

## The Folly of Fancy Fonts

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### Abstract

Research has indicated that the font information is presented in can be used by readers as a visual guide to the potential difficulty of the content; specifically that disfluent fonts are perceived as indicating greater task difficulty. A series of preliminary experiments was conducted in a Japanese high school in order to determine if such effects can be found in second language learners. It was found that students do indeed use the font lesson materials are presented in as a guide to the perceived difficulty or enjoyability of a task. Furthermore, these decisions are made within seconds of first seeing the material. The potential effects of disfluent fonts in boosting vocabulary retention were also investigated. However, while the results were inconclusive, it was determined that the students *believed* that such an effect existed. While further research is needed, these results indicate that teachers can potentially engineer small increases (or decreases) in student motivation via the font they choose when preparing lesson materials.

**Keywords:** font, perceived task difficulty, student beliefs, materials design

### 1.0 Introduction

Considerable psychological research has been conducted on identifying the factors that lie behind human behavioral change or its lack thereof. One key element that has been identified is the perceived degree of effort required for success: the higher the perceived effort required, the less likely the change in behavior will be successfully achieved, whether this be dieting (Sparks, Guthrie, & Shepherd, 1997), or learning a language.

Whilst it was known that the nature of the task (Buehler, Griffin, & Ross, 1994) and previous experience (Thomas, Handley, & Newstead, 2007) helped to guide estimations of a task's perceived required effort, Song and Schwarz (2008) investigated whether purely superficial features of a task, such as the font being used, had an impact on estimates of perceived required effort.

Song and Schwarz (2008) presented students with a recipe describing how to prepare a Japanese roll. The recipe was presented in either a fluent (easy to read) font or a disfluent (difficult to read) font. It was found that simply by modifying the font used the students' estimations of both how long the recipe would take to prepare and their willingness to prepare the dish changed.

It seemed that the students were using the difficulty of reading the font as a situational cue to aid their estimation of the effort required to complete the task, with the difficult to read recipe being perceived as requiring significantly more time to prepare than the easy to read recipe. Furthermore, the students were significantly less willing to prepare the difficult to read recipe than the easy to read one.

However, while many students and teachers consider a lesson that was easy to learn to be a successful one (Sweller & Chandler, 1994) and presenting materials that are easy to read helps achieve this aim, this does not always translate into successful retention or recall of material at a later date. Rather, requiring students to expend greater cognitive effort in learning material can lead to greater retention and recall under some circumstances (Bjork, 1994; Craik & Tulving, 1975). The creation of a subjective sense of increased difficulty, a disfluency, can lead to improved learning outcomes by requiring students to utilize deeper cognitive learning strategies which consequently lead to strengthened retrieval routes (Baddeley, 1997), and more long-lasting learning (Alter, Oppenheimer, Epley, & Eyre, 2007).

One of the simplest ways to induce disfluency is to alter the font of the target materials (Alter & Oppenheimer, 2009). The effect of using disfluent fonts to improve learning was elegantly demonstrated by Diemand-Yauman *et al.* (2010) in a US high school across a wide range of subjects, with students in the disfluent condition performing significantly better in class assessments.

In the EFL classroom, it is common for teachers preparing materials for their students to use various eye-catching fonts in order to make their materials more visually appealing to their students. If effects similar to those identified by Song and Schwarz (2008) and Alter and Oppenheimer (2009) occur in the language classroom, there is the possibility that teachers may actually be inadvertently sabotaging their own efforts via their materials design. Alternatively, if the effects shown by Diemand-Yauman *et al.* (2010) predominate, the use of eye-catching fonts could serve to aid learning.

This article describes a preliminary investigation, consisting of four experiments inspired by Song and Schwarz (2008) and Diemand-Yauman *et al.* (2010), which investigates how changes in the fluency of fonts affect perceptions of task difficulty and retention of target language among students of English as a foreign language.

### **2.1 Experiment One**

Twenty-seven Japanese high school students (10 females, 17 males; modal age 17 years) with an English ability ranging from elementary to intermediate read two identical passages printed in a fluent font (Times New Roman, 12 point) or a disfluent font (akaDora, 14 point). Before reading, they estimated how long (in seconds) reading each passage would take and how difficult they appeared (1 = very easy, 5 = very difficult). The students then read each passage, and the length of time taken to read each passage was recorded.

The order of presentation of the passages was alternated between students in order to avoid presentation effects biasing the results. The data was analyzed using Student's t-tests.

### **2.2 Results and Discussion**

As shown in Table 1, the students indicated that the passage presented in the fluent font appeared significantly easier to read than the passage presented in the disfluent font (Effect size ( $d$ ) 1.06). However, this estimate of difficulty was not reflected in either the estimated reading time or the actual time taken to read the passages. Indeed, the participants' estimates for the reading time showed little consistency (ranging from 30 to 900 seconds), nor much relationship to their actual reading times (ranging from 25 to 112 seconds). Whether this finding was due to the students being unable to accurately estimate reading time, or to a failure to take the task seriously, cannot be determined.

**Table 1. Impact of Font on Estimations of Reading Difficulty**

	Easy-to-read font		Difficult-to-read font	
	Mean	Standard Deviation	Mean	Standard Deviation
Estimated Passage Difficulty	2.75	0.96	3.69*	0.80
Estimated Reading Time (seconds)	125.31	121.96	151.25	171.73
Actual Reading Time (seconds)	62.54	21.85	51.58	21.15

\* $p \leq 0.0001$

### 3.1 Experiment Two

Continuing explorations of task difficulty estimation, twenty-seven Japanese high school students (10 females, 17 males; modal age 17 years) with an English ability ranging from elementary to intermediate were simultaneously shown (for 5 seconds only) two versions of a question and answer worksheet, which were identical other than that the title was printed in either a fluent font (Times New Roman, 24 point) or a disfluent font (akaDora, 26 point). After briefly seeing the worksheet, the students indicated which of the two worksheets appeared the more difficult.

### 3.2 Results and Discussion

Twenty-six of the participants in this study rated the question and answer worksheet with the disfluent title as appearing more difficult than the question and answer worksheet with the fluent title. One participant was unable to decide, and data were entered for both question and answer worksheets for that individual, giving a total of 28 data points. The obtained proportion of 0.96 falls in the 99% Modified Wald confidence interval, implying that the students were inferring the difficulty of the worksheet from the title font.

### 4.1 Experiment Three

Twenty-seven Japanese junior high school students (14 females, 13 males; modal age 12 years) with an English ability ranging from beginner to upper elementary were shown three versions of a worksheet, which were identical other than that the title and instructions were printed in one of two fluent fonts (Times New Roman and Comic Sans, 12 point) and one disfluent font (akaDora, 14 point). The students were asked to indicate which of the three appeared to be the most difficult, the easiest, the most fun, and the easiest to read. The order of the prints was rotated between each participant in order to avoid presentation effects biasing the results. The obtained results were analyzed using the Chi-squared statistic.

### 4.2 Results and Discussion

The students' responses were given extremely rapidly (modal response time was two seconds), indicating that the students were using the presented fonts as cues rather than attempting to read the worksheets. The authors were surprised that only a single student stated that all the prints were the same – and then only for the level of difficulty. It had been expected that a greater number of students would select this neutral category.

**Table 2. Impact of Font on Estimations of Task Difficulty and Enjoyment**

	Times New Roman	Comic Sans	AkaDora	Same	p values
<b>Most difficult</b>	0	0	26	1	0.0001
<b>Easiest</b>	9	18	0	0	0.0001
<b>Most fun</b>	5	20	2	0	0.0001
<b>Easiest to read</b>	17	7	3	0	0.0001

The students clearly indicated that they felt the disfluent font condition to be the most difficult, the Comic Sans font condition to be both the easiest and the most fun, and the Times New Roman font condition to be the easiest to read. This third finding was somewhat surprising since it might be expected that students would find fonts using characters most similar to those they are taught to write (which Times New Roman does not) the easiest to read.

### 5.1 Experiment Four

This final experiment was an attempt to see if deep processing effects could be elicited by manipulating font fluency. Fifty-six students (34 females, 22 males; modal age 12 years) were given a list of 10 target words selected by their regular Japanese English teacher. The words were presented in either a fluent (Times New Roman, 12 point) condition, or in one of three disfluent conditions: a disfluent font (akaDora, 14 point), a disfluency caused by vowels being deleted from each word, and a disfluency resulting from the words being printed in 50 percent greyscale.

The students were given a short time to practice the words, and were then given a spelling test at the end of the lesson, after one week, and again six weeks later. After the final spelling test, the students were given a short questionnaire which asked which of the four conditions they preferred and why, and also how they usually prepared for spelling tests.

### 5.2 Results and Discussion

On analysis of the results, no significant difference in word recall was found between any of the conditions in any of the tests. Whether this was because deep processing had not been induced, or whether its effect is diminished in the foreign language classroom cannot be determined at this stage. After the trial had been conducted it was discovered that the Japanese English teacher had unilaterally altered the experimental protocol. Instead of drawing up a list of new words for the students, the teacher had instead drawn up a list of key vocabulary already known by the students and which would feature in their end of year test. While the authors admire the Japanese English teacher's zeal to educate, and appreciate the lesson in the practicalities of conducting action research, this action created a confounding variable which made it impossible to determine the effect, if any, of font fluency on learning.

**Table 3. Spelling Item Recall**

Mean Item Recall (/10)	Font Condition			Greyscale	p values
	AkaDora	Times New Roman	No Vowels		
<b>Test 1</b>	7.6	7.9	6.1	6.4	0.195
<b>Test 2</b>	5.0	5.9	4.0	4.6	0.510
<b>Test 3</b>	5.5	5.8	4.6	5.8	0.505

Regarding student preferences, which were analyzed via a chi-squared test, the students showed a very definite preference ( $p=0.0003$ ) for the disfluent conditions (see Table 4, below). This preference was supported by the reasons given for their choices, with the overwhelming majority suggesting that the disfluent conditions, requiring their active involvement in practice, was the best way to learn words. By contrast, those who expressed a preference for the fluent font condition simply stated the fact that it was easy to read.

**Table 4. Font Condition Preferences**

AkaDora	Times New Roman	No Vowels	Greyscale
2	15	14	25

When asked about their preferred method of practice, the following results were obtained (note that some students gave more than one response, and none are mutually exclusive).

**Table 5. Reported Spelling Practice Methods**

Reported Method	No. of students (n=56)
Writing the words out repeatedly	53
Saying the words aloud	7
Review a few words every day	1
Making a personal vocabulary book	4

Given these results, the reason for the expressed preference for the disfluent conditions becomes clear since these conditions were apposite to the most commonly reported spelling practice method – that of repeatedly writing out the target words.

### 6.0 Discussion and Conclusion

At first glance, it could be easy to conclude that these experiments have discovered nothing more startling than that students find difficult to read texts more difficult to read than easy to read texts. However, such hasty conclusions would not be apposite.

In Experiment One, students indicated that the disfluent font *appeared* to be more difficult to read than the same passage in a fluent font. However, this perception was *not* borne out by their actual reading of the text.

In Experiment Two, students indicated that a worksheet with a disfluent title *appeared* more difficult than one with a fluent title.

In experiment Three, students demonstrated that their perceptions of identical worksheets could be manipulated via changing the font used in the title.

Finally, in Experiment Four, students showed that they recognized greater cognitive processing came from working with disfluent fonts, although this had no discernible impact on performance in this case.

The results from Experiments One, Two, and Three clearly indicate that students use the font that passages and activities are presented in as situational cues to make judgments as to the likely difficulty of those tasks. Furthermore, these decisions can be made very quickly (in only a few seconds). Even though these perceptions of difficulty may not actually impact on performance, as shown in the consistent reading times recorded in Experiment One, it is likely, as Song and Schwarz (2008) found, that increased perceptions of difficulty can lead to a decreased motivation to undertake a task. Since maintaining motivation is an ever-present issue in the language classroom, and improving motivation is one of the primary reasons language teachers use various unusual fonts in order to make their materials visually appealing to students, it is important to be aware that the simple appearance of the materials can have an impact on students' perceptions of the difficulty of the task and their subsequent willingness to undertake it.

However, as Experiment Three demonstrated, choosing the right font can help to elicit more positive associations with a task, and consequently increase students' willingness to undertake the task. Furthermore, although the results were not able to support the existence of a deep processing effect in word recall, the students themselves appear to have a native belief that such effects exist. Since using a disfluent condition has no effect on overall recall of word items, but is popular with the students, it seems justifiable in using them more often. While the authors, unlike Diemand-Yauman *et al.* (2010), cannot claim that this will lead to improved learning, identifying and responding to students' preferred methods of practice is one way to motivate students, a laudable goal in itself (Tomlinson *et al.*, 2003).

These results clearly indicate that, while they may not impact on task performance per se, students use fonts as situational cues to make rapid initial judgments as to the likely difficulty or enjoyment level of tasks. Since maintaining motivation is a key issue in the language classroom, it is important to be aware that the appearance of materials can have a strong impact on students' perceptions of a task and their willingness to undertake it. The authors feel justified in saying that teachers should be aware of the situational cues that the fonts they use can have and aim to use presentation methods that elicit reduced perceptions of difficulty and enhanced student motivation.

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