I. W. Cheung is with the Faculty of Health Sciences, Simon Fraser University, Burnaby,

BC, Canada V5A 1S6 (email: ivac@sfu.ca).

Tutorial

Plain Language to Minimize Cognitive Load: A Social Justice Perspective

—IVA W. CHEUNG

Abstract—This tutorial explores ethical implications of cognitive load theory and intersectional theory on technical and professional communication and proposes plain language as an ethical imperative to redress social inequities. **Key concepts**: *When the cognitive load of a learning task is too high and overwhelms working memory, learning is impaired. The greater stress and mental burden that marginalized populations experience can leave less working memory available for reading and learning. Using plain language to reduce cognitive load can be considered a political act that increases marginalized populations' opportunities to understand.* **Key lessons:** *1. Consider whether marginalized populations are part of your audience. 2. Using personas to represent those populations, audit their mental burden to exercise cognitive empathy. 3. Consider reducing cognitive load via plain language an ethical imperative.* **Implications for practice:** *Assessing the presence and absence of specific marginalized groups is iterative and takes practice, but developing plain-language communications that*

accommodate these audiences reduces cognitive load for all readers. And although personas are useful for developing cognitive empathy, nothing replaces user testing in determining your communication's effectiveness.

Index Terms: *Cognitive load theory, intersectional theory, marginalized populations, mental burden, plain language, social justice.*

This tutorial uses cognitive load theory and intersectional theory to provide an ethical motivation for using plain language in technical and professional communication. In short, I argue that

- Because marginalized populations have more to worry about, those worries can compound, leading to stress that can overwhelm working memory and interfere with learning.

- Doing as much as we can to decrease the cognitive load of our communications— namely, by using plain language—helps counter systemic inequity and is therefore an ethical imperative.

Others have explored the ethics of using plain language from various perspectives.

- In her TEDx talk, Sandra Fisher-Martins [1] argued that people cannot be active, participatory citizens if they don't understand the documents that inform them of their rights and responsibilities, and she urged her audience to push for simpler, clearer language.

- Justice Beverly McLachlin of the Supreme Court of Canada, a fierce advocate for access to justice, has said, "If we cannot understand our rights, we have no rights" [2, p. 285].

- Karen Schriver has made the case that clear, understandable consumer information is a logical extension of the historical consumer movement for truth in advertising and labeling [3].

- Mark Hochhauser has studied the language of medical consent forms and contends that there cannot truly be informed consent if the language is too complex for patients to understand [4, 5].

- In *Plain Language and Ethical Action,* Russell Willerton describes his BUROC framework, which outlines the *bureaucratic, unfamiliar, rights oriented,* and *critical* situations in which he recommends using plain language for ethical reasons [6].

These and other activists and scholars make compelling arguments for plain language based on fairness and equality, and although they acknowledge the inherent power differential between those with knowledge and those without, I aim to build upon their work and suggest an additional motivation for using plain language—one that explicitly considers, from an educational psychology perspective, how unnecessarily complex communications reinforce social marginalization.

This examination of how plain language may help mitigate the effects of social inequities is informed by the work of scholars such as Jones, who encourages technical communicators to think critically about their opportunities to challenge the status quo in

favor of social justice and elevate the voices of systemically marginalized, oppressed, and silenced groups. She writes, "Technical communicators have the content knowledge, the responsibility, and the power and potential to address issues of social justice and equality through their research and pedagogy" [7, p. 349]. Jones suggests several approaches—decolonial, feminist, and participatory—to uncover and amplify the narratives of marginalized groups.

This tutorial considers not *what* marginalized groups think about so much as *how much* they have to think about. In the Key Concepts section, I use cognitive load theory to show how this mental burden can interfere with learning and exacerbate social inequities for people at intersections of oppression. I suggest that using plain language may reduce cognitive load and can be a key strategy that technical communicators can use to level the playing field. In the Key Lessons section, I suggest specific methods to use during audience analysis to develop cognitive empathy for people from marginalized populations and urge technical communicators to see plain language as an ethical imperative. In the Implications for Practice section, I acknowledge that applying the key lessons is iterative and will not replace user testing in determining whether communication has been successful.

Critics of using plain language as a way to combat social inequities may raise concerns that plain-language "rules" impose a standard that undermines decolonization efforts by homogenizing communication rather than tolerating cultural differences in vocabulary or narrative structures [8]. Plain-language practitioners would offer the rebuttal that plain language is a process, not an endpoint, and it does not propose a one-size-fits-all solution [9], [10]. It explicitly centers the audience: judging whether a communication is plain

relies exclusively on whether the audience received the message effectively, and the linguistic prescriptions (real or perceived) of the communicator are irrelevant. Furthermore, frequent sources of unnecessarily complex language—corporations, governments, and academia—are still composed disproportionately of white males [11]–[13], and some civil rights activists and critical race theorists consider legalese and bureaucratese to be instruments of white supremacy and social control [14]–[16]. In opposing these instruments, plain language can be a tool for equality.

KEY CONCEPTS

This section presents the theoretical and empirical justification for using plain language as an ethical imperative to advance social justice. I review the key principles of cognitive load theory, explore the mental burden of marginalization, and explain the role of plain language in reducing cognitive load.

Guiding my approach to this topic is an intersectional framework. According to intersectional theory, different aspects of social and cultural identity, such as socioeconomic status, health status, race, gender, sexual orientation, and so on, interact with each other and compound systems of oppression [17]. Marginalized populations experiencing oppression have more worries that, collectively, can tax working memory in a way that impairs learning.

Because cognitive load theory is relatively well established, for that section I relied on an edited volume on the topic, featuring contributions from Sweller, the theory's developer, and instructional design authorities Moreno and Mayer [18].

To examine the effect of marginalization on cognitive performance, I searched the

PsycINFO database and Google Scholar for the following terms:

> ("stigma" OR "prejudice" OR "bigotry" OR "racis*" OR "poverty" OR
>
> "homophobi*") AND "cogniti*"

I focused on those results discussing the effects of cognitive performance on the victims

of marginalization (and not on the cognitive states of the perpetrators of prejudice or

bigotry). My aim was to find key examples rather than to conduct an exhaustive search of

all forms of oppression.

For the effect of plain language on cognitive load, I searched the Communication & Mass

Media Complete database, as well as Google Scholar, using the following terms:

> "plain language" AND ("reading performance" OR "cogniti*")

Here, I focused on those results presenting evidence about document design and language

features that improve reading speed and comprehension.

Cognitive Load Theory Cognitive load theory arose out of the field of instructional

design, and its main principles are the following [19]:

- To learn, we process inputs from our senses in our working memory.

- Once we learn something, we store it in our long-term memory as a *schema*.

- The capacity of our long-term memory seems to be boundless, but our working

  memory is limited in time and duration: we can hold only four or five items at a

time and only for a few seconds. If working memory is overwhelmed because the cognitive load of a learning task is too high, learning is impaired.

Cognitive load refers to the amount of mental effort that a task requires and is usually classified into one of three types, which are additive:

- *Intrinsic*, which comes from the difficulty of the material itself

- *Extraneous*, which is unproductive mental effort caused by poor instructional design

- *Germane*, which is productive mental effort helpful in creating schemas

Learning tasks must compete for attention against distractions, particularly negative distractions, which occupy or interfere with working memory [20], [21]. See Fig. 1.

Our schemas help us process information more efficiently. For instance, persons with low literacy may have to look at each letter and hold it in working memory before putting a word together. Their schemas consist of individual letters. Once they get more practice, they are able to recognize whole words or even groups of words. Their schemas become more complex, and reading becomes less mentally taxing [19].

Complex schemas let us automate our information processing in a way that takes advantage of what Kahneman calls System 1 thinking, which is fast and intuitive. In contrast, slow, effortful System 2 thinking requires deliberate attention and uses more glucose. Because we are evolutionarily predisposed to conserve glucose, we tend to avoid using System 2 thinking when we don't have to [23]. Reading tasks that take more mental effort—because unnecessarily complex language or poor instructional design increases

extraneous cognitive load—engage System 2 thinking and are more energy intensive. In contrast, people are more likely to read written communications that are plain enough to understand automatically via System 1, which will not deplete their energy stores. This consideration is especially important for marginalized populations devoting their energy to securing the basics of survival.

The Mental Burden of Marginalization Because working memory is limited and can be overwhelmed, any extraneous mental burden can interfere with learning [24]. People who are oppressed—because of racism, perhaps, or transphobia, or poverty—have a lot of worries to occupy their minds. According to intersectional theory, those oppressions— and the stress and anxiety associated with them—compound: a woman of color who has a disability has more to worry about than a woman of color who is not disabled, who in turn has more to worry about than a woman of the dominant culture (white, in Western societies) who is not disabled [25]. The stress of this mental burden leaves people with less available working memory to process new information when they undertake a learning task such as reading text or graphics.

Mental burden is hard to measure directly, but some indirect evidence supports this assertion:

- People who fear persecution for their sexuality at their workplace may have lower cognitive performance [26].
- People with disabilities and chronic illness describe having limited mental energy [27], [28].

- Individuals in groups facing a negative stereotype (for example, that women are bad at math or that African Americans perform poorly academically) may experience *stereotype threat*—anxiety about the risk of conforming to that stereotype—which consumes cognitive resources and working memory [29], [30].

- People in poverty have been found to have lower cognitive performance than the general population [31].

There is no reason to believe that people in poverty, for example, are inherently less intelligent than everyone else. Instead, having to worry about where they will find their next meal or how they will pay their bills may overwhelm their working memory, leaving them less "freedom of mind" to learn [32].

The problem is self-perpetuating: the harder a person finds the task of reading, the less likely that person is to do it. The 2003 National Assessment of Adult Literacy, for example, found that adults with low literacy are less likely to read to their children or get their information from printed sources [33]. The resulting lack of practice means they don't develop the schemas they need to make reading more automatic and less resource intensive. In other words, not only do marginalized populations have less available working memory (because of daily stressors) to process new information, but that difficulty is more likely to become entrenched.

The Role of Plain Language in Reducing Cognitive Load One way technical and professional communicators can help alleviate this mental burden is to reduce the cognitive load of the communications they produce. Authors such as Carliner [34] contend that information design and cognitive load theory should inform technical communication practice. One could even argue that the ultimate goal of plain language is to minimize the cognitive load of a learning task.

Early definitions of plain language tended to focus on specific heuristics—for example, using active voice, using verbs instead of nominalizations, and breaking content into smaller chunks [35]. Most of these plain-language strategies work by decreasing extraneous cognitive load. In other words, they decrease the distractions that demand unnecessary mental effort.

Although cognitive load is hard to measure [36], reading and comprehension speed can serve as a proxy, because faster performance suggests that the reader is using more automatic System 1 thinking rather than effortful System 2 thinking.

Let's look at the cognitive justifications for common plain-language heuristics.

Document Structure

- Give readers important information first, and tell them only what they need to know. Presenting readers with unessential information increases cognitive load because they have to keep it in their working memory while they evaluate its relevance. As well, according to the serial-position effect, we remember items at the beginning (and end) of series better than items in the middle [37].

- Give information in chunks. Presenting information in small, digestible chunks lowers cognitive load by allowing the reader time and space to absorb one piece of information before moving on to the next [38].

- Use headings. Headings signal readers about information to come and direct their attention to essential information, decreasing extraneous processing [38].

Document Design

- Use easy-to-read typefaces at a readable size. Type that is too small or hard-to-read typefaces like script fonts lead to slower reading, suggesting a higher cognitive demand [39].

- Use black ink on a white background. This arrangement is easiest to read and provides the high contrast that is especially important for people with low vision [39].

- Use white space and a modular grid. Grids help align the content to make it easier to scan and, together with judicious use of white space, help group content into semantically related rhetorical clusters, which make it easier for readers to see relationships between different elements on a page [3], [39].

- Use graphics as well as text. Our working memory has separate capacity to process visual and verbal material. These *dual channels* mean that readers can view both types of material together without getting overloaded [38].

Expression

- Use verbs rather than their nominalizations. We have to mentally translate nominalizations into verbs before we can understand them, a process that adds to cognitive load [40].

- Use active rather than passive voice. Because we are used to the agent of the action being the subject of the sentence, the passive voice adds to cognitive load by increasing the mental effort of identifying who is performing the action [41].

- Use affirmative rather than negative constructions. Negative constructions impose additional cognitive load because, again, we essentially mentally translate them to affirmative ones before we can understand them. Evidence suggests that we store schemas in the affirmative [41], [42].

- Use simple sentences. Keeping one idea per sentence allows readers to process that idea before moving to the next. Complex sentences with many subordinate clauses and qualifiers force the reader to hold many items in working memory. According to Schriver, Cheek, and Mercer, "syntactically complex sentences can make good readers look like poor readers, slowing down their reading speed" [43, p. 27].

- Use short, familiar words. Unfamiliar words add to cognitive load because readers must hold them in working memory and figure out what they mean before they can process them in context. They demand effortful thinking. Short words are faster to interpret and easier to learn compared with longer words that mean the same thing [44].

- Keep subject and verb close together. Interrupting a subject and verb forces the reader to hold the subject in working memory during the interruption, increasing cognitive load [45].

- Speak directly to the reader. According to the personalization principle, learners more actively process material that they feel is directed to them personally. In this case, personalization does not reduce *extraneous* cognitive load. Instead it's believed to increase *germane* cognitive load, which leads to more efficient schema formation [46].

There are exceptions to these guidelines in many situations, and so they should not be applied unthinkingly, but they can be useful as heuristics precisely because, in most situations, their effects of improving reading performance or decreasing mental effort are supported by empirical evidence.

Modern definitions of plain language emphasize the audience. Success is evaluated based on whether the communication reaches readers, not by metrics like word length and sentence complexity. For example, the International Plain Language Federation defined plain language as follows:

> A communication is in plain language if its wording, structure, and design are so clear that the intended readers can easily find what they need, understand what they find, and use that information. [47]

Similarly, the Plain Language Action and Information Network (plainlanguage.gov) defines the term as "communication your audience can understand the first time they read or hear it." [48]

Implied in these definitions is the assertion that plain language minimizes extraneous cognitive load and allows information to be understood through System 1 thinking.

This audience-focused definition of plain language is also congruent with cognitive load theory, especially with the finding that some features that reduce cognitive load for novice learners, such as textual explanations on diagrams, can increase cognitive load for experts (dubbed the *expertise reversal effect*) because they distract expert readers with information that they already know [49].

KEY LESSONS

This section explores the implications of considering cognitive load theory together with intersectionality, and suggests concrete steps to take to begin seeing technical and professional communication tasks through the lens of mental burden.

1. Deliberately consider whether marginalized populations make up part of your audience. Audience analysis is key to effective technical communication [50], but it assumes that you have a good understanding of who comprises that audience. Because marginalized populations often aren't represented in mainstream media, it is easy to forget that they may make up a sizeable part of your readership.

For instance:

- 32.9% of Americans belong to a racial or ethnic minority [51].
- 19% of Americans identify as having a disability [52].
- 18.5% experience mental illness in any given year [53].
- 13.5% live in poverty [54].

- 3.4% belong to a sexual minority group [55].

If your communications are meant for an ill-defined "general public," chances are high that marginalized populations will be among your readers.

To ensure that you capture them in your audience analysis, make a conscious effort to consider who might be missing from it. As an example, Smith rhetorically analyzed obstetric websites to see who did and did not make up the content's presumed audience (a process she called "presence and absence analysis") and found that most websites included information for expectant mothers but not expectant fathers [56]. Health practitioners and researchers using a questionnaire to assess mental capacity made for the dominant population discovered that it was problematic, clinically and culturally, when used to evaluate elders of Indigenous cultures [57]. This realization spurred a research and education program dedicated to including Indigenous people to create health communications that respect their culture and meet their unique health needs [58].

Bear in mind also that marginalized groups are diverse and that you may be accounting for their more vocal or visible representatives but not those who are less likely to advocate for themselves. For example, in creating a communication for the autistic community, you might find yourself focusing on the needs of its verbal members but possibly neglecting its nonverbal representatives or their caregivers. Elmore notes that this prejudice represents a missed opportunity:

> This false assumption that the inability to speak intelligibly signals an inability to
>
> learn and make decisions about technology use may be one reason why
>
> technology developers do not involve people with neurodevelopmental disabilities

as participants in the design of assistive technologies…. Technical communicators can bridge the divide between the knowledge-bases of the sciences and the humanities to facilitate productive dialogue between technology developers and autistic users. [59]

2. Using personas to represent people from those populations, audit their mental burden to exercise cognitive empathy. Multidimensional audience analysis involves considering your audience's knowledge, desire for detail, and physical and cognitive ability, including reading ability, education level, and physical and mental limitations [60]. Cognitive load theory and intersectionality together suggest that a person's cognitive ability is also affected by how much they have on their mind, leaving less working memory available for learning.

Personas are fictional representations of certain members of your audience. User experience designers use personas to better understand their users' goals, values, and limitations [61]. Imagining how a persona would interact with and read the document you create helps you empathize with them.

When using a persona, especially one from a marginalized or underrepresented group, be deliberate in assessing what their mental burden might be. What do they have to worry about that members of the dominant group do not?

For instance, what might a single father with a chronic illness have to worry about? And could any of your readers be self-described "spoonies"—people with (often invisible) chronic pain or illness that saps their energy (measured in metaphorical spoons) for day-

to-day activities [62]? If so, what is the state of their mental exhaustion, and what are their information needs when they are interacting with your document?

Consider the mental burden of your persona in the situations where they would use your document: Are they stressed or anxious? Distracted? Tired? But also consider how their daily experiences, particularly if they are marginalized, shape how receptive they are to the information you are trying to convey.

Personas are only one way to exercise cognitive empathy, which is a skill that can be practiced and improved [63].

Considering the effect of marginalization and stress on a persona's capacity to absorb new information through reading can shed light on the many ways that complex communications reinforce those disadvantages. It provides an added motivation to use plain language for social justice—one rooted not just in the ethic of fairness and equality, but one based on the fundamental way that the human mind works.

3. Consider reducing cognitive load via plain language as an ethical imperative.
Oppression manifests as an inequality in mental burden—an inequality that can become entrenched, by virtue of the way we form schemas over time by practice. Redressing this imbalance calls for active intervention to reduce the cognitive load of a learning task as much as possible, especially if marginalized groups with heavy mental burdens are part of your audience.

Applying plain-language principles is an evidence-based way to reduce cognitive load. Minimizing cognitive load increases the likelihood that people with heavy mental

burdens will read and understand the communication. From a social justice perspective, using plain language is not merely good business, saving money and increasing customer cooperation [64]; it is an overtly political act, countering the inequalities stemming from oppression.

Use plain language as a matter of course when members of your audience come from marginalized groups. And to widen your impact, advocate for plain language with clients, employers, and project managers.

IMPLICATIONS FOR PRACTICE

Assessing your audience for the presence and absence of specific groups is an important first step to building cognitive empathy for marginalized groups, but it comes with a major challenge: how do you know which groups you are missing? Certain groups may be underrepresented specifically because they are marginalized and have no voice, and they are not captured in demographic data that you collect about your existing audience. Just as retailers would not know how much business they are missing from wheelchair users until they make their stores wheelchair accessible, technical communicators may have trouble knowing what potential readers they are missing until they make their communications fully inclusive. Approach presence and absence analysis as an iterative process rather than a one-time task. The analysis may reveal an audience you did not realize that you had, and adjusting content or presentation to meet that previously hidden audience's needs may be warranted.

Seeing plain language as an ethical imperative helps the general population as well: high mental burden is not a problem restricted to people in marginalized groups. High-stress

situations that demand quick decision making and high-distraction environments also impose mental burdens that can interfere with working memory and information processing [65]. Just as inclusive design for people with disabilities led to innovations that serve everyone—for example, curb cuts for wheelchair users also help people with strollers or rolling luggage [66]—applying plain-language techniques to alleviate cognitive load, especially extraneous cognitive load, will benefit dominant, as well as marginalized, groups.

Finally, as with any guidelines or heuristics in plain-language and technical communication, the techniques and the social justice perspective of plain language presented here cannot replace user testing. The only way to ensure success in using plain language to empower marginalized groups is to test your communication with those groups. Once you've identified that they are part of your audience, consult them when you plan and create your communications. Involving users from the outset or co-creating communications with them increases the likelihood that they will use those communications and apply what they learn from them [67], [68].

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Iva W. Cheung, M.Sc. (University of British Columbia), M.Pub. (Simon Fraser University), is a plain-language editor and trainer, and a Ph.D. candidate in the Faculty of Health Sciences at Simon Fraser University, where she studies health literacy, accessibility, and knowledge translation in mental health.