

Lecture 11

LCD 306: Semantics & Pragmatics

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Queens College
CUNY

Thursday 19 March 2015

Outline

1 Group Project

- Proposal

- Poster

- Speech

2 Big Picture

3 Proposition Relations

4 Propositional Interaction

- Conjunction

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Table of Contents

1 Group Project

- Proposal

- Poster

- Speech

2 Big Picture

3 Proposition Relations

4 Propositional Interaction

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Research Proposal

- Due today!
- Do **not** start testing until I email go ahead by Saturday morning

Research Proposal: Grading

APA FORMATTING	5
Running header	
Title page	
Citations (in-text and in works cited)	
Appendices (if used)	
Font, formatting, margins, etc	
ACADEMIC ENGLISH GRAMMAR AND SPELLING	5
Solid command of Academic English grammar	
Appropriate use of punctuation	
Correct spelling	
Appropriate use of vocabulary	
Correct Pitch for Audience	
TIMELINE	10
Sufficiently detailed	
DIVISION OF RESPONSIBILITIES	10
All task assigned	
METHODOLOGY	60
Experiment replicating	
Discussion of phenomenon	
Details of original experiment	
Details of replication experiment	
Differences highlighted	
Examples	
INSTRUMENT	10
Scale or measurement	
All materials for instrument	
TOTAL	100

Table of Contents

1 Group Project

- Proposal

- Poster

- Speech

2 Big Picture

3 Proposition Relations

4 Propositional Interaction

- Conjunction

Poster Websites

colinpurrington.com/tips/poster-design

HOME PROJECTS TIPS PHOTO GALLERIES ABOUT/CONTACT

EXECUTIVE SUMMARY

This site has funile projects that amuse me, geaby tips, and posts about photography and science.

Search

PROJECTS

- Charles Darwin Has A Posse
- Evolution tattoos
- Possible Charles Darwin
- Prescription for antibiotics
- Patenting plagiarism
- Textbook disclaimers
- We need transparency of school vaccination rates
- Yams versus sweet potatoes

TIPS

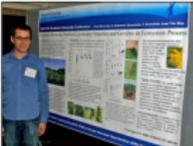
- Adding photo credits to talk slides
- Designing conference posters
- Getting out of camel crickets
- Giving a research talk
- Maintaining a lab notebook
- Protecting gardens from squirrels
- Requesting a recommendation
- Weaseling into a research lab
- Writing up experiments

RECENT POSTS

Designing conference posters

A one-sentence overview of the poster concept

A large-format poster is a big piece of paper (or wall-mounted monitor) that can communicate your research at a conference, and is composed of a short title, an introduction to your burning question, an overview of your novel approach, your amazing results in graphical form, some insightful discussion of aforementioned results, a listing of previously published articles that are important to your research, and some brief acknowledgement of the tremendous assistance and financial support conund from others — if all text is kept to a minimum, a person could fully read your poster in under 5 minutes (really).



[Why a poster?](#) • [Motivational advice](#) • [Choosing software](#) • [Poster templates](#) • [Section content](#) • [DOIs and DON'Ts](#) • [Adding pieces of flair](#) • [Presenting the poster](#) • [Useful internet sites](#) • [Useful literature](#) • [Printing the poster](#) • [Organizing a session](#) • [Using this page](#) • [Feedback](#)

If you're lazy and really don't want to read this long-winded page, click on the image below for the one-page summary — it's crammed full of tips and tricks. Just try to keep your poster to 800 words or less.

[Title formatted in sentence case \(Not Title Case and NOT ALL CAPS\) that lists up an interesting](#)

12:44 PM 3/19/2013

Poster Websites

colinpurrington.com/tips/poster-design

- Getting rid of camel crickets
- Giving a research talk
- Maintaining a lab notebook
- Protecting gardens from squirrels
- Requesting a recommendation
- Waxing into a research lab
- Wising up experiments

RECENT POSTS

- Vaccinating kids against sugary drink addiction
- Cold garden
- Consensus for Plant Biotechnology Research has finally stopped plagiarizing me
- 1,100+ school ready for measles? Slinkers for Darwin fans
- Survival of the fittest
- Boxes of bling for scientific posters
- Charles Darwin Has A Posse in Arabic
- Selies with Darwin
- Charles Darwin Has A Posse stickers

GRATUITOUS PHOTO OF ME



[DON'Ts](#) • [Adding pieces of flair](#) • [Presenting the poster](#) • [Useful internet sites](#) • [Useful literature](#) • [Printing the poster](#) • [Organizing a session](#) • [Using this page](#) • [Feedback](#)

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Title, formatted in sentence case (Not Title Case and NOT ALL CAPS), that hints at an interesting issue and/or methodology, doesn't spill onto a third line (ideally), and isn't hot pink

Colin Purrington
666 Tepeal Street, Posterville, PA 19801, USA

<p>Introduction</p> <p>Introduction text describing the background and purpose of the research.</p>	<p>Results</p> <p>Results text describing the findings of the study.</p>		<p>Conclusions</p> <p>Conclusions text summarizing the main takeaways from the research.</p>
<p>Materials and methods</p> <p>Materials and methods text detailing the experimental procedures.</p>	<p>Discussion</p> <p>Discussion text providing context and interpretation of the results.</p>		<p>References</p> <p>References text listing the sources cited in the poster.</p>
<p>Declaration of interest</p> <p>Declaration of interest text stating any potential conflicts of interest.</p>	<p>Acknowledgments</p> <p>Acknowledgments text thanking individuals or organizations for their support.</p>	<p>Further information</p> <p>Further information text providing contact details and additional resources.</p>	<p>Correspondence</p> <p>Correspondence text identifying the primary contact for inquiries.</p>

By the way, if you're a teacher, please feel free to print the above poster on a poster printer (here's a [PDF](#)). Then you can display it on a wall for students to examine *before* they start designing their own. Ideally, also print a full-size copy of "[Figs in space: effect of zero gravity and of blither feeding on weight gain in *C. elegans*](#)"

EN 12:44 PM 3/19/2015

Poster Websites

The screenshot shows the website www.makesigns.com/SciPosters_Templates.aspx. The page features a navigation bar with links for ACCOUNT, CART (0 items), ORDER MY POSTER NOW, PRICING, SHIPPING, MATERIALS, TEMPLATES (selected), TUTORIALS, CONFERENCES, and HELP. The main content area displays a grid of poster templates, each with a thumbnail image, a title, and a list of available sizes and prices.

MAKESIGNS
SCIENTIFIC POSTERS

ACCOUNT CART (0 items) ORDER MY POSTER NOW

PRICING SHIPPING MATERIALS TEMPLATES TUTORIALS CONFERENCES HELP

News Boxes

- 36 x 48 42x56 | 48x64
- 36 x 48 with infotail guides
- 24 x 48 36x72 | 42x48 | 48x96
- 36 x 54 36x36 | 42x42 | 48x72
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48
- 36 x 42 48x56
- 46.8 x 33.1 (A0)

Multi-Color Graphics

- 36 x 48 42x56 | 48x64
- 36 x 48 with infotail guides
- 24 x 48 36x72 | 42x48 | 48x96
- 36 x 54 36x36 | 42x42 | 48x72
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48
- 36 x 42 48x56
- 46.8 x 33.1 (A0)

Basic Professional

- 36 x 48 42x56 | 48x64
- 36 x 48 with infotail guides
- 24 x 48 36x72 | 42x48 | 48x96
- 36 x 54 36x36 | 42x42 | 48x72
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48
- 36 x 42 48x56
- 46.8 x 33.1 (A0)

Dark Orange

- 36 x 48 42x56 | 48x64
- 36 x 48 with infotail guides
- 24 x 48 36x72 | 42x48 | 48x96
- 36 x 54 36x36 | 42x42 | 48x72
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48
- 36 x 42 48x56
- 46.8 x 33.1 (A0)

Tail Stripe

- 36 x 48 42x56 | 48x64
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48
- 46.8 x 33.1 (A0)

Vertical Stripe

- 36 x 48 42x56 | 48x64
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48
- 46.8 x 33.1 (A0)

Tri-Color Site Bars

- 36 x 48 42x56 | 48x64
- 36 x 48 with infotail guides
- 24 x 48 36x72 | 42x48 | 48x96
- 36 x 54 36x36 | 42x42 | 48x72
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48

Green Apple

- 36 x 48 42x56 | 48x64
- 36 x 48 with infotail guides
- 24 x 48 36x72 | 42x48 | 48x96
- 36 x 54 36x36 | 42x42 | 48x72
- 42 x 42 36x36 | 42x42 | 48x48
- 42 x 48

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Google Trusted Store

EN 12:42 PM 3/19/2015

Poster Websites

www.waspacegrant.org/for_students/student_internships/wsgc_internships/posterdesign.html

Contact Us | Intranet | NASA

WASHINGTON NASA SPACE GRANT CONSORTIUM

Washington NASA Space Grant Consortium

About WSGC For Students For Educators General Public News & Events

Graduate Programs

- Fellowships
- NASA Fellowships

Undergraduate Programs

- Scholarships
- Courses

Student Internships

- WSGC Internships
- National NASA Internships

Student Team Awards

- NASA Microgravity University
- NASA University Student Launch Initiative

Calendar

The Basics of Poster Design

NEW! [Poster design workshop handout, 2014](#)

Most university and college students who participate in research will eventually need to create an academic poster. Done well, posters are an effective way to communicate research work concisely and powerfully.

- Getting started
- Organizing your research
- Choosing your tools
- Mastering the basics
- Creating design unity
- Some final tips
- More design resources & software tutorials

Carrier Bus for the Transiting Mars Gravity Biosatellite

Enlarge

This poster combines carefully selected graphics and plain fonts. The researcher's effective use of columns and precise, clear headings makes her poster presentation easy to follow, even without reading the large sections of text.

Poster Websites

www.ncsu.edu/project/posters/index.html

Creating Effective Poster Presentations | An Effective Poster

George Hess | Kathryn Tosney | Leon Liegel



An effective poster is a *visual* communications tool.

VIDEO
INTRODUCTION
(4:33)

An effective poster will help you ...

... engage colleagues in conversation.



... get your main point(s) across to as many people as possible.



An effective poster is ...

Focused Focused on a single message.

Graphic Lets graphs and images tell the story, uses text sparingly.

Ordered Keeps the sequence well-ordered and obvious.

In a hurry?

Try the [QUICK REFERENCE](#) from our [RESOURCES PAGE](#).

Or visit the [VIDEO LIBRARY](#).

An effective poster operates on multiple levels ...

- source of information
- conversation starter
- advertisement of your work

Many ineffective posters suffer from easy-to-fix problems, including ...

- objective(s) and main point(s) hard to find
- text too small

AN EFFECTIVE POSTER
DEFINE YOUR MESSAGE
KNOW YOUR AUDIENCE(S)
AN EFFECTIVE ABSTRACT
CREATE YOUR POSTER
: PLANNING
: FOCUS
: LAYOUT
: HEADINGS
: GRAPHICS
: TEXT
: COLORS
: EDITING
: SOFTWARE
PRESENT YOUR POSTER
EXAMPLES OF POSTERS
RESOURCES
VIDEO LIBRARY
Focused
Graphic
Ordered
USING THIS SITE
REPRODUCING MATERIAL
THE AUTHORS
EMAIL A COMMENT

12:43 PM
3/19/2015

Table of Contents

1 Group Project

- Proposal

- Poster

- **Speech**

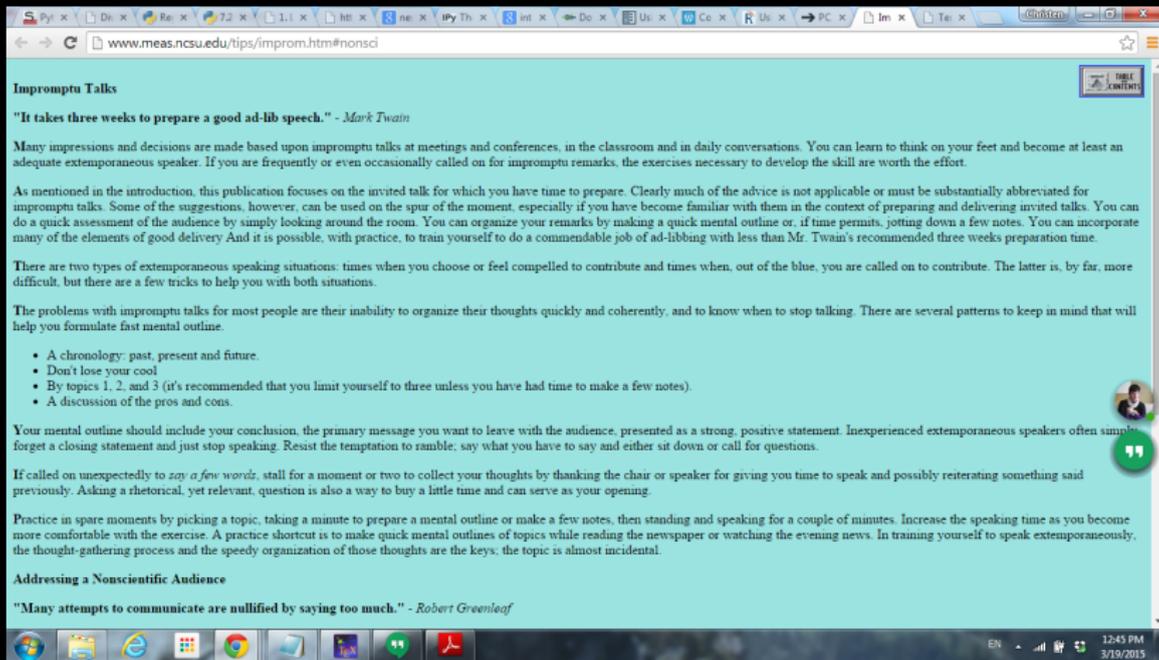
2 Big Picture

3 Proposition Relations

4 Propositional Interaction

- Conjunction

Speech Websites



The screenshot shows a web browser window with the address bar displaying `www.meas.ncsu.edu/tips/improm.htm#nonsci`. The page content is as follows:

Impromptu Talks

"It takes three weeks to prepare a good ad-lib speech." - Mark Twain

Many impressions and decisions are made based upon impromptu talks at meetings and conferences, in the classroom and in daily conversations. You can learn to think on your feet and become at least an adequate extemporaneous speaker. If you are frequently or even occasionally called on for impromptu remarks, the exercises necessary to develop the skill are worth the effort.

As mentioned in the introduction, this publication focuses on the invited talk for which you have time to prepare. Clearly much of the advice is not applicable or must be substantially abbreviated for impromptu talks. Some of the suggestions, however, can be used on the spur of the moment, especially if you have become familiar with them in the context of preparing and delivering invited talks. You can do a quick assessment of the audience by simply looking around the room. You can organize your remarks by making a quick mental outline or, if time permits, jotting down a few notes. You can incorporate many of the elements of good delivery. And it is possible, with practice, to train yourself to do a commendable job of ad-libbing with less than Mr. Twain's recommended three weeks preparation time.

There are two types of extemporaneous speaking situations: times when you choose or feel compelled to contribute and times when, out of the blue, you are called on to contribute. The latter is, by far, more difficult, but there are a few tricks to help you with both situations.

The problems with impromptu talks for most people are their inability to organize their thoughts quickly and coherently, and to know when to stop talking. There are several patterns to keep in mind that will help you formulate fast mental outline.

- A chronology: past, present and future.
- Don't lose your cool
- By topics 1, 2, and 3 (it's recommended that you limit yourself to three unless you have had time to make a few notes).
- A discussion of the pros and cons.

Your mental outline should include your conclusion, the primary message you want to leave with the audience, presented as a strong, positive statement. Inexperienced extemporaneous speakers often simply forget a closing statement and just stop speaking. Resist the temptation to ramble, say what you have to say and either sit down or call for questions.

If called on unexpectedly to *say a few words*, stall for a moment or two to collect your thoughts by thanking the chair or speaker for giving you time to speak and possibly reiterating something said previously. Asking a rhetorical, yet relevant, question is also a way to buy a little time and can serve as your opening.

Practice in spare moments by picking a topic, taking a minute to prepare a mental outline or make a few notes, then standing and speaking for a couple of minutes. Increase the speaking time as you become more comfortable with the exercise. A practice shortcut is to make quick mental outlines of topics while reading the newspaper or watching the evening news. In training yourself to speak extemporaneously, the thought-gathering process and the speedy organization of those thoughts are the keys, the topic is almost incidental.

Addressing a Nonscientific Audience

"Many attempts to communicate are nullified by saying too much." - Robert Greenleaf

The bottom of the screenshot shows a Windows taskbar with various application icons and a system tray on the right displaying the date and time: 12:45 PM 3/19/2015.

Speech Websites

The screenshot shows a web browser window with the address bar displaying `www.cgd.ucar.edu/cms/agu/scientific_talk.html`. The page title is "Ten Secrets to Giving a Good Scientific Talk". The content includes an introduction, a list of secrets, and detailed explanations for each.

More people will probably listen to your scientific talk than will read the paper you may write. Thus the scientific talk has become one of the most important communication forums for the scientific community. As proof, we need only look at the rising attendance at and the proliferation of meetings. In many ways your research reputation will be enhanced (or diminished) by your scientific talk. The scientific talk, like the scientific paper, is part of the scientific communication process. The modern scientist must be able to deliver a well organized, well delivered scientific talk.

I have compiled this personal list of "Secrets" from listening to effective and ineffective speakers. I don't pretend that this list is comprehensive - I am sure there are things I have left out. But, my list probably covers about 90% of what you need to know and do.

Most scientific presentations use visual aids - and almost all scientific presentations are casual and extemporaneous¹. This "scientific style" places some additional burdens on the speaker because the speaker must both manipulate visual media, project the aura of being at ease with the material, and still have the presence to answer unanticipated questions. No one would argue with the fact that an unprepared, sloppy talk is a waste of both the speaker's and audience's time. I would go further. A poorly prepared talk makes a statement that the speaker does not care about the audience and perhaps does not care much about his subject.

So what are the secrets of a good talk? Here is my list of do's and don'ts.

1) **Prepare your material carefully and logically.** Tell a story. The story should have four parts:

(a) Introduction (b) Method (c) Results (d) Conclusion/Summary.

The *Introduction* should not just be a statement of the problem - but it should indicate your motivation to solve the problem, and you must also motivate the audience to be interested in your problem. In other words, the speaker must try and convince the audience that the problem is important to them as well as the speaker.

The *Method* includes your approach and the caveats. To me, the Method becomes more interesting to the listener if this section is "story like" rather than "text book like". In other words "I did this and this did that, but that didn't work so I did something else." This Rather than, "The final result was obtained using this approach." This adds the human element to your research which is always interesting.

The *Results* section is a brief summary of your main results. Try and be as clear as possible in explaining your results - include only the most salient details. Less salient details will emerge as people ask questions.

The *Conclusion/Summary* section should condense your results and implications. This should be brief - a bullet or outline form is especially helpful. Be sure to connect your results with the overview statements in the *Introduction*. Don't have too many points - three or four is usually the maximum.

These four items are the core of a good talk. Good speakers often broaden the Introduction to set the problem within a very wide context. Good speakers may also add fifth item: *Future Research*.

There is a crusty old saying among good speakers that describes a presentation from the communication viewpoint: "Tell'em what you are going to tell'em. Tell'em. Then tell'em what you told'em." The

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 **Big Picture**
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Big Picture

Why are we learning...

- Set theory?
- Set theoretic notation?
- Propositional logic?
- Truth tables?

Big Picture

- To better understand meaning in propositions and words
- Entailment
- Quantifiers
- Pragmatics...

Big Picture

We are laying the groundwork to discuss the big picture. To get there, we will cover...

- Predicate logic (more abstractions)

Building Blocks

- This requires learning/memorizing the tools we will use
- There is a lot of abstraction

Realworld Grounding

Why truth tables? With your group, brainstorm

- All logical possibilities
- Demonstrating real world intuitions
- The complex is just a lot of simple, basic parts

Realworld Grounding

Why truth tables?

- The complex is just a lot of simple, basic parts
- We define fundamental axioms and use those to understand the more complex

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Meaning Relations

- Chapter 4 uses the terms:
 - Paraphrase
 - Contradiction
 - Implication
- We will use the terms
 - Equivalence
 - Contradiction
 - Entailment

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Logical Connectives

- Need to memorize the theorems
- Additionally the truth tables

Logical Connectives

- And: \wedge
 - $[[\phi \wedge \psi]] = 1$ iff $[[\phi]] = [[\psi]] = 1$
- Or: \vee
 - $[[\phi \vee \psi]] = 1$ iff $[[\phi]] = 1$ or $[[\psi]] = 1$
- Exclusive Or: \oplus

Logical Connectives

- Entailment, Conditional: \rightarrow
 - $[[\phi \rightarrow \psi]] = 1$ iff $[[\phi]] = 0$ or $[[\psi]] = 1$
- Mutual entailment, biconditional: \leftrightarrow
 - $[[\phi \leftrightarrow \psi]] = 1$ iff $[[\phi]] = [[\psi]]$
- Brackets: $()$

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Conjunction

A conjunction of two propositional expressions is True iff the two propositional expressions are individually True

- $[[\phi \wedge \psi]] = 1$ iff $[[\phi]] = [[\psi]] = 1$

Truth Values

- For the statements:
 - r : “It is raining outside”
 - c : “It is cold”
 - $r \wedge c$: “It is raining outside and it is cold”

Truth Values

r	c	$r \wedge c$
1	1	1
1	0	0
0	1	0
0	0	0

Conjunction

Are the two expressions equivalent?

- $[[\phi \wedge \psi]]$
- $[[\psi \wedge \phi]]$

Conjunction

Are the two expressions equivalent?

- “I woke up and left the house”
- “I left the house and woke up”

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 **Propositional Interaction**
 - Conjunction

Disjunction

A disjunction of two propositional expressions is True iff at least one of the two expressions is individually True

- $[[\phi \vee \psi]] = 1$ iff $[[\phi]] = 1$ or $[[\psi]] = 1$

Truth Values

- For the statements:
 - r : “It is raining outside”
 - c : “It is cold”
 - $r \vee c$: “It is raining outside or it is cold”

Truth Values

r	c	$r \vee c$
1	1	1
1	0	1
0	1	1
0	0	0

Assignment No. 7

Exercise 2.23

Draw a truth table for the statements:

- 1 'John is home and Mary is happy'
- 2 'John is home or Mary is happy'

Truth Values

- For the statements:
 - r : “It is raining outside”
 - c : “It is cold”
 - $r \oplus c$: “Either it is raining outside or it is cold”

Truth Values

r	c	$r \oplus c$
1	1	0
1	0	1
0	1	1
0	0	0

Assignment No. 7

Exercise 2.20

Draw a truth table for the statement:
'either she passed the exam or she
did not pass the exam'

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 **Propositional Interaction**
 - Conjunction

Conditional

A 'conditional' consisting of two propositional expressions is True iff the antecedent expression is False or the consequent expression is True

- $[[\phi \rightarrow \psi]] = 1$ iff $[[\phi]] = 0$ or $[[\psi]] = 1$

Truth Values

- For the statements:
 - k : “Karen went to the party”
 - g : “Gita went to the party”
 - $k \rightarrow g$: “If Karen went to the party, then Gita went to the party”

Truth Values

k	g	$k \rightarrow g$
1	1	1
1	0	0
0	1	1
0	0	1

Entailment

Does the first statement entail the second?

- 1 Xochitl cooked an egg
- 2 Xochitl boiled an egg

Entailment

Does the first statement entail the second?

- 1 Ofra boiled an egg
- 2 Ofra cooked an egg

Entailment

Does the first statement entail the second?

- 1 Julio saw a boy
- 2 Julio saw a person

Entailment

Does the first statement entail the second?

- 1 Sameer ate something
- 2 Sameer ate all the cookies something

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 **Propositional Interaction**
 - Conjunction

Biconditional

A 'biconditional' consisting of two propositional expressions is True iff the antecedent expression and the consequent expression both have the same truth value.

- $[[\phi \leftrightarrow \psi]] = 1$ iff $[[\phi]] = [[\psi]]$

Truth Values

- For the statements:
 - s : “Sarah went to the party”
 - d : “Dani went to the party”
 - $k \leftrightarrow d$: “Sarah went to the party if and only if Dani went to the party”

Truth Values

s	d	$s \leftrightarrow d$
1	1	1
1	0	0
0	1	0
0	0	1

Entailment

Does the first statement entail the second and vice versa?

- 1 Football is forbidden
- 2 Sports is forbidden

Entailment

Does the first statement entail the second and vice versa?

- 1 Some countries have no coastlines
- 2 Not all countries have a coastline

Entailment

Does the first statement entail the second and vice versa?

- 1 The archduke was assassinated by the Serbian
- 2 The archduke is dead

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Table of Contents

- 1 Group Project
 - Proposal
 - Poster
 - Speech
- 2 Big Picture
- 3 Proposition Relations
- 4 Propositional Interaction
 - Conjunction

Scope

Every logical connective has scope.

- Think of scope as domain that the connective operates over
- What is being operated on

Scope

- We can clarify domain using brackets
- Scope interactions can lead to ambiguity

Types of Scope

Given two interpretations of some logical operator (e.g. $\neg\phi \wedge \psi$), we can say refer to them as having:

- **Wide** scope
- **Narrow** scope

Types of Scope

Wide scope

- Operates over the larger grouping
- e.g. $\phi \wedge \psi$ are negated

Types of Scope

Narrow scope

- Operates over only the smallest unit
- e.g. Only ϕ is negated

Scope Practice

What is the scope of negation in the two wff (well-formed formulae)?

- $\neg(\phi \wedge \psi) \rightarrow \rho$
- $\neg((\phi \wedge \psi) \rightarrow \rho)$

Scope Practice

What is the scope of the connectives?

- $\phi \wedge \psi$
- $\phi \vee \psi \wedge \neg\phi \rightarrow \psi$
- $(\phi \vee \psi) \wedge (\neg\phi \rightarrow \psi)$
- $\neg\phi \vee \neg\phi$

Scope Practice

What is the scope of the connectives?

- $\neg(\phi \vee \neg\phi)$
- $\phi \rightarrow \phi \wedge \psi$
- $\phi \rightarrow (\phi \wedge \psi)$

Scope Practice

What is the scope of the connectives?

- $\neg\phi \rightarrow \psi \rightarrow \psi \rightarrow \rho \wedge \neg\phi \rightarrow \rho$
- $\neg(((\phi \rightarrow \psi) \rightarrow (\psi \rightarrow \rho)) \wedge \neg(\phi \rightarrow \rho))$

Main Connective

The **main connective** is the connective that has the widest scope. This tells us the type of connective we are dealing with (i.e. a negation, a conjunction, a disjunction, a conditional, or a biconditional)

Main Connective

Identify the main connective for the following expressions.

- $\phi \rightarrow (\phi \wedge \psi)$

- conditional

- $\phi \wedge \neg\phi$

- conjunction

Main Connective

Identify the main connective for the following expressions.

- $\phi \vee \neg\phi$

- disjunction

- $\neg(\phi \vee \neg\phi)$

- negation

Main Connective

Identify the main connective for the following expressions.

- $\phi \rightarrow (\psi \rightarrow \phi)$

- **conditional**

- $(\phi \wedge \psi) \leftrightarrow (\psi \wedge \phi)$

- **biconditional**

Main Connective

Identify the main connective for the following expressions.

- $$\left(\left((\phi \rightarrow \psi) \rightarrow (\psi \rightarrow \rho) \right) \rightarrow (\phi \rightarrow \rho) \right)$$

- conditional

Main Connective

Identify the main connective for the following expressions.

- $\neg(((\phi \rightarrow \psi) \rightarrow (\psi \rightarrow \rho)) \wedge \neg(\phi \rightarrow \rho))$

- negation

Main Connective

Identify the main connective for the following expressions.

- $(\phi \rightarrow \psi) \vee (\psi \rightarrow \phi)$

- disjunction

Scope

- “It is not raining and cold”
 - $\neg + r + \wedge + c$
 - $\neg r \wedge c$
 - $\neg(r \wedge c)$

Scope

r	$\neg r$	c	$\neg r \wedge c$
1	0	1	0
1	0	0	0
0	1	1	1
0	1	0	0

Scope

r	c	$r \wedge c$	$\neg(r \wedge c)$
1	1	1	0
1	0	0	1
0	1	0	1
0	0	0	1

Assignment No. 7

Exercise 2.11

The statement 'John paid Mary and Mary paid Bill or John paid Bill' has at least **two** meanings. What two of the meanings? How could they be distinguished in English by inserting a strategically placed 'either'?

Assignment No. 7

Exercise 2.11

$$jm \wedge mb \vee jb$$

- $(jm \wedge mb) \vee jb$

- $jm \wedge (mb \vee jb)$

Assignment No. 7

Exercise 2.11

$jm \wedge mb \vee jb$

■ $(jm \wedge mb) \vee jb$:

■ 'Either John paid Mary and
Mary paid Bill or John paid Bill'

Assignment No. 7

Exercise 2.11

$$jm \wedge mb \vee jb$$

- $jm \wedge (mb \vee jb)$

- 'John paid Mary and either Mary paid Bill or John paid Bill'

Assignment No. 7

Exercise 2.13

Draw the truth tables for the following expressions and verify their truth conditions are different.

1 $(p \wedge q) \vee r$

2 $p \wedge (q \vee r)$

Assignment No. 7

Exercise 2.13

$$1 \quad (p \wedge q) \vee r$$

$$2 \quad p \wedge (q \vee r)$$

These statements can be the result of different readings of an expression:

$$p \wedge q \vee r$$

Assignment No. 7

Exercise 2.9

Draw truth tables for the following sentences (assume 'inclusive or'):

- 1 'either the boat capsized or John fell in'

Assignment No. 7

Exercise 2.9

Draw truth tables for the following sentences (assume 'inclusive or'):

- 1 'either the Angels won and the Dodgers tied or the Giants lost'

Assignment No. 7

Exercise 2.9

Draw truth tables for the following sentences (assume 'inclusive or'):

- 1 'Pooh will have honey and either he will have maple syrup or he will have clotted cream'

Assignment No. 7

Exercise 2.16

- 1 'it is not the case that both p and q are true'
- 2 Check in the truth table that either p or q is false when the proposition above is true.

Assignment No. 7

Exercise 2.16

- 1 'it is not the case that either p or q is true'
- 2 Check in the truth table that both p and q are false when the proposition above is true.

Essentially the same sentence

- Either John is home, or he left his lights on.
- $p \vee q$
- If John is not home, then he left his lights on.
- $\neg p \rightarrow q$

Essentially the same sentence

Now you can simply negate p again in both formulae, without affecting their equivalence:

- $\neg p \vee q$

- $p \rightarrow q$

We want to check the truth of the conditional when p is false

Essentially the same sentence

To do that, we can rely on the disjunction in, because the two formulae are equivalent:

- if p is false, then $\neg p$ is true,

Essentially the same sentence

- and if $\neg p$ is true, then the whole disjunction is true, simply because one of its disjuncts is true.
- So the falsity of p makes the disjunction true,

Essentially the same sentence

- and since the disjunct is equivalent to the conditional,
- the conditional is also true.

Assignment No. 7

Exercise 2.21

Draw the truth tables for the following pairs of sentences. The following pairs of sentences should all have the same truth conditions.

Assignment No. 7

Exercise 2.21

- 1 John proposed to Mary and either she hit him or he banged his head.
- 2 Either John proposed to Mary and she hit him or else John proposed to Mary and he banged

Assignment No. 7

Exercise 2.21

- 1 John proposed to Mary and either she hit him or he banged his head.

- $p \wedge (h \oplus b)$

Assignment No. 7

Exercise 2.21

- 1 Either John proposed to Mary and she hit him or else John proposed to Mary and he banged his head.

- $(p \wedge h) \oplus (p \wedge b)$

Assignment No. 7

Exercise 2.21

The following pairs of sentences should all have the same truth conditions.

1 $p \wedge (h \oplus b)$

2 $(p \wedge h) \oplus (p \wedge b)$

Assignment No. 7

Exercise 2.21

Draw the truth tables for the following pairs of sentences. The following pairs of sentences should all have the same truth conditions.

Assignment No. 7

Exercise 2.21

- 1 Either Colonel Mustard did it or it was done in the billiards room and it was done with the candlestick.
- 2 Either Colonel Mustard did it or it was done in the billiards room

Assignment No. 7

Exercise 2.21

- 1 Either Colonel Mustard did it or it was done in the billiards room and it was done with the candlestick.

■ $m \oplus b \wedge c$

Assignment No. 7

Exercise 2.21

- 1 Either Colonel Mustard did it or it was done in the billiards room and (also) either Colonel Mustard did it or it was done with the candlestick.

- $(m \oplus b) \wedge (m \oplus c)$

Assignment No. 7

Exercise 2.21

Draw the truth tables for the following pairs of sentences. The following pairs of sentences should all have the same truth conditions.

1 $m \oplus b \wedge c$

2 $(m \oplus b) \wedge (m \oplus c)$

“... But...”

- How do we treat the word **but** in the proposition “The food is cheap but good”?

“... But...”

- Is this statement equivalent to “The food is cheap and good”?
- We can treat is as the same as the logical connective \wedge

Assignment No. 7

Exercise 2.24

Make a truth table for the statement: 'either p or q but not both'. This is often known as 'exclusive or' as opposed to 'inclusive or'

- $p \vee q \wedge \neg(p \wedge q)$

- $p \oplus q$

Exclusive 'or'

- The real question is, do we have an “exclusive or” in our semantics?
- Draw a truth table for “John spoke to Mary or Sue or Both” using the exclusive and exclusive or.