Choice Architecture for Human-Computer Interaction

Anthony Jameson
German Research Center for Artificial Intelligence, Germany

Bettina Berendt
KU Leuven, Belgium

Silvia Gabrielli
CREATE-NET, Italy

Federica Cena
University of Torino, Italy

Cristina Gena
University of Torino, Italy

Fabiana Vernero
University of Torino, Italy

Katharina Reinecke
University of Michigan, U.S.A.

now
the essence of knowledge
Boston — Delft

Foundations and Trends® in Human-Computer Interaction

Published, sold and distributed by:
now Publishers Inc.
PO Box 1024
Hanover, MA 02339
United States
Tel. +1-781-985-4510
www.nowpublishers.com
sales@nowpublishers.com

Outside North America:
now Publishers Inc.
PO Box 179
2600 AD Delft
The Netherlands
Tel. +31-6-51115274

The preferred citation for this publication is

A. Jameson, B. Berendt, S. Gabrielli, F. Cena, C. Gena, F. Vernero, and K. Reinecke. *Choice Architecture for Human-Computer Interaction*. Foundations and Trends® in Human-Computer Interaction, vol. 7, no. 1-2, pp. 1–235, 2013.

This Foundations and Trends® issue was typeset in LaTeX using a class file designed by Neal Parikh. Printed on acid-free paper.

ISBN: 978-1-60198-797-6

Foundations and Trends® in Human-Computer Interaction
Volume 7, Issue 1-2, 2013

Editorial Board

Editorial Scope

Topics

Foundations and Trends® in Human-Computer Interaction publishes surveys and tutorials on the foundations of human-computer interaction. The scope is broad. The list of topics below is meant to illustrate some of the coverage, and is not intended to be an exhaustive list.

- History of the research community
- Design and evaluation
- Theory
- Technology
- Computer supported cooperative work
- Interdisciplinary influence
- Advanced topics and trends

Information for Librarians

Foundations and Trends® in Human-Computer Interaction, 2013, Volume 7, 4 issues. ISSN paper version 1551-3955. ISSN online version 1551-3963. Also available as a combined paper and online subscription.

Foundations and Trends® in Human-Computer Interaction
Vol. 7, No. 1-2 (2013) 1–235

DOI: 10.1561/1100000028

now
the essence of knowledge

Choice Architecture for Human-Computer Interaction

Anthony Jameson
German Research Center for Artificial Intelligence, Germany
jameson@dfki.de

Bettina Berendt
KU Leuven, Belgium
Bettina.Berendt@cs.kuleuven.be

Silvia Gabrielli
CREATE-NET, Italy
silvia.gabrielli@create-net.org

Federica Cena
University of Torino, Italy
cena@di.unito.it

Cristina Gena
University of Torino, Italy
cgena@di.unito.it

Fabiana Vernero
University of Torino, Italy
vernerof@di.unito.it

Katharina Reinecke
University of Michigan, U.S.A.
reinecke@umich.edu

Contents

Abstract

People in human-computer interaction have learned a great deal about how to persuade and influence users of computing technology. They have much less well-founded knowledge about how to help users choose for themselves. It's time to correct this imbalance. A first step is to organize the vast amount of relevant knowledge that has been built up in psychology and related fields in terms of two comprehensive but easy-to-remember models: The ASPECT model answers the question "How do people make choices?" by describing six *choice patterns* that choosers apply alternately or in combination, based on Attributes, Social influence, Policies, Experience, Consequences, and Trial and error. The ARCADE model answers the question "How can we help people make better choices?" by describing six general high-level *strategies for supporting choice*: Access information and experience, Represent the choice situation, Combine and compute, Advise about processing, Design the domain, and Evaluate on behalf of the chooser. These strategies can be implemented with straightforward interaction design, but for each one there are also specifically relevant technologies. Combining these two models, we can understand virtually all existing and possible approaches to choice support as the application of one or more of the ARCADE strategies to one or more of the ASPECT choice patterns.

After introducing the idea of choice architecture for human-computer interaction and the key ideas of the ASPECT and ARCADE models, we discuss each of the ASPECT patterns in detail and show how the high-level ARCADE strategies can be applied to it to yield specific tactics. We then apply the two models in the domains of online communities and privacy. Most of our examples concern choices *about the use of* computing technology, but the models are equally applicable to everyday choices made *with the help of* computing technology.

A. Jameson, B. Berendt, S. Gabrielli, F. Cena, C. Gena, F. Vernero, and K. Reinecke. *Choice Architecture for Human-Computer Interaction*. Foundations and Trends® in Human-Computer Interaction, vol. 7, no. 1-2, pp. 1–235, 2013.

DOI: 10.1561/1100000028.

1

Introduction

1.1 What Is Choice Architecture for HCI?

If you work in human-computer interaction, you are probably a *choice architect*—even if you have been as unaware of that role as Molière's "bourgeois gentleman" was of having spoken prose all his life.

As Thaler and Sunstein [2008] wrote when introducing the term: "A choice architect has the responsibility for organizing the context in which people make decisions" (p. 3). And users of today's ever-present computing technology are constantly making small choices and large decisions:

1. Sometimes, the main purpose of an interactive system is to help people make a particular type of choice: Think of e-commerce websites and of apps for helping people choose healthy food.

2. Even if the main purpose is different—as with a navigation system that helps you follow a route from one place to another—the user often has choices to make about details—such as which of the several proposed routes to follow. Helping people make these "microchoices" (2.1) better is one (often not obvious) way of enhancing the user experience.

3. Finally, just about any interactive system, regardless of its purpose, requires its users to make some choices about how to operate the system: Which of these two text entry methods should I use to enter text right now? How might I configure this application so as to make it more convenient to use? And might I be better off using some other application instead of this one?

In all of these cases, the fact that the choice is "up to the user" does not release the designers from their responsibility as choice architects to "organize the context" so that users can easily make choices that they will ultimately find satisfactory. But fulfilling this responsibility is easier said than done, if we want to go beyond reliance on designer intuition and familiar design patterns. Good choice architecture for human-computer interaction (HCI) must ultimately be based on a solid understanding of two complex topics:

- The psychology of choice and decision making: How do people go about making choices in their everyday lives, with or without computing technology?

- Strategies and technologies for supporting everyday choice: What are the general ways in which it's possible to help people make better choices; and how can these be applied in the context of—and with the help of—today's interactive computing technology?

This publication aims to equip readers with a coherent understanding of both of these topics, along with an ability to pursue them in more depth by following up on the references. Figure 1.1 gives a preview of the two complementary models that we call the ASPECT and the ARCADE models after their two acronyms: The letters in ASPECT stand for the six *choice patterns* that we introduce to cover the phenomena of everyday choice and decision making. The letters in ARCADE stand for the six high-level *choice support strategies* that we have distilled from previous research and practice.

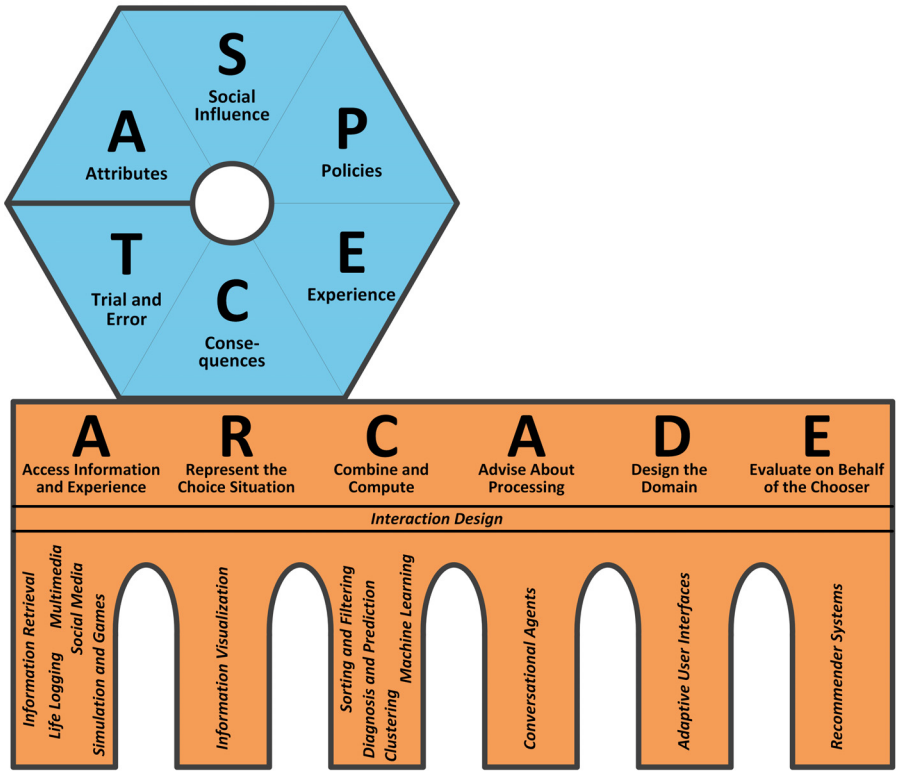

Figure 1.1: High-level overview of the ASPECT and ARCADE models of choice patterns and choice support strategies.

1.2 Hasn't It Already Been Done?

The idea of combining psychology and computing technology to help people make better choices is not new. So why does the HCI field need a new conception of choice architecture? We will explain by first introducing two general conceptual distinctions and then considering in turn several related lines of research and practice.

1.2.1 Preferential vs. Nonpreferential Choice

Many of the "choices" that have received the most attention in the HCI field are *nonpreferential* choices: A user wants to choose the steps (e.g., clicks on particular icons) that are required to achieve a particular goal, such as turning on change-tracking mode in his[1] word processing application. With nonpreferential choices, the question is not what the chooser *prefers* to do but rather what she *has* to do if she wants to achieve a particular goal.

With *preferential choice*—for example, "Shall I turn on change tracking or simply use the commenting functionality to recommend changes to my coauthors?"—a user can prefer one option over another one even though neither one is objectively right or wrong. A preferential choice can be influenced by factors such as the value that the chooser assigns to particular anticipated consequences, the policies the chooser wants to follow, and social expectations that the chooser wants to conform to—a multifaceted set of considerations that will be discussed in connection with the six ASPECT choice patterns.

1.2.2 Persuasion vs. Choice Support

It is also worthwhile to distinguish between two goals that a choice architect can have when attempting to influence a person's choices: *persuasion* versus *choice support*. It is true that neither of these concepts is easy to define crisply and that there are multiple equally reasonable alternative definitions for each concept. Still, there is an important high-level difference between them:

- We will use the term *persuasion* when the goal of the choice architect is to increase the likelihood that the chooser will choose a particular option (e.g., fruit salad instead of cake); or choose an option from some particular class (e.g., fruits and vegetables); or adopt a particular goal (e.g., eat in a more health-conscious way).

[1] To avoid clumsy formulations like "him or her" when using personal pronouns in a generic way, we will alternate between the masculine and feminine forms on an example-by-example basis.

- One possible definition of *choice support* runs as follows: The goal is to help the chooser make the choice in such a way that, from some relevant perspective, the chooser will be satisfied with the choice. One candidate for a "relevant perspective" is: "after learning about the consequences of the choice and taking the time to reflect on all important aspects of it". But other definitions can be argued for. In fact, a first step toward getting better at supporting choice is to understand better what constitutes a "good choice" from the point of view of the chooser (see the discussion in 3.6 below).

These two goals of persuasion and choice support can be pursued simultaneously in various ways. Sometimes, persuasion is used even when the top-level goal is that of choice support. A doctor who tries to persuade a patient to stop smoking presumably believes that the patient will ultimately approve of this choice from some relevant perspective. And in fact maybe the patient has arrived at this conclusion himself and begged the doctor to "persuade" him to perform the specific actions required to stop smoking.

Conversely, even if your top-level goal is to induce a chooser C to choose a particular option O that is in your own interest—for example, the option of buying your software application—adopting choice support as a subgoal can be a good strategy, for either of two reasons:

- You are convinced that C, given high-quality, unbiased choice support, will conclude for herself that O is her best option.

- There are various specific ways of executing O (e.g., various ways of using your software application); and you think that by helping C to choose the specific ways that are best for her, you will increase the likelihood that she will find it attractive to execute O.

Because of these and other interrelationships, techniques for persuasion and choice support can be compared to the black and white keys on the piano (Jameson, 2013): There are some tunes that you can play on just the black keys or on just the white keys; but if you know

how to use all of the keys together, your range of possibilities is vastly increased.

1.2.3 Thaler and Sunstein's Conception of Choice Architecture

Thaler and Sunstein [2008], who coined the term *choice architecture*, present a synthesis of psychological research (chaps. 1–4) that overlaps at many points with the synthesis in our newer ASPECT model, along with six "principles of good choice architecture" (chap. 5), captured with the acronym NUDGES, which suggest how to help people make better choices in everyday life. The remaining 13 chapters of this stimulating and influential book discuss in detail how their principles can be applied in a variety of areas of life, such as personal finance and health.

The relevance of this work for the HCI field is somewhat limited by the fact that Thaler and Sunstein do not devote particular attention to computing technology, either as a means for supporting everyday choice or as a domain in which choices need to be made. Also, as is understandable for a best-selling book, the synthesis of psychological research and the NUDGES principles do not have the clearly articulated structure and explicit grounding in previous literature that is required in a solid foundation for HCI researchers and practitioners. Work that has built on Thaler and Sunstein's conception (e.g., Johnson et al. [2012]) has begun in both of these respects to make the idea of choice architecture more relevant to HCI, but there are still many gaps for the present work to fill.

It is instructive to relate the concept of a *nudge*, which lies at the center of Thaler and Sunstein's conception of choice architecture, to the two conceptual distinctions just introduced above. On close inspection, we can see that the term *nudge* has several different meanings even in these authors' own book:

1. It often refers to a mild form of persuasion intended to bias a person's choice in the direction of a particular option while still being largely compatible with the goal of choice support in that the suggested option seems to be at least reasonably good for the

chooser and in any case the chooser is not compelled to choose it.[2] One of the types of nudge that they suggest (see, e.g., chaps. 5, 6, and 11)—the careful design of default options (cf. 6.2 below)—clearly illustrates this interpretation of the concept of a nudge.

2. Other forms of nudge that they propose—such as structuring complex choices, giving informative feedback, and helping people to "map" information onto concepts that are meaningful for them—can be useful approaches to supporting preferential choice that do not necessarily involve bias toward any particular option. We will be discussing these forms of choice support (along with many others) at many points in the present publication, relating them to the ASPECT and ARCADE models.

3. Finally, several of the forms of nudge can be seen as approaches to supporting *nonpreferential* choice. Under the category "Expect error", the authors present ideas, which will look familiar to readers from the HCI field, about how to help people to avoid doing the objectively wrong thing (e.g., forgetting to attach a document to an email message). Their examples of the nudges in the previous category likewise sometimes concern nonpreferential choice.

The existence of these very different meanings limits the usefulness of the term *nudge* as a way of communicating about tactics for choice support and persuasion. In particular, we may be inclined to agree readily that "people could use a nudge" when we think of the broad meaning that includes any sort of intervention to support or influence choices; but when doing so we can be interpreted as having accepted, in the narrow meaning of the term, a vision of a world in which people's choice processes are constantly being intentionally biased in subtle ways, often without their awareness.

[2] They write: A nudge is "any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives" (p. 6).

1.2.4 Persuasive Technology

When HCI people hear the idea of "helping people make better choices", they often think of persuasive technology: a line of research and practice which was introduced mainly by B. J. Fogg (2003) and which has since become widely represented both in the research literature and in practical systems and interface design methodologies. Like the present publication, Fogg's seminal book systematically combines research from psychology with a framework for making use of the research results in interactive computing technology. Many others have expanded and fleshed out Fogg's framework, and persuasive technology constitutes an important part of a choice architecture for HCI.

A limitation is that persuasive technology focuses squarely on persuasion, as opposed to choice support, as a way of influencing people's choices. It therefore does not provide direct guidance to choice architects who are pursuing the goal of choice support. For this purpose, we need to exploit and organize (in the ASPECT and ARCADE models) a vast amount of literature on choice and choice support that is seldom taken into account in the persuasive technology area.

Paradoxically, our inclusion of concepts and research results that are not oriented toward persuasion may well provide new ideas even to readers who are interested exclusively in persuasion. The reason is that just about every tactic that is designed with the goal of supporting choice can also be (mis)applied in an intentionally biased way (4.7.1). In the present work, we will focus our attention almost entirely on choice support efforts that are not characterized by intentional bias; readers more interested in persuasion will find it easy enough to work out biased versions of any new ideas that they acquire here.

1.2.5 Recommender Systems

A major computing paradigm that can be seen as supporting everyday nonpreferential choice is that of *recommender systems* (see, e.g., Jannach et al., 2011; Ricci et al., 2011). These systems aim to support and influence users' choices concerning products to buy, documents to read, and a variety of other types of item. As we will see in Section 4,

recommender systems essentially implement one of the six ARCADE strategies for choice support, *Evaluate on Behalf of the Chooser*: They typically apply any of a variety of algorithms to predict how satisfied a given chooser would be with particular options. In some cases, an algorithm of this sort can be seen as realizing a variant of one of the six ASPECT choice patterns. For example, some variants of the popular paradigm of *collaborative filtering* (see, e.g., Ekstrand et al., 2011) can be seen as automating a variant of the socially based choice pattern (3.3.4; Section 8), since they make use of information about choices or evaluations made by people who are similar to the current chooser.

1.2.6 Other Contributing Technologies

There are a number of other areas of computer science which, like persuasive technology and recommender systems, contribute techniques that can be used as part of a choice architecture. A number of these are discussed in Section 4 in connection with the ARCADE strategies, which help to explain how they fit into the picture.

1.3 Preview of the Rest of This Publication

Section 2 introduces the several types of choice problem that will yield most of the examples for the present publication. Section 3 offers a compact but broad overview of how people make everyday choices, introducing the ASPECT model. Section 4 introduces the other major part of our conceptual framework, the six high-level ARCADE strategies, giving initial examples of their application and discussing the most important technologies that can be used to realize these strategies. Each of the subsequent six major sections looks at one of the ASPECT choice patterns in more depth, summarizing key ideas from psychological research and discussing how the ARCADE strategies can be applied to support choosing according to the pattern. In the final two main sections, we illustrate how the ASPECT and ARCADE models can help to enhance understanding of choice processes in two important contexts: online communities and privacy, respectively. The final brief section

lists several directions in which the foundation laid in this work can be extended in future work.

References

Alessandro Acquisti and Jens Grossklags. Privacy attitudes and privacy behavior—losses, gains, and hyperbolic discounting. In *Economics of Information Security*, pages 165–178. 2004.

Irwin Altman. Privacy: A conceptual analysis. *Environment and Behavior*, 8 (1):7–29, 1976.

Morgan Ames and Mor Naaman. Why we tag: Motivations for annotation in mobile and online media. In Bo Begole, Stephen Payne, Elizabeth Churchill, Rob S. Amant, David Gilmore, and Mary B. Rosson, editors, *Human Factors in Computing Systems: CHI 2007 Conference Proceedings*, pages 971–980. ACM, New York, 2007.

Elisabeth André, Thomas Rist, and Jochen Müller. Employing AI methods to control the behavior of animated interface agents. *Applied Artificial Intelligence*, 13:415–448, 1999.

D. Anthony, D. Kotz, and T. Henderson. Privacy in location-aware computing environments. *IEEE Pervasive Computing*, 6, 2007.

Dan Ariely. *Predictably Irrational*. HarperCollins, New York, 2008.

Richard P. Bagozzi. The legacy of the technology acceptance model and a proposal for a paradigm shift. *Journal of the Association for Information Systems*, 8(4):243–255, 2007.

Peter J. Bayley, Jennifer C. Frascino, and Larry R. Squire. Robust habit learning in the absence of awareness and independent of the medial temporal lobe. *Nature*, 436(7050):550–553, 2005.

Gerard Beenen, Kimberly Ling, Xiaoqing Wang, Klarissa Chang, Dan Frankowski, Paul Resnick, and Robert E. Kraut. Using social psychology to motivate contributions to online communities. In Jim Herbsleb and Gary Olson, editors, *Proceedings of the 2004 Conference on Computer-Supported Cooperative Work*, pages 212–221. ACM, New York, 2004.

Victoria Bellotti, Maribeth Back, W.K̃. Edwards, Rebecca E. Grinter, Austin Henderson, and Cristina Lopez. Making sense of sensing systems: Five questions for designers and researchers. In Loren Terveen, Dennis Wixon, Elizabeth Comstock, and Angela Sasse, editors, *Human Factors in Computing Systems: CHI 2002 Conference Proceedings*, pages 415–422. ACM, New York, 2002.

M. Benisch, P. Kelley, N. Sadeh, and L. Cranor. Capturing location-privacy preferences: Quantifying accuracy and user-burden tradeoffs. *Personal and Ubiquitous Computing*, 2010.

B. Berendt, D. Clarke, R. De Wolf, B. Gao, J. Pierson, S. Preibusch, and R. Sayaf. SPION Deliverable 5.1 Report on Research Activities (Identity Management), 2012. COSIC Internal Technical Report, K.U. Leuven, Belgium.

Bettina Berendt. Ranking – use and usability. *Bulletin of the Belgian Mathematical Society — Simon Stevin*, 16:745–768, 2009.

Bettina Berendt. More than modelling and hiding: Towards a comprehensive view of web mining and privacy. *Data Mining and Knowledge Discovery*, 24(3):697–737, 2012.

Bettina Berendt, Oliver Günther, and Sarah Spiekermann. Privacy in e-commerce: Stated preferences vs. actual behavior. *Communications of the ACM*, 48(4):101–106, 2005.

Tilmann Betsch and Susanne Haberstroh, editors. *The Routines of Decision Making*. Erlbaum, Mahwah, NJ, 2005a.

Tilmann Betsch and Susanne Haberstroh. Current research on routine decision making: Advances and prospects. In Tilmann Betsch and Susanne Haberstroh, editors, *The Routines of Decision Making*. Erlbaum, Mahwah, NJ, 2005b.

James R. Bettman, Mary F. Luce, and John W. Payne. Constructive consumer choice processes. *Journal of Consumer Research*, 25:187–217, 1998.

Sudeep Bhatia. Associations and the accumulation of preference. *Psychological Review*, 120(3):522–543, 2013.

Suresh K. Bhavnani and Bonnie E. John. The strategic use of complex computer systems. *Human-Computer Interaction*, 15(2/3):107–137, 2000.

Suresh K. Bhavnani, Frederick A. Peck, and Frederick Reif. Strategy-based instruction: Lessons learned in teaching the effective and efficient use of computer applications. *ACM Transactions on Computer-Human Interaction*, 15(1), 2008.

Randolph G. Bias and Deborah J. Mayhew. *Cost-Justifying Usability: An Update for the Internet Age*. Morgan Kaufmann, San Francisco, 2005.

Jonathan Bishop. Increasing participation in online communities: A framework for human-computer interaction. *Computers in Human Behavior*, 23: 1881–1893, 2007.

Gerd Bohner, Hans-Peter Erb, and Frank Siebler. Information processing approaches to persuasion: Integrating assumptions from the dual- and single-processing perspectives. In William D. Crano and Radmila Prislin, editors, *Attitudes and Attitude Change*. Psychology Press, New York, 2008.

John Brooke. SUS — a quick and dirty usability scale. In Patrick W. Jordan, Bruce Thomas, Bernard A. Weerdmeester, and Ian L. McClelland, editors, *Usability Evaluation in Industry*, pages 189–194. Taylor & Francis, London, 1996.

Duncan P. Brumby and Andrew Howes. Strategies for guiding interactive search: An empirical investigation into the consequences of label relevance for assessment and selection. *Human-Computer Interaction*, 23:1–46, 2008.

A. J. Brush, John Krumm, and James Scott. Exploring end user preferences for location obfuscation, location-based services, and the value of location. In *Proceedings of the 12th ACM International Conference on Ubiquitous Computing*, 2010.

Susan L. Bryant, Andrea Forte, and Amy Bruckman. Becoming Wikipedian: Transformation of participation in a collaborative online encyclopedia. In *Proceedings of the 2005 International ACM SIGGROUP Conference on Supporting Group Work*, 2005.

Sven Buschbeck, Anthony Jameson, Adrian Spirescu, Tanja Schneeberger, Raphaël Troncy, Houda Khrouf, Osma Suominen, and Eero Hyvönen. Parallel faceted browsing. In *Extended Abstracts of CHI 2013, the Conference on Human Factors in Computing Systems (Interactivity Track)*, 2013.

Jerome R. Busemeyer and James T. Townsend. Decision field theory: A dynamic-cognitive approach to decision making in an uncertain environment. *Psychological Review*, 100(3):432–459, 1993.

Stuart Card. Information visualization. In Julie A. Jacko, editor, *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*, pages 515–548. CRC Press, Boca Raton, FL, 3rd edition, 2012.

Stuart K. Card, Thomas P. Moran, and Allen Newell. *The Psychology of Human-Computer Interaction*. Erlbaum, Hillsdale, NJ, 1983.

J. M. Carroll and M. B. Rosson. The paradox of the active user. In J. M. Carroll, editor, *Interfacing Thought: Cognitive Aspects of Human-Computer Interaction*, pages 80–111. MIT Press, Cambridge, MA, 1987.

Suzanne C. Charman and Andrew Howes. The adaptive user: An investigation into the cognitive and task constraints on the generation of new methods. *Journal of Experimental Psychology: Applied*, 9(4):236–248, 2003.

Luca Chittaro. Passengers' safety in aircraft evacuations: Employing serious games to educate and persuade. In *Proceedings of Persuasive Technology 2012*, pages 215–226, 2012.

Robert B. Cialdini. *Influence: The Psychology of Persuasion*. HarperCollins, New York, 2007.

Robert B. Cialdini and Noah J. Goldstein. Social influence: Compliance and conformity. *Annual Review of Psychology*, 55:591–621, 2004.

Robert T. Clemen and Terence Reilly. *Making Hard Decisions With DecisionTools*. Cengage Learning, Australia, 3rd edition, 2013.

Jonathan D. Cohen, Samuel M. McClure, and Angela J. Yu. Should I stay or should I go? how the human brain manages the trade-off between exploitation and exploration. *Philosophical Transactions of the Royal Society*, 362: 933–942, 2007.

Dan Cosley, Dan Frankowski, Loren Terveen, and John Riedl. Using intelligent task routing and contribution review to help communities build artifacts of lasting value. In Rebecca Grinter, Thomas Rodden, Paul Aoki, Ed Cutrell, Robin Jeffries, and Gary Olson, editors, *Human Factors in Computing Systems: CHI 2006 Conference Proceedings*, pages 1037–1046. ACM, New York, 2006.

Dan Cosley, Dan Frankowski, Loren Terveen, and John Riedl. SuggestBot: Using intelligent task routing to find work in Wikipedia. In Tessa Lau and Angel R. Puerta, editors, *IUI 2007: International Conference on Intelligent User Interfaces*, pages 32–41. ACM, New York, 2007.

Lorrie F. Cranor, Praveen Guduru, and Manjula Arjula. User interfaces for privacy agents. *ACM Transactions on Computer-Human Interaction*, 13 (2):135–178, 2006.

Antonio R. Damasio. *Descartes' Error: Emotion, Reason and the Human Brain*. G. P. Putnam's Sons, New York, 1994.

Jan De Houwer. Conditioning as a source of liking: There is nothing simple about it. In Michaela Wänke, editor, *Social Psychology of Consumer Behavior*. Psychology Press, New York, 2009.

Clarisse S. De Souza and Jenny Preece. A framework for analyzing and understanding online communities. *Interacting with Computers*, 16(3):579–610, 2004.

Ap Dijksterhuis, Maarten W. Bos, Loran F. Nordgren, and Rick B. van Baaren. On making the right choice: The deliberation-without-attention effect. *Science*, 311:1005–1007, 2006.

Ap Dijksterhuis, Rick B. van Baaren, Karin C. Bongers, Maarten W. Bos, Matthijs L. van Leeuwen, and Andries van der Leij. The rational unconscious: Conscious versus unconscious thought in complex consumer choice. In Michaela Wänke, editor, *Social Psychology of Consumer Behavior*. Psychology Press, New York, 2009.

Alan J. Dix. Information processing, context and privacy. In *Proceedings of the IFIP TC13 Third Interational Conference on Human-Computer Interaction*, pages 15–20, Amsterdam, 1990. North-Holland Publishing Co.

Peter Druschel, Michael Backes, and Rodica Tirtea. The right to be forgotten—Between expectations and practice, 2012. ENISA Report.

W. K. Edwards, M. W. Newman, and J. Z. Sedivy. The case for recombinant computing. Technical Report Technical Report CSL-01-1, Xerox PARC, 2001.

Ward Edwards and B. Fasolo. Decision technology. *Annual Review of Psychology*, 52:581–606, 2001.

Michael D. Ekstrand, John T. Riedl, and Joseph A. Konstan. Collaborative filtering recommender systems. *Foundations and Trends in Human-Computer Interaction*, 4(2):81–173, 2011.

Seymour Epstein. Demystifying intuition: What it is, what it does, and how it does it. *Psychological Inquiry*, 21:295–312, 2010.

Lujun Fang and Kristen LeFevre. Privacy wizards for social networking sites. In Michael Rappa, Paul Jones, Juliana Freire, and Soumen Chakrabarti, editors, *Proceedings of the 19th International Conference on World Wide Web*, pages 351–360. ACM, New York, 2010.

Klaus Fiedler and Peter Juslin, editors. *Information Sampling and Adaptive Cognition*. Cambridge University Press, Cambridge, UK, 2006.

Baruch Fischhoff. Debiasing. In *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge University Press, Cambridge, UK, 1982.

Baruch Fischhoff. Value elicitation: Is there anything in there? *American Psychologist*, 46(8):835–847, 1991.

Baruch Fischhoff. Constructing preferences from labile values. In Sarah Lichtenstein and Paul Slovic, editors, *The Construction of Preference*. Cambridge University Press, Cambridge, UK, 2006.

Martin Fishbein and Icek Ajzen. *Predicting and Changing Behavior: The Reasoned Action Approach*. Taylor & Francis, New York, 2010.

B. J. Fogg. *Persuasive Technology: Using Computers to Change What We Think and Do*. Morgan Kaufmann, San Francisco, 2003.

Craig R. Fox and Amos Tversky. A belief-based account of decision under uncertainty. *Management Science*, 44(7):879–895, 1998.

D. Frankowski, D. Cosley, S. Sen, L. Terveen, and J. Riedl. You are what you say: Privacy risks of public mentions. In *Proceedings of the 29th Annual International ACM SIGIR Conference on Research and Development in Information Retrieval*, pages 572–579, 2006.

Dan Frankowski, Shyong K. Lam, Shilad Sen, F. M. Harper, Scott Yilek, Micheal Cassano, and John Riedl. Recommenders everywhere: The wikiLens community-maintained recommender system. In *International Symposium on Wikis and Open Collaboration*, pages 47–60, 2007.

Simon French, John Maule, and Nadia Papamichail. *Decision Behaviour, Analysis, and Support*. Cambridge University Press, Cambridge, UK, 2009.

Wai-Tat Fu and J. R. Anderson. From recurrent choice to skill learning: A reinforcement-learning model. *Journal of Experimental Psychology: General*, 135(2):184–206, 2006.

Wai-Tat Fu and Peter Pirolli. SNIF-ACT: A cognitive model of user navigation on the world wide web. *Human-Computer Interaction*, 22:355–412, 2007.

B. Gao and B. Berendt. Feedback and awareness aspects. In A. Acquisti, E. Balsa, B. Berendt, D. Clarke, R. De Wolf, C. Diaz, B. Gao, S.F. Gürses, A. Kuczerawy, J. Pierson, F. Piessens, R. Sayaf, T. Schellens, F. Stutzman, B. Van Alsenoy, and E. Vanderhoven, editors, *SPION Deliverable 2.1 State of the Art*. 2011.

Bo Gao, Bettina Berendt, Dave Clarke, Ralf D. Wolf, Thomas Peetz, Jo Pierson, and Rula Sayaf. Interactive grouping of friends in OSN: Towards online context management. In Jilles Vreeken, Charles Ling, Mohammed J. Zaki, Arno Siebes, Jeffrey X. Yu, Bart Goethals, Geoffrey I. Webb, and Xindong Wu, editors, *12th IEEE International Conference on Data Mining Workshops*, pages 555–562. IEEE Computer Society, 2012.

Margaret M. Gardiner. Episodic and semantic memory. In Margaret M. Gardiner and Bruce Christie, editors, *Applying Cognitive Psychology to User-Interface Design*, pages 135–161. Wiley, Chichester, England, 1987.

Margaret M. Gardiner and Bruce Christie, editors. *Applying Cognitive Psychology to User-Interface Design*. Wiley, Chichester, England, 1987.

Gerd Gigerenzer. *Gut Feelings: The Intelligence of the Unconscious*. Penguin, London, 2007.

Gerd Gigerenzer. *Risk Savvy: How to Make Good Decisions*. Penguin, New York, 2014.

Gerd Gigerenzer and Peter M. Todd, editors. *Simple Heuristics That Make Us Smart*. Oxford, New York, 1999.

Daniel T. Gilbert, Elizabeth C. Pinel, Timothy D. Wilson, Stephen J. Blumberg, and Thalia P. Wheatley. Durability bias in affective forecasting. In Thomas Gilovich, Dale Griffin, and Daniel Kahneman, editors, *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge University, Press, Cambridge, 2002.

Thomas Gilovich, Dale Griffin, and Daniel Kahneman, editors. *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge University, Press, Cambridge, 2002.

Paul W. Glimcher and Ernst Fehr. *Neuroeconomics: Decision Making and the Brain*. Elsevier, Amsterdam, 2nd edition, 2014.

Andreas Glöckner. Does intuition beat fast and frugal heuristics? A systematic empirical analysis. In Henning Plessner, Cornelia Betsch, and Tilmann Betsch, editors, *Intuition in Judgement and Decision Making*. Erlbaum, New York, 2008.

Mark A. Gluck, Eduardo Mercado, and Catherine Myers. *Learning and Memory: From Brain to Behavior*. Worth, New York, 2nd edition, 2014.

Wayne D. Gray and Deborah A. Boehm-Davis. Milliseconds matter: An introduction to microstrategies and to their use in describing and predicting interactive behavior. *Journal of Experimental Psychology: Applied*, 6(4): 322–335, 2000.

K. Greene, V. J. Derlega, and A. Mathews. Self-disclosure in personal relationships. In A. Vangelisti and D. Perlman, editors, *Cambridge Handbook of Personal Relationships*, pages 409–427. Cambridge University Press, Cambridge, UK, 2006.

Stephen J. Guastello. *Human Factors Engineering and Ergonomics: A Systems Approach*. Taylor & Francis, Boca Raton, FL, 2nd edition, 2014.

Seda Gürses and Claudia Diaz. Two tales of privacy in online social networks. *IEEE Security & Privacy*, 11(3):29–37, 2013.

Reid Hastie. Problems for judgment and decision making. *Annual Review of Psychology*, 52:653–683, 2001.

Reid Hastie and Robyn M. Dawes. *Rational Choice in an Uncertain World*. Sage, Thousand Oaks, CA, 2nd edition, 2010.

Daniel M. Hausman. *Preference, Value, Choice, and Welfare*. Cambridge University Press, Cambridge, UK, 2012.

Marti A. Hearst. *Search User Interfaces*. Cambridge University Press, Cambridge, UK, 2009.

Ralph Hertwig, Greg Barron, Elke U. Weber, and Ido Erev. The role of information sampling in risky choice. In Klaus Fiedler and Peter Juslin, editors, *Information Sampling and Adaptive Cognition*. Cambridge University Press, Cambridge, UK, 2006.

Judith H. Hibbard and Ellen Peters. Supporting informed consumer health care decisions: Data presentation approaches that facilitate the use of information in choice. *Annual Review of Public Health*, 24:413–433, 2003.

Thomas T. Hills, Peter M. Todd, and Robert L. Goldstone. The central executive as a search process: Priming exploration and exploitation across domains. *Journal of Experimental Psychology: General*, 139(4):590–609, 2010.

Robin Hogarth. *Educating Intuition*. University of Chicago Press, Chicago, 2001.

Robin M. Hogarth. On the learning of intuition. In Henning Plessner, Cornelia Betsch, and Tilmann Betsch, editors, *Intuition in Judgement and Decision Making*. Erlbaum, New York, 2008.

Christopher K. Hsee. Attribute evaluability: Its implications for joint-separate evaluation reversals and beyond. In Daniel Kahneman and Amos Tversky, editors, *Choices, Values, and Frames*. Cambridge University Press, Cambridge, UK, 2000.

Darrell Huff. *How to Lie With Statistics*. Norton, New York, 1993. Originally published in 1954.

G. Iachello, I. Smith, S. Consolovo, M. Chen, and G. Abowd. Developing privacy guidelines for social location disclosure applications and services. In *Proceedings of the 2005 Symposium on Usable Privacy and Security*, New York, 2005. ACM.

Giovanni Iachello and Jason Hong. End-user privacy in human-computer interaction. *Foundations and Trends in Human-Computer Interaction*, 1 (1):1–137, 2007.

Walter Isaacson. *Steve Jobs*. Simon & Schuster, New York, 2011.

Alice M. Isen and Aparna A. Labroo. Some ways in which positive affect facilitates decision making and judgment. In Sandra L. Schneider and James Shanteau, editors, *Emerging Perspectives on Judgment and Decision Research*. Cambridge University Press, Cambridge, UK, 2003.

Sheena Iyengar. *The Art of Choosing*. Hachette, New York, 2010.

Sheena S. Iyengar and Mark R. Lepper. When choice is demotivating: Can one desire too much of a good thing? *Journal of Personality and Social Psychology*, 79:995–1006, 2000.

Anthony Jameson. How can persuasive technology help people choose for themselves? In Shlomo Berkovsky and Jill Freyne, editors, *Proceedings of Persuasive 2013*. Springer, Berlin, 2013. Abstract of a keynote address.

Anthony Jameson and Krzysztof Z. Gajos. Systems that adapt to their users. In Julie A. Jacko, editor, *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*. CRC Press, Boca Raton, FL, 3rd edition, 2012.

Anthony Jameson and Kerstin Klöckner. User multitasking with mobile multimodal systems. In Wolfgang Minker, Dirk Bühler, and Laila Dybkjær, editors, *Spoken Multimodal Human-Computer Dialogue in Mobile Environments*, pages 349–377. Springer, Dordrecht, 2005.

Anthony Jameson and Barry Smyth. Recommendation to groups. In Peter Brusilovsky, Alfred Kobsa, and Wolfgang Nejdl, editors, *The Adaptive Web: Methods and Strategies of Web Personalization*, pages 596–627. Springer, Berlin, 2007.

Dietmar Jannach, Markus Zanker, Alexander Felfernig, and Gerhard Friedrich. *Recommender Systems: An Introduction*. Cambridge, Cambridge, UK, 2011.

Blair T. Johnson, Gregory R. Maio, and Aaron Smith-McLallen. Communication, attitude change: Causes, processes, and effects. In Dolores Albarracín, Blair T. Johnson, and Mark P. Zanna, editors, *The Handbook of Attitudes*. Erlbaum, Mahwah, NJ, 2005.

Eric J. Johnson and Daniel G. Goldstein. Do defaults save lives? *Science*, 302 (5649):1338–1339, 2003.

Eric J. Johnson, Suzanne B. Shu, Benedict G. Dellaert, Craig Fox, Daniel G. Goldstein, Gerald Häubl, Richard P. Larrick, John W. Payne, Ellen Peters, David Schkade, Brian Wansink, and Elke U. Weber. Beyond nudges: Tools of a choice architecture. *Marketing Letters*, 23:487–504, 2012.

Jeff Johnson. *Designing With the Mind in Mind: A Simple Guide to Understanding User Interface Design Rules*. Morgan Kaufmann, Burlington, MA, 2010.

Joseph G. Johnson and Jerome R. Busemeyer. Rule-based decision field theory: A dynamic computational model of transitions among decision-making strategies. In Tilmann Betsch and Susanne Haberstroh, editors, *The Routines of Decision Making*. Erlbaum, Mahwah, NJ, 2005.

Helmut Jungermann and Katrin Fischer. Using expertise and experience for giving and taking advice. In Tilmann Betsch and Susanne Haberstroh, editors, *The Routines of Decision Making*. Erlbaum, Mahwah, NJ, 2005.

Helmut Jungermann, Hans-Rüdiger Pfister, and Katrin Fischer. *Die Psychologie der Entscheidung [The Psychology of Decision Making]*. Spektrum, Heidelberg, 2010.

Daniel Kahneman. *Thinking, Fast and Slow*. Farrar, Straus and Giroux, New York, 2011.

Daniel Kahneman and Amos Tversky. Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2):263–295, 1979.

Daniel Kahneman and Amos Tversky. Choices, values, and frames. *American Psychologist*, 39(4):341–350, 1984.

Daniel Kahneman, Amos Tversky, and Paul Slovic. *Judgment Under Uncertainty: Heuristics and Biases*. Cambridge University Press, Cambridge, UK, 1982.

Tatsuya Kameda, R. S. Tindale, and James H. Davis. Cognitions, preferences, and social sharedness: Past, present, and future directions in group decision making. In Sandra L. Schneider and James Shanteau, editors, *Emerging Perspectives on Judgment and Decision Research*. Cambridge University Press, Cambridge, UK, 2003.

Ralph L. Keeney. *Value-Focused Thinking: A Path to Creative Decisionmaking*. Harvard, Cambridge, MA, 1992.

David Kieras. Model-based evaluation. In Andrew Sears and Julie A. Jacko, editors, *The Human-Computer Interaction Handbook: Fundamentals, Evolving Technologies and Emerging Applications*, pages 1191–1208. CRC Press, Boca Raton, FL, 2nd edition, 2008.

Sara Kiesler, Robert E. Kraut, Paul Resnick, and Aniket Kittur. Regulating behavior in online communities. In Robert E. Kraut and Paul Resnick, editors, *Building Successful Online Communities: Evidence-Based Social Design*. MIT Press, Cambridge, MA, 2012.

Gary Klein. *Sources of Power: How People Make Decisions*. MIT Press, Cambridge, MA, 1998.

Alfred Kobsa and Maximilian Teltzrow. Contextualized communication of privacy practices and personalization benefits: Impacts on users' data sharing and purchase behavior. In *Privacy Enhancing Technologies*, pages 329–343, 2004.

Derek J. Koehler and Nigel Harvey, editors. *Blackwell Handbook of Judgment and Decision Making*. Blackwell, Malden, MA, 2004.

Robert E. Kraut and Paul Resnick. Encouraging contribution to online communities. In Robert E. Kraut and Paul Resnick, editors, *Building Successful Online Communities: Evidence-Based Social Design*. MIT Press, Cambridge, MA, 2012a.

Robert E. Kraut and Paul Resnick, editors. *Building Successful Online Communities: Evidence-Based Social Design*. MIT Press, Cambridge, MA, 2012b.

Robert E. Kraut, Moira Burke, John Riedl, and Paul Resnick. The challenges of dealing with newcomers. In Robert E. Kraut and Paul Resnick, editors, *Building Successful Online Communities: Evidence-Based Social Design*. MIT Press, Cambridge, MA, 2012.

Richard P. Larrick. Debiasing. In Derek J. Koehler and Nigel Harvey, editors, *Blackwell Handbook of Judgment and Decision Making*. Blackwell, Malden, MA, 2004.

Scott Lederer, Jason I. Hong, Anind K. Dey, and James A. Landay. Personal privacy through understanding and action: Five pitfalls for designers. *Personal and Ubiquitous Computing*, 8(6):440–454, 2004.

Jennifer S. Lerner and Philip E. Tetlock. Bridging individual, interpersonal, and institutional approaches to judgment and decision making: The impact of accountability on cognitive bias. In Sandra L. Schneider and James Shanteau, editors, *Emerging Perspectives on Judgment and Decision Research*. Cambridge University Press, Cambridge, UK, 2003.

Sarah Lichtenstein and Paul Slovic, editors. *The Construction of Preference*. Cambridge University Press, Cambridge, UK, 2006.

David A. Lieberman. *Human Learning and Memory*. Cambridge University Press, Cambridge, UK, 2012.

Charles E. Lindblom. The science of muddling through. *Public Administration Review*, 19(2):79–88, 1959.

Charles E. Lindblom. Still muddling, not yet through. *Public Administration Review*, 39(6):517–526, 1979.

George Loewenstein and Jon Elster, editors. *Choice Over Time*. Sage, New York, 1992.

George Loewenstein, Daniel Read, and Roy Baumeister, editors. *Time and Decision*. Sage, New York, 2003.

Tina Loraas and Michelle C. Diaz. Learning new uses of technology: Situational goal orientation matters. *International Journal of Human-Computer Studies*, 67:50–61, 2009.

Wendy E. Mackay. Triggers and barriers to customizing software. In Scott P. Robertson, Gary M. Olson, and Judith S. Olson, editors, *Human Factors in Computing Systems: CHI 1991 Conference Proceedings*, pages 153–160. ACM, New York, 1991.

Naomi Mandel and Eric J. Johnson. When web pages influence choice: Effects of visual primes on experts and novices. *Journal of Consumer Research*, 29:235–245, 2002.

James G. March. *A Primer on Decision Making: How Decisions Happen*. The Free Press, New York, 1994.

Judith Masthoff. Group recommender systems: Combining individual models. In F. Ricci, L. Rokach, B. Shapira, and P. B. Kantor, editors, *Recommender Systems Handbook*, pages 677–702. Springer, Berlin, 2010.

A. J. Maule. Can computers help overcome limitations in human decision making? *International Journal of Human-Computer Interaction*, 26(2–3): 108–119, 2010.

Alessandra Mazzia, Kristen LeFevre, and Eytan Adar. The PViz comprehension tool for social network privacy settings. In *Proceedings of the 2012 Symposium on Usable Privacy and Security*, New York, 2012. ACM. Extended version at `http://alliemazzia.com/pubs/pviz-tech-report.pdf`.

Eric McCreath, Judy Kay, and Elisabeth Crawford. i-ems - an approach that combines hand-crafted rules with learnt instance-based rules. *Australian Journal of Intelligent Information Processing Systems*, 9(1):49–63, 2005.

Luke McDowell, Oren Etzioni, Steven D. Gribble, Alon Halevy, Henry Levy, William Pentney, Deepak Verma, and Stani Vlasseva. Mangrove: Enticing ordinary people onto the semantic web via instant gratification. In Dieter Fensel, Katia Sycara, and John Mylopolous, editors, *The Semantic Web—ISWC 2003*, pages 754–770. Springer, Berlin, 2003.

Lorraine McGinty and James Reilly. On the evolution of critiquing recommenders. In F. Ricci, L. Rokach, B. Shapira, and P. B. Kantor, editors, *Recommender Systems Handbook*, pages 419–453. Springer, Berlin, 2011.

Joanna McGrenere, Ronald M. Baecker, and Kellogg S. Booth. A field evaluation of an adaptable two-interface design for feature-rich software. *ACM Transactions on Computer-Human Interaction*, 14(1), 2007.

Joseph T. McGuire and Joseph W. Kable. Rational temporal predictions can underlie apparent failures to delay gratification. *Psychological Review*, 120 (2):395–410, 2013.

Barbara A. Mellers. Choice and the relative pleasure of consequences. *Psychological Bulletin*, 126(6):910–924, 2000.

Anthony Morton, Bettina Berendt, Seda Gürses, and Jo Pierson. "Tool clinics" – Embracing multiple perspectives in privacy research and privacy-sensitive design. In A. Acquisti, I. Krontiris, M. Langheinrich, and A. Sasse, editors, *My Life, Shared - Trust and Privacy in the Age of Ubiquitous Experience Sharing*. 2013. Dagstuhl Reports 3(7).

Kanchan Mukherjee. A dual system model of preferences under risk. *Psychological Review*, 177(1):243–255, 2010.

Benjamin R. Newell, David A. Lagnado, and David R. Shanks. *Straight Choices: The Psychology of Decision Making*. Psychology Press, Hove, UK, 2007.

D. H. Nguyen and E. Mynatt. Privacy mirrors: Understanding and shaping socio-technical ubiquitous computing. Technical Report GIT-GVU-02-16, Georgia Institute of Technology, USA, 2002.

D. H. Nguyen, A. Kobsa, and G. R. Hayes. An empirical investigation of concerns of everyday tracking and recording technologies. In *Proceedings of the 10th International Conference on Ubiquitous Computing*, New York, 2008. ACM.

Donald A. Norman. Cognitive engineering. In Donald A. Norman and Stephen W. Draper, editors, *User Centered System Design: New Perspectives on Human-Computer Interaction*, pages 31–61. Erlbaum, Hillsdale, NJ, 1986.

Antti Oulasvirta, Janne Hukkinen, and Barry Schwartz. When more is less: The paradox of choice in search engine use. In *Proceedings of the 32nd International ACM SIGIR Conference on Research and Development in Information Retrieval*, 2009.

Antti Oulasvirta, Tye Rattenbury, Lingyl Ma, and Eeva Ratta. Habits make smartphone use more pervasive. *Personal and Ubiquitous Computing*, 16: 105–114, 2012.

Leysia Palen and Paul Dourish. Unpacking "privacy" for a networked world. In Loren Terveen, Dennis Wixon, Elizabeth Comstock, and Angela Sasse, editors, *Human Factors in Computing Systems: CHI 2003 Conference Proceedings*, pages 129–136. ACM, New York, 2003.

John W. Payne and James R. Bettman. Walking with the scarecrow: The information-processing approach to decision research. In Derek J. Koehler and Nigel Harvey, editors, *Blackwell Handbook of Judgment and Decision Making*. Blackwell, Malden, MA, 2004.

John W. Payne, James R. Bettman, and Eric J. Johnson. *The Adaptive Decision Maker*. Cambridge University Press, Cambridge, UK, 1993.

Stephen J. Payne and Andrew Howes. *Adaptive Interaction: A Utility Maximization Approach to Understanding Human Interaction With Technology*. Morgan & Claypool, Palo Alto, CA, 2013.

Sandra Petronio. *Boundaries of Privacy: Dialectics of Disclosure*. State University of New York Press, Albany, NY, USA, 2002.

Jella Pfeiffer. *Interactive Decision Aids in E-Commerce*. Springer, Berlin, 2012.

David J. Phillips. Privacy policy and PETs. *New Media & Society*, 6(6): 691–706, 2004.

Jennifer K. Phillips, Gary Klein, and Winston R. Sieck. Expertise in judgment and decision making: A case for training intuitive decision skills. In Derek J. Koehler and Nigel Harvey, editors, *Blackwell Handbook of Judgment and Decision Making*. Blackwell, Malden, MA, 2004.

Peter Pirolli. Exploring and finding information. In John M. Carroll, editor, *HCI Models, Theories, and Frameworks*, pages 157–191. Morgan Kaufmann, San Francisco, 2003.

Peter Pirolli. *Information Foraging Theory: Adaptive Interaction with Information*. Oxford University Press, New York, 2007.

Carolin Plate, Nathalie Basselin, Alexander Kröner, Michael Schneider, Stephan Baldes, Vania Dimitrova, and Anthony Jameson. Recomindation: New functions for augmented memories. In Vincent Wade, Helen Ashman, and Barry Smyth, editors, *Adaptive Hypermedia and Adaptive Web-Based Systems: Proceedings of AH 2006*, pages 141–150. Springer, Berlin, 2006.

Henning Plessner, Cornelia Betsch, and Tilmann Betsch, editors. *Intuition in Judgement and Decision Making*. Erlbaum, New York, 2008.

Jennifer Preece, Blair Nonnecke, and Dorine Andrews. The top five reasons for lurking: Improving community experiences for everyone. *Computers in Human Behavior*, 20(2):201–223, 2004.

Jenny Preece. *Online Communities: Designing Usability and Supporting Sociability*. Wiley, New York, 2000.

Pearl Pu and Boi Faltings. Enriching buyers' experiences: The SmartClient approach. In Thea Turner, Gerd Szwillus, Mary Czerwinski, and Fabio Paternò, editors, *Human Factors in Computing Systems: CHI 2000 Conference Proceedings*, pages 289–296. ACM, New York, 2000.

Howard Rachlin. *The Science of Self-Control*. Harvard, Cambridge, MA, 2000.

Tim Rakow and Ben R. Newell. Degrees of uncertainty: An overview and framework for future research on experience-based choice. *Journal of Behavioral Decision Making*, 23:1–14, 2010.

Kate Raynes-Goldie. *Privacy in the Age of Facebook: Discourse, Architecture, Consequences*. PhD thesis, Curtin University, 2012.

Daniel Read. Intertemporal choice. In Derek J. Koehler and Nigel Harvey, editors, *Blackwell Handbook of Judgment and Decision Making*. Blackwell, Malden, MA, 2004.

Daniel Read, George Loewenstein, and Shobana Kalyanaraman. Mixing virtue and vice: Combining the immediacy effect and the diversification heuristic. *Journal of Behavioral Decision Making*, 12:257–273, 1999a.

Daniel Read, George Loewenstein, and Matthew Rabin. Choice bracketing. *Journal of Risk and Uncertainty*, 19:171–197, 1999b.

James Reilly, Jiyong Zhang, Lorraine McGinty, Pearl Pu, and Barry Smyth. Evaluating compound critiquing recommenders: A real-user study. In *Proceedings of the 2007 Conference on Electronic Commerce*, 2007.

F. Ricci, L. Rokach, B. Shapira, and P. B. Kantor, editors. *Recommender Systems Handbook*. Springer, Berlin, 2011.

Francesco Ricci and Quang N. Nguyen. Acquiring and revising preferences in a critique-based mobile recommender system. *IEEE Intelligent Systems*, 22(3):22–29, 2007.

Robert M. Roe, Jerome R. Busemeyer, and James T. Townsend. Multialternative decision field theory: A dynamic connectionist model of decision making. *Psychological Review*, 108(2):370–392, 2001.

Karol G. Ross, James W. Lussier, and Gary Klein. From the recognition primed decision model to training. In Tilmann Betsch and Susanne Haberstroh, editors, *The Routines of Decision Making*. Erlbaum, Mahwah, NJ, 2005.

Stuart J. Russell and Peter Norvig. *Artificial Intelligence: A Modern Approach*. Prentice Hall, Upper Saddle River, 3rd edition, 2010.

Thomas L. Saaty and Kirti Peniwati. *Group Decision Making: Drawing Out and Reconciling Differences*. RWS Publications, Pittsburgh, 2008.

Rula Sayaf and Dave Clarke. Access control models for online social networks. In Luca Caviglione, Mauro Coccoli, and Alessio Merlo, editors, *Social Network Engineering for Secure Web Data and Services*, pages 32–65. IGI Global, 2013.

Eric Schaffer and Apala Lahiri. *Institutionalization of UX: A Step-by-Step Guide to a User Experience Practice*. Addison-Wesley, Upper Saddle River, NJ, 2nd edition, 2014.

Benjamin Scheibehenne, Rainer Greifeneder, and Peter M. Todd. Can there ever be too many options? A meta-analytic review of choice overload. *Journal of Consumer Research*, 37(3):409–425, 2010.

Sandra L. Schneider and James Shanteau, editors. *Emerging Perspectives on Judgment and Decision Research*. Cambridge University Press, Cambridge, UK, 2003.

P. W. Schultz, Jennifer J. Tabanico, and Tania Rendón. Normative beliefs as agents of influence: Basic processes and real-world applications. In William D. Crano and Radmila Prislin, editors, *Attitudes and Attitude Change*. Psychology Press, New York, 2008.

Barry Schwartz. *The Paradox of Choice: Why More Is Less*. HarperCollins, New York, 2004.

Eldar Shafir, Itamar Simonson, and Amos Tversky. Reason-based choice. *Cognition*, 49:11–36, 1993.

Herbert Simon. Rational choice and the structure of environments. *Psychological Review*, 63(2):129–138, 1956.

Paul Slovic, Melissa Finucane, Ellen Peters, and Donald G. MacGregor. The affect heuristic. In Thomas Gilovich, Dale Griffin, and Daniel Kahneman, editors, *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge University, Press, Cambridge, 2002.

Robert D. Sorkin, Shenghua Luan, and Jesse Itzkowitz. Group decision and deliberation: A distributed detection process. In Derek J. Koehler and Nigel Harvey, editors, *Blackwell Handbook of Judgment and Decision Making*. Blackwell, Malden, MA, 2004.

Abhay Sukumaran, Stephanie Vezich, Melanie McHugh, and Clifford Nass. Normative influences on thoughtful online participation. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*, pages 3401–3410, New York, NY, USA, 2011. ACM.

Richard H. Thaler. Mental accounting matters. *Journal of Behavioral Decision Making*, 12:183–206, 1999.

Richard H. Thaler and Cass R. Sunstein. *Nudge: Improving Decisions About Health, Wealth, and Happiness*. Yale University Press, New Haven, 2008.

Nava Tintarev and Judith Masthoff. Explanation of recommendations. In F. Ricci, L. Rokach, B. Shapira, and P. B. Kantor, editors, *Recommender Systems Handbook*. Springer, Berlin, 2010.

J. Y. Tsai, P. Kelley, P. Drielsma, L. F. Cranor, J. Hong, and N. Sadeh. Who's viewed you? the impact of feedback in a mobile location-sharing application. In *Proceedings of the 2009 Conference on Human Factors in Computing Systems, CHI 2009, Boston, USA, April 4-9, 2009*. ACM, 2009.

Endel Tulving. *Elements of Episodic Memory*. Oxford University Press, New York, 1983.

Daniel Tunkelang. *Faceted Search*. Morgan & Claypool, Palo Alto, CA, 2009.

Amos Tversky. Elimination by aspects: A theory of choice. *Psychological Review*, 79:281–299, 1972.

Amos Tversky and Daniel Kahneman. Rational choice and the framing of decisions. *Journal of Business*, 59(4):5251–5278, 1986.

Amos Tversky and Daniel Kahneman. Loss aversion in riskless choice: A reference-dependent model. *The Quarterly Journal of Economics, 106: 4, 1039ó 61.*, 106(4):1039–1061, 1991.

Amos Tversky and Daniel Kahneman. Cumulative prospect theory: An analysis of decision under uncertainty. *Journal of Risk and Uncertainty, 5 , 2976 323.*, 5:297–323, 1992.

Alcides Velasquez, Rick Wash, Cliff Lampe, and Tor Bjornrud. Latent users in an online user-generated content community. *Journal of Computer Supported Cooperative Work*, 23(1), 2014.

Viswanath Venkatesh and Fred Davis. A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2):186–204, 2000.

Viswanath Venkatesh, Michael G. Morris, Gordon B. Davis, and Fred D. Davis. User acceptance of information technology: Toward a unified view. *MIS Quarterly*, 27(346):425–478, 2003.

Bas Verplanken, Vemund Myrbakk, and Erik Rudi. The measurement of habit. In Tilmann Betsch and Susanne Haberstroh, editors, *The Routines of Decision Making*. Erlbaum, Mahwah, NJ, 2005.

Peter Wakker. *Prospect Theory for Risk and Ambiguity*. Cambridge University Press, Cambridge, UK, 2010.

Yang Wang, Pedro G. Leon, Kevin Scott, Xiaoxuan Chen, Alessandro Acquisti, and Lorrie F. Cranor. Privacy nudges for social media: An exploratory Facebook study. In *Companion Proceedings of the 22nd International Conference on World Wide Web*, pages 763–770, 2013.

Youcheng Wang and Daniel R. Fesenmaier. Assessing motivation of contribution in online communities: An empirical investigation of an online travel community. *Electronic Markets*, 13(1):33–45, 2003.

Colin Ware. *Information Visualization: Perception for Design*. Morgan Kaufmann, San Francisco, 2nd edition, 2004.

Elke U. Weber and Eric J. Johnson. Mindful judgment and decision making. *Annual Review of Psychology*, 60:53–88, 2009.

A. Westin. *Privacy and Freedom*. Atheneum, New York, NY, USA, 1967.

Ryen W. White and Resa A. Roth. *Exploratory Search: Beyond the Query-Response Paradigm*. Morgan & Claypool, San Francisco, CA, 2009.

Max L. Wilson, Bill Kules, m. c. schraefel, and Ben Shneiderman. From keyword search to exploration: Designing future search interfaces for the web. *Foundations and Trends in Web Science*, 2(1), 2010.

Timothy D. Wilson. *Strangers to Ourselves: Discovering the Adaptive Unconscious*. Harvard, Cambridge, MA, 2002.

Wendy Wood and David T. Neal. A new look at habits and the habit-goal interface. *Psychological Review*, 114(4):843–863, 2007.

J. F. Yates, Elizabeth S. Veinott, and Andrea L. Patalano. Hard decisions, bad decisions: On decision quality and decision aiding. In Sandra L. Schneider and James Shanteau, editors, *Emerging Perspectives on Judgment and Decision Research*. Cambridge University Press, Cambridge, UK, 2003.

Richard M. Young and Allan MacLean. Choosing between methods: Analysing the user's decision space in terms of schemas and linear models. In J. J. O'Hare, editor, *Human Factors in Computing Systems: CHI 1988 Conference Proceedings*, pages 139–143. ACM, New York, 1988.

Robert M. Young. Rational analysis of exploratory choice. In M. Oaksford and N. Chater, editors, *Rational Models of Cognition.* Oxford University Press, Oxford, 1998.

Rami Zwick, Amnon Rapoport, Alison K. Lo, and A. V. Muthukrishnan. Consumer sequential search: Not enough or too much? *Marketing Science*, 22(4):503–519, 2003.