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The Science of Making Your PowerPoint Memorable: Q&A with Nelson Cowan

By Cliff Atkinson

*How can you make your PowerPoint presentation more memorable? Align it with the way the mind forms memories, according to **Nelson Cowan**, Ph.D., who works in the working-memory laboratory of the Department of Psychological Sciences at the University of Missouri. An expert in the field of short-term memory, Nelson is a fellow of the American Psychological Association, associate editor of the Quarterly Journal of Experimental Psychology, and author of **Attention and Memory: An Integrated Framework**. Although Nelson's research deals with basic aspects of human information processing rather than with bulleted lists in PowerPoint, he suggests relevant points that should be considered in any presentation.*

Cliff Atkinson: *Nelson, how does your research in memory and attention relate to PowerPoint?*

Nelson Cowan: It is not a question I have asked before. However, all active cognitive tasks can be performed only to a level that is affected by two basic human limits: the ability to pay attention fully to only one complex stream of information at a time, and the ability to keep in mind only a small number of separate items or concepts at once.

CA: *What is the relationship between short-term and long-term memory?*

NC: Short-term memory refers to the small amount of information that is kept in mind at one time or is in a temporarily accessible state in memory, whereas long-term memory refers to the vast amount of information retained during one's lifetime. Short-term memory is sometimes referred to as *working memory* because it is necessary to use that memory to comprehend language, solve problems, and so on. It is related to long-term memory in several fundamental ways.

Multiple data or ideas present in short-term memory at the same time, or at least in a part of short-term memory termed the *focus of attention*, get linked together or integrated to form a new concept, or a new memory of the episode in one's life. This new information is rapidly added to long-term memory. In turn, long-term memory information influences how much can be saved in short-term memory. For example, it would be difficult to remember the 9-letter sequence "IMBIFBICA," but much easier to remember the 9-letter sequence "IBMFBI CIA," once your long-term memory provides the information that the letters form three known acronyms (IBM, FBI, CIA).

CA: *How can someone configure information on a single PowerPoint slide in a way that aligns with the short-term memory capacity of the mind?*

NC: My answer involves some speculation. We do know that it is possible for viewers to retain about 7 ideas if each one has a short catch word that refers to the idea in a straightforward way. Then, the ideas can be rehearsed mentally. However, that involves a lot of work on the part of the viewers. A slide with no more than 3 or 4 points would be easier to grasp without such effort and it may be advisable to limit slides in that way. I know of no applied work on PowerPoint that directly tests this suggestion, though. Also important is the perhaps obvious suggestion that the points on the slide should follow from one another in a logical manner. Of course, this is not to say that the whole presentation should consist of bulleted points. There are other interesting formats.

CA: *How can someone configure information over the course of a series of PowerPoint slides in a way that aligns with the long-term memory capacity of the mind?*

NC: The important thing is to have a clear organization and to explain the organization to the viewers. Then, at various points in the presentation, the viewers should be reminded about the organization and should be told explicitly where the presentation is currently, within that organization.

CA: *Some PowerPoint users justify the use of 5-7 lines of bullet points on George Miller's 1956 **article**, The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information. What is the correct understanding that PowerPoint users should take away from Miller, and from your own **article**, The Magical Number Four in Short-Term Memory: A Reconsideration of Mental Storage Capacity?*

NC: It is true that people (young adults, at least) typically can recall lists of about 7 items and not much more. However, Miller referred to the magical number 7 primarily as a rhetorical device to tie together different topics that he wanted to discuss, as he made clear in a later autobiographical essay. Miller's more important point was that the units that can be kept in short-term memory are not the units we feed in to the subject, but the units that they form mentally. In the IBMFBICIA example I described, people can recode 9 letters into 3 acronyms and thereafter need only retain 3 independent "chunks" of information. What Miller may not have appreciated fully at the time of his article is that people form chunks very rapidly, and sometimes arbitrarily. That may be why telephone numbers are presented in the form "#### - #### - ####," so that multi-digit chunks can be rapidly memorized. The magical number 7 appears to result from a smaller magical number plus the benefits of covert verbal rehearsal and grouping processes in the mind.

In my 2001 **article** I reviewed many situations in which it is not possible to apply mental rehearsal or grouping, such as situations in which information is presented too quickly or unpredictably, or in which each item is too long to rehearse (such as memory for a list of idiomatic expressions: "a stitch in time saves nine," followed by "my country right or wrong," and so on). In such situations, it appears that people can retain in mind only about 3 or 4 independent ideas on average; though individuals vary from about 2 to about 6. Donald Broadbent made a similar suggestion in 1975, but I expanded upon it by pulling together a much wider arsenal of recent literature.

CA: *What is the limit of the memory's capacity when presented with a bulleted list?*

NC: That depends on how easily the bullets can be integrated together. To the extent that they must remain separate points, it probably is best to limit the list to 3 or 4 bullets.

CA: *How does the addition of narration of the bulleted list impact memory? The addition of visuals?*

NC: The focus of one's attention probably must shift back and forth. At one moment it is grasping the outline of the slide but, at another moment, it must shift to appreciate the visuals or narration. All of that is for the good, but only if the narration and visuals are relevant and the viewers are given enough time and guidance to integrate them back to the main points of the slide and its organization.

CA: *How can someone apply information "chunking" in PowerPoint, and how do rhetorical structures such as story structure help someone retain information in long-term memory?*

NC: These structures are quite helpful in forming new long-term memories and making use of old ones. Perhaps the most fundamental guideline is that the presenter should make sure to consider what the presentation will be like from the point of view of the audience members, who do not know in advance what the speaker intends to say or what the organization is going to be. The better the presenter understands the audience and its point (or points) of view, and the better the attempt to adapt to this point of view and speak to it, the better the presentation will be. The first draft of one's talk is often useful primarily as a reminder to oneself but one must go well beyond that to see the audience's point of view. When one already knows something, it is not always easy to keep in mind that other people do not yet know it.

CA: *If I am going to present a PowerPoint presentation at a conference where all of the other speakers will also be using PowerPoint, what can I do to increase the likelihood that the audience will remember what I had to say for a long time afterward?*

NC: This is off-topic a bit, but I believe that if one speaks directly to the audience members in a somewhat spontaneous, interactive way, allowing audience responses and comments to influence how the presentation proceeds to a moderate extent, this helps keep the audience awake. Novice speakers are sometimes hesitant to do this because they are afraid of losing the way. However, if the speaker has practiced enough, it is easy to use the PowerPoint presentation to provide enough self-reminders to keep on track, while still allowing interaction with the audience.

Cliff Atkinson is an independent management consultant who helps organizations solve problems related to PowerPoint. Visit his website at www.sociablemedia.com, read more articles and interviews [here](#), or email him [here](#).