Task 10:

Discuss your Results

Deliverables for this Task | A full working version of your Discussion section.

Overview

By this time, you have your own results in the form of a set of ANOVA tables, tables of descriptive statistics, graphs, tables, and a Results section that describes them.

This Task focuses on *discussing* your results. The Results section simply *described* your results. In research reports, there is no "Conclusion" section, but a section where you discuss the results of statistical analysis of your data. In part, that's because you're not supposed to come to a final proof or conclusion: you're just offering additional data to stimulate on-going discussion, not to finish it.

Some of your results were statistically significant and others were not. Was there a pattern? Were these results similar to what other researchers found? What do you think happened that led to these results? These are some of the questions that you will consider in your discussion section.

This Task Package tells you how to write up the Discussion section.

1. Parts of a Discussion section

Think of the Discussion section as having three parts:

- a recapitulation or review of the problem and methods

- the discussion of the results

- the closing -- a little part on directions for further study

Mitchell, Jolley & O'Shea (2007, p. 77) observe that if your Discussion section makes up less than 25% of your whole paper, then you probably haven't put enough thought into writing it. The Discussion section is in many senses the most important part of the a research paper: it's your last chance to convince the reader that you found some interesting and important results, or at least learned some valuable lessons.

The easiest way to organize the the Discussion is to mirror the organization of the Results section: use the same sections and discuss the results that you got in each section. See the sample outline below.

Here's a sample outline for a Discussion section. It's the same outline as for the Results section, to make it easier for the reader to find specific information and to follow what you're talking about. (Imagine that each dash represents a paragraph. You can use subtitles like the ones in italics (but use *your* factor names!). The information in angle brackets is to indicate what you should be talking about in each part.)

```
<Recapitulation>
        - <Summary of your Research Problem (1 sentence)>
        - <Summary of Lit Review (2 sentences)>
        - <Summary of Methods (1 sentence)>
Factor 1
        -
        -
        -
        -
Factor 2
        -
        -
        -
        -
Interactions of Factor 1 and Factor 2
        -
        -
<Closing>
        <What's still not known?>
        -
        <How can we get more and better information about this problem?>
```

The following rest of this Task Package provides more information on each of these parts of a Discussion section.

2. Recapitulate

Because a lot of people look at the Discussion section first when they're scanning reports, it's often a good idea that the first paragraph of the discussion be a recapitulation (or "recap") of what you've done in the study: you posed a question for certain reasons, chose a method, and collected data. Your first paragraph should restate quickly what you've been doing and why. In fact, the first paragraph of the Discussion will be very much like an abstract or summary of the whole study. A simple way to approach it is to build this paragraph from three sentences:

- A one-sentence summary of your research question;

- A two-sentence summary of your Lit review; and

- A one-sentence summary of your Methods;

Two examples of how authors recapitulate what they are studying follow. Note that they only provide enough information to remind the reader what the problem was and what methodological approach they took.

Examples

Example 1

<div align="center">Discussion</div>

This study investigated the effects of agreement with an opinion on the comprehension of that opinion and the effects of the Need for Cognition on reading comprehension. The effects of the Need for Cognition on comprehension have been well documented with advertising texts (Cacioppo et al, 1983; Cacioppo et al, 1986; Haugtvedt & Petty, 1992). The present study built on this consensus by focusing on the recall of two different political texts. Research on the effects of agreement, however, has been mixed. While the theory of cognitive dissonance has been accepted overall, selective exposure as characterized by the theory has been disputed. The goal of this study was to measure the effects of selective exposure in the context of two different salient political texts and to extend this idea by examining the effect of strong opinions versus weak opinions.

Example 2

<div align="center">General Discussion</div>

Ideally, design of interfaces should be informed by general principles derived from cognitive psychology. This top-down approach cannot be sufficient for interface design; bottom-up adaptations to particular tasks are also needed. Here, we applied cognitive design principles derived from cognition of events and from effects of media to the design of interfaces for assembly of two objects, a musical instrument and a toy.

Example 3

In this study, we have conducted laboratory evaluations of display formats, embedded controls/parameters, and navigation aid in the design of a CBP system. Two simulation systems, SimCBP and SimPlant, are developed to be the research platform of this study. These two systems follow a client/server scheme and are network-connected. In addition, both systems are configurable so that factors of interest can be manipulated.

3. Discuss each factor and interaction

The outline above includes separate sections for each of your factors and their interactions. You already described your results in the previous section; so, you **don't** want to repeat them again in the Discussion section. What, then, should you say about them in your Discussion?

First, you have to make an important personal decision:

> Do you believe more in the results that you got or in the intuition that you started off with?

Option 1: You believe in your results. If you believe your results are reasonable, then you will link them to other results that you cited in your Lit Review, as described in the section below called *Link the Discussion with the Lit Review*. For each factor or interaction, compare your results to published results.

Experienced researchers say that the Discussion section is where you try to "tell the readers a story": *what's going on* to produce the results that you found? In particular, what exactly happened in your sub-process that produced the results that you found? This is just another way of saying that you want to try to "make sense" of the results or explain how they are related.

Option 2: You believe in your intuition. If you believe more in your intuition, then you want to explain **why** your results were not as expected. In this case, you'll focus on a methodological analysis of your study by comparing it in detail with other, similar studies to discover what should be changed or avoided to get more reliable information about your problem. Think through *each* of the sub-sections of your Methods: participants, materials, tasks, procedure, instructions, coding, and analysis. When you've identified the parts that you think led to your unexpected results, then compare them in detail with other studies to describe how future research needs to be carried out.

Notice that it's just as likely that a published study had methodological problems as yours did. Reviewers and editors end up missing many, many details in published papers.

One example of this methodological analysis is when you observe that most of the participants performed extremely well or extremely poorly on your task. If your task was too easy and your participants performed so well that there were few differences between them, then you got a *ceiling effect* – their scores were mostly at the top of an imaginary graph.

If your task was too hard and your participants performed so poorly that there were few differences between them, then you got a *floor effect* – their scores were mostly at the bottom of an imaginary graph.

Link the Discussion with the Lit Review

Think for a minute about your Lit Review. You stated the problem and provided reasons why your problem is important to study, including things that we might learn by doing this research and the ways in which this knowledge can be useful. You made a sort of promise: *"if you support the effort to research this problem, then I'll give you more knowledge about it in return."* The Discussion section, then, is payback time: you should go back to those things that we *might* learn to say what *in fact* was learned. In

this sense, the Discussion section should revisit the topics of the Lit Review and say what you can add to what we knew before.

In the Lit Review, you tried to convince the readers that your problem is important to study and important enough for them to keep reading ("it's interesting" is no good!). There are at least four ways that a good research problem can be "interesting".

- A clear answer to the problem can help people solve some *practical problem*. Can we improve something or solve some pressing problem with the results of this kind of study? How many people will benefit if we have better information about this problem? The answers you found to questions like these are what I call the *practical consequences* of your research project.

- A clear answer to the problem can help people understand better *how the process works*. Will we have answers that we didn't have before? The answers you found to questions like these are what I call the *theoretical consequences* of your research project.

- Researching the problem will produce *useful, new data*. Will it be easier for other people to study this problem with your results (for example, new data)? The answers you found to questions like these are what I call the *empirical consequences* of your research project.

- Researching the problem will produce *useful, new information about the methods and techniques used*. Will we find out more about a particular research method? The answers you found to questions like these are what I call the *methodological consequences* of your research project.

Remember that different readers will think that one kind of justification is more important than another. Experimenters, for example, value highly the empirical and methodological justification of a research study. Theorists, on the other hand, pay more attention to the theoretical justification. Engineers, politicians, business people, and other non-researchers clearly pay much more attention to the practical justification of a research study.

For each of your factors and interactions, think about these different ways of discussing your research in terms of the consequences of your findings. For example, your found factor X had (or did not have) a significant effect when the dependent variable was Y. How does this fact help us to understand:

- how the process works (theoretical consequences)? Explain how your piece of the process is affected by factor X and how that compares to what other researchers have found. Will your results help us decide between two different explanations?

- what practical problems we can solve with this new information (practical consequences)? Explain how we can change our procedures to take advantage of this knowledge. Compare these suggestions to what other researchers have found.

- what new data is now available (empirical consequences)? Explain how your new data might have helped other researchers.

- how to improve our methods for studying this and related problems (methodological consequences)? Explain what new information you've discovered about the methods that you used.

Examples

The examples below illustrate some of the ways in which researchers discuss their results. Notice that the author focussing on what the results mean – in theoretical or practical terms. Note that they did NOT repeat the information from the results section, except to explain why.

Sample discussion of a factor

Although the effects of Personality Type on reading comprehension were not statistically significant in this study, the numbers suggest otherwise (see Table 1). Introverts tended to outperform extroverts when the reading comprehension task was given in silence. These findings suggest that introverts generally have better reading comprehension skills. These findings also raise questions as to why introverts performed better than extroverts in reading comprehension and what factors influenced these results.

< Factor 1 (Personality type)

One factor believed to have contributed to the small main effect of Personality Type and the insignificant interaction of Music and Personality Type is the small number of participants in each condition. As stated earlier, introverts did outperform extroverts when the test was given in silence. However the small number of introverts made it difficult to reach statistical significance. Figure 1 clearly suggests that introverts and extroverts performed differently during the no music condition. This finding suggests that further research with more participants should yield signicant effects of Personality Type.

< Methodological Issues

Sample discussion of an interaction

The interaction of Music and Personality Types was not statistically significant. Although the results suggest that Music alone affected reading comprehension, the data suggest that Personality Type is also involved. In Figure 1, it is clear that extroverts outperformed introverts during the presence of music. The same conclusion is supported by many other studies (Fouts & Click, 1979; Furnham, Trew & Streade, 1999). This suggests that no relationship was found for the interaction of Music and Personality Type because of the insufficient participants of each type. The interaction followed a similar pattern as that of Personality Type alone. The present study showed similar patterns to previous studies, but not to the same degree. Because the methods used here were so similar to other studies, it seems likely that with additional participants similarly significant results will appear.

< Interaction of Factor 1 with Factor 2

< Link to previous research

See Appendix A for additional examples of Discussions from published research.

4. Write the Closing

A research paper doesn't have a "conclusion" in the sense of an essay's conclusion. It only has a Discussion section that will focus on explaining the specific results of the current study, without

In the last part of the Discussion section, just to finalize it, you will usually talk about two things:

a)   the pattern of results taken together, to wrap up;

Even when you organize your Discussion factor by factor, don't forget to look at the pattern of the results taken together. Try to explain how *all* of the results that you found fit together in how they affect the process that you are studying. For example, think of these three scenarios for a 2 x 2 factorial design:

- the main effects (or one main effect only) are significant, but the interaction is not

This means that the factor(s) influence the process *in*dependently, but they don't influence *each other*. In other words, each factor doesn't increase or decrease the effects that the other factor has on your dependent variable.

- the interaction is significant, but the main effects are not

This means that the factor(s) don't influence the process *alone*, but they *do* influence the process *when taken together* In other words, a single factor doesn't affect your dependent variable, but when you combine the factors they have an additive or interction effect.

- Both the main effects *and* the interaction are significant

This means that the factor(s) influence the process *in*dependently, and they also influence *each other*. In other words, each factor affects participants' performance on your task (measured by the dependent variable) AND increases or decreases the effects that the other factor has on your dependent variable.

b)   future investigations of the same topic: what they need to emphasize, what measures or methods they can try, what other studies they can relate to, etc.

One common strategy for the very last sentence of the discussion is to reiterate how important **the topic** is.

Example

     This study is part of a line of research that is important for understanding how to improve reading comprehension in realistic settings. It focused on the effects that auditory distractions, particularly music, have on the reading comprehension of both extroverts and introverts. One important direction for further research is to investigate in more detail how different distractors affect different personality types. Workplace settings, for example, include a range of distractors and workers with a variety of personality characterstics. Further research can provide systematic orientation for customizing workplace settings to maximize worker comfort and productivity. Additional work on the effects of distractors and personality types on reading comprehension will make work, study, and learning environments more effective.

< Future research

< Importance

See Appendix B for additional examples of Closings from published research.

Sample (Student) Discussion Section #1

Discussion

This study investigated the effects of agreement with an opinion on the comprehension of that opinion and the effects of the Need for Cognition on reading comprehension. The effects of the Need for Cognition on comprehension have been well documented with advertising texts (Cacioppo et al, 1983; Cacioppo et al, 1986; Haugtvedt & Petty, 1992). The present study built on this consensus by focusing on the recall of two different political texts. Research on the effects of agreement, however, has been mixed. While the theory of cognitive dissonance has been accepted overall, selective exposure as characterized by the theory has been disputed. The goal of this study was to measure the effects of selective exposure in the context of two different salient political texts and to extend this idea by examining the effect of strong opinions versus weak opinions.

< Recapitulation

The current study yielded additional evidence that Need for Cognition has a significant effect on comprehension: participants with a high Need for Cognition comprehend more than participants with a low Need for Cognition across both political texts. These results are consistent with the previous research on the effects of Need for Cognition on comprehension of a text (Cacioppo et al, 1983; Cacioppo et al, 1986; Haugtvedt & Petty, 1992). This research also suggests that the previous research on Need for Cognition can generalize across different types of text. One way to interpret these results is that a person who has a high Need for Cognition is compelled to think more about a text that they have read, so they process the information from the text more and more, making it more likely that the information from the text will be stored in long term memory (Kintsch & van Dijk, 1978). Because the interactions between Need for Cognition and both agreement and attitude intensity were not significant in the present study, it suggests that the Need for Cognition affects reading comprehension independently of agreement. This may, however, be related to the fact that both agreement measures were not found to have significant effects on reading comprehension.

< Factor 1: Need for Cognition

< Link to previous research

< Additional conclusion

< Additional conclusion

This study focussed on two components of selective exposure: attitude direction and attitude intensity. The lack of a significant effect of agreement with the text's argument on reading comprehension is consistent with the literature (Festinger, 1964; Friedman, 1958; Johnson, 1968). It seems that, contrary to the cognitive dissonance theory, disagreement with the text does not cause participants to actively avoid the information that would lead to dissonance stated in the text and agreement does not cause participants to actively seek dissonance-reducing information.

< Factor 2: Attitude, with 2 dep vars
< Dep var1: attitude direction

< Link to previous research

The effect of attitude intensity on reading comprehension is more complicated. In this study, attitude intensity did not have a significant effect on reading comprehension, suggesting that this type of selective exposure does not exist. However, this is not consistent with previous studies on attitude intensity on reading comprehension (Cantril, 1974; Clark & James, 1967). This may be due to a discrepancy in methods. Clark and James (1967) found that participants who were told that they would be engaging the issue in the text(s) socially (debating or discussing) were significantly more likely to engage in selective exposure than if they were told that they would be engaging the issue in the text through writing. Also, participants' selective exposure in the social engagement condition was significantly affected by the intensity of their attitudes, while participants' selective exposure use in the written engagement condition was unaffected by attitude intensity. This is consistent with the present results, since the participants only engaged in *written* activities related to the text that they read. If participants thought that they would be debating or discussing the information that they were about to read, it seems that those with strong opinions on the topic in the text may have actively searched for information that supported their opinions in the text, leading to better comprehension of the text.

< Dep var2: attitude intensity

< Link to previous research
< Details about methodological differences

The interaction between the Need for Cognition and agreement with

< Interaction 1

a text on the comprehension of that text was not significant because there was no effect of attitude direction on comprehension. The two attitude direction groups were not distinguishable based upon reading comprehension because participants did not engage in selective exposure. The only group differences were based upon different levels of Need for Cognition, which affected both attitude direction groups in the same way.

The interaction between the Need for Cognition and the intensity of attitudes about a text on the comprehension of that text was not significant apparently because of the way that the participants were asked to engage the issue in the text. Because the participants engaged the issue in the text by writing, the two attitude intensity groups were not distinguishable based upon reading comprehension. If the participants thought that they would engage the issue in debate or discussion, it seems likely that the two attitude intensity groups would have had different levels of reading comprehension and that there would have been a cumulative interaction effect between the Need for Cognition and attitude intensity. As it stands, however, the only group differences were based upon different levels of Need for Cognition, which affected both attitude intensity groups equally.

< Interaction 2

It seems that the effects of Need for Cognition indeed generalize beyond advertising texts to political texts. While it does not significantly interact with selective exposure when participants expect only to engage the ideas of the text in writing, it would likely interact when participants expect to engage in discussion or debate on the ideas presented in the text. Beyond that, a better understanding of Need for Cognition would come from determining which other heuristics it affects or interacts with to impact the way readers gain information. The existence of selective exposure and its properties remain elusive, but, through refined measures and methods, future studies will be able to better examine selective exposure. Another direction to take with selective exposure is to examine its impacts on comprehension of other media such as television and radio news. Through this and subsequent studies, the understanding of the nature of comprehension can be expanded.

< Closing

Sample Discussion Section #2

(from Dillinger, 1994)

Discussion

The present study was concerned, in most general terms, with how simultaneous interpreting is carried out, in particular with the similarities and differences between experienced and inexperienced interpreters' comprehension processes during interpreting. This general question about the nature of interpreting expertise was broken down into more specific questions about the extent and relative importance of syntactic processing, proposition generation and frame-structure processing — component processes of comprehension in general.

< Recapitulates the initial problem

< Summarizes the organization of the results section

Experience had a weak quantitative effect on interpreting overall, reflecting the fact that the experienced interpreters performed 16.6% more accurately than the inexperienced bilinguals across the board. There were few qualitative differences as would indicated by interactions of Experience with text-structure variables, and the order of presentation of the texts had no important effects at all. The only exception to this pattern was a weak interaction of Experience with directness of mapping: experienced interpreters were apparently more selective in their processing of non-root propositions in the matrix clauses of the procedural text. This suggests that the experienced subjects may have learned to be more selective in the surface information they will process semantically, as as function of the text frame structure that is to be built with it. That is, the subprocess of proposition generation may be more closely tailored to the needs of subsequent frmae processing for the experienced interpreters.

< Effects of the factor "Experience"

The pattern of results found here is consistent with the view that experienced interpreters have not acquired any special set of abilities, rather that normal comprehension processes are more flexible than previously believed. This is supported in particular by the presence of main effects of experience and text-structure variables in the absence of systematic interactions between them. Experienced subjects apparently performed the same sorts of processing in the same ways, but with a slight quantitative advantage.

< More general interpretation of the results; explicitly linked to specific effects

Figure 8 provides a summary of the results, depicting performance by experience group as a function of the text-structure variables assessed. The parallelism of the two sets of lines reflects the absence of major group differences; the deviations from parallelism indicate the small, unsystematic differences in processing that were found. Note that experience-related differences only began to appear for the processing of the procedural frame information, and the only statistically significant interaction of experience was with the directness of mapping
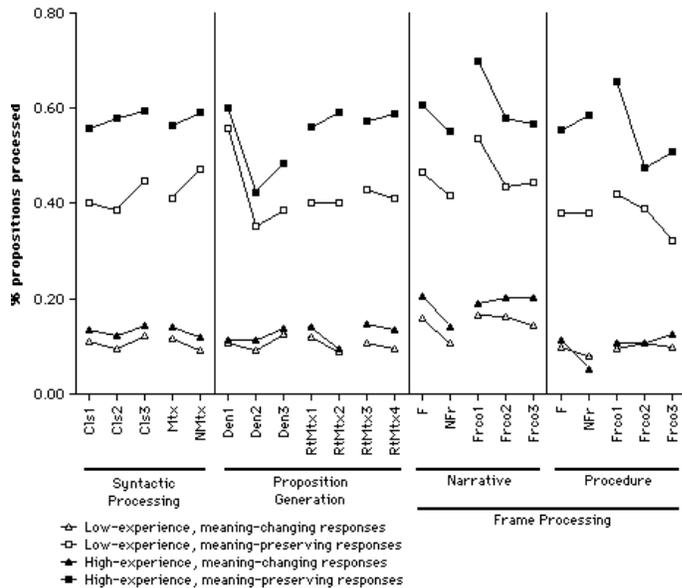
< A new figure is added to help summarize the results in a different way

variables (RtMtx). Two kinds of responses are shown as well: meaning-preserving responses (accurate translations), and meaning-changing responses (modifications to the meaning of the original text) to show that the relation of both response-types to the different text-structure variables and to experience are similar.

Figure 8. Interpreting performance (means) by Experience, Text-structure and Response-type variables.

These results, then, constitute support for the view that translation abilty and interpreting skill are natural consequences of bilingualism (see Harris & Sherwood, 1978 and Longley, 1978), and as a result that the differences between experienced and inexperienced interpreters will be mainly quantitative. It is very important to note, however, that the results discussed here refer to the simultaneous interpreting of prepared texts in a conference setting, and may not be generalizable to interpreting more spontaneous dialogue or debates. Conversational text is different from the materials used here in that it is generally less explicit and less predictable, so its processing makes greater demands on prior knowledge and inference generation. Moreover, Frederiksen (1989) argues that the processing of different text types is independent of general comprehension skill (as reflected here in the quantitative differences in undertanding the two texts), so that it is possible that an interpreter may work well in the booth with the types of pre-prepared materials used here, but not perform so well with conversational dialogue, or vice versa.

Furthermore, it must be made clear that although there were only very subtle differences in the comprehension processes used by experienced and inexperienced subjects, this does not mean that they may

<You can add new, different graphs in the discussion section, if they help synthesize the results

< Relates this study's results to other researchers' findings

< Warnings here about how NOT to interpret the results

< More warnings on the limits to generalizability of these results

not be important. Some of the differences appeared in relation to the more difficult procedural text, and showed up under very specific conditions, which suggests that any special comprehension abilities of experienced interpreters may only appear clearly with more difficult materials or at faster rates of presentation. The variables indexing proposition generation interacted with Experience and this suggests that the possible differences may bear on this poorly understood component of comprehension.

Perhaps even more importantly, it would be misleading to conclude that there are no differences at all between expert and novice interpreters: the main finding of this study bears on their comprehension processes only, and the importance of production processes is not to be underestimated. Quite clearly, "it is one thing to have comprehended a passage in the original and quite another to reproduce it within the given time constraints in the target language" (B. Moser-Mercer, personal communication). It is quite possible that expert interpreters may differ from novices principally with respect to their production processes, which have not been studied here. For example, it may be the case that experienced interpreters will show more independence in their production; that is, the novices will tend to follow the surface features of the original, whereas the experts will produce target-language texts whose formal features are nearly independent of those of the original. Answers to this await further research. The point of the present study was to discover whether the apparent differences between experienced and inexperienced interpreters are due to differences in comprehension; of course to complement these findings, differences in production ability also have to be studied.

< Tries to avoid a possible mis-interpretation of the results

< Raises questions for future research

Further Resources on Discussing your Results

APA Publication Manual, §1.11 (p. 26-27).

Mitchell, M. & Jolley, J. 2005/2007. *Research Design Explained* [Ch. 15, pp. 478-479]. Belmont, CA: Thompson Wadsworth.

Mitchell, M. & Jolley, J. & O'Shea, R. 2007. *Writing for Psychology* [§3.7, pp. 77-81]. Belmont, CA: Thompson Wadsworth.

Discussion sections from published research!

Appendix A: Additional examples of Discussion sections

Example 1

Discussion

Several key findings emerged from this experiment. First, text-based interest did not produce higher self-rated comprehension or better memory for the text. Free recall did not significantly differ for high-interest relative to low-interest narratives (for the read-only control), replicating and extending the recall results in Experiment 1. Cued recall also did not significantly differ across interesting and less interesting narratives (read-only control groups). Thus, even when the memory test was designed to cue access of particular sentences, there was no evidence that narratives that differed on rated interest produced different amounts of retention of the information in the narrative.

< Recap results

Second, there were more subtle effects of interest on text memory than have been reported previously. Specifically, narratives differing in rated interest varied in terms of the processing manipulation that was most mnemonically beneficial. Free recall and cued recall converged on the following pattern: Letter deletion, but not sentence unscrambling, improved recall of interesting narratives, whereas sentence unscrambling, but not letter deletion, improved recall of less interesting narratives. That is, the interest level of a text can modulate the degree to which processing difficulty or processing strategies benefit memory performance.

< Link to previous research

< One reason why

This pattern illuminates an important theoretical implication: Text-based interest seems to produce qualitative differences in the kind of information that tends to be processed and well encoded. This conclusion is based on the idea that letter deletion focuses processing on proposition-specific information and that sentence unscrambling promotes organizational processing (Einstein et al., 1990; McDaniel et al., 1994). The interesting narratives appeared to attract encoding of the structural linkages (organization) of the features and elements in the story (thereby rendering redundant the organizational processing necessary to unscramble sentences). In contrast, the less interesting narratives appeared to produce a focus on the individual propositions embedded in the story (thereby rendering redundant the proposition-specific processing induced by letter deletion).

< This is what happened

Example 2

The results show that the design of embedded controls/parameters has a clear advantage over the design of separate controls/parameters when performance time and ease of use are the most important issues. However, the embedded design has its disadvantages of limiting operator's scope of information gathering and is harder to develop and maintain. On the contrary, the design of separate controls/parameters, although takes more time to operate, helps the operator to comprehend the actual or abstract hierarchical structure of the system and is ideal for training purpose.

Although the effect of navigation aid is not statistically significant on performance time in this research, subjective opinions expressed strong preferences for such design. We postulate that in this study, the effect of navigation aid was washed out by the design of embedded controls/parameters and by the cut down version of task. It is still recommended to include such kind of facility in the process control system because cross-referencing is inevitable in real-world situations. It also relieves the burden having to mentally remember where to go and how to get back. Future researches on this topic should also compare other forms of navigation aid in addition to the one proposed in this study. As to the display format of simplified flowchart, more thorough researches and creative designs are required to make such format really practical in real cases. The necessity of flowchart in a computerized procedure system should also be evaluated since the flow logics can be embedded into the interactive procedure content, as we pointed out before. In this research, the simplified flowchart is found to be helpful in understanding the relationship of procedure steps, but not the meaning of the step instructions. It is also less used due to the fact that our research platform has the flow logics embedded. Considering the growing complexity of modern day systems, the design of flowchart should be further studied.

Example 3

These experiments demonstrate that the organization of text elements (concepts) in a text and the general semantic association of elements to the text context independently influence memory for text.   < Main conclusion

Text elements were recalled better when they were more central in the text organization (as assessed by the CI model of Kintsch, 1998) and when they were more semantically related to the topic, or context, of the text (as assessed by the LSA model of Landauer & Dumais, 1997). In addition, in Experiment 1, semantic association effects differed as a function of text genre, with LSA predicting recall much better for expository texts than for narrative effects.   < Evidence from these experiments

These results suggest that semantic associations are important to text recall in general, but also that the genre of a text can trigger processing strategies that vary the extent to which these associations may be relevant to the task of processing and recalling a text.   < A more specific conclusion

For expository texts, the prior semantic associations among text elements, which represented knowledge that the reader already possessed, play a critical role in determining text memory. For narrative texts, the novel associations established by the organization of concepts in the current story appear to be relatively more important than the general semantic associations. Finally, Experiment 2 demonstrated that specific topic-relevant knowledge, in the form of topics in which the relationships among elements are largely fixed (as in the expository texts in Experiment 1) is not sufficient to trigger reliance on semantic associations during recall. In pairs of narratives in which topic-relevant knowledge was manipulated, recall patterns mirrored the narrative results of Experiment 1, with CI predictions accounting for recall data much better than LSA predictions.

Appendix B: Additional examples of Closings

Example 1

It appears that the power of visual representations lies in their ability to support the learner's strategic use of comprehension processes during learning rather than in the specific characteristics of the media itself. Accordingly, developers and researchers are faced with the difficult task of determining how multimedia materials can most effectively support student performance of the processes critical to learning. Researchers need to know more about the ways that experts learn with diagrams and multimedia, and they must determine how to use visual representations to support these processes. But, as a general cognitive approach to multimedia learning, attending to the cognitive support of diagrams represents another step toward the continued refinement of effective principles for multimedia design.

Example 2

To conclude it has been shown that the proposed task variables included in the analyses affect assembly complexity during instruction comprehension and can be identified in real world and abstract assemblies. The task variables correlated with complexity measures and the multiple regression analysis has shown four of the five task variables to be significant predictors of complexity. At least some of the unknown variables that play important roles in the performance of procedural assembly tasks with illustration only instructions suggested by Morrell and Park have been identified. In addition, it has also been shown that it is possible to predict the complexity of assembly tasks based upon the task variable levels that are inherent within the assembly. A method for evaluating the likely complexity of assemblies based upon relevant physical characteristics has great potential and value, both applied and theoretical. Further to practical tools for evaluating assembly complexity, guidelines can be devised from understanding how task variables affect

assembly complexity. Also, the interaction between the task variables and the human allow cognitive models of the assembly process to be explored. It is clear that the methodology adopted in this research is of value and further experiments involving full construction of assemblies in order to study all seven task variables are worth conducting.