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Personality in Cyberspace: Personal Web Sites as Media for Personality Expressions and Impressions

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This research examined the personality of owners of personal Web sites based on self-reports, visitors' ratings, and the content of the Web sites. The authors compared a large sample of Web site owners with population-wide samples on the Big Five dimensions of personality. Controlling for demographic differences, the average Web site owner reported being slightly less extraverted and more open to experience. Compared with various other samples, Web site owners did not generally differ on narcissism, self-monitoring, or self-esteem, but gender differences on these traits were often smaller in Web site owners. Self-other agreement was highest with Openness to Experience, but valid judgments of all Big Five dimensions were derived from Web sites providing rich information. Visitors made use of quantifiable features of the Web site to infer personality, and the cues they utilized partly corresponded to self-reported traits.

Keywords: personality perceptions, self-observer agreement, self-presentation, personal Web site, Internet

Referring to Jean Paul Sartre's famous statement that hell is other people, Rothstein (1996, p. D3) wrote: "Sartre had it only partly right: Hell is [. . .] other people's home pages." It is not uncommon in popular and even scientific outlets (e.g., DiGiovanna, 1996) to describe personal Web sites as a garbage depository, filled with useless information that mainly serves the purpose of demonstrating the owner's vanity. Moreover, some authors speculate that owners of personal Web sites use the medium to act out their exhibitionistic narcissistic tendencies (e.g., Lemay, 1996), whereas others present evidence that computer-mediated communication is particularly attractive to those low in Extraversion and Emotional Stability (Hertel, Schroer, Batinic, Konradt, & Naumann, 2005, whose research was on e-mail communication, not personal Web sites). Still another perspective views the Internet in general (Turkle, 1995), and personal Web sites in particular (e.g., Wallace, 1999), as a playground for postmodern personalities, where people can create and experiment with multiple identities.

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Obviously, personal Web sites have a special appeal to the individuals who are willing to invest time to create and maintain them, to some journalists, and to researchers interested in identity construction and the expression of personality. To the owners, a personal Web site offers an unprecedented opportunity to present almost anything they want to in an inexpensive, highly flexible mass medium to a potentially world-wide audience (e.g., Döring, 2002; Schütz, Machilek, & Marcus, 2003). Although there is no reliable statistic available on the number of personal Web sites, it is estimated that there are millions in a single European country like Germany (see Schütz & Machilek, 2003). For personality research, personal Web sites may be described as a highly controllable environment in which owners can deliberately create an identity to be presented to others (Vazire & Gosling, 2004). In terms of Mischel's (1977) distinction, personal Web sites can be seen as a weak situation particularly prone to the expression of personality traits (Schütz et al., 2003). Given all of these partially contradictory speculations, and the potential scientific value of studying personal Web sites, there is surprisingly little systematic research on personal Web sites in general, and on the personality of their owners in particular. Reviews of personal Web site research identified approximately 40 empirical studies in the social sciences on the topic, including theses and unpublished reports (Döring, 2002; http://www.machilek.de/forschung.html). Many of these studies have addressed merely descriptive variables like prevalence and owners' demographic characteristics. Most of the theory-driven studies have relied on small (*N*s are typically below 100, often with fewer than 30 cases) and highly preselected convenience samples (drawn from university directories or specific groups of Internet users). Furthermore, the studies have mostly employed qualitative research methods (for reviews, see Döring, 2002; Schütz & Machilek, 2003). Although these approaches have revealed a number of interesting insights, they are not very infor-

mative about the personalities of Web site owners and about the question of how they are perceived by people visiting the Web site.

As far as we know, there are only two studies to date that have addressed the topic of personal Web sites from a quantitative trait perspective on personality. In a German sample, Machilek, Schütz, and Marcus (2004) compared a relatively large ($N = 266$) sample of personal Web site owners to various groups of non-Web site owners on the Big Five dimensions of personality, narcissism, self-monitoring, and self-esteem. They found that, compared with the general adult population, Web site owners scored lower on Extraversion, Agreeableness, and Conscientiousness, and higher on Openness to Experience. Contrary to popular beliefs, Web site owners did not generally differ from comparison groups on narcissism, self-esteem, or the protective form of self-monitoring, but scored lower on assertive self-monitoring. The generalizability of these partially counterintuitive results is somewhat restricted, however, because Machilek et al. (2004) were not able to fully account for demographic differences that might present alternative explanations. In another study ($N = 79$ to 87) on American Web site owners, Vazire and Gosling (2004) investigated several sources of ratings on the five-factor model of personality. They found considerable agreement between observers' ratings of owners' personalities on the basis of Web site content and both the owners' self-reports and personality ratings by acquaintances across all five factors. Openness to Experience was rated with the highest validity[1] by Web site visitors unacquainted with the owners. The authors concluded that personality impressions formed on the basis of personal Web sites are very accurate compared with other sources used in zero-acquaintance studies of personality (e.g., Borkenau & Liebler, 1992).

In summary, conclusions from previous research on personal Web sites appear somewhat ambiguous. On one hand, there is evidence that personal Web sites can be a highly attractive medium for the study of personality perceptions and self-presentation—one that is at the same time rich in information, cost-effective to investigate, and rising in popularity. On the other hand, there is still concern that specifics of the population of Web site owners may limit the generalizability of results to broader populations. At present, this concern cannot be ruled out with confidence. The present research thus aims at clarifying the two issues by partially replicating earlier results on a larger scale and extending that work to a number of previously unresolved issues. Our objectives and methodological approaches are detailed in the following section.

Present Study

The present study had three major objectives and used three samples and three data collection methods. However, the three objectives were partially addressed with multiple samples, methods, or both. In order to avoid confusion, we will first give an overview of the objectives, samples, and the methods used, as well as our rationales. Then the three research objectives, as well as the methods, are described in more detail.

As our first objective, we wanted to examine differences between Web site owners and the general population with respect to a broad range of personality characteristics. Unlike most previous research, we used random sampling and controls of demographic variables to ensure representativeness and comparability, and we drew considerably larger samples of Web site owners than any previous study. Data on this part of our research are based on self-reports only, but used all three samples. A large random sample (according to the chronology of data collection referred to as Sample 3) was drawn in addition to those described below to create a broader basis for comparing Web site owners to others.

Second, we partially replicated Vazire and Gosling's (2004) research on self-observer rating agreement in a larger sample from a different culture. We conducted an observer rating study (referred to as Study 1 from here on) based on a subset of a sample of Web sites drawn at random (referred to as Sample 1). In addition, we were interested in the impact of the richness of information provided on self-other agreement, a question not addressed previously. For this purpose, we replicated our own observer rating study with a sample of distinctive Web sites. Outstanding pages were drawn by hand to address the question whether sites that are particularly well-designed and rich in information would be more informative with respect to the owner's personality and thus yield higher self-observer agreement. This sample of distinctive Web sites is referred to as Sample 2 and the respective observer rating study as Study 2. In this study, we used two sets of raters and two sets of instruments in order to rule out potential artifacts in Study 1. We also matched a subsample from the Web sites in Sample 1 with respect to gender and age to the distinctive sites to enhance internal validity.

Third, and finally, we wanted to assess how an owner's personality translates into objective features of the Web sites and how these features, in turn, affect observer ratings of personality traits. Hence, we added objective content analysis of the Web sites as a third source of information beyond self- and observer ratings. Measurement of objective Web site content was also not used previously in personality research in this domain. Data on this research question are based on the same samples (part of Samples 1 plus 2) as investigated in the two observer rating studies just described.

Personality Profile of Personal Web Site Owners

First, we are trying to shed light on the personality profile of owners of personal Web sites. One aspect is mostly exploratory in nature and refers to the question as to whether personal Web site owners differ from the general population on general dimensions of personality. We used the Big Five or five-factor model (FFM) of personality[2] to address this issue. The second aspect is to compare Web site owners with non-Web site owners on a number of traits related to the self and to self-presentation. This aspect is more closely linked to the tradition of much of the earlier literature on personal Web sites and their owners. Thus, some more or less speculative assumptions were subjected to empirical tests here. In particular, we tested the contentions that (a) Web site owners, on

[1] This research, just like ours, draws on Brunswik's (1956) terminology and therefore uses the term 'cue-validity.' We use this term in the present article to stay consistent with the research we build on. We add, however, that the use of self-ratings as validation criteria may be argued on several grounds.

[2] We use the terms "Big Five" and "FFM" interchangeably throughout this article, although we are well aware that these terms refer to different traditions of personality theory and measurement. Such questions, however, are beyond the scope of the present article.

average, score atypically high on narcissism, (b) Web site owners tend to possess a relatively unfavorable self-concept or low self-esteem, especially on social aspects, which makes them prone to avoid face-to-face interactions, and (c) personal Web sites are a medium particularly attractive to high self-monitors who tend to adapt to different contexts and present different images of the self to different audiences.[3] Although each of these assumptions appears to possess some plausibility if viewed in isolation, they are based on fairly different considerations and, obviously, do not fit together very well. Especially contradictory are Contentions a, which is mostly based on common sense, and b, based on the notion of the attractiveness of computer-mediated communication to socially insecure people, as narcissism typically shows a moderately positive correlation with self-esteem (e.g., Morf & Rhodewalt, 2001). Hypothesis c can be derived from theories of identity construction and postmodern personality, which had a substantial impact on prior research on personal Web sites (e.g., Döring, 2002). In light of the findings by Machilek et al. (2004), however, we hypothesized that only Contention b would be supported empirically.

Self-Other Agreement

Our second main objective was to replicate and extend findings by Vazire and Gosling (2004) on the accuracy of personality impressions based on personal Web sites. To be precise, we actually did not perform a replication since the present study was planned and partially conducted before we had access to the research of Vazire and Gosling (2004). Nevertheless, the present study is similar to that of the latter authors in that both obtained self-reports as well as observer ratings of the five factors of personality from student raters unacquainted with the Web site owners. Unlike Vazire and Gosling, we did not collect acquaintance ratings or owners' ideal self-ratings, but we systematically varied Web site content instead. Controlling for owners' and observers' demographics as well as method (rating format) effects, we expected higher self-observer agreement with Web sites that are well-designed and rich in information than with randomly drawn Web sites. In experimental research on personality perceptions, richness of information is typically manipulated systematically (e.g., by varying audiovisual cues). Laboratory research established effects of such variables with internal validity, but did not address the question as to what extent variation in naturally occurring self-presentational behavior affects self-observer agreement. In fact, heterogeneity of content appears to be one of the most pertinent features of personal Web sites (e.g., Papacharissi, 2002a; Schütz et al., 2003). While all personal Web sites consist almost entirely of identity claims under full control of the owner (Vazire & Gosling, 2004), the value of these claims as sources of information may depend on how owners make use of their control.

Web Site Content Analysis

As our third objective, we were interested in a more detailed examination of Web site content as a link between owners' expression of personality and visitors' impressions of the owners. This part of our research draws on the work of Gosling, Ko, Mannarelli, and Morris (2002; cf. also Funder, 1995), who adapted Brunswik's (1956) lens model to the formation of personality impressions. Gosling et al. (2002) posit that features of a personally created environment can be seen as expressions of the personality of the individual to whom the environment belongs, on the one hand, and as a sample of cues another person might use to infer the owner's personality, on the other hand. Thus, correlations between environmental features and personality impressions can provide evidence of cue utilization by observers, and correlations between those features and owners' self-reported personality can be taken as indicating cue validity. Comparisons between these two sets of correlations allow us to examine the correspondence between the impact of personality on external environments (cue validity) and the impact of the environment on impression formation (cue utilization). Gosling et al. (2002) have applied their model to physical environments, but, as Vazire and Gosling (2004) point out, the same procedures may be extended to virtual environments that are intentionally created as a more direct expression of one's identity.

In their research on rooms, Gosling et al. (2002) relied on observers' subjective judgments (e.g., "clean," "stylish," "modern," "organized," etc.). In contrast to that procedure, we coded mostly countable features (e.g., number of photographs showing the owner, number of links to other persons' Web sites, cf. method section), which are to be more independent of coders' judgments. The background of this decision was that we wanted to obtain a truly independent third source of information. However, a number of subjective Web site ratings were coded as well. On the basis of the content analysis, we addressed the following research questions: (a) What are the objective bases of impression formation on the part of naïve observers of personal Web sites (cue utilization)? (b) How do personality traits translate into the content of personal Web sites (cue validity)? and (c) Do observers utilize valid cues to infer personality (correspondence between the two sets of correlations)?

Methods

Samples

Web site owners. Self-report data were collected from three different samples of Web site owners. Sample 1 was drawn at random from the population of personal Web sites in the German language, using a multistage procedure based on an Internet search engine (see Schütz & Machilek, 2003, for details). A personal Web site was defined as a Web site operated by a single person who predominantly presents information about his or her private identity (cf. Storrer, 1999), thereby excluding commercial sites as well as mainly job-related personal Web sites like those describing research interests and listing publications by university faculty. Of the 685 potential participants who were successfully contacted via e-mail, we obtained questionnaires completed online from 281 persons (41%). To guarantee data security, respondents were provided with an individual code number they had to type in before they could submit the completed survey. As several participants incorrectly wrote their code number, only 274 questionnaires could be matched with their respective Web sites. Thirty-

[3] As an anonymous reviewer pointed out, the opposite hypothesis is also plausible. While research on Internet services such as chat or multiuser dungeons (MUDs) may be a forum to play with identities, a personal Web site is usually more stable over time and may thus be very attractive to low self-monitors, who present themselves as they perceive themselves and do not show much variation.

four of the respondents (12.4%) were women. Age was coded as a categorical variable, yielding the following distribution: 18 persons (6.6%) who were 19 years or younger; 51 (18.6%) between 20 and 24; 63 (23%) between 25 and 29; 83 (30.3%) between 30 and 39; 40 (14.6%) between 40 and 49; 13 (4.7%) between 50 and 59, and 6 (2.2%) age 60 or older. The median was 30.4 years. Of the respondents providing additional demographic information, only 21% were enrolled at universities, whereas 63% were currently employed. The median monthly net income was 1.732 €.

For Sample 2, the second author selected 71 personal Web sites on the basis of extensive Internet searches. The sites were chosen on the grounds that they were distinctive with respect to the following criteria: a) they presented extensive and exceptionally rich information, though not necessarily on the owner, b) they heavily used the various features available in electronic media (e.g., providing a guided virtual tour of the owner's apartment). The judgment of distinctiveness was made subjectively after screening hundreds of personal Web sites. Thirty-six of the owners originally contacted via e-mail delivered usable questionnaires and are included in this sample. In contrast to the random sample described above, most (25 of 36) of the participants in the selected sample were women, and the median age was 24.2 years. Sample 2 also contained a larger proportion of students (38%), whereas the median net income was 1.128 € per month. Our approach to control for these potential confounds is described in the procedure section.

Whereas Samples 1 and 2 were recruited and surveyed during 2002, Sample 3 was drawn approximately 2 years later and surveyed in December 2004. This sample was drawn to replicate the findings on question one (personality profile of owners) in a larger sample. In this sample, we also tested a number of research questions on the impact of various measures taken to improve response rates. Compared to Sample 1, length of survey was manipulated by dropping large parts of the questionnaire (including some personality tests) in one condition, salience was varied by framing the research more generally without mentioning personal Web sites in the experimental group, and the incentives of offering participation in a lottery and personal feedback were dropped in other conditions. Besides systematic variations on these variables, the sampling procedure was basically the same as that with Sample 1 described previously, except that we used multiple search engines this time because the ranking criteria for hits used by the former search engine had been changed in a way that made random sampling no longer possible. The number of Web site owners contacted was 2,152; usable questionnaires were obtained from 562 persons. Since length of survey was varied within the sample, data on most of the specific personality variables is available from only 226 participants. Ninety-five of those 555 persons whose gender is known were women (17%), the median age was 31.6 years, and the median net income was 1.826 € per month. Nineteen percent of the respondents were university students, and 62% were working adults. These figures are all very close to those reported for Sample 1.

Response rates in Samples 1 and 2 were higher than in previous research that usually reported rates between 20 and 35% (e.g., Misoch, 2004; Papacharissi, 2002b), whereas Sample 3 fell into that typical range. The drop in response rates between 2002 and 2004 is in line with a general trend of decreasing participation in survey research (Sheehan, 2001; Curtin, Presser, & Singer, 2005) In addition, in Sample 3 we varied some features of the survey that were uniform in Sample 1. As people reluctant to participate in surveys may be less agreeable and open to experience than participants (B. Marcus & Schütz, 2005), we tested the possibility that lower response rate led to lower average values on these dimensions in Sample 3. A post-hoc comparison between Samples 1 and 3 showed no significant differences with respect to Big Five variables (all ds $< .20$, all ps $> .05$) and, as already mentioned, demographics were also highly similar across samples. We therefore assume that different response rates did not affect our results substantially.

Web sites and raters. All Web sites belonging to Samples 1 and 2, respectively, were stored to hard disks to make them available for later research. Observer ratings of owners' personalities were obtained on all Web sites in Sample 2 and on a subsample ($N = 186$) of Web sites in Sample 1. The main problem that reduced sample size at this stage was that many mirrored Web sites did not run stably at the campus computer pool where the observer ratings were collected. Subsequent t tests revealed that owners whose Web sites had to be dropped did not differ significantly from those retained on any of the self-reported personality variables.

In Study 1, the Web sites were presented at a campus computer pool to a group of university students ($N = 119$) who received course credit for their participation and were unacquainted with the target persons. Mean age in this group was 22 years ($SD = 3.3$) with a range of 18 to 40. Most observers were female (79%). Each Web site owner was rated by five independent observers. Raters received course credit for participation and were permitted to participate in up to five sessions.

In Study 2, a second independent set of ratings was obtained for all 36 owners in the distinctive sample, and for a matched sample of the same size drawn from Sample 1 (matched with respect to age and gender), to control for possible artifacts. The two samples were compared to see whether distinctive sites were better sources of information than average sites. The additional ratings were performed by a second set of 16 student raters (mean age: 24, $SD = 6.3$), with eight males and eight females and a different rating procedure (see below).

Instruments and Procedures

Owners' self-reports. All potential participants were initially contacted via e-mail to inform them about the objectives of the study and to obtain consent. Approximately 10 days later, they were sent another e-mail containing the link to the online questionnaire and an individual code number, as described above. Reminder notices were sent out 2 weeks after the second contact to nonrespondents. All Web site owners, except a subset of Sample 3, received the same online questionnaire. The survey began with a set of items pertaining to the individual Web site and a brief test of Internet competence. The second part contained the personality questionnaires, followed by a set of demographic items. Finally, participants were asked if they were interested in feedback and willing to participate in follow-up research. We herein report details on the personality tests only (see Machilek et al., 2004, for a more complete description). The entire survey consisted of 359 items. In a subsample of Sample 3, however, survey length was substantially reduced to 91 items, with the result that personality data are available only on the Big Five dimensions and narcissism for this group.

The dimensions of the FFM were measured by the *Big Five Inventory* (BFI; see John & Srivastava, 1999; German version by Lang, Lüdtke, & Asendorpf, 2001). The BFI measures the dimensions of Neuroticism, Extraversion, Agreeableness, Openness to Experience, and Conscientiousness, with scales consisting of 7 to 10 items each. Responses are scored on 5-point Likert-type scales. The BFI shows high convergent validity with other measures of the FFM (John & Srivastava, 1999). Narcissism was measured with a shortened 15-item version of the 40-item *Narcissistic Personality Inventory* (NPI; Raskin & Terry, 1988; German version by Schütz, Marcus, & Sellin, 2004), which is designed to measure subclinical narcissism as a personality trait.[4] Items in the NPI have a dichotomous forced-choice format, with one statement from each pair representing narcissism. Self-esteem was measured with a German adaptation of Fleming and Courtney's (1984) scale, the *Multidimensionale Selbstwertskala* (MSWS; Schütz & Sellin, in press), which contains 37 items scored on 7-point Likert-type scales. The MSWS yields a total score on

[4] The NPI-15 includes a broad range of facets of narcissism with an emphasis on the aspect of authority. It consists of six items from Raskin and Terry's (1988) subscale "authority," three from "superiority," two from "exhibitionism," two from "entitlement," and one each from "self-sufficiency" and "exploitativeness."

global self-esteem as well as seven subscale scores: self-regard (emotional self-esteem), confidence in social interactions, acceptance of critique (the latter two comprising social self-esteem), academic and job-related self-esteem (these two comprising performance-related self-esteem), physical attractiveness, and physical abilities (these two comprising physical self-esteem). Self-presentation styles initially introduced by Arkin (1981) were measured with German versions of the *Revised Self-Monitoring Scale* and the *Concern-for-Appropriateness Scale* (RSMS and CAS; Lennox & Wolfe, 1984) created by Laux and Renner (2002). We used the RSMS subscale "Ability to modify self-presentation" to measure acquisitive self-monitoring that aims at winning social approval. The CAS subscale "Attention to social comparison information" was used to assess protective self-monitoring that is characterized by a desire to avoid social disapproval. Each subscale comprises six items scored on 4-point scales of agreement.

Observer ratings: Study 1. Observers were instructed by a test administrator to view each Web site with the major objective of forming an impression of its owner's personality. The sequence in which the five Web sites within each set were presented to the five observers in the first study was counterbalanced to avoid sequence effects. Exposure time to each Web site was restricted to 5 minutes, which, after extensive pretesting, was deemed a reasonable compromise between cost-effectiveness and validity considerations. Immediately after each Web site was presented, an online questionnaire concerning characteristics of the Web site and its owner was administered. Here, we present results only on the observers' perceptions of the owners. Since the raters were not acquainted with the targets, observer ratings represent a variant of the zero-acquaintance or minimal information paradigm in personality assessment (e.g., Borkenau & Liebler, 1992, 1993; Kenny, 1994).

Given the relatively large number of Web sites to be rated, considerations of cost-effectiveness forced us to collect observer ratings with instruments that were shorter than the self-report measures. We chose brief adjective scales to measure the Big Five dimensions of personality. Since a recently developed and validated 10-item adjective measure of the five-factor model (Gosling, Rentfrow, & Swann, 2003) was not available at the time the present study was planned, we adopted our indicators from lists of marker variables presented by Ostendorf (1994) and adjectives included in the BFI items. The following terms were chosen after pretesting: "anxious" and "moody" for Neuroticism; "sociable" and "uncommunicative" (reverse-scored) for Extraversion; "creative," "intellectual" and "broadly interested" for Openness to Experience; "likable" and "cold" (reverse-scored) for Agreeableness; and "conscientious" and "meticulous" for Conscientiousness. Observers also rated a number of other traits not reported in detail here. Items were rated on a 5-point Likert-type scale ranging from "not at all true" to "absolutely true." Mean interrater consensus per Web site (calculated as the average measure interrater correlation across the five raters with regard to all items) was $ICC_{[5,1]} = .78$ in the full sample (.77 in Sample 1, and .85 in Sample 2, respectively).

Observer ratings: Study 2. The procedure for conducting the follow-up study on Sample 2 and the subset of Sample 1 was the same as described above. However, the two studies differed with respect to the sample of observers, the sample of Web sites, and the instruments administered. First, all Web sites in Study 2 were rated by an equal number of men and women to rule out possible gender effects. The number of raters per Web site was increased to eight, and each rater viewed 16 Web sites from Samples 1 and 2, respectively, so that rater characteristics would not affect between sample comparisons. Further, the subset of Web sites from Sample 1 was drawn to match Sample 2 on gender, since a target's gender has been found to affect mean observer ratings (D. Marcus & Lehman, 2002). Due to the small number of female owners in Sample 1 and the relatively large number of women in Sample 2, it was not possible to match both samples exactly on other demographic variables. Compared with the entire Sample 1, however, the subsample chosen for this study was considerably closer to Sample 2 in median age (interpolated at 26 years), but still contained a smaller proportion of students (22%) than Sample 2.

To further improve comparability across samples and rule out a number of potential methodological artifacts in Study 1, we employed an observer rating form of the BFI in addition to the short adjective scales described above.[5] This permits (1) an examination of the convergent validity of the adjective scales vis-à-vis an established measure of the Big Five, (2) an independent replication of observer accuracy and consensus in Study 1 with a different set of raters, and (3) multiple comparisons between Samples 1 and 2 within Study 2 to control for possible effects of using the same or different measures of the Big Five for self- and observer ratings. Overall mean interrater consensus in Study 2 (average measure interrater correlation across the eight raters and all items) was $ICC_{[8,1]} = .75$ in the full sample (.75 in Sample 1, and .76 in Sample 2, respectively).

Content analysis. Members of the research team independently generated hypotheses about the Web site features that could potentially have been affected by the owner's personality. A coding scheme was developed on the basis of extensive discussions, which included the categories on which agreement was achieved among the members of the research team. The final coding scheme covered the following domains of Web site content: personal information provided by the owner (e.g., hobbies, social network, biographical sketches), contact information directed at the visitor (e.g., postal address and phone number, welcome messages, guest books, etc.), photographs directly linked to the Web site (e.g., portraits of the owner, pictures of friends, family, and physical objects, situational context of the photographs), external links to other pages (e.g., links to other personal Web sites, music and artwork, the owner's hometown, downloads, etc.), and miscellaneous items (e.g., Web camera, visitor counter, categories on the home page). The majority of items required the categorization of objective features and then a simple count to obtain a score. In addition, some subjective ratings of the Web site content were collected. We report findings separately for countable features and ratings in the results section.

We initially employed a relatively liberal standard for inclusion of an item in the coding scheme to avoid premature exclusion of potentially valid categories. More than 100 items were coded originally, which took an average of 2 hours per Web site. The Web sites were coded by two teams, each consisting of two trained research assistants. Coders were unacquainted with Web site owners and none of them belonged to the sample of raters who provided observer ratings. Each team coded approximately one half of the content categories for one half of the Web sites and then the remaining items for the other half of the Web sites. The second team independently coded a random sample of 40 Web sites that was already coded by their peers to obtain estimates of interrater agreement. We report findings only for categories on which an acceptable level of consensus ($ICC_{[2,1]}$ 0.50 or larger) could be attained. We also dropped a proportion of categories originally coded due to insufficient variance (e.g., many of the categories used to code, e.g., external links were so rare in the sample that they were not deemed sufficiently informative).

Results

Study Descriptives

Table 1 shows means, standard deviations, intercorrelations, and internal consistency reliabilities of all self-reported personality variables based on uncorrected scores for the full sample, including Samples 1, 2, and 3. Descriptive statistics displayed in Table 1 differ from those reported in the following tables due to corrections for age and gender, described in detail as follows.

[5] In addition, the BFI self-rating form was administered to all raters in Study 2 to test for the possibility that their ratings are affected by their own personality characteristics. Since none of the raters' self-reported traits correlated statistically significantly with their ratings of the Web site owners, we omitted details on this issue herein.

Table 1
Descriptive Statistics for Self-Reported Personality Variables

	M	*SD*	#	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Big Five																			
(1) Neuroticism	2.54	.69	7	(.83)															
(2) Extraversion	3.36	.71	8	−.26*	(.86)														
(3) Openness to Experience	3.73	.56	10	−.02	.31*	(.79)													
(4) Agreeableness	3.52	.53	8	−.26*	.09*	.07	(.71)												
(5) Conscientiousness	3.59	.57	9	−.29*	.25*	.12*	.24*	(.80)											
Self-Concept																			
(6) Narcissism	5.01	3.42	15	−.21*	.45*	.33*	−.17*	.14*	(.79)										
(7) Global Self-Esteem	183.33	29.58	37	−.62*	.51*	.17*	.13*	.41*	.37*	(.93)									
(8) Self-Regard	38.26	7.48	7	−.65*	.39*	.03	.13*	.34*	.26*	.82*	(.88)								
(9) Social Confidence	24.13	6.62	5	−.45*	.69*	.16*	.12*	.31*	.36*	.75*	.55*	(.86)							
(10) Acceptance of Critique	23.51	6.70	5	−.54*	.29*	.01	.11*	.28*	.17*	.78*	.58*	.59*	(.86)						
(11) Academic Self-Esteem	21.62	3.76	4	−.18*	.16*	.38*	.02	.15*	.26*	.35*	.18*	.18*	.16*	(.70)					
(12) Job-Related Self-Esteem	31.86	5.35	6	−.47*	.29*	.14*	.05	.36*	.25*	.70*	.61*	.40*	.47*	.30*	(.76)				
(13) Physical Attractiveness	22.56	6.17	5	−.40*	.30*	.21*	.05	.27*	.30*	.74*	.52*	.45*	.47*	.19*	.40*	(.83)			
(14) Physical Ability	21.40	6.00	5	−.29*	.27*	.05	.10	.23*	.18*	.60*	.34*	.34*	.37*	.04	.27*	.46*	(.72)		
Self-Monitoring																			
(15) Acquisitive Self-Monitoring	16.54	3.16	6	−.24*	.38*	.18*	−.01	.14*	.35*	.31*	.25*	.34*	.18*	.21*	.23*	.13*	.16*	(.80)	
(16) Protective Self-Monitoring	11.41	3.70	6	.27*	−.10	.04	−.14*	−.18*	.09	−.37*	−.31*	−.33*	−.36*	−.06	−.20*	−.24*	−.19*	.20*	(.82)

Note. # = Number of items in the scale. Cronbach's Alphas appear in parentheses. *N* is between 848 and 864 for variables (1) through (6), and between 522 and 532 for the remaining variables.
* $p < .01$, two-tailed.

Table 2
Big Five Scores of Web Site Owners, Corrected for Demographic Differences, Versus a Comparison Group

	Web Site Owners		Comparison Group			
Sample	*M*	*SD*	*M*	*SD*	*t*-value	*d*
Neuroticism	2.60	.68	2.61	.59	−.28	−.02
Extraversion	3.32	.71	3.50	.64	−4.74**	−.25
Openness to Experience	3.67	.56	3.50	.54	5.45**	.31
Agreeableness	3.64	.52	3.68	.49	−1.40	−.08
Conscientiousness	3.70	.56	3.77	.50	−2.35*	−.13

Note. *N* is between 844 and 858 for Web site owners and 480 for the comparison group.
* $p < .01$. ** $p < .001$, two-tailed.

Personality Characteristics of Web Site Owners Compared With Reference Groups

We compared the personality scores of the combined Samples 1, 2, and 3 of Web site owners on the Big Five dimensions of personality with those reported by Lang et al. (2001) for a sample of 480 German adults. Lang et al.'s sample consisted of three distinct age groups of young (age 20 to 40 years), middle-aged (between 45 and 65), and older (70–90) adults, and was equally distributed on gender. Since age differences emerged on three of the five factors in Lang et al.'s study, and our sample of Web site owners was considerably younger on average, it was necessary to employ age corrections to compare results. We therefore either subtracted or added an age-specific constant to each individual's Big Five scores that was equivalent to the difference between Lang et al.'s full-sample mean and the respective mean reported in that study for the age group to which the individual in our study belonged, multiplied by −1. For example, if a participant in our study was younger than the average participant in Lang et al.'s study, and if Lang et al. reported that the younger participants scored higher than average on a particular dimension, we subtracted the respective mean difference from our participant's score. Since Lang et al. found gender-specific differences only for Neuroticism, with women scoring higher than men (which is largely in accordance with findings on other Big Five measures; Feingold, 1994), we corrected scores in our study for gender effects on that dimension only. Thus, we subtracted the equivalent of half of the effect size reported by Lang et al. from every woman's score and added the same value to every man's score in our sample. After corrections were made, the size of our sample of Web site owners varied between $N = 844$ and 858 across dimensions, due to slightly differing numbers of missing values. Sample means and standard deviations of the corrected scores of Web site owners and Lang et al.'s full sample are shown in Table 2, along with *t*-statistics and standardized mean differences (*d*) between samples.

Statistically significant differences between Web site owners and the sample drawn from the general population emerged on three of the Big Five dimensions after correcting for demographic variables, but only two exceeded conventional levels of practical significance (Cohen, 1988). Namely, Web site owners scored slightly higher on Openness to Experience ($d = .31$), and lower on Extraversion ($d = -.25$). If the uncorrected values had been used (reported in Table 1), the corresponding effect sizes would have been .42 for Openness, and −.22 for Extraversion, respectively. In addition, Web site owners would have appeared less Agreeable ($d = -.31$) and Conscientious ($d = -.37$) than the general population. Thus, except for Extraversion, correcting for age led to less pronounced differences.

Due to a lack of appropriate norms, we were not able to compare Web site owners with the general population on the more specific traits related to self-esteem and self-presentation. But, we had access to raw data for various studies in which the same measures of these traits had been administered to non-Web site owners.[6] We were thus able to apply more direct controls of demographic variables in our comparisons, using analysis of covariance (ANCOVA). In all analyses reported below, we entered age as a covariate and gender as a dummy-coded factor in addition to the dummy-coded sample factor (Web site owner vs. comparison group). This allows for examining interaction effects between gender and possession of a personal Web site.

With respect to narcissism, 838 Web site owners, 149 of whom were women, were compared with a sample of $N = 355$ college students (284 women, mean age was 22 years, $SD = 3.65$) who had completed the same scale on different occasions (cf. Schütz et al., 2004, Samples 2 and 4). Data on the self-monitoring scales were only available for subsamples of Web site owners ($N = 516$, of whom 98 were women) and student participants ($N = 176$, 150 women; Schütz et al.'s Sample 2). With self-esteem, the same subsample of Web site owners as with self-monitoring was available ($N = 521$, due to fewer missing values), but the comparison group was considerably larger ($N = 558$, of whom 339 were women), and much more diverse in age ($M = 38$ years, $SD = 18.5$), because it contained a student sample as well as a sample drawn from the general population (cf. Schütz & Sellin, in press). Table 3 displays the results of the analysis of covariances with these samples separately for narcissism, the two components of self-monitoring, and self-esteem.

[6] Possession of a personal Web site was actually not controlled in the samples serving as comparison groups. Thus, it is possible that some participants in these groups operate a personal Web site, too. However, since even the most extreme estimates of the prevalence of personal Web sites in the general population do not exceed five percent (e.g., Schütz & Machilek, 2003), this possibility should not have severely distorted our results.

Table 3
ANCOVA Results for Web Site Owners Versus Comparison Groups on Narcissism, Self-Monitoring, and Global Self-Esteem

Dependent Variable	Source	*df*	*F*	Eta^2	Web Site Owners		Comparison Group		*d*
					EMM	*SD*	*EMM*	*SD*	
Narcissism					4.96	3.42	4.64	3.01	.10
	Age	1	2.98	.002					
	Gender	1	17.21***	.014					
	Sample	1	1.34	.001					
	Gender × Sample	1	9.17**	.008					
	Error	1188	(10.77)						
Acquisitive Self-Monitoring					16.51	3.17	16.87	3.12	−.11
	Age	1	3.50	.005					
	Gender	1	16.96***	.024					
	Sample	1	.83	.001					
	Gender × Sample	1	11.28***	.016					
	Error	687	(9.72)						
Protective Self-Monitoring					11.71	3.71	11.63	3.60	.02
	Age	1	25.90***	.036					
	Gender	1	2.81	.004					
	Sample	1	.03	.000					
	Gender × Sample	1	5.60*	.008					
	Error	688	(12.99)						
Global Self-Esteem					180.15	29.65	181.87	28.65	−.06
	Age	1	12.95***	.012					
	Gender	1	32.75***	.030					
	Sample	1	.71	.001					
	Gender × Sample	1	.14	.000					
	Error	1074	(806.23)						

Note. The predictor "sample" refers to the effect of Web site versus comparison group samples. Values in parentheses represent mean square errors. *EMM* = Estimated marginal means, adjusted for age and gender. *N*s are 838 (Web site owners) and 355 (comparison group) for narcissism, 516 to 517 (Web site owners) and 176 (comparison group) for self-monitoring, and 521 (Web site owners) and 558 (comparison group) for global self-esteem.
* $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed.

After adjusting for other factors, men scored higher than women on narcissism, acquisitive self-monitoring, and global self-esteem. Age was negatively related to protective self-monitoring and positively to global self-esteem. Web site owners did not differ from the comparison groups on any of the personality variables when demographics were controlled for. Negligibly small effect sizes underscore this conclusion. However, statistically significant interactions between gender and Web site possession occurred for narcissism and both components of self-monitoring. These interactions are plotted in Figures 1a, b, and c, respectively. In all cases, it is evident that gender differences in the student samples are substantially reduced in the sample of Web site owners. Whereas female students reported considerably less narcissism and self-monitoring than male students, women operating a personal Web site are almost identical to male Web site owners on these traits.

In addition to the ANCOVA on general self-esteem reported previously, we conducted a multivariate analysis of covariance (MANCOVA) with the subscales of the MSWS as a set of dependent variables in order to examine the possibility that differences on more specific aspects of self-esteem may have been obscured in the general measure. In that analysis, we dummy-coded participant status as a student versus nonstudent as an additional demographic factor that could have affected the results. Findings of this MANCOVA are reported in Table 4.

Omnibus tests revealed highly significant ($p < .001$) effects on all dependent variables. Multivariate tests of the independent variables showed statistically significant main effects for gender, age, and sample, as well as for the gender by sample interaction term (all *p*s $< .001$). The main effect of student status was also significant ($p < .01$), but all multivariate and univariate interaction terms with this variable were nonsignificant. We therefore omitted these terms in Table 4. A detailed examination of between-subjects effects shows that gender had an impact on almost all aspects of self-esteem, whereas both age and student status were related to three facets only. Notably, students were not different from nonstudents on academic self-esteem, but scored lower on the job-related self-esteem ($d = -.37$). Contrary to the results on global esteem, there were also statistically significant differences between Web site owners and the comparison group on most specific aspects of self-esteem, after adjusting for demographic variables. Web site owners scored lower on self-regard, confidence in social interactions, and both facets of physical self-esteem, but higher on both academic and job-related self-esteem. The difference in academic self-esteem was of medium size, differences in both facets of physical self-esteem slightly exceeded conventional levels for a small effect, and the remaining differences fell below that level. The gender by sample interaction term was statistically significant for both physical aspects of self-esteem. The plots (shown in Figure 2) indicated that, similar to the interaction effects reported above, the gender difference on both variables was smaller in Web site owners than in the comparison group. In contrast to self-presentation variables, interaction effects on self-esteem appear to

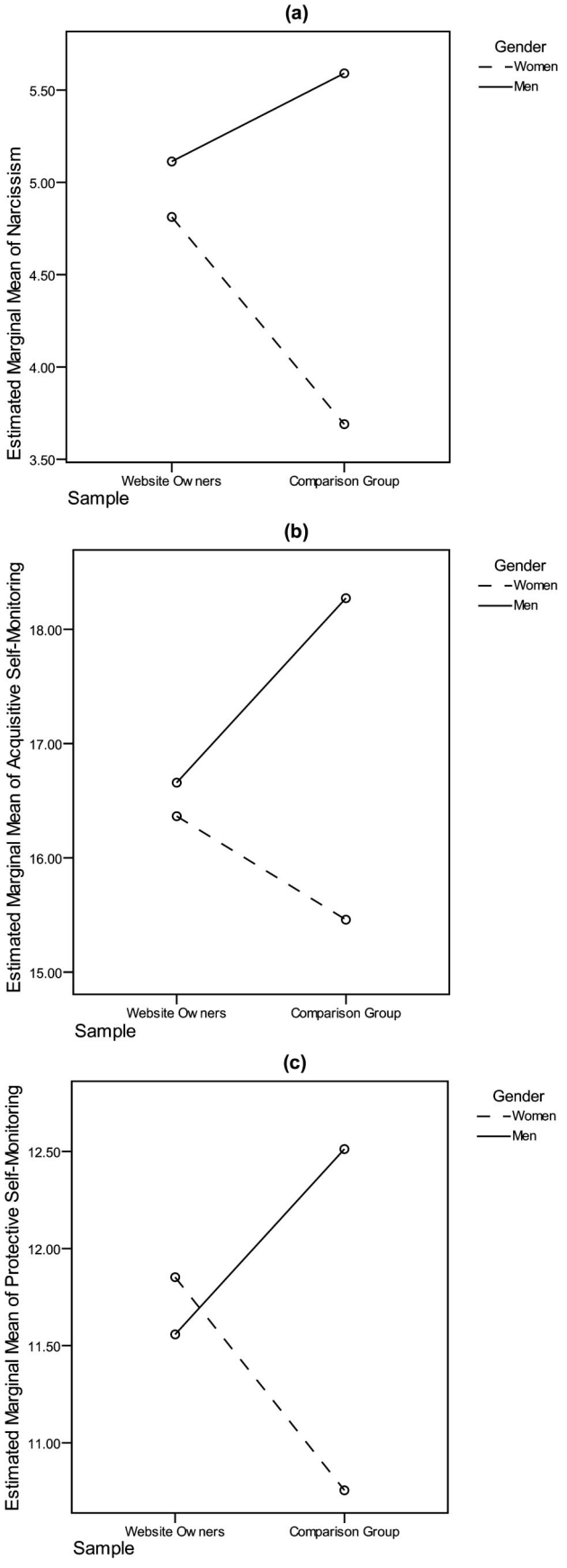

Figure 1. Effects of Gender × Sample Interactions on (a) Narcissism, (b) Acquisitive Self-Monitoring, and (c) Protective Self-Monitoring

be mainly due to lowered scores of male Web site owners compared to men in general.

Self-Other Rating Agreement

Study 1. In Table 5, we report internal consistency reliabilities of the observer rating scales along with convergent correlations between the mean observer ratings and the owners' self-ratings for the full sample, and for the two subsamples separately.

Our short adjective scales used for observer ratings yielded satisfactory reliabilities, with the notable exception of the Neuroticism scale. In the full sample, moderate convergence of self- and observer ratings was found for Extraversion ($r = .23$), Conscientiousness ($r = .18$), and, despite the low reliability of the observer scale, Neuroticism ($r = .20$). The relationship between both sources of judgment was more substantial for Openness to Experience ($r = .36$), but there was practically no correlation between owner and observer ratings of Agreeableness. The mean association across the five dimensions was $r_{mean} = .20$, which is considerably lower than the comparable figure of .31 reported by Vazire and Gosling (2004).

When the random and preselected samples were examined separately, substantial differences emerged. In the larger sample drawn at random, only Openness to Experience and, to a lesser extent, Extraversion, could be judged with some validity. By contrast, Openness to Experience was the only dimension in the sample preselected for distinctiveness that was not rated validly, whereas substantial convergence was observed on the remaining four factors. An additional MANCOVA, with sample and gender entered as factors and Big Five self- and observer ratings as dependent variables, revealed that, controlling for gender, owners of the selected group of Web sites appeared substantially more open to experience in both self ($d = .72$) and observer ($d = .93$) ratings, but not different from the random group on any of the other traits. The mean differences in Openness were accompanied by range restrictions in the selected group as compared with the random sample in self- ($u = .85$) and observer ($u = .69$) ratings. If the self-observer correlation in the selected group was corrected for this double-sided restriction in range (e.g., Hunter & Schmidt, 2004, p. 107), its value rose from $r = .18$ to $r_{corr} = .27$. Thus, the low self-observer correlation for Openness to Experience in the selected group seems to be at least partly due to a ceiling effect. The mean uncorrected self-observer rating correlation across the five factors was $r_{mean} = .14$ in the random sample and $r_{mean} = .44$ in the selected sample. However, this finding is open to various alternative interpretations, as the two samples differed in gender composition, we used different instruments for self and observer ratings, and one of the observer scales lacked reliability. These issues were addressed in observer rating Study 2.

Study 2. Table 6 displays internal consistency estimates for the full sample of Web site owners (selected sites plus matched

Table 4
MANCOVA Results for Web Site Owners Versus Comparison Groups on Facets of Global Self-Esteem

Dependent Variable	Source	*df*	*F*	Eta^2	Web Site Owners		Comparison Group		*d*
					EMM	*SD*	*EMM*	*SD*	
Self-Regard					36.55	7.53	37.91	6.83	−.19
	Age	1	.44	.000					
	Gender	1	39.77***	.036					
	Sample	1	5.44*	.005					
	Student status	1	2.37	.002					
	Gender × Sample	1	3.52	.003					
	Error	1062	(48.79)						
Confidence in Social Interactions					23.70	6.60	24.91	6.13	−.19
	Age	1	12.06***	.011					
	Gender	1	3.93*	.004					
	Sample	1	5.47*	.005					
	Student status	1	4.46*	.004					
	Gender × Sample	1	.00	.000					
	Error	1062	(38.65)						
Acceptance of Critique					22.56	6.73	23.58	6.57	−.15
	Age	1	16.04***	.015					
	Gender	1	16.69***	.016					
	Sample	1	3.71	.004					
	Student status	1	5.04*	.005					
	Gender × Sample	1	.09	.000					
	Error	1062	(40.63)						
Academic Self-Esteem					21.55	3.74	19.33	3.94	.58
	Age	1	2.27	.002					
	Gender	1	.26	.000					
	Sample	1	48.61***	.044					
	Student status	1	.16	.000					
	Gender × Sample	1	.13	.000					
	Error	1062	(14.66)						
Job-Related Self-Esteem					31.33	5.34	30.34	5.24	.19
	Age	1	1.15	.001					
	Gender	1	4.67*	.004					
	Sample	1	5.44*	.005					
	Student status	1	14.76***	.014					
	Gender × Sample	1	.26	.000					
	Error	1062	(26.54)						
Physical Attractiveness					22.13	6.21	24.13	6.10	−.32
	Age	1	1.06	.001					
	Gender	1	12.53***	.012					
	Sample	1	15.76***	.015					
	Student status	1	.03	.000					
	Gender × Sample	1	5.39*	.005					
	Error	1062	(36.87)						
Physical Ability					20.60	5.78	22.26	6.45	−.27
	Age	1	7.42**	.007					
	Gender	1	32.87***	.030					
	Sample	1	10.76***	.010					
	Student status	1	.52	.000					
	Gender × Sample	1	9.69**	.009					
	Error	1062	(37.31)						

Note. Values in parentheses represent mean square errors. *EMM* = Estimated marginal means, adjusted for age and gender. *N*s are 509 (Web site owners) and 553 (comparison group), with listwise deletion of cases containing missing values.
* $p < .05$. ** $p < .01$. *** $p < .001$, two-tailed.

random subsample) and correlations between observer ratings based on the same and different instruments within and between studies. In addition, correlations between self-ratings and the three sets of observer ratings are shown for all raters for the two samples separately.

In general, results in Study 2 were very similar to those in Study 1. The observer rating scales based on adjectives were slightly more reliable, but the Neuroticism scale again fell short of attaining an acceptable level of internal consistency. Still, convergent correlations with the longer BFI scales were substantial across all dimensions, including Neuroticism. Values vary between $r = .76$ and .95 within Study 2, and even if different sets of observers used different instruments to rate the same Web site owners, all convergent correlations exceeded a value of .60. Thus, the scales used

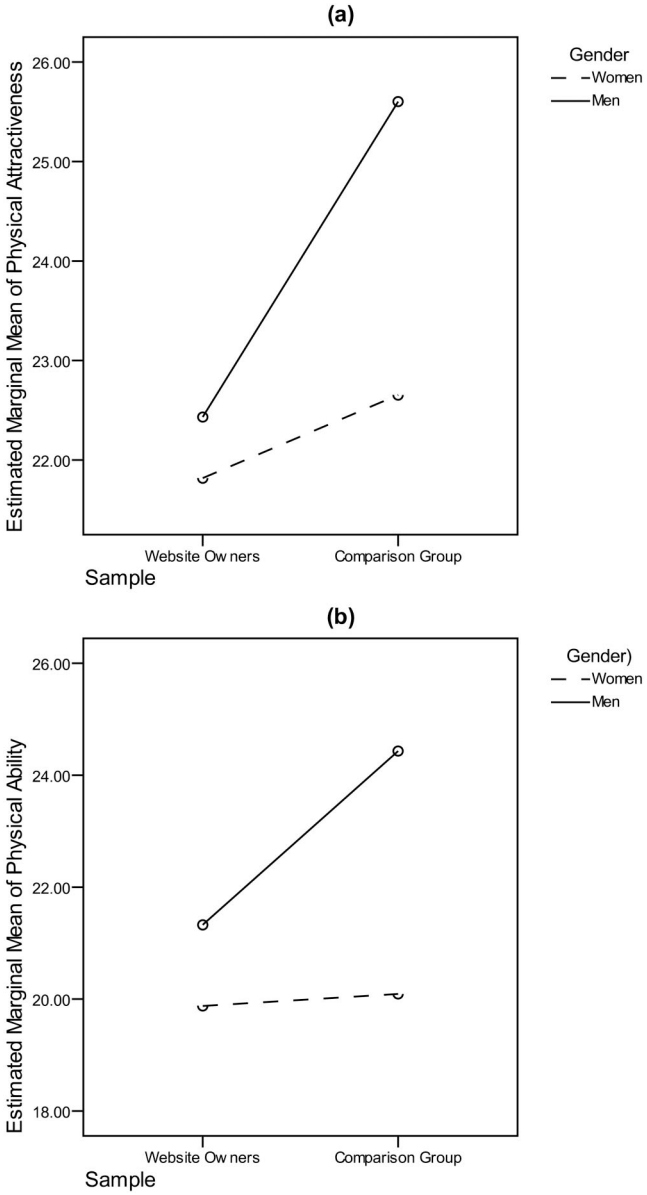

Figure 2. Effects of Gender × Sample Interactions on Self-Esteem Facets of (a) Physical Attractiveness, and (b) Physical Ability.

to obtain observer ratings did not seem to have a decisive impact. The same can be said for the different sets of raters in Studies 1 and 2, respectively, as is evident from the data in the right-hand part of Table 6. The second set of observers rated the random sample with slightly higher validity (r_{mean} = .24 vs. .16, if both used the adjective scales), whereas owners of the selected Web sites were judged somewhat more validly in Study 1 (r_{mean} = .44) than in Study 2 (r_{mean} = .36). These differences are not very pronounced and statistically nonsignificant ($p \geq .70$ in both cases). As in the preceding study, highly valid ratings of the latter group of Web site owners on all Big Five dimensions except Openness to Experience[7] were found in Study 2. Almost exactly the opposite pattern of self-observer correlations was observed in the matched subgroup of the random sample. Observers agreed strongly with the owners' self-ratings on Openness to Experience in that group. Of the remaining personality dimensions, however, only Neuroticism was rated validly by the second set of raters, and none by the first set.

Web Site Content and Owners' Personality

We present data on the relationships between independently coded elements of the Web sites and the self- as well as observer ratings of the owners' personalities following Gosling et al.'s (2002) adaptation of the Brunswikian lens model. That is, elements of the Web sites are seen as environmental cues in which owners' expressions of their identities are manifested, and from which observers infer the personality of the owners. Accordingly, we computed correlations between these cues and the owners' self-ratings on the five factors of personality (cue validity), on one hand, and between the cues and observer ratings (cue utilization), on the other hand. We included only those Web site owners for whom both self- and observer ratings of personality were available. These findings are shown in Table 7, with counted and rated features of the Web sites presented in separate parts of the Table. In addition, we assessed the level of agreement between cue validity and utilization by computing the vector correlations between the respective columns in Table 7.

It is evident from the left-hand part of Table 7 that only few and modest cue validity correlations between objective Web site features and owners' self-reported personality were observed. The few significant correlations, however, make intuitive sense. For example, owners high on Neuroticism tended not to disclose their postal address, to avoid explicit feedback seeking, to avoid commenting on the external Web sites linked to their pages, to have a preference for lyrics, and to express more emotions and personal beliefs. Extraversion had almost no correlates in Web site content, except for possession of a Web log and a category for lyrics. More meaningful relationships were observed with Openness to Experience, which correlated with, among others, a Web log on the pages, more links to Web sites about fine arts, a lyrics category, and a more emotional style of self-related information. Agreeableness was related to the number of links to the owner's hometown or region, and, negatively, to the presence of a Web camera and the expression of emotions or moods. Conscientious persons tended to present their curriculum vitae, to show more pictures of their family, to count the visitors to their Web site, and to express fewer personal beliefs.

Cue utilization correlations, shown in the right-hand section of Table 7, were considerably more frequent and often more substantial than the cue validity correlations. Observers inferred owners' neuroticism, for example, from the absence of several types of categories, photographs, links, and comments on these links, and from the presence of a Web camera and expressions of emotions. Observers utilized various types of contact and personal information, links, and, in particular, the number of photographs, and the

[7] Mean differences between samples in Study 2 accompanied by a restriction in range in the selected group were found on all four measures of Openness to Experience, replicating the earlier finding in Study 1. Details on the size of these effects can be obtained from Bernd Marcus.

Table 5
Big Five Observer Rating Reliabilities and Self-Observer Rating Correlations in the Full and Selected Samples of Web Site Owners

	Cronbach's α[a]			Self-observer *r*		
Web Site Sample	Full	Random	Selected	Full	Random	Selected
Big Five dimension						
Neuroticism	.19	.21	.20	.20**	.05	.52**
Extraversion	.77	.77	.74	.23**	.18**	.39**
Openness to Experience	.76	.78	.43	.36**	.31**	.18
Agreeableness	.75	.75	.81	.01	−.08	.55**
Conscientiousness	.76	.75	.80	.18**	.11	.55**
M				.20**	.14*	.44**

[a] Cronbach's α is computed on the mean rating per item across five independent raters. *N* is 222 for the full sample, 186 for the random sample, and 36 for the selected sample.
* $p < .05$. ** $p < .01$, one-tailed.

amount and emotional quality of personal information, to form impressions of the owner's standing on Extraversion, Openness to Experience, and Agreeableness. High ratings on Conscientiousness were associated with the presence of a site map, a counter, a curriculum vitae (especially if it contained hard facts, e.g., information on the owners' jobs), explicit requests for feedback, and links to owners' projects and to political or other nonprofit organizations.

With respect to the broader categories in the content analysis, it is evident that the overall number of photographs was related to observer ratings on most traits in the more desirable direction, but only to Neuroticism (positively) with self-ratings. Apparently, a large number of photos make a positive impression on observers, but this does not correspond to self-reported personality. Similar, but not as pronounced, was the effect of overall number of links, which appeared to affect observer perceptions of Openness and Conscientiousness but was unrelated to self-reports. We also computed overall indices of the categories of personal information and contact information and correlated them with personality ratings (not reported in the table, because large differences within categories and the different scale quality of the indices may cause interpretational difficulties). An overall index of personal information was related (at $p < .05$) to observer ratings of Extraversion ($r = .16$), Agreeableness (.20), and Conscientiousness (.17), as well as to self-reported Conscientiousness (.15). The only significant correlation of the number of contact information provided was with self-reported Neuroticism ($r = -.23$), indicating that emotionally stable Web site owners tended to provide visitors with less opportunities to get in contact with them.

The degree of correspondence between the observers' inferences of personality from Web site cues and the cues' actual relationships with self-ratings were examined by computing correlations between the vectors of cue validity and cue utilization correlations in Table 7. In contrast to earlier research (Gosling et al., 2002; Funder & Sneed, 1993), we did not perform Fisher's *r* to *Z* transformations on the column entries in Table 7 before computing the vector correlations, because most coefficients in the Table represent nonparametric correlations, and almost all are low to moderate. Thus, transformations developed for Pearson *r* neither appeared appropriate nor would have had a sizable impact. The vector correlations between cue validity and utilization coefficients ($N = 54$) are $r = .35$ for Neuroticism ($p < .01$, one-tailed), .32 for Extraversion ($p < .01$), .57 for Openness to Experience ($p < .001$), .13 for Agreeableness (*n*.s.), and .54 for Conscientiousness ($p < .001$). Thus, despite the low absolute values of most correlations between ratings and Web site cues, there was a sizable degree of correspondence in the patterns of these correlations between self- and observer ratings on four of the five factors of personality.[8] Similar to research on environmental cues (Gosling et al., 2002), traits that were judged with higher validity (cf. Table 5) tended to also be characterized by higher Web site cue vector correlations. In both sets of correlations in the present study, as well as in Gosling et al.'s (2002) research on rooms, the highest value was observed for Openness to Experience, and the lowest value for Agreeableness.

If the vector of Big Five validity coefficients in the fourth data column of Table 5 was correlated with the corresponding set of vector correlations just reported, these two sets of coefficients correlated at $r = .81$. The corresponding values in Gosling et al.'s (2002) study (computed based on the tables reported there) are .74 for judgments based on offices and .71 for judgments based on bedrooms. If we correlated our validity estimates and cue vector correlations with those reported by Gosling and colleagues across the five factors of personality, the following *r*s were observed: .98

[8] As rightly pointed out by one anonymous reviewer, vector correlations are highly sensitive to the signs of the single data entries, as these affect the variance of coefficients within each vector. This can artificially inflate (or deflate) vector correlations if the coding of variables was arbitrary. However, this was not the case for the large majority of our content categories. Frequency measures cannot take on negative values, and it appears to make more sense to dummy-code the absence of a category as "0" than its presence. The personality variables could be recoded (to indicate, e.g., Emotional Stability instead of Neuroticism), but this would simply reverse all the signs in each vector and not change correlations between corresponding vectors. Thus, the only potential sources of artificial inflation are the ratings of Web site content. We examined the potential impact of this artifact by (a) reversing the signs of all coefficients in that part of the analysis, and (b) reversing only those signs for which corresponding validity and utilization values were negative (which reduces within-vector variation). The mean vector correlation across the Big Five dropped from the original $r_{mean} = .382$ to .376 after manipulation (a), and to .377 after manipulation (b). This does not seem to indicate a large amount of possible distortion.

Table 6
Big Five Observer Rating Reliabilities, Within- and Interobserver Correlations, and Self-Observer Correlations in Two Matched Web Site Samples

Web Site sample	Cronbach's α[a]		Within- and interobserver r			Self-observer r							
	Full sample		Full sample			Full sample			Random sample			Selected sample	
Rating source[b]	Adjectives (1)	BFI (2)	Study 2, (1) vs. (2)	Study 1 (1) vs. study 2 (1)	Study 1 (1) vs. study 2 (2)	Study 1 (1)	Study 2 (1)	Study 2 (2)	Study 1 (1)	Study 2 (1)	Study 2 (2)	Study 1 (1)	Study 2 (1)	Study 2 (2)
Big Five dimension														
Neuroticism	.45	.90	.88	.65	.61	.37**	.48**	.48**	.22	.46**	.46**	.52**	.52**	.51**
Extraversion	.88	.97	.91	.72	.67	.18	.20*	.21*	−.10	−.14	−.13	.39**	.50**	.46**
Openness to Experience	.87	.96	.95	.69	.68	.51**	.49**	.53**	.55**	.61**	.62**	.18	−.05	.11
Agreeableness	.82	.94	.81	.74	.69	.24*	.31**	.37**	.00	.11	.27	.55**	.54**	.48**
Conscientiousness	.81	.95	.76	.53	.66	.29**	.27*	.32**	.13	.17	.14	.55**	.28*	.43**
M						.32**	.35**	.36**	.16	.24	.27	.44**	.36*	.40**

[a] Cronbach's α is computed on the mean rating per item across eight independent raters. [b] Rating source refers to both the study in which the observer ratings are collected (Study 1 and Study 2) and the instruments used for obtaining these ratings (adjective scales (1) vs. Big Five Inventory (2)). *N* is 72 for the full sample, and 36 for the random sample and the selected sample, respectively. The twelfth data column is the same as the last data column in Table 5.
* $p < .05$. ** $p < .01$, one-tailed. All within- and interobserver correlations are significant at $p < .001$, one-tailed.

for Web site versus office validity estimates, .81 for Web site versus bedroom validity estimates, .91 for Web site versus office vector correlations, and .99 for Web site versus bedroom vector correlations. Thus, the present research on personal Web sites very closely resembles earlier findings on physical environments with respect to the bases of personality judgments in factual reality.

Discussion

In the present studies on personal Web sites, we examined three different questions, each of which had previously attracted only limited attention by personality researchers: (1) Do owners of personal Web sites comprise an exceptional or unusual population in terms of personality profile? (2) To what extent can the personality of Web site owners operating typical and distinctive personal Web sites be inferred by Web site visitors unacquainted with the owners? (3) What are the bases of these personality impressions in manifest Web site content, and to what extent do the cues used to infer personality correspond to the impact of personality on these cues? We address these three issues separately in the following discussion and include potential limitations in the respective subsections, instead of including an overall limitations section.

The Personality of Personal Web Site Owners as Compared to Reference Groups

Owners of personal Web sites have repeatedly been described as a highly selected population both in terms of demographic variables and the owner's personality. The present research addressed these issues in a large and carefully drawn sample of personal Web site owners by taking interactions between demographic and personality variables into account. As in previous research, the Web sites in our sample were predominantly operated by men. Contrary to previous assumptions, however, the majority of personal Web sites were not operated by college students but by working adults, and the age of the owners covered the entire range from adolescence to mature adulthood rather than being restricted to persons in their early twenties (although many owners were young adults). After adjusting for these demographic characteristics, the assumption that the typical owner of a personal Web site has an unusual personality profile had to be rejected.

If there is anything like a typical Web site owner, this person may best be described as a man in his early thirties whose personality does not differ much from that of the general population. He is relatively high on Openness to Experience, but a bit more introverted than the average person of the same age. He feels relatively uncomfortable in social interactions and may be somewhat concerned about his physical appearance, but has a strong feeling of confidence in his job-related and academic skills and performance, which compensates for weaknesses in other facets of self-esteem. Thus, he may be inclined to spend more time on the creative and technically demanding task of setting up an Internet Web site than the average person, but may invest less time in face-to-face social interactions. These tendencies make sense intuitively and are in accordance with other research on personality as related to Internet usage (e.g., Hertel et al., 2005).

The differences that we failed to find are even more striking. Contrary to popular beliefs, owners of personal Web sites cannot be described as especially narcissistic, nor do they tend to present

Table 7
Big Five Self and Observer Rating Correlations with Web Site Cues

Cue validity (self-ratings)							Cue utilization (observer)				
N	*E*	*O*	*A*	*C*	#	Web site cue	*N*	*E*	*O*	*A*	*C*
						Objective Count/Categorization[a]					
						Personal information					
.05	−.08	−.05	−.01	.07	(1)	"About me" category	.07	.13	.03	.11	.05
−.07	.01	−.13	.02	.14*	(2)	Curriculum vitae	−.06	.01	.04	.14*	.19**
−.05	.05	−.14*	.06	.07	(3)	Hobbies category	−.17*	.11	.09	.29**	.10
−.02	−.05	−.05	.11	.15*	(4)	Vacations category	−.19**	.10	.17*	.08	.12
−.06	.00	.05	.08	.10	(5)	Family category	.02	.01	.00	−.01	.08
.12	.01	−.01	−.12	−.07	(6)	Friends category	.08	.05	−.03	−.03	−.05
−.02	−.07	.04	.04	.09	(7)	Job/studies category	−.06	−.06	−.04	−.05	.14*
.06	.17*	.18**	−.10	−.09	(8)	Web log	.19**	.17*	.13	.06	−.14*
						Contact information directed at visitor					
−.03	.01	−.09	.06	.11	(9)	Contact category	.03	−.10	−.06	−.01	.09
−.13	−.03	−.09	.11	.09	(10)	Welcome message	−.07	.06	−.10	.04	−.03
−.17*	.06	−.11	.04	.04	(11)	Postal address	−.04	−.11	−.06	−.07	.16*
−.13	.07	−.07	−.07	.04	(12)	Phone number	.01	−.10	−.13	−.11	.03
.00	.02	.04	−.01	−.01	(13)	Guestbook	−.03	.28**	.06	.23**	−.08
.01	−.01	.01	−.01	.00	(14)	Chat room	−.04	.11	−.04	−.04	−.08
−.10	.06	−.02	−.05	.01	(15)	Explicit feedback request	−.17*	.23**	.14*	.08	.15*
−.17*	.03	−.06	.13	.14	(16)	Feedback request concerning Web site	−.05	−.19*	−.05	−.12	−.01
						Photographs				.	
.16*	.01	.03	.08	−.06	(17)	Total # of photographs	−.15*	.36**	.32**	.28**	−.05
.14*	.04	.09	−.01	−.07	(18)	# owner's portrait: half length	.06	.28**	.21**	.13	−.01
.03	.07	.00	.04	−.03	(19)	# owner's portrait: full length	−.14*	.38**	.17*	.20**	−.15*
.00	.09	.00	.07	.02	(20)	# owner in company with others	−.11	.34**	.17*	.20**	−.12
.12	.01	.05	.08	−.02	(21)	# only other persons	−.13	.35**	.28**	.27**	−.06
.12	−.00	−.01	.12	.03	(22)	# no persons	−.15*	.24**	.31**	.23**	.04
.06	.00	.01	−.00	.19**	(23)	# owner's own family	−.01	.12	.03	.22**	.03
.18**	−.01	.03	−.05	−.11	(24)	# owner's own pets	−.04	.12	.04	.24**	−.03
.01	−.01	−.17*	.10	.10	(25)	# owner's own (inanimate) property	−.14*	.06	−.04	.06	−.08
.08	−.01	−.03	.09	.06	(26)	# context: vacation	−.18**	.24**	.22**	.23**	−.04
.08	.05	.00	−.06	−.05	(27)	# context: party	−.08	.35**	.16*	.21**	−.13
−.04	.02	−.13	.12	.08	(28)	# context: hobby	−.15*	.06	−.01	.20**	.04
−.08	−.08	−.06	−.05	−.06	(29)	Percentage of photos showing owner[b]	.11	−.18*	−.13	−.13	.05
						Objective Count/Categorization[a]					
						External links					
.03	−.06	.01	.03	−.01	(30)	Total # of links	−.06	.04	.21**	.07	.19**
−.00	−.15*	−.04	.01	−.01	(31)	# links to Internet and computers	−.03	−.13*	.01	−.02	.07
−.05	−.02	.07	−.02	−.01	(32)	# links to downloads	−.14*	−.01	−.00	.00	.05
.06	−.04	.11	.01	−.06	(33)	# links to other personal Web sites	−.04	.26**	.23**	.18**	−.05
−.15*	.03	−.01	.15*	.13*	(34)	# links to owner's hometown/region	−.17*	−.00	.09	.16*	.13
.06	.04	.15*	−.05	.04	(35)	# links to owner's projects/work	.07	.05	.20**	.07	.13*
.01	−.01	.01	.06	−.06	(36)	# links to humorous Web sites	.00	.01	.07	.06	.06
−.01	.02	.13	.05	.01	(37)	# links to music	.02	.18**	.17*	.13	−.08
.05	.08	.19**	.00	.04	(38)	# links to visual arts	−.01	−.02	.22**	−.04	.10
−.01	−.06	.06	.07	.09	(39)	# links to political/non-profit organizations	−.11	−.00	.22**	.09	.23**
−.20**	−.03	−.06	.08	.04	(40)	Links commented on website	−.21**	−.01	.02	.01	.07
						Miscellaneous items					
−.02	−.06	−.03	.04	.05	(41)	# of categories on home page	−.10	.22**	.09	.09	−.02
−.04	.01	.08	−.02	.04	(42)	Sitemap	.04	−.07	.09	−.04	.14*
−.09	−.07	−.16*	.11	.14*	(43)	Visitor counter	−.12	.02	−.08	.10	.14*
.10	.01	.04	−.14*	−.11	(44)	Web camera	.20**	.12	.10	.07	−.09
−.14*	.08	.09	−.06	.03	(45)	Newsletter	.02	.09	−.02	−.11	.02
.16*	.16*	.28**	−.02	−.05	(46)	Lyrics as category	.10	.04	.21**	.03	−.10
−.10	−.06	−.04	.04	.10	(47)	Service as category	−.03	−.12	−.10	−.02	.00

(*table continues*)

Table 7 (*continued*)

Cue validity (self-ratings)							Cue utilization (observer)				
N	*E*	*O*	*A*	*C*	#	Web site cue	*N*	*E*	*O*	*A*	*C*
						Ratings[b]					
.11	−.05	.03	.02	.05	(48)	Amount of personal information on Web site	.01	.21**	.22**	.26**	.08
.22**	.10	.22**	−.04	−.06	(49)	Emotional (vs. factual) style of personal information on Web site	.04	.37**	.35**	.35**	−.08
.11	−.08	−.08	.07	.10	(50)	'Hard facts" in curriculum vitae (CV)	.02	.00	.11	.13	.21**
−.05	.02	−.13	.01	.12	(51)	CV in a creative (vs. formalized) format	−.01	.04	.05	.15*	.12
.16*	.08	.19**	−.09	−.14*	(52)	Expression of personal beliefs/points of view	.00	.33**	.35**	.29**	.01
.18**	.04	.22**	−.14*	−.07	(53)	Expression of emotions/mood	.18*	.10	.09	.10	−.10
.06	.04	.02	−.03	.01	(54)	Disclosure of intimate details	.11	.03	.03	−.03	.04

[a] Coefficients represent point-biserial correlations if Web site cues are coded as present (1) vs. absent (0), and, due to skewed distributions, Spearman rank correlations if cues are counted. Counts are indicated by "#". [b] Coefficients represent Pearson correlations. Cue validity is the self-rating/cue correlation, and cue utilization is the observer rating/cue correlation with neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C), respectively. *N* varies between 208 and 222, except variables # 16 (*N* 147 to 148), and # 29 (*N* 164 to 166), which were coded only if applicable.

* $p < .05$. ** $p < .01$, two-tailed.

different images of the self to different audiences, as high self-monitors would do. Moreover, our description of "the typical Web site owner" was somewhat misleading, as there is little evidence for the prototypicality of that population in terms of a restriction in range on the traits we examined. The standard deviations of the Web site owners' personality scores reported in Tables 2 through 4 tend to be slightly larger, rather than smaller, than those of the comparison groups. Thus, we include the notion of a "typical Web site owner" in the preceding paragraph for illustrative purposes only. Web site owners are at least as diverse in their personality profiles as the groups with which we compared them. All in all, neither very elevated means nor range restrictions prevent us from generalizing findings from Web site owners to the general population. This is good news for personality researchers who wish to find alternatives to the overresearched population of college students and seek participants over the Internet.

Some remarkable exceptions from the general finding of a lack of personality differences emerged when we examined interactions of Web site owners' personalities with gender. In the relatively rare cases that women operate personal Web sites, they are strikingly more similar to male Web site owners than women are to men in the general population on the dimensions of narcissism, self-monitoring, and physical aspects of self-esteem. The low prevalence of women operating Web sites may make this activity particularly attractive to women who deviate from their own gender stereotype on certain traits. Put differently, the popular belief that operating a Web site is a "male thing" may lead women who are similar to the average man on these traits to engage in this activity. On the other hand, men operating Web sites seem less narcissistic and self-monitoring than other men. Male Web site owners were also less confident about their physical appearance than men in general. To them, the attraction in creating a Web site may not so much be a question of self-presentation as a matter of trying out new technology. Some support for these tentative explanations comes from our survey of motives for creating a Web site. Men slightly more often mentioned technological aspects, whereas women were more inclined to seek contact via the Web site.

With respect to personality research on the Internet, the fact that gender differences were smaller among Web site owners than among other populations may be the only aspect that needs to be taken into account. To analyze gender differences, the Web may not provide data that can be generalized to the offline population. We think that this aspect is subject to change, though. In the past years there was a lot of discussion about a gender divide, that is, more men than women using the Internet. This gap is rapidly closing (Commission of the European Communities, 2005). The general trend may also apply to Web sites and their new variant, Web logs. Soon, having one's one Web site or Web log may no longer be "a male thing."

The present findings are not without limitations, however. Despite the relatively large samples involved, the number of women in our sample of Web site owners was limited, and the distribution of various demographic variables was remarkably different from that in the comparison groups. We used statistical controls to rule out these possible confounds to the extent possible. Although a perfect control could not be attained, the present study is, to the best of our knowledge, the first that has even attempted to rule out demographic effects. It is also by far the largest study on the personality of Web site owners ever conducted, in terms of sample size, and one of the rare studies that relied mainly on random sampling. Although we also included a sample not drawn at random, the small size of this subsample should have precluded a strong impact on overall results, but it increased the number of female Web site owners available for analyses.

Self-Other Rating Agreement

The second part of our research is closely related to Gosling et al.'s (2002) research on physical environments and even more closely to Vazire and Gosling's (2004) study on personal Web sites as sources of personality perceptions. In our first study, we

collected self- and other ratings of personality dimensions in a sample drawn with a random sampling procedure. The findings from our and Vazire and Gosling's (2004) random samples converged to a considerable extent, but not perfectly. As in the previous research, we found that Openness to Experience could be inferred from personal Web sites with the highest validity of all five factors. Of the remaining factors, however, only Extraversion was judged with some validity in our random sample, whereas Vazire and Gosling obtained valid observer ratings on all five factors. Unexpectedly, our pattern of findings across the Big Five in the random sample corresponded more closely to Gosling et al.'s (2002) earlier research on offices (r between the vectors of validity estimates across the Big Five = .97), and bedrooms (.75), than it did to their results on American Web sites (.52), although the bases of judgment were much more similar in the latter case. The Gosling et al. validity estimates on offices and bedrooms were also more highly correlated among each other (r = .84) than they were to Vazire and Gosling's Web site self-observer correlations (.51 with offices, .65 with bedrooms). Thus, the pattern of self-observer correlations obtained by Vazire and Gosling appears to be slightly different from other patterns found within the same line of research, including the present one. Random effects in the relatively small sample used by Vazire and Gosling may account for this discrepancy.

Despite such differences, there is still a considerable level of overall agreement among the various studies. Physical as well as virtual environments are particularly well-suited to infer the owner's Openness to Experience, whereas this same factor is judged with practically no validity in classical zero-acquaintance studies, which typically employ cues like photographs or short-cut films of the target persons (Kenny, 1994). This provides another piece of evidence that trait visibility may vary substantially across cues. The latter kinds of cues show the target person's facial and verbal expressions, which are a good basis for inferences of Extraversion and Conscientiousness. Physical environments, by contrast, show behavioral residue of a person's creative work and activities, which should allow one to infer traits related to these behaviors. Web sites should provide a particularly rich source of information, in that cues on both a target person's physical appearance and creative work are often available. In contrast to the results reported by Vazire and Gosling (2004), we only partially confirmed that assumption in our relatively large random sample of Web site owners. Again, the differences can be explained by random effects due to sample size, but cultural and methodological differences between these two studies may provide alternative explanations.

There are a number of artifactual as well as substantive potential explanations for this discrepancy. We tested one substantive hypothesis in both of our observer rating studies by collecting ratings on a sample of distinctive Web sites that contained particularly rich information and attracted the visitor's visual attention with an eye-catching Web design. In addition, we systematically examined a number of potential methodological and sampling artifacts in the second observer rating study that may have affected our findings in Study 1. All possible artifacts that we controlled for could be ruled out in Study 2. The differences in observer rating validities between the random and selected samples found in Study 1 were almost fully replicated after adjusting for differences in the gender distributions of the target persons, and raters, and in the content and psychometric properties of the instruments used to obtain self- and observer ratings. The main difference between the Web site samples in both studies was that a high level of self-observer agreement was found only on Openness to Experience in the random sample, but on all dimensions *except* for Openness to Experience in the distinctive sample. With that one exception, the values observed in the latter sample are comparable to those found in long-term acquaintance studies (e.g., Gosling et al., 2002; Johnson, 2000). The lack of convergence on Openness in the distinctive sample was largely attributable to a ceiling effect. Owners of these Web sites, on average, were rated very high on that trait by themselves as well as by observers. This seems to indicate the validity of the trait ratings from both sources in predicting how Web sites are designed, rather than the invalidity of observer ratings in that group.

Thus, the findings from both samples in both studies point to the conclusion that personal Web sites may indeed provide a very rich source of information across the entire personality sphere as described by the five-factor model, but that their value in part depends upon the quality of the information provided and the way it is presented. Given the high degree of correspondence in results between our methodologically different Studies 1 and 2, cultural differences appear the most plausible explanation for the overall difference in self-other agreement between our findings and that of Vazire and Gosling. This difference remained stable for a similarly drawn random sample even if we used the same Big Five measure as Vazire and Gosling. Perhaps American Web site owners, on average, tend to reveal more personal information than Germans, but this is certainly a speculative statement in need for supporting evidence.

The findings discussed in this section may also be qualified by some shortcomings. The sample of distinctive Web sites was small in both Studies 1 and 2, and the matched random sample was just as small in the second study. However, total sample size in Study 2 was not very different from Vazire and Gosling's (2004) study (who obtained self-ratings from 79 Web site owners), and was considerably larger in Study 1. Another limitation might be the fact that the distinctive sample was drawn on the basis of the judgment of a single researcher. This was necessitated by the fact that drawing this sample required extremely extensive Internet searches and a very high degree of familiarity with the range of content in personal Web sites. Reassuringly, the empirical findings presented here do not provide much reason to call the distinctiveness of the sample obtained in that way into question. The observers in Study 1 had rated a number of features of the Web sites in addition to the trait adjectives. For example, the standardized mean difference scores between the selected and the random sample were d = 1.25 on "distinctive," 1.10 on "creative," 1.09 on "impressive," and −1.01 on "boring" (all values significant at $p <$ .001, two-tailed).

Web Site Content and Owners' Personality

Our final objective was to explore personality expressions and the bases of personality impressions in the manifest content of the Web sites. The procedures employed for statistical analyses were adopted from Gosling et al.'s (2002) research on physical environments but the procedures and coding schemes for content analyses were not. Whereas Gosling and colleagues mainly used adjective ratings to describe the rooms in their studies, codings in

our study were mostly based on the presence versus absence, or on frequencies of directly observable features. Findings from the present research on Web sites and both studies reported by Gosling et al. (2002) converge on the conclusion that the highest degree of correspondence between cue validity and utilization on the Big Five is found for Openness to Experience, and the lowest is found for Agreeableness. The similarity in the overall pattern of findings across the various data sets ranged from high to almost perfect. Moreover, findings from all studies converge on the conclusion that the degree of correspondence between cue validity and cue utilization is positively related to the accuracy of personality ratings by observers. Thus, there is now growing evidence from different sources that strangers' personality judgments based on external environments have a basis in objective reality, and that the validity of this basis varies systematically across different dimensions of the five-factor model. It is highest with Openness to Experience, the very dimension that seemed to be almost impossible to rate accurately by strangers in earlier zero-acquaintance studies. This suggests that strangers are able to provide valid ratings on a wide spectrum of personality traits based on minimal information, provided that this information is of appropriate content. If appealingly designed, personal Web sites may be a particularly rich source of information.

The findings just discussed were obtained although the single cue validity correlations were generally low, and even the cue utilization correlations were moderate at best. That we found higher cue utilization correlations than cue validities is no surprise, since the Web sites were the only source of information available to the raters. The low cue validity correlations indicate that objective features of the Web sites we coded were weak indicators of personality if considered in isolation. Taken together, however, these weak indicators were nevertheless informative about owners' personalities. This might be taken as another variant of the aggregation principle in personality research (e.g., Rushton, Brainerd, & Pressley, 1983). Very low validity at the single indicator level may well translate into considerable validity at the aggregate level.

Conclusion

In the present research, we presented the largest and most inclusive data set on the personality of owners of personal Web sites currently available. Our data showed that Web site owners do by no means comprise an exceptional group of narcissistic self-presenters who differ much from the average personality. This should put an end to speculations to the contrary in various media and encourage personality researchers who are interested in conducting studies with this population. Our data further showed that meaningful inferences of personality could be derived from visiting a personal Web site for just 5 minutes, especially if the Web site is well-designed. This should make Web site owners, or those who plan to create such a site, aware that they should take care of their sites if they want to be seen as they are, and that strangers may learn a lot about them simply by visiting their Web site. For personality researchers, the present findings provide another piece of evidence that environmental cues are informative sources for the formation of personality impressions, and that personal Web sites might be a particularly fruitful field for future research.

References

Arkin, R. M. (1981). Self-presentational styles. In J. T. Tedeschi (Ed.), *Impression management theory and social psychological research* (pp. 311–333). New York: Academic Press.

Borkenau, P., & Liebler, A. (1992). Convergence of stranger ratings of personality and intelligence with self-ratings, partner ratings, and measured intelligence. *Journal of Personality and Social Psychology, 65,* 546–553.

Borkenau, P., & Liebler, A. (1993). Consensus and self-other agreement for trait inferences from minimal information. *Journal of Personality, 61,* 477–496.

Brunswik, E. (1956). *Perception and the representative design of psychological experiments.* Berkeley: University of California Press.

Cohen, J. (1988). *Statistical power analysis for behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Commission of the European Communities. (2005). *eInclusion revisited: The local dimension of the information society.* Retrieved February 16, 2005, from http://europa.eu.int/comm/ employment_social/news/2005/feb/eincllocal_en.pdf

Curtin, R., Presser, S., & Singer, E. (2005). Changes in Telephone Survey Nonresponse over the Past Quarter Century. *Public Opinion Quarterly, 69,* 87–98.

Döring, N. (2002). Personal home pp. on the Web: A review of research. *Journal of Computer-Mediated Communication,* 7 (3). Retrieved April 22, 2005, from http://www.ascusc.org/jcmc/vol7/issue3/doering.html

DiGiovanna, J. (1996). Losing your voice on the Internet. In P. Ludlow (Ed.), *High noon on the electronic frontier: Conceptual issues in Cyberspace* (pp. 445–457). Cambridge, MA: MIT Press.

Feingold, A. (1994). Gender differences in personality: A meta-analysis. *Psychological Bulletin, 116,* 429–456.

Fleming, J. S., & Courtney, B. E. (1984). The dimensionality of self-esteem: II. Hierarchical facet model for revised measurement scales. *Journal of Personality and Social Psychology, 46,* 404–421.

Funder, D. C. (1995). On the Accuracy of Personality Judgment: A Realistic Approach. *Psychological Review, 102,* 652–670.

Funder, D. C., & Sneed, C. D. (1993). Behavioral manifestations of personality: An ecological approach to judgmental accuracy. *Journal of Personality and Social Psychology, 64,* 479–490.

Gosling, S. D., Ko, S. J., Mannarelli, T., & Morris, M. E. (2002). A room with a cue: Personality judgments based on offices and bedrooms. *Journal of Personality and Social Psychology, 82,* 379–398.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A Very Brief Measure of the Big-Five Personality Domains. *Journal of Research in Personality, 37,* 504–528.

Hertel, G., Schroer, J., Batinic, B., Konradt, U., & Naumann, S. (2005). Kommunizieren schüchterne Menschen lieber per E-Mail? Einflüsse der Persönlichkeit auf die Präferenz von Kommunikationsmedien [Do the shy prefer e-mail communication? Impact of personality on preferences for communication media]. In K.-H. Renner, A. Schütz, & F. Machilek (Eds.), *Internet und Persönlichkeit* (pp. 134–147). Göttingen, Germany: Hogrefe.

Hunter, J. E., & Schmidt, F. L. (2004). *Methods of meta-analysis* (2nd ed.). Thousand Oaks, CA: Sage.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed.) (pp. 102–109). New York: Guilford Press.

Johnson, J. A. (2000). Predicting observers' ratings of the Big Five from the CPI, HPI, and NEO-PI-R: A comparative validity study. *European Journal of Personality, 14,* 1–19.

Kenny, D. A. (1994). *Interpersonal perception: A social relations analysis.* New York: Guilford Press.

Lang, F. R., Lüdtke, O., & Asendorpf, J. (2001). Testgüte und psychometrische Äquivalenz der deutschen Version des Big Five Inventory

(BFI) bei jungen, mittelalten und alten Erwachsenen [Validity and psychometric equivalence of the German version of the Big Five Inventory in young, middle-aged and old adults]. *Diagnostica, 47,* 111–121.

Laux, L., & Renner, K.-H. (2002). Self-Monitoring und Authentizität: Die verkannten Selbstdarsteller. [Self-Monitoring and authenticity: The misjudged self-presenters]. *Zeitschrift für Differentielle und Diagnostische Psychologie, 23,* 129–148.

Lemay, L. (1996). *Noch mehr Web Publishing mit HTML* [More Web publishing with HTML]. Haar, Germany: Markt & Technik.

Lennox, R., & Wolfe, R. (1984). Revision of the self-monitoring scale. *Journal of Personality and Social Psychology, 46,* 1349–1364.

Machilek, F., Schütz, A., & Marcus, B. (2004). Selbstdarsteller oder Menschen wie du und ich? Intentionen und Persönlichkeitsmerkmale von Homepagebesitzer/inn/en. [Self-presenters, or people like you and me? Intentions and personality traits of owners of personal Web sites]. *Zeitschrift für Medienpsychologie, 16,* 88–98.

Marcus, B., & Schütz, A. (2005). Who are the people reluctant to participate in research? Personality correlates of four different types of nonresponse as inferred from self- and observer ratings. *Journal of Personality, 73,* 960–984.

Marcus, D. K., & Lehman, S. J. (2002). Are there sex differences in interpersonal perception at zero acquaintance? A social relations analysis. *Journal of Research in Personality, 36,* 190–207.

Mischel, W. (1977). The interaction of person and situation. In D. Magnusson & N. S. Endler (Eds.), *Personality at the crossroads: Current issues in interactional psychology* (pp. 333–352). Hillsdale, NJ: Erlbaum.

Misoch, S. (2004). *Identitäten im Internet. Selbstdarstellung auf privaten Homepages.* Konstanz, Germany: UVK.

Morf, C., & Rhodewalt, F. (2001). Unraveling the paradoxes of narcissism: A dynamic self-regulatory processing model. *Psychological Inquiry, 12,* 177–196.

Ostendorf, F. (1994). Zur Taxonomie deutscher Dispositionsbegriffe [On the taxonomy of German dispositional adjectives]. In W. Hager & M. Hasselhorn (Eds.), *Handbuch deutschsprachiger Wortnormen* (pp. 382–441). Göttingen, Germany: Hogrefe.

Papacharissi, Z. (2002a). The self online: The utility of personal home pages. *Journal of Broadcasting & Electronic Media, 46,* 346–368.

Papacharissi, Z. (2002b). The presentation of self in virtual life: Characteristics of personal home pages. *Journalism and Mass Communication Quarterly, 79,* 643–660.

Raskin, R., & Terry, H. (1988). A principle components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology, 54,* 890–902.

Rothstein, E. (1996, March, 4). Technology: Connections. Can Twinkies think, and other ruminations on the Web as a garbage depository. *New York Times,* p. D3.

Rushton, J. P., Brainerd, C. J., & Pressley, M. (1983). Behavioral development and construct validity: The principle of aggregation. *Psychological Bulletin, 94,* 18–38.

Schütz, A., & Machilek, F. (2003). Who owns a personal home page? A discussion of sampling problems and a strategy based on a search engine. *Swiss Journal of Psychology, 62,* 121–129.

Schütz, A., Machilek, F., & Marcus, B. (2003). Selbstdarstellung auf privaten Homepages–Ausgangspunkt und erste Ergebnisse [Self-presentation on personal Web sites: Starting point and first results]. In E. Keitel, K. Boehnke, & K. Wenz (Eds.), *Neue Medien im Alltag: Nutzung–Vernetzung–Interaktion* (pp. 234–262). Lengerich, Germany: Pabst.

Schütz, A., Marcus, B., & Sellin, I. (2004). Die Messung von Narzissmus als Persönlichkeitskonstrukt: Psychometrische Eigenschaften einer Lang- und einer Kurzform des Deutschen NPI. [Measuring narcissism as a personality construct: Psychometric properties of a long and a short version of the German Narcissistic Personality Inventory]. *Diagnostica, 50,* 202–218.

Schütz, A., & Sellin, I. (in press). Die multidimensionale Selbstwertskala (MSWS). [The multidimensional self-esteem scale]. Göttingen, Germany: Hogrefe.

Sheehan, K. (2001). E-mail Survey Response Rates: A Review. *Journal of Computer-Mediated Communication* 6 (2). Retrieved May 3, 2005, from http://www.ascusc.org/jcmc/vol6/issue2/sheehan.html

Storrer, A. (1999). Was ist eigentlich eine Homepage? Neue Formen der Wissensorganisation im World Wide Web [What exactly is a Web site? New forms of knowledge organization in the World Wide Web]. *Sprachreport, 1999 (1),* 2–9. Retrieved April 22, 2005, from http://www.hytex.uni-dortmund.de/storrer/papers/homepage.pdf

Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet.* New York: Simon & Schuster.

Vazire, S., & Gosling, S. D. (2004). e-Perceptions: Personality impressions based on personal Web sites. *Journal of Personality and Social Psychology, 87,* 123–132.

Wallace, P. (1999). *The psychology of the Internet.* Cambridge, UK: Cambridge University Press.

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