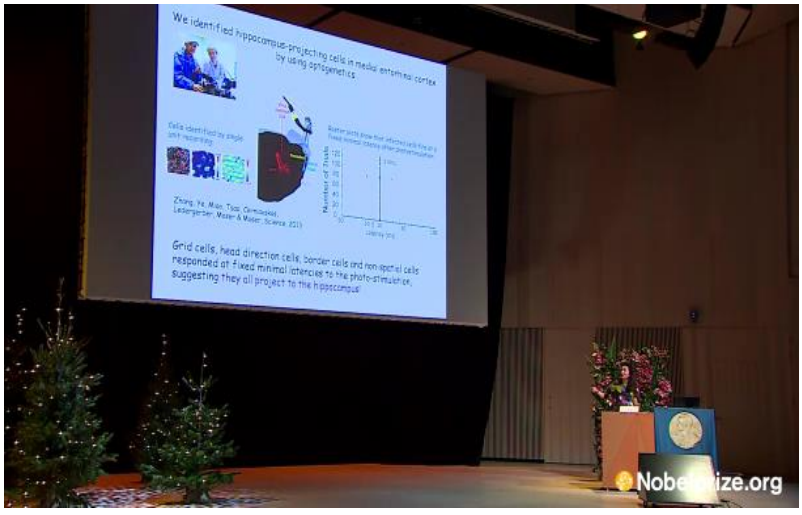
In the next section, I explore the relation between the different ways of pointing, the spoken language used by the speakers to determine spatial deixis, and the type of visuals projected during the presentations.

4.3 Pointing: language and body deixis

As already mentioned, when talking about pointing, we should consider both language deixis and body and gesture deixis (Knoblauch 2005, 78). For this reason, the meaning of pointing has to be reconstructed correlating linguistic studies (Levinson 1983) with gesture studies (Knoblauch 2008) in which it is claimed that particular gestural forms 'carry' meaning. Moreover, we should consider that pointing may be performed also with the aid of technical instruments such as sticks, pens, and pencils, as well as the computer mouse (although we find that presenters hardly ever utilise the mouse-pointing functions in Nobel lectures). In this corpus, the most popular form of pointing in connection with PowerPoint is the laser pointer, sometimes associated with hand movement (seven speakers out of nine). This may be because of the spatial context of the presentation and the triangular relation that it creates between the presenter, the audience, and the visuals (see Section 3.1). Only two orators (Jean Tirole, Nobel Laureate in Economic Sciences; Shinya Yamanaka, Nobel Laureate in Medicine) opt for no pointing, preferring an oratory style that is completely untethered from the PowerPoint slideshow.

Observing the Nobel lectures collected, it is possible to specify several functions entailed by pointing with the laser, considering the movement of the pointer itself (Knoblauch 2008, 83-85). The most frequent movements made using the laser pointer are encircling, circumscribing, and underlining. These movements are often employed to indicate specific elements that need to be explained, as shown in example (1) below (passages of talk during which the speaker is encircling with the laser pointer are underlined). They are typically found in figurative visuals with or without verbal insertions and they are frequently used in medicine presentations.

(1)

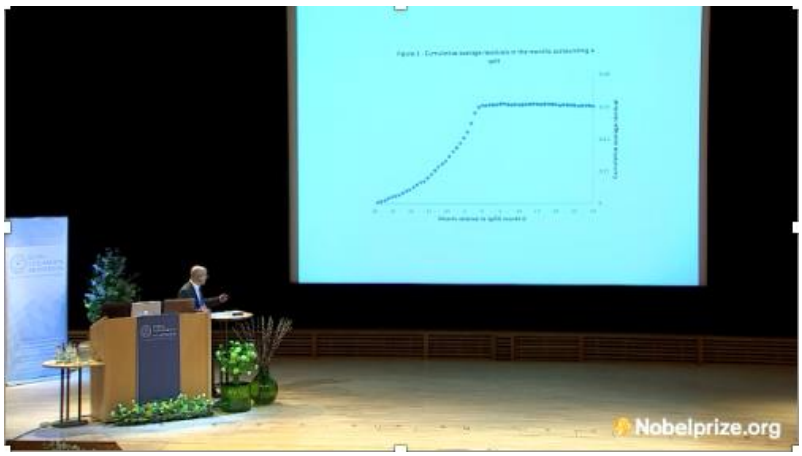


> "[…] in addition to this, **these** rats, **this** is a sagittal section, **this** is a faint hippocampus, and **here** would be the entorhinal cortex, the rat had a microdrive **here** with sensors into the entorhinal cortex checking the quality or the function of **these** cells." (May-Britt Moser, "Grid Cells, Place and Memory")

As is possible to see from the picture, the presenter slightly turns her body to the PowerPoint and with a laser pointer indicates, by encircling them, every part involved in her explanation. The movements of the laser pointer are coordinated with the talk development and the speaker uses the pointing gesture in six points during her talk. All the instances are related to spatial deictics. The linguistic spatial deictics associated to gesture are instances of proximal deixis (*this*, *there*, *here*) and, as for other examples described in this section, they signal that the orator places herself as the deictic centre in respect to the visuals and to the audience. She is the pivotal vertex in the triangular setting of the presentation and the pointing functions as conceptual link with the audience, which is thus accompanied through gesture in the discovery of knowledge.

A second set of pointing gestures, frequently observed in Nobel lectures, is always made by means of a laser pointer and it includes actions such as waving, creating lines, and other movements. This pattern is typical of Chemistry and Economic Sciences presentations especially in graphical visuals in which we can find graphs, tables, and plots of schemes with geometric shapes. While the slide represents a static view of various objects, these laser movements turn the static elements and the parts of the talk into a dynamic process (Knoblauch 2008, 83). Example (2) provides an instance of this pointing strategy:

(2)



> "[…] **this** is the plot of the cumulative average residuals **from** 30 months before the split; **this** is the split month **here** and **this** is up 30 months after the split and **these** are

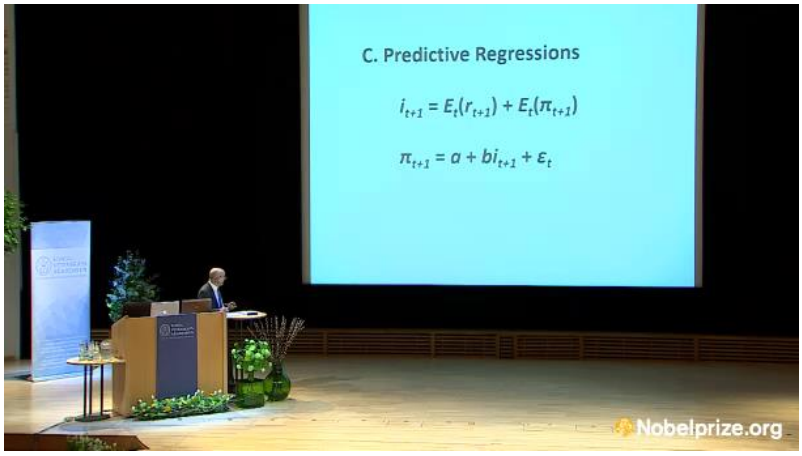
> averaged across all of the 670 companies that did stock splits in **this** time period. So you see **this this** is the path of what happens in advance of the split; so you see **this** cumulative **going straight up** so what what it says quite obviously is that companies split their stocks after they've experienced good times." (Eugene Fama, "Two Pillars of Asset Pricing")

As shown by the picture, the speaker turns a little to the slide projected on the screen and, in correspondence of the underlined part of the transcript, he draws a path following the line defined by the plot with the laser pointer. What is designed as a simultaneous structure on the slide is thus turned into a temporal sequence of processes that are characterised by the movements of the pointer (Knoblauch 2008, 83). The gesture becomes meaningful, acquiring a performative role (Knoblauch 2008, 84). The movements are also described through the verbal mode ("this cumulative is **going straight up**"), so we can say that the meaning is created by the interplay of three elements: visual, gesture, and words.

As for spatial deixis, as in the previous example, the deictical centre is that of the speaker, so we only find instances of proximal deictics (*this*, *there*, *here*). Here, however, the engagement of the audience is far more visible because the orator explicitly refers to the receivers of his description with the expression "so **you** see […]."

A third interesting category of pointing found in the video sub-corpus is static pointing. It is often used to indicate an overall result described in the PowerPoint slide and it is common in numerical or scriptural slides especially in Economic Sciences lectures. Here the verbal mode prevails in the interplay of meaning creation, and pointing is just employed to introduce an intertextual reference to a publication already written, as shown in example (3):

(3)



> "[…] so in **this** paper I've proposed a very simple model for the expected real return it's constant well if that's just a constant it doesn't have any T's on it what that says is the

> interest rate varies one-to-one with the expected inflation rate." (Eugene Fama, "Two Pillars of Asset Pricing")

In the example, the utterance is related to a numerical slide which presents a mathematical model. The laser pointer is statically directed to it and, due to the contextual position, the presenter has his body slightly turned to the visual projected. However, if we consider the spatial deictic used by the orator, we can see that he refers to the publication ("**this** paper") in which the model was proposed, thus having the function of intertextual reference. The speaker makes use of an instance of proximal deixis to something not 'physically' present in the talk, which is something that commonly occurs also in other kinds of speaking.

A last interesting function of pointing is represented by what we have called the 'institutional' pointing. It is an instance in which the speaker uses the laser pointer to underline photos of collaborators of research depicted on a figurative slide. Example (4) explains what we mean:

(4)

> "[…] I just wanted to end by **showing you** some pictures of some of the people I've collaborated with over the year; there's John Millebar sitting down **there** Gila Rock Chris Paxson will be **here** tomorrow Martin Browning, **this** is John Campbell, **this** is my friend John, **here's** Alan Heston and Betina Anton who's sitting in **the front row here.**" (Angus Deaton, "Measuring and Understanding Behavior, Welfare and Poverty")

In (4), the orator outlines all the people involved with him in the research that obtained the Nobel Prize. There is a strong connection between the action performed by pointing (i.e., underlining) and the linguistic realisations of spatial deixis. The movements are accompanied by instances of both proximal deictics (*this, here*) and distal deictics (*down there*) to signal the presence of some of them in the parterre to the audience.

In the next paragraph, some concluding remarks on the analysis will be drawn.

5. Concluding remarks

This study has highlighted the importance of the interplay of speech, pointing/ body formations, and visuals in conference presentations, taking in particular the case of Nobel lectures. As a consequence, the research has tried to propose a three-fold analysis, considering aspects of spatial deixis in relation to the PowerPoint slides and the presenter's body and gesture deixis.

Starting with the broader context, it is possible to say that the highly institutionalised setting influences the presentation, thus creating a triangular relation between the orator, the audience, and the PowerPoint slideshow. The presenter is in a fixed position behind a podium; thus he/she becomes the pivotal vertex of the triangle and, therefore, he/she is the deictical centre of the talk and of the visuals projected. This also influences the type of pointing which is mainly performed through the aid of a laser pointer because of the distance between the speaker and the screen where slides are shown. The speaker uses turning towards the screen as a way of aiding memory during the talk. In addition, the speaker occasionally may turn to the slide in such a way as to indicate the relevance of what is being said to what is being shown at certain points of their speech. The body becomes the pivot of the communication creating a bridge between the PowerPoint slideshow, which creates the scaffolding of conference presentations as pointed out by Degano (2012), and the audience, and it is used by the speaker as "the most flexible element in the structuring of attention" (Knoblauch 2008, 86) because speech and slides may vary, but the speaker's position in space does not change. As Knoblauch (2008) points out, PowerPoint-aided presentations are not just performances. Indeed, thanks to the pivotal role of the body, they are forms of "immediate communication" (Knoblauch 2008) that is to say, live performances.

Pointing acquires a performative role and carries specific meaning and function by changing in its realisation and acts synergistically together with the multiplicity of visual typologies of PowerPoint slides (mainly graphical and figurative in Noble lectures). As highlighted by Dubois (1980), slides play an important function as they provide "visual interest and reinforcement of key points" and they "carry the crucial information of the body of the speech, information which is often not imparted orally by the speaker" (1980, 50). Through pointing, the presenter is enabled to "perform knowledge" (Knoblauch 2008, 81) detailing different purposes in relation to the various semiotic resources used. Pointing may be used as part of knowledge transfer strategies (e.g., underlining or encircling specific items that needs to be further explained) or may give dynamicity in describing static elements (e.g., waving, creating lines and movements to highlight the development of a graph). Finally, pointing can also be used statically to refer to

external elements to the presentation, as for example to published papers, with the function of intertextual reference, or to people involved in the research.

As with the majority of studies, the current study is subject to limitations and further research will include a comparison between Nobel lectures and conference talks to highlight differences and similarities in the connection between visual and verbal mode in PowerPoint slideshow presentations. This comparison would give more relevance to the data presented here. Moreover, the corpus of textual data should be enlarged in order to gain more reliable results as for the typology of deixis related to pointing.

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