

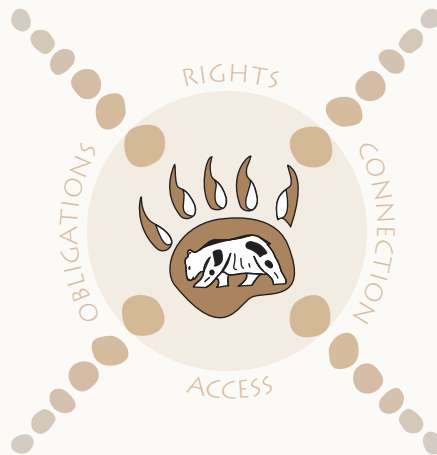
Understanding Technical Language: A Literature Review

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Executive Summary

There are three primary factors that affect a person's ability to understand technical language: linguistic characteristics of the language, education levels and literacy rates. Research indicates that technical language is written at a level well beyond the reach of the average person. In addition, it is clear that lower education levels and literacy rates among minority groups leaves them at a severe disadvantage in understanding a language that is already inaccessible. However, the research also demonstrates that simplification improves comprehension. Therefore, the effects of linguistic difficulties with language can be mitigated by simplifying technical language. Addressing the second and third factors, limited literacy and education, would involve substantive change because the literacy rates and education levels in minority communities must be improved.

Introduction

The aim of this literature review is to answer two questions regarding the comprehension of technical language: (1) Does the general public understand technical language? (2) Is there any evidence to suggest that minorities understand technical language any better or worse?

Technical language is very different in style and structure from everyday language. The term refers to vocabulary, grammar, sentence structure, and document organization. Technical language is found in fields such as medicine, law, finance, etc.

Many studies of the general public's understanding of technical terminology or documents are included, all of which suggest that comprehension is minimal at best. Three evaluation methodologies are examined to obtain a picture of the general public's understanding of technical language: readability, comprehension studies, and literacy rates. Readability tests evaluate the mechanics of a document to estimate the level of difficulty for the reader. Common readability tests used are the Flesch, Flesch-Kincaid, Dale-Chall, Fry, Fog, and SMOG tests. Comprehension studies focus on the understanding of jury instructions and plain language redrafting, with a lesser focus on understanding of terminology. Methodology usually involves paraphrasing tasks, interviews, or comprehension questionnaires (multiple choice, definitions, true/false). Literacy rates are reported by government agencies or public organizations.

Although conclusions about the general public are easy to draw from the evidence, minorities' understanding is more difficult to evaluate. By examining factors in minority groups that are frequently cited as affecting understanding of technical language in the general public, such as literacy and education levels, an inference can be made that minorities would be less likely to understand technical terminology. Further research would be beneficial to clarify discrepancies between understanding in minority groups and the general public.

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In conclusion, it appears that two elements can impede understanding of technical language: personal factors and linguistic factors. Personal factors can be divided into education levels and literacy rates. Linguistic factors encompass barriers such as technical terminology, jargon, passive sentences, lengthy sentences, etc. Together, these factors make it very difficult for the general public, and even more difficult for minorities, to access technical language.

Review of Relevant Literature

Technical Language

Technical language is any language that laypeople are not exposed to on a regular basis. This includes legal, medical, taxation, financial language, etc. It refers to both technical terminology and technical documents, thereby including vocabulary, grammar, sentence structure, and document organization. Technical language can be found in legislation, contracts, policy, consent forms, and even in newspaper articles.

It has been proven that technical language is very different in style and structure from that of everyday literature,¹ and to treat it as separate, therefore, is appropriate in research. Much of the literature on technical language thus treats technical terminology and structure as comprising a fully separate language from, or subset of, everyday English.² Specific grammatical differences of technical language are described in detail in the works of Charrow and Charrow, Tiersma (1999), Mellinkoff, Benson, Masson and Waldron, and Sales, Elwork, and Alfini (1977).³ Sales, Elwork, and Alfini perhaps give the best list of psycholinguistic research to support elements they list as problematic, although Charrow and Charrow have the results of their own experiments to support their suggestions.

1 Veda Charrow, Jo Ann Crandall, and Robert Charrow, "Characteristics and functions of legal language," in *Sublanguage: Studies of language in restricted semantic domains*, ed. Richard Kittredge and John Lehrberger, 175-190 (Berlin: Walter de Gruyter, 1982); Peter Tiersma, "What Makes Legal Language Difficult to Understand?" Ch. 12 in *Legal Language* (Chicago: University of Chicago Press, 1999); David Mellinkoff, *The Language of the Law* (Boston: Little, Brown and Co, 1963); Robert Benson, "The End of Legalese: The Game is Over," *New York University Review of Law and Social Change* 13 (1985): 519-73; Michael Masson and Mary Anne Waldron, "Comprehension of Legal Contracts by Non-Experts: Effectiveness of Plain Language Redrafting," *Applied Cognitive Psychology* 8 (1994): 67-85; Bruce Sales, Amiram Elwork, and James Alfini, "Improving Comprehension for Jury Instructions," in *Perspectives in Law & Psychology*, vol.1, ed. Bruce Sales (New York: Plenum Press, 1977).

2 See: Mellinkoff, *Language of the Law*, 10, *supra* note 1; Peter Tiersma, "Some Myths about Legal Language," *Los Angeles: Loyola Law School*, 2005. Online: <http://ssrn.com/abstract=845928>; Brenda Danet, "Language in the Legal Process," *Law & Society Review* 14, no.3 (Spring 1980): 445-564.

3 Robert and Veda Charrow, "Making Legal Language Understandable: A Psycholinguistic Study of Jury Instructions," *Columbia Law Review* 79, no.7 (Nov 1979): 1306-1374; Tiersma, "What Makes Legal Language Difficult to Understand?" *supra* note 1; Mellinkoff, *Language of the Law*, *supra* note 1; Benson, "The End of Legalese," *supra* note 1; Masson and Waldron, "Comprehension of Legal Contracts by Non-Experts," *supra* note 1; Sales, Elwork, and Alfini, "Improving Comprehension for Jury Instructions," *supra* note 1.

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The characteristics that make technical language unique also make it complex.⁴ Sales, Elwork, and Alfini show that many of the unique linguistic elements of technical language have proven to hinder understanding in other literature.⁵

Technical Language and the General Public

There are three ways this paper will examine whether the general public understands technical language: readability tests, comprehension studies, and literacy rates.

Readability

Readability is one measure of a document's probable comprehensibility. Readability is measured using readability formulas, which evaluate the mechanics of a document to estimate the level of difficulty for the reader. Common formulas include the Flesch Reading Ease, Flesch-Kincaid Grade Level, Fog, SMOG, Fry, and Dale-Chall.

Research (and common sense) indicates that readability improves with increased frequency of familiar and shorter words⁶ and increased use of shorter and less complex sentences,⁷ therefore readability tests are based varyingly on word length and familiarity (by compiling "common" word lists) and sentence length and complexity. It is not unreasonable to infer that many technical terms are unfamiliar or lengthy, and sentences in technical documents lengthy and complex, and that this would be a reason why technical writing is difficult for the general public to understand.

To test the assumption that technical language contains lengthy and unfamiliar words composed into lengthy and complex sentences, researchers have performed a variety of readability tests on technical language. Their research is summarized below. (*Also, see the appendix for a table of summarized research.*)

Robert Benson⁸ – performed readability tests on a consent form, simplified jury instructions, original (legalese) jury instructions, legislation, a news article, and an excerpt from a sixth grade textbook. All literature that contained legalese (legislation, consent form, original jury instructions) was well beyond the average reading level for his state of California.

4 Tiersma, "What Makes Legal Language Difficult to Understand?" supra note 1.

5 Sales, Elwork, and Alfini, "Improving Comprehension for Jury Instructions," supra note 1.

6 *In fact, Elwork, Sales and Alfini. point out, "There are literally hundreds of psycholinguistic studies that have demonstrated that familiar words are more easily perceived, remembered, and comprehended." Amiram Elwork, Bruce Sales, and James Alfini, "Juridic Decisions: In Ignorance of the Law or in Light of It?" Law and Human Behavior 1, no. 2 (1977): 165; also see George Klare, "The role of word frequency in readability," Elementary English 45 (1968):12-22; Steven Stahl, "Vocabulary and Readability: How Knowing Word Meanings Affects Comprehension," Top Language Disorders 23, no. 3 (2003): 241-247.*

7 E. Coleman, "Improving Comprehensibility by Shortening Sentences," *Journal of Applied Psychology* 46 (1962): 131-134.

8 Benson, "The End of Legalese," supra note 1.

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Jeffrey Davis⁹ – compared an original consumer contract and a simplified one for readability levels. The original one tested at between the sixteenth and seventeenth grade levels, whereas the simplified one was between the eleventh and twelfth grade levels, according to both the Flesch and Dale-Chall tests.

Graber, D'Alessandro and Johnson-West¹⁰ – tested the readability of privacy policies on internet health websites. They found that the policies fell, on average, within the “difficult” spread, or worse, for all sites tested.

Hopper, TenHave and Hartzel¹¹ – studied the readability of informed consent forms. They found that they all contained large amounts of complex words and the lowest grade level of education required to read a document was 10.8.

David Magleby¹² – (In Benson) tested voter pamphlets for readability. Pamphlets are written at above average grade level for four different states.

Masson and Waldron¹³ – revised a contract using three different methods (removing archaic terms, redrafting using plain language, defining legal terms) and tested for readability. Readability increased with each revision; improving in total from 19.0 on the original document to 71.2 on the legal-terms-defined on the Flesch Reading Ease 100 point scale.

David Pothier¹⁴ – performed the Flesch Reading Ease test on both the standard UK consent form and Statement of Patient. Both documents scored within the “difficult, college” range of readability.

Smith and Richardson¹⁵ – compared original and revised versions of the Australian taxation legislation for readability. While the revised version did show an improvement in readability, it was only slight and both drafts were within an unacceptably complex region of the test.

9 Jeffrey Davis, “Protecting Consumers from Overdisclosure and Gobbledygook: An Empirical Look at the Simplification of Consumer-Credit Contracts,” *Virginia Law Review* 63, no.6 (Oct 1977): 841-920.

10 Mark Graber, Donner D'Alessandro and Jill Johnson-West, “Reading Level of Privacy Policies on Internet Health Websites,” *Journal of Family Practice* 51, no. 7 (July 2002): 642-645.

11 Tenneth Hopper, Thomas TenHave and Johnathan Hartzel, “Informed Consent Forms for Clinical and Research Imaging Procedures: How Much Do Patients Understand?” *American Journal of Roentgenology* 163 (Feb 1995): 493-496.

12 David Magleby, “Voter Pamphlets: Understanding Why Voters Don't Read Them,” Paper Prepared for Delivery at 1981 Annual Meeting of American Political Science Association, New York City, Sept. 3-6, 1981.

13 Masson and Waldron, “Comprehension of Legal Contracts by Non-Experts,” *supra* note 1.

14 David Pothier, “Many patients may not understand consent forms,” *British Medical Journal* 330, no. 7500 (May 2005): 1151.

15 David Smith and Grant Richardson, “The Readability of Australia's Taxation Laws and Supplementary Materials: An Empirical Investigation,” *Fiscal Studies* 20, no. 3 (1999): 321-349.

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Walfish and Watkins¹⁶ – tested the readability of Notices of Privacy Practices using the Flesch-Kincaid Grade Level score and the Flesch Reading Ease scale. Sixty-five percent of the documents were at the Grade 12 level or above, and ninety percent of them were in the “difficult” or “very difficult” ranges of the Flesch Reading Ease scale. They point out that this was well above national literacy levels, which suggest that half of American adults cannot read above ninth grade level.

All of these tests found that technical language scores poorly on readability scales, suggesting it would be incomprehensible to the majority of the population. As well, the studies present a variety of documents containing technical language, implying that their results can probably be generalized to all technical language.

The only contrasting find was Rogers et al., who tested the readability of Miranda waivers and warnings in the United States. They found that based on the Mirandas’ mechanics, over eighty percent (82.3) of them were likely to be readable to eighty percent of the general population.¹⁷

Readability and Comprehension

While it is agreed that readability is a good indicator of difficulty,¹⁸ it is unclear whether improving readability lessens difficulty levels, thereby improving comprehension. The most common method to attempt to improve readability is to simplify documents using “plain language” drafting, which encompasses simplifying words, sentences, grammatical structure, and layout.

Studies by Masson and Waldron, and Davis use plain language to simplify contracts, and their results support the idea that as readability increases, so does comprehension.¹⁹ Charrow and Charrow, however, found no such correlation in their study on jury instructions.²⁰ Instead, their results showed that where some rewritten instructions showed an improvement in comprehension, they either regressed or did not progress in readability, and that instructions that showed no great improvements in comprehension sometimes scored better on readability tests than the original versions.

However, results also differ depending on measures taken to resolve readability issues. While many studies do not distinguish between different measures, a few attempt to discover which changes produce improvements. For example, Masson and Waldron

16 Steven Walfish and Keely Watkins, “Readability Level of Health Insurance Portability and Accountability Act Notices of Privacy Practices Utilized by Academic Medical Centers,” *Evaluation & the Health Professions* 28, no. 4 (Dec 2005): 479-486.

17 Richard Rogers et al., “An Analysis of Miranda Warning and Waivers: Comprehension and Coverage,” *Law and Human Behavior* 31 (2007): 177-192.

18 George Klare, “Assessing Readability,” *Reading Research Quarterly* 10, no. 1 (1974-5): 62-102.

19 Masson and Waldron, “Comprehension of Legal Contracts by Non-Experts,” supra note 1; Davis, “Protecting Consumers from Overdisclosure and Gobbledygook,” supra note 9.

20 Charrow and Charrow, “Making Legal Language Understandable,” supra note 3.

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found that removing or defining archaic and technical terminology did not improve understanding as effectively as redrafting the text to improve structure, and shorten and simplify sentences.²¹ In general, Zakaluk and Samuels agree that rewriting text with simpler words does not consistently improve comprehension.²²

Contrary to the basis of established readability formulas, Charrow and Charrow found sentence length had “virtually no effect” on comprehension.²³ However, this finding is criticized by Benson, who writes that the Charrows’ simplification process shortened sentences by an average of 35 percent, and that this could have well accounted for some of the increase in comprehension they observed.²⁴ In addition, it contradicts research that shows the correlation between sentence length and difficulty is strong.²⁵

Comprehension Studies: Jury Instructions

One very common method for testing the general public’s comprehension of technical language is testing understanding of jury instructions. This is appropriate because it is a common way in which laypersons are exposed to the legal system. Jury duty requires constant deciphering of legal language: from lawyers, in evidential documents, and in instructions by the judge. Jury instructions are of particular interest because they include the basic concepts of law and conditions for finding a defendant guilty. In addition, persons for jury duty in the United States (the origin of most found studies) are chosen randomly from registered voter, tax, and driver’s license lists to ensure an acceptable cross-section of the population, making it a representative sample of the general public.

Beginning in 1976, Strawn and Buchanan²⁶ set forth to determine whether jurors understood Florida jury instructions. They asked people who had been summoned for jury duty to watch a video and respond to multiple-choice and true/false questions to assess comprehension. One group received no instructions; the other was given the standard Florida jury instructions. While they found a ten percent improvement in comprehension for those who received instructions, Strawn and Buchanan stress that many key concepts remained misunderstood. Overall error rates were still high, and the authors suggest legal jargon may be responsible for much of it, as comprehension results for jargon either increased by only minuscule amounts or actually dropped for those who received instructions.

21 Masson and Waldron, “Comprehension of Legal Contracts by Non-Experts,” supra note 1.

22 Beverley Zakaluk, and S. Jay Samuels, ed. *Readability: Its Past, Present, and Future* (Newark: International Reading Association, 1988).

23 Charrow and Charrow, “Making Legal Language Understandable,” 1320, supra note 3.

24 Benson, “The End of Legalese,” supra note 1.

25 Coleman, “Improving Comprehensibility by Shortening Sentences,” supra note 7.

26 David Strawn and Raymond Buchanan, “Jury Confusion: A Threat to Justice,” *Judicature* 59, no.10 (1976): 478-483.

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Whereas Strawn and Buchanan did suggest jargon was an obstacle to understanding, the first substantial work that tries to correct language only appears in 1977, when Elwork, Sales and Alfini²⁷ set out to prove that they could use knowledge from psycholinguist studies and revise jury instructions to make them better understood. To do so, they asked students to watch a video and then fill in a questionnaire based on two sets of instructions: the original, legalese, version; and the version simplified by the researchers using the principles from the psycholinguistic studies. They were successful; the number of correct responses in the group that received simplified instructions was higher than in the group that did not.

However, they were critical of their own results. In their first study, they did not ask their participants to apply the instructions to a trial situation. The study was repeated, putting the instructions into a trial context, and the results were the same. Comprehension was still better for those who received simplified instructions.

In 1979, Charrow and Charrow²⁸ built on the work of Elwork, Sales and Alfini in “Making Legal Language Understandable: A Psycholinguistic Study of Jury Instructions.” They hypothesized that jury instructions are insufficiently understood by jurors due to specific linguistic characteristics, which could be identified and removed or revised to improve understanding. Their study differed from Elwork, Sales and Alfini’s work in two ways. They used prospective jurors instead of students to create a more representative population sample, and they attempted to empirically identify which linguistic elements were hindering understanding specifically for jury instructions (Elwork, Sales and Alfini based the linguistic elements they chose on previous research which was based on comprehension of literature in general, and not on legalese specifically).

Using paraphrasing methodology, Charrow and Charrow performed two experiments to test their hypothesis: (1) they asked prospective jurors to paraphrase unmodified jury instructions, and analyzed problem areas to identify impediments to understanding; and (2) they asked jurors to paraphrase jury instructions that had been modified according to the results from the first experiment. The results proved that Charrow and Charrow were successful in both increasing comprehension among jurors and identifying problem characteristics. Results improved by approximately 41 percent with revision.

Severance and Loftus,²⁹ in 1982, performed a similar study to Charrow and Charrow, which also attempted to identify areas of difficulty for jurors, but without a focus on linguistic properties. They analyzed clarification questions submitted to judges by deliberating juries to identify common problem areas. Based on the abundance of questions attempting to clarify information that should have been given in the jury instructions, the researchers concluded that the jury instructions were not understandable to the average juror.

27 Elwork, Sales, and Alfini, “Juridic Decisions,” supra note 6.

28 Charrow and Charrow, “Making Legal Language Understandable,” supra note 3.

29 Laurence Severance and Elizabeth Loftus, “Improving the Ability of Jurors to Comprehend and Apply Criminal Jury Instructions,” *Law & Society Review* 17, no.1 (1982): 153-198.

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To test this theory, they asked students to fill out a questionnaire, based on three conditions: receiving no instructions, receiving legalese instructions, and receiving instructions revised by the researchers to address common questions found in the first part of this study. They also found that comprehension increased with revision, and additionally, that confidence in the application of such knowledge increased as well.

Also in 1982, Elwork, Sales, and Alfini³⁰ studied Nevada and Florida jury instructions for their respective comprehensibility using juror participants and questionnaires. The average number of correct responses on the original draft of the Nevada instructions was 51 percent, as compared to 66 percent after their first revision, and 80 percent after a second revision. For the Florida instructions, average correct responses went from 65 to 85 percent.

In 1984, Severance, Loftus and Greene³¹ tried to expand upon their previous findings by addressing some of its weaknesses. Actual jurors had not been used for their 1982 study, nor had they considered as a focus the legal accuracy of their revisions. Therefore, the goal of this new study was to create legally accurate instructions, which would also be understandable to actual jurors.

To test this, they recruited people who had reported for jury duty in the past, as well as people currently waiting to serve jury duty. Before testing for comprehension differences between the original and revised jury instructions (already formulated from their last study), they submitted the revised instructions to legal professionals for assessment of legal accuracy. With legal accuracy satisfied, jurors were asked once again to fill out questionnaires, with the result again that the error rate in responses was lower for those who had received revised instructions. Finally, the researchers sent copies of the original and revised instructions to judges, who were asked to choose their preference. Judges preferred the revised instructions.

In 1990, Kramer and Koenig³² reviewed the results of the Michigan Juror Comprehension Project, which tested the comprehension of jurors who had served on trials using questionnaires. Their aim was to compare the effect of instructions specific to an individual juror's trial. For example, jurors who sat for murder cases were tested for their comprehension of jury instructions pertaining to murder, as compared to their comprehension of jury instructions for theft. They found that the effects of instructions were slight. More questions showed no significant effect than those that did, and one even showed a negative effect.

30 Amiram Elwork, Bruce Sales, and James Alfini, *Making Jury Instructions Understandable* (Charlottesville, Va.: Michi Company, 1982).

31 Laurence Severance, Edith Greene, and Elizabeth Loftus, "Toward criminal jury instructions that jurors can understand," *Journal of Criminal Law & Criminology* 75 (1984): 198-233.

32 Geoffrey Kramer and Dorean Koenig, "Do Jurors Understand Criminal Jury Instructions? Analyzing the Results of the Michigan Juror Comprehension Project," *Journal of Law Reform* 23, no.3 (1990): 401-437.

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In 1992, Reifman, Gusick and Ellsworth³³ took issue with some of the methodology in previous studies and sought to correct it in their own. Specifically, they wanted to see if the results of previous research could be generalized, because many had failed to account for factors in an actual trial situation. For example, they suggested that an actual trial, where someone's life is affected, might motivate jurors to better understand than in a simulated trial. In addition, they argued jury instructions are not the only source of instruction actual jurors receive on the law—both the crown and defense will argue points of the law in opening and closing arguments.

To address these perceived shortcomings, they sent a questionnaire to two target groups: people who had recently served on juries, and people who had been called for duty, but never sat on a jury. Comparing the two groups showed that those who had received instructions (those who had served) scored better than those who had received none (those who had not served). However, they also noted, in agreement with Kramer and Koenig, that jurors who were instructed in particular aspects of the law pertaining to their case (ie. definition of “drug trafficking” in a drug case) did not necessarily score significantly better on questions relating to pertinent law than those who had served on juries deciding the fate of unrelated law (ie. break and enter). In conclusion, they stated that while jury instructions, which were written in legalese, did improve comprehension over no instructions, they also left a lot to be desired. Overall comprehension levels were still low and the researchers even comment that many participants wrote to complain about the language used in their study, which was taken, for the most part, directly from the legalese instructions.

Comprehension Studies: Plain Language Redrafting

There are also many studies that attempt to prove that technical language is incomprehensible by comparing the results of original, technical, documents to redrafted, plain language ones on comprehension tests. This work is summarized below.

Jeffrey Davis³⁴ simplified consumer credit contracts and tested two versions by administering a multiple choice questionnaire to participants. His work showed a statistically significant improvement in score for those who had read the simplified contract, as opposed to the original. Scores improved by 26 percent.

Masson and Waldron³⁵ also worked with simplifying contracts, but they created three different drafts of a legal contract, each successively simplified with a method of plain language redrafting, to study what changes were the most effective for improving comprehension. Participants (students and clerical staff at the University of Victoria) were asked to read one version and then answer questions and paraphrase sections of

33 Alan Reifman, Spencer Gusick, and Phoebe Ellsworth, “Real Jurors’ Understanding of the Law in Real Cases,” *Law and Human Behaviour* 16, no. 5 (Oct 1992): 539-554.

34 Davis, “Protecting Consumers from Overdisclosure and Gobbledygook,” supra note 9.

35 Masson and Waldron, “Comprehension of Legal Contracts by Non-Experts,” supra note 1.

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the document. The percentage of questions correct increased from 69 to 84 percent. Justification for correct answers improved, and reading speed increased significantly. As for the most effective changes, the researchers found that replacing archaic terms and legalese alone was not as effective as fully restructuring the document using plain language. This may suggest that applying the principles of plain language drafting is more important than simply addressing difficult terminology.

Robert Benson³⁶ performed a comparison of different types of literature using a cloze test (which is similar to fill in the blank). He asked a group of law students and a group of non-lawyers to read and fill out a cloze test on a variety of literature: a consent form, simplified and legalese jury instructions, legislation, a news article, and an excerpt from a sixth grade textbook. While law students performed well on all documents, Benson found that non-lawyers experienced difficulty with any literature that contained legalese—the legislation, consent form, and legalese jury instructions. Non-lawyers also performed poorly on the news article, which was unexpected to Benson, but he explains that the article was about politics and used technical jargon concerning that topic, which may explain the confusion.

Joseph Kimble³⁷ performed a series of studies in which he asked judges and lawyers to choose between plain language and legalese paragraphs or sentences. Results consistently showed that even legal professionals preferred plain language writing.

In another study on legal professionals and technical language, Robert Benson and Joan Kessler³⁸ asked judges and their assistants to appraise legalese and simplified appellate briefs. Participants rated legalese documents as less persuasive, weaker, and the attorneys that wrote them as less professionally prestigious. The researchers suggest that these findings imply that lawyers run a great risk in drafting documents in legalese, as both judges and their assistants favour plain English. They add that their evidence refutes the idea that legalese is preferable because it is considered more intellectual or convincing.

David Kaufer³⁹ redrafted medical consent forms and noticed a 91 percent improvement in scores. On average, those who read the original form answered 2.36 questions correctly, whereas those who read the redrafted form answered 4.52 questions correctly. Kaufer also found a decrease in response time.

The IRS Tax Forms Simplification Project Interim Progress Report⁴⁰ noted that

36 Benson, “The End of Legalese,” *supra* note 1.

37 Joseph Kimble, *Lifting the Fog of Legalese* (Durham, N.C.: Carolina Academic Press, 2006).

38 Robert Benson and Joan Kessler, “Legalese v. Plain English: An Empirical Study of Persuasion and Credibility in Appellate Brief Writing,” *Loyola University of Los Angeles Law Review* 20 (1987): 301-321.

39 David S. Kaufer, Erwin Steinberg, and Sarah Toney, “Revising Medical Consent Forms: An Empirical Model and Test,” *Law, Medicine & Health Care* 11 (1983): 155-161.

40 Internal Revenue Service, *IRS Tax Forms Simplification Project Interim Progress Report* (New York: Siegel and Gale Inc. 1980).

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taxpayers filled out plain English forms quicker and more accurately – with a more accepting attitude – than the original forms.

Comprehension Studies: Terminology

Emma Crawford and Ray Bull⁴¹ studied teenagers' (age 12, 13, and 15) understanding of common legal terminology in the UK. They found that understanding increased with age, but only for certain terms. Some terms remained ill defined or unknown for all age groups, implying that a lack of understanding of some terms extends into adulthood.

Showing that a lack of understanding does extend into adulthood, David Scanlan et al.⁴² studied patients' understanding of key medical terminology and found that all but one participant understood at least 40 percent of the terminology. The average score was 68.3 percent correct.

Gittelman, Mahabee-Gittens, and Gonzalez-del-Rey⁴³ surveyed parents and guardians on their knowledge of common medical terms and definitions. The authors were disturbed to find that many parents gave incorrect or incomplete definitions for terms they thought they knew. The authors suggest this may hinder communication even further than if the guardians did not provide a definition, because it suggests that parents and physicians' definitions of medical terms differ.

Other Factors for Consideration: Understanding Legal Language

Although redrafting technical writing was found by most researchers to improve comprehension, many note that overall levels of comprehension remained unacceptably low.⁴⁴ This suggests that there are other impediments to understanding, aside from the linguistic idiosyncrasies of technical language.

There are many competing ideas on what the other impediments may be, however. Masson and Waldron suggest a “folk” understanding of the law (previous beliefs about the law) can impede our ability to understand it properly.⁴⁵ Balkin suggests a somewhat similar idea, proposing that if the law conflicts with our beliefs, we perceive it as incoherent to avoid cognitive dissonance because, in general, he argues that personal,

41 Emma Crawford and Ray Bull, “Teenagers’ difficulties with key words regarding the criminal court process,” *Psychology, Crime & Law* 12, no.6 (Dec 2006): 653-667.

42 David Scanlan et al., “Informed Consent for Cataract Surgery: What Patients Do and Do Not Understand,” *Journal of Cataract & Refractive Surgery* 29, no.10 (Oct, 2003): 1904-1912.

43 M. Gittelman, E. Mahabee-Gittens and J. Gonzalez-del-Rey, “Common medical terms defined by parents: Are we speaking the same language?” *Pediatric Emergency Care* 20, no.11 (Nov 2004): 754-758.

44 Masson and Waldron, “Comprehension of Legal Contracts by Non-Experts,” 79, *supra* note 1; Charrow and Charrow, “Making Legal Language Understandable,” *supra* note 3; Severance and Loftus, “Improving the Ability of Jurors...” 194, *supra* note 29.

45 Masson and Waldron, “Comprehension of Legal Contracts by Non-Experts,” 79, *supra* note 1.

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social and cultural beliefs affect our understanding of the law.⁴⁶ Severance and Loftus agree, writing that “to the extent that the instruction conflicts with an individual juror’s personal sense of justice, that conflict may reduce his or her comprehension and application scores.”⁴⁷ Kramer and Koenig concur, adding that such preexisting beliefs may come from media and popular culture.⁴⁸ Finally, Tannen and Wallet also found that a “preknowledge” created problems for comprehension, adding that preknowledge schemas were difficult to dislodge, causing continued problems.⁴⁹

On the other hand, Davis argues that preknowledge of concepts can actually aid in comprehension, which contrasts Masson and Waldron, Severance and Loftus, and Balkin who state it would hinder comprehension.⁵⁰ He cites research that has proven information load peaks at a certain level for all people, regardless of intellectual capacity, thereby affecting someone’s comprehension of any literature.

Lastly, Davis points out that conceptual difficulty could account for a lack of comprehension of technical material. This is supported by the Charrows finding that the complexity of technical ideas strongly correlates with comprehension.⁵¹ However, the Charrows add that they do not submit that conceptual difficulty is an impossible barrier, because they found that comprehension can be improved using their methods, even for difficult concepts.⁵² Elwork, Sales, and Alfini later add to this with their results, which show that comprehension of complex technical concepts can be improved upon even more than simpler ones, as there is more room for improvement.⁵³

Literacy

The ability to understand technical language is evidently linked to the ability to read and understand literature in general. More specifically for technical language, however, are the concepts of legal and health literacy, which postulate that the literacy skills needed to understand legal and medical language are different from that of everyday language. This seems probable, as it has already been proven that technical language is different from everyday language.

Legal literacy is defined as “the ability to understand the words used in the legal context

46 Jack Balkin, “Understanding Legal Understanding: The Legal Subject and the Problem of Legal Coherence,” *The Yale Law Journal* 103, no.1 (Oct 1993): 105-176.

47 Severance and Loftus, “Improving the Ability of Jurors...” 194, supra note 29.

48 Kramer and Koenig, “Do Jurors Understand Criminal Jury Instructions?” supra note 32.

49 D. Tannen and C. Wallet, “Interactive Frames and Knowledge Schemas in Interaction: Examples from a Medical Examination/Interview,” *Social Psychology Quarterly* 50 (1987): 205-215; D. Tannen and C. Wallet, “Medical professionals and parents: a linguistic analysis of communication across contexts,” *Language and Society* 15 (1986): 295–312.

50 Davis, “Protecting Consumers from Overdisclosure and Gobbledygook,” supra note 9.

51 Charrow and Charrow, “Making Legal Language Understandable,” 1334, supra note 3.

52 Ibid, 1335.

53 Elwork, Sales, and Alfini, *Making Jury Instructions Understandable*, supra note 30.

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and to access rights in the justice system.”⁵⁴ In 2005, Statistics Canada reported seven percent of the population at literacy Level 1 (translating to seriously disadvantaged), nine percent at Level 2 (disadvantaged), and 22 percent at Level 3 (some difficulties, especially with technical language). Sixty-two percent of the population is at Level 4, the optimal level, where an individual is considered fully functional with literature in everyday activities and even some challenging ones.⁵⁵

Health literacy is defined as “the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”⁵⁶

Health literacy numbers in the US are staggering. According to the National Adult Literacy Survey, half of the population falls within the “severely disadvantaged” or “disadvantaged” categories of health literacy.⁵⁷

Technical Language and Minorities

This paper will take the stance that it is probable that minority groups will experience more barriers to understanding technical language than the general population. However, though there is an abundance of suggestions as to why minorities may experience more difficulty, there are no studies that directly address this question. Instead, we are left to infer from studies, using what is known about the relevant characteristics of minority groups. The findings of those studies are summarized below.

Culture

Initially, there are many reports on access to justice, which suggest that additional barriers to understanding technical language for minority groups may be based on cultural differences. For example, the Report of the Aboriginal Justice Inquiry of Manitoba suggests differences in understanding of word meaning and legal concepts could create barriers for Aboriginal people in Canada. The report also explores problems of translation, such as difference in word meaning between languages, and a lack of words or concepts to rearticulate technical terms and concepts in Aboriginal languages.⁵⁸ Diana Eades’ studies on Australian Aborigine groups make similar suggestions, but also emphasizes that Aboriginal English does not encompass corresponding words or concepts for some technical terms or concepts taken from

54 Council of Canadian Administrative Tribunals, “Literacy and Access to Administrative Justice in Canada: A Guide for the Promotion of Plain Language,” 2005, 11. Online: <http://www.ccat-ctac.org/en/publications/Literacy%20and%20justice.pdf>.

55 Ibid, 8-9.

56 Committee on Health Literacy, Institute of Medicine, *Health Literacy: A Prescription to End Confusion* (Washington DC: National Academies Press, 2004), 43.

57 Committee on Health Literacy, *Health Literacy*, 64, supra note 56.

58 Aboriginal Justice Implementation Commission, “Aboriginal Concepts of Justice,” ch. 2, in *Report of the Aboriginal Justice Inquiry of Manitoba: The Justice System and Aboriginal People*, vol. 1, 1999. Online: <http://www.ajic.mb.ca/volumel/chapter2.html>.

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English.⁵⁹

Mary Stratton's report, "Balancing the Scales: Understanding Aboriginal Perspectives on Civil Justice," suggests that Eades' findings are also applicable to Canada's many Aboriginal languages.⁶⁰ In addition, participants in Stratton's survey suggest that the focus on written instead of oral communication in technical communication is a problem, because there is a strong history of and preference for oral communication among Aboriginal communities. Finally, participants suggest lack of translation and interpretation services for cultural groups and the prevalence of poor literacy rates further limit understanding for cultural minorities.⁶¹

Study Findings: Demographics

MARC Research did a survey on perceptions and knowledge of the justice system in the United States; the demographic results showed that nonwhites were less likely to answer knowledge questions correctly, as were females, people who were less educated, from a lower income household, unregistered to vote, and in the youngest and oldest age groups (seniors or young adults).⁶² Crawford and Bull's study of youth's knowledge of legal terminology showed that knowledge increased with age from 12 to 15 years old, but that there were limits to this as well.⁶³ She suggests that some terms would be incomprehensible to laypersons of all ages.⁶⁴

Davis discovered that those who benefited the most from the simplification of his consumer contract were low-income, black and younger groups, perhaps implying that they previously understood less of the technical writing in its original form.⁶⁵ Lehmann's study on youth's ability to comprehend the justice system in the United States also

59 Diana Eades, "A Case of Communicative Clash: Aboriginal English and the Legal System," in *Language and the Law*, ed. John Gibbons, 11-50 (London: Longman, 1994); Diana Eades, "White Australia v. Nancy," in *Language and Culture in Aboriginal Australia*, ed. Michael Walsh and Colin Yallop, 181-190 (Canberra: Aboriginal Studies Press, 1993).

60 Mary Stratton, "Balancing the Scales: Understanding Aboriginal Perspectives on Civil Justice," Civil Justice System and the Public Project, Canadian Forum on Civil Justice, 2006. Online: <http://cfcj-fcjc.org/docs/BalancingTheScales.pdf>.

61 Ibid.

62 MARC Research, "Perceptions of the U.S. Justice System," American Bar Association, 1999. Online: <http://www.abanet.org/media/perception/perceptions.pdf>.

63 Emma Crawford and Ray Bull, "Teenagers' difficulties with key words regarding the criminal court process," *Psychology, Crime & Law* 12, no.6 (Dec 2006): 653-667.

64 Ibid.

65 *This is supported by a suggestion by Severance, Greene and Loftus, who found that ex-jurors benefited less than current jurors from simplification, and suggested that those who have a lesser previous knowledge of the law benefit the most from simplification because they previously understood less and, therefore, had the greatest room for improvement as an explanation for their results.* Davis, "Protecting Consumers from Overdisclosure and Gobbledygook," supra note 9; Severance, Greene, and Loftus, "Toward criminal jury instructions that jurors can understand," supra note 31.

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found that youth (11-14 years old) were three times less likely to understand the legal system.⁶⁶ Ericson and Perlman studied knowledge of legal terminology and the court process in developmentally disabled adults, and found that developmentally disabled adults were significantly less likely to comprehend legal language and the justice system.⁶⁷

Study Findings: Education

Some factors have been found to be associated with various aspects of understanding technical language. For example, there are several studies that have tested the association between education and comprehension of technical language. Studies by Kalichman et al.; Schillinger et al.; Gazmararian, Parker, and Baker; Beers et al.; and Benson and Foreman all found that lower education levels were associated with lower health literacy.⁶⁸ Charrow and Charrow, Kramer and Koenig, and later Scanlan, all found that as education levels fell, so did comprehension of jury instructions and informed consent forms.⁶⁹ This, however, is contradicted by Keselman et al.'s finding that education level was not a good predictor for familiarity with medical terms.⁷⁰ However, these differences may be explained by the focus on differing aspects of technical language that the authors chose to study.

Since it has also been shown that minorities are more likely to have an education level below that of the general public,⁷¹ it can be inferred that this means they will experience more difficulty in understanding technical language than the general public. In addition, having a lower level of education is associated with a reduced vocabulary, which would

66 Chrisitne Lehmann, "Study Questions Youths' Ability to Understand Trial Process," *Psychiatric News* 38, no.7 (2003): 5.

67 Kristine Ericson and Nitza Perlman, "Knowledge of Legal Terminology and Court Proceedings in Adults with Developmental Disabilities," *Law and Human Behavior* 25, no.5 (2001): 529-545.

68 S. Kalichman et al., "Health Literacy and Health-Related Knowledge Among Persons Living with HIV/AIDS," *American Journal of Preventative Medicine* 18, no. 4 (2000): 325-331; D. Schillinger et al., "Association of Health Literacy with Diabetes Outcomes," *Journal of the American Medical Association* 288, no. 4 (2002): 475-482; J. Gazmararian, R. Parker, and D. Baker, "Reading Skills and Family Planning Knowledge and Practices in a Low-Income Managed-Care Population," *Obstetrics & Gynecology* 93, no. 2 (1999): 239-244; J. Gazmararian et al., "Health Literacy Among Medicare Enrollees in a Managed Care Organization," *Journal of the American Medical Association* 281, no. 6 (1999): 545-551; B. Beers et al., "Disparities in Health Literacy between African American and Non-African American primary care patients," *Journal of General Internal Medicine* 18 (2003): 169; J. Benson and W. Forman, "Comprehension of Written Health Care Information in an Affluent Geriatric Retirement Community: Use of the Test of Functional Health Literacy," *Gerontology* 48, no. 2 (2002): 93-97.

69 Charrow and Charrow, "Making Legal Language Understandable," supra note 3; Kramer and Koenig, "Do Jurors Understand Criminal Jury Instructions?" supra note 32; Scanlan et al., "Informed Consent for Cataract Surgery," supra note 42.

70 Alla Keselman et al., "Assessing Consumer Health Vocabulary Familiarity: An Exploratory Study," *Journal of Medical Internet Research* 9, no. 1 (2007).

71 For example, *Aboriginal and francophone people in Canada*: Statistics Canada, "Canadians Better Educated than Ever," 2001 Census. Online: <http://www12.statcan.ca/english/census01/Products/Analytic/companion/educ/canada.cfm#aboriginal>; Jim Cummins, "Minority Status and Schooling in Canada," *Anthropology & Education Quarterly*. 28, no. 3 (1997): 411-430.

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again have negative implications for understanding technical language.⁷²

Study Findings: Literacy

Literacy is intricately linked to both understanding technical language and education levels. Unfortunately, it is also linked to minority group status. Extensive research on factors affecting health literacy show that while in one study Gazmararian, Parker, and Baker found health literacy was not significantly associated with race, studies by Arnold et al., Beers et al., Bennett et al., Kalichman et al., Lindau et al., Schillinger et al., and another study by Gazmararian et al. all reported race, ethnic or minority status as demographics associated with lower health literacy.⁷³

Again, it has been proven that minorities are more likely to have a literacy level below that of the general public,⁷⁴ which allows for another inference that minorities will experience greater difficulty in understanding technical language than the general public. Again, having lower levels of literacy are associated with a limited vocabulary.⁷⁵

Other factors

Another very important factor addressed in Native Counselling Services of Alberta's "Aboriginal Legal Education Needs Survey: 2006-2007" that can affect comprehension is apprehension of the justice system itself. According to the survey, "apprehension commonly leads to a lack of understanding of the criminal justice system and hesitation in asserting one's rights under the law."⁷⁶ This is especially true for minority groups, because, as the survey suggests for Aboriginal groups, "apprehension is often linked to issues of oppression and trepidation of authority due to the power structure that

72 Keselman et al., "Assessing Consumer Health Vocabulary..." supra note 70.

73 C. Arnold et al., "Smoking status, reading level, and knowledge of tobacco effects among low-income pregnant women," *Preventative Medicine* 32, no. 4 (2001): 313-320; B. Beers et al., "Disparities in Health Literacy..." supra note 68; Bennett et al., "Relation between literacy, race, and stage of presentation among low-income patients with prostate cancer," *Journal of Clinical Oncology* 16, no.9 (1998): 3101-3104; S. Kalichman et al., "Health Literacy and Health-Related Knowledge..." supra note 68; Gazmararian, Parker, and Baker, "Reading Skills and Family Planning," supra note 68; Gazmararian et al., "Health Literacy Among Medicare Enrollees..." supra note 68; S. Lindau et al., "The Association of Health Literacy with Cervical Cancer Prevention Knowledge and Health Behaviors in a Multiethnic Cohort of Women," *American Journal of Obstetrics & Gynecology* 186, no. 5 (2002): 938-943; D. Schillinger et al., "Association of Health Literacy with Diabetes Outcomes," supra note 68.

74 *According to the National Adult Literacy Survey, minority groups are significantly less likely to be literate and health literate. In addition, the Center for Health Care Strategies adds that 50 percent of Hispanic people and 40 percent of African-Americans in the US have reading problems.* National Centre for Educational Statistics, "National Adult Literacy Survey," December 15, 2005; Linda Potter, "Health Literacy Fact Sheet" (New Jersey: Centre for Health Care Strategies: 2005). Online: www.chcs.org.

75 Keselman et al., "Assessing Consumer Health Vocabulary..." supra note 70.

76 Patti LaBoucane-Benson et al., "Aboriginal Legal Education Needs Survey: 2006-2007," Native Counselling Services of Alberta, 2007, 7.

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exists in the system itself.”⁷⁷ Stratton’s report, “Balancing the Scales: Understanding Aboriginal Perspectives on Civil Justice,” suggests that complex terminology, complex processes, formality in the court, and previous negative interactions between Aboriginal people and the law (ie. treaties, residential schools) may be responsible for the anxiety of Aboriginal participants in the justice system.⁷⁸

There are also a few other factors which, although the subject of limited research, are worth reporting nonetheless. First, according to the American Institute of Medicine, “poverty is intertwined with many sociodemographic variables, which, in turn, are associated with limited literacy.”⁷⁹ For example, according to the Centre for Health Care Strategies, 50 percent of welfare recipients in the US read below a fifth grade level.⁸⁰ Since it is well known that many minority groups live at poverty levels in greater numbers than the general population in both Canada and the United States, it can be postulated that minority groups would be at a greater disadvantage in understanding technical language, as it has already been discussed that lower literacy is associated with a lower comprehension. Second, Keselman et al. found a correlation between health literacy, English proficiency and recognizing and understanding medical terms.⁸¹ Of course, for many minority groups in Canada, English may be not their first language, so this is also relevant as another possible area of disadvantage.

Limitations of Reviewed Literature

Several limitations of existing studies must be noted. Foremost, the idea of “comprehension” is broad and poorly defined. In addition, it is difficult to say that there is an accurate method of measuring such an abstract concept. It is unknown whether the studies that use paraphrasing methodology are more efficient in identifying whether people comprehend something better than those that use questionnaire methodology. It is possible that some people are more predisposed to succeed at one or another type of methodology, as they are dependent upon the participants’ other skills. For example, Charrow and Charrow write that participants’ writing skills could affect scores on their paraphrasing task. As such, they chose to do their experiment orally, neglecting to see that this was dependent on the participants’ oral skills.⁸²

Secondly, many other factors affect comprehension. For example, many of the mock trial studies note that participants may not have given their decisions as much consideration as an actual juror would have, as there was no onus on their decision.⁸³ Davis writes that

77 Ibid.

78 Stratton, “Balancing the Scales,” supra note 60.

79 Committee on Health Literacy, *Health Literacy*, 56, supra note 56.

80 Potter, “Health Literacy Fact Sheet,” supra note 74.

81 Keselman et al., “Assessing Consumer Health Vocabulary...” supra note 70.

82 Charrow and Charrow, “Making Legal Language Understandable,” supra note 3.

83 Reifman, Gusick and Ellsworth, “Real Jurors’ Understanding...” 542, supra note 33; Severance and Loftus, “Improving the Ability of Jurors...” 196, supra note 29; Elwork, Sales, and Alfini, “Juridic Decisions,” 174, supra note 6.

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people's motivation to understand something for a research project probably differs from that of an actual credit decision.⁸⁴ Klare's research proves that motivation affects comprehension, as does the environment of the test (time and place), subject matter, competence of participant and incentive (such as payment to participate).⁸⁵ Wogalter et al. found that comprehension is greater when a form appears to be less formal, time pressure is minimized, or the document is presented orally as well as in written form.⁸⁶ In fact, it is commonly suggested that there is a difference in comprehension levels between a group that is presented information orally, and a group that is given both oral and written instruction. However, while Kramer and Koenig found that having both is beneficial for jury instructions, Reifman, Gusick, and Ellsworth found no difference between groups in their experiment, so it is unclear whether this does affect comprehension.⁸⁷

**Some studies attempted to address these confounding variables. For example, a few studies paid their participants. See Masson and Waldron, and Davis. Also, in Reifman, Gusick, and Ellsworth's and Kramer and Koenig's studies on jury instructions, there were attempts to address the concern of motivation affecting comprehension by using jurors who had actually served on juries.⁸⁸*

Finally, all study designs have flaws. Multiple choice, interview, paraphrasing, written, and oral methodology have all been criticized for their respective weaknesses or biases.

In addition, the readability formulas used in some of these studies have been questioned for their validity as a measure of comprehensibility, as it is possible that an incoherent sentence can score well, whereas a coherent one may score poorly.⁸⁹ As well, readability tests fail to account for document layout, which is considered an important factor in comprehensibility. Unfortunately, there is no solution to this; no perfect formula exists. However, the government of Canada has used or recommends the Flesch Reading Ease scale, the Flesch-Kincaid Grade Level test, and the Fog Index.⁹⁰ The Flesch Reading Ease

84 Davis, "Protecting Consumers from Overdisclosure and Gobbledygook," 847, supra note 9.

85 Klare, George, quoted in Benson, "The End of Legalese," supra note 1.

86 Wogalter et al., "On the adequacy of legal documents: factors that influence informed consent," *Ergonomics* 42, no. 4 (1999): 593-613.

87 Kramer and Koenig, "Do Jurors Understand Criminal Jury Instructions?" supra note 32; Reifman, Gusick and Ellsworth, "Real Jurors' Understanding..." supra note 33.

88 Masson and Waldron, "Comprehension of Legal Contracts by Non-Experts," supra note 1; Davis, "Protecting Consumers from Overdisclosure and Gobbledygook," supra note 9; Kramer and Koenig, "Do Jurors Understand Criminal Jury Instructions?" supra note 32; Reifman, Gusick and Ellsworth, "Real Jurors' Understanding..." supra note 33.

89 For example, short words can still be complicated – gnat, jibe – and long words can be simple – fantastic, Saturday. This would affect the results of any readability test based on word length.

90 Health Canada, "Notice: Guidance for Industry," 2004. Online: http://hc-sc.gc.ca/dhp-mps/prodpharma/applic-demande/guide-ld/monograph/pm_mp_e.html; Treasury Board of Canada, "Reviewing an Internal Audit

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test is also the most commonly used formula,⁹¹ and has proven in many instances to be both valid and accurate.⁹²

Areas for further study

Although many studies on culture and technical language suggest that there is a disadvantage for minorities because of technical terminology, there are no studies that actually prove or disprove this idea. There is no research to date that simply compares the general public's understanding of technical terminology or documents to that of minority groups, in Canada or elsewhere. All conclusions reached are based on an amalgamation of other factors.

In addition, research within those factors is limited. Research on English as a Second Language, a factor that would surely apply to many minority groups, is nearly non-existent in relation to understanding technical language.

Conclusion

Technical language is rife with linguistic elements that are unique and difficult to understand. As such, it can be studied as its own phenomenon. This review examined three ways in which the general public's understanding of technical language can be assessed: readability, comprehension studies, and literacy rates.

Readability tests have been performed on a variety of technical documents, from consent forms, to legislation and contracts. All, but Rogers et al., found that the technical documents are well beyond what could be expected to be understood by the majority of the population.

Comprehension studies had three focuses: understanding jury instructions, plain language redrafting, and understanding terminology. Studies on jury instructions were dominated by the work of the Charrows; Elwork, Sales and Alfini; and Severence, Loftus, and Greene. All researchers agree that jury instructions are largely indecipherable to the general public. Many showed that current jury instructions are on par with an absence of instructions in terms of their helpfulness. Moreover, all the researchers demonstrated that attempts to improve jurors' comprehension levels by redrafting the instructions in

Assurance Engagement Report," 2003. Online: http://www.tbs-sct.gc.ca/ia-vi/tools-outils/report-rapport/report-rapport_e.asp; Robert Kerton, "Policy: The Consumer in the Future of Canada's Financial Services Sector," online: http://www.fin.gc.ca/taskforce/research/pdf/RR8_V1c_e.pdf.

91 *It is the most commonly found in this research and has also been noted by Klare as the most commonly used formula by non-academics.* George Klare, "The formative years," in *Readability: Its Past, Present, and Future* ed. Zakaluk and Samuels, 20, supra note 22.

92 *See: G. England, M. Thomas, and D. Paterson, "Reliability of the Original and the Simplified Flesch Reading Ease Formulas," Journal of Applied Psychology 37 (1953): 111-113; P. Hayes, J. Jenkins, and B. Walker, "Reliability of the Flesch readability formulas," Journal of Applied Psychology 34 (1950): 22-26.*

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plainer language were successful in some respect to varying degrees.

Studies focused on plain language redrafting not involving jury instructions are dominated by Davis' and Masson and Waldron's works. Again, there was blanket agreement in all studies that a variety of other technical documents – contracts, consent forms, legislation, taxation law – are incomprehensible to the public. However, research shows that redrafting using the principles of plain language can improve comprehension.

Finally, the limited studies that focused on understanding terminology showed that technical terminology is at best only partially understood, and often misunderstood.

In addition, many people are at a disadvantage in understanding technical language, especially health and legal jargon, because of limited literacy. The numbers of people with limited literacy in both Canada and the United States are discouraging: half of Canadians and Americans are reading at levels that are insufficient for understanding and making decisions in legal and health spheres.

Almost all research indicates that comprehension increases significantly with simplification, though readability does not necessarily, as was demonstrated by Charrow and Charrow. Methods of simplification result in varying degrees of success. Two such breakdowns are outlined in the works of Charrow and Charrow, and Mason and Waldron.

In addition, even though comprehension increases, it often remains at poor levels overall, causing some authors to suggest alternative reasons (other than language) as to why technical language is incomprehensible. Davis suggests a few which have been evidenced before in other literature: information load and conceptual complexity. Other authors suggest incorrect preconceptions of the law will hinder understanding, but Davis points out that preknowledge can also aid in understanding.

Determining the extent of comprehension amongst minority groups is much more difficult. However, studies do show that lower education and literacy levels hinder an understanding of technical language, and that these factors are more prevalent in minority communities. Other factors, such as apprehension, English proficiency, and poverty have also been shown to affect comprehension.

In conclusion, three factors affect a person's ability to understand technical language: linguistic characteristics of the language, education level and literacy rates. Research indicates incontrovertibly that technical language is written at a level well beyond the reach of the average person. In addition, it is clear that lower education levels and literacy rates among minority groups will leave them at a severe disadvantage in understanding a language that is already inaccessible. In general, it would appear that minorities experience greater barriers in understanding technical language than the general public.

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Research also indicates incontestably that simplification improves comprehension. Therefore, to address the first factor, the affects of linguistic difficulties with language can be mitigated by simplifying technical language. To address the second and third factors, limited literacy and education, literacy rates and education levels in minority communities must be improved.

Finally, it is important to remember that there are limitations to all the literature reviewed, and that further study is required to properly assess the relationship between minority groups and understanding technical language.

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Appendix

Table: Summary of Readability Studies

Author(s)	Technical Document(s) Tested	Readability Formula(s) Used	Readable (Yes/No)?	Specific Findings
Benson	Jury Instructions, Consent Form, Legislation, News Article, Grade Six Textbook Excerpt	Fry, Flesch	No	All literature that contained legalese (legislation, consent form, original jury instructions) was well beyond the average reading level for his state, California.
Davis	Contracts	Flesch, Dale-Chall	No	Compared original contract to simplified one; original contract tested at between the sixteenth and seventeenth grade levels, whereas the simplified one was between the eleventh and twelfth grade levels.
Graber, D'Alessandro and Johnson-West	Privacy Policies on Internet Health Websites	Flesch, Fry, SMOG	No	The policies fell, on average, within the "difficult" spread, or worse, for all sites tested.
Hopper, TenHave and Hartzel	Informed Consent Forms	Flesch-Kincaid, Flesch, Fog	No	All forms contained large amounts of complex words and the lowest grade level of education required to read a document was 10.8.
Magleby	Voter Pamphlets	Unknown	No	Pamphlets were written at above average grade level for four different states.
Masson and Waldron	Contracts	Flesch	No	Successively simplified contract using three different methods, readability increased with each revision. On the Flesch Reading Ease 100 point scale, readability improved from 19.0 on the original document to 71.2 on the legal-terms-defined.
Pothier	Consent Forms, Statement of Patient	Flesch	No	Both documents scored within the "difficult, college" range of readability.

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Smith and Richardson	Australian Tax Legislation	Flesch, Flesch-Kincaid	No	Compared original and revised versions of the Australian taxation legislation, while revised version did show an improvement in readability, it was only slight and both drafts were within an unacceptably complex region of the test for the general public.
Walfish and Watkins	Notices of Privacy Practices	Flesch-Kincaid, Flesch	No	65 percent of the documents were at the Grade 12 level or above, and 90 percent of them were in the “difficult” or “very difficult” ranges of the Flesch Reading Ease scale. Well above national literacy levels, which suggest that half of American adults cannot read above ninth grade level.
Rogers et al.	Miranda warnings and waivers	Flesch, Flesch-Kincaid, SMOG	Yes	Over eighty percent (82.3) were likely to be understood by eighty percent of the general population.

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