Birds of a Feather:
How Personality Influences Blog Writing and Reading

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Contents

Abstract i

1. Introduction 1
2. Background 2
   2.1 Personality and blogs: A framework 2
   2.2 Personality expression in written text 3
   2.3 Perception of author personality 3
   2.4 Personality and interpersonal attraction 4
   2.5 Blog genres 4
3. Methodology 5
   3.1 Study 1 5
      3.1.1 Participants 5
      3.1.2 Procedure 5
   3.2 Study 2 6
      3.2.1 Participants 6
      3.2.2 Procedure 6
   3.3 Text analysis 7
4 Results 7
   4.1 Authors' and readers' personalities 7
   4.2 Corpus of blog entries 7
   4.3 Personality expression in blog text 8
   4.4 Perception of blog author personality 8
   4.5 Similarity attraction 9
   4.6 Influence of blog genre 9
5. Discussion 10
   5.1 Emotional words as a cue 10
   5.2 Blog readers achieve consensus, not accuracy 11
   5.3 Not all genres are equal 11
   5.4 Bloggers of a feather flock together 11
   5.5 Limitations 12
6. Conclusions 12

Appendix 1: Tables 16
Appendix 2: Figures 19

Abstract

The rapid development of blogs as a social networking tool has greatly increased the number of people who are expressing themselves in text published online. As yet little is known about the social psychology of online interaction using recently developed Web 2.0 functionalities. To what extent do principles of social psychology carry over into the online domain and how can appropriate use of those principles assist in activities such as community building, e-commerce, marketing, and personalization of services? There would seem to be a large number of novel research questions that can be posed with respect to online interaction. One pertinent question concerns the extent to which compatibility of personality influences online interaction. We investigated this question in terms of hypotheses derived from the personality research literature, using a two-part experiment. In the first study, eight participants wrote blogs in two distinct genres (personal diaries and commentaries) and rated their own personalities. In the second study 12 different participants judged the personality of authors as implied in the blog texts created in the first study. Those participants also completed a personality questionnaire and rated their attraction to the blog text author. Readers of the blog corpus were able to consistently judge the personality of the writers. Moreover, they followed a well-established social rule regarding interpersonal attraction in real-life interaction. Blog readers were significantly more attracted to blog writers with more similar personalities—offering support that in the blog community, "birds of a feather flock together." Emotion word use in the blog corpus correlated with writer's personality, suggesting that online personality may be signalled by linguistic cues. The two most popular genres of blog writing, personal journal and commentary, differed in word use and how accurately readers judged author personality traits. Based on the results obtained it is suggested that personality is an important determinant and that further research on how people communicate with blogs will be relevant to social network analysis and to marketing.

1. Introduction

As of this writing, over two-thirds of the global internet population now visit blogs or social networking sites according to a recent report by the Nielson Company (2009). Blogs and social networks accounted for almost one out of every 10 minutes spent on the internet (Nielson 2009). More than 133 million blogs existed worldwide with nearly 1 million blog posts each day (Sifry 2008).

The staggering rise of the blog medium reflects growing consumer appetite for interactive, social content. In its simplest definition, a blog is a website where content is posted periodically and displayed in reverse-chronological order. Although blogs are sometimes conceptualized as personal diaries, most are neither private nor unidirectional in communication. In fact, a key attractor of blogs is their social nature: communities can be formed both through subject association (for example, blogs about a common musician) and through hypertext structure (for example, through a network of links, posted comments or the use of a "TrackBack" feature that sends alerts when blog authors write new entries) (Chin and Chignell 2006a, 2006b, Miura and Yamashita 2007). Large searchable directories of "bloggers" (people who author blogs) and their sites exist on websites such as technorati and blo.gs. Moreover, the rising appropriation of the internet for interpersonal purposes is changing the way people spend time online: instead of picking up the local tabloid, for example, someone may visit a popular entertainment blog site like PerezHilton.com; instead of using the phone to keep in touch with a professional contact, someone may choose to comment on that contact's blog.

This transformation highlights a key question for researchers in human-computer studies: how is the medium of blogs affecting people's social behaviour? As yet little is known about the social psychology of online interaction using recently developed Web 2.0 functionalities. To what extent do principles of social psychology carry over into the online domain and how can appropriate use of those principles assist in activities such as community building, e-commerce, marketing, and personalization of services? Personality is of particular interest because of its influence on a person's self-expression and interpersonal communication. However, it is unclear how social phenomena that may be observable in real life translate to online settings. When people communicate through online text, for example, does their personality show? If so, does this affect other people's attraction towards them, and in turn, the development of online community? Do people prefer to interact with blog authors who have similar personalities—i.e., do bloggers of a feather flock together?

The goal of this research is to investigate the role of personality in blogs, so as to better understand how personality affects behaviour among members of web-based communities. To do this we review previous work on personality in online settings to develop hypotheses related to blogging (Section 2) and describe two studies conducted to test our hypotheses (Section 3): the first in which participants author blog entries and the second in which participants evaluate those entries. The main contributions of our paper are:

- We investigate how an author's personality is expressed in blog text through such linguistic characteristics as word length and emotionality (Section 4.3);
- We test how well naïve readers can judge the personality of blog authors solely by their blog entries and whether this accuracy is similar to that of other CMC modes (Section 4.4);
- Rather than generalizing across all forms of blogs, we explicitly examine the mediating role of blog genre (personal diary versus commentary) both on word use and personality judgments (Section 4.6);

- Most importantly, we verify that personality affects interpersonal attraction in the blog medium just as it does in real-life (Section 4.5).

Our results suggest that personality influences how people behave and establish community through blogs. This finding is not only relevant to social psychology and HCI researchers, but also to companies and organizations who are increasingly interested in engaging the online public through recommender systems (e.g., digg.com, reddit.com, StumbleUpon.com) and social network-based brand promotion and marketing.

2. Background

2.1 Personality and blogs: A framework

Personality can be generally defined as "a dynamic and organized set of characteristics possessed by a person that uniquely influences his or her cognitions, motivations, and behaviours in various situations" (Ryckman 2004). It influences how a person interacts with their environment. Personalities differ in distinct and classifiable ways. However, there are a number of theories that purport to describe the nature of personality differences and their classification. Here we employ the five-factor model, or "Big Five" (Goldberg 1981), which describes personality using five mutually-independent, measurable dimensions:

- Extraversion (talkative, assertive) versus Introversion (quiet, reserved)
- Emotional stability (calm, stable) versus Neuroticism (anxious, moody)
- Agreeableness (friendly, sympathetic) versus Disagreeableness (unfriendly, cold)
- Conscientiousness (organized, self-disciplined) versus Unconscientious (disorganized, careless)
- Openness to experience (imaginative, complex) versus Closed to experience (conventional, uncreative)

The Big Five model has been validated experimentally (McCrae and Costa 1987), and has become the dominant approach to modeling personality in psychology (De Raad and Perugini 2002). Some research has shown that other models, such as Eysenck's three-factor model and the Myers-Briggs Type Indicator (MBTI), measure aspects of the Big Five model (Eysenck and Eysenck 1991, McCrae and Costa 1989).

Here we employ a simple framework to model the effect of personality in communication via text (Figure 1). In this model, a writer's personality is reflected in their blog text. Readers of these blogs make personality judgments based on this text which in turn affects their interpersonal attraction towards the author. This may be manifested through blog-related actions (such as commenting and linking to blogs) which help to establish a sense of online community. Here we investigate two hypotheses (H1-H2) and four research questions (RQ1-RQ4) related to personality and blogs as shown in (Figure 1). The next sections describe literature leading to the development of these hypotheses and questions.

(Refer to Figure 1 at the end of this document)

Figure 1. Framework for looking at role of personality in text communication with corresponding hypotheses and research questions.

2.2 Personality expression in written text

In studying how personality influences blog communication, we first consider whether personality can even be expressed in text. Previous work indicates that linguistic style is a stable, reliable individual difference and that text analysis programs can be used to link natural language characteristics to personality measures, particularly Extraversion and Neuroticism (e.g., Pennebaker and King 1999, Pennebaker and Lay 2002, Groom and Pennebaker 2002, Dewaele and Furnham 2000). In particular, Pennebaker and King (1999) correlated word use to the Big Five personality dimensions by analyzing writing samples of several hundred university students, using the same text analysis program employed here, Linguistic Inquiry and Word Count (LIWC). Overall, they found that high Neuroticism was associated with greater use of first person pronouns and negative emotion words but less use of positive emotion words and articles, while high Extraversion correlated with more positive emotion words and social process words but fewer negative emotion words. Conscientious people used more positive emotion words and fewer negative emotion words; this same trend was found for agreeable people. People who were open to new experiences tended to use more articles and longer words, but fewer self-references. These correlations had modest effect sizes between 0.10 and 0.16.

In recent years linguistic study has been increasingly applied to the internet and CMC, in part because of the availability of large amounts of natural language data and in part because of its shift toward interpersonal use. Previous works applying linguistic investigation specifically to blogs have found that blog text can predict the blogger's mood (Mishne 2005; Leshed and Kaye 2006), sentiment (Chesley *et al.* 2006), emotionality (Gill *et al.* 2008) and gender (Herring and Paolillo 2006; Nowson 2006). Several computational methods have been used to classify personality of blog authors (Oberlander and Nowson 2006). Of particular note, work by Nowson *et al.* (2005) found that a blogger's personality as measured by the Big-Five Inventory influences the contextuality and formality of their written text, and that personality traits correlate with several linguistic features (Nowson 2006). These suggest that blogs contain a range of linguistic characteristics that reflect aspects of a blogger's personality.

RQ1: How will the word use of blog authors reflect their personalities?

2.3 Perception of author personality

The next issue we look at is how well readers are able to judge a blogger's personality through text. In face-to-face communication people are very effective at judging personality (Funder and Colvin 1988, Funder and Dobroth 1987, Paunonen 1989). However, with computer-mediated communication these judgments are less confident and less accurate (Gill *et al.* 2006, Hancock and Dunham 2001, Markey and Wells 2002). In a study of synchronous CMC, judges could not rate Extraversion, Emotional Stability and Agreeableness as well as face-to-face (Gosling *et al.* 2003). In chat scenarios, judges achieved consensus for the target's Extraversion, Agreeableness and Openness traits. However, while their impressions corresponded to the target's self-reported personality for Extraversion and Openness, it differed for Agreeableness (Markey and Wells 2002). In ratings of personal websites, Openness had the best target-judge agreement (i.e. readers were able to accurately judge this trait) (Vazire and Gosling 2004). In emails, readers had high target-judge agreement for Extraversion and high agreement among judges for Extraversion, Neuroticism and Psychoticism (Gill *et al.* 2006). Thus, it appears that it is possible to make accurate personality judgments in many different types of CMC but only to a limited extent. In

particular, the work by Markey and Wells (2002) and Gill *et al.* (2006) mentioned above suggests that readers are highly effective at achieving consensus on author personality but their judgments do not match the author's self-reported personality well.

To our knowledge this work is the first to investigate personality perception in blogs. Thus, we hypothesize that blog readers will be able to agree on the personalities of authors as in other CMC media but do not make specific predictions on which traits will be easiest to judge.

H1: Blog readers will be able to agree on the personality of blog authors.

RQ2: Will judgments by readers agree with blog author's self-reported personality?

2.4 Personality and interpersonal attraction

If readers of blogs are in fact able to judge personality, the key question becomes: How does personality influence relationships and associations among individuals? In real-world interaction, strong empirical evidence indicates that "birds of a feather flock together": people like to interact with personalities that are similar to their own. In psychology this is known as the "law of similarity-attraction" (Reeves and Nass 1996, Byrne 1971) or the "self similarity hypothesis" (Klohnen and Luo 2003). People strongly prefer to interact with and become friends with strangers who have similar personalities (Duck 1973) and individuals experience greater initial attraction to partners who have similar attachment characteristics (Klohnen and Luo 2003). These suggest that similarity of personality helps facilitate attraction to other individuals.

More importantly, this behaviour appears to be so ingrained in us that we automatically and subconsciously apply these rules in situations where communication is not face-to-face with another human, such as interacting with a computer's "personality" in text displays: Reeves and Nass (1996) found that dominant personality users prefer dominant personality computers while submissive users prefer submissive computers. Thus, we predict this personality-based social rule to be evinced in blogging as well.

H2: Interpersonal attraction will increase with greater personality similarity between blog author and blog reader.

2.5 Blog genres

Considering the various purposes of blogging today, we also investigated the mediating effect of blog genre. Two of the major motivations for blogging are documenting one's life as in a personal diary and providing commentary or opinions (Nardi *et al.* 2004). Herring *et al.* (2004) found that of 203 randomly selected blogs, these were the most frequent overall purposes of blogs, with personal journals at 70% and commentaries (or "filters") at 13%. While a single blog may contain entries from both genres, the entries themselves can be classified as one or the other reliably (Herring and Paolillo 2006).

Moreover, authors write differently depending on the purpose of their writing. These differences can not only be used to separate between different fields of writing (such as novels, scientific articles and blogs), but also between genres within blogs: diary entries contain more "female" stylistic features while commentary entries contain more "male" stylistic features, regardless of author gender (Herring and Paolillo 2006). Using LIWC, past research (cf. Pennebaker *et al.,* 2001) showed that personal texts used more self-references, more social

words, more negative emotions, more cognitive words, fewer articles and fewer big words than formal texts. We compare whether the linguistic word use between personal and formal blog entries differ and evaluate whether trends from previous works are present in the blog domain.

RQ3: Will word use characteristics be different for personal diary entries versus commentary entries?

Likewise, if individuals express themselves differently when writing diary entries versus commentary entries, it is possible that readers pick up on this and judge blogs of one genre to exhibit different personality traits than the other. For example, commentary entries may receive higher ratings for Conscientiousness because they are written in a more formal and organized manner. We therefore investigate whether blog genre influences personality judgment.

RQ4: Will personality ratings be different for personal diary entries versus commentary entries?

Gender was not considered in this analysis because previous studies on blogs did not identify gender as a significant effect on word use (Herring and Paolillo 2006) and because only two of eight authors were female.

3. Methodology

We conducted two related studies: in the first, participants wrote blogs using a web-based interface on a computer; in the second, participants read and judged the corpus of blogs from the first study. Blog sites extensively employ asynchronous text as their predominant means of communication (although many blogs contain photos or other media). We chose to have blogs written in a controlled fashion (instead of existing blogs) because it allowed us to easily manipulate the experimental condition (blog genre) and obtain personality information.

3.1 Study 1

3.1.1 Participants

Eight participants (two female, six male) aged between 21 to 40 (with a mean of 29) years old were recruited from the University of Toronto community. The study was conducted in a research lab at the University of Toronto. All participants were fluent in English. Four participants were graduate students and four were undergraduates. Four participants had blogged before (periods ranging from 1 month to over 2 years) while the others had no experience with blogging.

3.1.2 Procedure

The experiment was conducted on a Dell Precision desktop PC running Windows XP. Blogger[1] was used as the web-based blog-writing interface (Figure 2). Participants were limited to using the "Compose" tab only (no editing of HTML) and were allowed to use any of the styling features (e.g., bold, text colour) and blog tools (e.g., spell check).

[1] A web-based blogging application developed by Google (www.blogger.com).

Study 1 participants were asked to write blog entries using the Blogger interface in two different genres: commentary and personal journal. For commentary, the scripted instructions said to "please write some commentary about one or more particular subjects that interest you and that you would like to share with others"; for personal journal, the instructions were "please write about one or more personal experiences that you would like to share with others." For each genre, participants were given 20 minutes and were asked to write at least two entries. They also filled out demographic information (including prior blogging use) and the Ten-Item Personality Inventory (TIPI), which is a validated questionnaire based on the full Big Five instrument (Gosling *et al.* 2003).

(Refer to Figure 2 at the end of this document)
Figure 2. Blogger interface for writing blogs.

3.2 Study 2

3.2.1 Participants

Twelve participants (six female, six male) aged between 18 and30 (with a mean of 25) years old were recruited from the University of Toronto community, as in Study 1. All Study 1 participants were excluded from taking part in Study 2. All participants were fluent in English. Four participants had post-graduate education; all others had some form of collegiate-level education. Participants had diverse prior backgrounds with respect to blogging: reading frequency varied from less than once a month to daily.

3.2.2 Procedure

Participants read the corpus of blog entries written by subjects in Study 1 using the Blogger interface in a blind, randomized test. (Figure 3) shows an example of the view for a blog entry. Only the blog entry was provided, with no information given about the author or the entry's genre. Viewing order was randomized for each trial. Participants rated interpersonal attraction to the blog author using the two-item measure employed by Byrne and Nelson (1965) ("I feel that I would probably like this blog's author"; "I believe that I would like working with this blog's author"). They also rated the perceived personality of the blog author, using the same ten-item personality scale that was delivered to both authors and readers in the preliminary questionnaire. The use of identical scales across studies allowed for direct comparison of personality scores between author, reader and the reader's judgment of the author. All ratings were made on seven-point Likert scales ranging from "Strongly Disagree" to "Strongly Agree." The study was designed as a fully-within subjects experiment with one factor (blog genre) that had two conditions: commentary and personal journal. As in the first study, participants filled out demographic and personality questionnaires.

(Refer to Figure 3 at the end of this document)
Figure 3. Blogger interface for reading blogs.

3.3 Text analysis

We used the word-based text analysis program developed by Pennebaker *et al.* (2001) called Linguistic Inquiry and Word Count (LIWC). It measures a wide range of psychological dimensions using subjective dictionaries that were independently rated by judges. Validating studies have found its measures of word use to demonstrate good internal consistency, with an ability to discriminate between personality factors and performance comparable to human judges (e.g., Pennebaker and King, 1999). We used the web-based LIWC analysis tool[2].

4 Results

4.1 Authors' and readers' personalities

The personalities of authors were assessed, yielding the following summary: Extraversion Mean 4.81, SD 1.19; Agreeableness Mean 5.00, SD 0.85; Conscientiousness Mean 4.75, SD 0.71; Emotional Stability Mean 5.38, SD 1.41; Openness Mean 5.94, SD 0.56. The personality of readers gave the following scores: Extraversion Mean 4.04, SD 1.27; Agreeableness Mean 4.88, SD 1.11; Conscientiousness Mean 5.00, SD 1.33; Emotional Stability Mean 4.63, SD 1.11; Openness Mean 5.54, SD 0.69. These results indicate that personality profiles of participants are similar to normative data (e.g., in Gosling *et al.* 2003).

4.2 Corpus of blog entries

Altogether participants from Study 1 wrote 39 entries of average length 107 words (SD=61.2). Writers produced between four and seven blog entries. Style effects (text color, bold/italics) were used to a very limited extent (only with a few words in four of the entries) so are not considered further in this paper. As expected from the open-ended instructions, the topics of writing varied widely, from personal travel to Israeli-Palestinian politics. Entry titles are listed in (Table 1) (note that some entries were not given titles).

(Refer to Table 1 at the end of this document)

As our corpus of blogs was collected experimentally, we compared it with "real" blogs to determine how representative it was. Table 2 lists LIWC variables from our corpus and that of Nowson (2006), who used existing blog text from authors. Means between corpora were similar for all dimensions except negative emotion words, which had higher relative frequency in our blogs. This similarity suggests our corpus is representative of existing blogs, although we mention the caveat for negative emotions in the results that follow.

As expected, standard deviations were higher in our study compared to (Nowson 2006) based on the fewer number of samples used.

(Refer to Table 2 at the end of this document)

[2] Available at http://www.liwc.net/liwcresearcH17.php

4.3 Personality expression in blog text

To examine RQ1, we correlated the self-reported personality traits of each writer with the linguistic factors of their blogs as determined by the LIWC program following the example of previous work (Pennebaker and King 1999). (Table 3) presents the results. Pearson correlations are used so that results can be compared with those obtained by Pennebaker and King (1999).

Word use of blog authors reflected their personalities to a limited degree. This effect was found mostly for emotional words. For commentary entries, Extraversion was significantly correlated with use of positive emotion words ($r=.75$, $p<.05$, Pearson, pair-wise, two-tailed), so extraverts used more positive emotion words. Conscientiousness ($r=-.87$, $p<.01$) and Emotional Stability ($r=-.83$, $p<.05$) were both negatively correlated with use of negative emotion words, so conscientious bloggers and emotionally stable bloggers used fewer negative emotion words. These same three effects were present in Pennebaker and King's (1999) analysis of student writing samples, suggesting some similarity between CMC forms. We also found a strong negative correlation between Openness and use of articles ($r=-.93$, $p<.01$). These correlations were not found for personal diaries, which we discuss further in Section 5. For diary entries greater use of big words was a significant indicator of higher Emotional Stability ($r=.81$, $p<.05$).

(Refer to Table 3 at the end of this document)

4.4 Perception of blog author personality

H1 was supported. Readers were able to judge blog author personality with high agreement amongst themselves. As in previous work (Gill *et al.* 2006, McCrae and Costa 1987), we calculated several measures of judgment. We first tested inter-rater reliability using Kendall's W concordance coefficient[3]. Ratings for all personality factors had agreement significantly better than random at the $p<.001$ level: $W_E = .343$, $\chi^2(38)=156$; $W_A = .502$, $\chi^2(38)=229$; $W_{ES} = .431$, $\chi^2(38)=197$; $W_C = .403$, $\chi^2(38)=184$; and $W_O = .333$, $\chi^2(38)=152$. Results are shown in the first column of (Table 4). Readers agreed most on the Agreeableness of blog authors, followed by Emotional Stability.

As an additional measure of inter-rater agreement, we performed correlations for each reader with every other reader and computed the mean correlation between reader pairs for each personality factor. The second column of (Table 4) shows these results along with the average percentage of reader-pairs whose ratings were significantly positively correlated given in brackets.

Readers were able to correctly judge the self-reported personality of authors only to a limited degree. To look at RQ2, we analyzed the overall accuracy of readers' personality judgments by correlating the agreement between an author's self-reported personality ratings and the mean personality judgments by readers. (We use the term "accuracy" to describe agreement with the author's self-ratings.) Results are presented in the last column of (Table 4). Kendall's tau is used as the correlation coefficient for analyses in this study given the ordinal nature of Likert-scale measures and the possibility of multiple tied ranks if similar ratings are given. Extraversion ($\tau=.263$, $p=.085$) and Openness ($\tau=.251$, $p=.099$) were borderline significant (one-tailed), as was Agreeableness (but negatively correlated: $\tau=-0.266$, $p=.084$).

[3] A value of 0 indicates total disagreement and a value of 1 indicates total agreement.

(Refer to Table 4 at the end of this document)

4.5 Similarity attraction

H2 was partially supported. To test whether interpersonal attraction increases with greater personality similarity, we considered two types of author-reader personality similarity: between the reader's and author's self-reported personalities ("reader-author") and between the reader's personality and their judgment of the author's personality ("reader-judgment"). With both measures, personality differences were computed by taking the absolute difference between the personality ratings; e.g., for reader-author, the absolute difference between the reader's and the author's self-reported ratings for each trait was scored from 0 (most similar) to 2 (least similar). We also summed over the five factors to get an overall similarity score from 0 (most similar) to 10 (least similar). Results are presented in (Table 5). No significant correlations with attraction were found for reader-author difference. For reader-judgment difference, however, the personality traits of Agreeableness (τ_b=-.124, p=.007, Kendall, pair-wise, one-tailed) and Openness (τ_b=-.346, p<.001) were found to significantly correlate with a reader's attraction to the author. The overall reader-judgment difference was also found to be significantly correlated with attraction (τ_b=-.232, p<.001). These negative correlations indicate that as predicted, the smaller the difference between a reader's personality and the perceived personality of the blog author, the greater the interpersonal attraction. However, as no correlations with the author's self-reported personality were found, people may have been more attracted to authors whom they judged to have similar personalities, but the authors may not have in fact been so similar. Thus H2 is partially supported.

(Refer to Table 5 at the end of this document)

4.6 Influence of blog genre

With respect to RQ3, word use differed between commentary entries and diary entries in our corpus. To examine blog genre effects, a one-way repeated measures analysis of variance (ANOVA) was conducted with genre as the within-subject factor and word use data aggregated by author. Personal journal entries contained significantly more self-references (M=9.97, SD=2.33) than did commentary entries (M=3.97, SD=.492), F(1,7)=7.354, p=.030, two-tailed. Use of big words was borderline significant (p<.10). Commentary entries tended to contain more big words (M=19.1, SD=1.44) than journal entries (M=14.7, SD=1.48), F(1,7)=4.69, p=.067. These effects were also evident in student writing samples by Pennebaker *et al.* (2001). However, the additional effects they identified for social words, negative emotions, cognitive words and articles were not found in this study.

With respect to RQ4, we found that participants' ratings of personality differed between the diary and commentary genres. We conducted a similar ANOVA as for RQ3, with genre as the within-subject factor but with Big Five rating data aggregated by rater. Journal entries as compared to commentary entries were judged to be more introverted (F(1,11)=13.5, p=.004), more agreeable (F(1,11)=12.7, p=.004) and less conscientious (F(1,11)=12.6, p=.005). This is illustrated in (Figure 4), which shows mean reader assessment for each personality factor, on a

scale from -1 (negative end of factor scale) to +1 (positive end of factor scale) with 0 indicating neutrality.

(Refer to Figure 4 at the end of this document)
Figure 4. Blog genre influences perception of personality factors. Judged personality is scaled from -1 (negative end of factor scale) to +1 (positive end of factor scale). Error bars represent 95% confidence intervals.

In addition, we tested whether participants could more accurately judge personality when reading one genre over the other. The same ANOVA as above but with judgment accuracy for each Big Five trait revealed significant differences between genres for four of the five traits. (Figure 5) shows the mean difference between the self-reported personality of the author with the reader's judgment. Extraversion ($F(1,11)=9.88$, $p=.009$) and Agreeableness ($F(1,11)=5.25$, $p=.043$) were more accurately assessed with personal journals (i.e. readers achieved lower error in judgments), while readers' judgments of Conscientiousness ($F(1,11)=11.0$, $p=.007$) and Emotional Stability ($F(1,11)=26.3$,$p<.001$) were significantly more accurate with commentary entries. Although significant, these improvements were small—around 0.1 points, or 5%, on a scale of 0 (no error, best accuracy) to 2 (largest error, worst accuracy).

(Refer to Figure 5 at the end of this document)
Figure 5. Blog genre influences how closely reader personality assessment matches author self-reported personality. Accuracy is scaled from 0 (no error, best accuracy) to 2 (largest error, worst accuracy). Error bars represent 95% confidence intervals.

5. Discussion

5.1 Emotional words as a cue

In the writing of commentary blogs, positive emotion words were used more by extraverted people while negative emotion words were used more by low conscientious and neurotic people (where these labels are applied based on self-reported judgments). Compared to past work, these same exact effects were found in student writing samples (Pennebaker and King 1999). This suggests that use of emotion words is a strong indicator of self-reported personality dimensions across the domains of blogging and writing samples. Indeed, personality has long been linked to emotional expression (e.g., by Eysenck and Eysenck 1991). The use of affective language has been found to distinguish between authors expressing different emotions (Gill *et al*. 2008a) and some evidence suggests readers are able to detect emotion based on blog text (Gill *et al.* 2008b). It should however be noted that our corpus contained a higher relative frequency of negative emotion words than previous blog corpora analysed in (Nowson 2006).

The effects of emotion word use were only found for commentary entries and not for personal diary entries. This may be because while it is expected that writing related to topics of a personal nature will contain emotion-conveying words, this expectation is not present for commentary content. Thus, when writers *do* use emotion words in commentary it is more discriminative of their personality. Note that the writing corpus used by Pennebaker and King (1999) was based on student essays, which are likely to have greater similarity to commentary entries than to diary entries.

5.2 Blog readers achieve consensus, not accuracy

When reading blogs, people agreed amongst themselves about the personalities of unacquainted blog authors. This agreement was good across all Big Five personality measures based on a variety of statistical measures. Moreover, the presence of high inter-rater agreement corresponds with previous work with zero-acquaintance email judgments (Gill *et al.* 2006) and shows better agreement than in one-to-one chat (Markey and Wells 2002). This implies that blog text presents consistent, readable cues of its author's personality. These personality cues seem to be present in other CMC media as well.

Interestingly, although there was a high level of inter-rater agreement on author personality, author-rater agreement was low. This means that while blog readers agreed amongst themselves about an author's personality, their judgments did not always match the author's self-reported personality.

Nevertheless, readers were able to judge the author's self-reported personality for two of five personality factors: Extraversion and Openness. These effects were small and marginally better than random. Compared with other CMC: Extraversion and Openness were the same two factors identified as having significant target-judge agreement in one-to-one chat room communication (Markey and Wells 2002); Extraversion was accurately judged in email communication (Gill *et al.* 2006); and Openness had the highest target-judge agreement for judgments of personal websites (Vazire and Gosling 2004). These similarities support the idea that some CMC media may present similar limitations in personality discrimination.

5.3 Not all genres are equal

Our work also highlights differences in the perception of blogs between journal and commentary genres. The personalities of bloggers as judged by their journal entries were more introverted, more agreeable and less conscientious than for commentary entries. People who keep personal journals may be viewed as more introverted because the content of these entries is more introspective. Journal topics may also be "warmer" than commentary thereby appearing more agreeable while also appearing less structured or organized than entries meant to teach or inform about a particular topic. Additional research is needed to explore what specific aspects of each of these genres cause these differences in personality judgment.

Another result from this study is that some personality traits were better assessed by reading one blog genre over another. Extraversion and Agreeableness were more accurately judged with journal entries, while Conscientiousness and Emotional Stability were more accurately judged with commentary entries. Although the effects were small, the idea that different genres of blogs influence how well readers are able to judge certain personality dimensions provides further evidence that within the general medium of blogs, different genres warrant specific treatment.

5.4 Bloggers of a feather flock together

Our work offers support that "bloggers of a feather flock together" but with a caveat: readers are more attracted to authors they *think* are similar in personality (particularly those they feel match in Agreeableness and Openness) even though these authors may not be so similar based on their own self-rating. This result seems reasonable as readers would only be affected by their impression of an author's personality rather than the author's own impression of his or her personality. Moreover, the judgments of readers were based on blog text only and without

reference to the reader's own personality self-assessment (i.e., readers could not refer back to their questionnaire sheet as it was collected at the beginning of the experiment).

The result that people prefer to interact online with individuals similar to themselves may not come as a surprise, but our work is one of the first to relate personality effects observable in real life to online social networks such as blogs. The "bloggers of a feather" analysis presented here adds to recent literature suggesting that personality factors influence who decides to participate in online social networks (Ross *et al.*, 2009) by presenting evidence that it also affects how people connect within those networks.

5.5 Limitations

One of the limitations of this research is the use of a student sample to write blogs in an experimental setting rather than using a corpus of previously-existing blogs. Our participants may have experienced different motivations or pressures during writing of their blogs, although a standard office environment and typical blogging interface was used. We do, however, compare word use characteristics between our blog corpus and previous ones and find ours to be largely representative. While we expect our results to be reproducible with existing blogs on the internet, additional work is needed to examine whether this is the case, and to investigate how personality similarity affects online actions (such as commenting and linking).

6. Conclusions

This work investigated the effect of personality in blogging using a two-part experiment: the first in which eight participants wrote blogs and the second in which the resulting blog corpus was read and judged by a different set of 12 participants. The naïve readers were able to assess authors' personality traits with a high level of agreement amongst themselves, irrespective of the author's "true" personality. Blog text therefore painted a clear picture of personality, even though the impression conveyed to readers may have differed from the author's own opinion of him/herself. Results also suggested that a first judgment based solely on a single blog entry may be improved after reading additional entries of different genres by the same author, since certain personality factors are better assessed with diary entries over commentary (and vice versa). This is promising for researchers interested in using natural language processing techniques to characterize blogger personality based on blog text.

Furthermore, we find evidence that readers—being able to agree on author personality—are more attracted to authors whom they believe have similar personalities, offering some support of our hypothesis that "bloggers of a feather flock together." Given that readers consistently agree on a blog writer's personality after reading their text and that this judgment affects how they feel about the writer, the role of personality in blogging and online social interaction may be more important than previously thought. Personality metrics may therefore be useful in supporting online social interaction and should be considered in the design of blog communities, content recommendation systems and viral marketing campaigns where user participation is important. Having provided evidence that the law of similarity-attraction can be applied to blog communication, a natural extension for future studies is to ask: What other real-life social rules regarding personality are manifested online? Understanding these issues will provide insight into how people behave and interact in online social networks and allow for the design of messages and features that account for the personalities of users in those virtual communities.

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Appendix 1: Tables

Table 1. Titles of blog entries.

Author	Titles of commentary entries	Titles of personal diary entries
1	Lust, Caution audio books	My upcoming trip to Mexico Alvin's Wedding
2	SLI-certification means what exactly? DX10 here and gone Working for the government	Don't cops have anything better to do? music DMR Speeding
3	(no title) (no title)	(no title) (no title)
4	Being a Boss vs. Being an Employee Website - Time killer? Canadian Dollar vs. US Dollar	Kids' Fun Coffee time with wife
5	Understanding Real Estate Agents - the bidding war The Canadian Dollar	Making a complaint or letting it go? The cyclist
6	How to Secure a Faculty Position telephone interview citypass, a good choice for tour in Toronto	Toronto Zoo tired of blogging
7	Tokoyo Toronto 's public services systems	Tibet World Trade Center in NY
8	Notes to a Post You Should Understand Iron and Wine (no title) (no title) (no title)	(no title) (no title)

Table 2. Mean relative frequencies (out of 100 words) for LIWC variables in blog corpora of this study and (Nowson 2006).

		Li		Nowson	
LIWC dimension	Examples	M	SD	M	SD
Self-references	I, me, my	6.50	8.16	6.81	1.66
Social words	talk, us, friend	5.92	5.19	5.90	1.75
Positive emotions	happy, pretty, good	2.15	1.57	2.86	0.69
Negative emotions	hate, worthless, enemy	2.35	7.95	1.66	0.78
Overall cognitive words	think, know, consider	6.97	4.43	*	*
Articles	a, an, the	6.73	2.79	6.84	1.51
Big words (> 6 letters)	n/a	17.46	6.51	15.30	2.67

* not listed

Table 3. LIWC factors and simple correlations with author's Big-Five personality scores.

	Big-Five dimension (author personality)				
LIWC dimension	Extraversion	Agreeableness	Conscientiousness	Emotional Stability	Openness
Commentary entries:					
Self-references	0.35	-0.54	0.41	0.15	0.60
Social words	0.50	-0.22	0.68	0.20	-0.21
Positive emotions	0.75* †	-0.65	0.61	0.30	0.36
Negative emotions	-0.56	-0.20	-0.87** †	-0.83* †	0.00
Overall cognitive words	0.48	0.50	0.18	0.23	0.54
Articles	-0.22	-0.01	-0.07	-0.15	-0.93**
Big words (> 6 letters)	-0.23	0.16	0.14	0.09	-0.62
Total length	0.04	-0.17	0.50	0.64	-0.14
Personal entries:					
Self-references	-0.26	-0.06	-0.01	-0.36	0.44
Social words	0.31	-0.05	0.12	-0.22	0.33
Positive emotions	0.42	0.14	-0.10	0.19	0.02
Negative emotions	-0.44	0.10	-0.12	-0.25	0.33
Overall cognitive words	-0.10	0.19	0.23	-0.12	-0.33
Articles	-0.09	0.26	-0.37	0.11	-0.38
Big words (> 6 letters)	0.53	0.39	0.63	0.81*	-0.04
Total length	0.47	-0.21	0.13	-0.21	-0.03

* Correlation is significant at the 0.05 level (2-tailed)

** Correlation is significant at the 0.01 level (2-tailed)

† Correlation was found to be significant and have the same polarity as in Pennebaker and King (1999)

Table 4. Author-rater and inter-rater agreement for personality traits (Kendall's τ correlation).

Big-Five dimension	Inter-rater agreement, W	Inter-rater agreement, τ (with % of sig. reader pairs)	Author-rater agreement, τ
Extraversion	.343**	.218 (54%)	.263†
Agreeableness	.502**	.357 (79%)	-.266†
Conscientiousness	.403**	.273 (69%)	.139
Emotional Stability	.431**	.303 (68%)	.053
Openness	.333**	.276 (40%)	.251†

† significant at p<0.1

** significant at p<.001

Table 5. Correlation between interpersonal attraction and personality differences.

	Reader-author difference		Reader-judgment difference	
Big-Five dimension	τ_b	Sig. (1-tailed)	τ_b	Sig. (1-tailed)
Extraversion	.008	.440	.002	.485
Agreeableness	-.028	.296	-.124**	.007
Conscientiousness	.024	.324	-.061	.110
Emotional Stability	.020	.346	.037	.231
Openness	.003	.478	-.346**	.000
Overall	.017	.365	-.232**	.000

** significant at p<.001

Appendix 2: Figures

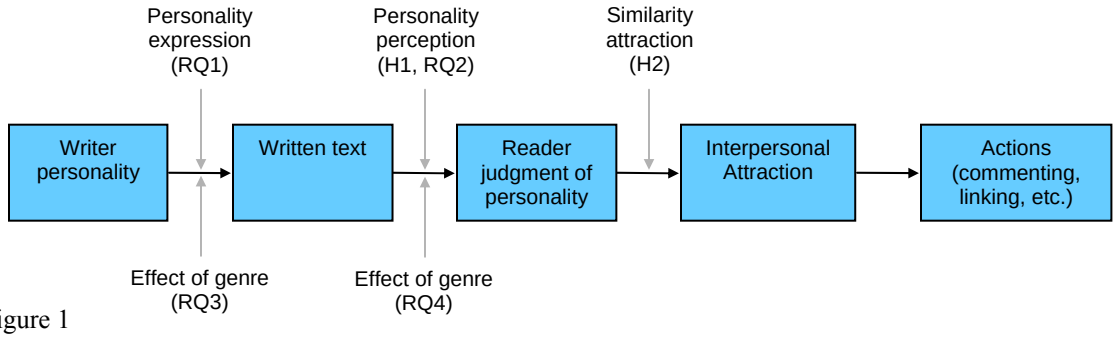

Figure 1

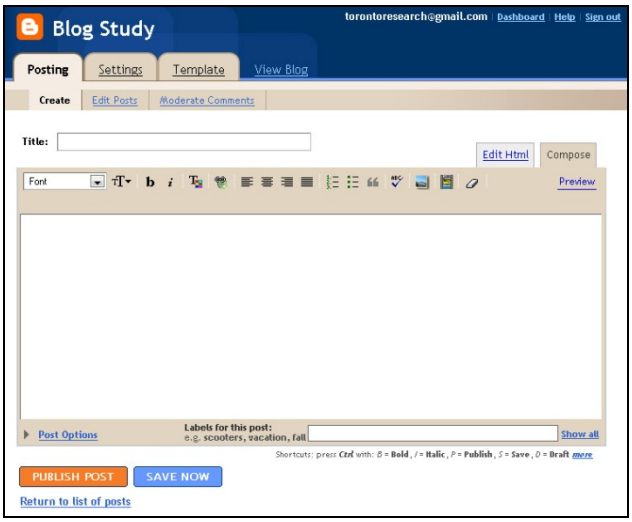

Figure 2

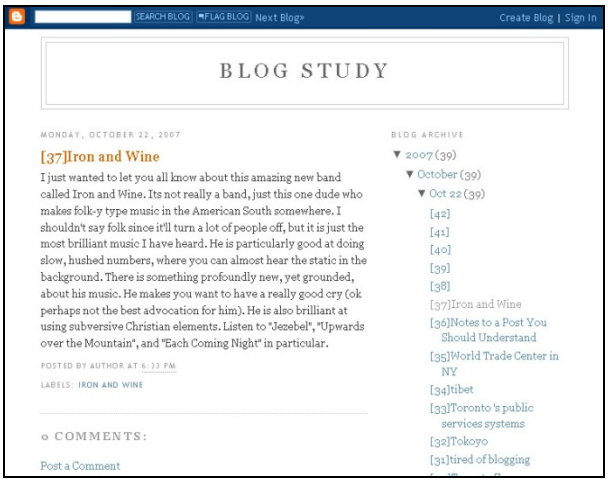

Figure 3

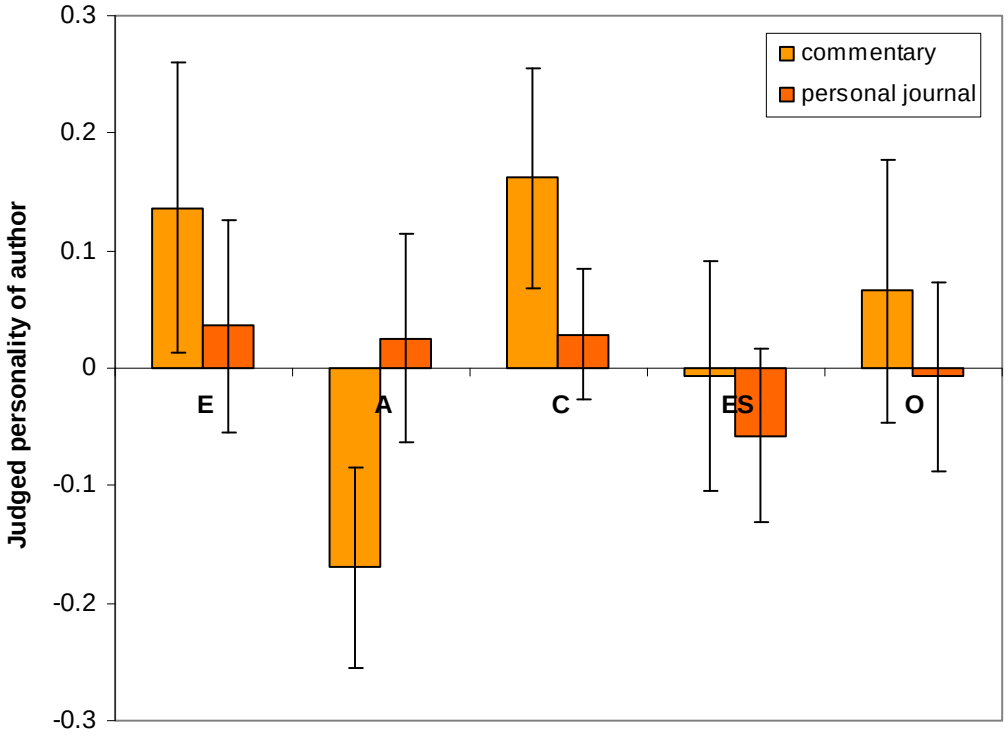

Figure 4

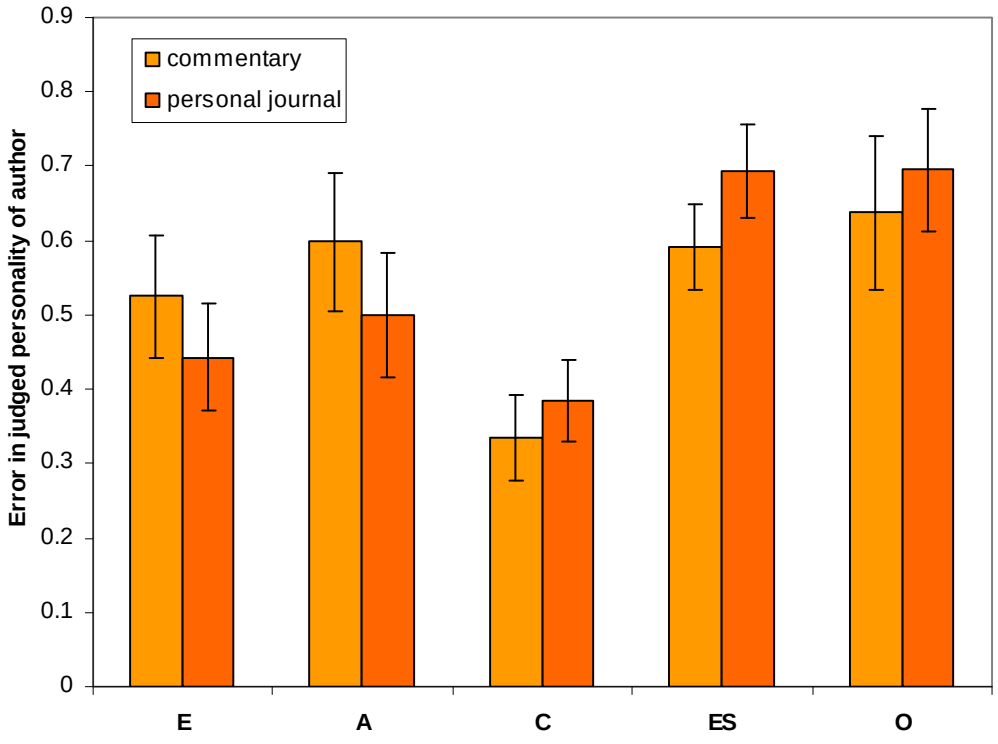

Figure 5