

From Analog to Digital Psychology: Results from Surveys on Information Behavior among German Psychologists between 1997 and 2010

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Data from four surveys on information behavior of German psychologists conducted between 1997 and 2010 are compared. Results indicate that information behavior of researchers does not seem to have changed fundamentally, with the main focus being on efficiently accessing all pertinent publications. Differences in information needs and behavior between researchers and practitioners point out the importance of considering differing outlooks and available resources regarding scholarly information.

Introduction

The use of electronic communication media has become virtually universal in modern societies over the last decades. Scholarship is of course no exception to this. For example, digitalized communication holds the promise of increasing quantity and quality of research results by speeding up and extending access to resources and by facilitating cooperative work (Dutton & Jeffreys, 2010).

At the same time, it is equally apparent that use of electronic media differs among academic disciplines. Roughly speaking, adoption has so far been much more pervasive in the natural sciences than in the arts and humanities, with social sciences roughly in between (Education for Change, 2002). Even

within those broad categories, there are differences in the ways electronic media are used (Kling & McKim, 2000).

Epistemic and social foundations of disciplines have been identified as the reasons for such divergences (e.g., Kling & McKim, 2000). These works generally follow the notion that researchers in the natural sciences have a more unified understanding of their discipline and cooperative work is much more commonplace than in more “individualist” disciplines (Becher & Trowler, 2001).

It has thus been cautioned that to better understand the big picture, discipline-specific developments in electronic scholarly communication have to be considered (Cronin, 2003). Psychology is a special case in that it encompasses both mechanistic and subject-oriented ways of theorizing; and even though mainstream psychology is now strongly oriented toward the natural science paradigm, it is far from being a unified field, with a multitude of micro-theories coexisting and competing (Lück et al., 2011).

So far, the question of whether and how psychologists have adapted their information behavior in the digital age does not seem to have been investigated. The Leibniz Institute for Psychology Information (ZPID) provides information for the psychology community in German-speaking countries. To adapt its services appropriately, it has been conducting surveys about information needs and behaviors of the community. In the present contribution, results of four surveys sampled between 1997 and 2010 are compared to draw inferences about the transition to digital scholarship in psychology. However, it must be cautioned in advance that the surveys were not designed for time comparison. Therefore, the present study can only serve as a first exploration and basis for further investigation.

Methods

Survey Samples and Their Comparability

Core features of survey samples and prior publications referring to the four surveys analyzed are tabulated in Table 1. Only surveys #1.1 and #1.2 were explicitly designed for comparison purposes (i.e., items are identical). Because sampling dates are reasonably close, the corresponding samples can be meaningfully pooled into the composite survey sample #1 (middle column). Its target population (researchers) and composition of academic positions roughly resemble those of survey #3. By contrasting surveys #1 and #3, changes in researchers' information behavior from around the end of the millennium to 2010 can thus be evaluated.

Survey #2, which was administered in 2003-2004, differs starkly from the others in terms of the target group and gender composition. Therefore, no straightforward comparison with regard to changes over time can be made. However, it offers the interesting possibility of contrasting information behavior among psychologists engaged in research versus (mostly clinical) practice. Therefore, the sample was retained, even though interpretation must remain tentative because survey date and target population are confounded.

Comparability of Survey Items

Surveys #1.1 and #1.2 contained the same set of 25 items pertaining to the frequency of use of different information sources. Scale endpoints were labeled “never” versus “very often.” Surveys #2 and #3 each contained a semantically similar set of items on the use of information sources, with endpoints “never” versus “weekly” and “never” versus “all the time,” respectively. These can be regarded as sufficiently similar to allow comparisons to the items in #1.

However, between the surveys, the particular items contained in the information source item sets only partially overlapped. For example, survey #1 asked about the use of bookstores as a means of procuring information, but surveys #2 and #3 did not. Conversely, survey #3 asked about social networking platforms, while surveys #1 and #2 did not. As the last example shows, the change in information sources that were included in the surveys is, to a good degree, due to the increasing importance of digital communication.

Surveys #2 and #3 each included a set of items asking for the subjective importance of each of several properties of an “information service” (#2) or a “database or other information source” (#3) such as up-to-dateness and ease of use, both with scale endpoints “unimportant” versus “very important.” Table 2 lists categories that served as a conceptual guideline for comparing the frequency of use and importance of information service property items. The actual items falling under these categories are reported in the results section along with their respective scores. (A full list of items in all surveys, including exact wordings and additional descriptive statistics, can be obtained from the corresponding author hans.bauer@zpid.de.)

All scales for frequency of use and information service property items were transformed to a percentile scale to compare means and to facilitate interpretation. (Percentile values reported in the results section thus represent means on a scale interpretable as “percentage of the original scale maximum.”) Also, because partially different sets of information sources and information service properties were asked about in the different surveys, rank

Table 1

Core features of survey samples and prior publications referring to surveys

	Survey #1.1	Survey #1.2	Survey #1	Survey #2	Survey #3
Sampling date	1997	1999	–	2003-2004	2010
Target population	Senior members in German universities' psychology depts.	Junior members in German, Austrian, and Swiss universities' psychology depts.	–	Members of German psychology practitioners' association (BDP)	Members of German psychology researchers' association (DGPs)
Sampling method	Full sampling	Austria, Switzerland: Full population; Germany: every third person in list	–	Random sampling of 1,500 persons from BDP members' directory	Full sampling of 10 of 15 DGPs sections (representing all 15 sections due to multiple memberships)
Survey format	Postal	Postal	–	Postal	E-mail invitation to Web questionnaire
Valid responses (response rate)	265 (48%)	221 (36%)	486 (41%)	324 (22%)	298 (17%)
Academic titles / positions ^a	18% PD, 82% FP	45% Postgrad, 48% Postdoc, 7% PD	21% Postgrad, 22% Postdoc, 13% PD, 44% FP	Not inquired	12% Postgrad, 26% Postdoc, 17% PD, 38% FP, 7% missing
% female ^b	16	32	23	67	38
Mean age	missing	36	missing	44.0	42.9
Used in ^c	A, B	C	–	D, E	F, G, H

Notes. ^a Abbreviations used: PD – Privatdozent (roughly comparable to assistant professor); FP – Full Professor. ^b Gender missing < 3 % in all samples.

^c A – Montada, Krampen, & Burkard (1999); B – Krampen, & Montada (2000); C – Neppi, Wiesenhütter, Krampen, & Montada (2001); D – Becker (2004);

E – Krampen, Becker, Labouvie, & Montada (2004); F, G, H – Krampen, Fell, & Schui (2011, 2012a, 2012b).

Table 2. List of comparison categories for frequency of use of information sources and subjective importance of information service properties

Information sources	Library, literature databases, publication contents, WWW
Information services	Up-to-dateness, quality assurance, internationality, cost, ease of use, search speed, workflow integration, full text access

values are provided as a rough indicator of item score relative to other items in the respective survey.

Finally, surveys #1.1 and #3 contained open-ended questions about “desired improvements in PSYNDEX” (i.e., a psychology literature database produced by the ZPID; see <http://www.zpid.de>) (#1.1) and “typical difficulties while searching for information” (#3). Responses to these were crudely evaluated to identify potential shortcomings in information resources offered to the respondents at the time they were surveyed.

Results

Use of Information Sources

In the composite survey #1, libraries as a means of finding information scored on average 71% (on a scale from “never” to “very often”), ranking second in frequency of use among all 25 sources that were inquired about. Survey #3 did not ask about overall use of libraries, but instead about online library catalogs, which also ranked quite high (third of 32 sources) with a score of 61%. Direct access to the library scored 84% on a scale from “unimportant” to “very important” in survey #3. In contrast, mean use of either online library catalogs or local libraries was only 40% (ranking 14th / 15th among 31 sources) in the practitioner survey #2, on a scale from “never” to “weekly.” (For the frequency of use data, width of 95% confidence intervals for means ranged from 3.7% to 6.6% in survey #1, from 2.8% to 7.9% in survey #2, and from 3.2% to 8.7% in survey #3.)

All three surveys asked about the use of two psychology-focused literature databases: PsycINFO (with a strong focus on English language publications) and PSYNDEX (indexing publications with at least one coauthor from the German-speaking countries). In the late 1990s researchers’ survey #1, the most commonly used format was CD-ROM, whereas PSYNDEX and PsycINFO scored 63% (seventh) and 67% (fourth), respectively. Online

versions were, at this time, used less frequently: 33% for both databases. Surveys #2 and #3 did not ask about database format.

In the 2010 researchers' survey #3, as compared to the late 1990s researchers' survey #1, use of PSYNDEX had somewhat declined (57%, ranking sixth), while PsycINFO was used somewhat more often (73%, second). In the 2003 practitioner survey #2, database use in general was markedly lower, but PSYNDEX was being used more often: 25% (17th) for PSYNDEX and 11% (21st) for PsycINFO. Finally, use of unspecified "other" databases (not inquired about in survey #2) increased from survey #1 to #3: 38% (CD-ROM; 15th) to 45% (12th).

In both researchers' surveys, journals ranked first among the inquired information sources: In survey #1, which asked about browsing publications, browsing of "the top journals in your field" was rated 75%. In survey #3, use of online journals (not specifying in what way, e.g., browsing or chaining) scored 88%. Unspecified journal use was also fairly common among practitioners (79%), but only ranking sixth. Instead, books (87%) were rated as the most heavily used source of information. In survey #1, browsing of "many books" as a means of getting information scored 58% (ninth).

Only survey #3 differentiated between electronic and print versions of publications. With 49% (10th), print journals were used markedly less frequently than online journals by researchers in 2010. Use of open access online journals, which was asked for separately, was rated 56% (seventh). Thus, use of open access journals was less frequent than of journals in general.

The change in survey focus is especially apparent in questions related to use of WWW resources as information sources. Whereas survey #1 only inquired about unspecified "search on the Internet (WWW)," which was rated 48% (10th), survey #3 included 14 WWW-related sources. Most commonly used among them were "conventional search engines" (59%, fifth) and Google Scholar (56%, seventh). With 41% (15th), Google Books was used less frequently. Usage score was 44% for authors' Web sites (13th), 39% for unspecified discipline-specialized Web sites (16th), and 25% for document / preprint servers (24th). Research-oriented social networking platforms and (micro-)blogs were hardly used at all (8% / 30th and 7% / 31st, respectively).

Survey #2 included five WWW-related items. For practitioners in 2003-2004, use of unspecified "Internet search engines" was fairly common (73%, seventh), which was even more true for Google (82%, fourth). Web sites pertinent to professional activity scored 56% (eighth).

Subjective Importance of Information Service Properties

Surveys #2 and #3 asked about perceived importance of several properties of information services (effectively referring to literature databases). Both practitioners in 2003-2004 and researchers in 2010 considered “up-to-dateness of contents” very important: 92% (ranking second among 12 properties inquired about) for practitioner survey #2 and 97% (second among 31 properties) for researcher survey #3 on a scale from “unimportant” to “very important.” (For the importance of properties data, width of 95% confidence intervals for means ranged from 2.2% to 7.0% in survey #2 and from 2.1% to 7.6% in survey #3.)

Quality assurance of contents was also deemed very important by both groups: Practitioners rated “service professionalism” 95% (first) and “certified information” 87% (fourth). Researchers rated “correctness of information” 94% (sixth) and “professional quality assurance” 85% (10th). However, as can be seen from the ranks, even though researchers considered these aspects important, there were several others they deemed at least equally significant, taking random error into account (keep in mind that researchers were asked for a total of 31 properties, whereas practitioners were only asked for 12).

Rated importance was also fairly similar with respect to interdisciplinarity of contents (70% and ninth rank in survey #2, 67% and 18th rank in survey #3) and search speed (#2: 78%, sixth rank; #3: 80%, 12th rank). Integration of services into workflow was considered similarly important: Possibilities for “subsequent processing of information, e.g., in personal databases” were rated 67% (10th) by practitioners. Researchers rated “seamless connection of resources” 72% (15th) and “dataset exporting capabilities” 68% (17th).

Even though “low user fees” were rated as quite important by practitioners (79%, fifth), researchers seemed to place even more emphasis on this aspect: 88% (seventh) for “open access (no charge).” However, the difference may also be due to the wording of the items.

Notable differences between practitioners and researchers emerged with regard to the “internationality of contents”: While practitioners rated this aspect 71% (eighth), researchers considered it one of the most important properties, with a rating of 96% (fourth). There also appears to be a difference regarding preferred search style: Practitioners considered “straightforward, uncomplicated search technology” one of the most important aspects (91%, third). Researchers, in contrast, gave fairly low ratings to ““intelligent” search engines” (52%, 20th) and “recommender systems” (38%, 26th), and higher ratings to “powerful search syntax” (71%, 15th) and “many searchable database fields” (75%, 13th).

The property considered most important by researchers was “direct access to full text” (98%). Practitioners were not asked about this in the context of information service features. However, when asked on a scale from “very low” to “very high” how important they thought online full text services would become in the future, they gave a rating of 68%. On a scale from “never” to “weekly,” they rated their current frequency of use of online full text services at 25%.

Open-Format Answers Regarding Problems in Information Search

Survey #1.2 (see Table 1) asked about “desired improvements” regarding the literature database PSYINDEX. Online access to the database was the most commonly given single answer. Integration of the database into literature management workflow, linking to full texts, and integration with other literature databases were also often mentioned. Another class of frequently given answers referred to improved up-to-dateness and search features.

Survey #3 more generally asked researchers for “typical difficulties encountered while searching for information.” Most often, problems with access to the full text of publications were mentioned. Difficulties concerning search strategy (e.g., choosing proper keywords, filtering results, identifying all pertinent literature) were also quite common. Other notable issues included insufficient coverage of literature by databases (such as confinement to a single discipline, to certain languages, or to certain publication types) and flaws in usability (especially heterogeneity in user interfaces of databases).

Discussion

Finding relevant scholarly information is pertinent to all research-related contexts, and the widespread digitalization of communication has affected the ways in which such information can be obtained. In the present work, information behavior and needs of German psychologists were examined by comparing the results of four surveys conducted between 1997 and 2010, a critical period in terms of the transition to various forms of digital communication.

The surveys appear to be the only ones regarding psychologists in Germany. However, they varied considerably with regard to target population characteristics and survey items. To obtain more valid data, prospectively designed investigations need to be carried out. In addition, because of the known weaknesses of the survey method, such as social desirability or differ-

ing interpretation of items (cf. Lietz, 2010), it is necessary to complement self-report data with observation of actual information behavior. The ZPID aims to implement both approaches, and the purpose of the present work is to serve as a starting point.

In general, information behavior of researchers in psychology does not seem to have changed fundamentally from the late 1990s to 2010. At both points in time, journals are rated as the most frequently used source of information. Notably, in 2010, use of open access journals is still rather infrequent compared to established subscription-based journals. Also, preprint and document servers are only rarely used as information sources in the psychology researchers' community. In terms of disciplinary culture, credit seems to be mainly allocated through publication in well-established, reputable journals, in contrast to the often-cited "preprint culture" in high-energy physics (Kling & McKim, 2000). However, recent data also indicate a trend toward increased publishing in open access journals (Krampen et al., 2012).

Researchers' database use appears to have remained stable in the preceding decade, although there does seem to be a slight shift toward more "international" (i.e., English-language) contents. This is consistent with an ongoing increase in the quota of English-language publications by psychologists from German-speaking countries (Krampen et al., 2012). Use of general-purpose search engines in searching for scholarly information has, as might be expected, increased from the late 1990s to 2010. However, it is important to point out that when searching for such information, psychology researchers still report using specialized databases more often than these search engines, and also more frequently than Google Scholar.

There has been some debate about the role of research libraries in the course of digitalization (e.g., Applegate, 2008). Library Online Public Access Catalogs (OPACs), the primary digital medium of searching library holdings, are one of the most frequently used means of searching information reported by psychology researchers in 2010, even though frequency appears to be somewhat lower than library use in the late 1990s. Despite virtualization, researchers still consider direct access to the library very important.

In general, and consistently over time, psychology researchers' main concern in information search was efficiently identifying and accessing all publications pertinent to their research topic, as evidenced by their comments regarding difficulties and desired improvements in scholarly information searches. Therefore, literature databases like PSYNDEX need to be integrated into more comprehensive systems.

Besides efficiency in obtaining information, the notion of trustworthiness or "approvedness" of sources (usually by peer review) figures prominently in

researchers' information needs. These two motives are probably the main reason for psychologists' near non-existent use of new communication forms like blogs and social networking sites as research information sources. However, most recently, fueled by increased awareness of questionable research practices in psychology (John et al., 2012), increased discontent has been voiced concerning the current publishing regime (e.g., Chambers, 2012), and eventually, innovations in communication may be embraced. This is particularly likely in the case of open access publishing, data sharing, and similar arrangements aimed at increased transparency and removal of barriers to access.

Finally, in the case of psychology in particular, information service providers should be aware of practitioners' perspectives on scholarly information, as evidenced by the practitioners' survey. Comparing this population with the researchers, some remarkable differences in information needs and behavior emerged. Practitioners used general purpose search engines more, but specialized databases less, than researchers did. When using databases, they placed more emphasis on ease of use and less on coverage of international publications. Practitioners also rated books as a more frequently used source of information than journals and made less use of library catalogs.

Clearly, these differences can largely be explained in terms of the availability of information services (e.g., journals or databases via the university library). Making information resources available to practitioners is a crucial challenge if psychological practice is to be grounded in empirical foundations. The results also reinforce the importance of including books and native-language publications in resources such as literature databases and library collections.

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