Fonts and Fluency:

The Effects of Typeface Familiarity, Appropriateness, and Personality on Reader Judgments

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Abstract

The advent of digital typography has seen the printed letter permeate many aspects of our world, due to its function as the visual manifestation of verbal language. However, few scientific researchers have paid attention to these innocuous and ubiquitous characters. Furthermore, existing typeface research has generally been divided into two strands: For nearly ninety years, communicators (writing, marketing, business, and design professionals) have made attempts to investigate how typefaces of different classes and styles might indicate different personalities to the viewer, and explored the notion of typeface appropriateness. More recently, psychologists have taken advantage of word processing software to manipulate perceptual fluency by changing the fonts of different documents, finding several interesting effects. In this study, two experiments were conducted, with the aim of acknowledging and synthesizing both lines of inquiry. In Experiment 1, a restaurant menu was printed with either an easy-to-read, fluent font or a difficult-to-read, disfluent font. It was expected that reading the disfluent font would influence participants' (n = 110) choices from the menu as well as certain judgments about the dishes. However, there was only one significant effect, whereby participants who read the disfluent font expected to enjoy their chosen dessert less than those who read the fluent font. In Experiment 2, participants (n = 94) judged a person of the opposite sex using the Big Five Inventory, a measure of human personality. The target photograph was paired with a name set in one of two fonts (familiar and unfamiliar). Female participants rated the target higher on the factor of Openness when the name was printed in the novel font. The results of the current study indicate that to some extent, document designers may safely continue selecting typefaces through intuition, and do not necessarily need the supplementation of additional empirical research.

Introduction

OVERVIEW

A question shared by professionals and laymen alike is to what extent the fonts they use in a document will influence the reader, and whether some fonts might be more suitable than others. The present study investigated the psychology of fonts with respect to reader cognition and behaviour, by reviewing past research involving fonts and conducting two new experiments. The topics of typeface familiarity, personality and appropriateness were of most interest, with research on fluency providing valuable theoretical insight.

Type and typography

Johannes Gutenberg's invention of the Western movable-type printing press in the mid-fifteenth-century cannot be overestimated as one of the most important and world-shaping developments in recorded human history. Since the invention of writing on paper, humanity's endless thirst for knowledge had been documented and passed on almost exclusively to those who could read, write, and buy manuscripts. One of the reasons was that books had to be handmade and handwritten, which could take months, even years. This labour severely limited the rate of production, making written records precious and prohibitively expensive. The ability of Gutenberg's printing press to not only print, but copy different books, easily and quickly, cracked the hierarchy of knowledge open. Printed books increased the circulation of knowledge due to their relative cheapness and availability, and a large market was unlocked as people opened their minds and purses. Printing presses appeared all over Europe, with each establishment making choices about paper, ink, and typeface.

Typefaces (sets of individual characters sharing the same design) used for the first

generation of printed books were based on contemporary calligraphic writing styles, as they were meant to emulate and compete with handwritten books. With more and more people learning to read and write, vernacular letterforms were finalised, but typeface makers were free to produce variations on what are essentially abstract figures. For a time, typography, the process of arranging type (the letters, numbers, and symbols of typefaces) for printing, enjoyed a very favourable reputation as a practical art form. Over centuries of human development, type evolved, and hundreds of different typefaces were produced and used by printers, with distinctive aesthetic styles emerging from different places and philosophies. Some of these changes were influenced by larger cultural movements, such as romanticism and modernism. But during this time, typography remained almost exclusively within the domain of the printer, as one of the defining tools of the trade.

In the present day, advanced technology has completely changed the cultural and communications landscape. In particular, the proliferation of personal computers, desktop publishing software, and the internet has ushered many aspects of life into the digital realm. However, this innovation would not have been possible if typography did not also make the leap. In the information age, the handwritten (and in certain cases, the spoken) word has been superseded by the printed word, allowing typography to flourish as the primary emissary of language. The vast majority of typefaces are now digital — designed and created using computer programs, for the express purpose of being used in other computer programs. Whether published physically or digitally, typeset documents are almost always designed and prepared with computers.

An indicator of the extent to which digital typography has supplanted traditional hand-set typography is in the terminology of typeface and font. In traditional typography, *fonts* at different point sizes were cast from the same typeface design,

resulting in slight adjustments between the same letters at different font sizes. A titling font (greater than 24-point) would have finer features that could be admired at large sizes, but fonts for body text (9- to 14-point) were made slightly sturdier to withstand the printing process. In digital typography, the same design is used at all sizes, so typeface and font generally refer to the same thing. The two terms will be used interchangeably in this paper.

Most computer users will have discovered the surprisingly long and varied list of fonts installed on their computers and available for use in desktop publishing programs. The spectacle of this smorgasbord may then trigger a brief burst of creativity in which a document is haphazardly altered in the pursuit of finding fonts that appeal to the user. However, this fascination tends to be short-lived, with most users continuing to use the defaults set by different programs and applications. But the choice is always there, and has opened a new world of communication.

As Prometheus' gift of fire gave mortal men the ability to rise beyond their natural state, the availability of digital typography tools (such as word processors, image manipulation software, and online text generators) has turned consumers into creators. Living in an age of heightened public awareness and relations, people have used these widely accessible tools to create documents in their own image.

The advent of digital typefaces, coupled with the rise of the internet as an information superhighway and social network, has made typeface design and consumption open and relatively approachable to those willing to learn and participate in the market. When the Industrial Revolution made advertising necessary, new breeds of attention-seeking fonts were used to visually beckon and call from flyers and posters. The demand for new, unique, and interesting fonts has grown to such an extent today that MyFonts.com, the world's largest collection of commercial digital typefaces, is able to boast over 100,000 fonts available for purchase online, with

more added on a regular basis. For the casual or spendthrift user dabbling with design, there is a smaller but still significant pool of free fonts as well. Dafont.com has the largest range, with over 17,000 fonts in 71 themes at the time of writing. The sheer size and variety of the digital font world clearly shows the existence of a wide and targetable audience for typefaces, who appreciate the ability to alter a document's visual tone by scrolling down increasingly long lists.

When printing with movable type was first popularised, only a few typestyles were needed for each audience. The current range of fonts would have been unfathomable, overwhelming, and indeed, completely unnecessary. But in the present social climate, consumers effectively brand themselves with the things they read, watch, and buy, whether to stand out or fit in. In this context, the explosion of typography has been a natural progression, filling hundreds and thousands of niches.

Keeping in mind the role of the printed and written letter as the visual manifestation of language, the practice and science of typography is crucial in a world that is constantly trying to communicate with itself. A key idea in the practice of conventional, reader-focussed typography (as opposed to art for art's sake) is that it should be invisible to the reader. That is, the hand of the designer should be imperceptible, so as not to impede the act of reading. Beatrice Warde's influential metaphor is that of a choice between two goblets from which to drink wine — *"One is of solid gold, wrought in the most exquisite patterns. The other is of crystal-clear glass, thin as a bubble, and as transparent"* (Warde, 1955; p.11). A true connoisseur would prefer the crystal goblet, because it *reveals* rather than simply contains what it has been designed to hold. In the same way, appropriate application of typographic principles should lead the reader to focus on the content of the message, not the characteristics of the message itself.

Due to the ubiquity of type, it is important that we seek to understand the effects of different modes of typography. Research to do with reading and fonts has sporadically accumulated for over eighty years, with several notable studies appearing in the last fifteen years.

LITERATURE REVIEW

As mentioned, good typography for reading should focus on bringing the semantic content to the fore. In operational terms, this involves *legibility* and *readability*. Legibility is about the ease of identifying individual letterforms and words, while readability is concerned with the ease of identifying larger sections of letters in the act of continuous reading. Early scientific research usually focussed on this technical side of reading, using different fonts, variations in line spacing and line lengths, and other typographic manipulations (see Spencer, 1969). These experiments (represented in the prolific oeuvre of M. Tinker and colleagues) usually used reading speed as the measure of legibility, with faster reading indicating efficient processing of the stimuli. These studies simultaneously concerned themselves with comprehension, given that it was the goal of reading. However, Matthew Luckiesh (called the 'Father of the Science of Seeing' in his day) and Frank Moss made an interesting innovation. Luckiesh's study of visibility led to the finding that reading speed was only affected by reduced contrast (between letters and the background) at extreme levels, and that muscle fatigue around the eye was not particularly sensitive to time spent reading. That is, the eye-brain system is quite robust at compensating for different conditions, possibly including different levels of typeface legibility. Up until that time, legibility researchers were uninterested in mental and physical fatigue from reading, because no changes had been detected. However, Luckiesh and Moss came across a measure of readability, using fatigue.

Being aware of Ponder and Kennedy's (1927) work on blinking, Luckiesh and

Moss (1939, 1942) tested the readability of extended passages by manipulating several typographic factors (such as type size, weight, class) and using blink rate as the measure. Blinking during reading both lubricates the eye and relieves mental tension, by allowing split-second rests that do not seem to affect reading speed. Increases in blink rate were thus found by Luckiesh and Moss to be an important indicator of fatigue (and today it can be linked to theories of mental resources and attention). One study examined the readability of different weights of the typeface Memphis (see Figure 1). Typeface weights distinguish between different stroke thicknesses in letterform construction. For example, **boldfaces** use thicker lines and are designated as heavier weights than regular faces. Blink rate in this study clearly designated the medium weight as the most readable, followed by bold, light, and extra bold. Reading speed was considerably less sensitive to the different weights.

Figure 1. Left to right: The medium, bold, light, and extra bold weights of the typeface Memphis.

Despite showing that blink rate was a valid index of visual efficiency, the reading studies by Luckiesh and Moss that used blink rate were severely criticised by mainstream legibility experimenters such as Tinker (1943a, 1943b), Bitterman and Soloway (1946), and Carmichael and Dearborn (1947), who cited contradictory results in their own and other studies, as well as stressing that reading speed was the standard measure. Luckiesh's (1943, 1947) responses to the criticism were largely rejected, and the research community generally forgot about this issue (but see Hoffman, 1946 for an independent study of reading fatigue that also affirmed blink rate). However, more recent evaluation has redeemed the work on readability. Stern, Boyer, and Shroeder (1994) agreed with Luckiesh's argument that opposing researchers had used flawed methodology in their experimental attempts to refute him. In assessing whether blink rate increased over prolonged periods of reading,

they had negated any major effects by interrupting with intermittent comprehension tests (a common practice), thus reducing time-on-task and any associated fatigue. Stern et al. (1994) thus supported Luckiesh and Moss' efforts, while considering further work on blink rate and fatigue in human factors research (see Sirevaag & Stern, 2000 for a similar view from a slightly different approach).

The study of legibility reached an interesting level of legitimacy with the development of the **Clearview Highway** font in conjunction with the Pennsylvania Transport Institute. Designers worked with researchers to create and test a new font that could eventually replace the existing, forty-year-old road sign typeface (Garvey, Pietrucha, & Meeker, 1997, 1998). The study targeted three areas of interest: the difference between word legibility and word recognition in the context of sign-reading, the difference in sign-reading performance between all-uppercase and mixed case, and whether the new **Clearview** font could offer a significant sign-reading improvement over the existing **Standard Highway Series** fonts. The designers noted that the combination of the **Highway Series**' bold strokes and the bright, reflective material on which they were printed resulted in a phenomenon called *irradiation*. Irradiation, caused by headlight illumination of road signs, reduces legibility by bleeding light into the open spaces of letters, making them less recognizable (see Figure 2).

Figure 2. An illustration of irradiation reducing the legibility of a highway typeface.

Another issue was that road sign legends were often set in all-uppercase, despite decades-old research for the (U.S.) Highway Research Board showing that mixed case was superior for reading traffic signs (Forbes, Moscovitz & Morgan, 1950). Uppercase text is set using only capital letters, while mixed case primarily uses

lowercase letters, with capitalization at the start of some words (see Figure 3). The merits of mixed case over all-uppercase can be explained on two levels: travellers who have a place name in mind are more likely to mentally picture the word in mixed case, so mixed case signs would make the recognition process smoother. Also, when viewed from a distance, strings of capital letters consistently form rectangular blocks because of equal letter heights, while mixed-case words have more varied and distinct letter shapes (Garvey et al., 1997).

Figure 3. Comparison of all-uppercase (left) and mixed case (right).

The Clearview project thus aimed to improve the legibility of road signs by developing a typeface design that would remain legible despite irradiation, and testing the mixed case version against an all-uppercase style. Two experiments were conducted using a moving car from which participants had to identify target words on a constructed road sign: the first examining *recognition distance* (participants had to distinguish the target word from two others on the same sign), and the second involving *legibility distance* (participants read aloud a previously unseen word from a sign). The results generally established potential for improving road sign legibility with the new typeface (Garvey et al., 1997). In night-time testing with older drivers (mean age = 74.8), words using mixed-case **Clearview** were recognised at a significantly greater distance than the mixed-case **Highway Series E(M)** font ($p = .008$) and all-uppercase **SERIES D** font ($p = .007$). In the night-time legibility distance task, participants were able to read the **Clearview** signs at 22 percent greater distance than the **Series E(M)** signs ($p = .03$). The study recommended the use of mixed case over all-uppercase for road signs. The results also suggested **Clearview**'s superiority for night-time viewing, pending further validation. This study is a notable example of how the basics of typography

can be important for more than words on a page. Especially in high speed areas, it is important that the time spent reading a road sign does not cause drivers to miss potential hazards.

Very recently, research involving font legibility and driving surfaced again with a study testing typefaces used on in-car displays (such as GPS navigators). Reimer, Mehler, and Coughlin (2012) measured response times and number of glances in a driving simulation which used two different typeface styles on a display screen (Frutiger and Eurostile). For male participants, text displayed using Frutiger, a humanist typeface, was processed 10.2% faster than Eurostile, a square grotesque typeface ($p = .019$). The results indicated that using a less legible font (square grotesque) could negatively impact driving performance by increasing the time needed to read text, thereby decreasing the time available to respond to other things. Since the latter class of typeface is often associated with technology and has current automobile applications, this exploratory study may influence how future interfaces are designed.

An ongoing debate concerns the assumed superiority of serif typefaces over sans-serif typefaces for reading. Traditional Latin types have finishing strokes called *serifs*, usually at the open end of a stroke. They are most visible at the 'feet' of letters like 'n' (see Figure 4). Sans-serif typefaces are those without serifs, and thus have simpler structures. Sans-serif printing types became popular during the 19th century, and, for some years, dominated the digital typography scene.

Figure 4. Comparison of serif (left) and sans-serif (right) letterforms.

De Lange, Esterhuizen, and Beatty (1993) presented a list of arguments and counter arguments for the idea of serif superiority. The serif advantage is often based on the

assumption that the lines formed by serifs help guide the eye horizontally across the page more smoothly. However, research on the eye movements involved in reading tends to invalidate this idea. Rather than flowing steadily across the page, the eye makes a series of leaps (*saccades*) and pauses (*fixations*), focussing on discrete groups of words. This action was established as early as 1878 (De Lange et al., 1993), and means that serifs are not necessary for efficient reading. Using modern eye-tracking equipment, Beymer, Russell, and Orton (2008) have found no significant differences in reading speed between serif and sans-serif fonts displayed on computer screens ($n = 82$). Rather than speaking solely in hard terms of serif and sans-serif, it may be more prudent to consider the merits of individual typefaces, as styles within each of these two main categories (as well as others) can vary enormously.

Gasser, Boeke, Haffernan, and Tan (2005) examined the effect of font classification on recall of a document. Participants read a page about tuberculosis, set in one of 4 fonts representing combinations of two typeface design factors: serif vs. sans-serif, monospaced vs. proportional. Monospaced designs like `Courier` consist of characters that are all the same width. Proportional letterforms (most designs) vary according to convention and style, but letters like 'M' are wider than narrow ones like 'i'. After a distractor task, a short recall test was administered. It was found that reading the serif fonts corresponded with 9% better recall ($p = .05$), with no significant difference between monospaced and proportional fonts. The authors discussed how the sample of college students ($n = 149$) may have had more experience reading serif fonts (often used in textbooks and other reading materials), and suggested that optimising reading speed and readability was important for professions that require large amounts of reading, because it would allow more time and mental resources for comprehension and memorisation.

Fonts in psychological research

In recent years, some psychology researchers have used fonts in the context of manipulating *processing fluency*. This is part of the study of heuristics, which are metacognitive cues that inform human judgment and decision-making. Processing fluency is the subjective feeling of ease or difficulty associated with processing stimuli, experienced in tasks such as reading (Oppenheimer & Frank, 2008). The experience of high or low fluency can lead people to respond to the same task in different ways; if it is difficult to determine the source of fluency, it may be misattributed to any plausible factors (Winkielman, Schwarz, Fazendeiro, & Reber, 2003). These 'naïve theories', which are acquired naturally, form the basis for fluency heuristics (Alter & Oppenheimer, 2009).

The effects of fluency on a number of cognitive judgments, such as truth and liking, have been widely studied. High processing fluency appears to be experienced as affectively positive, as suggested by research on the link between fluency and familiarity (Schwarz, 2004). People instinctively know that they process familiar things faster, and studies have shown that people judge new stimuli to be more familiar when they experience high fluency (e.g. Rhodes & Kelley, 2003; Whittlesea & Williams, 2001). Moreover, familiar things are treated positively in terms of affective response, as shown by the mere exposure effect, whereby liking for initially neutral stimuli will gradually increase with repeated exposure (Zajonc, 2000). This framework is very appropriate for the understanding of typographic effects, because there are some typefaces that are familiar to a large base of people, while many (in fact, most) fonts have been exposed to only a very small part of the population. For example, Times New Roman and Arial are well-known to most university students and teachers around the world, due to their inclusion in assignment formatting guidelines. Present them with the same essay typed in either Times or **Bodoni**, and

they will probably prefer to read the former, because it is more familiar and thus fluent.

In contrast, low fluency (also called *disfluency*) results in more negative affect, as evidenced by increased activation of the corrugator muscle (associated with frowning) when reading poor typography. In perhaps the only published study to date measuring the impact of typography on emotion, Larson, Hazlett, Chaparro, and Picard (2007) set out to try new methods of measuring the aesthetics of reading. In one experiment, participants read a document with either good or poor typography (with variations in font, word spacing, and hyphenation). They were then tested with the candle problem, a creative problem-solving task in which a person must fix a candle to a wall using only a box full of tacks, such that if the candle was lit, no wax would drip onto the table below. The accepted solution is to empty the tacks from the box, use tacks to nail the box to the wall, and place the candle inside the box. Participants in the optimised typography condition were significantly more likely to solve the candle task ($p = .04$), suggesting that the formatting of the text had influenced problem-solving capability. In a different reading task, facial electromyography (EMG) was used to capture changes in facial expression. It was found that the corrugator muscle (used in frowning) was activated significantly more when participants read poor typography ($p = .04$). The activation of this muscle indicates frustration, disapproval, tension, or mental effort (Larson et al., 2007). These two measures (the candle task and facial EMG) were both sensitive to the aesthetic differences between good and bad typography, and supported the idea that either good typography improves mood, or bad typography induces a negative mood. These results were also in line with previous research showing that positive moods improve performance in creative thinking tasks (e.g. Isen, 1993).

Fluency effects on mood/emotion are thus doubly important because they, in turn, can affect processing style (as seen in the candle task). Benign situations encourage business-as-usual thinking, with more heuristic-based, top-down processing (Schwarz, 2004). Sadder moods may foster less casual approaches, with more systematic processing of persuasive information (Schwarz, Bless & Bohner, 1991), less reliance on stereotypes (Bless, Schwarz & Kemmelmeier, 1996), but also less spontaneous thinking (as required by creative tasks). Cognition, therefore, may naturally adapt to meet situational processing requirements, using the signals of immediate emotional responses as a litmus test (Schwarz, 2004).

Researchers have taken advantage of the ease of using digital fonts to test fluency effects, so much so that font manipulation (changing the fonts in a document) may be the most common technique in *perceptual fluency* research, which investigates the ease of processing visual stimuli (Alter & Oppenheimer, 2009).

Song and Schwarz (2008a) found that people generalise feelings about the ease of processing text (i.e. fluency) to the ease of performing the behaviour described by the text. Participants read about a physical exercise routine, and then estimated how long the task would take, how quick it would feel, whether it would "flow naturally", "drag on", or be "boring", and whether they were likely to incorporate it into their daily routine. The materials were set using either an easy-to-read (fluent) font, or a difficult-to-read (disfluent) font. Results supported the idea that participants misread the difficulty of processing (due to font manipulation) as the difficulty of the described behaviour. As predicted, participants who read the difficult-to-read font (Mistral) expected the exercise to feel longer ($p \leq .05$, $d = 1.08$), less fluent ($p \leq .01$, $d = 1.39$), and were less willing to do it ($p \leq .05$, $d = 0.95$), compared to those who read the easy-to-read font (Arial). In subsequent experiments, participants who read instructions for a recipe in Mistral rated it as requiring more skill from the

cook than the same recipe printed in Arial ($p \leq .05$, $d = 0.98$). They also estimated it would take longer to prepare ($p \leq .05$, $d = 0.92$) and were less willing to try the recipe ($p \leq .05$, $d = 0.79$). All of these results had large effect sizes, indicating that the differences caused by the fonts were sizeable, in addition to being statistically significant. The findings of this study thus highlight the importance of using fluent fonts in instructional texts.

In a separate study (Song & Schwarz, 2008b), the effects of low font fluency were investigated when it pertained to a distorted, trick question. Participants ($n = 32$) were asked two open questions — one undistorted (*"Which country is famous for cuckoo clocks, chocolate, banks, and pocket knives?"*), and the other distorted (*"How many animals of each kind did Moses take on the Ark?"*). Both questions were presented in the same typeface — either an easy-to-read font (Arial) or a difficult-to-read font (Mistral). The correct answer to the first question, Switzerland, was intended to be easily inferred through spontaneous association. The second question was an example of distortion because Noah was in fact the correct actor in the biblical story, not Moses. Instructions given prior to the test indicated that the correct answer to a distorted question was "can't say". It was expected that low fluency would improve detection of the 'Moses illusion', while reducing spontaneous association for the undistorted question. As predicted, more participants in the low fluency (Mistral) condition were able to correctly answer the distorted question (40% vs. 5.9%, $p < .01$). For the undistorted question, however, they were less likely to give the correct answer (53.3% vs. 88.2%, $p < .02$), and were more likely to say "don't know" (20% vs. 5.9%, $p < .05$). These trends were also found with a different distorted question — *"In the biblical story, what was Joshua swallowed by?"* (the character was actually Jonah). The testing of fluency effects on both distorted and undistorted questions thus demonstrates how disfluency affects processing style — greater scrutiny of the material and reduced reliance on heuristics, with different

results for different types of questions.

In a study that examined whether disfluency effects could be harnessed for positive outcomes, Diemand-Yauman, Oppenheimer, and Vaughan (2011) manipulated the fonts used in teaching materials at a school. The researchers were taking advantage of previous findings that showed disfluency leading to greater depth of processing (Alter, Oppenheimer, Epley, & Eyre, 2007), more abstract thinking (Alter & Oppenheimer, 2008), and better comprehension (Corley, MacGregor, & Donaldson, 2007). It was found that student retention of learning matter (across a variety of subjects) was improved by changing the fonts of teaching materials to ones that were more disfluent (**Haettenschweiler**, *Monotype Corsiva*, *Comic Sans Italic*). Expressed in Z-scores, the data showed that students learning from disfluent materials obtained higher test scores ($M = .164$, $SD = 1.03$) than those with unaltered materials ($M = -.295$, $SD = 1.03$). A t-test confirmed this trend as statistically significant and moderately large in size ($p < .001$, $d = .45$). As the authors mentioned, the teachers were likely to expect that harder-to-read fonts would make the students do worse, making the hypothesis more conservative. When asked about their feelings toward the material, students in the disfluent condition felt no different from those in the control condition. Thus, this experiment proved to be an intriguing and effective application of fluency findings.

In another example, Oppenheimer (2006) conducted a series of experiments to gauge the effects of fluency on ratings of author intelligence when essay texts were manipulated in various ways. When a text was printed in an easy-to-read font (Times New Roman) or a hard-to-read font (ðüĩĉę), participants who read the latter gave lower author intelligence ratings ($p < .05$, $d = .47$), perhaps attributing lack of fluency to the author's inability to write well. Exit interviews confirmed that font selection had been attributed to the experimenter rather than the writer (thus ruling

out the possibility that ratings of author intelligence were based on the inability to choose a suitable font). However, when low fluency was obviously attributable to the fact that the document had been printed with low printer toner (resulting in streaks and lighter text), participants responded with higher ratings, suggesting overcompensation.

The fluency studies reviewed are important in two ways: they show that different fonts can have different effects on performance and behaviour, and more significantly, that people generally do not seem to notice fonts (as demonstrated by the contrasting results obtained with low toner). The latter observation highlights another aspect of fluency research: *spontaneous discounting* (Oppenheimer, 2004; Alter & Oppenheimer, 2009). When people become conscious of a plausible source of fluency, they will automatically discount the information provided by the fluency experience if they deem the source to be irrelevant to the task or judgment. For example, Schwarz, Bless, Strack, Klumpp, Rittenauer-Schatka, and Simons (1991) added a twist to the classic *retrieval fluency* experiment by adding distracting background music. In this procedure, participants are asked to think of either a few or several examples of themselves engaging in a type of behaviour, such as assertiveness. Despite having more evidence of the behaviour, those who recall more examples subsequently judge the behaviour to be less characteristic, due to the greater difficulty of processing. But in this study, when the experimenter drew attention to the distracting music, participants attributed the difficulty of generating many examples of assertiveness to the music, rather than lack of assertiveness. Consequently, the normal effects of retrieval disfluency were reversed, and the participants reported higher assertiveness. Note that in some contexts, people may engage in discounting without any nudging from the experimenter (Alter & Oppenheimer, 2009).

The low risk of spontaneous discounting explains why font manipulation has been a popular choice for researchers. Both in natural and experimental contexts, most people would not notice whether different fonts are used, partly because typeface variety has become an essential part of the cultural landscape. This invisibility neatly satisfies the 'crystal goblet' ideal of typography put forth by Warde (1955).

Despite the aforementioned studies featuring different typefaces as part of the main stimuli, there is in general a lack of font-*focussed* research within psychology. In fluency studies, font manipulation is quite often chosen for convenience rather than a desire to study the effects of fonts themselves (though the results so far have been very interesting). That is to say, no respect has been paid to what makes typefaces unique and worth studying. Here, we may turn to the fields of technical communications, business, and marketing for supplementation.

Font research in other fields

Typography plays a significant part in communications research due to its role as a vessel for language, an essential element of written and visual communication. Recognizing that the rules of typography as practised by printers and designers for many years were essentially 'craftlore', a handful of researchers have attempted to provide a basis for continuing empirical exploration in the desktop publishing era (Brumberger, 2003a).

One area of interest involves the supposed personality of fonts. Unsurprisingly, both typographic practitioners and laymen intuitively ascribe descriptive labels to typefaces, based on their visual characteristics. It is roundly accepted that typefaces carry connotations that are mostly independent of textual meaning. For example, **Bodoni** may be described as "*dramatic and sophisticated*" (Shushan & Wright, 1994), Century Schoolbook as "*serious yet friendly*" (Kostelnick & Roberts, 1998), and Futura as "*cool*" (Spiekermann & Ginger, 1993). Stopke and Staley

(1992) identified certain typeface design characteristics with certain looks, such as the rounded counters and letterforms in Century Schoolbook that allegedly signal friendliness. However, these are all subjective, taste-driven, and practitioner-generated labels that may not carry the same weight with readers and viewers.

Kostelnick and Roberts (2011) suggest that these natural, untaught judgments come from conditioning. For example, a beginner ESOL (English for Speakers of Other Languages) student, who has only read short and simple passages, would experience and describe a font differently to a CEO, who has read hundreds of emails, letters, and reports relating to their business. Many fonts are tied to an historical era, and there can be no doubt that tastes have varied from period to period and place to place. All typefaces were new at some stage, and there were reactions against modern and geometric styles. For example, Baskerville was described by an acquaintance of Benjamin Franklin as "blinding", due to the thin, narrow strokes and supposedly unnatural proportions (Nichols, 1812).

Brumberger (2003a) notes that the 'crystal goblet' ideal of transparency may partly explain why typographic research in the twentieth century tended to focus on legibility and readability, which involve quantifiable and manipulable units and numbers rather than subjective labels. Nevertheless, a small body of studies exploring typeface persona, starting nearly 90 years ago, has helped to inform what present knowledge exists.

The earliest studies examined the 'atmosphere values' of typefaces used for advertising. Poffenberger and Franken (1923) asked male and female participants to judge specimens of 29 commonly-used typefaces in terms of their appropriateness for five 'abstract qualities' (cheapness, dignity, economy, luxury, strength) and five commodities (automobiles, building material, coffee, jewelry, perfume). The results showed a high level of agreement between

participants (with no significant differences between men and women), and indicated that typefaces varied in appropriateness for different contexts due to their differing contributions to visual mood. For example, Goudy Old Style (shown in Figure 5) seemed most indicative of Strength in terms of abstract quality, and its most appropriate uses in advertising were for Building Material and Coffee.

Figure 5. Example of a typeface specimen used by Poffenberger and Franken (1923).

Later studies tried to further establish the validity of personality differences by comparing the perceptions of practitioners and laymen. This is important because communication can only reach maximum effectiveness if it holds the same meaning for both the sender and the receiver (Brumberger, 2003a). Whereas Poffenberger and Franken only offered simple dichotomous choices (appropriate or not appropriate), these later studies used semantic differential scales, with opposing adjectives on each scale (see Osgood, Suci, & Tannenbaum, 1957).

Brinton (1961) asked 22 typography experts/professionals and 25 laymen to judge thirteen typefaces using a list of 26 polar adjective pairs (e.g. Imperfect-Perfect, Hard-Soft, Constrained-Free). The professionals were more comprehensive in their judgments, generally attributing more qualities to each typeface than the laymen. But of more importance was the large amount of overlap in the adjectives used by both groups. For example, in the case of **Bodoni Book**, both groups gave ratings indicating that it was a Perfect, Good, Clean, Harmonious, and Honest typeface. The only other adjective the laymen agreed upon was Soft. The professionals, however, also assigned it the qualities of Light, Rich, Beautiful, Expensive, Meaningful, Graceful, Tight, and Formal.

Tannenbaum, Jacobson, and Norris (1964) partially followed Brinton's study,

adding a group of "semi-pros" between groups of "pros" and "amateurs". This study (n = 75) was somewhat complicated by the presentation of different variants of each of the 4 typefaces shown (lowercase regular, UPPERCASE REGULAR, *lowercase italic*, *UPPERCASE ITALIC*). Factor analyses of the 25 rating scales revealed five factors: *evaluation* (e.g. pleasant-unpleasant), *potency* (e.g. strong-weak), *activity* (e.g. active-passive), *complexity* (e.g. plain-fancy), and *physical* (e.g. large-small). Generally speaking, there was a high level of agreement in judgments across the three groups, showing that to a certain extent, fonts were perceived similarly by people with different levels of typeface knowledge.

Bartram (1982) also explored semantic qualities of typefaces as judged by different groups (design students and non-design students). From 13 semantic differential rating scales, four factors were identified: *evaluation* (e.g. beautiful-ugly), *potency* (e.g. bold-delicate), *mood* (e.g. happy-sad), and *activity* (e.g. fast-slow). Ratings between the two groups were compared to find similarities and differences in perceptions of 12 typefaces (which were presented as complete uppercase and lowercase alphabets). For example, Futura was seen by both groups as 'strong' but 'passive' (positive in Potency and negative in Activity). However, designers rated it positively for both Evaluation and Mood, while non-designers assessed it negatively for these factors. Signs of both agreement and disagreement were found for almost all the typefaces, with complete consensus only for Old English. While there were some instances of strong disagreement on some factors, it was noted that the responsibility fell to the designers to ensure that their typeface choices would properly resonate with their audiences, rather than acting on their own impressions.

Brumberger (2003a) attempted to build upon the previous research exploring the existence of typeface personas. 15 typefaces were judged using 20 Likert attribute scales (e.g. Cheap, Loud, Warm; 1 = Not at all, 7 = Very). The typeface samples

displayed complete uppercase and lowercase alphabets, as well as numerals and the pangram *"A quick brown fox jumps over the lazy dog"* (see Figure 6). There was a substantial level of agreement about the personality attributes of the typefaces, and furthermore, factor analysis identified three typeface categories: *elegance* (e.g. **Counselor Script**), *directness* (e.g. Arial), and *friendliness* (e.g. Bauhaus Md BT). This study provided evidence that some perceptions of fonts are shared between different people, as expressed through a number of typeface traits. It was the first to bring font persona/atmosphere research into the twenty-first century and possibly the first in two decades, which partly explains why the three typefaces categories identified were different to those found in previous studies.

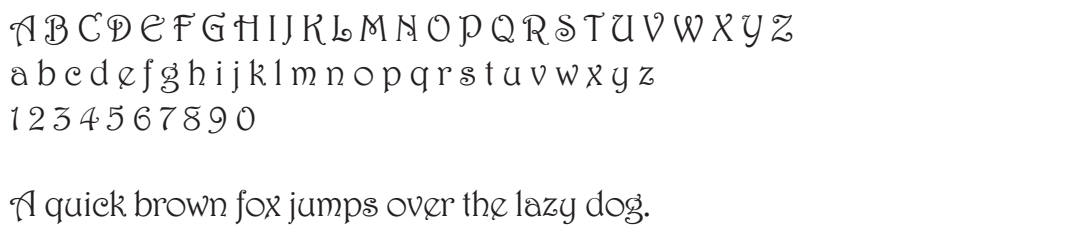

Figure 6. Example of a typeface specimen used by Brumberger (2003a).

For the purposes of technical communication, Mackiewicz undertook the question of *why* different typefaces are viewed in different ways. In one study (Mackiewicz & Moeller, 2004), technical writing students rated 15 typefaces (presented through similar character sets to those in Brumberger, 2003a) using 10 Likert attribute scales (covering traits like Friendly, Professional, Technical), and also gave qualitative open comments about their ratings. It was clear from these written statements that the participants, who had not received specific typographical training, did not have any systematic method for categorizing fonts, instead drawing on their personal experiences to give informal judgments. For example, in justifying Times New Roman as a 'professional' font, participants said *"everyone uses this font"*, and described it as a *"common, everyday typeface"*. Lower ratings also gave clues about the criteria for certain attributes. For example, the three lowest-scoring

fonts for the 'professional' attribute were all handwriting-based, and participants described them variously as *"lazy"*, *"fancy"*, or *"relaxed"*. The authors noted that these comments do not isolate any anatomical features of the typefaces, instead relying on overall impressions.

In an extension of the previous study, Mackiewicz (2005) attempted to use the anatomical features of five particular letterforms (the letters of "Jagen") to assess typeface personality. As before, 15 typefaces were rated across 10 personality attributes. Examining and comparing the anatomical features of the typefaces that had been rated the highest for the 'professional' and 'friendly' attributes, the author produced lists of features that could be used to judge the extent to which an untested typeface belonged to an attribute category. For example, the archetypal 'professional' san-serif font (exemplified by Helvetica) could be identified by the following anatomical features present in "Jagen": moderate weight, moderate x-height to cap-height ratio (about 3:4), uppercase 'J' resting on the baseline, a horizontal crossbar on the lowercase 'e', and a double-storey lowercase 'a' (see Figure 7). Note: the *baseline* is the line on which most letters sit, *x-height* refers to the distance between the baseline and the median line of a typeface (usually equivalent to the height of a lowercase 'x'), and the *cap height* is the height of capital letters above the baseline.

Figure 7. The five letterforms of Helvetica (left) examined by Mackiewicz (2005), and a single storey lowercase 'a' (right).

However, many typefaces may only possess certain personality characteristics to small degrees (thus resisting classification), and as the author notes, a typeface may interact with the overall tone of the document in different ways. For example, an audit letter is unlikely to be seen as friendly even if set in Comic Sans (a typeface

with rounded, simplistic features that was rated second-highest on the friendly attribute). The author also acknowledged that any inherent attributes could be overridden by overuse in a specific context (e.g. calligraphic scripts for invitations).

Gump (2001) asked participants to rate the readability of 10 typefaces (either 'easy to read' or 'hard to read') as well as indicating the best-fit mood or emotion generated by each typeface ('rigid', 'friendly', 'plain', 'elegant', no opinion). Note that the mood labels in this study correspond to the personality variables used in other studies, rather than emotions. Participants (n = 84) also considered which typeface was the easiest to read, hardest to read, and their overall favourite. Different levels of consensus about ease-of-reading allowed the typefaces to be ranked according to general readability, and majority agreement concerning the best-fit mood or emotion was found for four of the typefaces. For example, Arial was considered 'easy to read' by 98.8% of participants and was selected as 'plain' by 65.5%. Only 27.4% thought **Alternate Gothic No.2** was 'easy to read', and 52.4% saw it as 'rigid'. However, there was no general agreement about which typeface was the easiest to read, hardest to read, or favourite. These results show the subjectivity of judging fonts, which likely stems from different prior experiences.

Bringing typeface research into the digital realm, some researchers have examined how people view fonts on the screen. Mackiewicz (2007) looked at perceptions of fonts used in projected PowerPoint text slides. 10 common fonts (five serif, five sans-serif) were compared across four dimensions ('comfortable-to-read', 'professional', 'interesting', 'attractive'), which were chosen for their relevance to technical communicators. Sans-serifs were rated significantly higher on the 'professional' variable, although it may be unwise to generalise due to the idiosyncrasies of some of the fonts. For example, Garamond's overall size was quite small compared to all the other fonts, and Lubalin Graph Bk was the only representative of a

certain typeface category in the group. Certain conjectured relationships between variables were not found ('professional' correlating positively with 'comfortable-to-read'; 'comfortable-to-read' correlating negatively with 'interesting'). However, an unexpected, statistically significant positive relationship was discovered between the 'interesting' and 'attractive' variables ($r = .85$, $p < .01$). Notably, Gill Sans (sans-serif) and Souvenir Lt (serif) both had high ratings across all domains, earning a general recommendation for use in presentation slides.

Shaikh, Chaparro, and Fox (2006) examined perceptions of onscreen type using an online survey, with 20 fonts from five typeface categories (serif, sans-serif, script/fun, monospaced, display/modern). In the first part of the study ($n = 561$), font samples (displaying uppercase and lowercase alphabets, numerals, and common punctuation marks and symbols) were rated using 15 adjective pairs (e.g. Stable-Unstable, Polite-Rude, Formal-Casual) along a 4-point Likert scale. Serif fonts (e.g. Constantia) were rated high on traits such as Stable, Practical, Mature, and Formal. Sans-serifs (e.g. Calibri), on the other hand, did not stand out as high or low on any traits. Script/Funny fonts (e.g. Gigi) were seen as Youthful, Happy, Creative, Rebellious, Feminine, Casual, and Cuddly. Modern/Display fonts (e.g. **Impact**) were rated as Masculine, Assertive, Rude, Sad, and Coarse. Monospaced fonts (e.g. Courier New) were Dull, Plain, Unimaginative, and Conforming.

In the second part of the study ($n = 533$), participants were asked to categorise fonts according to a predetermined grid of potential uses (e.g. business documents, emails, graphics/logos). A reasonable, but mixed level of consistency was found for both individual fonts (e.g. Times New Roman, a serif font, was seen as useful for business documents by 78% of participants) and font groups (e.g. serif fonts overall were perceived as suitable for business documents by 71% of participants). Participants were less sure about the uses for Modern/Display and Monospaced fonts, perhaps due to lack of familiarity.

For best practice, it is often recommended that typeface and text share the same personality (described as *typeface appropriateness*, or *matching*). The implicit personality of a font may lead to favourable or unfavourable impressions about the document creators or associated products depending on whether readers/viewers perceive it as appropriate for the context. Combined with knowledge about the relationship between fluency and emotion, research in this area may be of special interest to advertisers. Doyle and Bottomley (2004) conducted a study in which participants made forced choices between two fictional brands (invented using phonebook surnames, e.g. Farleigh, Galloway) belonging to 10 different product categories (e.g. Car Rental, Specialty Jams), in either an "investigate first" or "purchase" scenario (n = 120). In general, participants chose the brand name set in the more appropriate font (as determined by pretest) at least twice as often as the other one. For example, in the pretest, the Snowdrift typeface was considered more appropriate than Arial for Ice Cream brand names (mean appropriateness ratings of 83.1 and 36.2, respectively, on a scale of 0–100). Participants in the main procedure chose to 'purchase' the ice cream brands featuring Snowdrift significantly more than those set with Arial ($p < .001$). This effect was also found when brand names were explicitly connotative (e.g. Temptation, Aqua-Vitalis), and when an actual box of chocolates was used to present chocolate brand names. These results can be explained in terms of the fluency of matching typeface and text personas. When an appropriate font is used, the process is fluent (or normal). However, a seemingly inappropriate font may trigger an unfavourable reaction due to disfluency.

Brumberger (2003b) investigated whether readers might identify certain typefaces with certain types of text. Counselor Script ('elegant'), Arial ('direct'), and Bauhaus Md BT ('friendly') were selected as representatives of the 3 typeface categories found in Brumberger (2003a), as well as 3 text passages representing different categories of text persona ('professional', 'violent', 'friendly'). Nine text-

typeface combinations were made, which were all judged by participants for appropriateness (rather than comprehension), using 7-point Likert scales. Overall, Arial was consistently rated as more appropriate, followed by Bauhaus, then *Counselor Script* ($p < .01$). This order was also present for the ratings within each text category ($p < .01$). It can be seen that Arial was a good all-purpose font (rather than possessing any distinct personality characteristics lending itself to professional, violent, *and* friendly texts), while *Counselor Script* was inappropriate for all three text persona categories. In light of fluency research, these results can be interpreted in terms of Arial's general fluency and *Counselor Script*'s disfluency. An experiment was also conducted to see whether inherent typeface personas (*visual tone*) might influence reader perceptions of text persona (*verbal tone*). It is sometimes contended that typeface personalities are strong enough to prime readers in such a way that the same passage will be read differently (thus violating transparency). Again using nine combinations of the same text and typeface categories, participants judged the passages on 20 attributes (e.g. Cheap, Loud, Warm) using 7-point scales. There was a significant text persona effect, indicating differences in attribute ratings across the three texts ($p < .001$), but no typeface persona effect and only one instance of interaction. For the Serious attribute, the 'violent' text was seen as most serious when set in the 'direct' typeface (Arial), and least serious when presented in the 'elegant' typeface (*Counselor Script*). Note, however, that this text passage was excerpted from a spy novel, which is very unlikely to be printed using a script typeface, because the poor readability of scripts makes them unsuitable for extended body text. Therefore, this single instance of interaction is not likely to affect real-world typesetting considerations. There were a number of differences by gender that were not found or analysed in other font studies, although this could be due to the content of the text passages. In particular, the largest gender rating differences were found for the 'violent' text,

which might reflect different levels of experience or perceptions about the genre. But in general, typeface persona did not significantly affect perceived text persona. The results of these two experiments imply that the consideration of font personalities may be largely irrelevant for extended texts (compared to the short phrases or words used in branding), because participants clearly preferred Arial over the other two typefaces, regardless of the text genre. But it may also mean that other text and typeface categories need to be explored, as it is unlikely that any three can adequately represent the vast array of extant fonts and texts. The results of Brumberger's study may also reflect the fact that in many situations, the same fonts are used regardless of content. For example, journals and magazines often have in-house formatting styles that do not change to suit the topic or strength of language, and general fonts like Arial could be appropriate for all kinds of editorial content found in different publications. In the case of text-heavy documents, modern readers and consumers may thus be informally conditioned to focus on content first, and designers should simply avoid *inappropriate* fonts rather than endeavouring to find the most appropriate ones.

The current state of font research and the aim of the present study

As reviewed above, the body of literature concerning typefaces and typography is quite rich, spanning a number of topics, several disciplines, and many decades. Marketers and communicators, wanting to make informed decisions rather than intuitive guesses, have tried to determine the personality profiles of different fonts, and have also considered whether matching the right font to the right message matters, with varying methodologies and results. In general, there can be no doubt that professionals and laymen alike harbour impressions of typefaces that can be expressed in terms of personality traits. Typefaces can be described as formal, funny, lazy, playful, hard-working, or almost any adjective that can apply to living,

moving things. In a very real sense, they are not mere inanimate drawings, as they bring their own energy into associated text in various ways. But does the spark of life inhabit the anatomical details of letterforms, or is the effect due to cultural conditioning? So far only one researcher (Mackiewicz, 2005) has attempted to systematically analyse the characteristics of a small selection of fonts. But with typeface libraries ever expanding and public and private tastes evolving, the task of compiling a hard list linking physical traits to different typeface personas becomes more daunting and perhaps less useful as time passes by.

From a more detached perspective, psychologists have manipulated the fonts used in documents to see how they affect fluency and thus cognition and behaviour. The popularity of font manipulation is most likely a result of the convenience afforded by personal computers and word processing software for preparing research materials. By setting documents in either fluent (easy-to-read) or disfluent (hard-to-read) fonts, researchers have been able to manipulate effort prediction (Song & Schwarz, 2008a), answers to distorted and undistorted questions (Song & Schwarz, 2008b), ratings of author intelligence (Oppenheimer, 2006), and even test scores (Diemand-Yauman et al., 2011). These results are very interesting and demonstrate the potency of typography, but the focus has clearly been on supporting and extending cognitive theory, and not examination of the typeface stimuli, as the same results might have been achieved using distracting background music or reducing figure-ground contrast. Little attention has been dedicated to the multifaceted nature of typography and its historical and cultural significance.

All of these studies hint at the important of the typed letter in today's society, pervading and influencing the lives of ordinary people, not just those that create and manipulate these letters. Thanks to the art of traditional typography and the digital revolution that sprang from it, the written word is more prominent than

ever, carrying at least as much weight as the spoken word, and shared with people all around the world.

However, what is notably absent in the literature is a unification of the two different approaches to the systematic study of typefaces. One is informed by cultural and technical appreciation of typefaces while the other is driven by psychological theory, with neither informing one another, despite the common denominator. The aim of the present study was thus to unite existing knowledge from both quarters while conducting further research. Fonts were examined in semi-natural contexts, which have been largely absent from the font-based fluency literature (with the notable exception of Diemand-Yauman et al., 2011), and results will be explained and discussed in terms of the fluency of font personality and typeface matching, which are largely lacking in the papers of other disciplines. It was hoped that this would provide a possible basis and rationale for future research and theory focussing on fonts. Researchers of typeface personality might, in future, consider whether fluency and emotion play a part in determing the atmospheric values of different fonts, and psychologists might factor font personas and text/typeface matching into their studies of fluency.

Two experiments were conducted, investigating the role of font fluency in a semi-naturalistic environment and the potency of typeface personality and appropriateness. In Experiment 1, two fonts were compared in the context of a restaurant menu, from which participants chose items and then made various judgments. In Experiment 2, participants evaluated the personality traits of human targets who were associated with fonts of contrasting personas.

Experiment 1

INTRODUCTION

An application that lends itself to the use of many different, non-standard fonts is the making of restaurant menus. Due to the need to have a customised identity (distinct from similar establishments), menu designers will often eschew traditional, everyday fonts (e.g. Times New Roman) in favour of decorative and/or script typefaces (e.g. ALGERIAN and *Brush Script*), which are seen as more novel, attractive, and appropriate. Different fonts may be chosen to fit a theme or to say something about the establishment. For example, calligraphic scripts (like *Edwardian*) are considered 'classy' due to their connection with wedding stationery, and may be used to denote higher status. But as the research literature suggests, choosing the right font is a decision that sometimes warrants serious consideration, and 'boring', everyday fonts may even be the most suitable when considering fluency effects and reader familiarity.

The current study aimed to apply research on fluency in a practical context, by testing the effects of different fonts used in a restaurant menu. Previous studies have shown that different fonts can elicit different judgments, but few have attempted to focus on active choices in naturalistic contexts.

Overview and hypotheses

An experiment was conducted in which participants picked items from a menu that was printed in either a fluent or disfluent font. The main hypothesis was that participants who experienced low fluency with the menu in a difficult-to-read font would choose the items that they were most familiar with, due to the desire to minimise further cognitive effort devoted to processing the menu, and to gain the security offered by familiar, fluent items. Another aspect that was tested was

the extent to which participants had high expectations of the items that they chose. It was hypothesised that due to the more negative emotions generated by lower fluency, participants who read the more difficult font would report less optimistic expectations. Although not quite the same situation as Song and Schwarz (2008a), who used recipe instructions, participants were also asked to estimate the skill level required to prepare their chosen menu items, with the expectancy that disfluency would lead to higher estimations of skill.

METHOD

Participants

Participants (n = 110) were recruited at a weekly market, which was open to all members of the general public. They approached the experimenter's stall to participate in a survey as part of a Master's thesis project, and were offered entry into a draw for a $50 restaurant voucher.

This setting was chosen for its convenience in gathering a general sample. People from all walks of life go to restaurants at least occasionally, and the selected marketplace attracts people interested in takeaway food, fresh produce, books, clothing, handmade items, toys, art, and other items. In essence, a wide variety of people was known to visit the market, especially in a city where many general attractions and activity places are no longer available (after the Christchurch earthquakes of 2010 and 2011).

The final sample consisted of 49 males (44.55%) and 61 females (55.45%). Ages ranged from 14 to 75 years, with a mean age of 35.89 years (SD = 16.73). 96 participants were New Zealand residents (87.27%), with 14 participants from Malaysia, the United States, Ireland, Hong Kong, Thailand, and Vanuatu (12.73%). 51 participants had completed some form of post-secondary education (46.36%).

Materials

Menus:

A dinner menu was adapted from the Boulcott Street Bistro to feature twelve dishes across three courses (4 entrées, 4 mains, 4 desserts).

Entrées: (1) Hot smoked Akaroa salmon; (2) Maize mousseline; (3) Gremolata crumbed calamari; (4) Pork rillette macaroni.

Mains: (1) Braised lamb shank; (2) Mackenzie Country saffron risotto; (3) Grilled snapper; (4) Free range pork loin.

Desserts: (1) Crème brûlée; (2) Rhubarb crumble; (3) Chocolate and pistachio praline parfait; (4) Citron tarte.

Two variants of the menu were created: a high fluency version printed using Cambria (serif), and a low fluency version using **Lobster** (script). See Appendix A.
These fonts were chosen because they are plausible candidates when designing a real menu, while possessing strikingly different appearances and fluency properties. Cambria is similar to traditional serif typefaces like Times New Roman (used in several previous studies), while **Lobster** is a script typeface like Mistral (used in Song & Schwarz, 2008a). Cambria was expected to be fluent and easy-to-read because of its relatively conventional serif appearance, and **Lobster** was designated as disfluent due to its bold weight and because scripts are naturally less readable when set at normal body text sizes (these fluency assumptions were tested in the last question of the questionnaire below). Apart from the different fonts, the menus were technically identical in paper, layout, use of italics, and black, 11-point text for the menu items.

Questionnaires:

A 22-item, 7-point Likert scale questionnaire was prepared (see Appendix B), with

rating scales for (a) degree of familiarity with each of the twelve menu items ("How familiar are you with each dish?"; 1 = very unfamiliar, 7 = very familiar; 12 items), (b) level of expectations for each of the participants' three choices ("How high are your expectations for each of your chosen dishes?"; 1 = very low, 7 = very high; 3 items), (c) anticipated enjoyment for each of the three choices ("How much do you think you will enjoy each of your chosen dishes?"; 1 = very little, 7 = very much; 3 items), (d) the estimated degree of skill involved in preparing the three choices ("What degree of skill do you think is involved in preparing each of your chosen dishes?"; 1 = very low, 7 = very high; 3 items), and (e) the ease of reading the menu font ("How easy was it to read the font in which the menu was printed?"; 1 = very hard, 7 = very easy; 1 item). Demographic questions concerning age, sex, language, ethnicity, occupation, education, and country of residence were also asked. The questionnaire occupied three pages of two A4 sheets: Familiarity items filled the first page, with the expectation, enjoyment, and skill items on the second page, and the font ease-of-reading question was placed on the third page with the demographic questions to avoid influencing other answers through spontaneous discounting.

These questions were intended to cover a range of possible effects, mainly stemming from fluency research. The question of estimated skill was taken from Song and Schwarz (2008a), who used similar fonts to manipulate effect prediction after reading instructional texts. In view of previous findings that high fluency generates more positive emotions (which promote casual, uncritical thinking) compared to low fluency, it was expected that participants reading the Cambria font would report higher expectations and anticipated enjoyment than those reading *Lobster*.

Like the menu, two versions of the questionnaire were made, using either Cambria or *Lobster*. This was done so that any fluency effects could be maintained throughout the whole experiment. If a menu with hard-to-read typography was followed by a

questionnaire that enhanced fluency, effects such as deeper systematic processing could be lost over the course of the survey.

Procedure

Participants were told that the survey was about restaurant menus, and were seated at a table at the market stall. They were randomly assigned to either the high fluency or low fluency condition, and given the corresponding menu (Cambria or **Lobster**, respectively) to peruse for as long as they wished. They were instructed to 'order' three items from the menu (one dish from each course) by stating their choices out loud, which were noted by the experimenter. The menu was removed and participants then completed a questionnaire (printed in the same font as the presented menu) with the experimenter at hand.

The survey was administered in groups of up to four individuals, who worked separately. Participants were allowed to refer to the menu if necessary, especially for rating the font's ease-of-reading.

The procedure was conducted in a way that roughly approximated choosing and ordering menu items at a restaurant, while retaining features of laboratory experiments, such as the presence of the same experimenter, venue, and furniture. But given the setting, there was no control over the surrounding environment, such as weather and crowds.

RESULTS

Firstly, a *t*-test (two-tailed, independent samples, $\alpha = .05$) was used to determine whether there were any differences in ease-of-reading ratings for the menu fonts. Participants rated the Cambria menu ($M = 6.24$, $SD = 1.09$) as significantly easier to read than the **Lobster** menu ($M = 4.66$, $SD = 1.58$), $t(108) = 6.12$, $p < .001$, $d = 1.16$. This allowed subsequent results to be interpreted in terms of fluency or disfluency

caused by an easy-to-read or difficult-to-read font.

Means and standard deviations were calculated for the main questionnaire items (displayed in Table 1). Questionnaire answers for the two font groups were then compared using a series of two-tailed, independent samples *t*-tests (α = .05). Test statistics are also shown in Table 1, with results detailed below.

Table 1.

Mean ratings, standard deviations, and t-test results for (a) familiarity ratings of chosen dishes, (b) proportion of chosen dishes with highest familiarity ratings, (c) expectation ratings of chosen dishes, (d) anticipated enjoyment ratings for chosen dishes, and (e) estimated skill levels for preparing chosen dishes.

		Cambria High fluency (n = 55)		Lobster Low fluency (n = 55)			
		Mean	*SD*	*Mean*	*SD*	*t*	*p*
Familiarity of chosen*	*Entrée*	4.80	1.89	5.02	1.47	–.68	.50
	Mains	5.98	1.15	5.86	1.16	–.58	.56
	Dessert	5.26	1.66	5.53	1.50	–.90	.37
	Overall	5.35	1.09	5.47	1.01	–.61	.55
Proportion of most-familiar chosen**	*Entrée*	.75	.44	.75	.44	.00	1.0
	Mains	.82	.39	.78	.42	.47	.64
	Dessert	.58	.50	.67	.47	–.98	.33
	Overall	.72	.24	.73	.30	–.35	.73
Expectation for chosen*	*Entrée*	5.71	1.17	5.86	1.03	–.70	.49
	Mains	6.16	.88	6.06	.83	–.67	.50
	Dessert	6.13	.94	5.89	1.03	1.25	.21
	Overall	6.00	.79	5.93	.81	.44	.66
Enjoyment for chosen*	*Entrée*	5.84	1.07	5.86	.99	–.09	.93
	Mains	6.22	.88	5.95	1.10	1.44	.15
	Dessert	**6.24**	.84	**5.75**	1.22	**2.46**	**.02**
	Overall	6.10	.76	5.85	.92	1.55	.13
Skill level for chosen*	*Entrée*	5.13	1.36	4.96	1.37	.63	.53
	Mains	5.53	1.00	5.18	1.32	1.55	.13
	Dessert	5.27	1.27	4.95	1.35	1.31	.19
	Overall	5.31	.88	5.03	1.09	1.48	.14

*Ratings on a scale of 1–7. **Proportion out of 1.

Familiarity of menu choices

To find whether the menu font influenced whether participants chose more familiar items, familiarity ratings for each chosen dish were compared between the font groups with the *t*-test. No statistically significant differences were found in familiarity ratings between the two conditions for chosen entrée ($t(108) = -.68$, $p = .50$, *ns*), mains ($t(108) = -.58$, $p = .56$, *ns*), or dessert ($t(108) = -.90$, $p = .37$, *ns*) dishes, or when the ratings were averaged across the overall meal ($t(108) = -.61$, $p = .55$, *ns*). Thus, the hypothesis that disfluency would lead to safer menu choices was not supported, as participants who read the **Lobster** menu did not rate their chosen dishes as more familiar than those who read the Cambria menu.

An attempt was also made to compare the extent to which chosen dishes were a familiar choice. For each course, it was noted whether the familiarity rating for the chosen dish was the highest (or highest-equal). The number of times this occurred was compiled and compared across the two conditions. For example, 74.6% of participants who read the Cambria menu chose (one of) their most familiar dishes for the entrée course. However, *t*-tests revealed no statistically significant differences for the proportion of highest-rated chosen entrées ($t(108) = .00$, $p = 1$, *ns*), mains ($t(108) = .47$, $p = .64$, *ns*), desserts ($t(108) = -.98$, $p = .33$, *ns*), or across the overall meal ($t(108) = -.35$, $p = .73$, *ns*). For the entrée course, the mean proportion and standard deviation were exactly the same across the two font groups, indicating a very similar pattern of choosing and rating the entrée dishes.

Expectation ratings of menu choices

No significant differences of expectation were found for entrées ($t(108) = -.70$, $p = .49$, *ns*), mains ($t(108) = -.67$, $p = .50$, *ns*), desserts ($t(108) = 1.25$, $p = .21$, *ns*), or overall ($t(108) = .44$, $p = .66$, *ns*). Participants generally had high expectations of their chosen dishes (Cambria overall mean = 6.00, **Lobster** overall mean = 5.93).

Enjoyment ratings of menu choices

Ratings of anticipated enjoyment for chosen dishes did not significantly differ for entrées ($t(108) = -.09$, $p = .93$, *ns*), mains ($t(108) = 1.44$, $p = .15$, *ns*), or overall ($t(108) = 1.55$, $p = .13$, *ns*). But for chosen desserts, participants who read the **Lobster** (low fluency) menu expected to enjoy their dish significantly less than those who read the Cambria (high fluency) menu ($t(108) = 2.46$, $p = .02$, $d = .47$).

Skill level ratings of menu choices

There were no significant differences in estimations of the skill required to prepare chosen entrées ($t(108) = .63$, $p = .53$, *ns*), mains ($t(108) = 1.55$, $p = .13$, *ns*), desserts ($t(108) = 1.31$, $p = .19$, *ns*), or overall ($t(108) = 1.48$, $p = .14$, *ns*). Contrary to expectations, the overall trend showed that participants who read the disfluent menu gave lower skill level ratings.

Chi-square analysis

A chi-square analysis was conducted to test whether reading different fonts affected which items on the menu participants chose. Table 2 shows how frequently each dish was chosen by participants in the Cambria and **Lobster** groups. There were no significant differences in menu choices between the two groups for entrées ($\chi^2 = .40$, $p = .94$, *ns*), mains ($\chi^2 = 4.97$, $p = .17$, *ns*), or desserts ($\chi^2 = 1.01$, $p = .80$, *ns*), with the largest difference observed for the Saffron risotto dish.

Table 2.
Observed frequency values of chosen dishes for entrées, mains, and desserts.

	Cambria	Lobster	Total	
Hot smoked Akaroa salmon	30	28	58	Entrées
Maize mousseline	4	5	9	
Gremolata crumbed calamari	10	9	19	
Pork rillette macaroni	11	13	24	
Total	55	55	110	

	Cambria	Lobster	Total	
Braised lamb shank	28	25	53	Mains
Saffron risotto	2	9	11	
Grilled snapper	13	11	24	
Free range pork loin	12	10	22	
Total	55	55	110	

	Cambria	Lobster	Total	
Crème brûlée	15	17	32	Desserts
Rhubarb crumble	17	14	31	
Chocolate and praline parfait	16	19	35	
Citron tarte	7	5	12	
Total	55	55	110	

Analyses of variance

2 (Cambria vs. Lobster) × 2 (male vs. female) analyses of variance (ANOVAs) were conducted to examine whether the gender of participants was a significant factor in answering questionnaire items (See Appendix C for *F*-test results).

Only one significant difference was found: a greater proportion of male participants chose their most familiar dish for the entrée course, $F(1,106) = 6.64$, $p = .01$. The effect size of this finding was modest ($\eta^2 = .059$).

DISCUSSION

In general, analysis of the data found no expected differences between the high fluency and low fluency conditions for judgments of familiarity, expectation,

enjoyment, or skill. Thus, changing the font of the menu did not have a strong impact on participants' responses, whether it was which dishes were chosen or any judgments about those dishes. However, it was found that participants who read the *Lobster* (low fluency) menu anticipated lesser enjoyment of their chosen dessert dishes, and male participants tended to choose familiar entrées.

The general absence of main effects of font are not entirely surprising, given the complexity of the stimuli, which were made from a real restaurant menu to simulate the real-world experience. It is likely that there were both unmeasured and unmeasurable processes competing with font fluency effects pertaining to the menu choices, such as past experiences and comprehension. For example, the ratings of estimated skill level could be affected by whether the participant had prepared the dish (or a similar one) before.

That the only significant effect of menu font (d = .47) was for dessert enjoyment may indicate that participants thought about the three meal courses differently. The effect found was in the expected direction (due to high fluency safeguarding positive emotions), but it was not present for entrées or mains. It could be that people naturally look forward to dessert the most, and in the low fluency condition, participants were particularly thrown off by the difficulty of processing. Since dessert is at the end of a meal and determines whether it will finish on a high note, the stakes are higher. A lower enjoyment rating could have helped to counter disappointment, or it could have signified the more subdued or negative emotions associated with disfluency. For the other two courses, attitudes may have been more neutral or robust.

Although the differences were not significant, participants in the low fluency (*Lobster*) condition regarded their chosen dishes as requiring less skill to prepare. This would have been relatively straightforward to explain if they had picked their most familiar dishes, as the enhanced fluency when thinking about familiar things

would have extended to estimations of difficulty, as suggested by Song and Schwarz (2008a).

As shown in Table 2, participants in the two groups chose each dish at about the same frequency, which demonstrated that the menu font had little effect on participants' decisions. Inspection of the frequency table also reveals that Hot smoked Akaroa salmon (entrée) and Braised lamb shank (mains) each dominated menu selections for their respective courses, receiving about 50% of orders. If this experiment were to be conducted again, a more balanced menu would need to be constructed, perhaps with different item arrangements within each course to avoid order effects.

A possible problem with the procedure was the fact that participants were asked to rate familiarity after making their menu choices, allowing them to answer based on what they had chosen. In particular, participants might have guessed that the experimenter expected them to make familiar choices, and given appropriate or inappropriate answers depending on whether they wanted to help meet this expectation. Also, some participants may have inflated overall familiarity ratings (in order to appear more knowledgeable) and ceiling effects would then prevent detection of whether the chosen dish was more familiar.

It must also be noted that participants were self-selected into the survey, which may have attracted mainly people who like going to restaurants or are particularly open to experience. These people may then care less about fluency cues and item familiarity in an already novel situation (participating in a student survey at the market). Moreover, it is difficult to say how important font fluency cues are in the full restaurant experience, with many distractors competing for attention, and the influence of factors such as social company, price, mood, and occasion.

Previous studies have shown that the fluency levels of different fonts would influence certain judgments and behaviours relevant to the task at hand, but the results of

Experiment 1 suggest that in a restaurant context, these differences would not influence which items patrons choose. Participants experienced the fonts differently (*Lobster* was harder to read), but this information was not used to make menu choices and did not sway judgments of expectation, enjoyment, or skill.

Experiment 2

INTRODUCTION

Whether walking in the park, waiting at a traffic light, or sitting across a desk, people constantly make spontaneous judgments about others. Typically, these judgments are based on visual information gleaned from physical appearance, with faces being one of the most prominent and interesting features. Sometimes, we encounter human faces (in the form of photographs) paired with typed information, as in the case of ID cards, driver's licences, and passports. Face perception studies have shown that people can make fairly stable personality trait assessments with exposures as brief as 100ms (Willis & Todorov, 2006). That is, a person can make very quick judgments when looking at strangers' faces, which do not fluctuate dramatically over the period of first acquaintance.

Some researchers in communications have attempted to gain credence for the idea of inherent typeface personas — visual tones (such as fun, elegant, or professional) that are imparted through typeface design characteristics and may influence perceptions of the text itself. Brumberger (2003b) tested the hypothesis that typeface personas could interact with text personas, and found one case of significant interaction (the 'violent' text passage was seen as most serious when set in the 'direct typeface', and least serious when the 'elegant' typeface was used). Although that particular finding was not very meaningful (given that 'violent' texts are unlikely to be set using 'elegant' typefaces), it showed that interaction of font personas with other elements was possible, so the current study aimed to explore and extend the scope of this kind of effect beyond text alone. Experiment 2 considered whether the pairing of human faces with text set in different fonts would be sufficiently strong enough to influence judgments of human personality (which are well-practised compared to judgments of text and typeface personality).

A popular theory of human personality is the framework of the *Big Five*, which posits the existence of five main personality factors: Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness (Norman, 1963; Costa & McCrae, 1992). Several measures of the Big Five have been developed and tested, including the Big Five Inventory (BFI) developed by John, Donahue, and Kentle (1991). The BFI is a 44-item questionnaire that is both psychometrically sound (tested for reliability and validity) and relatively brief (John & Srivastava, 1999), making it a convenient tool for assessing personality, and as such, it was used in this study. It can be obtained from www.ocf.berkeley.edu/~johnlab/bfi.htm.

In this experiment, participants examined a portrait photograph paired with a name, which served as the text to be manipulated. It was expected that the persona of the typeface used to present the name would influence ratings of human personality measured through the BFI. In particular, it was hypothesised that font manipulation would have the most impact on ratings for the Big Five factor of Openness. This personality factor differentiates between people who are creative, curious, and interested in more artistic pursuits (open to experience), and those who are more conventional and down-to-earth (not open to experience). A difference was predicted for Openness due to the contrasting personas of the two typefaces used (described below).

Times New Roman is seen as a traditional, formal, possibly stiff font by many people, due to over-exposure in desktop-produced materials (Mackiewicz & Moeller, 2004; Shaikh et al., 2006). But at the same time, it is trustworthy and fluent due to its familiarity. In the case of the bold script font ***Ballpark***, it might be seen as more fun, friendly, and expressive. The script typefaces studied by Mackiewicz and Moeller (2004) scored the highest ratings on the 'friendly' attribute, and scripts used by Shaikh et al. (2006) were highest on personality traits such as Flexible, Creative,

and Youthful. However, ***Ballpark*** was expected to be unfamiliar as it was obtained online (www.dafont.com/ballpark-weiner.font).

Times New Roman is a very safe and general choice for many types of documents, and was thus expected to correspond to a personality type that is less open, while ***Ballpark*** possesses an appearance (such as boldness and a flowing style) and novelty that should be associated more with an open personality. Times New Roman was placed in the 'Directness' group in Brumberger (2003a), and ***Ballpark*** is similar to ***Counselor Script***, which was found in the 'Elegance' category of the same study.

METHOD

Participants

Participants (n = 94) were students recruited from different locations within the University of Canterbury campus. They were approached in person by the experimenter to complete a survey for a Master's thesis, with no incentive offered.

The final sample consisted of 47 males (50%) and 47 females (50%). Ages ranged from 18 to 52 years, with a mean age of 22.09 years (SD = 5.55). 83 participants were New Zealand residents (88.30%), and there were 11 participants from Malaysia, China, France, Japan, and the United States (11.70%).

Materials

Target Stimuli:

Two colour photographs, depicting a young man and woman in a passport-style pose, were obtained from pics.psych.stir.ac.uk/2D_face_sets.htm. Full names were invented for these targets by combining common first and last names ('Daniel Foster' for the male target and 'Jennifer Walker' for the female target).

The target stimuli were four quarter-A4 sheets, each featuring one of the photographs

and an associated name printed below in 18-point type (see Appendix D). Two of the sheets showed the male target with the name 'Daniel Foster' underneath, which was printed in Times New Roman on one sheet and ***Ballpark*** on the other. Likewise, the female target 'Jennifer Walker' was paired with Times New Roman and ***Ballpark*** on two different sheets.

Daniel Foster

Daniel Foster

Figure 8. Text stimuli for the male target: Times New Roman (top) and Ballpark (bottom).

Jennifer Walker

Jennifer Walker

Figure 9. Text stimuli for the female target: Times New Roman (top) and Ballpark (bottom).

The fonts used here differed from those used in Experiment 1, because those were chosen specifically for restaurant menu use. However, the same typeface categories were retained (Times New Roman is quite similar to Cambria, as ***Ballpark*** is to ***Lobster***), thus maintaining continuity of legibility and fluency.

Questionnaire:

A one-sheet A4 questionnaire was made, with 48 judgment items arranged in two columns on the front page, and demographic questions (the same as in Experiment 1) on the other side. Instructions adapted from the BFI were printed on a separate sheet, directing respondents to indicate the extent to which they agreed or disagreed with each judgment item, using a five-point Likert scale ("Please write a number next to each statement to indicate the extent to which you agree or disagree with that statement"; 1 = Disagree strongly, 5 = Agree strongly).
See Appendix E for the instruction sheet and questionnaire.

The first 4 judgment items asked participants to rate the extent to which the target

was attractive, unfamiliar *(R)*, unmemorable *(R)*, and intelligent (items marked *(R)* were reverse-coded during data analysis). These general traits were added to test the possible effect of font personas on other judgments as well as personality. Due to Times New Roman's ubiquity, it was expected that the ***Ballpark*** stimuli would be perceived as more unfamiliar.

The remaining 44 judgment items were the complete list from the Big Five Inventory, which could be collapsed into measures of each of the Big Five factors of personality (Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness). The questionnaire items belonging to each factor are listed below (note that this was not the structure presented to participants).

Extraversion items:

This person is someone who… is talkative
is reserved *(R)*
is full of energy
generates a lot of enthusiasm
tends to be quiet *(R)*
has an assertive personality
is sometimes shy, inhibited *(R)*
is outgoing, sociable

Agreeableness items:

This person is someone who… tends to find fault with others *(R)*
is helpful and unselfish with others
starts quarrels with others *(R)*
has a forgiving nature
is generally trusting
can be cold and aloof *(R)*
is considerate and kind to almost everyone
is sometimes rude to others *(R)*
likes to cooperate with others

Conscientiousness items:

This person is someone who… does a thorough job
can be somewhat careless *(R)*
is a reliable worker
tends to be disorganized *(R)*
tends to be lazy *(R)*
perseveres until the task is finished
does things efficiently
makes plans and follows through with them
is easily distracted *(R)*

Neuroticism items:

This person is someone who… is depressed, blue
is relaxed, handles stress well *(R)*
can be tense
worries a lot
is emotionally stable, not easily upset *(R)*
can be moody
remains calm in tense situations *(R)*
gets nervous easily

Openness items:

This person is someone who… is original, comes up with new ideas
is curious about many different things
is ingenious, a deep thinker
has an active imagination
is inventive
values artistic, aesthetic experiences
prefers work that is routine *(R)*
likes to reflect, play with ideas
has few artistic interests *(R)*
is sophisticated in art, music, or literature

The accuracy of participants' personality judgments was not measured in this study, as it was only of interest whether these perceptions of the targets could be manipulated through the different fonts.

Unlike Experiment 1, the questionnaire was not printed using the same font as the stimuli; the same one was used for both conditions. This decision was made partly on the basis that personality judgments are fairly stable, and also due to the observation that a full questionnaire page printed using ***Ballpark*** would be noticeably off-putting and difficult to read, thus violating transparency and exposing the chance of spontaneous discounting. Franklin Gothic was chosen as a neutral typeface that would not influence results in either direction, being neither a serif nor a script. It belongs to a typeface class sometimes called 'anonymous sans-serif' (due to plain letterforms).

Procedure

Participants were seated, and randomly assigned to either the Times New Roman or ***Ballpark*** condition. They were given one of the four target stimuli to examine for 30 seconds (timed by the experimenter). Due to the attractiveness item in the questionnaire, the target shown was always a member of the opposite sex. Therefore, male participants were shown 'Jennifer Walker' with either Times New Roman or ***Ballpark***, and female participants saw one of the two variants of the 'Daniel Foster' stimuli.

Participants then answered the pen-and-paper questionnaire (consisting of general trait and personality items, as well as demographic questions), which took approximately 5 minutes to complete. The survey was administered one-on-one, and participants were allowed to refer to the target while answering the questions.

RESULTS

Firstly, several questionnaire items were reverse coded (marked in the Questionnaire section). Scale scores for each of the Big Five personality factors were computed by averaging the relevant items (indicated in the Questionnaire section). Two-tailed, independent samples *t*-tests ($\alpha = .05$) were then used to compare scores in the Times New Roman and ***Ballpark*** groups for the Attractive, Memorable, Familiar, and Intelligent items, as well as the collapsed scores for the five BFI personality factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness). See Table 3 for means, standard deviations, *t*-test statistics and *p*-values for each of the analysed variables.

Table 3.

Mean ratings, standard deviations, and t-test results for (a) Attractive, Memorable, Familiar, Intelligent trait items, and (b) BFI scale measures of Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness — all participants.

	Times New Roman (*n* = 46)		***Ballpark*** (*n* = 48)			
	Mean	*SD*	*Mean*	*SD*	*t*	*p*
Attractive	3.15	.70	3.31	.66	−1.15	.25
Memorable	3.07	.90	3.06	.95	.88	.99
Familiar	3.54	1.31	3.27	1.43	.67	.34
Intelligent	3.50	.72	3.48	.77	.10	.89
Extraversion	3.12	.65	3.17	.66	− .34	.68
Agreeableness	3.55	.48	3.70	.52	− .72	.16
Conscientiousness	3.17	.59	3.28	.66	−1.16	.40
Neuroticism	2.78	.51	2.68	.45	.48	.31
Openness	3.18	.36	3.31	.40	− .50	.09

All ratings on a scale of 1–5.

The *t*-tests did not reveal any statistically significant differences between the font groups for any of the questionnaire variables. But the ***Ballpark*** stimuli were rated higher on Openness, which was a near-significant effect, $t(92) = -.50$, $p = .086$, *ns*.

Analyses of variance

2 (Times New Roman vs. ***Ballpark***) × 2 (male vs. female) ANOVAs ($\alpha = .05$) were conducted on the nine main variables to further gauge font effects (see Appendix F for *F*-test results).

Gender was a significant or near-significant ($p < .1$) factor for most of the BFI variables (Extraversion, Agreeableness, Conscientiousness, Neuroticism), with male participants consistently giving slightly higher ratings.

However, there was no significant main effect of font for any of the variables. Overall, the only case where font had a much greater impact than gender was for Openness, but this effect (the same found using the *t*-test) was small and not statistically significant, $F(1,90) = 2.99$, $p = .087$, $\eta^2 = .032$, *ns*. There was a near-significant interaction of font and gender for the Familiar item, whereby females rated the target as more familiar if the associated font was ***Ballpark***, but males considered the target more familiar when they saw Times New Roman, $F(1,90) = 3.27$, $p = .074$, $\eta^2 = .035$, *ns*.

The ANOVAs indicated that there were some differences between male and female participants' responses, which was very likely due to the differing target stimuli. Therefore, the data was split and re-examined by gender, using the same *t*-tests.

Results for female participants

Table 4 shows the mean questionnaire ratings, standard deviations and *t*-test results for female participants. A *t*-test revealed a statistically significant and large effect of font for the BFI factor of Openness ($t(45) = -2.01$, $p = .05$, $d = .59$), such that the target was rated higher on this factor when the name was printed with ***Ballpark***. However, scores for Extraversion, Agreeableness, Conscientiousness, and Neuroticism did not significantly differ across font groups, although the ***Ballpark***

target was rated as more agreeable, $t(45) = -1.33$, $p = .19$, *ns*.

The Familiar item approached significance ($t(45) = -1.79$, $p = .08$, *ns*), with female participants rating the target as more familiar when the name was printed with ***Ballpark***. Although this difference was not statistically significant, it had a large effect size ($d = 1.47$). There was very little difference between average ratings across the font groups for attractiveness and intelligence, with some indication that the ***Ballpark*** target was perceived as more memorable ($t(45) = -1.00$, $p = .32$, *ns*).

Table 4.

Mean ratings, standard deviations, and t-test results for (a) Attractive, Memorable, Familiar, Intelligent trait items, and (b) BFI scale measures of Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness — female participants.

Female participants	Times New Roman *(n = 23)*		***Ballpark*** *(n = 24)*			
	Mean	*SD*	*Mean*	*SD*	*t*	*p*
Attractive	3.35	.57	3.33	.64	.08	.94
Memorable	2.83	.83	3.08	.93	−1.00	.32
Familiar	2.30	1.43	3.08	1.56	−1.79	.08
Intelligent	3.52	.79	3.50	.83	.09	.93
Extraversion	2.97	.66	3.02	.63	− .25	.80
Agreeableness	3.44	.47	3.63	.46	−1.33	.19
Conscientiousness	3.09	.67	3.13	.78	− .22	.83
Neuroticism	2.69	.49	2.56	.34	1.05	.30
Openness	**3.15**	.36	**3.37**	.37	**−2.01**	**.05**

All ratings on a scale of 1–5.

Results for male participants

Table 5 shows the mean questionnaire ratings, standard deviations, and *t*-test results for male participants. Font manipulation did not significantly affect responses for any of the questionnaire variables. The Attractive item was closest to obtaining statistical significance ($t(45) = -1.58$, $p = .12$, $d = .45$ *ns*), with the target rated as more attractive when the name was printed with ***Ballpark***.

Table 5.

Mean ratings, standard deviations, and t-test results for (a) Attractive, Memorable, Familiar, Intelligent trait items, and (b) BFI scale measures of Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness — male participants.

Male participants	Times New Roman *(n = 23)*		***Ballpark*** *(n = 24)*			
	Mean	*SD*	*Mean*	*SD*	*t*	*p*
Attractive	2.96	.77	3.29	.69	−1.58	.12
Memorable	3.04	.98	2.79	.98	.88	.38
Familiar	2.61	1.20	2.38	1.21	.67	.51
Intelligent	3.48	.67	3.46	.72	.10	.92
Extraversion	3.26	.61	3.32	.66	− .34	.74
Agreeableness	3.66	.48	3.77	.58	− .72	.48
Conscientiousness	3.25	.50	3.42	.50	−1.16	.25
Neuroticism	2.88	.53	2.81	.51	.48	.63
Openness	3.20	.37	3.26	.42	− .50	.62

All ratings on a scale of 1–5.

DISCUSSION

For Experiment 2, there was only one significant finding — pairing the target with a name printed with ***Ballpark*** resulted in higher ratings for Openness items than when Times New Roman was used. This result was both statistically significant and the effect size was quite large (d = .59). However, this effect was only found for female participants (with the target 'Daniel Foster'). Presumably, ***Ballpark*** possesses a persona that is more suggestive of Openness than Times New Roman, and its association with the photograph made positive answers to Openness items more fluent.

Also for the female participants, the familiarity item showed a trend towards faces paired with ***Ballpark*** being judged as more familiar than with Times New Roman, which ran counter to the pattern for male participants. This was somewhat surprising, given that Times New Roman should be most familiar to both sexes

of the university student sample, and it was expected that the human personality judgments would reflect properties of the paired typeface, including familiarity. However, this could be explained by the fluency related to typeface matching.

If Times New Roman is inherently inappropriate as a match for the male face featured in the stimuli (possibly due to differing implicit personalities), a visual conflict may have been registered, one which would then be experienced as disfluency. Low fluency, in turn, would suggest to the viewer that the stimuli was unfamiliar (Schwarz, 2004). Typeface appropriateness does not necessarily have any relationship to typeface personas — in Brumberger's (2003b) study, Arial was rated as the most appropriate font for professional, violent, and friendly texts, but probably not because it possesses a professional, violent, *and* friendly font persona. More likely, its relative neutrality compared to the 'friendly' and 'elegant' typefaces was simply the most compatible out of the three presented. However, in this experiment, there is some evidence that personality did play a part in determining appropriateness (shown by the results for Openness compared with the general traits).

For male participants, the only interesting result was a (non-significant) trend whereby the face paired with ***Ballpark*** was judged to be more attractive than the same face paired with Times New Roman (d = .45) This could be interpreted in terms of both typeface personality and typeface appropriateness. If given the chance to compare the two fonts by themselves, the male participants might have judged ***Ballpark*** to be more attractive than Times New Roman, with this perception of greater attraction extending to the photograph. Whether this impression of attractiveness would be due to design characteristics (such as script style) or the novelty factor is debatable. On the other hand, male participants could have seen ***Ballpark*** as more appropriate for the female target than Times New Roman,

and responded accordingly. However, the positivity of the target/typeface match did not affect other judgment ratings, so in this case, ***Ballpark***'s own perceived attractiveness may have been more relevant.

A factor that may have influenced the results was that of the names paired with the targets. Names carry personalities and connotations of their own (e.g. Young, Kennedy, Newhouse, Browne, & Thiessen, 1993), and typeface appropriateness may have been subconsciously judged by comparing not just the font and the face, but a combination of the font and name. This could have partly contributed to the differences between male and female participants (in addition to the different faces), as the name/font combinations may have varied in appropriateness. For example, a more adventurous name than 'Jennifer Walker' could have been chosen for the female target. The consistency between the bold name and ***Ballpark*** might then lead to higher ratings of Openness in that condition, while in the Times New Roman group, the disparity might result in lower ratings, with a significant difference overall. Thus, if the names did influence ratings through unmeasured judgments of appropriateness, a more neutral item might have been better for the caption text (in order to isolate the font/face interaction), although it might have appeared less natural to the participants than a name.

Another possible problem was central tendency bias. Several participants answered almost all judgment items (except attractiveness and familiarity) with a neutral '3' on the 1–5 Likert scale, a response indicating either lack of strong opinions about the target or that the respondent did not know. For these participants, it was likely to be the latter case, as they perceived that they were given no relevant information with which to evaluate the targets' personality. In the judgment of human personality, traits are usually inferred through behaviour rather than appearance alone, and this is discernible in several of the BFI items (e.g. "perseveres until the task is finished",

"starts quarrels with others"). However, the number of these 'neutral' respondents was quite low (6 males, 1 female).

This experiment might have benefited from obtaining personality ratings for the fonts by themselves, in addition to being paired with the photographs. However, it was difficult to find a comprehensive list of variables that would validly apply to both typefaces and people. Given that some participants were loath to judge the human targets at all, this aversion could extend even more so to font judgments if the criteria were unsuitable. For example, the BFI uses items that refer to distinctly human behaviours and characteristics (like "is inventive" or "prefers work that is routine"), which are utterly inappropriate for measuring typeface personas. On the other hand, research on font personality has involved labels such as 'formal' and 'professional' (e.g. Brumberger, 2003a), which can certainly apply to humans, but not without context.

Besides their convenience for sample-gathering, university students were chosen for this experiment because of their close proximity in age to the targets, which was appropriate for the attractiveness item. Since changing the associated fonts did not significantly affect attractiveness ratings, this item could be excluded if this experiment was to be repeated. Removing the attractiveness item would allow a more general sample to be taken, as well as presentation of the same target for both genders.

General Discussion

The results of the two experiments conducted in the present study provide a mixed view of the psychology of fonts and whether the effects are important enough to be considered seriously by practitioners.

Summary and discussion of Experiments 1 and 2

Experiment 1 investigated the role played by the menu font in a restaurant experience. Participants who read the Cambria and **Lobster** menus made comparable decisions about which dishes to order and offered largely similar answers to questions of familiarity, expectation, enjoyment, and estimated skill. The only notable finding was that participants who read the higher fluency (Cambria) menu thought that they would enjoy their dessert significantly more than those who experienced low fluency with the **Lobster** menu. As discussed, this may be an indicator of different attitudes towards the dessert course, with higher stakes balanced by lower expectations in the low fluency condition. In Experiment 2, the aim was to discover whether so-called typeface personas were strong enough to influence the personality ratings of an associated target. Female participants rated the target person significantly higher on the Big Five Inventory dimension of Openness when their photograph was paired with a name printed in **Ballpark** (as opposed to Times New Roman). Ratings of Extraversion, Agreeableness, Conscientiousness, and Neuroticism did not seem to be affected by the matched font, with no significant results for male participants.

At first glance, it seems that although the two fonts used within each experiment were significantly different in terms of appearance and readability, they were almost interchangeable and equivalent when it came to influencing participants' answers to survey questions. However, this does not necessarily warrant a pessimistic view concerning the legitimacy and applicability of font effects.

Experiment 1 did not uncover any evidence of leaning towards familiar restaurant dishes when the menu was difficult to read. If font manipulation was unable to effect any significant changes in this experimental procedure, it is likely that in a real restaurant situation, the font would have even less impact on customer behaviour, given the many uncontrollable distractors and competing factors in such an environment. Diners may recognise whether something looks nice or is hard to read (*Lobster* was rated as significantly less readable), but this probably would not have any measurable impact on their behaviour and overall experience, such as what they order and whether they enjoy it. This is especially likely given that food caters to a basic human need (as well as stimulating multiple senses) and understandably garners a lot of attention, whereas aesthetic satisfaction from a nicely presented menu is considerably less important. In this light, the general absence of significant results in this experiment is acceptable. The lack of any meaningful differences between the two fonts could be attributed to the failure of disfluency to overcome the excitement primed by the restaurant simulation. In fact, the market setting (with food stalls present and the height of business around lunchtime) may have contributed more to the impression and feeling of a dining experience than previously considered. Therefore, in the case of Experiment 1, it is quite understandable how and why the font manipulation did not result in the expected fluency effects.

In Experiment 2, there was an appreciable difference in ratings of Openness, but only for female participants. This finding alone is quite remarkable, as it shows that typeface characteristics do have some relation to perceptions of personality and in some contexts, can affect judgments of associated items. Although participants were not asked to rate the font itself, it seems reasonable to think that they found *Ballpark* to be more interesting and open than Times New Roman, and that this impression partly influenced human personality ratings. As discussed, the mixed

and differing results for male and female participants could be explained by an unmeasured difference in typeface appropriateness for the target photograph and name. In future research, it would be worth attending to this factor first before assuming fonts like Times New Roman are automatically fluent due to familiarity and legibility/readability. In the case of an essay, Times New Roman will almost always be appropriate and fluent (unless another typeface is specified), but on a billboard advertisement showing something fun (and where viewers can expect some degree of creativity), Times New Roman might feel less fluent, because its visual tone would probably be inconsistent with the message of the advertisement. It might be interesting to see whether the effect obtained in this experiment can be found using text-only stimuli (no pictures), where the author is rated with a personality measure. Previous studies of font manipulation have asked participants to rate author intelligence (Oppenheimer, 2006) and the personality of the text passages themselves (Brumberger, 2003b), but none have investigated human personality variables, which may prove more useful in the context of written communication. More favourable impressions might be obtained by choosing a typeface with desirable implicit personality traits, or by matching fonts with your verbal tone.

Taken at face value, the results of Experiment 1 may suggest that reliance on intuition for choosing document fonts generally does not do any harm, as there may not be any inherently superior individual fonts or typeface classes for any real-world task (however, note that only two fonts were tested). Inferior and/or difficult-to-read fonts do exist, but if their use is avoidable using common sense (and maybe a little training), further investigation is not really required (unless these fonts are very popular). Viewers and readers may notice whether a font is slightly harder to read, but since they are accustomed to seeing everything in a variety of fonts, it does not influence their thinking or behaviour. This outlook may have to be accepted by

communicators to some extent, especially since reading and viewing conditions for documents and advertisements are often unpredictable and uncontrollable across different consumers. Bartram's (1982) suggestion that designers conduct their own small surveys of potential audience members seems most relevant here. Designers and writers should not hope to rely on published research to support the wide use of a few 'good' fonts. Especially in advertising, where every case is different, designers and marketers can take a case study approach by asking groups to evaluate typefaces and other design elements in view of the current product. In general, intuition is not a bad way to choose fonts, especially if the communicator is experienced and well-acquainted with the target audience. They can be somewhat assured that when considering audience impressions and actions, there is likely some room for error when choosing a document font.

But on the other hand, Experiment 2 showed that the appearance of a small piece of text (2 words) can have a significant effect on judgment through association. This suggests that for names, logos, and advertisements with only a phrase or two, different font choices can be considered more seriously, as the font persona is probably more potent in the smaller package (less is more). Doyle and Bottomley (2004) found very significant differences in choices across a variety of products when the brand name font was more appropriate. However, there is still room for research determining which typefaces are *most* appropriate (rather than simply adequate or less inappropriate) for certain products.

Present understanding of font psychology and implications for the future

As discussed, the psychology of fonts is a subject that still warrants further research, to a certain extent. While some of the effects of font choices may be intuitively and correctly assumed by designers and writers, further scientific research into these choices can help inform future decisions for those professions where typography

is considered important, especially if stylistic trends change dramatically. Nevertheless, the psychology of fonts can already be explained to a reasonable degree by existing studies and theories, through the literature on fluency, typeface appropriateness, and typeface personas. Previous studies have generally belonged to two camps: the communicators (marketers, writers) and the psychologists. Both groups have developed their own methodologies for working with fonts, but they have remained largely independent. Psychologists working with heuristics are aware of how and why processing fluency can alter behaviour (explored in Experiment 1), but their interest in fonts is mainly a matter of the convenience afforded by personal computers and office printers. The communicators, mindful of the creator-consumer relationship, have closely examined the personality and appropriateness of fonts (investigated in Experiment 2), but have largely operated with naïve theories. As exemplified within the current study, these two strands of inquiry can be merged for a deeper understanding of the psychology of fonts. In order for this to happen, psychologists who are driven to explain exactly how fonts and typography affect reader behaviour through fluency should familiarise themselves with the relevant areas of typographic history and practice, and communicators wanting to predict reader cognition and emotion should learn the applicable theories.

The model of perceptual fluency helps to show how and why the use of one font in a document can elicit a significantly different response to the same document set in a different font. But at the same time, precise effects cannot be studied or predicted without understanding the details that go into type and typography (especially those that distinguish between type classes). These different responses are of particular interest to technical writers and advertisers, who wish to ensure that miscommunication does not occur when messages are read by others. For example, an inappropriate font may indicate lack of experience or sincerity. In general, it seems that optimising the fluency of document fonts can only be

a good thing, particularly for persuasive messages. This can be accomplished either through using familiar or easy-to-read fonts, or by ensuring that the tones of typeface, text, and image are conceptually congruent (typeface matching). The former requires a combination of intuition and experience, while the latter may require some degree of typographic knowledge. Readers are more likely to be in a better mood and feel more positively about the stimuli, in addition to using less critical and cognitively-demanding processing styles.

However, it must be noted that in the real world, any effects of fonts due to personality or fluency are likely to interact with or be overwhelmed by other factors, whether within the document or part of the presentation environment. Looking at some of the most common fonts used by designers, many typeface designs are intended to be relatively neutral 'workhorses' that are able to accommodate many verbal tones across many settings, fulfilling the ideal of the crystal goblet. The most fluent and most appropriate fonts found and used in previous research studies (e.g. Arial, Times New Roman) can be considered workhorses that simply leave the least impression (rather than contributing positive feelings).

The empirical rules for facilitating high fluency experiences with respect to typefaces are yet to be firmly established (given the limited number of options tested so far in each study and the focus on *dis*fluency effects), but certain ideas have the ring of truth. Intuition and research both support the notion that in general, familiar fonts are the easiest to read due to practice (e.g. Mackiewicz, 2003), although location, time, and context may be important. For example, blackletter scripts (e.g. Old English) were used quite widely from the eleventh to fifteenth centuries, and for many contemporary readers and writers, they would have been considered the epitome of beautiful and functional writing and printing. However, these scripts would be considered almost illegible by most English readers today (Licko,

1990). But fluency might also be achieved by matching typefaces and text that are thematically consistent, which is something designers often do. This idea has not yet been tested by fluency researchers.

In this study, the aim was to progress beyond measuring the performance-based consequences of using different fonts (such as reading speed, comprehension), and promote research exploring more interesting psychological topics with fonts. The two experiments of the present study used only two fonts each to serve as opposing fluency moderators, but there are several other recognised type categories open for examination (including the more novel and informal fonts that are used in things like advertisements, newsletters, and greeting cards). Studies exploring typeface choices in an educational setting (Diemand-Yauman et al., 2011) and in car display interfaces (Reimer et al., 2012) demonstrate that almost any application of typography can be tested for improvement.

Conclusion

In conclusion, the study of typefaces does not need to be a 'niche' project to be undertaken by researchers with nothing else convenient to manipulate. Type is everywhere, and cannot be avoided. It is present in the home, in the workplace, on the street, both printed and on the screen. Moreover, it is easier to create, mix, and share than ever before. Almost anyone can type a few words on a computer and email or print it off. Despite mixed results and implications about the effect of fonts on cognition and behaviour, research on the psychology of fonts and typography has left much to be discussed and explored, and may prove important if current trends such as personalisation and aggressive persuasion continue.

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Appendix A

Experiment 1 menus: Cambria *and* Lobster

Dinner Menu

Entrées

Hot smoked Akaroa salmon 17
with celeriac remoulade and rocket dressing

Maize mousseline 16
with caramelized fennel and citrus
extra virgin dressed cherry tomatoes

Gremolata crumbed calamari 16
with sauce tartare and lemon

Pork rillette macaroni 17
with crumbed free range egg, parmesan, and thyme sauce

Mains

Braised lamb shank 34
with potato mash, lentil sauce, and minted peas

Mackenzie Country saffron risotto 34
with asparagus baby peas, fresh herbs, and Grana Padana

Grilled snapper 36
with coriander and walnut vinaigrette on sage-fried potatoes

Free range pork loin 36
with chickpea and sage polenta chips and ratatouille

Desserts

Crème brûlée 16
with berry compote and sesame wafers

Rhubarb crumble 16
with nut brown butter ice cream

Chocolate and pistachio praline parfait 16
with pear purée and ginger shortbread

Citron tarte 16
and candied zest ice cream with mandarin jelly

Dinner Menu

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with caramelized fennel and citrus
extra virgin dressed cherry tomatoes

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with potato mash, lentil sauce, and minted peas

Mackenzie Country saffron risotto 34
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Free range pork loin 36
with chickpea and sage polenta chips and ratatouille

Desserts

Crème brûlée 16
with berry compote and sesame wafers

Rhubarb crumble 16
with nut brown butter ice cream

Chocolate and pistachio praline parfait 16
with pear purée and ginger shortbread

Citron tarte 16
and candied zest ice cream with mandarin jelly

Appendix B

Experiment 1 questionnaires (90% actual size): Cambria *and* Lobster

How familiar are you with each dish?

Hot smoked Akaroa salmon

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Maize mousseline

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Gremolata crumbed calamari

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Pork rillette macaroni

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Braised lamb shank

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Mackenzie Country saffron risotto

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Grilled snapper

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Free range pork loin

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Crème brûlée

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Rhubarb crumble

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Chocolate and pistachio praline parfait

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Citron tarte

1 2 3 4 5 6 7
very unfamiliar *very familiar*

How high are your expectations for each of your chosen dishes?

Entrée

1	2	3	4	5	6	7
very low						*very high*

Main

1	2	3	4	5	6	7
very low						*very high*

Dessert

1	2	3	4	5	6	7
very low						*very high*

How much do you think you will enjoy each of your chosen dishes?

Entrée

1	2	3	4	5	6	7
very little						*very much*

Main

1	2	3	4	5	6	7
very little						*very much*

Dessert

1	2	3	4	5	6	7
very little						*very much*

What degree of skill do you think is involved in preparing each of your chosen dishes?

Entrée

1	2	3	4	5	6	7
very low						*very high*

Main

1	2	3	4	5	6	7
very low						*very high*

Dessert

1	2	3	4	5	6	7
very low						*very high*

How easy was it to read the font in which the menu was printed?

1	2	3	4	5	6	7
very hard						*very easy*

In which year were you born?

_____

What is your sex? (please circle one)

Male *Female*

What is your primary language?

_____

Which ethnic group do you primarily belong to? (please circle one)

European
Maori
Pacific Peoples
Asian
Middle Eastern/Latin American/African
Other _____

What is your current occupation(s)?

_____

What is the highest level of education you have completed?

_____

What is your country of residence?

New Zealand
Other _____

Other information relevant to the experiment
(e.g. dietary restrictions)

_____

_____

How familiar are you with each dish?

Hot smoked Akaroa salmon

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Maize mousseline

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Gremolata crumbed calamari

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Pork rillette macaroni

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Braised lamb shank

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Mackenzie Country saffron risotto

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Grilled snapper

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Free range pork loin

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Crème brûlée

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Rhubarb crumble

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Chocolate and pistachio praline parfait

1 2 3 4 5 6 7
very unfamiliar *very familiar*

Citron tarte

1 2 3 4 5 6 7
very unfamiliar *very familiar*

How high are your expectations for each of your chosen dishes?

Entrée

1 2 3 4 5 6 7
very low *very high*

Main

1 2 3 4 5 6 7
very low *very high*

Dessert

1 2 3 4 5 6 7
very low *very high*

How much do you think you will enjoy each of your chosen dishes?

Entrée

1 2 3 4 5 6 7
very little *very much*

Main

1 2 3 4 5 6 7
very little *very much*

Dessert

1 2 3 4 5 6 7
very little *very much*

What degree of skill do you think is involved in preparing each of your chosen dishes?

Entrée

1 2 3 4 5 6 7
very low *very high*

Main

1 2 3 4 5 6 7
very low *very high*

Dessert

1 2 3 4 5 6 7
very low *very high*

How easy was it to read the font in which the menu was printed?

1	2	3	4	5	6	7
very hard						*very easy*

In which year were you born?

_____

What is your sex? (please circle one)

Male *Female*

What is your primary language?

_____

Which ethnic group do you primarily belong to? (please circle one)

European
Maori
Pacific Peoples
Asian
Middle Eastern/Latin American/African
Other _____

What is your current occupation(s)?

_____

What is the highest level of education you have completed?

_____

What is your country of residence?

New Zealand
Other _____

Other information relevant to the experiment
(e.g. dietary restrictions)

_____

_____

Appendix C

Experiment 1: Font (Cambria, Lobster) × Gender (Male, Female) ANOVA test results

Dependent Variable: Familiarity Ratings of Chosen Dishes (Entrées)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.984	1	1.984	.685	.410	.006
Gender	2.374	1	2.374	.819	.367	.008
Font × Gender	.290	1	.290	.100	.752	.001

Dependent Variable: Familiarity Ratings of Chosen Dishes (Mains)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.370	1	.370	.278	.599	.003
Gender	.561	1	.561	.420	.518	.004
Font × Gender	1.698	1	1.698	1.273	.262	.012

Dependent Variable: Familiarity Ratings of Chosen Dishes (Entrées)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	2.104	1	2.104	.852	.358	.008
Gender	2.040	1	2.040	.826	.365	.008
Font × Gender	5.944	1	5.944	2.407	.124	.022

Dependent Variable: Familiarity Ratings of Chosen Dishes (Overall)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.563	1	.563	.519	.473	.005
Gender	1.536	1	1.536	1.416	.237	.013
Font × Gender	2.035	1	2.035	1.876	.174	.017

Dependent Variable: Proportion of Chosen Dishes Rated Most Familiar (Entrées)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.088	1	.088	.476	.492	.004
Gender	1.227	1	1.227	6.642	.011	.059
Font × Gender	.102	1	.102	.552	.459	.005

Dependent Variable: Proportion of Chosen Dishes Rated Most Familiar (Mains)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.030	1	.030	.184	.669	.002
Gender	.030	1	.030	.184	.669	.002
Font × Gender	.083	1	.083	.504	.479	.005

Dependent Variable: Proportion of Chosen Dishes Rated Most Familiar (Desserts)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.195	1	.195	.814	.369	.008
Gender	.002	1	.002	.010	.919	.000
Font × Gender	.073	1	.073	.303	.583	.003

Dependent Variable: Proportion of Chosen Dishes Rated Most Familiar (Overall)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.035	1	.035	.484	.488	.005
Gender	.197	1	.197	2.693	.104	.025
Font × Gender	.006	1	.006	.086	.770	.001

Dependent Variable: Expectation Ratings of Chosen Dishes (Entrées)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.238	1	1.238	1.047	.309	.010
Gender	3.907	1	3.907	3.303	.072	.030
Font × Gender	.677	1	.677	.572	.451	.005

Dependent Variable: Expectation Ratings of Chosen Dishes (Mains)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.076	1	.076	.107	.745	.001
Gender	2.160	1	2.160	3.026	.085	.028
Font × Gender	.432	1	.432	.605	.438	.006

Dependent Variable: Expectation Ratings of Chosen Dishes (Desserts)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.761	1	.761	.792	.375	.007
Gender	2.941	1	2.941	3.063	.083	.028
Font × Gender	.575	1	.575	.599	.441	.006

Dependent Variable: Expectation Ratings of Chosen Dishes (Overall)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.000	1	.000	.000	.988	.000
Gender	2.960	1	2.960	4.820	.030	.043
Font × Gender	.557	1	.557	.907	.343	.008

Dependent Variable: Anticipated Enjoyment Ratings of Chosen Dishes (Entrées)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.000	1	.000	.000	.990	.000
Gender	.016	1	.016	.015	.902	.000
Font × Gender	.469	1	.469	.436	.510	.004

Dependent Variable: Anticipated Enjoyment Ratings of Chosen Dishes (Mains)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.766	1	1.766	1.769	.186	.016
Gender	.173	1	.173	.174	.678	.002
Font × Gender	.200	1	.200	.200	.656	.002

Dependent Variable: Anticipated Enjoyment Ratings of Chosen Dishes (Desserts)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	4.616	1	4.616	4.190	.043	.038
Gender	1.200	1	1.200	1.089	.299	.010
Font × Gender	.464	1	.464	.421	.518	.004

Dependent Variable: Anticipated Enjoyment Ratings of Chosen Dishes (Overall)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.354	1	1.354	1.875	.174	.017
Gender	.213	1	.213	.295	.588	.003
Font × Gender	.023	1	.023	.031	.860	.000

Dependent Variable: Estimated Skill Ratings of Chosen Dishes (Entrées)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.860	1	.860	.463	.498	.004
Gender	1.561	1	1.561	.840	.362	.008
Font × Gender	3.198	1	3.198	1.720	.192	.016

Dependent Variable: Estimated Skill Ratings of Chosen Dishes (Mains)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	2.194	1	2.194	1.610	.207	.015
Gender	2.407	1	2.407	1.766	.187	.016
Font × Gender	.863	1	.863	.633	.428	.006

Dependent Variable: Estimated Skill Ratings of Chosen Dishes (Desserts)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.111	1	1.111	.652	.421	.006
Gender	5.051	1	5.051	2.967	.088	.027
Font × Gender	.406	1	.406	.238	.626	.002

Dependent Variable: Estimated Skill Ratings of Chosen Dishes (Overall)

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.332	1	1.332	1.352	.248	.013
Gender	.722	1	.722	.733	.394	.007
Font × Gender	.249	1	.249	.253	.616	.002

Appendix D

Experiment 2 stimuli: Male targets and female targets

Daniel Foster

Daniel Foster

Jennifer Walker

Jennifer Walker

Appendix E

Experiment 2 questionnaire (90% actual size)

	is attractive
	is unmemorable
	is talkative
	tends to find fault with others
	does a thorough job
	is depressed, blue
	is original, comes up with new ideas
	is reserved
	is helpful and unselfish with others
	can be somewhat careless
	is relaxed, handles stress well
	is curious about many different things
	is full of energy
	starts quarrels with others
	is a reliable worker
	can be tense
	is ingenious, a deep thinker
	generates a lot of enthusiasm
	has a forgiving nature
	tends to be disorganized
	worries a lot
	has an active imagination
	tends to be quiet
	is generally trusting

	is unfamiliar
	is intelligent
	tends to be lazy
	is emotionally stable, not easily upset
	is inventive
	has an assertive personality
	can be cold and aloof
	perseveres until the task is finished
	can be moody
	values artistic, aesthetic experiences
	is sometimes shy, inhibited
	is considerate and kind to almost everyone
	does things efficiently
	remains calm in tense situations
	prefers work that is routine
	is outgoing, sociable
	is sometimes rude to others
	makes plans and follows through with them
	gets nervous easily
	likes to reflect, play with ideas
	has few artistic interests
	likes to cooperate with others
	is easily distracted
	is sophisticated in art, music, or literature

In which year were you born?

_____

What is your sex? (please circle one)

Male *Female*

What is your primary language?

_____

Which ethnic group do you primarily belong to? (please circle one)

European
Maori
Pacific Peoples
Asian
Middle Eastern/Latin American/African
Other _____

What is your current occupation(s)?

_____

What are you studying? (if student)

_____

What is the highest level of education you have completed?

_____

What is your country of residence?

New Zealand
Other _____

Other information relevant to the experiment

_____

_____

Appendix F

Experiment 2: Font (Times New Roman, Ballpark) × Gender (Male, Female) ANOVA test results

Dependent Variable: Attractive

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.604	1	.604	1.343	.250	.015
Gender	1.101	1	1.101	2.448	.121	.026
Font × Gender	.718	1	.718	1.597	.210	.017

Dependent Variable: Memorable

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.000	1	.000	.000	.989	.000
Gender	.032	1	.032	.037	.847	.000
Font × Gender	1.522	1	1.522	1.755	.189	.019

Dependent Variable: Familiar

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	1.746	1	1.746	.948	.333	.010
Gender	.958	1	.958	.520	.473	.006
Font × Gender	6.022	1	6.022	3.269	.074	.035

Dependent Variable: Intelligent

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.010	1	.010	.018	.894	.000
Gender	.043	1	.043	.074	.786	.001
Font × Gender	.000	1	.000	.000	.995	.000

Dependent Variable: BFI Extraversion

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.071	1	.071	.173	.679	.002
Gender	2.045	1	2.045	4.973	.028	.052
Font × Gender	.001	1	.001	.003	.958	.000

Dependent Variable: BFI Agreeableness

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.501	1	.501	2.001	.161	.022
Gender	.745	1	.745	2.974	.088	.032
Font × Gender	.028	1	.028	.112	.739	.001

Dependent Variable: BFI Conscientiousness

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.278	1	.278	.711	.401	.008
Gender	1.146	1	1.146	2.932	.090	.032
Font × Gender	.089	1	.089	.227	.635	.003

Dependent Variable: BFI Neuroticism

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.236	1	.236	1.067	.304	.012
Gender	1.166	1	1.166	5.262	.024	.055
Font × Gender	.017	1	.017	.078	.780	.001

Dependent Variable: BFI Openness

Source	*Type III Sum of Squares*	*df*	*Mean Square*	*F*	*Sig.*	*Partial Eta Squared*
Font	.437	1	.437	2.986	.087	.032
Gender	.016	1	.016	.109	.743	.001
Font × Gender	.144	1	.144	.982	.324	.011