

Understanding Legal Terminology through Symbolic Logic

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- The median reading level among jury-eligible adults in the US is estimated to be roughly equivalent to 7th-8th grade level (think *Hunger Games*).
- The language of legal procedure is filled with terms whose meanings are interpreted narrowly by practitioners.
- We studied samples of jury instructions provided online by state justice department websites.
 - Language can be dense: long words, long sentences, prolific in sub-clauses. Average readability score for language we looked at is college-level or college-graduate level.
 - In many cases juries receive their instructions for the first time directly prior to the deliberation phase, after the arguments have been completed.
 - Some states allow judges to issue written instructions; in some cases juror instructions are only issued orally.

Specificity of legal terms

Legal terms have very specific meanings that are well-understood by legal practitioners but may not be commonly understood in other settings:

- proof beyond a **reasonable doubt** vs. based on a **preponderance of the evidence**
- **if / so / then / when**: (as opposed to “if and only if”)
- **but-for causation**: “*But for* the driver’s negligence, she would not have hit the pedestrian.”
- **consistent with**: “The bullet found at the scene is *consistent with* a .33 caliber handgun.”

Examples of “complex” language

Considering prior transactions

I instruct you that before you may consider any other transaction for the limited purpose I have referred to, you must first determine whether this accused committed the other transaction, and if so, whether any such act was similar enough to the crime charged in this indictment, so that proof of another transaction in light of the limited purpose for which it has been presented to you would tend to prove an element of a crime charged in this indictment.

Examples of “complex” language

Expert witnesses

I am allowing the witness to testify in part to materials that have not been admitted in evidence. This testimony is allowed for a limited purpose. It is allowed so that the witness may tell you what they relied on to form their opinion. The material being referred to is not evidence in this case and may not be considered by you as evidence. You may consider the material for the purpose of deciding what weight, if any, you will give the opinions testified to by this witness.

Examples of “complex” language

Contracts

Because intent, including intent to be bound, is seldom susceptible to direct proof as it relates to a person’s state of mind, the law presumes that a person intends the natural and probable consequences of that person’s acts. The meeting of the minds or the mutual manifestation of intent may be made wholly or partly by written or spoken words or by other acts or conduct, and an internal or unexpressed intention not to be bound is ineffective.

In determining whether there was any contract, you must decide whether or not there was a meeting of the minds between the parties with respect to the terms of the alleged oral agreement and a present intention to be bound.

Current simplification efforts

- In many jurisdictions (notably, states of California, Florida, and Illinois) there have been efforts to simplify the language provided to juries:
 - Reduce grade level (sentence-length and word-length); reduce “legalese”; reinforce concepts through repetition
- Reducing word count does not necessarily reduce the *logical complexity* of a sentence.
- Research done with mock juries has not shown conclusively that the simplified instructions result in a higher rate of understanding.
- We propose that learning ordinary symbolic logic forms a solid foundation for equipping jurors with the tools they need to deal with this language.

Legal terms

Simple connectives like those referenced above can be framed through propositional logic and translated into truth tables:

If p then q (no content when p is false):

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

But for p , not q (no q without p):

p	q	$\neg p \rightarrow \neg q$
T	T	T
T	F	T
F	T	F
F	F	T

p is consistent with q (may coexist, existential):

p	q	$\neg(p \rightarrow \neg q)$
T	T	T
T	F	F
F	T	F
F	F	F

Considering prior transactions

I instruct you that **before** you may consider any other transaction for the limited purpose I have referred to, you must first determine whether this accused committed the other transaction, **and if so**, whether any such act was similar enough to the crime charged in this indictment, so that proof of another transaction in light of the limited purpose for which it has been presented to you would tend to prove an element of a crime charged in this indictment.

Despite the density of language, the logical complexity of the imperative to the reader is low: “If you are to consider other transactions, then you are to determine both that the accused committed the other transaction and that the transaction was similar to the crime charged.”

$$p \rightarrow (q \wedge r)$$

Expert witnesses

I am allowing the witness to testify in part to materials that have not been admitted in evidence. This testimony is allowed for a limited purpose. It is allowed so that the witness may tell you what they relied on to form their opinion. The material being referred to is not evidence in this case and may not be considered by you as evidence. You may consider the material for the purpose of deciding what weight, if any, you will give the opinions testified to by this witness.

Again, the logical content of these sentences is relatively straightforward. The only imperative to the reader is this: “if you consider this material, then it must be toward establishing the credibility of the witness.”

$$p \rightarrow q$$

Preliminary efforts

Research goal: gauge the effectiveness of basic education in symbolic logic as preparing potential jurors for the task of parsing complex instructions.

- Liberal Arts Mathematics course as a petri dish
 - Unit on deductive reasoning (symbolic language, truth tables, deductions, Lewis Carroll problems)
- 30 students volunteered to complete a questionnaire before and after this unit
 - Basic syllogisms, legal case study vignettes—multiple choice and short-answers about their thinking
- Our results:
 - Big improvement in ability to assess syllogisms (phew)
 - Some improvement in correctly applying sample instructions to case vignettes

Future work

- Collaborate with social scientists and lawyers
- IRB approval and support for a larger study
- Lobby for wider adoption of symbolic deductive reasoning as a foundational mathematics topic

Resources

- **Historical context**

S. Cho, *Capital Confusion: The Effect of Jury Instructions on the Decision to Impose Death*, Journal of Criminal Law & Criminology

- **Initial improvement efforts**

E. Chilton, P. Henley, *Jury Instructions: Helping Jurors Understand the Evidence and the Law*, Public Law Research Institute

- **Issues with current simplification efforts**

C. Baguley, B. McKimmie, B. Masser, *Deconstructing the Simplification of Jury Instructions: How Simplifying the Features of Complexity Affects Jurors? Application of Instructions, Law and Human Behavior*