PLAIN LANGUAGE IN ENVIRONMENTAL POLICY DOCUMENTS: AN ASSESSMENT OF READER COMPREHENSION AND PERCEPTIONS*

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ABSTRACT

Several government agencies are seeking quality improvement in environmental policy documents by asking for the implementation of Plain Language (PL) guidelines. Our mixed-methods research examines whether the application of certain PL guidelines affects the comprehension and perceptions of readers of environmental policy documents. Results show that the presence of pronouns affects inferential comprehension of environmental impact statement summaries (EIS summaries), but that the effect varies with the reader’s education level. Further, headings in question phrasing affect a reader’s perception of familiarity and reliability of EIS summaries. A reader’s perceptions of EIS summaries and attitudes toward the organizations creating the documents are also affected by overall design features. PL guidelines on the use of pronouns and question headings are not fully supported by our research and need further validation with regard to comprehension. This article ends with a call for further research.

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INTRODUCTION

Policymakers, stakeholders, and the general public have indicated that environmental policy documents are difficult for people to understand and often cause mistrust toward agencies writing the documents. These documents are issued under the requirements of the National Environmental Policy Act (NEPA). To improve the quality of the environmental documents, several federal and state agencies have called for the implementation of Plain Language (PL) guidelines. The federal PL guidelines suggest that writers of public policy documents consider implementing the following six document features: a “logical organization with the reader in mind; the use of ‘you’ and other pronouns; active voice; short sentences; common, everyday words; and easy-to-read design features” [1]. Implementing these precepts should help readers “find what they need, understand what they find, and use what they find to meet their needs” [1]. This is particularly important for NEPA documents, which by law are required to inform the general public about a project before a final decision is made. In addition to this legal requirement, NEPA documents often have substantial influence on a project and how the public perceives the sponsoring agency. It is important to note that PL is not the same thing as everyday “understandable” language or generally more “readable” language. PL has specific guidelines that authors must follow that distinguish PL from a layperson’s view of readability and comprehensibility. The goal of this article is to examine the effect of some of the PL guidelines on reader comprehension and perceptions of environmental policy documents.

Beyond the federal guidelines concerning PL, some states have adopted PL guidelines. In Washington state, Governor Christine Gregoire issued an executive order in 2005 that called for all state agencies to “adopt the principles and practices of Plain Talk currently used in the Departments of Revenue, Labor and Industries and Ecology” [2]. In the Washington State government, “Plain Talk” is the same as “Plain Language,” the term we use throughout this article. The Washington State Department of Transportation provides its writers with a “Reader-Friendly Document Toolkit,” which includes authoring guidelines for the formatting of policy documents, including the formatting of headings, tables, sidebars, captions, footnotes, and bulleted and numbered lists [3]. Proponents of PL believe that following the principles presented in federal and state PL guidelines will result in well-written and well-designed documents that are easy for citizens to understand.

Regardless of the efforts that lead agencies have made to use PL in public policy documents, many NEPA writers express concern about the effectiveness of PL in making NEPA documents easier to comprehend. Few empirical studies have been conducted that examine the effect of implementing PL guidelines in NEPA documents on reader comprehension and reader perceptions. This article presents research in this area. We first review relevant literature and then explain the process of narrowing in on specific PL variables for our study. We then describe the two studies we conducted: one study investigates the effects of our chosen
variables (heading phrasing and personal pronouns) on reader comprehension and perceptions of an Environmental Impact Statement summary; a second study has focus groups investigate perceptions of various design features of PL guidelines in Environmental Impact Statements summaries (EIS summaries). We discuss the results of these studies and conclude with directions for future research on PL.

LITERATURE REVIEW

This section provides a brief history of the PL movement, document-design guidelines related to PL, the effects of PL on readers, and the effects of heading phrasing and personal pronouns on reader comprehension.

Brief History of Plain Language

Studying the history of PL at a federal level might feel like watching a tennis match with Democrats and Republicans facing off from either end of the court. President Jimmy Carter, PL’s first big proponent, issued an executive order in 1978 that sought to make government regulations “cost-effective and easy-to-understand” [4]. Agencies soon began researching the efficiency and application of PL guidelines. In response to President Carter’s executive order, The National Institute of Education, the American Institute for Research, the Document Design Center at Carnegie-Mellon University, and others began researching ways to “improve design and readability of public documents” [5]. President Ronald Reagan rescinded Carter’s order in 1981. At that point, the use of PL became the choice of individual agencies.

In 1998, President Bill Clinton, supporting PL, issued a memorandum detailing the requirement that all “Federal Government’s writing must be in plain language” [4]. Vice President Al Gore supported PL by handing out “No Gobbledygook Awards” to government employees whose written communication exemplified PL [6]. The Bush administration had no PL programs, although some agencies continued with PL agendas. When President Barack Obama was a senator, he co-sponsored a bill to “enhance citizen access to government information and services by establishing plain language” [7].

In 2009, Representative Bruce Braley introduced the Plain Language in Health Insurance Act of 2009 which would require health insurance providers to write their documents in PL. This proposed act led to H.R. 946: Plain Writing Act of 2010, still in legislation, which would require the federal government to write all new publicly distributed information in a “clear, concise, well-organized” manner that follows the guidelines of Plain Language [8].

Separate from governmental regulations, much of the early advocacy for PL occurred in the legal world. A detailed history of PL and an overview of contradictions and controversies in the early PL conversations can be found in the Plain Language in Health Insurance Act [9], which explains disagreements
about the definitions of PL terms, e.g., “plain” and “clarity.” Literature shows a general understanding of PL among writers [10, 11], but the lack of a broad federal mandate has resulted in a lack of consistency for understanding and application of explicit PL guidelines. More recent research surveying writers of government health communication shows that consensus on guidelines for writing in PL is lacking [12]. The Plain Language Working Group, formed in 2008, however, has the goal of defining plain language and creating a “formal plain language institution,” in addition to advocating for and professionalizing PL [13].

Plain Language Document-Design Guidelines

Federal PL guidelines specify a number of ways that documents should be designed for “ease of reading.” Ease of reading, as defined on plain language.gov, is affected when documents appear cluttered or dense. While readers of this journal are assumed to be familiar with standard guidance concerning document design issues such as line length, text justification, use of illustrations, and font treatments, what is novel about PL are the specific design features that PL chooses to single out. Suggestions found on plainlanguage.gov are aimed at creating “visually manageable chunks” of information for the reader through specific design principles.

Suggestions include:

- replacing large blocks of text with headings, tables, and lists to create more white space;
- shortening sections so that a document has five to six sections per page;
- using lists and tables often;
- using ragged-margin text rather than justified text;
- including illustrations “for good effect”; and
- using bold and italics for text emphasis, rather than full capitalization or underlining.

In a similar vein, the Washington State Government Management & Performance Office presents Plain Talk guidelines on its website. The guidelines include a number of document-design recommendations that the developers of the Plain Talk guideline believe allow a customer to “scan the document quickly.”

Washington State Plain Talk guidelines include:

- using 12-point font for body text;
- using only one or two font types per document;
- inserting bold headings to break up text;
- using italics sparingly to emphasize important text;
- using bullets when list items are not ordinal;
- using consistent bullet types;
- using numbers with ordered steps in directions and with outlines;
- maintaining 1-inch margins for letters;
• separating paragraphs with white space; and
• using left-justified, ragged-right text, rather than fully justified text.

Research on Plain Language Effects on Readers

As discussed below, some existing research on PL has shown that readers have improved comprehension of and preference for documents written in PL. These improvements translate into cost savings for public agencies that incorporate PL into their documents.

In a variety of settings, PL has been shown to improve text comprehension of readers with varying levels of familiarity with document content. Readers have been shown to “[find] information faster,” “[answer] more questions correctly,” and “[rate] new rules as easier to use” [14]. In one study, juror instructions written in PL increased juror comprehension by 31 percent over comprehension of the original instructions [15]. Another study found comprehension improvements for jurors ranging from 15 to 29% [16]. Reader accuracy improved by 91% in medical consent forms written in PL [17]. In the early 2000s, the Washington State Department of Revenue rewrote a notice to business owners reminding them that they might owe tax on goods bought out of state or through the internet. The original notice was ignored by almost all recipients (97%). When the notice was rewritten in PL, people paid attention, and the state exceeded its goal for “use tax” payments by more than $800,000 [18].

There are additional cost benefits to using PL. When people understand more, they call for explanations less often, saving agencies time and money. In the late 1970s, when the Federal Communications Commission rewrote the rules for CB radios, phone calls about requirements dropped by more than 90% [19]. When a Veterans Benefits Administration office used PL to rewrite a standard letter sent to veterans, phone calls dropped from an average of 1.5 calls for each letter sent to .27 calls per letter [19]. The Arizona Department of Revenue rewrote many of its standard letters in PL in 2006 and phone calls went down by so much in 2007 that workers were able to process about 30,000 more claims for unclaimed property that year [20]. In addition to increasing comprehension in some settings, PL is also preferred by readers [21]. Readers are also encouraged by PL principles to read documents carefully [21].

While a number of studies on the effects of PL in government writing exist, fewer studies have examined the effects of PL in national environmental policy documents. A few studies have examined the visual aspects of PL guidelines in EIS summaries [22], yet public understanding of EIS summaries is poor [23].

In order to narrow in on specific PL guidelines to investigate, we conducted an informal survey of NEPA document writers from six environmental consulting firms located in either Washington, Oregon, or California. From this survey, we determined which PL guidelines writers resist most, which they perceive to be most difficult to follow, and which are least acceptable to writers’ lead
agencies. After reviewing the literature and analyzing 59 responses to our survey, we settled on two PL features to further investigate: heading phrasing (question versus statement); and the use of personal pronouns, e.g., “we” and “you.”

**Headings and Comprehension**

Signals such as headings, overviews, and preview sentences are well documented as helping readers understand textual relationships [24-28]. Headings are an in-text signaling device known to aid recall and comprehension [26-28]. It has been shown that marginal and embedded headings support readers’ “recall, search and retrieval of information” [29]. Readers’ prior knowledge, as well as the phrasing, location, and frequency of headings all affect reader comprehension. Headings help readers with little knowledge of material, and in turn, readers with extensive knowledge of material find important information [30]. Even in online text, headings have been shown to improve reader comprehension [31].

The Washington State Department of Transportation’s (WSDOT) Reader-Friendly Document Toolkit requires that headings appear in question form, making a claim that question headings will make text more engaging. The Toolkit suggests question headings help readers find the information they are looking for and process that information through provision of “answers” in section contents [3]. Like WSDOT’s Toolkit, federal PL guidelines also suggest the use of question-format headings [1]. The guidelines emphasize that question headings help the reader scan the document for specific information. The question-and-answer phrasing is also intended to make the text more engaging by emphasizing the question a reader may have, rather than emphasizing the sometimes dry or technical answer the document provides. Research, however, has indicated that question headings alone do not produce a significant improvement on comprehension over topic headings, except for young, low-ability readers [32, 33].

**Pronouns and Comprehension**

The federal PL guidelines suggest that personal pronouns such as “you” and “we” help the reader access document content: “More than any other single technique, using ‘you’ pulls readers into your document and makes it relevant to them” [1]. Specifically, the federal guidelines suggest readers be addressed as “you” and the authoring agency to be addressed as “we.” The use of personal pronouns can ideally help to create a personal tone [34]. First-person and second-person pronouns, in addition to names of people and personal nouns (“father,” “child,” “family”), are recommended to achieve a more personal style [35].

A direct relationship between impersonal style and passive voice exists [36], i.e., the avoidance of personal pronouns often causes writers to use passive-voice constructions [36, 37]. Although our study does not directly address the issue of
passive voice and comprehension, while creating test documentation for our experiment, we found that the incorporation of a higher number of personal pronouns resulted in a larger number of active voice constructions.

Proponents of PL assert that the use of personal pronouns facilitates document readability and enhances the readers’ perspective. PL guidelines also suggest readers can more easily identify their own responsibilities and the responsibilities of the authoring agency if the roles are specified using “you” and “we” [1]. Research has shown that the use of pronouns can affect the reader’s perspective [38]. However, research also shows that reader interpretation of pronouns can vary from the author’s intent [39].

**OUR RESEARCH**

Based on our review here of PL document design guidelines, the research on the effects of headings and personal pronouns on comprehension, the call for the use of PL in environmental policy documents, and the scarcity of empirical research on the effects of PL on readers’ comprehension and perceptions, we conducted two studies to examine how documents incorporating PL features affect readers.

The first study used a within-stage mixed model research method for a reading study in which we created four versions of an EIS summary to generate a $2 \times 2$ design: heading phrasing (statements, questions) and personal pronouns (present, absent). Participants read one of the four EIS summaries and answered surveys including closed-response and open-ended demographic, perception, and comprehension questions. We developed four initial hypotheses. H1 and H2 concern comprehension; H3 and H4 concern perceptions.

- **H1:** Readers of EIS summaries that include question headings will have higher comprehension scores than readers of EIS summaries with statement headings.
- **H2:** Readers of EIS summaries that include personal pronouns will have higher comprehension scores than readers of EIS summaries without personal pronouns.
- **H3:** Readers of EIS summaries that include question headings will have more positive perceptions of the EIS summaries than readers of EIS summaries with statement headings.
- **H4:** Readers of EIS summaries that include personal pronouns will have more positive perceptions of the EIS summaries than readers of EIS summaries without personal pronouns.

The second study consisted of a qualitative study in which we used a focus group and asked two returning sets of participants to examine six different EIS summaries for about 10 minutes, after which a moderator fostered a discussion about design features and how those features affect participants’ perceptions. The
goal of this study was to ascertain whether design features affected participant perceptions of EIS summaries.

STUDY ONE: METHODS

Participants

To take part in the reading study, 120 participants came to the University of Washington campus. Participants were recruited through postings on Craigslist.com and fliers placed in local establishments.

Materials

For our study materials, we selected a section of an existing EIS summary that was about 1,500 words. The EIS summary concerned a topic with which participants from the greater Seattle, Washington, region were not expected to be familiar. From this EIS summary, we created four conditions for the $2 \times 2$ study: heading phrasing (statements, questions) and personal pronouns (present, absent). Examples of all four versions are shown in Tables 1 and 2. Table 1 shows a question and statement heading in the pronoun present and absent condition. Table 2 shows two sentences from the body of the text, one with pronouns present and one with pronouns absent. In the statement heading version, 30% of the sentences were passive voice when pronouns were absent compared with 16% when pronouns were present. In the question heading version, 43% of the sentences were passive voice when pronouns were absent compared with 13% when pronouns were present. The versions varied slightly (Grade 14-15) in their Flesch-Kinkaid Grade Level reading scores, differences most triggered by heading format (see Table 3).

Survey questions included demographic items, perception items, and a comprehension test. The perception questions included 20 statements that participants were asked to rate on 5-point Likert scales and two open-ended questions about the EIS summaries’ organization and friendliness. The comprehension test included

| Table 1. Example of Question vs. Statement Headings and Pronoun vs. No Pronouns |
|---------------------------------|--------------------------------|--------------------------------|
| Pronouns present                | Pronouns absent                |
| Question headings               | Would Segment 2 Affect Your Safety on Route 161? | Would Segment 2 Affect Safety on Route 161? |
| Statement headings              | Segment 2 Would Affect Your Safety on Route 161 | Segment 2 Would Affect Safety on Route 161 |
nine factual and ten inferential questions taken from sections across the entire EIS summary. Factual questions required participants to recall facts that were stated explicitly in the EISs; inferential questions required participants to make connections and draw inferences across different sections of the EIS summary. All questions were tested for passage dependency by pilot subjects to ensure that answer slots had an equal likelihood of being selected by readers who had never read the EIS summary. The passage dependency testing involved multiple iterations to refine the questions and answer slots.

**Overall Procedure**

After participants arrived at University of Washington classrooms, the researchers gave them information and consent forms, with time to read the documents and ask questions. Participants were randomly assigned to read one of the four EIS summary versions. Participants were asked to read the EIS summary without taking any notes, and when finished to take the tests at the end of the document packet without looking back at the summary. Each condition was read by about 30 participants. Study moderators recorded participants’ reading start time. Participants were instructed to record their finish time and then to continue to the survey questions. When participants finished, they turned
in their materials and were then compensated $40.00 for their time and were reimbursed for on-campus parking. On average, participants spent about 12 minutes \((SD = 6.03)\) reading the EIS summary.

Surveys were scored for total number of comprehension questions correctly answered and then summed for total inferential, factual, and total correct. In addition to the comprehension and perception questions, participants’ answers to the two open-ended questions about the organization and the friendliness of the EIS summary were judged by three raters as either positive or negative on four content areas. Data were entered into SPSS and results were analyzed in SPSS 16 on a PC.

**STUDY ONE: RESULTS AND DISCUSSION**

After a brief review of participant demographics, we examined comprehension and perception results. An alpha level of .05 was used to determine significance.

**Demographics**

Of the 120 participants, 13 did not meet the study protocols (i.e., native speaker of English and 18 years or older). We excluded non-native English speakers because previous comprehension studies have shown comprehension differences between native and non-native English speakers [28, 31]. Of the 107 respondents included in the final results, 48 were male and 59 were female. In general, given the range of ages, education, and level of community involvement, our sample was consistent with heterogeneity found in the general population. Participants’ average age was 35.35 \((SD = 14.14)\). Participants varied in terms of their educational background but were on average quite educated, with 27% reporting some college, 8% reporting an Associate’s Degree, 37% reporting a Bachelor’s Degree, and 19% reporting a graduate degree. Only 10% reported less than some college.

We were eager to know whether participants were actively concerned about environmental issues in their community. While 50% of the participants had attended community meetings of some type, only 32% of participants had attended a public meeting about environmental issues and 27% had previously read EIS summaries. We vetted this sample and our sampling method with an environmental engineer who had provided us with EIS summaries and supplied some of our funding. He confirmed that the demographics were on par with the citizens whom he meets at public meetings concerning environmental issues.

**Comprehension**

We ran two-way ANOVAs on the full sample \((n = 107)\) to examine the effect of heading phrasing (question, statement) and personal pronouns (present, absent) on inferential, factual, and total comprehension. The tests were not significant. Table 4 shows the means and standard deviations in each condition. However, of interest, the power of all these tests was low, ranging from .06 to .357; ideal
power is .8 or greater. With the wide variety of participants in each condition, in particular with regard to education levels, the heterogeneity of variance in the cells was too great to be able to observe any effects on comprehension.

We next ran a correlation of education level against all three comprehension scores (inferential, factual, and total) and found significant correlations in two cases. Education level and factual comprehension significantly correlated, \( r(107) = .213, p = .028 \); and education level and total comprehension significantly correlated, \( r(107) = .744, p = .000 \). Hence, we ran ANCOVAs to assess the effect of heading phrasing and personal pronouns on all three comprehension variables with education as a covariate. There were no main effects or interactions on any of the three comprehension measures with education as a covariate. However, of interest and as further discussed later, the power of all these tests was still low, ranging from .05 to .313.

To further tease out the effect of education, we analyzed the comprehension variables by segmenting the sample based on education. The resulting groups had more homogeneous variance than the full sample, higher power, and thus led to some significant findings. ANOVAs to assess the effect of heading phrasing and personal pronouns on comprehension for participants without college graduate degrees revealed a significant interaction between headings and pronouns. As shown in Figure 1, participants who received the EIS summary version with statement headings and pronouns had significantly lower inferential comprehension than other conditions, \( F(1, 87) = 4.190, p = .044 \).

For participants with at least 2 years of college, the ANOVAs revealed a main effect for pronouns—the absence of pronouns led to significantly higher inferential comprehension than the presence of pronouns, \( F(1, 67) = 6.681, p = .012 \). Results had the same significant pattern for total comprehension, \( F(1, 67) = 8.370, p = .005 \), with a trend in the same direction for factual comprehension, \( F(1, 67) = 3.116, p = .082 \). Table 5 reveals the means and standard deviation. Power for these calculations rose to .72.

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Pronouns</th>
<th>n</th>
<th>Inferential (10 possible) M (SD)</th>
<th>Factual (9 possible) M (SD)</th>
<th>Total (19 possible) M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
<td>Present</td>
<td>29</td>
<td>3.31 (1.34)</td>
<td>3.83 (1.54)</td>
<td>7.14 (2.07)</td>
</tr>
<tr>
<td>form</td>
<td>Absent</td>
<td>26</td>
<td>3.54 (1.70)</td>
<td>3.77 (1.70)</td>
<td>7.31 (2.71)</td>
</tr>
<tr>
<td>Statement</td>
<td>Present</td>
<td>25</td>
<td>3.08 (1.26)</td>
<td>3.68 (1.55)</td>
<td>6.76 (2.18)</td>
</tr>
<tr>
<td>form</td>
<td>Absent</td>
<td>27</td>
<td>3.74 (1.38)</td>
<td>4.15 (1.88)</td>
<td>7.93 (2.59)</td>
</tr>
</tbody>
</table>
Perceptions

To assess reader perception of the EIS summaries, we asked participants to rate their overall impressions of many document features as well as the organization and friendliness of the EIS summaries.

**Overall Impressions of the EIS Summaries**

We first examined patterns in the participants’ overall impressions of the EIS summary with regards to interestingness, difficulty, engagement, and familiarity.
of the information in the EIS versions. We were hopeful that a majority of participants would rate the variables near the midpoints or below on these four variables and thus make for a group of readers who would not be in a position to find the EIS summaries too interesting, easy, engaging, or familiar. Had this been the case, participants’ personal relationships to the text would have allowed them to overcome issues encountered in various text versions. Participants had a rather neutral-to-interesting level of interest, a difficult-to-neutral view of difficulty, an unengaging-to-neutral view of engagement, and an unfamiliar-to-neutral view of familiarity (see Table 6). Participants were an appropriate group of readers who would not be excessively interested, find the text too easy, or be overly engaged or overly familiar with the content.

We then ran two-way ANOVAs to examine the effect of heading phrasing (question, statement) and personal pronouns (present, absent) on interestingness, difficulty, engagement, and familiarity of the information. The only significant results were for familiarity. The two-way ANOVA concerning familiarity revealed a significant main effect for heading phrasing on participants’ perception of familiarity, \(F(1, 107) = 6.738, p = .011\). Readers were significantly more likely to rate the EIS summary as more familiar when headings were phrased as questions (\(M = 2.72, SD = 1.06\)) vs. statements (\(M = 2.25, SD = .977\)). Perception of familiarity was rated on a 5-point Likert scale (1 = Very Unfamiliar, 5 = Very Familiar).

<table>
<thead>
<tr>
<th>Perceptions of Interest, Difficulty, Engagement, and Familiarity with EIS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceptions</strong></td>
</tr>
<tr>
<td>Interestingness of info.</td>
</tr>
<tr>
<td>2.80</td>
</tr>
<tr>
<td>Difficulty of info.</td>
</tr>
<tr>
<td>1.87</td>
</tr>
<tr>
<td>Engagement of info.</td>
</tr>
<tr>
<td>5.61</td>
</tr>
<tr>
<td>Familiarity of info.</td>
</tr>
<tr>
<td>16.82</td>
</tr>
</tbody>
</table>
For other perception questions, participants were asked to rate their agreement with statements about the EIS (e.g., whether the information in the EIS summary was “reliable” or in another case “formal” on 5-point Likert scales, with 5 indicating most agreement and 1 indicating least agreement). The two-way ANOVA concerning EIS reliability revealed a significant main effect for heading phrasing on participants’ perception of reliability, $F(1, 107) = 4.27, p = .041$. The results show that readers are significantly more likely to perceive an EIS as reliable when it has headings phrased as statements ($M = 3.26, SD = .56$) versus questions ($M = 3.00, SD = .76$) [see Table 7]. There was no significant main effect for pronouns or any interaction between statement headings and presence of pronouns.

The two-way ANOVA concerning ratings of ease of finding information revealed a significant main effect of presence of pronouns on participants’ perception of ease of finding information, $F(1, 107) = 4.91, p = .029$. The results show that readers are significantly more likely to perceive information as easy to find in EIS summaries containing personal pronouns ($M = 3.64, SD = .94$) than those without personal pronouns ($M = 3.23, SD = .98$). There was no significant main effect for heading phrasing or any interaction between presence of pronouns and heading phrasing, but power was low.

The two-way ANOVA concerning friendliness revealed a significant effect of presence of pronouns on participants’ perception of EIS friendliness, $F(1, 107) = 4.33, p = .040$. The results show that readers are significantly more likely to perceive as friendly an EIS with personal pronouns ($M = 3.34, SD = .98$) than without personal pronouns ($M = 2.94, SD = .98$). There was no significant main effect for heading phrasing or any interaction between presence of pronouns and heading phrasing, but power was low.

There were no other significant differences among the four EIS conditions on any of the remaining perceptual variables that are reported in Table 7.

Organization and Friendliness of the EIS Summaries

In addition to the comprehension and Likert-scaled perception questions, participants answered two open-ended questions. These responses were rated by three raters as either positive or negative on four content areas:

- style;
- organization;
- tone; and
- headings.

Three raters judged 119 comments from the two open-ended questions as either positive or negative on the four content areas. This resulted in 952 positive or negative ratings. The raters achieved 94% inter-rater reliability, agreeing on 895 of the possible ratings; 6 codes were dropped as outliers. The total number of
Table 7. Means (Standard Deviations) on Perception Variables by Heading and Pronoun Conditions

<table>
<thead>
<tr>
<th>Question</th>
<th>Question Headings M (SD)</th>
<th>Statement Headings M (SD)</th>
<th>Pronouns M (SD)</th>
<th>No pronouns M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The information in this EIS Summary was reliable.</td>
<td>3.00 (0.76)</td>
<td>3.26 (0.56)</td>
<td>3.13 (0.71)</td>
<td>3.12 (0.65)</td>
</tr>
<tr>
<td>The information in this EIS Summary was easy to find.</td>
<td>3.36 (1.04)</td>
<td>3.52 (0.91)</td>
<td>3.64 (0.94)</td>
<td>3.23 (0.98)</td>
</tr>
<tr>
<td>This EIS Summary was friendly.</td>
<td>3.11 (1.08)</td>
<td>3.18 (0.90)</td>
<td>3.34 (0.98)</td>
<td>2.94 (0.98)</td>
</tr>
<tr>
<td>This EIS Summary was easy to read.</td>
<td>3.09 (1.07)</td>
<td>2.90 (0.97)</td>
<td>3.02 (1.08)</td>
<td>2.98 (0.98)</td>
</tr>
<tr>
<td>This EIS Summary was easy to understand.</td>
<td>3.05 (0.93)</td>
<td>2.94 (0.84)</td>
<td>3.11 (0.85)</td>
<td>2.88 (0.92)</td>
</tr>
<tr>
<td>The information under the headings was sometimes unexpected.</td>
<td>2.75 (1.09)</td>
<td>2.70 (0.99)</td>
<td>2.75 (1.02)</td>
<td>2.69 (1.08)</td>
</tr>
<tr>
<td>The EIS Summary was well organized.</td>
<td>3.33 (1.25)</td>
<td>3.48 (0.99)</td>
<td>3.49 (1.17)</td>
<td>3.31 (1.09)</td>
</tr>
<tr>
<td>It was difficult to understand how each section of the EIS Summary related to the next.</td>
<td>3.00 (1.15)</td>
<td>2.98 (1.19)</td>
<td>2.81 (1.19)</td>
<td>2.17 (1.12)</td>
</tr>
<tr>
<td>On next reading, it would take a long time to locate specific facts in this EIS Summary.</td>
<td>2.40 (0.91)</td>
<td>2.38 (0.97)</td>
<td>2.26 (0.90)</td>
<td>2.52 (0.96)</td>
</tr>
<tr>
<td>It was easy to identify the main topics in this EIS Summary.</td>
<td>3.67 (0.96)</td>
<td>3.64 (0.90)</td>
<td>3.64 (1.00)</td>
<td>3.67 (0.86)</td>
</tr>
<tr>
<td>This EIS Summary was formal.</td>
<td>3.44 (1.05)</td>
<td>3.52 (0.99)</td>
<td>3.38 (1.08)</td>
<td>3.58 (0.96)</td>
</tr>
<tr>
<td>This EIS Summary was credible.</td>
<td>3.33 (0.82)</td>
<td>3.34 (0.59)</td>
<td>3.40 (0.79)</td>
<td>3.27 (0.63)</td>
</tr>
<tr>
<td>The headings were helpful in suggesting what content would appear next.</td>
<td>3.62 (0.93)</td>
<td>3.72 (1.09)</td>
<td>3.75 (1.05)</td>
<td>3.58 (0.96)</td>
</tr>
<tr>
<td>This EIS Summary seemed honest.</td>
<td>3.65 (0.87)</td>
<td>3.78 (0.68)</td>
<td>3.81 (0.83)</td>
<td>3.62 (0.72)</td>
</tr>
<tr>
<td>This EIS Summary addressed issues that affect concerned citizens.</td>
<td>3.96 (1.00)</td>
<td>4.08 (0.72)</td>
<td>4.11 (0.89)</td>
<td>3.92 (0.86)</td>
</tr>
</tbody>
</table>
negative ratings for each content area for each condition was then subtracted from the total number of positive ratings for each content area for each condition; results are shown in Figure 2. Figure 2 shows that the condition that used both questions and pronouns resulted in positive ratings of perception for style, organization, tone, and headings. In contrast, the positive-versus-negative perception ratings varied across the other three conditions (questions with no personal pronouns, statements with no personal pronouns, and statements with personal pronouns).

As shown in Figure 3, documents with question headings without pronouns positively impacted perceptions of organization and tone but negatively impacted perceptions of style and headings. In contrast, as shown in Figure 4, in documents with statement headings and no personal pronouns, perceptions of style were more positive and perceptions of organization and tone were more negative. As shown in Figure 5, statement headings with pronouns positively impacted perception of organization and negatively impacted perceptions of style in the document. In addition, Figure 6 shows that a document with question headings (and no personal pronouns) positively affected perceptions of organization and tone but negatively impacted perceptions of style.

Overall, the results show that statement headings are most positively perceived when paired with pronouns (with a composite positive-minus-negative rating of 2.30). Statement headings are most negatively perceived in the absence of
pronouns (with a composite positive-minus-negative rating of 1.03). Question headings are most positively perceived when paired with pronouns (with a composite positive-minus-negative rating of 2.00). However, question headings are most negatively perceived when in the absence of pronouns (with a composite positive-minus-negative rating of –0.97).

This study yielded many interesting results and has a number of implications for reader comprehension and perception of EIS summaries and other public-policy documents. Though proponents of PL guidelines encourage the use of headings in question form and the inclusion of personal pronouns, implementing these text elements in environmental policy documents may not be sufficient to help readers better understand and comprehend the content of the documents.

The general public that we tested was a very heterogeneous group, and the high variance of their comprehension results made the assessment of comprehension challenging. The study population was recruited through the use of Craigslist.org and fliers at local venues. With 107 participants, the demographic of the sample population varied greatly, including a large range shown on the basis of education, socioeconomic status, and prior experience with environmental impact statements.
Further iterations of the study would benefit from a sample size close to double that of this study’s to produce more definitive results about factual comprehension, a variable, which in all analyses had rather low power.

Our hypotheses concerning comprehension (H1 and H2)—that EIS summaries including the PL elements of headings in question form and personal pronouns would improve comprehension—were not supported. In fact, for participants with less than a graduate education, statement headings in the presence of personal pronouns led to higher inferential comprehension. Yet, for the participants with at least 2 years of college, the absence of pronouns led to higher inferential comprehension.

Our hypotheses concerning perceptions (H3 and H4)—that EIS summaries including headings in question form and personal pronouns would positively affect reader perceptions—were only partially supported. Question headings resulted in participants perceiving the EIS as more familiar, yet statement headings made participants perceive the EIS as more reliable. The results imply a tradeoff when writers choose between question headings and statement headings. Personal pronouns made the EIS appear more approachable—readers felt EIS summaries with personal

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Figure 4. Comparison of positive-minus-negative ratings for the two test condition, Statement Headings with Pronouns and Statement Headings with No Pronouns.
pronouns were friendlier and easier to find information in. Finally, statement and question headings were most positively perceived when paired with pronouns.

Overall, our examination of user comprehension and user perception of a document that incorporates PL guidelines yielded interesting results. Our comprehension tests were mixed. With regard to our perception study, we found that although readers were more likely to rate EIS summaries that incorporated headings in the question form as more familiar, use of question headings also yielded less positive ratings of perceived reliability than statement headings did. These data suggest that there is some “trade-off” between perceived familiarity and perceived reliability.

With regard to the usage of personal pronouns, EIS summaries containing personal pronouns (and more active-voice constructions) were perceived as friendlier and as containing information that was easier to find. Finally, perceptions of style, organization, tone, and headings were rated most positively when headings were in question form and pronouns were present. There was great variability of the perception ratings in the other three conditions (questions without personal pronouns, statements without personal pronouns, and statement with personal pronouns).
STUDY TWO: METHODS

The goal of Study Two was to ascertain whether specific design features affect participant perceptions of EIS summaries in positive or negative ways.

Participants

At the end of Study One’s final survey, we included an additional question that asked participants whether they would be willing to take part in a follow-up focus group. The focus group was described as an opportunity to view many different EIS summaries and provide feedback on ways to improve them. Compensation of $45 and reimbursement for on-campus parking fees were offered for participation in a one-hour focus group session.

Of the Study One participants, 97 expressed interest in being part of a follow-up focus group. We analyzed the 97 interested participants’ qualitative comments in Study One for quantity of topic-relevant evaluative statements. The 14 participants with the greatest numbers of critical statements (positive and negative

Figure 6. Comparison of positive-minus-negative ratings for the two test condition, Statement Headings with No Pronouns and Question Headings with No Pronouns.
relevant to the questions asked) were contacted and offered the opportunity to take part in a follow-up focus group. Twelve were able to attend.

**Demographics**

The 12 focus group participants were divided into two focus group sessions of 6 people each. Session 1 had four female and two male participants; Session 2 had two female and four male participants. All participants were native English speakers. The average age of participants was 32.6 years. Seven of the 12 participants had college Bachelor’s degrees and one had an Associate’s degree.

**Materials**

Each participant was given a set of six different, naturally occurring EIS summaries to examine. The summaries were each given condensed, single-word titles, so that participant references to a specific document would be clear and consistent. The six EIS summaries are briefly described in the following text and in Appendix A; these descriptions will prove quite relevant in understanding participants' comments. The six summaries fell into a range of three types of documents. The first two, Cape Wind and Moab, are rather conventional portrait layouts with standard amounts of white space. North Shore and Snoqualmie are still laid out in portrait orientation but have more white space, layout, graphics, and use of color. Salmon and Viaduct use a multitude of layout and graphic devices with Viaduct even using 11” by 17½”, heavy-stock paper.

Focus group questions were developed and then used to provide initial structure and facilitate discussion. Questions were either value-neutral (e.g., *When you look at these various documents, which design features stand out?*) or were paired to provide opportunity for both positive and negative feedback (e.g., *What characteristics make these documents valuable? What characteristics detract from that value?*).

Following is a brief description of the six EIS summaries.

*Cape Wind Energy Project Draft EIS Executive Summary (Cape Wind)*

*Cape Wind* is an 8½” by 11”, portrait-oriented document on normal-stock paper. It lacks a cover page or table of contents (see Figure 7) [40]. The body text is single-column (7-1/8”) and fully justified with a moderate number of paragraph breaks, normal line leading, and 12pt paragraph spacing. The document’s margins are a narrow ¼” with a 1” gutter. Headings are a combination of numbers and noun phrases used to express document structure, with differences in heading level expressed through the use of capitalization (full capitalization vs. title capitalization), bold text, underlining, and italics. The document contains no figures, but has large, moderately formatted, portrait-oriented, multi-page tables.
Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Final Environmental Impact Statement (Moab)

Moab is an 8½” by 11”, portrait-oriented document on normal-stock paper (see Figure 8) [41]. It has a cover page, cover sheet, table of contents, table of tables, table of figures, and a list of acronyms. The cover page has a seal from the U.S. Department of Energy’s Office of Environmental Management. The document’s body text is single-column (6/2”) and left justified/ragged right with a conservative number of paragraph breaks, conservative line leading, and 12pt paragraph spacing. The document’s left margin is ¾” and the right margin is 1”. Headings are noun phrases, with differences in heading level expressed through the use of relative size, bold text, italics, and position (above body text vs. in-line). The document has a liberal number of figures, the majority of which are in black and white, and contains one full-page, color map. The document also has call-outs, black and white maps, and a large, conservatively formatted, landscape-oriented, 10-page table.

North Shore Road Draft EIS Summary (North Shore)

North Shore is an 8½” by 11”, portrait-oriented document on normal-stock paper. It lacks a cover page or table of contents (see Figure 9) [42]. The body text is single-column (6/2”) and left justified/ragged right with a moderate number of paragraph breaks, normal line leading, and 12pt paragraph spacing. The document’s margins are 1” with a 1” gutter. Headings are a combination of
numbers and noun phrases used to express document structure, with differences in heading level expressed through the use of color (blue vs. black), bold text, and relative size. The document contains in-line color figures, color images, and lists; it contains a large, moderately formatted, landscape-oriented, multi-page table. The majority of images presented in the document are general images, rather than examples specifically referred to in the document text.
I-90 Snoqualmie Pass East Draft EIS Executive Summary (Snoqualmie)

*Snoqualmie* is an 8½” by 11”, portrait-oriented document on normal-stock paper. It has a cover page, but does not have a table of contents (see Figure 10) [43]. The body text is single-column (5”) and left justified/ragged right with a moderate number of paragraph breaks, conservative line leading, and 6pt paragraph spacing. The document’s body text has 2½” left margins and 1” right margins. Major headings are questions and sub-level headings are noun phrases, with differences in heading level expressed through relative size and position (above body text vs. in-line). The document liberally uses color figures and color images, always on entire pages opposing body text. Moderately formatted, within-body tables are liberally used in the document. The majority of images presented in the document are examples specifically referred to in the document text.

Improving Salmon Passage, Final Lower Snake River Juvenile Salmon Migration Feasibility Report/EIS (Salmon)

*Salmon* is an 8½” by 11”, double-sided, spiral-bound, portrait-oriented document on normal-stock paper (see Figure 11) [44]. It has a cover page, a table of contents, a cover letter directly addressed to the reader, and a back cover page. The cover page, cover letter, and back cover page have seals of the U.S. Army Corps of Engineers. The document’s body text is single-column (3”–6¼”) and varies between full justification and left justified/ragged right. The text also

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Figure 10. I-90 Snoqualmie Pass East, Draft EIS Executive Summary.
has a moderate number of paragraph breaks, conservative line leading, and 12pt paragraph spacing. The document’s left margin varies between 7/8” and 3”, and the right margin varies between ½” and 3”. Column placement varies and column widths vary between 3” and 6¾”. Headings are in the form of noun phrases, with differences in heading level expressed through the use of bold text and relative size. Elements of headings are emphasized through the use of in-line variable text size, in-line text color differences (black vs. blue), in-line capitalization differences (full capitalization vs. title capitalization), and corresponding vertically or horizontally oriented images and/or large blocks of color. The document liberally uses color figures, color images, lists, and call-outs. Figure, image, list, and call-out styling and formatting varies, with use of overlay, shape (geometric vs. organic), border usage, and alignment to text. The document also contains large, liberally formatted and styled, landscape and portrait-oriented tables. Formatting and stylization varies between tables. Images and figures presented in the document are a combination of general examples with specific examples directly referred to in the text.

**SR 99: Alaskan Way Viaduct and Seawall Replacement Project, Supplemental Draft EIS Summary (Viaduct)**

*Viaduct* is an 11” by 17½”, landscape-oriented document on tabbed, glossy, heavy-stock paper (see Figure 12). It has a cover page, a minimal table of contents (only listing the three chapters) [45]. It includes two data CDs containing digital
Overall Procedure

The focus groups took place in a conference room at the University of Washington. The moderator and six participants sat around a large table. Two research members sat at a separate table and took detailed notes using laptop computers. At the beginning of each focus group session, participants were given an information statement and consent form with time to read the documents and ask questions. Participants then each received the same set of six EIS summaries and were asked to look at the documents for a period of 5 to 10 minutes, after which the moderator began the discussion by asking some initial questions. Each set of documents was stacked in the same order, but participants were told they could view the documents in any order. Session 1 participants took the
full 10 minutes to initially look at the documents, whereas Session 2 participants took about seven minutes before commencing discussion.

The initial questions presented by the moderator involved establishing context for EIS production and use (e.g., When do people read environmental impact statements? What are their expectations? How well do these various documents fit within those expectations? When do public agencies provide documentation on environmental policy? What do you think their major goals are? How well do these documents address these goals?). The focus of the moderator’s questions then moved to specific document characteristics and their effects within discussed contexts (e.g., What characteristics make these documents valuable? What characteristics detract from that value? Within these documents, which characteristics would affect the way in which you read?).

Beyond these initial prompts, moderator questions were used to draw out comments on how specific design features affected users and their perceptions. The moderator gave regular verbal prompts to encourage participants in their conversation, and asked for clarification when participant comments were unclear. On the few occasions where the note-takers needed additional clarification for statements, they directly asked the participants.

Focus group notes, from the two researchers who took them, were input into Atlas.ti 5.0 and then checked for accuracy by the researcher who led the focus group. Focus group notes were then independently coded by the four researchers who agreed on six common themes. Three researchers reread the notes and then recoded them in Atlas.ti 5.0 for presence of the six themes.

**STUDY TWO: RESULTS AND DISCUSSION**

This discussion examines the researchers’ ratings of participants’ perceptions of the six agreed-upon themes: (1) motivation, (2) tone, (3) style, (4) publication characteristics and graphics, (5) organization, and (6) layout.

**Motivation**

Motivation is defined as ethos and the perceived motivation of the authors or authoring organization to produce the EIS summaries. Three aspects affected the perceived positive or negative perception of the motivation behind the production of EIS summaries. We identified three aspects of motivation in participant perceptions as reader-centered tone, persuasion, and authorship.

**Reader-Centered Tone**

One of the most prominent themes that arose from the focus groups’ attention to the motivation behind the summaries was the tone and the perception of a “reader-centered” document. The participants had a more positive perception of the EIS summaries that gave the readers a sense that “the writer was on their
side,” while EIS summaries that did not seem to give appropriate attention to the
readers left participants with a sense that the authors or authoring organizations
were not “reader-centered.” For example, numerous participants complained that
they felt the tone of the Viaduct EIS was argumentative and that the document
felt more like a presentation “to investors,” with one participant stating that the
Viaduct EIS summary appeared like it should be “in the library, as a reference,
but not for people to read.”

**Persuasion**

Another aspect that appeared to affect participants’ positive or negative per-
ception of motivation was the idea of persuasion (the author’s purpose for creating
the document or the readers’ perception of the writer’s motivation). Participants
felt that because of controversy surrounding some of the projects, some of the
EIS summaries (e.g., Viaduct) were “making an argument as much as presenting”
or “trying to win people over or convince people.” Other participants felt that
Viaduct, Cape Wind, and Salmon, as persuasive documents, were “trying to sell
you [projects].” The participants acknowledged that the perceived persuasive
motivation of the production of these documents varied greatly, and noted that
“there is a distinct difference between why these things [EIS summaries] are
produced.” Moab gave participants the perception that certain EIS summaries
have been produced “because they had to be.”

**Authorship**

Being able to easily identify the author or the authoring agency of the EIS
proved to be an important aspect in encouraging a more positive perception of
motivation for the focus group participants. EIS summaries that did not readily
identify the authors of the documents were not taken as seriously by the readers.
For example, North Shore and Cape Wind, because “they don’t immediately
present themselves as part of any department,” gave the impression that the
document was “something students put together.” On the other hand, Viaduct,
Moab, and Salmon were taken “more seriously” because of clear references to the
specific authoring agencies, both within the documents and on the documents’
covers. A clear emphasis on authorship, or the lack thereof, played a pivotal role in
affecting the positive or negative perception of motivation in the EIS summaries.

**Tone**

Tone is defined as the author’s attitude toward content, self, and reader; the
Plain Language guidelines explain that “the tone of your [document] will project
your attitude to the reader” [1]. Tonal aspects that were found to affect perceptions
were deceptive or “slick” appearance and a sense of invitation.
Appearance

Most focus group participants felt that a “slick” or extravagant appearance, though aesthetically pleasing, did not garner the perception of honesty. For example, participants felt that Viaduct’s slick appearance was deceptive and suspicious, while they felt that other less extravagant EIS summaries, such as Snoqualmie and Salmon, gave the perception that the writers were “on their side.” It should be noted that Viaduct has been a source of political, social, and economical contention and participants may have come to the focus group with preconceived ideas about the Viaduct project and EIS summaries related to it.

Sense of Invitation

A sense of invitation was appreciated in the EIS summaries. One EIS in particular, Salmon, included a letter addressed to citizens at the beginning of the document. Participants were impressed that the EIS started with a “letter to them” and gave the perception of a “friendly” tone or an “inviting” tone. Similarly, perceptions of tone were more positive if participants felt that the authors “thought about putting themselves in our [the participant’s] shoes.” One participant stated that the “layout of Snoqualmie is kind of an indication that they care about the public. . . . They put enough time in to make it a really accessible doc . . . they really thought about you and your needs.”

Style

Style is defined as the author’s manipulation of semantics and syntax. The amount of information, and technical jargon and acronyms affected perceptions of style.

Amount of Information

Participants’ perception of style proved to be negatively impacted by an over-abundance of information. The inclusion of too much information overwhelmed participants. One EIS in particular stood out as providing too many details for readers. Viaduct was described as “more of a reference” by one participant, and as “giving [me] too much information” by another. Salmon and Snoqualmie, on the other hand, were described as being designed with the thought of “what can we do to help the reader find what they need,” rather than presenting every angle for every potential stakeholder in the project.

Technical Jargon and Acronyms

Another factor that affected participants’ perceptions of style was the inclusion of technical jargon and acronyms. For participants, not knowing what acronyms stood for proved to be problematic. Specifically, Moab was considered to be an
EIS that seemed to be “above the head of the layman” because of the plethora of acronyms and technical jargon. Viaduct, on the other hand, was noted as providing targeted and easy-to-understand language for readers.

**Organization**

Organization is defined as the ordering, grouping, and revealing of information. Participants’ perceptions of the EIS were affected by the following aspects of organization: page-numbering style, inclusion of table of contents, and the number of references to material located on other pages.

**Page-Numbering Style**

Page numbers, of course, aid readers in locating information in multi-page documents. Participants noted that the type of page numbers used made a difference in regard to the organization of the EIS summaries. In general, participants appreciated the use of “real page numbers” such as in Salmon, in contrast to a more complex decimal numbering system (such as Cape Wind’s page 1.1, 1.2, etc.). In the absence of a table of contents, such as in Cape Wind or North Shore, participants found it difficult to easily reference page numbers in the documents. “You can’t say, ‘Oh yeah, it’s on page 10.’”

**Table of Contents Inclusion**

A table of contents was generally seen as “helpful” by participants. Cape Wind, which lacked a table of contents, was described as seeming “shoddy,” and the more complicated the EIS, such as North Shore, the more participants missed a table of contents. On the other hand, Snoqualmie, which was perceived to be simple and concise, appeared “succinct enough that they could get away without a TOC.”

In addition, numerous participants agreed that the inclusion of a table of contents helped to keep readers engaged. Participants noted that without a table of contents, it was difficult to understand the organization of the document and that the document would likely lose readers’ attention. Further, the extensiveness of the table of contents affected perceptions. One participant noted that with Moab, an EIS that begins with “a bunch of lists,” the table of contents “reinforces that it’s going to be a chore to get through.” When comparing the EIS summaries, participants felt that lack of a table of contents is generally “detrimental.”

**Number of References to Material on Other Pages**

Finally, another aspect of organization that affected participants’ perceptions was the over-abundance of references to material on other pages. Moab, in particular, seemed to overwhelm participants. Though participants acknowledge
that a reference list in the front of the document was a good thing, the “flipping” back and forth to understand all references was less desirable.

**Layout**

Layout is defined as the use of whitespace and type characteristics to reveal emphasis and organization. Aspects that affected participants’ perceptions of layout of the EIS summaries were the document’s headings, text density, the margin size and whitespace, and other miscellaneous layout elements.

**Headings**

The inclusion of headings in the documents, as well as the wording and design of the headings, directly affected participants’ perception of the EIS summaries. For example, the headings in Moab seemed “vague” to participants while the headings in Salmon seemed “very clear” and “attractive.” Further, the design of the headings (including font size) also affected perceptions. The headings in Snoqualmie and Salmon were both described as being very “obvious,” with the bold Salmon headings reminding participants of “textbooks.” Moab’s use of clearly different fonts and bolding for headings aided participants and helped them to “delineate section changes.” Participants agreed that these clear headings made it “easier to see and flip through” the EIS summaries.

**Density of Text**

Participant layout perceptions were also affected by the amount of text present on the page. For example, participants felt “lost in text” when reading Cape Wind and Moab. However, participants felt that the “short snippets and charts” in Snoqualmie made reading much easier and accessible. Participants noted that they could “identify” more with EIS summaries such as Salmon and Viaduct, which did “not present walls of text” found in Moab and Cape Wind, and thus appeared much less daunting.

**Margin Size/Whitespace**

Margins and whitespace also played a pivotal role in participant perceptions. In general, EIS summaries with clear “margins, whitespace, and graphics with clear purpose” and “great captions” helped participants who wanted to “thumb through” an EIS. With its use of whitespace and “clean headers,” Salmon was noted as seeming “open.”

**Miscellaneous Layout Elements**

In addition to headings, size of margins, and use of whitespace, other various layout elements affected participant perceptions. FAQs (Frequently Asked
Questions) were sometimes seen as positive and at other times as negative. Participants felt that Snoqualmie did a good job of breaking the EIS summary topics into questions, while participants did not like the FAQs in Viaduct because it felt like it was “giving too much information.”

Also, participants’ perception of the author’s goals impacted attitudes toward the EIS summaries. Salmon and Snoqualmie were considered to be more visually “clean” and were better-received than Moab and Cape Wind, which did not appear to be accessible to readers. In Moab and Cape Wind, participants questioned whether the author(s) “really want you to get all the way through it” and were genuinely interested in “public feedback.”

### Publication Characteristics and Graphics

Publication characteristics and graphics were defined as the physical and tactile features of the printed document. Aspects of the publication characteristics and graphics that affected participants’ perceptions included: the presence of seals; the design of the EIS; the gloss, size, and weight of paper used; the apparent purpose of images; and the length of the EIS.

#### Seals

Three of the EIS summaries (Moab, Salmon, and Viaduct) included a governmental seal on the covers of the EIS summaries. Most participants found these seals ethically convincing and felt that the inclusion of the seals added to the documents’ credibility. According to one of the participants, governmental seals would encourage readers to “take them more seriously” than if seals were omitted.

#### Design of EIS Summaries

One of the most impactful design elements of the EIS summaries was the “voter pamphlet” design of the Salmon EIS. The participants noted that the Salmon EIS looked like a voter pamphlet, providing participants with the accessible features and the possible effects of proposed action to be taken in a “nutshell.” Participants agreed that the voter pamphlet publication characteristic of the Salmon EIS was “valuable.”

#### The Gloss, Size, and Weight of Paper

The gloss, size, and weight of paper played a large role in the participants’ positive or negative perception of the EIS summaries. Viaduct, in particular, stood out as an extravagantly published EIS. Because of the glossy, full-colored, oversized publication, participants questioned the “availability” of the document and felt that, considering that the document was an EIS, the EIS presented itself as a kind of “oxymoron” because it did not seem to consider the “environmental impact.” One participant noted that Viaduct was “intimidating because I don’t
Another commented on the difficulty of carrying around such a large document. Multiple participants noted that it would be near impossible to print that document out from a normal printer at home, which greatly limited the accessibility of the document.

**Purpose of Images**

With the exceptions of Cape Wind, all of the EIS summaries contained at least some photographs, figures, and/or other graphics. Images that were included to supplement text and convey information related to the proposals positively impacted participants’ perceptions, while unnecessary images negatively impacted participants’ perceptions. Images that were simply “pretty,” such as those in North Shore, did not illustrate what was “going to take place” and did not aid participants. In addition, Salmon’s use of a large number of figures and diagrams, proved to be “distracting” to some participants.

**Length of Document**

The length of the EIS summaries affected participants’ positive perception of the documents in that they gave participants a sense of comprehensiveness. EIS summaries such as Moab that seemed to be longer appeared “more comprehensive,” primarily because the document was “thicker than the others.” On the other hand, EIS summaries such as Viaduct that seemed to rely on a plethora of images negatively impacted participants’ perceptions because participants did not feel that they were “getting much information on each page.”

**STUDY TWO: SUMMARY**

The focus groups revealed a number of design aspects that affected perception (either positively or negatively). Participants appreciated aspects of the EIS summaries that seemed to keep the reader in mind (reader-centered and inviting tone, limited technical jargon, inclusion of only necessary information, and a clear organization revealed by table of contents, clear headings, and a simple numbering system). In addition, readers valued layouts that were not cluttered (many provided ample white-space and were not text-heavy), included thoughtful and meaningful images, balanced extravagance with document purpose and motivation, and were appropriate in length. Document features (motivation, tone, style, publication characteristics and graphics, organization, and layout) significantly impacted both positive and negative perceptions of the EIS summaries.

Participants’ perceptions of each EIS depended on the presence or absence of these design aspects. With its dense text and lack of a table of contents, Cape Wind was perceived as a document the authors were required to write, rather than a document meant to inform readers. Participants felt the Cape Wind EIS could
have more directly addressed the negative consequences on the environment. Moab’s acronym-heavy content, vague headings, and some complex diagrams caused participants to dislike the EIS. Like Cape Wind, Moab seemed to participants to fulfill a requirement to be written, rather than to inform the public. North Shore’s unclear illustrations and small captions distracted participants. Participants felt some illustrations were gratuitous. Snoqualmie, on the other hand, with its question headings, interesting illustrations, and directory of meetings resulted in positive perceptions. Participants liked Salmon for the opening letter addressed directly to the reader, its table of contents, and its clean layout (including bold headings and interesting graphics). While participants may have been biased against Viaduct before the focus group, all participants agreed the EIS’s large layout, glossy pages, and tabs were unnecessary and an attempt to “sell” to readers.

CONCLUSIONS AND FUTURE RESEARCH

Plain Language precepts can indeed affect readers of environmental policy documents. Study One found mixed effects of the effect of question vs. statement headings and personal pronouns on comprehension depending on how the sample was analyzed. The full data set lacked sufficient power to assess comprehension without separating the sample by education because the sample was too heterogeneous—the public who volunteered to come to the university and participate represented a wide range of people with highly varying education levels. Our participants did, however, represent an appropriate group of readers who would be likely to participate in community meetings regarding environmental concerns—they would not work overly hard, or be unduly comprised due to interest, ease, engagement, or familiarity.

While no significance was found in regard to comprehension across test conditions for the full sample, separating the sample by educational levels proved to be very informative. For participants with at least two years of college, the absence of personal pronouns led to higher inferential comprehension. Yet, for participants with less than college graduate degrees, statement headings in the presence of personal pronouns led to lower inferential comprehension. Though proponents of PL guidelines encourage the use of headings in question form and the inclusion of personal pronouns, implementing these text elements in environmental policy documents may not be sufficient to help readers at any education level better understand and comprehend the content of the documents. However, when comprehension is positively influenced, it is noteworthy that it is inferential comprehension versus factual comprehension that is affected, revealing that the absence of personal pronouns can positively influence readers’ abilities to decipher broader implications of environmental policy documents. Further, statement headings can negatively influence readers’ abilities
to decipher broader implications of environmental policy documents. Hence, the PL guidelines in favor of the presence of personal pronouns and question headings are not fully supported by this study in terms of comprehension and need further validation. Maximizing comprehension of these documents is central to their role in public decision making and merits further research.

Study One also revealed that heading and pronoun phrasing affects reader perceptions of environmental policy documents. Readers were significantly more likely to rate the EIS summary as *more familiar* when its headings were in question vs. statement form. But they were more likely to agree that it was *reliable* when its headings were in statement vs. question form. Similarly, the presence of personal pronouns affected reader perceptions. Readers were significantly more likely to agree that information was *easy to find* and that the summaries were *friendly* when the documents contained personal pronouns.

There appears to be a complex relationship between familiarity and reliability—the results imply that there is a tradeoff between question and statement headings. Writers of EIS summaries should consider this tradeoff when phrasing headings in their documents and keep in mind whether a reader’s perception of familiarity or reliability is most important in a given context. Writers should also consider using personal pronouns to make EIS summaries seem more approachable.

Finally, statement and question headings were most positively perceived when paired with personal pronouns. Positive perceptions of EIS documents have implications for citizen attitudes and response toward EIS summaries, the proposed project, and the sponsoring agency.

In addition, Study Two revealed that specific design considerations can affect readers’ perception of motivation, tone, style, publication characteristics and graphics, organization, and layout of EIS summaries. Readers value documents that are reader-centered, have an inviting tone, limit the use of jargon, clearly reveal organization, use white space, and include meaningful images. Moreover, perceptions are also affected by the organization, accessibility, and amount of information presented in environmental policy documents. While PL guidelines suggest specific criteria applicable to document design, our findings reveal that PL design features interact and readers’ perceptions of their value vary across documents and contexts.

Though the current results are encouraging for proponents of PL in environmental policy documents, further iterations of this study should assess larger and more homogeneous samples and other types of documents. In addition, conducting a web-based version of the test might yield different results as online readers do not necessarily perform the same as readers of paper documents. The results of such a study could be particularly important considering the current rapid progression of public policy documents to online media. While the results of this study are exciting, clearly more work is needed to fully understand the impact of PL guidelines on readers of environmental policy documents.
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ACKNOWLEDGMENTS

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