EECS 4441 Human-Computer Interaction

Topic #7: More on Formatting and Writing

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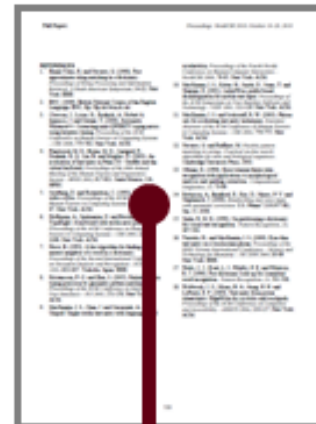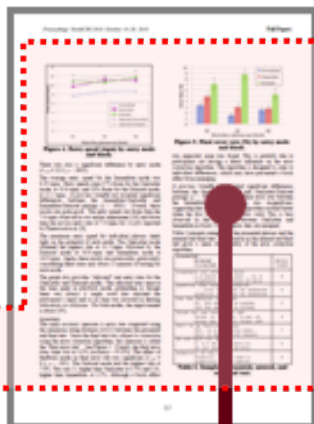
Title   Abstract   Keywords   Introduction

Method | Results and Discussion | Conclusion   References

Results and Discussion

- Results and discussion are usually combined

- Same level heading as Method (results are not part of the method)

- If there were outliers or any data filtering or transformations, state this up-front

- Statistical approach and tests sometimes conveyed in an opening paragraph

- No strict rules, but a common approach is to organize this section by dependent variables, beginning with the most important (e.g., speed, task completion time)

Results and Discussion (2)

- For each dependent variable, begin with a broad observation, then progress to finer details

- Give the effect size in absolute and/or relative terms:

The mean task completion time for method A was 2.7 seconds. Method B was 9.1% slower with a mean task completion time of 3.0 seconds.

Results and Discussion (3)

- Discuss and explain the results:
  - What caused the differences in the measurements across experimental condition?
  - What detail in the interaction caused one method to be faster/slower than the other?
  - Did one condition require more input actions?
  - Were participants confused?
  - Was the method hard to learn?
  - Did participants experience fatigue or discomfort?
  - etc.

Results and Discussion (4)

- Differences are likely

- Were the differences real or just an artefact of the variability in measurements?

- Usually, this question is answered by an analysis of variance (ANOVA)

- Give the ANOVA results parenthetically, in supporting statements such as…

> As expected, entry speed increased significantly across blocks ($F_{2,18} = 6.2$, $p < .05$). There was also a significant difference by entry mode ($F_{2,18} = 32.3$, $p < .0001$).

(Backdrop paper)

Results and Discussion (5)

- Do not give too many results
  - It is your job to distinguish what is important and relevant from what is unimportant

- Compare
  - Draw comparisons with related work (cited, of course)

- Visuals
  - Use as appropriate, to illustrate and create interest
  - Line charts, bar charts, etc.

- Participant feedback
  - Interviews, questionnaires, etc.
  - Analyse, discuss

Formatting a Paper

- Think of the reader

- Reading a paper should be like "watching a movie"

- A good movie → You aren't distracted by poor sound quality, a sticky floor, a noisy air conditioner, a lumpy seat – you "get into" the movie

- A good read → You aren't distracted by the grammar, the spelling, the sentence structure, the formatting – you "get into" the story, the research

- The point: a submitted manuscript should be perfect, w.r.t. formatting, grammar, spelling, sentence structure, etc. (easier said than done)

- In fact, it should be so perfect, the reader doesn't notice!

Headings

SECTIONS

The heading of a section should be in Helvetica 9-point bold, all in capitals (Heading 1 Style in this template file). Use Arial if Helvetica is not available. Sections should not be numbered.

Subsections

Headings of subsections should be in Helvetica 9-point bold with initial letters capitalized (Heading 2). (Note: For sub-sections and sub-subsections, a word like *the* or *of* is not capitalized unless it is the first word of the heading.)

Sub-subsections

Headings for sub-subsections should be in Helvetica 9-point italic with initial letters capitalized (Heading 3).

Italics

- Use a plain style for the name of a company

- Use italics for the name of a product

- E.g.,

> The experiment was conducted on computer systems running Mandrake's *GNU/Linux* version 7.2. Output was viewed on a 19" colour monitor. Text entry was performed using a PC Concepts *KB-5640* numeric keypad

Italics (2)

- Use italics for the names of variables

- E.g.,

> coordinates is computed. In view of the inherent one-dimensional nature of Fitts' law, we assume movement along the horizontal (x) axis, and use SD_x as the measure of accuracy. Throughput (TP), in bits per second (bits/s),

- Exception: Names of independent and dependent variables are *not* set in italics

Italics (3)

- Use italics to add emphasis to common words

- E.g., see "not" in previous slide

- Do not overdo this (try to use language to add emphasis)

Italics (4)

- Use italics when introducing an important term

> as a result, efficient and accurate *face detection* techniques (e.g., [7]) are available. However, for the more difficult problem of *face recognition*, current techniques are not robust enough to automatically annotate faces in family albums. Therefore,

- For subsequent use of the term, use a plain style

Quotation Marks

- Use quotation marks (") to feature common words used in uncommon ways

determines candidate words for a given key sequence. For instance, 8TUV-4GHI-3DEF might produce "the" from the possible letter combinations. Where collisions occur, a rank-ordered list is produced. For example, 3DEF-6MNO-4GHI matches "dog" and "fog". List ordering occurs through a

this is, there are a number of deficiencies. One is the constant need to "home" the hand between the keyboard and the mouse. Another is the valuable

Quotation Marks (2)

- Use quotation marks around text that is taken directly from another source

> They report that "performance measured in information rate is almost identical in all cases for movements of intermediate difficulty executed under all three instructional sets for speed vs. accuracy." [1, p. 481] Their work was

- Always follow the quotation with a citation and page reference

Spaces

- Use a space…
  - Between words
  - Following a period, comma, semi-colon, or colon
  - On both sides of mathematical operators

Participants, 5 females, 6 males, were drawn from a university population (mean age=31.91, S.D=12.14). Of these, there 10 were right handed and 1 left handed.

as the total number of errors of each type. The total number of characters is $(9 + 8 + 8 + 8) / 4 = 8.25$. This is the mean

Spaces (2)

- Use a space…
  - Between a number and its units

The radius of the Tilt Menu is 40mm, and the diameter of the center region is 10mm. The Tilt Menu is invoked as

5.42 bits/s. The average a and b coefficients over all levels of $MT_\%$ were -84.22 ms and 224.61 ms/bit, respectively.

Spaces (3)

- Use a space…
  - Between the initials of names in a reference list

13. Wobbrock, J.O., Myers, B.A. and Kembel, J.A. (2003) EdgeWrite: A stylus-based text entry method designed for high accuracy and stability of motion. *Proc. ACM UIST '03*, 61-70.

10. Langolf, G. D., Chaffin, D. B., & Foulke, J. A. (1976). An investigation of Fitts' Law using a wide range of movement amplitudes. *Journal of Motor Behavior, 8* (2), 113-128.

Non-breaking Spaces

- Use a non-breaking space[1] to prevent
  - Splitting across lines

mouse (0.87 s). The differences were statistically significant ($F_{3,15}$ = 95.8, p < .00001). See Figure 3.

Figure 5 shows the relationship between selection time and row. While the effect of row

Note the spacing between "Figure" and "5"

[1] CTRL-SHIFT-SPACE on MS Word

Numbers

- General rule:
  - Use words for numbers less than 10
    - "The task was repeated eight times."
  - Use figures for numbers 10 and above
    - "The task was repeated 18 times."
- Exceptions
  - Use words if a number begins a sentence
    - "Six repetitions were administered."
  - Use figures for a unit of measurement
    - "5 cm"
  - Use figures for comparisons with numbers 10 and above
    - "Participants were less accurate in 7 of 12 attempts."
  - Use figures for numbers used in a statistical sense
    - "5% of the trials"

Numbers (2)

- Exceptions (continued)
  - Use figures for numbers that represent a time or date
    - "January 1, 2000 was a day of vindication for programmers."
  - Use figures for numbers pertaining to participants, samples, points on a scale, scores, and sums of money
    - "There were 2 left-handed participants."
    - "A score of 5 or higher on the 7-point scale was considered good."
    - "Each participant was paid $8 upon completing the experiment."
  - Use figures for numbers representing a position in a numbered series
    - "This is described in chapter 3."
    - "A contrary opinion is expressed on page 7."
    - "Figure 2 shows the general idea."

Formatting an *F*-statistic

> There was a significant main effect of input method on entry speed ($F_{1,9} = $ 8.44, $p < .05$).

- Notice in the parentheses
  - Uppercase for *F*
  - Lowercase for *p*
  - Italics for *F* and *p*
  - Space both sides of equal sign
  - Space after comma
  - Space both sides of less than sign
  - Degrees of freedom are subscript, plain, smaller font
  - Three significant figures for *F* statistic
  - No zero before the decimal point in the *p* statistic (except in Europe)
- As an alternative, the degrees of freedom may be set plain in parentheses (in this case, use a space following the comma)

F-Statistic Examples

Analysis of variance of counting the opened menus showed a high significant main effect for all menu-types ($F_{11,60} = 10.864$, p < 0.0001) under condition 3,

As for the movement time, repeated measures analysis of variance shows a significant main effect for technique type ($F_{2,22} = 6.171$, p = .005). The descriptive statistics of

P0, and 79.5% for P1. The system with command prediction showed a 4.8% improvement over that without command prediction ($F_{1,16} = 10.030$, $p < .01$). The stan-

Note: Three or four digits of precision is sufficient.

F-Statistic Examples (2)

difference between the two in Task 2 was not significant ($F_{3,15} = 1.45$, $p > .05$). In a web form

Tables

- Caption above and centred, capitalize major words
- Horizontal rules look better than boxes
- Use double rules to separate major sections

Table 1
Keystrokes Per Character
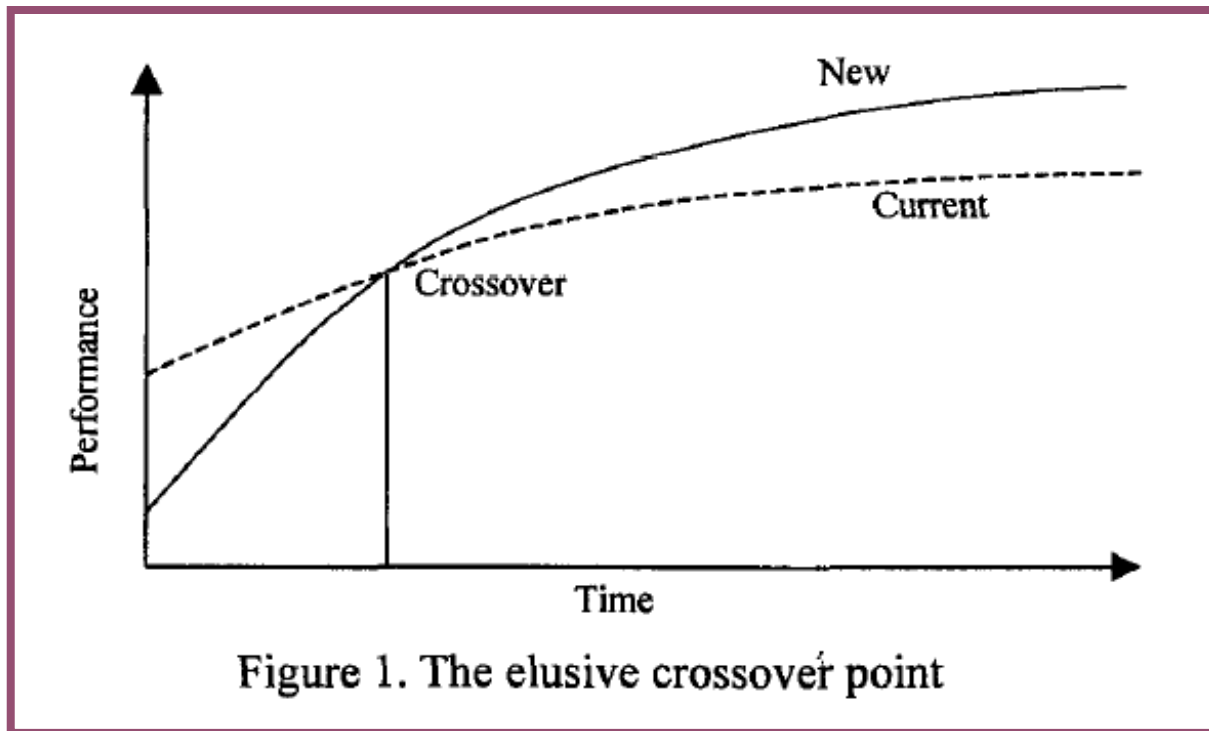($KSPC$) for Various Techniques

Technique	$KSPC$
Multitap	2.0342
Dictionary-based disambiguation (*T9*)	1.0072[a]
LetterWise	1.1500

[a] see text for important assumptions

Figures (1)

- A powerful way to demonstrate ideas

Figure 1. The elusive crossover point

Figures (2)

- Figures…
  - Make results more interesting
  - Reveal salient outcomes
- Always label both axes
- Include units where appropriate

Figure 5. Keystrokes per character (*KSPC*), computed and observed, by entry method

Figures (3)

Figure 7. Keystroke categories by method
(a) Method #2 (b) Method #6

Figures (4)

Figure 8. Changes in speed (MT Factor) and accuracy (SDx Factor) with constant throughput – all participants
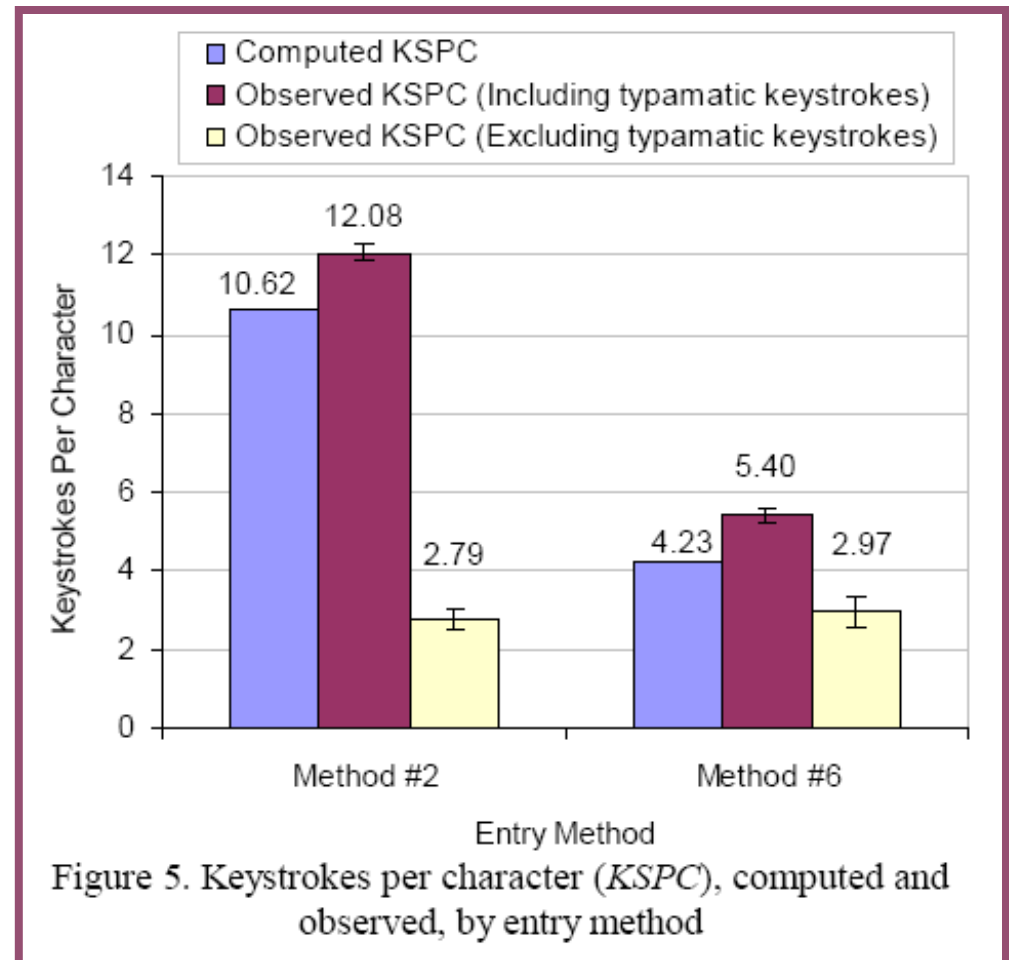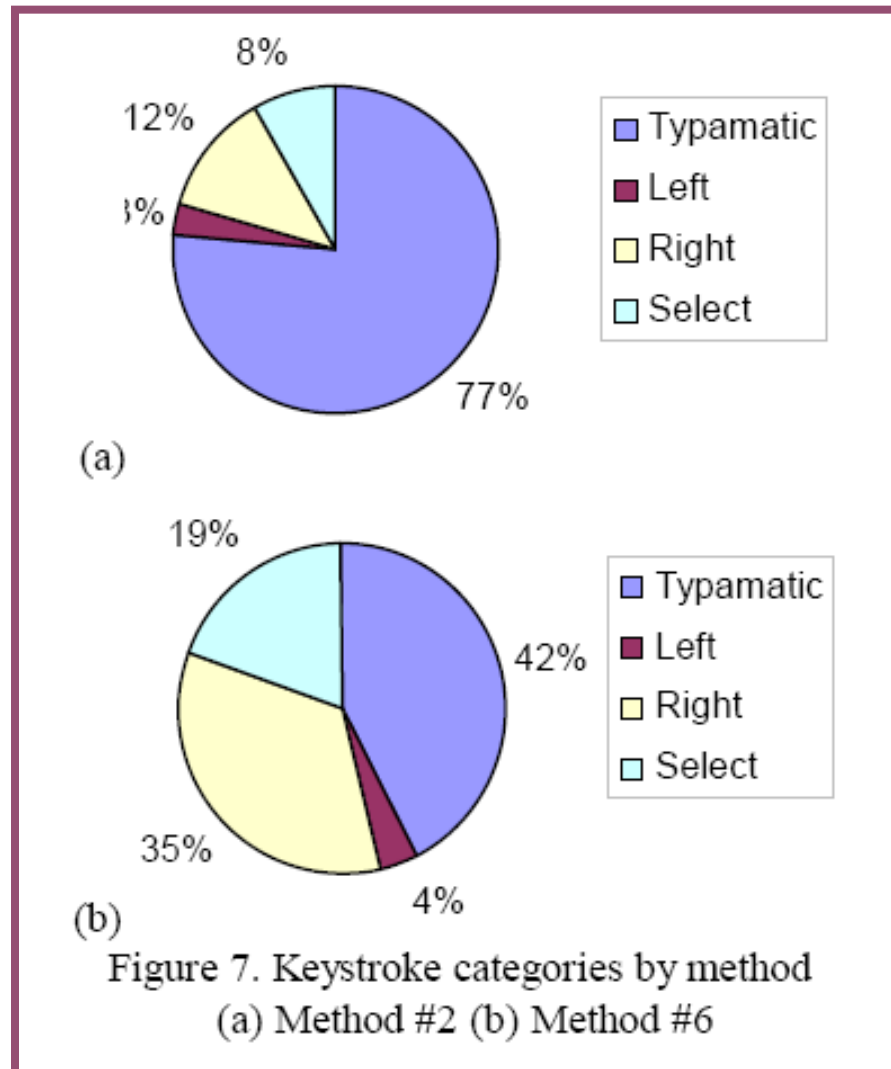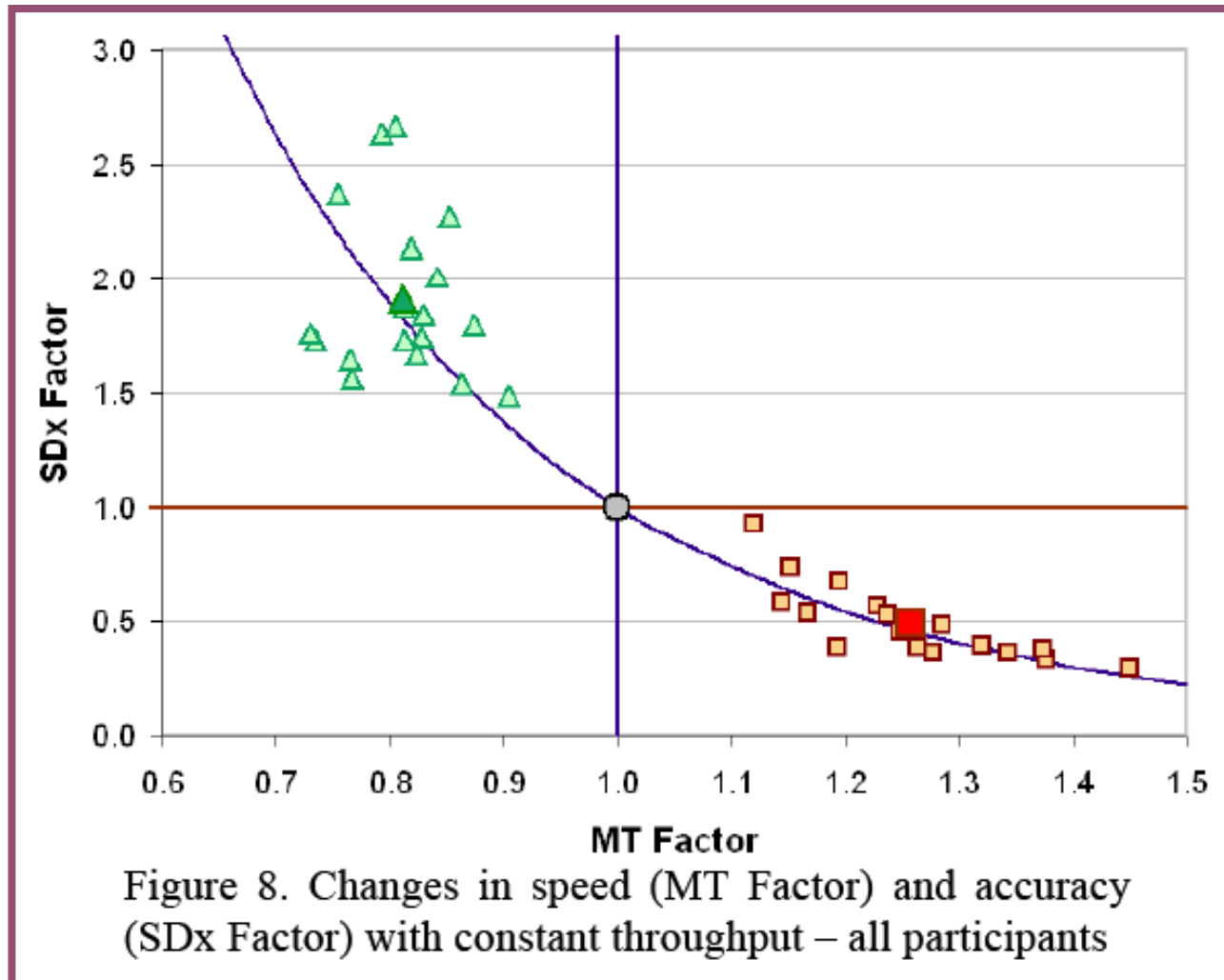
Photographs

- Use photographs to illustrate the apparatus or procedure

Figure 4. Experimental apparatus used for *LetterScroll*

Citations and References

- Citations and references are the connections – the hyperlinks – that tie research together
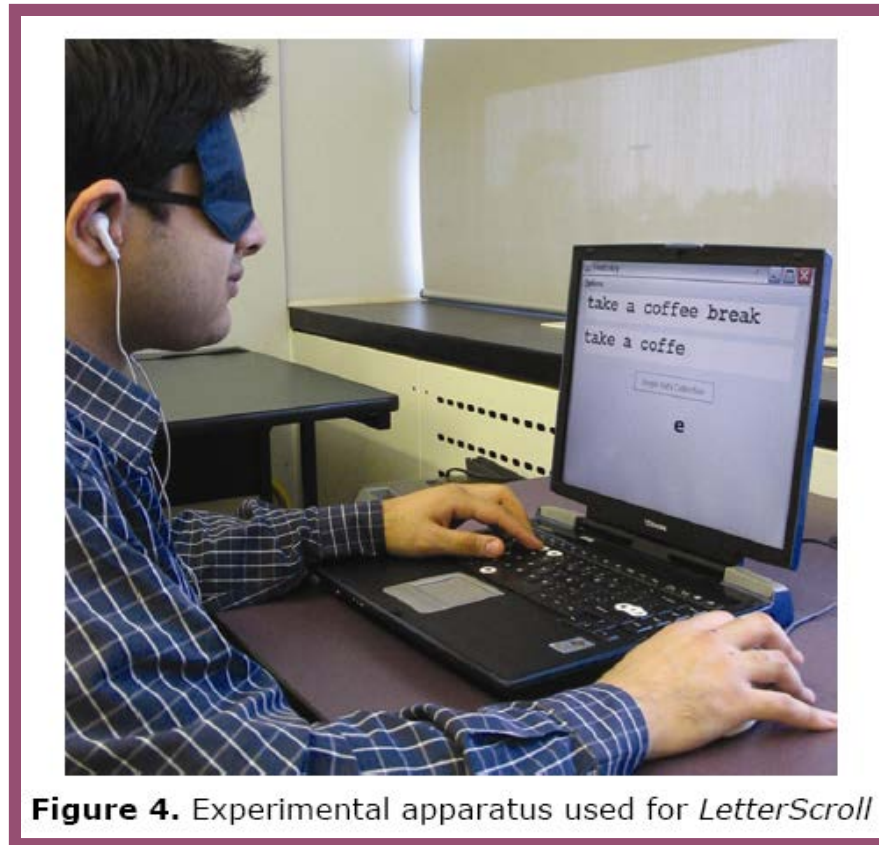
- Research submissions (e.g., for CHI) have formatting requirements for citations and reference lists

- They should be perfect (but, they rarely are!)

- Tip: use *EndNote* (http://www.endnote.com/)

CHI Reference List Formatting

- Numbered

- Ordered alphabetically by 1st author's surname

- Surnames, then initials of given names

- Capitalize first word in title, first word after colon, proper nouns

- Always include the year (substitute "in press" for accepted but not-yet-published papers)

- Always include pages (except for books)

- Italics for name of publication and journal volume

- Give location and name of publisher for conference papers and books

- May abbreviate conference and journal names to save space

- Only include works that are cited in paper

- Study and imitate!

- Be consistent

REFERENCES

1. Balakrishnan, R. and MacKenzie, I.S. (1997) Performance differences in the fingers, wrist, and forearm in computer input control. *Proc. CHI '97*. New York: ACM Press, 303-310.

2. Balakrishnan, R. (2004) "Beating" Fitts' law: Virtual enhancements for pointing facilitation. *Int'l J. of Human-Computer Studies 61* (6), 857-874.

3. Card, S.K., English, W.K. and Burr, B.J. (1978) Evaluation of mouse, rate-controlled isometric joystick, step keys, and text keys for text selection on a C... *Ergonomics 21* (8...

4. Card, S.K., Mora... *Psychology of Hu...* NJ: Lawrence Erl...

5. Crossman, E.R.F.... simple hand movements. In *The Nature ... Acquisition of Industrial Skills*, E.R.F.W. Cross...n and W.D. Seymour (eds). Report to the M.R.C. ...nd D.S.I.R. Joint Committee on Individual Efficiency in Industry.

6. Crossman, E.R.F.W. and Goodeve, P.J. (1963/1983) Feedback control of hand-movement and Fitts' law. *Quarterly J. of Exp. Psychology 35A* (2), 251-278.

7. Fitts, P.M., Jones, R.E. and Milton, J.L. (1950) Eye movements of aircraft pilots during instrument-landing approaches. *Aeronautical Engineering Review 9* (2), 24-29.

Closer look

Example #1

REFERENCES

1. Ahlberg, C. and Shneiderman, B., The Alphaslider: A compact and rapid selector, *Proceedings of the ACM Conference on Human Factors in Computing Systems - CHI '94*, (New York: ACM, 1994), 365-371.

2. Card, S. K., Moran, T. P., and Newell, A., *The psychology of human-computer interaction*. Hillsdale, NJ: Erlbaum, 1983.

3. Grudin, J. T., Error patterns in novice and skilled transcription typing, in *Cognitive aspects of skilled typing*, (W. E. Cooper, Ed.). New York: Springer-Verlag, 1983, 121-143.

4. Matias, E., MacKenzie, I. S., and Buxton, W., One-handed touch typing on a QWERTY keyboard, *Human-Computer Interaction*, *11*, 1996, 1-27.

Conference paper

Book

Chapter in edited book

Journal article

Example #2

References

[1] John Arnott. Probabilistic character disambiguation for reduced keyboards using small text samples. pages 238–253, September.

[2] Gregory W. Lesher, Bryan J. Moulton, and D. Jeffery Higginbotham. Techniques for augmenting scanning communication. *ISAAC*, 1998.

[3] H. Horstmann and Levine. Modeling the speed of text entry with a word prediction interface. *IEEE transactions on rehabilitation engineering* 2, 1994.

[4] Karin Harsbush and Michael Khn. An evaluation study of two-button scanning with ambiguous keyboards. *AAATE*, 20

Edmund T. Lo... ard ... Heidi H. Koe... Se...ting a... pro...ate s...rate: the .65... P...NA 2... pro...dings.

[6] ... Simpson ... H...i He...mann. ...daptive one-switch ...w-co...n scanning. *IEEE Transactions on ...abilitacion engineering* vol7. N 4, 1999.

pp.

publication?

year?

Initials only
(initials after surname)

out of order

pages?

Levine who?

uppercase

pages?

italics

"Kuhn"

Ugh!

34

Writing
(tips, rules, etc.)

e.g.

- Means "for example"
- From the latin "exempli gratia"
- Set as "e.g.," (always with a comma)

> by cognitive overhead (e.g. pausing or slowing down to plan for the following segments when a polyline stroke has

> builds statistical models from records of users' interaction with their messages, e.g., Horvitz et al. [10]. Another

et al.

- Means "and others"

- From the latin "et alii"

- Use when there are three or more authors

- Set as "et al." (don't forget the period)

> Vision TiltText [17] is a remake of the TiltText input method by Wigdor et al [16]. Instead of using an accelerome-

- The paper cited above [16] has two authors! (don't use et al.; give both names)

> statistically examining users' decision rules. Although Venolia et al. [24] used a large-sample quantitative survey

i.e.

- Means "that is"
- From the latin "id est"
- Set as "i.e.," (always with a comma)

> ety of instantiations, this *selection-action* [8] interaction is typically serial in nature, i.e., the scope and command specifications occur in sequence, one after the other. This

But: "nature" should be followed with a semicolon, not a comma.

viz.

- Means "that is to say"
- From the latin "videlicet"
- Set as "viz." (always with a period)

vs.

- Means "versus" or "against"
- Set as "vs." (always with a period)

cf.

- Means "compare" or "compare with"
- From the latin "confer"
- Set as "cf." (always with a period)

etc.

- Means "and so forth"
- From the latin "et cetera"

I

- For scientific writing, it is generally unacceptable to write in the first person

Data

- Data: the plural of datum

web page starting from their university's home-page. The data from experiment one was analysed using a paired T-Test to compare task performance using the back button

could be captured through different input devices. The captured data is fed into the gesture recognizer which

the mouse [4]. Eye movement data were included starting from the first fixation that started after the

by this interface. As our data concerning pEYEwrite suggest, it takes about four weeks of training until a very fast performance

Pronouns and Possessive Adjectives

- A pronoun or possessive adjective must agree with its antecedent[1]
  - "Most users hold the mouse in their right hand."

    Antecedent   Possessive adjective

  - "Since the buttons are small, they are hard to press."

    Antecedent   Pronoun

[1] Antecedent: a word or phrase replaced by a substitute (Websters)

Example of Confusion

"Users can issue a command to a computer by selecting it in a menu."

?

Example of Disagreement

Clearly, usability evaluation is valuable for many situations, as it often helps validate both research ideas and products at varying stages in its lifecycle.

?

their

Another Example (same paper)

Because usability evaluation
methodologies are easy to teach, learn, and examine (as
compared to other 'harder' methods such as design, field
studies, etc.), it has become perhaps the most concrete
learning objective in a standard HCI course.

?

Question: Is a
methodology an
"objective"?

they (have)

Question: Is
"design" a method?

This sentence makes no sense!

And Another (same paper)

Typically we already understand the broad **outlines** or primary **properties** of the phenomena being studied, and make progress by looking at **its** very specific details (i.e., one or two variables) in order to distinguish between competing theories.

?

their

Yet More (same paper)

Some of our early buggy designs may actually be the one that has the most potential for benefit in the long run, but we have no way of knowing this.

?

ones (that have)

And More (same paper)

We demand validation as a pre-requisite for publication, yet these first evaluations are typically confirmatory and thus weak.

?

the (first evaluation is)

More Again (same paper)

ACM CSCW and UBICOMP incorporate and nurture ethnography and qualitative methods as part of its methodology corpus, for both realized the importance of culture to understanding technological innovations.

?

their

Yikes! (same paper)

We also see innovative technologies that are highly successful but not developed by the CHI community, so we are left to evaluate its usability only after the fact. There is something wrong with this picture.

?

their

What's Going On Here? (same paper)

The consequence is that the CHI academic culture generally accepts the doctrine that submitted papers on system design must include a usability evaluation – usually controlled experimentation or empirical usability testing – if it is to have a chance of success.

?

they (are)

Plan

- Content
- Formatting
- Writing
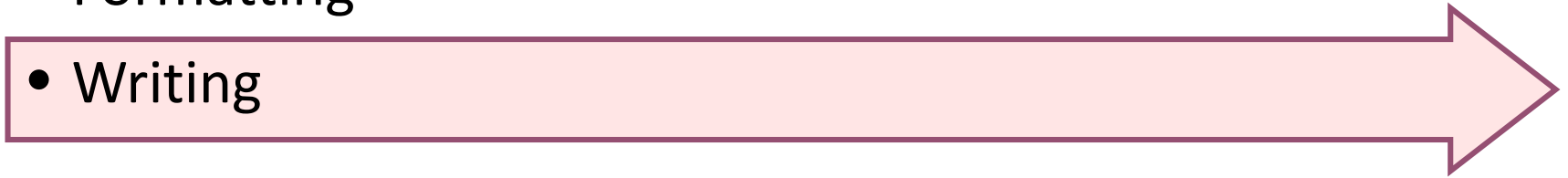
Step 1
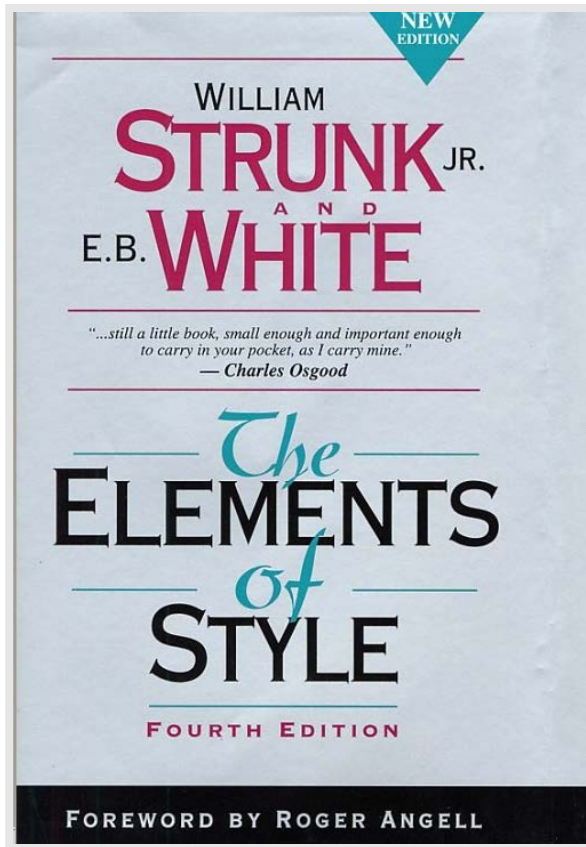
- Get the little book[1]

- Learn and invoke the *elementary rules, elementary principles,* and *approaches to style,* and you are 99% there!

- For example…

[1] Strunk, W., Jr., & White, E. B. (2000). *The elements of style* (4th ed.). Needham Heights, MA: Allyn & Bacon (first published in 1935).

Rule #9 - The Number of the Subject Determines the Number of the Verb

- The simplest construct in English is the declarative sentence, consisting of a subject, then a verb, then an object
  - E.g., teenagers like computers
- Watch for subject-verb agreement
- English is peculiar!
  - I.e., most teenagers like but a teenager likes
- Large unruly sentences are prone to error, so…
- Use the KISS principle (keep it simple stupid)

Rule #9 Example (Yikes!)

- An excerpt from the CHI template file:

subject verb object

The first set of keywords will be used to index the paper in the proceedings. The second set are used to catalogue the paper in the ACM Digital Library.

is
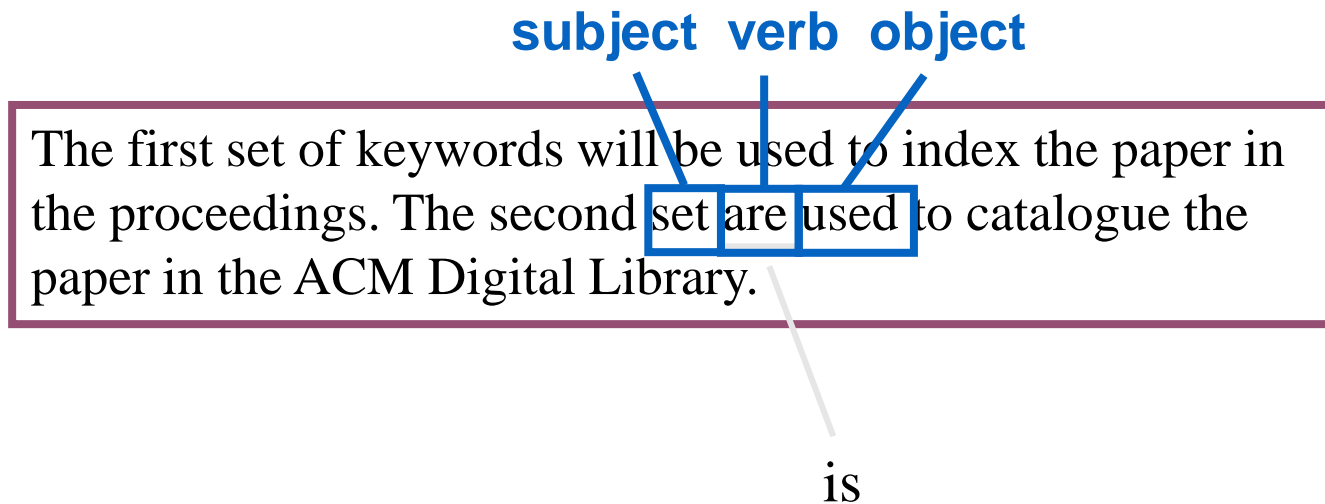
Rule #9 Example (2)

- From the journal *Interacting with Computers* (v *20,* p. 407…

This paper is organized as follows. **Details** of the empirical study **is discussed** in Section 2. In Section 3, analysis of the experimental data is presented. Our proposed model of

subject — Details

verb — is

object — discussed

are
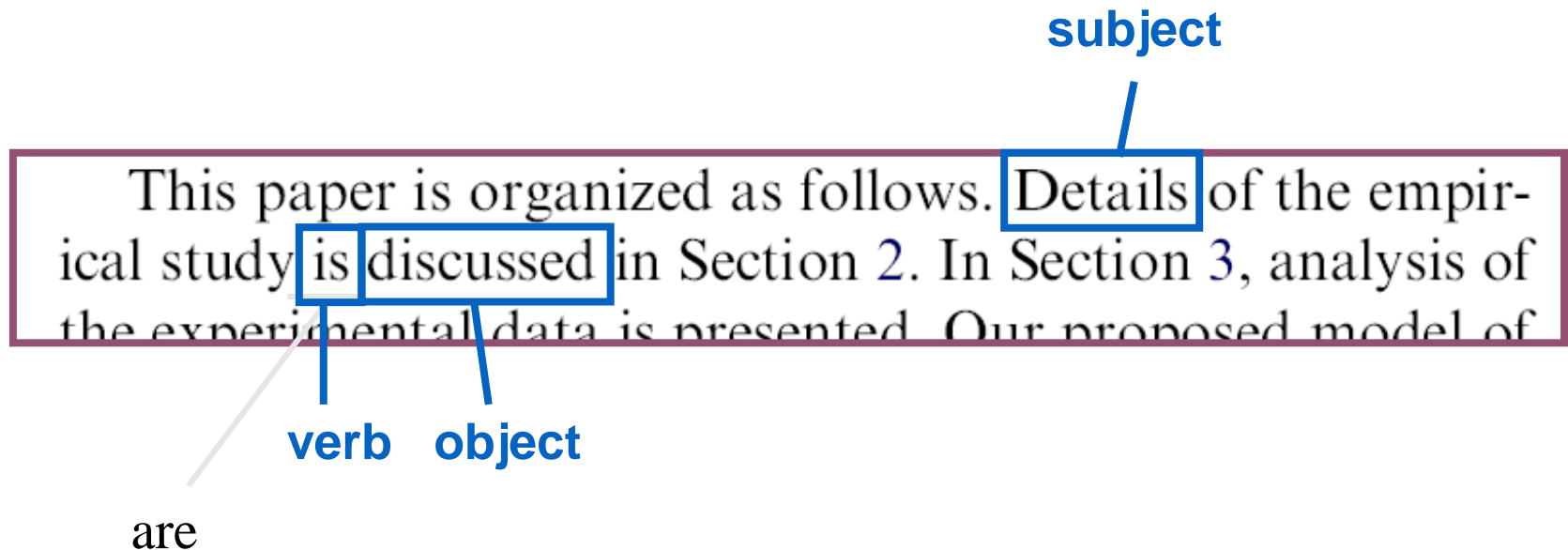
Rule #9 Example (3)

- First sentence from a paper in the *CHI 2008* proceedings…

subject

Current practice in Human Computer Interaction as encouraged by educational institutes, academic review processes, and institutions with usability groups advocate usability evaluation as a critical part of every design process.

verb

object

advocates

Other Rule #9 Examples (same paper!)

subject   **object**

Invention and innovation | is | critical | to CHI.

verb

are

favor

subject   **verb**   **object**

ACM | DIS and DUX | favors | case | studies | that emphasize design, design rationale, and the design process.

Another Example (same paper)

subject

Yet usability evaluation methods as done in research typically fails to consider the promise of novel engineering inventions and interface innovations.

verb **object**

fail

And Another (same paper)

Alternately, they may emphasize aspects of an existing problem that lends itself to that method, where that aspect may not be the most important one that should be considered.

Yikes! (same paper)

Academic paper submissions or product descriptions should be judged by the question being asked, the type of system or situation that is being described and whether the method the inventors used to argue their points are reasonable.

Rule #3 – Enclose Parenthetic Expressions Between Commas

- Use a comma before and after

- If the interruption is minor, the commas may be eliminated (but never use just one comma)

- The sentence should make sense and be structurally intact if the parenthetic expression is removed

Parenthetic expression

If the user slows down, taking about 10% longer for each selection, we expect a slight improvement in accuracy.

Rule #3 - Elaborated

- First comma
  - Alerts the reader to an interruption in the flow

- Second comma
  - Flow resumes where it left off

- Without the commas
  - At the beginning of the parenthetic expression, the flow continues unabated
  - The reader looses a sense of the structure of the sentence and of the relationship among the words and phrases
  - By the time the reader "comes out the other side", there is good a chance he or she has lost the meaning of the sentence

Without commas

With commas

Parenthetic
expression

,

,

Parenthetic
expression

Parenthetic
expression

Got it!

Hmm?

67
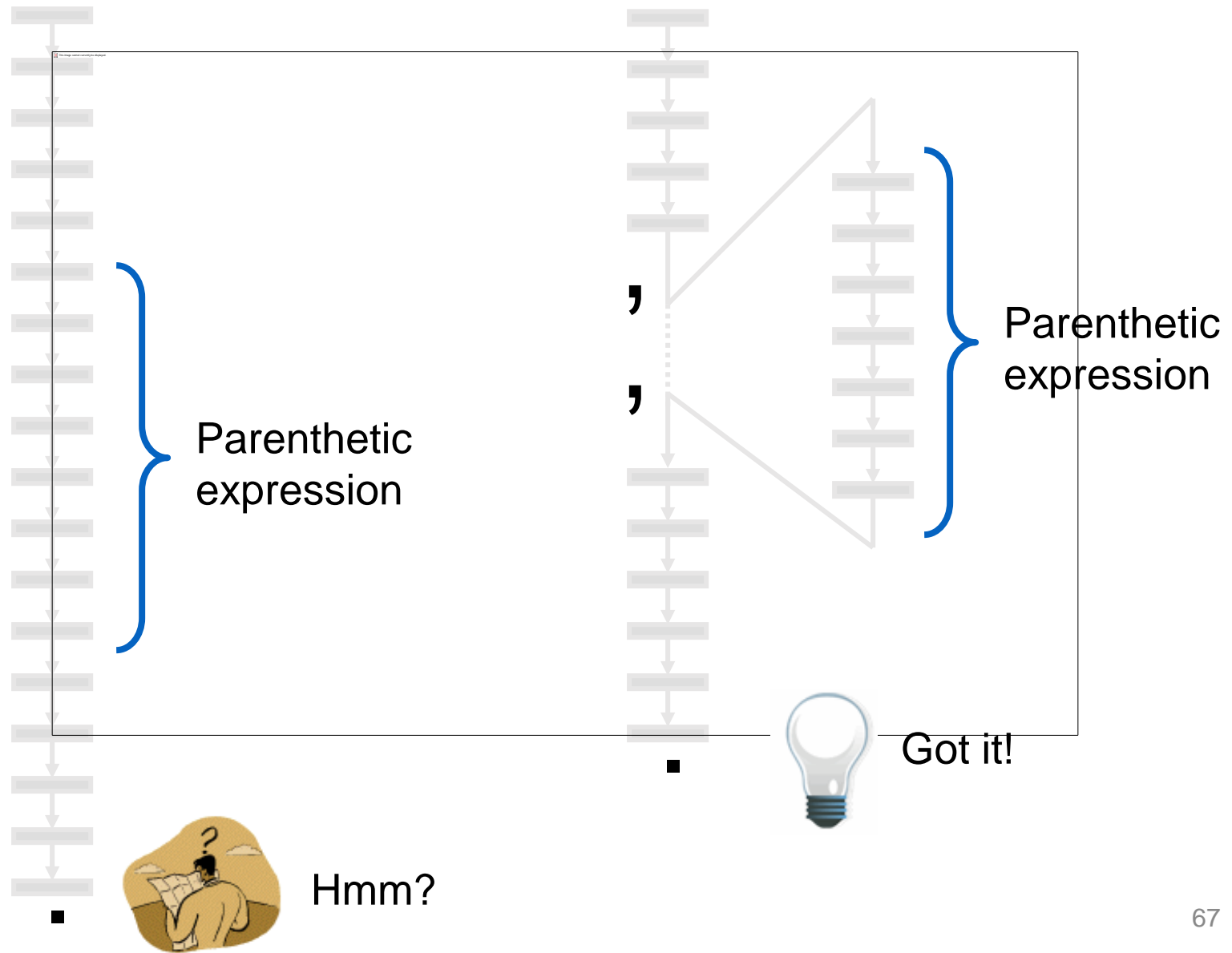
Rule #3 – Another example

- The earlier example of subject-verb disagreement also violates rule #3 (see below)

- The sentence contains a large 13-word parenthetic expression

- Commas are needed, in this case, or confusion looms

Current practice in Human Computer Interaction as encouraged by educational institutes, academic review processes, and institutions with usability groups advocate usability evaluation as a critical part of every design process.

Rule #17 – Omit Needless Words

Should be able to understand	Should understand
In order to do this	To do this
Prior gaming experience affects	Gaming experience affects
With this goal in mind	With this in mind
There are a large number of steps	There are many steps
The selection was made based on	The selection was based on
Novice users	Novices
Each of the participants	Each participant

Style Rule #7 – Do not Overstate
Style Rule #8 – Avoid the use of Qualifiers

This is a very important result.   This is an important result.

This result demonstrates…

S&W: *When you overstate, the reader will be instantly on guard, and everything that has preceded your overstatement as well as everything that follows it will be suspect in his mind because he has lost confidence in your judgment.*

The Abstract – Revisited (Writing Style)

- An example from UIST [1]

- Let's see if there is room for improvement

[1] Lee, J. C., Forlizzi, J., & Hudson, S. E. (2002). The kinetic typography engine: An extensible system for animating expressive text. *Proceedings of the ACM Symposium on User Interface Software and Technology -- UIST 2002*, pp. 81-90. New York: ACM.

Original

Kinetic typography – text that uses movement or other temporal change – has recently emerged as a new form of communication. As we hope to illustrate in this paper, kinetic typography can be seen as bringing some of the expressive powers of film – such as its ability to convey emotion, portray compelling characters, and visually direct attention – to the strong communicative powers of text. Although kinetic typography offers promise for expressive communication, it has not been widely exploited outside a few limited application areas (most notably in TV advertising). One of the reasons for this has been the lack of tools directly supporting it, and the accompanying difficulty in creating dynamic text. This paper presents a first step in remedying this situation – an extensible robust system for animating text in a wide variety of forms. By supporting an appropriate set of carefully factored abstractions, this engine provides a relatively small set of components that can be plugged together to create a wide range of different expressions. It provides new techniques for animating text used in traditional cartoon animation, and provides specific support for typographical manipulations.

Revision

Kinetic typography – text that moves or otherwise changes – is a new form of communication. As we illustrate, kinetic typography brings the expressive power of film – the ability to convey emotion, portray compelling characters, and direct attention – to the world of text. Although kinetic typography offers promise, it is not widely exploited outside areas such as TV advertising. Reasons include the lack of support tools and the difficulty in creating dynamic text. Our remedy is an extensible robust system for animating text. Through a set of abstractions, the engine provides a small set of pluggable components to create a range of expressions. It provides new techniques for animating text and provides support for typographical manipulations.

Compare

Kinetic typography – text that uses movement or other temporal chan... [183 words overlay] ...w form of communicatio... ...per, kinetic typogra... ...of the expressive po... ...such as its ability to convey emotion, portray compelling characters, and visually direct attention – to the strong communicative powers of text. Altho... com... few... One... dire... crea... reme... anim... appr... engi... can... expr... used... supp...

Kinetic typography – text that moves or otherwise changes – is a new for... [114 words overlay] ...e, kinetic typography... ...– the ability to convey e... ...rs, and direct attention – t... ...Although kinetic typography offers promise, it is not widely exploited outside areas such as TV advertising. Reasons include the lack of support tools... ...s an ...set ...able ...s ...for

1. Be concise

Original: *text that uses movement or other temporal change*
Revision: *text that moves or otherwise changes*

2. Omit needless words

Original: *As we hope to illustrate in this paper…*
Revision: *As we illustrate…*

3. Use the active voice

Original: *it has not been widely exploited…*
Revision: *it is not widely exploited…*

Abstract Deconstructed (1)

Kinetic typography – text that uses movement or other temporal change – has recently emerged as a new form of communication.

1

Kinetic typography – text that moves or otherwise changes – is a new form of communication.

As we hope to illustrate in this paper, kinetic typography can be seen as bringing some of the expressive powers of film – such as its ability to convey emotion, portray compelling characters, and visually direct attention – to the strong communicative powers of text.

2

As we illustrate, kinetic typography brings the expressive power of film – the ability to convey emotion, portray compelling characters, and direct attention – to the world of text.

Abstract Deconstructed (2)

Although kinetic typography offers promise for expressive communication, it has not been widely exploited outside a few limited application areas (most notably in TV advertising).

3

Although kinetic typography offers promise, it is not widely exploited outside areas such as TV advertising

One of the reasons for this has been the lack of tools directly supporting it, and the accompanying difficulty in creating dynamic text.

4

Reasons include the lack of support tools and the difficulty in creating dynamic text.

Abstract Deconstructed (3)

This paper presents a first step in remedying this situation – an extensible robust system for animating text in a wide variety of forms.

5   Our remedy is an extensible robust system for animating text.

By supporting an appropriate set of carefully factored abstractions, this engine provides a relatively small set of components that can be plugged together to create a wide range of different expressions.

6   Through a set of abstractions, the engine provides a small set of pluggable components to create a range of expressions.

Abstract Deconstructed (4)

It provides new techniques for animating text used in traditional cartoon animation, and provides specific support for typographical manipulations.

7

It provides new techniques for animating text and provides support for typographical manipulations.

In-class Exercise

- Go to the ACM Digital Library and randomly retrieve a paper from the CHI proceedings.

- Start reading!

Thank you