PowerPoint in Public:
Digital Technologies and the New Morphology of Demonstration

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Forthcoming in *Theory, Culture & Society.*

Abstract When policy issues involve complex technical questions, demonstrations are more likely to marshal charts, graphs, models, and simulations than to mobilize popular movements in the streets. In this paper we analyze PowerPoint demonstrations, the most ubiquitous form of digital demonstrations. Our first set of demonstrations are the PowerPoint presentations made in December 2002 by the seven finalist architectural teams in the Innovative Design competition for rebuilding the World Trade Center. Our second case occurred some blocks away, several months later: Colin Powell's PowerPoint demonstration at the United Nations. We argue that Edward Tufte's denunciation of PowerPoint does not capture the cognitive style made possible by the affordances of this pervasive new technology. On the basis of our case materials, we demonstrate the distinctive morphology of PowerPoint. Its digital character provides affordances 1) that allow heterogeneous materials to be seamlessly re-presented in a single format that 2) can morph easily from live demonstration to circulating digital documents that 3) can be utilized in counter-demonstrations. A careful examination of this widely used technology is critical for understanding public discourse in a democratic society.

Keywords: PowerPoint, demonstrations, digital technologies, cognitive style, architects, Colin Powell

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INTRODUCTION

New forms of demonstration

How do actors conduct demonstrations before the public using digital tools? Our motivations to address this question can be stated as four related propositions which we develop with increasing elaboration. First, in our era, *political questions and technical questions are increasingly entangled*. As researchers in the field of science and technology studies have shown, technical questions almost always have a political component (Latour, 1990, 2004; Callon, 2004). Similarly, critical political issues are likely to involve technical questions. As soon as we think about matters like the environment, national security, abortion, urban housing, public health, or macroeconomic policy, we recognize immediately that we are on the terrain of questions that are simultaneously political and technical (Barry, 2001).

The second proposition follows logically from the first. The entanglement of technical problems and political issues reshapes modes of demonstration. In an era when policy decisions involve complex technical questions, *demonstrations are as likely to marshal charts, figures, models, and simulations as to mobilize popular movements in the street.* To be clear, people still go to demonstrations; but political demonstrations are not confined to the massing of bodies in public settings. Just as production has moved from mass production to flexible specialization, and mass media is giving way to the new social networking forms of collaborative media, so the public sphere is shifting from mass movements to new forms of political demonstration (Girard and Stark, 2007).

What does it mean to demonstrate? Precisely because political questions are also technical questions, it is not enough to put people in the street. To be effective, demonstrations must also be persuasive about technical matters (Barry, 2001). Take, for example, the group Asthma Moms, one of several grass roots civic associations that sprang up in Lower Manhattan after 9/11 to protest the fact that, far from simply being poorly informed, they had been knowingly and deliberately misinformed about hazardous environmental conditions in their neighborhoods adjacent to Ground Zero. Asthma Moms learned that banners saying "The Air is Unsafe," would not be sufficient to demonstrate their claims. If they mobilized in protest, they also needed to mobilize their own counter experts, to learn enough about complicated technical terminology, and to develop innovative means to demonstrate this knowledge to their communities, to health professionals, to policy makers, and to the broader public (Girard and Stark, 2007). In

short, they learned that to demonstrate is to attempt to persuade about matters political and technical.

Whereas our first two propositions were about politics and technology, the third is about technologies of politics, specifically about technologies of demonstration. When we think about political representation, we think first about who speaks for whom. But representative politics is now, as it has always been, also about representational images. Effective demonstrations mobilize forms of representation that speak to (perhaps by enunciating, perhaps by suppressing or disguising) the political interests and the technical questions at stake. By employing new technologies of representation, new forms of demonstration open possibilities for new kinds of politics, allowing for the representation of new identities, actors, and agents, but also suppressing other voices, actors, and interests. That is, new forms of representation can also pose new forms of misrepresentation.[1] In our era, the new technologies of representation are digital technologies. Thus, our third proposition: *Public demonstrations are increasingly digital demonstrations*. The question then is what happens when demonstrations take digital forms that can circulate through new network channels quite different from traditional broadcast media. When the tools of representation (as mediated images) become interactive, the task of representation (as who can speak for whom about what) can be re-imagined.

Our fourth motivating proposition: *PowerPoint is the most ubiquitous form of digitally assisted demonstration.* Together with the spreadsheet, the word processor, the emailing program, the website, and the search engine, PowerPoint is one of the key products of the personal computing revolution to become a part of everyday life. With its origins reaching back to engineers, and especially military contractors, who moved from flipcharts, to transparencies and slide projectors, to digital layout and LCD projectors, PowerPoint software has become one of the most prevalent tools of communication, with an estimated 30 million Microsoft PowerPoint presentations everyday (Parker, 2001). Primarily conceived for business presentations, this slideware product has spread widely, not only to government, architecture, science and engineering, but also to university lectures, elementary education, church sermons, courtrooms, weddings, and even funeral homes.[2] As the most popular oral-demonstration support, PowerPoint is an ideal candidate to examine reconfigurations in the work of persuasion when it is operated by digital tools. Because it is increasingly deployed outside of business contexts in efforts to persuade the public, a careful examination of this widely used technology is critical for understanding public discourse in a democratic society.

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[1] In an insightful history of the increasingly powerful technologies and institutions that shape the objects of attention for mass populations, Crary (2000) examines the intimate relationship between attentiveness and distraction.

[2] On the use of PowerPoint in elementary education, for example, see Levasseur and Sawyer (2006) ; on courtrooms, see www.powerpointforcourt.com; on churches see, www.eBibleTeacher.com and www.churchslides.com.

What processes, then, are at work when PowerPoint is used in demonstrations and counter-demonstrations in the public sphere? To answer this question, we examine cases that follow from the four propositions stated above. The criteria guiding our case selection are, thus, the following: The cases must be ones in which PowerPoint presentations were the dominant mode of demonstration. These demonstrations must be performed in a public assemblage and must circulate in digital form after that performance. The demonstrations must represent technical issues entangled with political questions. And they should involve non-trivial matters of public concern.

What is the morphology of a PowerPoint public demonstration?

In what form is a "PowerPoint presentation"? Edward Tufte (2006) offers a decisive answer to this question: The various features of PowerPower technology – such as the AutoLayout functions, "click-to-add-title," and bullet-point formatting – pre-form the performance. Tufte has made insightful observations about PowerPoint, and we summarize and discuss his perspective below. But Tufte's is not the final word on this pervasive new technology. The major failing of Tufte's analysis, we will argue, is that his underlying criteria for evaluating the communicative potential of PowerPoint are derived from a different and not fully comparable medium, namely written documents or reports. Limited by these criteria, Tufte criticizes users for presenting too little information in too few words. Whereas for Tufte, the cognitive style of PowerPoint is almost entirely limited to one element in its grammar, in our study we point to other aspects of the elementary grammar of PowerPoint including the use of images and compositional effects of rupture and continuity, as well as other features of effective storytelling such as pacing and rhythm.

Even expanding the elementary grammar of PowerPoint, however, would not fully capture the curious morphology of this new tool of demonstration. In one form it conforms to the "demo": in real time, an audience, a device, and a demonstrator providing a voice-over about the object.[3] But whereas in that form it requires the co-presence of author and audience, a PowerPoint demonstration can also circulate independently from the oral presentation. Shorn of context, the question "Did you see her PowerPoint?" has an ambiguous referent. On one hand, it could refer to the live presentation at a public meeting; on the other, it could refer to the PowerPoint "presentation" that you found on a website, read as a handout, or opened as an email attachment in .pdf or .ppt format. Whereas the first form supports an oral demonstration,

[5] See especially Rosental (2002). Callon's (2004: 123) definition of demonstration is particularly useful: "Demonstration, as the origin of the word indicates, makes visible for an audience, constructed contemporaneously with the demonstration, an object about which a discourse is articulated. It therefore simultaneously implies a putting-into-words, the construction of a referential chain (which enables the object to be articulated) and the organization of a public space in which the solidity, robustness, relevance and interest of the demonstration can be tested (possibly by other demonstrations)."

the second form replaces the more conventional textual product as in "I haven't finished the paper, but I can send you the PowerPoint."[4]

PowerPoint is an interesting and complex sociological object because each form could involve different publics: the live performance is not the same socio-technical assemblage[5] as that for the derivative products that circulate as electronic documents. Because it can take different forms involving diverse publics in time and space it thus becomes meaningful to ask "When and where is a PowerPoint presentation?" These aspects of the geography of persuasion are especially important when examining digital demonstrations in the public sphere, for they give new salience to questions about knowledge and expertise. Our analysis suggests that the more that demonstrations are presented in virtual form (posted, for example, on a highly visible website), the more they are available as materials for counter-demonstrations.

PowerPoint technology, we shall argue, offers a set technical capacities or "affordances" (Gibson, 1979) by which we refer not to structures that are directly deterministic but to processes of constrained opportunities. The pre-formatted features of Microsoft's AutoContent Wizard, for example, constrain certain types of actions even as they enable others. But, as we shall see, they do not exhaust the possibilities within this medium. Many of the affordances of PowerPoint derive from its digital character. The ability of a PowerPoint presentation to morph so easily from one form to another, for example, is directly related to its digital character. The bits and bytes are indifferent to whether they are projected onto a large screen, delivered by your printer, available on a website, or read by the Adobe or Microsoft programs on your laptop. Moreover, they are also indifferent to whether they are displayed by a government official or re-appropriated by counter-experts in efforts to challenge the claims made to the public.
We do not argue that PowerPoint is a unique medium; in fact, it is an interesting case to study precisely because it shares much with interactive technologies and other new media objects (Manovich, 2002). We take PowerPoint as an example of new forms of demonstration supported by digital tools. Our goal is to analyze the technical and rhetorical modalities of digital demonstrations in order to understand the staging/screening of "facts," their circulation, and the new opportunities they provide for counter-demonstrations. To study demonstrations that attempt to persuade the public requires that we examine new forms of representational politics. This paper studies "demos" in the *demos*.

[4] See Yates and Orlikowski (2006) for an analysis of the consequences that consultants frequently offer their PowerPoint "stacks" as a contractual "deliverable."

[5] On the concept of socio-technical assemblage see Callon (2004); Marcus and Saka (2006) ; and Girard and Stark (2007).

CASE SELECTION, DATA, AND METHODS

We are deep at the bottom of Ground Zero. Everything is devastated. The camera pans slowly to the left, scanning across the ruins. We see dust, debris, and heavy equipment, but not a single human life. Without interruption, the camera reverses direction, panning slowly to the right. Immediately, we encounter people going for a walk with their kids under a sunny sky. We are in the exact same place, still at Ground Zero, but now restored to life. At the end of the 360 degree panoramic, the camera looks toward the sky, above the pregnant women, kids, and businessmen enjoying the lively green place, to let us see imposing edifices, the new World Trade Center (WTC). Everything is in order, and everything is as if it has always been here. We are in a middle of a PowerPoint presentation. Daniel Libeskind, one of seven architectural finalists in the Innovative Design Study for the WTC is presenting his design proposal to the public at the Winter Garden on the Hudson River. Two years later and some blocks across town on the East River, another man also used a PowerPoint presentation. Sitting around a horseshoe table, the audience faced the Iraqi desert, looking at trucks moving weapons of mass destruction while hearing intercepted conversations as Colin Powell presented the case to put his nation at war.

Both of these PowerPoint presentations were demonstrations, simultaneously political and technical. And like many of the new demonstrations that we encounter, they represented technical questions using digital technologies in efforts to persuade the public. What was being demonstrated in our two cases? Stated most succinctly, each of the seven architects at the Winter Garden sought to demonstrate that his project would make a wounded city whole. Colin Powell sought to demonstrate that weapons of mass destruction posed an imminent threat to the United States. Whereas the architects to justify a future project and Powell attempted the justification of a future war, each used digital tools to support their political and technical claims before the public. We examine these otherwise disparate cases to explore how digital technologies of representation equip the activity of demonstration.

The analyses here are based on data collected for a project, co-directed by Monique Girard, that examined new technologies of demonstration and public assembly in the rebuilding of the World Trade Center site. As part of that project, our research team interviewed architects, public officials, and civic activists and gathered a broad array of materials. For this paper, we focus on the presentations of the seven architectural finalists in the "Innovative Design" competition for the WTC site. The basic data are the PowerPoint presentations of the seven architectural teams. These presentations were available on the website of the Lower Manhattan Development Corporation, the official agency that sponsored the competition. (They were also posted on numerous other websites, including those of the architects.) To study the cognitive style of these demonstrations, we systematically examined the seven PowerPoint presentations as digital documents. To study the "live" component of these demonstrations, we examined the taped broadcast of the presentations at the Winter Garden of the World Financial Center in December 2002. In this way we could examine PowerPoint presentations as a combination of textual, visual, and oral argument in front of a live (and broadcast)

audience. To study the circulation of digital documents, we also searched the web to explore the numerous and highly varied formats in which they were made available to the public. Similarly, we examined dozens of websites to study the reappropriation of the PowerPoint presentations and their incorporation in various counter-demonstrations.

The guiding framework of our data collection and analysis was to examine the seven architects' demonstrations and Colin Powell's demonstration in a symmetrical manner. As with the architects, the basic data in Powell's case was the PowerPoint document, made available on the website of the U.S. State Department within minutes of the conclusion of its presentation at the United Nations. As with the architects, we analyzed the content of the PowerPoint presentation as a digital document, exploring, for example, how Powell exploited visual references to the presentation by Adlai Stevenson (in the same room in the United Nations during the Cuban missile crisis). As with the architects, we coded the instances where diverse digital materials were imported into the document to "transport" the audience to a distant imaginary. Also, symmetrically, we studied a taped broadcast of the UN presentation, examined the circulation of the digital document, and searched the web to analyze numerous ways in which the PowerPoint presentation was subjected to counter-expertise and re-enscribed in digital counter-demonstrations.

Behind the methodology of examining our cases symmetrically there is another symmetry: in both cases, the demonstrations were about something that did not exist. The "buildings" that were presented so palpably in the seven architects' presentations, of course, did not exist. And, as it turns out, none of them, not even the winner's, will ever be constructed in materials other than the digital. The same holds for the non-existent "weapons of mass destruction" presented by Colin Powell. Our task in this paper is not, however, to analyze the truth claims of these demonstrations.[6] That is, our attention turns from whether there were weapons of mass destruction to how actors use weapons of communication. By systematically making comparisons between two cases, we highlight the new figures of computer-assisted argumentation.

To do so, we draw on and develop analytic tools from Science and Technology Studies (STS). Because technical demonstrations are not confined to the restricted space of experts (on the debate, see Collins, 1988), new research in STS is studying practices of proof "in the wild" (Hutchins, 1995) – outside the laboratory, the scholarly journal, or the professional meeting (Clark and Pinch, 1995; Latour and Weibel, 2005).
Two features of PowerPoint demonstrations are most salient for STS. First, like much of the recent work in STS, we are studying a technology in its early moments of adoption during which there are important questions about when and, if so, how it becomes stabilized (Bijker, 1995; Bijker, Hughes, and Pinch, 1990). That is, we suggest that the "interpretive flexibility" (Pinch and Trocco, 2002) of the medium is considerably greater than that seen in the barage of bullet points. By deliberately studying non-standard uses of PowerPoint technology (the seven finalist teams in the WTC architectural study, like those who assisted Colin Powell, certainly did not use Microsoft's AutoContent Wizard)

[6] This aspect of our methodology draws on Rosental's (2003) exemplary book on "demos" in the field of fuzzy logic.

we study cases in which users are exploring other affordances with significant potential for the work of persuasion, representation, and mis-representation.[7]

Second, from the standpoint of the history of science (Gooding et al, 1989; Licoppe, 1996; Shapin and Schaffer, 1985), PowerPoint is an interesting form because it is a "live" demonstration that, despite the presence of eye-witnesses, is typically not an *experiment* performed in front of an audience. In a simple sense, PowerPoint images are projected onto a screen. More complexly, however, the demonstrator is re-presenting materials to "project" the audience backward or forward in time or to transport them from the meeting room into the "laboratory." That is, whereas as the standard template urges "Click to add title," other affordances make it possible to click to add text, images, animations, databases, sound. In this way, as we shall see, a PowerPoint presentation "re-presents" materials gathered or produced elsewhere to achieve highly orchestrated effects. Although we do not find it in our cases here, in its most innovative form, when a PowerPoint presentation uses embedded hyperlinks, data (in many different modalities) can be directly imported into the presentation, thus, reshaping the demonstration in the direction of potentially real-time experiments.

CLICK TO ADD TITLE

Not surprisingly for a technology that has risen so quickly to such prominence, the literature on PowerPoint is divided into two camps – backers and detractors. Whereas the first is dedicated to promoting the tool and explaining how to make a good case, the second could be succinctly summarized as "don't use PowerPoint." This latter shows how a rich rhetoric could be flattened and oversimplified by presenting it in standard PowerPoint format (Norvig, 1999; Stewart, 2001). In a short but forceful essay, "The Cognitive Style of PowerPoint: Pitching Out Corrupts Within," revised from a earlier essay in 2003, Edward Tufte (2006) argues that PowerPoint slideware weakens the analytical quality of presentations, deteriorates verbal and spatial reasoning, and corrupts statistical analysis.

Tufte's criticism concerns the format of enunciation that yields a constricted vision of thought, and the major culprit in his tale of woe is the AutoContent Wizard. As a set of normative guidelines, these ready-made templates are prescriptive. But because they format the very process of writing, we might also think of them as *pre-scriptive*. The AutoContent Wizard assists you to make a case, but it also makes it own case – about how much information to organize and how to organize it. It helps you to edit, but it also edits you. The simplest slide tenaciously pre-formats the point, be it with a heading followed by bullet points or with a certain number of frames that can be filled up. It guides you to make the point, but because it focuses only on the outcomes it makes it more difficult to convey the process of reasoning. In this way, the author is co-authored, shepherded toward a certain, quite minimalist, frame of mind.

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[7] On persuasion in the field of science, see especially Law and Wiliams (1982).

Tufte does not employ the term, pre-scriptive, but the concept is implicit in his argument. By making the concept explicit, we see how the scripted format operates to *pre-form the performance*. As such, the analysis resonates with new work in STS on the performative character of new technologies (see Callon, 1998; and especially MacKenzie and Millo, 2003 on performativity in the field of finance).

As the reader's own experience likely confirms, Tufte's critique of the typical PowerPoint presentation is on target. But Tufte's critique has some serious limitations, and it should not be taken as the final word on this new technology. Most significantly, Tufte ignores the fact that a PowerPoint demonstration is a performance. For Tufte, a PowerPoint presentation functions above all as a *report.* Throughout the essay, he denounces PowerPoint presentations because they fail by comparison with printed reports. His table on "Median Number of Entries in Data Matrices for Statistical Graphics in Various Publications," for example, finds a selection of PowerPoint presentations wanting when compared with entries in *Science, Nature, the New York Times, the New England Journal of Medicine*, and so on (Tufte, 2006: 159). A Harvard School of Public Health primer that advises users of PowerPoint to use simple tables is denounced by comparison to a public health publication in 1662 showing a Table of Casualties with 1,885 different data cells which Tufte claims allows 1,719,585 pair wise comparisons (p. 178). And his table, "Character Counts and Density per Page-Image" contrasts 250 characters per page in a selection of 189 PowerPoint presentations with 13,600 characters per page in the *Physicians' Desk Reference* (p. 180).

Tufte's criticisms are valid where the printed PowerPoint *document* is submitted as a report. Yet the thrust of his essay is not about this specific limitation (in any case, much more astutely analyzed by Yates and Orlikowski, 2006), but rather about PowerPoint presentations in general. As a *presentation*, PowerPoint is inferior to printed reports:

> [N]early all PowerPoint slides that accompany talks have much *lower* rates of information transmission than the talk itself… As shown in this table, *the PowerPoint slide typically shows 40 words, which is about 8 seconds of silent reading material.* The example slides in PP textbooks are particularly disturbing: in 29 books, which should use first-rate examples, the median number of words per slide is 15, worthy of billboards, about 3 or 4 seconds of silent reading material (Tufte 2006:169, emphasis in the original).

The problem, most concisely, is that Tufte uses criteria more appropriate for evaluating a train schedule than for examining PowerPoint as a tool for persuasion. Whereas we agree with Tufte in the need for a careful reading of PowerPoint, we disagree with his assumption that the attendee at a PowerPoint demonstration is literally a *reader*, disappointed with only several seconds of "silent reading material." Because we see PowerPoint not as a report (see Wakeford, 2006; Doumont 2005) but as a means of demonstration, we are less preoccupied with rates of "information transmission" than with the economy of persuasion.

Tufte's analysis thus seems to us a poor starting point for understanding our two cases. In the first and most simple place, neither Powell nor any of the architects used the conventional bullet point formatting. With an average of 20.4 words per slide for the architects[8] and an average of 12.3 words per slide in the Powell PowerPoint, our cases would obviously fail Tufte's test of information transmission. More importantly, although one could certainly make a case about problems of logic and use of evidence in Powell's presentation, we would fail entirely to understand that important moment by denouncing it as an impoverished persuasive style.[9] What is striking to us about both Powell and the architects is how they discover rhetorical power in the digital format.

It is perhaps ironic that Tufte, who has written several eloquent books on the visual display of information, entirely ignores visual images in his analysis of PowerPoint. Although they have not addressed the PowerPoint format, other scholars of digital technologies, especially those working in the new field of "visual literacy," are aware that the social practices of writing and reading are undergoing fundamental transformations in our era. In the search for new concepts, it is not surprising that many turn to the classical period (Welch, 1999; LaGrandeur, 2003; Baetens, 2003).[10] Whereas that earlier transformation involved the movement from oralism to literacy (Ong, 1982), ours involves a transformation from printed words to screened images. Or, more accurately, it

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[8] In fact, four of the architectural teams averaged fewer than 6 words per slide. United Architects: 5.5 words per slide, Daniel Liebeskind: 5.4 words, Peter Eisenman and Richard Meier: 2.1 words, and Norman Foster: a mere 1.4 words per slide. Among the architects, the Peterson/Littenburg team was the outlier with 56.9 words per slide.

[9] Powell's demonstration was largely rejected by his colleagues at the Security Council and by world opinion. But it had an extraordinary effect on its intended audience at home. Liberal Democratic Senators, including Tom Daschle, Dianne Feinstein, Joseph Biden, and John Kerry, lined up to endorse it, a *Washington Post* editorial called the evidence "irrefutable," a *New York Times* editorial hailed it as "the most powerful case to date," and opinion polls in the week after the address registered a massive shift in favor of the view that the United States had proved its case against Iraq, especially marked among those who had watched, listened to, or heard about Powell's presentation (DeYoung, 2006:470-1).

[10] Gorgias, contemporary of Plato, was among the first to analyze the role of images in rhetoric. The observations in his famous "Economium on Helen" apply uncannily to Powell's presentation on "Weapons of Mass Destruction": "Through sight the soul receives an impression even in its inner features… It has happened that people, after having seen frightening sights, have also lost presence of mind for the present moment; in this way fear extinguishes and excludes thought…. To understand that persuasion, when added to speech, is wont also to impress the soul as it wishes, one must study logically necessary debates *in which a single speech, written with art but not spoken with truth, bends a great crowd and persuades*." (Gorgias, 1972, emphasis added).

involves the technologies of new media in which the reader is simultaneously presented with words and images (Baetens, 2003; Wiley, 2003).

Instead of starting with Tufte, who regards PowerPoint as a counterpart to the memo or a report that presents statistical tables, we would do better to understand PowerPoint by reference to the analysis of comic books. We think especially, for example, of Chris Ware's experimentation to develop a visual grammar in the graphic novel in which the reader can take in an entire image on a single page and then, through combinations of words and images in the segmented panels, experience distinctive rhythms in the passage of time (see especially Raeborn, 2004). The team that assisted Colin Powell as well as those that assisted the seven architects clearly understood that they were not simply presenting a report but were narrating a story. And, like good storytellers, their screened compositions used pacing and rhythm with systematic effect.

THE COGNITIVE STYLE OF POWERPOINT REVISITED

For Tufte, the rhetorical style of PowerPoint has already been standardized. That may or may not be true in the business context; but in any case, our study cannot adjudicate this question. What we can do is raise the possibility that in the public sphere the genre is still unfolding. In this sense the period we are in would resemble the years immediately following the invention of the printing press. Scholarship on that earlier invention has argued persuasively that reshaping the graphic landscape contributed to reorganize the landscape of readers' minds (Eisenstein, 1979). But the graphic landscape of print that we take for granted today took many decades to develop (Hesse, 1996; Nunberg, 1996; O'Donnell, 1998). Fixity was not given by print itself but was something that was shaped and then again reshaped by many contingent actors.[11] Following the dramatic invention of the printing press were many innovations, large and small, in pagination, typefaces, punctuation, footnoting, and so on. In the PowerPoint landscape, the heading and the bullet point are two quickly established conventions. But the genre styles of PowerPoint are likely to be still evolving. By coding the elements of the PowerPoint demonstrations in our cases and analyzing how they were being creatively recombined, we found innovations in the economy of digital demonstration. Not as an exhaustive catalog, we present several of these elementary forms which, no less than the bullet point, should be considered in a more comprehensive analysis of the cognitive style of PowerPoint.

For each of our two cases, we aim to show how the demonstrators used affordances toward their persuasive aims. Recall the objectives of the demonstrators in our cases: the architects striving to make a case that their project would heal a wounded city, Colin Powell attempting to persuade American public opinion about an imminent danger. In

[11] See especially Johns (1998); his debate with Eisenstein in Johns (2002); and a useful discussion of the debate by Boczkowski and Lievrouw (forthcoming).

each case, the demonstrators adopted elementary features of PowerPoint to construct a visual narrative.

Blinking effect: the frame and the pace

All the architects' presentations were stories of remembrance, reconciliation, and renaissance; all were dedicated to making a resurrected global city. Their task of representing rebirth was facilitated by one of the most powerful affordances of PowerPoint technology. Thanks to the *exact over-impression* of slides and the skill with which they paced it, architects could produce the feeling that, from a monumentally tragic occurrence, a life-affirming opportunity could emerge. By "exact over-impression" we refer to the fact that the dimensions of a PowerPoint slide remain fixed from one slide to the next. Parts of an image can be added, subtracted, or substituted. In a sense, each slide is like a single frame in a film. Through such "blinking," the medium provides (affords) a simple animation that can be used for specific effects.[12]

Norman Foster, for example, used this simple animation function to produce the effect of filling the void. Starting from an aerial view of Manhattan, the point of view comes closer and closer to let the void appear. In the next series of slides, we go from the messy disaster to a more and more re-organized representation of the site with the reappearance of the WTC footprints, which were buried under the dust, and then later with the site plan showing the placement of Foster's buildings. This "fill in" effect not only gives the impression of something rather than nothing, but it also gives the impression of order rather than disorder-disaster. The over-impression effect allows keeping track of the previous slides and gives the "impression" of adding order to the chaos. This narrative organization produces the desired experience of restoration.

The United Architects team as well as the team from Skidmore Owings & Merrill (SOM) used the same technical function for a different rhetorical purpose to give the sensation of a bustling, crowded place, adding new buildings from slide to slide while keeping point of view fixed. This narrative effect would be impossible with flip charts and would still be difficult with the 35mm slide projector (where the "blinking" is all-too-noticeable), but PowerPoint makes it technically straightforward, thanks to a unitary frame and a pace regulated by the narrator who controls the gaze of his/her eyewitnesses. Some studies have shown that cognitively, it was a revolution to go from a horizontal reading to a vertical reading (Chartier, 1993; Goody, 1979). Here, PowerPoint demonstrations bring us a new cognitive configuration where the information is framed in such a way that the eyes don't have to move while the narrative fills the space. Moreover, the narrator

[12] For examples of these and other uses of the PowerPoint medium by the architects and Powell see a PowerPoint presentation accompanying this article available at www.tcs.xxx.xxx.uk. The PowerPoint includes numerous images, animations by the architects, and examples of imported audio files in Powell's U.N. presentation. In it we exploit frame, pace, rupture, rhythm, voiceover, and composition in a kind of demo about demonstration.

controls the pace of this filmic, we might say, musical composition. Technical function meets rhetorical purpose with persuasive effect. This simple but powerful visual tool combined with the demonstrations' varied rhythm was a shared graphic language among the architects.

Sequential effect: rupture and continuity

It is one thing to show two different images, one of devastated ground zero, one of the final buildings. It is another to show the *process* of going from the dust to the astounding skyline where a new WTC is standing, right in the middle of an astonished public. PowerPoint doesn't simply show the re-generation, it is a "live" celebration of the renewal. Rather than going directly from the initial to the last stage, the power of a PowerPoint demonstration is situated in the possibility to present the various steps, that is, to install a rhetoric of *continuity*. As we shall see, an added value in this movement is that by demonstrating the process by which the building comes to be (in some cases, by demonstrating engineering features of its construction), the architect conveys in terms accessible to the lay public a sense of how these large towers can stand up. Visual progression lets the various elements be integrated in a cognitive landscape as well as in a physical landscape.

This visual progression, it should be emphasized, is not produced through a simple rhetoric of continuity, but rather through an efficient and effective use of *rupture*. In coding the architects' demonstrations, we see them moving abruptly from one kind of image to another – from site plan, to digital rendering, to technical drawing – scaling up and down, here moving forward in time to present a glimpse of the final product and then moving backward in time, within an overall logic that tends toward completion. By doing so, the demonstrator allows the spectator both to understand the concrete detailed arrangements of the abstract future project and to give her a good sense of how it could stand up and fit in the landscape.

The rhetorical effect is that, while the demonstration is *composed*, the experience of the spectator is that it has not been *imposed*. The challenge facing the architects is difficult, easier to state than to carry out: Recall that their goal is to demonstrate that their designs can make a wounded city whole. The resulting buildings must appear impressive, but they cannot be experienced as imposing. And, thus, neither should the demonstration be experienced in an imposing way. To be successful, the architect must demonstrate that his building is impressive, indeed iconic; but at the same time, given the specific program (New York City after 9/11 in which the "client" is to some extent "the public") it must also be in some sense familiar, indeed, intimate. In short, how to achieve the grandiose *and* the intimate? How to achieve a sense of familiarity with a work that literally no one has ever seen before? And how to do all that in a twenty minute demonstration?

The star architects at the Winter Garden were not above using gimmicks to produce a sense of intimacy: all but one of the teams showed at least one slide in which a child could be seen together with an image of their building (and some used such a device with considerable frequency). But this kind of cheap rhetoric was trivial in proportion to a

much more profound rhetorical move: the spectator gains a deeper feeling of intimacy and familiarity when he/she understands the design. The emotional states of familiarity and intimacy *can be* produced directly; but they are experienced more fully if they are produced indirectly, that is, cognitively.

To achieve this effect – by which the spectator recognizes their buildings – the architects show their design in varied states, drawing, with subtlety, connections between the precision of particular detail and the global sense of the project. An ongoing variation in the building's state of being (not literally through the stages of its construction but figuratively – here as technical drawing, there as digital rendering, photograph of scale model, animation of its engineering features, watercolor of its location, and finally, for each and every, its postcard representation on the Manhattan skyline) allows the audience to go down into details, refining its knowledge about the building, and then jump up to the iconic and striking final building.

Steadily, we move cognitively towards a finalized version of the building in cumulating knowledge's effects thanks to a series of non-sequential presentational states of the building. As it goes through this variation of states, of points of views, of material supports, of rhythms, the building emerges as something understandable, more real and visible in the cognitive and physical landscape.[13] The building is not shown in its construction; instead, the viewer is shown heterogeneous images – the better for the viewer to construct it, to build it up cognitively.

The changing scale was a crucial element of the demonstration. The rhythmic feelings of going from one stage to another helped the spectator to make sense of the building process. The successive move, however, did not follow a linear process that went from a small model to a more and more informed and detailed model. The ruptured jumps from an overarching view to a ground floor and vice versa, from a tiny detailed model to a full scale representation helps the spectator to gradually absorb cognitively the idea of the building, going from a realistic vision to a rhetoric of feasibility. From a very human life scale, to a historical dimension, it was just a matter of one slide. Architects played with these two opposite registers at a low cost. They were scaling up and down, going from the ground floor where life has taken is rights back, to the monumental dimension of the event, where the iconic image of the new WTC fitted in the landscape, as if it had been always there. This was the climatic conclusion of each of the PowerPoint presentations: demonstrating that it fit into the skyline and that it was *already* an icon, a postcard.

[13] This demonstration process thus mirrors the broader process of experimentation in the design phase. See Yaneva (2005) on the notion of "practical cognitive power" whereby architects use models not simply or even primarily as demonstrations to the client but in the actual design process. Models are a form of knowledge – not only a means of representing what one knows but also a technology for learning and producing knowledge.

Image 1. THINK Team. Shigeru Bon, Frederic Schwartz,
Ken Smith, and Rafael Vinoly. Digital rendering. Credit: Rafael Vinoly Architects.

Image 2. Peter Eisenman, Charles Gwathmey, Steven Holl, and Richard Meier, Digital rendering.

By seeing the building from different aspects (not, of course, simply from different angles or perspectives) the spectator builds up a set of different (kinds of) images. Paradoxical only on first inspection, rupture – movement from one type of representation to another – produces the sense of familiarity. We are guided to recognize various features across different modalities. Together with the architect, the spectator composes a building out of heterogeneous representation, and with each moment of recognition the building becomes more familiar.

Some of the architects mixed such rupture with another means to create familiarity and intimacy by using 3-dimensional animation to penetrate the displayed artifact. The "place of refuge," the sanctuary for private remembrance and reflection they wanted to build, could be experienced from within. The 3-dimensional tool allowed the spectator to infiltrate the building at a pace controlled by the demonstrator, go through doors, transport his body into the building, "climb" the stairs up to the last floor, look around to see how the view from the top of the building. In the case of the Rafael Vinoly's Think team, this possibility of experiencing the space from inside, took the form of a seamless three-minute animation (as if one "camera shot" sustained without rupture). As opposed to a textual argumentation in which the reader can skip over some parts, a PowerPoint demonstration compels spectators to follow the demonstrator. In the 3D animations in particular, as with the fixed-order character of the PowerPoint slides in general, step by step we follow the commentator up to the top floor as step by step we follow the argumentation.

Composition: multi-media in one medium

These effects work in relation to each other as the new technology makes it possible to bring remote facts with different textures together in front of the eye-witnesses. Whereas the demonstrations of the architects transported the spectator to some future state of the world, the demonstration of Colin Powell employed technical means to achieve the rhetorical effect of transporting the spectator to a distant place back in time. Like the architects, Powell exploited the compositional capacity of PowerPoint by integrating video, satellite imagery, and even audio conversations in his demonstration. The facility of combining in the same text images, streaming videos and audio to *compose* a case may be the most powerful aspect of the PowerPoint rhetoric. This investigation leads us to consider an important dimension of the virtual economy of persuasion, that of the location of facts and the place of witnesses as well as the site of demonstration.

Colin Powell's presentation of evidence of Iraqi deception to the United Nations bring us back to the time when Adlai Stevenson, presented evidence to the UN Security Council during the Cuban missile crisis. The setting and the situation are similar. On October 25, 1962 after sparring with his Soviet counterpart, Adlai Stevenson turned to his demonstration:

> I doubt if anyone in this room, except possibly the representative of the Soviet Union, has any doubt *about the facts*. But in view of his statements

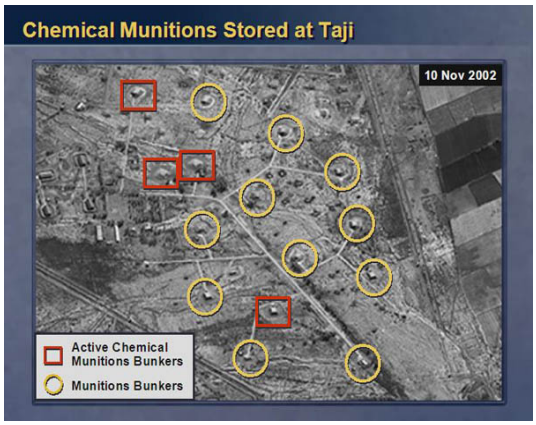
> and the statements of the Soviet Government up until last Thursday, when Mr. Gromyko denied the existence or any intention of installing such weapons in Cuba, I am going to make a portion of the evidence available right now. *If you will indulge me for a moment, we will set up an easel here in the back of the room where I hope it will be visible to everyone* (Stevenson, 1962, emphasis added).

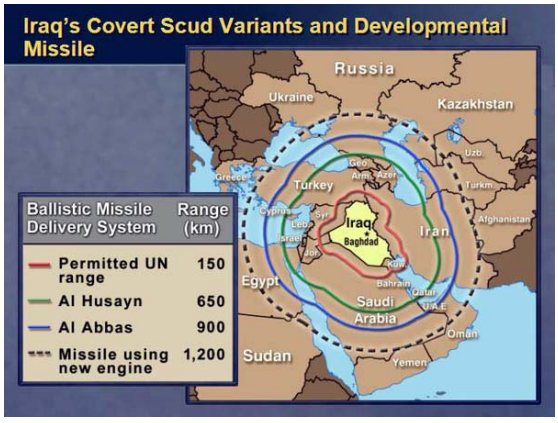
With the assistance of an aide who turned the flip charts, Stevenson then presented a series of photographs taken from a U2 spy plane as well as a set of maps which he interpreted as demonstrating the existence of Soviet missiles on Cuban territory.

On February 5, 2003, after some opening remarks, Colin Powell introduced his demonstration in terms similar to Stevenson: *"What you will see is an accumulation of facts…"* Powell then presented, among other materials discussed below, a series of photographs and maps which has striking similarity to those presented by Stevenson. This deliberate parallel to Stevenson's address is one of the key underlying rhetorical strategies of Powell's demonstration.[14]

[14] In her biography of Colin Powell, DeYoung (2006) devotes considerable attention to the conflicts between the White House (and the office of Vice President Cheney in particular) and Powell's staff in the State Department regarding the form and content of Powell's Security Council address. On January 28, only a week before the UN address, Powell was given a forty-eight page, single-spaced, ready-to-deliver speech drafted by the vice-president's office. After attempting to work with that document, CIA director George Tenet and Powell's chief advisor, Lawrence Wilkerson decided on the afternoon of January 29th to scrap the White House document and start from scratch. "Late that night, after the senior CIA and White House officials had left for the day, Wilkerson and his colleagues watched a film he had borrowed from the State Department archives of Adlai Stevenon's historic speech to the Security Council at the height of the Cuban Missile Crisis in 1962… Stevenson had responded with irrefutable proof in the form of twenty-six grainy, poster-sized black-and-white photographs… *That 'Stevenson moment,' Wilkerson told them, was the effect they were after*" (DeYoung, 2006: 462, emphasis added).

Adlai Stevenson, October 25, 1962 **Colin Powell, February 5, 2003**





Images 3-8. Similar aerial photographs and maps from Security Council demonstrations. (See accompanying PowerPoint document for further examples.)

But the parallels should not be overdrawn: Although the situation and the setting are similar, the technological setup has changed in the intervening forty one years. From the point of view of our media savvy era, Stevenson's remarks, asking the indulgence of his audience as they set up the easels which he hopes will be visible to everyone, seem almost charming. Powell, by contrast, makes no meta-references to the technology he is employing for it is already commonplace.[15]

Image 9. UN Security Council, October 25, 1962.

Image 10. UN Security Council, February 5, 2003.

[15] Whereas statecraft once involved aspects of stagecraft, today the "staging" of political events has given way to the "screening" of events before the public (Sheller 2004). Screening can reveal representations; but screens also conceal and filter. On the "staging of facts" in the field of science see Latour (1990).

What Powell does do is to demonstrate, without mentioning it explicitly, is that *his* government has even more powerful surveillance technologies than those available to Stevenson. "*Let me begin by playing a tape for you. What you're about to hear is a conversation that my government monitored.*" (Powell voiceover, slide 3). With these words, Powell introduces his first piece of evidence, an audio recording of an intercepted conversation between two officers in the Iraqi Republican Guard. An avalanche of "facts"[16] then followed – videos, satellite imagery, other photographs, drawings, maps, and another intercepted conversation, this one between a Iraqi fighter pilot and his commander.

> *Here we see* cargo vehicles are again at this transshipment point, and we can see that they are accompanied by a decontamination vehicle associated with biological or chemical weapons activity. (Powell, voiceover PowerPoint presentation, emphasis added)
>
> When they searched the homes of an Iraqi nuclear scientist, they uncovered roughly 2,000 pages of documents. *You see them here* being brought out of the home and placed in UN hands" (Powell, voiceover slide 11). [They were there, and the voice of Powell, over the images, was here to remind us that] "Iraq's goal was to give us in this room, to give those of us on this Council, the false impression that the inspection process was working" (Powell, voiceover, slide 10).

With this visual and audio "evidence" Powell's rhetoric suggested that, whereas Adlai Stevenson's government had spy planes, his government had even more powerful tools that could not only surveille from the skies but could reach into homes and even into the Iraqi command structure. Just as Stevenson could counter the "deception" of his Soviet counterparts, so Powell would unmask the "denial and deception" of his Iraqi counterparts. Stevenson's spy planes had revealed the existence of weapons of mass destruction. With even more powerful tools, Powell's spoke from the facts. If the world believed Stevenson, it should believe Powell.

The difference for the purposes of this study is not that Powell spoke falsely. Nor is it that Powell used "media" whereas Stevenson only used photographs. All demonstrations are mediated. The difference is that Powell could compose from multimedia *in a single medium*. With the PowerPoint "import" function, audio and video files could be loaded into the slides, flowing, seemingly effortlessly at the click of a key, into the composition. Representational materials encoded in diverse types of files could be re-presented in a single medium. The audience was in Security Council or in their homes watching the televised address, but on the screens they could be transported to the Iraqi desert. Import to transport.

[16] Powell uses the word, "facts," nine times in his seventy-five minute address.

CIRCULATION AND COUNTER-DEMONSTRATION

The heterogeneous materials with which Powell and the architects composed their demonstrations had one thing in common: they took the digital form. The digital morphology of the resulting PowerPoint documents then allowed for another aspect of the new geography of persuasion. Where were the PowerPoint demonstrations? As live performances they were undoubtedly in rooms – the Winter Garden and the Security Council. But as we have seen, PowerPoint is a kind of transportation system that could "bring" the home of an Iraqi official into the Security Council or "take" the audience around and inside Rafael Vinoly's World Cultural Center. Where were the PowerPoint demonstrations? On a screen, in a room, yes. But also on many screens, first on the television screens where the demonstrations were broadcast live, and then, moments later, on the computer screens where users could view the downloaded PowerPoint documents. Within minutes after Powell's Security Council address, his PowerPoint demonstration was available on the State Department's website. By the afternoon of the Winter Garden presentations, users could find the architects' PowerPoint slides on the website of the Lower Manhattan Development Corporation. And if they would not think to go there, they could find them on the websites of New York Times Digital, WNYC, CNN, BBC, and dozens of other media outlets. The PowerPoint demonstrations were everywhere.

To examine this final aspect of the morphology of PowerPoint we make a brief excursus to the work of Harry Collins, a leading figure in Science and Technology Studies.[17] In an important essay, "Public Experiments and Displays of Virtuosity : the Core-Set Revisited," Collins (1988) made a critical distinction between "experiments, demonstrations, and displays of virtuosity." Experiments, Collins argued, are about *testing*; demonstrations are about *showing*. The third part of the typology is not immediately transparent from the terminology. By "display of virtuosity" Collins referred to media depictions of demonstrations. The triad moves with ever increasing degrees of staging, and ever increasing degrees of control, from uncertainty to certainty. An experiment must be controlled – in order to isolate the component of uncertainty, for to be an experiment the outcome cannot be known in advance. In a live demonstration, outcomes are known, as for example, when an actor conducts a procedure for which the experimental results are already known. These are staged; but there could still be an element of uncertainty because things can go wrong. In a display of virtuosity, this last aspect of uncertainty is eliminated. The projector might malfunction, but the presenter controls every other aspect of the presentation. Displays of virtuosity are about *lock in.* The fix is in, outcomes are locked up, contending interpretations are locked out.

Within Collins' schema, the PowerPoint performances of Powell and the architects would correspond to *demonstrations*. Something could go wrong; the demonstrator could make a terrible gaffe or otherwise mis-speak. In demonstrations other than in the Security

[17] See Paravel and Stark (forthcoming) for a more elaborated discussion that situates PowerPoint in historical context of the changing topography of experiment, demonstration, and virtuosity.

Council – for example, as you make a PowerPoint presentation in an academic department – the demonstrator might have to deal with persistent interruptions from the audience. Within Collins' schema, the PowerPoint *document*, however, is a display of virtuosity. It seems to circulate outside the live performance in a fixed form.

Collins's essay was written before the advent of new media technology. Film and television broadcast were the forms of virtuosity he had in mind. The question we ask of Collins' schema is what happens when the display of virtuosity takes its most virtual form, posted on websites available to many users. Using Collins' framework, could we say: the more the virtuality, the more the virtuosity? Our cases show something different.

As we mentioned, the PowerPoint demonstrations of the architects of war and the architects of public buildings were posted almost immediately on the websites of various official agencies as well as those of numerous media outlets. Citizens could then examine these demonstrations at times convenient to them. More importantly, because the documents were digital, citizens could also download the PowerPoint documents, cut and paste materials from them, and then post them, alongside their comments, on other websites. The materials from the Winter Garden thus began to circulate in altered form outside the control of the architects, as some citizens, for example, juxtaposed images from several of the architects or highlighted some features for praise or criticism. Within days after Mr. Powell made the case for the invasion of Iraq, a citizen who typed "Colin Powell United Nations" or similar phrases into the Google search engine would find among the ten sites ranked most highest by the Google algorithm not only the official State Department website from which Powell's PowerPoint could be downloaded but also sites in which the images from the demonstration had been entirely reframed (see accompanying PowerPoint demonstration). Some of these counter-experts questioned whether the resolution of satellite imagery warranted the conclusions that trucks were transporting weapons of mass destruction, others noted that none of the intercepted conversations were played in their entirety, and others countered the CIA's estimates with contrary interpretations from French and British Intelligence.[18]

Broadcast over television, the demonstrations might have conformed to Collins' "displays of virtuosity." But as they now re-circulated in *counter-demonstrations* on the web, they had slipped out of the control of the initial demonstrator. At the hands of "citizen-participants" (Barry, 2001; Callon et al, 2001), from displays of virtuosity, they had become displays of volatility, with new elements of uncertainty and skepticism where the facts had once been black boxed.

[18] A citizen on yet another website cut and pasted the aerial photographs alongside critical comments expressing puzzlement that the images in Powell's PowerPoint demonstrations were in black and white, noting that satellite cameras transmit images in color. Our analysis suggests an explanation: as opposed to color, black and white images would be more likely to evoke the deliberate (but unstated) analogy to the Stevenson demonstration.

CONCLUSION: THE DISTINCTIVE MORPHOLOGY OF POWERPOINT

We have argued that the auto-formatting features of PowerPoint technology are, in fact, pre-scriptive in the sense that they preform the performance. But the same technology also allows these features to be turned off, providing the discovery of new affordances different from the AutoContent Wizard and the hierarchically-ordered bullet points of the standard format. In analyzing two symmetrical cases involving eight (seven plus one) PowerPoint presentations before the public, we demonstrated that the new technology could be a persuasive medium when it more fully exploited the given potential to manipulate text, sound, and image. To begin the process of studying the elementary grammar of a cognitive style of PowerPoint that departs from the text centered bullet points, we identified several basic elements of a visual rhetoric – used well, though not always for good, in the demonstrations we analyzed. Far from an exhaustive catalog of that grammar, our analysis is meant to be suggestive, in hopes of stimulating further research on the potential of this new medium for persuasion, representation, and mis-representation.

Our analysis further demonstrates the distinctive morphology of PowerPoint. Its digital character provides affordances 1) that allow heterogeneous materials to be seamlessly re-presented in a single format that 2) can morph easily from live demonstration to circulating digital documents that 3) can be utilized in counter-demonstrations. The persuasive power of digital demonstrations suggests that they are likely to become a pervasive feature of public life. Will these new forms of demonstration be corrosive of democracy? Or will they provide new tools for citizen-participants to redefine expertise in new forms of distributed intelligence? This is the generalized experiment that is one of the challenges of democracy in the age of digital demonstration.

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