The Good News about Bad News: Communicating Data Services to Cognitive Misers

Effective communication takes place when the listener clearly understands the message that the speaker intends to send. Library administrators and core staff make challenging decisions to advance the institutional mission while wondering about the best way to communicate to users. This article considers how to communicate and interact with researchers about data management services.

Scholars have explored the nature and implication of social communication for decades. For example, Hovland (1948) defined social communication as "the process by which an individual (the communicator) transmits stimuli (usually verbal symbols) to modify the behavior of other individuals (communicatee)" (p. 371). Crucially, the elements discussed by Hovland situate a source, the content, an audience, and the effect in a model germane to the task: to make sense of the roles and responsibilities of library staff in communicating research-data management services to key constituencies, along with an eye toward behavioral changes for the betterment of data management. More pointedly, through this investigation the authors hope to address the notion that bad information resonates with researchers better than good information, and they hope to explore how that stimuli transmission may be used to inform the ways that libraries approach the promotion of data services broadly and data management practices specifically.

The emergence of research-data management services within academic libraries has prompted many studies about the nature and orientation of these services. Some descriptive works have focused on best practices for structuring and delivering data management services; other consider the tools, resources, and training that academic librarians need in order to

successfully offer these services (Gold, 2007; Heidorn, 2011; Tenopir, Birch & Allard, 2012; Tenopir et al., 2015). In her two-part study, Gold (2007) directly addressed library practitioners on the front lines who are potentially working with faculty and graduate students in the context of data services. She reminded readers that "While social science data services in libraries have existed for decades" (Social science data services section, para 1), with the emergence of new methods and data ubiquity across domains, contemporary data librarianship "breaks more radically with traditional models of academic librarianship, presaging a greater role for libraries in pre-publication scholarship" (Why data matters to libraries section, para. 1). She provided a litany of potential roles "upstream" and "downstream" in the research cycle, and even implored librarians to form strong relationships with researchers and their teams (Proposed roles section). Yet she stopped short of providing guidance about how to communicate to these constituencies.

Heidorn (2011) also enumerated several arguments for why data continues to grow in importance and reminded the academic library community of its oft-expressed mission to steward institutional outputs. Surveying the institutional landscape at the time of writing, he stated his vision plainly: "[L]ibraries are among the only institutions with the capacity to curate many data types" (p. 663). Writing near the same time, Tenopir et al. (2012) produced a white paper reporting the results of a survey from a large swath of academic libraries in the US and Canada. Their report characterized a range of activities through which libraries might participate in the broad rubric of research data services (RDS). Statistics are offered on consulting services, outreach, reference, web guides, and training. A particularly relevant consideration for the present study is the percentage of survey respondents who reported "(RDS) with other librarians, or other people on campus, or RDS professionals, on a semi-regular frequency" (p. 50). The authors found that just over 32% of libraries reported that this activity was currently being

offered or would be offered within a year, while over 53% had no plans to engage in discussions of research data services (p. 17).

Given that "the academic library community has identified data curation as one of the top ten trends in 2012" (Tenopir et al., 2012, p. 3), it is fortunate that a follow-up study was published in 2015. In this study, Tenopir et al. (2015) reported, among other findings, the results of their investigation of the obstacles to the development of research data services: the "recognition of the need for good data management is now widespread" (p. 3). However, they found that the majority of respondents still did not currently offer, or plan to offer, most types of research data services. Surprisingly, they reported that more than 60% of respondents stated no plans to engage in "discussing RDS with others on a semi-regular frequency" (p. 6). In concluding a mismatch between provision of research data services and the stated importance of engagement from libraries, Tenopir et al. said, "however, interviewees noted that it is important to portray RDS as not just a means of compliance, but also as services that will directly benefit the researchers themselves" (p. 18). The authors did not find any other indication that Tenopir and her colleagues pursued the nature and/or tenor of that portrayal, which is a major point of interest in the present investigation.

Targeting specific contributions of academic libraries to research data management, Pinfield, Cox and Smith (2014) provided a useful list of key components of an institutional research data management (RDM) program. The list described functional activities such as policy development, vision setting, process refinement, and technology deployment. Helpfully, Pinfield and colleagues supplemented this list of activities with a collection of qualitative data in the form of participant quotes to offer a glimpse at the nature of the communication involved in

establishing the components of an RDM program. They concluded by generally indicating that while libraries are active participants in RDM, uncertainty reigns, and libraries are:

> focused on creating a "story" around RDM as a coherent concept. RDM is in fact comprised of a number of different strands of activity which might conceivably be seen as separate (albeit related) problems and therefore managed separately. The RDM challenge as being pursued by libraries involves arguing (explicitly or implicitly) for the bundling of these different strands into a single RDM agenda which should then be managed in a coherent way. It is clear that this assumption of the coherence of the RDM agenda has come to inform many of the activities of the participants involved in this research and that of their library organisations and that they see their role partly in terms of advocating such an approach (p. 17).

The authors have written previously about the raised expectations for data sharing tied to changing requirements from granting agencies, especially in Europe and the US (Nicholson & Bennett, 2011). With the increased prevalence of funder mandates, data sharing may be perceived more readily as an important stage in the life cycle of data services. Kim and Adler (2015) provided a glimpse into the personal, organizational, and financial factors influencing data sharing. Their survey revealed that "social scientists' data sharing behaviors are mainly driven by personal motivations and norms of data sharing within the social science disciplines" (p. 416). In developing one of their hypotheses—that perceived normative pressure would have a positive influence on a social scientist's data-sharing behavior—they drew upon Merton's norms of science, especially communalism, which supports and encourages the sharing of scientific knowledge, including the data used to support scientific analysis and results (p. 12). Results of their work pointed up the importance of informal communications among scholars that, among

other things, enable sharing of raw data. The role of journal publishers exerting pressure also comes into play, yet there was no mention of other organizations, such as libraries, playing a role. Commenting in the same vein, Hickson, Poulton, Connor, Richardson and Wolski (2016) found that individual motivation and attitude played an outsized role in influencing data management behavior. Their article takes on added significance as it applied a behavioral change framework, Wolski's A-COM-B, to a small social science research center. [Briefly, A-COM-B describes a framework where *attitude* (A) exerts an overriding influence onto *capability*, *opportunity* and *motivation* (COM), which all interact to generate *behavior* (B) (p.256).] As reported, the aim of A-COM-B to help service providers focus attention and nudge, if not change, researcher practice holds promise. Based on their preliminary reporting about the applicability of this framework, the authors highlighted the importance for "the research support teams to understand individual behaviours within the context of their local cohort level rather than at the larger faculty or institutional level" (p. 257). Hickson et al.'s particular attention to the threat of data loss as a potential trigger motivator bolsters the observations in the present study. The impact of bad news messaging is further reinforced by Hickson et al. as they describe how negative messages may change behavior. Quoting a study participant who discussed institutional mandates against researchers' use of file-sharing tools that are deemed to be less secure than institutionally supported tools, Hickson et al. reported: "'[they] put the fear of god into me about using Dropbox'" (p. 62).

Communication theory, and specifically the activation theory of information exposure, developed by Donohew and Palmgreen (Donohew, 2009), explains individual differences in attention and continued exposure to mass and interpersonal messages. Not wholly unlike Hovland, the theory treats messages as sources of stimulation and holds that success or failure to

attract and hold listeners or viewers is a function of both cognitive and biologically based individual needs. Successful messages, they posited, "are those possessing enough novelty, movement, color, intensity, and other such formal features to generate a level of activation that will maintain attention but not so high as to cause distraction" (p. 12).

One possible way to create a message that will "generate a level of activation and maintain attention" (Donohew, 2009, p. 13) is to accentuate the negative. Baumeister, Bratslavsky, Finkenauer and Vohs (2001) suggested that when a message is framed as bad news, that message will have a stronger impact on its recipient, and thus greater resonance. They attributed much of this to evolutionary theory, pointing to organisms' survival modes, and stated the thesis plainly: "Survival requires urgent attention to possible bad outcomes, but it is less urgent with regard to good ones. Hence, it would be adaptive to be psychologically designed to respond to bad more strongly" (p. 325). What is more, in the absence of an unlimited capacity for information processing, the human brain has to make choices in order to prioritize the information that it receives:

> Insofar as people are cognitive misers, they cannot afford to process all information to an equally full extent, so they must prioritize their cognitive resources and focus on what is important. If bad is generally stronger than good, then information pertaining to bad events should receive more thorough processing than information about good events… (p. 340).

They concluded as follows:

> The principle that bad is stronger than good appears to be consistently supported across a broad range of psychological phenomena. In no area were we able to find a consistent reversal, such that one could draw a firm conclusion that good is stronger than bad. This

> failure to find any substantial contrary patterns occurred despite our own wishes and efforts. We had hoped to identify several contrary patterns, which would have permitted us to develop an elaborate, complex, and nuanced theory about when bad is stronger versus when good is stronger. The most we can say is that occasionally other psychological patterns will override the greater strength of bad things, and the greater strength of bad varies with respect to size, amount of evidence, and methodological strength of evidence. However, the greater strength of bad was apparent nearly everywhere. Hence, we must conclude that bad is stronger than good at a pervasive, general level (p. 354).

With this framework in mind, the authors set out to consider if the notion that negative messages resonate better than positive messages can be used to inform the ways that libraries approach the promotion of data services—specifically communications about data management practices.

Methodology

Acknowledging that researchers are not a monolithic blob, the authors endeavored to look across multiple disciplines in an examination of the types of communal norms that might support and encourage data-sharing behaviors among researchers. To frame this multidisciplinary approach, the authors looked to the quadrant-based classification of academic disciplines developed by Biglan, as described by Becher's *Academic Tribes and Territories* (1989), to guide the selection of disciplines to focus on for deriving a sample. While it might be reasonable to believe that any random sample of researchers across disciplines would point to universal conclusions about researcher behavior, Becher points out that "differences among disciplines and specializations are so essential, compelling, and inescapable that all performance indicators and bureaucratic measures based on common criteria are 'totally inappropriate'" (p.

166). In order to identify communal norms attributable to researchers in different disciplines, the authors selected four diverse academic disciplines, each representing one of Biglan's four quadrants: Hard Pure (biology), Hard Applied (mechanical engineering), Soft Pure (sociology), and Soft Applied (education), as shown in Figure 1.

[Place figure 1 here.]

Once settling on the domains, the authors analyzed ethics statements put forth by the major professional organizations representing each of these four disciplines. Specifically, they focused on what, if anything, these ethics statements said about data sharing within the discipline. To further investigate data-management norms and practices, they then selected the top two journals—as determined by the *Journal Citation Reports* (JCR) rankings, by impact factor, in each of these four disciplines (JCR, 2016)—and examined their instructions to authors in search of data-sharing directives or guidelines.

To examine a communication bridge between the academic domains and libraries, the authors next applied a sentiment-analysis technique to identify the tone (positive, neutral, or negative) of the discussion/description of research data management (RDM) and/or data sharing practices found within the web pages of a small random sample [$N = 10$] of academic libraries, selected from among the member institutions of the Association of Research Libraries (ARL), representing major research libraries in the US and Canada, and Research Libraries UK (RLUK), representing research libraries in the UK and Ireland. Sentiment analysis, also called *opinion mining*, is a field of study that analyzes people's opinions, sentiments, appraisals, attitudes, and emotions toward entities and their attributes expressed in written text (Liu, 2015). Liu further explained that the entities can be products or services, affording a ripe construct to inform the analysis of the RDM-related web pages and their communicative nature. Liu clarifies that:

> *Sentiment words* are natural features as they are words in a language for expressing positive or negative sentiments. For example, *good*, *wonderful*, and *amazing* are positive sentiment words, and *bad*, *poor*, and *terrible* are negative sentiment words. Most sentiment words are adjectives and adverbs, but nouns (e.g., *rubbish*, *junk*, and *crap*) and verbs (e.g., *hate* and *love*) can also be used to express sentiments. Besides individual words, there are also *sentiment phrases* and *idioms*, for example, *cost someone an arm and a leg* (p. 50).

Results

Examination of journal guidelines on data management and data sharing reveal that an overwhelmingly neutral tone was conveyed to authors and potential authors (see Figure 2). Only one of the journals' guidelines could be solidly classified as positive, and none of them were negative. Included among those that were classified with a neutral tone were two journals that were essentially silent about data sharing requirements (or suggestions) in their guidelines to authors.

[Place figure 2 here.]

Similar to the generally neutral sentiment found in journal guidelines, the ethics statements from the premier professional organizations associated with the disciplines named above were—in three out of four cases—explicit in their advocacy for data sharing among scholars in these disciplines, as Figure 3 shows. In two instances, this advocacy was presented in neutral terms, stating that professionals in this field share data "as a regular practice" (although studies of actual researcher behavior may support a different conclusion) (Cragin, Palmer, Carlson & Witt, 2010; Fecher, Friesike & Hebing, 2015; Tenopir et al., 2011). Probably not surprising, some professional organizations address data sharing with a single statement that

manages to contain both positive and negative tone. We found adjacent language promoting free and open exchange and warning against the withholding of information to advance a particular point of view.

[Place figure 3 here.]

The results from the sentiment-analysis coding exercise revealed that only one library put forth a decidedly negative message about the consequences that could arise from poor data management practices. Much more prevalent was a neutral [n = 5] or positive message [n = 4], as Figure 4 shows. Using the Liu framework (2015), the authors found that neutral messages abound, either with service-intimating statements such as “consult us about data management” and other offers to “help with” or “assist with” data plans; or pointers to additional resources that may be useful for developing data management plans. Some of these neutral messages tilt toward the positive, with reminders that good data management “saves time” or may enhance “opportunities for collaboration;” or note that data management plans may make grant applications “more competitive” or “increase the impact” of research. The more overtly positive messages suggest data management to be “important” in “enhancing a researcher’s profile” and “advancing scholarly communication,” or “enabling reuse” of data or even “promoting” scholarly tasks like replication. The instance of strong negative messaging presented imagery of data management “gone wrong.” The impact of this message was enhanced by being placed in opposition to some of the positive benefits of having a strong data management plan.

[Place figure 4 here.]

Discussion and Conclusion

Inspired by Baumeister et al. (2001), and intrigued by Hickson et al.’s (2016) test of a small research center, the authors asked if it might make sense for libraries to infuse their

message about data management with a negatively nuanced tone in order to ensure a stronger impact. Yet the results from this analysis of a small sample of academic libraries revealed scant alignment with the research that indicates negative messages are more likely to gain attention and inspire action from those who are receiving these messages. This is not surprising, as academic librarians have a long tradition of promoting themselves as helpful, supportive, and approachable allies to researchers. Slightly more surprising, neither did the examination of journal guidelines and professional organizations' ethics statements point to the persuasive powers of negative messaging.

It seems reasonable to forecast benefits from researchers making their data available to foster replication and reuse in different contexts. Behavioral change for the good of science and for the good of data curation resulting in infrastructure and citation advances may evolve over time or could be spurred on in part by the way libraries participate in the scholarly communication ecosystem. The authors noticed that some disciplinary journals articulate a need to deposit related data in appropriate repositories, while others acknowledge difficulty preparing and sharing data, and still others remain completely silent on the topic. These observations seem to be aligned with observations from Tenopir et al. (2011) that "Barriers to effective data sharing and preservation are deeply rooted in the practices and culture of the research process as well as the researchers themselves" (p. 1).

As Baumeister et al. (2001) cautioned, we are all cognitive misers who must of necessity prioritize the use of our limited cognitive resources (such as attention, recognition, and memory). Armed with this understanding, libraries may choose to forgo a single unified message, diluted in its appeal to general audiences, and may instead seize the opportunity to craft specific, pointed (and somewhat negative) messages that are targeted to researchers' discipline-specific concerns.

Traditional liaison/collections librarians working in concert with the growing numbers of data specialists can craft messages that explain the essentials (including the negative outcomes that can arise from not having, or not adhering to, a well-constructed data management plan), acknowledge time constraints, and recommend reasonable and actionable protocols to nudge behaviors. Library administrators will do well to find ways to design cross-functional teams or otherwise remove barriers to foster these meaningful collaborations within their organizations. The many-sided perspective arising from these variegated teams will leave them well-positioned to communicate clear risks and rewards of current data management and sharing practices, and to point up standards-based protocols that address ease of use and reuse to ensure the persistence of scholarly data.

The descriptive work offered here is intended to be a catalyst that sparks further discussion and analysis. It would be particularly useful to develop empirical studies that seek to reveal the appropriate components of discipline-specific messaging to researchers, particularly messages around data management and data sharing. It would also be helpful to better understand the barriers that obstruct the receipt of such targeted messages, in order to determine how to infuse an appropriate measure of attention-getting bad news into these messages. The promise of Wolski's A-COM-B framework (Hickson et al., 2016)—and perhaps other studies that offer a similar focus on the multifaceted actors and inputs that influence behavior and behavioral change—presents an opportunity to test a variety of interventions to discover intra-organizational roles and capabilities.

References

Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology, 5*(4), 323-370. doi:10.1037/1089-2680.5.4.323

Becher, T. (1989). *Academic tribes and territories: Intellectual enquiry and the cultures of disciplines*. Milton Keynes [England]: Open University Press.

Cragin, M. H., Palmer, C. L., Carlson, J. R., & Witt, M. (2010). Data sharing, small science and institutional repositories. *Philosophical Transactions: Mathematical, Physical and Engineering Sciences, 368*(1926), 4023-4038. doi:10.1098/rsta.2010.0165

Donohew, L. (2009). Activation theory of information exposure. In S. W. Littlejohn & K. A. Foss (Eds.), *Encyclopedia of communication theory* (Vol. 2, pp. 12-14). Thousand Oaks, CA: Sage. doi:10.4135/9781412959384.n5

Fecher, B., Friesike, S., & Hebing, M. (2015). What drives academic data sharing? *PLoS ONE, 10*(2), e0118053. doi:10.1371/journal.pone.0118053

Gold, A. (2007) Cyberinfrastructure, data, and libraries, part 2: Libraries and the data challenge: Roles and actions for libraries. *D-Lib Magazine, 13*(9/10). doi:10.1045/july20september-gold-pt2

Heidorn, P. B. (2011). The emerging role of libraries in data curation and e-science. *Journal of Library Administration, 51*(7-8), 662-672. doi:10.1080/01930826.2011.601269

Hickson, S., Poulton, K. A., Connor, M., Richardson, J., & Wolski, M. (2016). Modifying researchers' data management practices: A behavioural framework for library practitioners. *IFLA Journal, 42*(4), 253-265. doi:10.1177/0340035216673856

Hovland, C. (1948). Social communication. *Proceedings of the American Philosophical Society, 92*(5), 371-375. Retrieved from http://www.jstor.org/stable/3143048

Journal Citation Reports® (2015 ed.). (2016). Thomson Reuters. Retrieved from http://wokinfo.com/products_tools/analytical/jcr/

Kim, Y., & Adler, M. (2015). Social scientists' data sharing behaviors: Investigating the roles of individual motivations, institutional pressures, and data repositories. *International Journal of Information Management, 35*(4), 408-418. doi:10.1016/j.ijinfomgt.2015.04.007

Liu, B. (2015). *Sentiment analysis: Mining opinions, sentiments, and emotions*. New York, NY: Cambridge University Press. doi.org/10.1017/CBO9781139084789

Nicholson, S. W., & Bennett, T. B. (2011). Data sharing: Academic libraries and the scholarly enterprise. *portal: Libraries and the Academy, 11*(1). 505-516. Retrieved from https://muse.jhu.edu/article/409890

Pinfield, S., Cox, A. M., & Smith, J. (2014). Research data management and libraries: Relationships, activities, drivers and influences: *PLoS ONE, 9*(12) e114734. doi:10.1371/journal.pone.0114734

Tenopir, C., Allard, S., Douglass, K., Aydinoglu, A. U., Wu, L., Read, E., … Frame, M. (2011). Data sharing by scientists: Practices and perceptions. *PLoS ONE, 6*(6), e21101. doi:10.1371/journal.pone.0021101

Tenopir, C., Birch, B., & Allard, S. (2012). *Academic libraries and research data services: Current practices and plans for the future* [white paper]. Association of College and Research Libraries. Retrieved from

http://www.ala.org/acrl/sites/ala.org.acrl/files/content/publications/whitepapers/Tenopir_Birch_Allard.pdf

Tenopir, C., Hughes, D., Allard, S., Frame, M., Birch, B., Baird, L., … Lundeen, A. (2015). Research data services in academic libraries: Data intensive roles for the future? *Journal of eScience Librarianship, 4*(2), e1085. doi:10.7191/jeslib.2015.1085