Birds of a feather: How personality influences blog writing and reading

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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 based solely on the text that they wrote. 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 a blog environment, “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 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.

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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 Nielsen Company (2009). Blogs and social networks accounted for almost one out of every 10 min spent on the internet (Nielsen Company, 2009). More than 133 million blogs existed worldwide with nearly 1 million blog posts each day (Sifry, 2008).

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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 (http://technorati.com) and Blo.gs (http://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. In particular, we evaluate whether or not personality can be conveyed adequately in short blog entries, whether this weakened view of personality is sufficient to trigger the normal evaluative responses in readers, and how such factors as blog genre influence this response. 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 unacquainted 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 (http://digg.com), reddit (http://reddit.com), StumbleUpon (http://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), can be related to aspects of the Big Five model (Eysenck and Eysenck 1991, McCrae and Costa 1989). Thus, the Big Five model is used in this work.

We employ a simple framework to model the effect of personality in communication via text (Fig. 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 hypotheses concerning the relationship between personality and blogs shown in (Fig. 1). The next sections describe the background literature that stimulated the development of the hypotheses tested in the studies reported below.

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 involved 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., 2008a,b) and gender (Herring and Paolillo, 2006; Nowson, 2006). Several computational methods have been used to classify personality-based on student essays, conversational recordings and blog entries (Mairesse et al., 2007; 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 findings suggest that blogs contain a range of linguistic characteristics that reflect aspects of a blogger’s personality.

2.3. Perception of author personality

There is evidence that blogs contain linguistic characteristics that reflect aspects of author’s personality, but how well are readers 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). Judges were less accurate in rating Extraversion, Emotional Stability and Agreeableness in synchronous CMC than they were when making those ratings for a face-to-face context (Gosling et al., 2003). In chat scenarios, judges achieved consensus for target’s Extraversion, Agreeableness and Openness traits. However, while their impressions corresponded to 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 author’s self-reported personality well.

To our knowledge the research reported below 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 specific predictions on which traits will be easiest to judge will not...
be made. Although readers’ judgments did not agree with the self-reported personality of authors in email-based experiments, we test whether this is true for blogs, which may better communicate an individual’s personality.

H1. (Personality Judgment Consensus): Blog readers will be able to agree with each other on the personality of blog authors.

H2. (Personality Judgment Accuracy): Personality judgments made by blog readers will agree with the self-reported personality of blog authors.

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 applicable to blogging as well.

H3. (Similarity Attraction): 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 be used not only to distinguish 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.

H4. (Genre Expression): Word use characteristics will differ between personal diary entries and 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.

H5. (Genre Perception): Personality ratings will differ between personal diary entries and commentary entries.

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

3. Methodology

Blog sites extensively employ asynchronous text as their predominant means of communication (although many blogs contain photos or other media). We consequently conducted two related studies: in the first, participants wrote blogs using a web-based interface on a computer; and in the second, participants read and judged the corpus of blogs from the first study.

The study of how people create and respond to online materials such as blogs has inherent methodological challenges. With millions of blogs to choose from and many different types of blogs, how should the content material to be used in the study be chosen? Similarly, which of the many types of blog readers should be selected to assess whether or not they can infer blogger personality from blog content? As these challenging questions do not have a single right answer, a study of this type could have been addressed in a number of different ways. For instance,
we could have chosen to extract material from actual blog entries (using random selection or some other means) and we could have attempted to build some representative sample of readers for those specific blog entries. Conducting a study of that nature (“blogging in the wild”) would have been extremely challenging and would have likely raised important concerns about the sampling strategy used (why were particular blogs or types of people chosen?) and about the interpretability and generalizability of the results.

In the methodology that was actually employed, participants experienced standardized environments that were chosen to be as representative of typical conditions for blog writing and reading as possible. Our study was structured as a lab experiment instead of an analysis “in the wild” because we wanted to test how personality judgments are made at zero acquaintance (i.e., when the reader has no previous contact with the author). With real world data, readers may have prior impressions of a blogger’s personality based on offline acquaintance, previously read posts, other online content (e.g., profile information) or the credibility of a referring site; we wanted the readers to focus entirely on the blog entry text itself, and not on what they knew about the blog, its author, or the hosting organization.

We also chose to have blogs written in a controlled fashion instead of using existing blogs because it allowed us to standardize the blog authoring environment, manipulate the experimental condition (blog genre), gather reliable personality information and obtain empirically reproducible results. While a real world corpus may have provided a wider range of blog entries and a more heterogeneous sample, we chose to isolate a subsection of the potentially huge blog writing population in our methodology so as to address our research questions and mitigate potential mediating factors associated with an uncontrolled sample (e.g., sampling bias, multiple writers, varying writing styles and diction of writers from different countries, issues with reproducibility of results).

As with many behavioural studies, this one used members of the university community as participants. Such a sample would be expected to have relatively high intellect and may therefore be better at detecting personality through textual cues than the general population.

In summary then, this study had participants from a university population make personality judgments of blog entries that were not situated within a surrounding context (e.g., known blog author or known blog). Consistent with the foregoing considerations, the methodology was designed to examine the hypotheses that personality can be detected in blog text and can then influence perceived interpersonal attraction between blog author and blog reader. The results of this study alone were not intended to generalize to inferences concerning the broader population of people and blogs per se, since such generalization will likely require a series of studies looking at different types of blog text and blog readers.

3.1. Study 1

3.1.1. Participants

Eight participants (two female, six male) aged between 21 and 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. Blogger1 was used as the web-based blog-writing interface (Fig. 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).

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 min 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).

1 A web-based blogging application developed by Google (www.blogger.com).
3.2. Study 2

3.2.1. Participants

Twelve participants (six female, six male) aged between 18 and 30 (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. Fig. 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 entry’s genre. Readers were given the entries written by an author separately (rather than being given the complete set of entries together) and did not know which entry belonged to which author. 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 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.

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 and readers were assessed, yielding the summary data presented in (Table 1). 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 2) (note that some entries were not given titles).

As our corpus of blogs was collected experimentally, we compared it with “real” blogs to determine how representative it was. Average blog entry length from our corpus was lower than in some research (e.g., in Herring et al., 2004) possibly due to the presence of multiple short entries, but consistent with excerpt lengths used in other work.

2Available at http://www.liwc.net/liwresearchH17.php
LIWC variables from our corpus and that of Nowson (2006), who used existing blog text from authors, were compared. The corpora were similar in terms of percentage of words that were self-references (6.5 for our study, 6.81 for Nowson), social words (5.92 vs. 5.90) and articles (6.73 vs. 6.84). The largest differences were for emotion words (2.15 vs. 2.86 for positive emotions, 2.35 vs. 1.66 for negative emotions) but even for emotion words the differences between the rates in each corpus were less than a percentage point.

4.3. Personality expression in blog text

Self-reported personality traits of each writer were correlated 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).

<table>
<thead>
<tr>
<th>Author</th>
<th>Commentary entries</th>
<th>Diary entries</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Lust, Caution audio books</td>
<td>My upcoming trip to Mexico</td>
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<tr>
<td></td>
<td>SLI-certification means what exactly?</td>
<td>Alvin’s Wedding</td>
</tr>
<tr>
<td></td>
<td>DX10 here and gone</td>
<td>Don’t cops have anything better to do?</td>
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<td></td>
<td>Working for the government</td>
<td>music DMR</td>
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<tr>
<td>2</td>
<td>Being a Boss vs. Being an Employee</td>
<td>Speeding</td>
</tr>
<tr>
<td></td>
<td>Website-Time killer?</td>
<td>(no title)</td>
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<tr>
<td></td>
<td>(no title)</td>
<td>(no title)</td>
</tr>
<tr>
<td>3</td>
<td>Understanding Real Estate Agents—the bidding war</td>
<td>Making a complaint or letting it go?</td>
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<td></td>
<td>The Canadian Dollar</td>
<td>The cyclist</td>
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<tr>
<td>4</td>
<td>How to Secure a Faculty Position</td>
<td>Toronto Zoo</td>
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<td></td>
<td>telephone interview</td>
<td>tired of blogging</td>
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<td></td>
<td>citypass, a good choice for tour in Toronto</td>
<td>Tibet</td>
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<td></td>
<td>Tokyo</td>
<td>World Trade Center in NY</td>
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<td></td>
<td>Tokyo’s public services systems</td>
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<tr>
<td>5</td>
<td>Notes to a Post You Should Understand</td>
<td></td>
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<tr>
<td></td>
<td>Iron and Wine</td>
<td>(no title)</td>
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<tr>
<td>6</td>
<td>How to Secure a Faculty Position</td>
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<td>7</td>
<td>Tokyo’s public services systems</td>
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<td>8</td>
<td>Notes to a Post You Should Understand</td>
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</tr>
<tr>
<td></td>
<td>Iron and Wine</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(no title)</td>
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4.4. Perception of blog author personality

The Personality Judgment Consensus hypothesis (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. Ratings for all personality factors had agreement significantly better than random at the significance level: $W_E = 0.343$, $\chi^2(38) = 156$; $W_A = 0.502$, $\chi^2(38) = 229$; $W_{ES} = 0.431$, $\chi^2(38) = 197$; $W_C = 0.403$, $\chi^2(38) = 184$; and $W_O = 0.333$, $\chi^2(38) = 152$. Results are shown in the first column of (Table 4). Readers agreed most on the Agreeableness of blog authors, followed by Emotional Stability. Note that after correcting family-wise alpha using Bonferroni adjustment, the agreement on all five personality factors was significant at the $p < 0.01$ level. This indicates that readers were able to achieve consensus on the overall personality model of authors. Note also that all tests carried out for hypotheses 1 through 3 were one-tailed while all tests for hypotheses 4 and 5 were two-tailed.

A value of 0 indicates total disagreement and a value of 1 indicates total agreement.
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’ judgments of personality did not match the self-reported personality of authors. To examine the Personality Judgment Accuracy hypothesis (H2), 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 the Likert-scale measures and the possibility of multiple tied ranks if similar ratings are given. The correlations for Extraversion (τ = 0.263, p = 0.085), Openness (τ = 0.251, p = 0.099) and Agreeableness (τ = −0.266, p = 0.084) were modest but non-significant, and in particular, author-reported and reader-reported ratings of Agreeableness were negatively correlated.

Table 5 presents representative examples of blog entries that readers judged to strongly favour one end of each of the Big Five personality dimensions. These excerpts give a general sense of the types of entries that produced strong judgments for each of the dimensions. They also allude to some of the word use characteristics that may have influenced the judgments; for example, the sample extravert text contains the position emotion words “great” and “fun” while the introvert text contains no positive emotion words but does contain the negative emotion word “complaint.”
Table 5
Excerpts from blog entries judged by readers to strongly exhibit Big Five personality dimensions.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Extrovert: (no title)</th>
<th>Agreeableness: Iron and Wine</th>
<th>Introvert: Making a complaint or letting it go?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diving is a great experience that I would recommend to everyone</td>
<td>I just wanted to let you all know about this amazing new band called Iron and Wine. Its not really a band, just this one dude who makes folk-y type music in the American South somewhere. I shouldn’t say folk since it’ll turn a lot of people off...</td>
<td>Does you doctor routinely make you wait? Mine does. Have you ever had a contractor not do something that you thought was in the contract? I have recently had both these experiences and found it easy to let it go but also...</td>
<td></td>
</tr>
</tbody>
</table>

Conscientiousness: telephone interview
A lot of research on the committee background is necessary for the telephone interview. Basically, I browsed through the websites of the committee members for this purpose. Based on this information, I thought over the possible questions that they... | Emotional Stability: citypass, a good choice for tour in Toronto
A citypass for Toronto includes 6 sites for a tourist: CN Tower, Casa Loma, Ontario Science Center, Royal Ontario Museum, Hockey Hall of Fame, and Toronto Zoo. This tour package costs only < $60, while the total prices for the above 6 sites, given tickets bought separately, cost double... | Unconscientious: Website—Time killer?
Now I found I am using more and more time over the internet. Browsing the news, chatting with friends, go to my favorite forum to see the posts and join in the discussions. It gives me nice feeling some time, with exchanging ideas and having more “virtual” friends... |

Openness: (no title)
Diving is a great experience that I would recommend to everyone. I went diving last summer and I learned how to do it after 30 h of training. "TRAINING WASN'T AS FUN" You might ask why I recommend it then!!!... | | Mr. Sarkozy should just die.

4.5. Similarity attraction

The Similarity Attraction hypothesis (H3) 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 6. No significant correlations with attraction were found for reader–author difference. For reader-judgment difference, however, the personality traits of Agreeableness ($\tau_b = -0.124, p = 0.007$, Kendall, pair-wise, one-tailed) and Openness ($\tau_b = -0.346, p < 0.001$) were found to significantly correlate with a reader’s attraction to the author. Note that after correcting family-wise alpha using the Bonferroni adjustment, both these effects are significant at the $p < 0.05$ level. The overall reader-judgment difference was also found to be significantly correlated with attraction ($\tau_b = -0.232, p < 0.001$). 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 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 the Similarity Attraction hypothesis (H3) is partially supported.

Table 6
Correlation between interpersonal attraction and personality differences.

<table>
<thead>
<tr>
<th>Big-Five dimension</th>
<th>Reader–author difference ($\tau_b$, Sig. (1-tailed))</th>
<th>Reader–judgment difference ($\tau_b$, Sig. (1-tailed))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraversion</td>
<td>0.008 0.440</td>
<td>0.002 0.485</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>-0.028 0.296</td>
<td>-0.124 0.007</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>0.024 0.324</td>
<td>-0.061 0.110</td>
</tr>
<tr>
<td>Emotional Stability</td>
<td>0.020 0.346</td>
<td>0.037 0.231</td>
</tr>
<tr>
<td>Openness</td>
<td>0.003 0.478</td>
<td>-0.346 0.000</td>
</tr>
<tr>
<td>Overall</td>
<td>0.017 0.365</td>
<td>-0.232 0.000</td>
</tr>
</tbody>
</table>

**significant at $p < 0.001$.**
4.6. Influence of blog genre

With respect to the Genre Expression hypothesis (H4), word use was not found to differ 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. Considering each LIWC dimension independently, personal journal entries appeared to contain significantly more self-references \((M = 9.97, SD = 2.33)\) than did commentary entries \((M = 3.97, SD = 0.492)\), \(F(1,7) = 7.354, p = 0.030\), two-tailed, as well as tending to have fewer big words \((M = 14.7, SD = 1.48)\) than commentary entries \((M = 19.1, SD = 1.44)\), \(F(1,7) = 4.69, p = 0.067\); but with the Bonferroni adjustment of alpha level, none of the effects were found to be significant.

With respect to the Genre Perception hypothesis (H5), we found that participants’ ratings of personality differed between the diary and commentary genres. We conducted a similar ANOVA as for H4, 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 \((F(1,11) = 13.5, p = 0.004)\), more agreeable \((F(1,11) = 12.7, p = 0.004)\) and less conscientious \((F(1,11) = 12.6, p = 0.005)\). This is illustrated in Fig. 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. After correcting alpha levels using the Bonferroni adjustment, these effects are significant at \(p < 0.05\).

Aside from the five hypotheses that were tested, some additional (exploratory) post-hoc analyses were carried out and are noted here. Mean difference between the self-reported personality of the author and reader’s judgment for each of the Big Five traits was compared between genres. Extraversion \((F(1,11) = 9.88, p = 0.009)\) and Agreeableness \((F(1,11) = 5.25, p = 0.043)\) were more accurately assessed with personal journals (i.e., readers achieved lower error in judgments), while readers’ judgments of Conscientiousness \((F(1,11) = 11.0, p = 0.007)\) and Emotional Stability \((F(1,11) = 26.3, p < 0.001)\) 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). Accounting for alpha levels using the Bonferroni adjustment, the difference in Agreeableness ratings was not significant, although all other effects were significant at the \(p < 0.05\) level (Fig. 5).

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 by 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.

5.2. Blog readers achieve consensus but not agreement with authors

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 author’s self-reported personality.

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 writing may also be “warmer” than commentary writing thereby appearing more agreeable while also appearing less structured or organized than entries meant to teach or inform about a particular topic.

Another result from this study is that some personality traits were better assessed by reading one blog genre over another. In particular, readers’ assessments of Extraversion had better agreement with the authors’ self-assessments when based on journal entries versus commentary entries; likewise, readers’ ratings of Conscientiousness and Emotional Stability agreed better with the authors’ self-reported ratings when based on commentary entries versus journal 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.

These results suggest that the consistent picture readers form of a blog author’s personality may be affected by the inter-related factors of linguistic cues in the blog and blog genre. Indeed, different categories of blog writing may invoke different topics and word use, although this is an issue that requires additional research.

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 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 they believe to be similar to themselves may not come as a surprise, especially since previous work has established that readers are able to form reliable impressions of author personalities based on text samples such as college admissions essays (Hatch et al., 1993), and that in general, the act of writing is aligned with one’s identity (Ivanic, 1998). However, blogs differ from other written forms in several important ways: they are typically anonymous, they do not have pre-imposed topics (the writer writes about whatever topic they choose) and there is neither a set structure nor a conventional vocabulary as in email or essay-writing. On one hand, these attributes may make blogs a medium in which people portray themselves differently than they actually are; on the other, it may lead people to express their true selves more than in real-life or with other forms of writing. Given the distinctions present in the blog medium, our finding that a personality-based social rule applies to the blog environment is not a tautological one.

The “bloggers of a feather” analysis presented here also 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 and future work

One of the limitations of this research, as noted in the methodology section (Section 3), is the use of a student sample to write blogs in an experimental setting rather than using a corpus of previously existing blogs. While this methodology allowed participants to experience consistent circumstances in the writing and reading of blogs within a standardized environment and with a standardized blog interface, it limits the generalizability of the results to blogs, and blog readers, in general. Thus, while the present
results show that author personality can be inferred from brief samples of blogging text, and that such inferred personality can influence reader–author attraction, the generalizability of this result to a wide range of blogs and readers requires further research.

Our expectation that the present results may be generalizable is supported to some extent by the fact that word use characteristics between our blog corpus and previous corpora were found to be similar (although our entries were shorter than some previous corpora). Moreover, participants wrote about a wide variety of topics (as would be the case in the actual blogosphere) and as indicated by the topic list, only one entry pertained specifically to academia (“How to Secure a Faculty Position”). However, future research should take into account issues related to real world data, such as blog interface variation, categorization of blog genre, collection of personality and demographic information and sampling bias in the selection of blogs.

While our study focused on a small, relatively generic student sample and did not extensively evaluate the effect of individual differences (apart from personality), different author and reader characteristics may affect the perception of personality traits through blogs. As an example, it is possible that participants for this study were particularly astute in perceiving author personality by virtue of their education level (all our participants were affiliated with the University of Toronto) and that less educated readers would have greater difficulty distinguishing the personality traits of authors. Although segmentation of a huge population of blog writers is a necessary limitation of this study, additional work should be done with separate demographics to investigate the potential mediating effect of individual differences such as cultural background, age, education level and profession. Indeed, writing styles and diction vary across populations, cultures, etc.

The research reported in this paper shows that personality can be expressed and perceived at the level of an individual blog entry, even when the entry is relatively short, and that personality and the law of similarity-attraction may influence the formation of online social networks. This research calls for additional work that examines how personality and interpersonal attraction influences specific networking actions in blog communities, such as linking, commenting and “friending”. In addition, our investigation of the two primary blog genres reveals that journal entries and commentary entries exhibit different personality perception and judgment characteristics, demonstrating the need for future research to explore what specific aspects of each of these genres affect writing style and personality assessment.

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, regardless 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.

A number of limitations were also noted in this research that affect the immediate generalizability of the results. Further research is needed to confirm that people, in realistic blog reading contexts, can infer the personality of blog authors and can be influenced in how much they like the author based on that inference. It would also be interesting to know if people who skim through large numbers of blog entries can still detect personality differences and be influenced by them. The issue of blog genre and its relation to personality also needs further explication: since genre and author personality both influence the resulting blog text, one could expect genre effects to obscure and amplify the effects of author personality on blog text.

In spite of the limitations noted above, this research has demonstrated the role that personality can have in affecting how people respond to blogs and their authors. While it remains to be seen how broadly this personality effect applies, it has the potential to have a large impact on blogging practice. In addition, 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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