Perceptions of the Ethics of Persuasive Technology

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Perceptions of the Ethics of Persuasive Technology

by

Christopher C. Branch

Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in Human-Computer Interaction

Rochester Institute of Technology

B. Thomas Golisano College of Computing and Information Sciences

School of Information

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Rochester Institute of Technology

B. Thomas Golisano College of Computing and Information Sciences

Master of Science in Human-Computer Interaction

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Abstract

This thesis explores the perceptions of the ethics of persuasive technology as applied to the design of user interfaces. The intentions are to learn whether consumers of software see persuasion through technology as ethical, whether producers of software view the development of persuasive technology as ethical, and whether these opinions can be reconciled. This research consists of a review of relevant literature on the topic, a survey of software consumers, interviews with software producers, and an analysis of the data, resulting in conclusions intended to influence the responsible design of user interfaces in the future.

The results suggest a number of findings, including that persuasive technology is effective, that software consumers do not necessarily recognize persuasion when it is applied to them, and that they do not generally wish to be persuaded, unless they view the motivation of the persuader as being morally admirable. Software producers, on the other hand, do not intentionally behave unethically, but they are open to the development of persuasive technology, and even deceptive technology under some conditions. Persuasive technology has been described and analyzed to some extent in the academic literature, but often the ethical considerations have been given only secondary importance, although in a few cases, authors have expressed strong opinions that ethics can and should be considered when designing and developing software. Recent discussions among software design professionals online have demonstrated that there are growing concerns about the use of persuasive technology, even if these concerns have not yet been extensively explored in academic study.
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# Table of Contents

1. Introduction .................................................................................................................. 6

2. Review of Literature ...................................................................................................... 9

3. Survey of Software Consumers .................................................................................. 22
   3.1. Methodology ............................................................................................................ 22
   3.2. Results ................................................................................................................... 26

4. Interviews with Software Producers ............................................................................ 37
   4.1. Methodology ............................................................................................................ 37
   4.2. Results ................................................................................................................... 39

5. Discussion ..................................................................................................................... 46

6. Conclusion ..................................................................................................................... 55

7. References ..................................................................................................................... 58

8. Appendix A: Consumer Survey ..................................................................................... 61
   8.1. Survey Introduction ................................................................................................. 61
   8.2. Survey Questions .................................................................................................... 62

9. Appendix B: Producer Interview ................................................................................. 68
   9.1. Interview Introduction ............................................................................................. 68
   9.2. Interview Questions ............................................................................................... 69
1 Introduction

Human efforts at persuasion have likely existed for as long as humans themselves have. People make their way in the world using various strategies, one of which has always been to persuade others to act in ways that benefit the persuader. The use of persuasion in marketing is a more recently developed human behavior, but one that nevertheless has a rich history, and that has grown over time to result in the advertising-driven world of media presented for our consumption. Robert Cialdini’s classic book *Influence: The Psychology of Persuasion* (Cialdini, 1984), covers the subject from the point of view of a marketing professional whose goal is to persuade others, and also suggests that consumers can (and should) use the knowledge of these marketing tactics to resist their effects. Clearly, advertisers have evidence that their methods are succeeding; otherwise they wouldn’t continue spending money on these efforts. Persuasion has only become more technologically advanced over time, to the point where we are being persuaded without even being aware of it. The question of whether such activities are ethical has sometimes been ignored, at other times discussed and debated, but ultimately sidestepped by acknowledging that the use of persuasion is ubiquitous: a simple truth about society that is unlikely to change.

The most recent advance in this field is the use of persuasion in the design of user interfaces, which is the subject of this thesis. The study of user interface and user experience design is intended to help designers create interfaces that improve the experience of the users of newly developed hardware and software, but the definition of this improved experience is not always clear. In the case of persuasive technology, the user may have an experience in which he or she is persuaded to behave in a particular way, with the interface having been intentionally
designed to obtain this result. This includes what can be considered benign persuasion, such as persuasion that is done in order to guide users in the most efficient use of the technology, as well as persuasion that is intended to influence users in other ways for the persuader’s own benefit.

However, many software professionals are currently designing and implementing interfaces that are persuasive or even deceptive in order to further the interests of their employers, rather than, or in addition to, those of the users of the software. For example, persuasion can be used in web-based software to convince users to click on ads or links. It can be used in social media software to increase the time that people spend using the software. It can be used in social networking software to encourage users to invite or engage with others in an attempt to increase the population of users. While the user may, in some or all of these cases, interpret the experience as positive, the truth is that users may not be aware of the persuasion having taken place. If the user is not aware of persuasion, the user cannot form a judgement about whether the persuasive design is ethical. It is worthwhile to ask if persuasive design is an ethical use of technology.

The answer may depend on whether the intentions of the software producer are seen as morally admirable, morally neutral, or morally questionable. Or it may depend on people’s perception of having been deceived and their reaction to the deception, even if it was done in the service of a goal that is seen as morally admirable. One thing to make clear at the outset is that the persuasion being discussed here is not the simple presentation of facts in an effort to persuade a person of a scientific truth about reality. Bernardine M. C. Atkinson (2006) emphasizes that it is important to “distinguish very clearly between persuasion and education” (p. 180). She defines education as “imparting established factual information and theory to its participants” (Atkinson, 2006, p. 180) and makes the claim that the sharing of this information should not be
considered persuasion. While facts can be persuasive, that type of persuasion can take place without any motivation on the part of the presenter of those facts. Here, we are interested in the motivations of those behind the persuasion, since this may affect the perception of that effort.

This thesis explores perceptions of the ethics of persuasive technology as applied to the design of user interfaces. The perceptions of both consumers (users) of technology and producers (software development professionals) are of interest here. The first contribution of the research is to learn whether consumers see persuasion through technology as ethical, and if so, under what circumstances they are comfortable with it being applied. The second contribution is to learn whether software professionals view the development of persuasive technology as ethical, and if so, under what circumstances they are comfortable with developing it. Finally, an attempt is made to reconcile these opinions. In addition to a review of relevant literature, this research consists of:

- The development of a survey on the topic of persuasion, the administration of this survey to software consumers, and an analysis of the resulting data.
- The development of a set of interview questions, the use of these questions in interviews conducted with software producers, and an analysis of the resulting data.
- An assessment of the survey results and the interview responses with a focus on integrating and reconciling the quantitative and qualitative data collected, with conclusions that may help guide the behavior of software professionals and could influence the responsible design of user interfaces in the future.
2 Review of Literature

There is extensive literature on the subject of persuasive technology, beginning with its origins in the late 1990s, and a significant subset of this literature acknowledges or directly addresses the issue of ethics in connection with persuasion. However, as shall be seen, there have been few attempts to learn the attitudes of consumers and producers of software on the topic, and many of the scholarly discussions reach conclusions that are limited in their implications for future research and development.

In one of the earliest efforts to recognize and address the subject of ethics in persuasive technology, an article in the Communications of the ACM from 1999 presents a set of eight principles of persuasive technology design, of which the eighth is the “Golden Rule”: “The creators of a persuasive technology should never seek to persuade anyone of something they themselves would not consent to be persuaded of” (Berdichevsky & Neuenschwander, 1999, p. 58). The authors include examples, both positive and negative, of persuasive technologies, and a discussion of whether they are ethical, encouraging the reader to think critically about ethical issues. The goal of the article is to “steer the field in a positive direction from the outset” (Berdichevsky & Neuenschwander, 1999, p. 58).

While written in 1999, this article presents ideas that remain relevant today, and includes a decision tree for evaluating the ethics of persuasive technology design that is referenced in later scholarly material. An attempt to present an up to date discussion of the ethics of persuasive technology will benefit from using this article as a base from which to further explore the topic.
Also essential as background for this topic is the textbook *Persuasive Technology* (Fogg, 2003), written by one of the originators of the field, B.J. Fogg, who coined the term “captology” and recognized potential ethical concerns from the beginning. This book presents a comprehensive discussion of all aspects of the subject. Numerous ideas and principles are isolated and articulated, beginning with the concept of the “functional triad” – the role of technologies as tools, as media, and as social actors.

The content is remarkably visionary for its time. The discussion of persuasion through mobility and connectivity accurately describes common attributes of smartphone apps today, even though it was written two years before the first iPhone was released. The book includes numerous references to ethical concerns, including an entire chapter focused on the subject. Fogg considers coercion and deception to be approaches that are “almost always unethical” (p. 223) and discusses at length the methods of operant conditioning and surveillance, both of which “raise red flags” (p. 224) in his view. He describes scenarios in which each of these methods could be ethical (scenarios in which they are “overt and harmless” (p. 225)) and presents a stakeholder-based method for evaluating the ethical nature of a persuasive technology product. In another prescient comment, he suggests that “[i]n the future, certain interactive influence tactics are likely to raise ethical concerns, if not public outrage” (p. 250).

In fact, the content of Fogg’s book raised ethical concerns a few years after it was published, in a paper titled “Captology: A Critical Review” (Atkinson, 2006). Atkinson provides an overview of the strengths and weaknesses of Fogg’s analysis, then discusses the weaknesses in further detail. She points out issues with the terminology used in the book, especially in the “functional triad” (p. 173) discussion (Atkinson, 2006). She subsequently criticizes Fogg’s approach for ignoring “unintended changes in attitudes inherently associated with or caused by
the product," (p. 177) considering this to be both “a theoretical and a design oversight” (Atkinson, 2006, p. 177).

Atkinson (2006) further objects to Fogg’s failure to address a significant philosophical question: “Is it ethical to intend to change a person’s attitude, belief, or behavior?” (p. 179) and concludes that in fact, “[i]t is ethical only if they are aware of the intention from the outset of their participation with the program” (p. 179) and suggests that the intent of any persuasive technology be “exposed at the beginning of one’s engagement with a program. It would then be possible for the user to determine the program’s relevance and exercise their right to accept or reject its offering” (p. 180).

Another work worth considering in this research is the popular science discussion presented by Nobel Prize winning economist Richard Thaler and legal scholar Cass Sunstein in their 2009 book, Nudge: Improving Decisions About Health, Wealth, and Happiness. This book covers choice architecture, not specifically technology-related, but in all aspects of society. It introduces the concept of “nudges” (Thaler & Sunstein, 2009, p. 4) or persuasive techniques to encourage people to do things that are in their own best interests.

Interestingly, the subject of ethics is not directly addressed; rather, the authors come down firmly on the side of what they term “libertarian paternalism” (p. 4) to reflect that nudges are paternalistic, in that they are based on the best judgements of the choice architects about what behavior is really best for people, but also libertarian, in that nudges do not force people to make the recommended choice; they are free to choose otherwise. The authors believe that choice architecture will inevitably encourage people in some direction, so it is morally admirable that it be one that is in their interest, as judged by the choice architects.
In a short paper from 2006, IJsselsteijn, de Kort, Midden, Eggen, & van den Hoven present a brief overview of persuasive technology with a focus on human well-being. The authors emphasize that ethical matters must be considered, noting, for example, that “[i]f force (coercion) or misinformation (deception) are used, these would fall outside the realm of persuasive technology” (W. IJsselsteijn, de Kort, Midden, Eggen, & van den Hoven, 2006, p. 1). They conclude that one of the three key research challenges is that new moral dilemmas will arise as a result of more subtle and effective persuasive techniques, and that ethical guidelines should be explicitly included in design activities.

A closely related topic to persuasion is that of surveillance, and there are several papers in the field that address this, including one by Leth Jespersen, Albrechtslund, Øhrstrøm, Hasle, & Albretsen (2007), who begin with the historical concept of the Panopticon as envisioned by Bentham and then discuss the modern interaction between surveillance and persuasive technology.

The increase in surveillance over time is covered, including surveillance in the sense of collection and analysis of personal data, with the intention of using the collected data to influence behavior. Ethical concerns are discussed at some length, but largely the ethics of data collection and use, for example, the tension between profiling for purposes of security and the potential for discrimination based on the profile. As far as the ethics of the persuasion itself, the authors tend to agree with the position that the intent of the persuader should be made clear to those exposed to the surveillance and persuasive technology, otherwise it would be considered manipulation.

While adequately covering a wide range of perspectives on the topic, the authors don’t reach a broadly applicable conclusion – instead, they present a variety of implications,
conditions, and considerations that need to be examined further when dealing with surveillance as used for persuasion, presumably on a case by case basis.

Another paper that considers the interaction between persuasive technologies and surveillance is by Nagenborg (2014), a philosopher, who asserts that “[p]ersuasion in itself is not unethical” (Nagenborg, 2014, p. 43) and makes the point that “[n]ew technologies always tend to cause changes in human behavior” (Nagenborg, 2014, p. 44). He does, however, see potential ethical challenges in the way that data collected via surveillance is used to influence users.

There is a fascinating discussion of the different types of surveillance, including “soft surveillance” (p. 43) or “participatory surveillance” (p. 43) in which users give their consent to be observed, and the author includes many references to (Fogg, 2003) and (Thaler & Sunstein, 2009) given their focus on persuasive technologies as neutral or positive. Nagenborg (2014) raises some tentative challenges to this general attitude, but the conclusion is a bit weak. He emphasizes that in order for persuasive technology to be ethical, it must allow users to retain their freedom to act as they choose, and although he sees the potential of surveillance to restrict users by influencing them with data about their own behavior, he ultimately considers strategies such as “self-monitoring” (p. 46) as helpful rather than harmful (Nagenborg, 2014).

Several papers address issues relating to transparency and the extent to which the acceptance of the use of persuasion is voluntary. For example, Barral, Aranyi, Kouider, Lindsay, Prins, Ahmed, Jacucci, Negri, Gamberini, Pizzi, & Cavazza (2014) describe a study of subliminal cues and their effect on selection behavior, as well as reviewing subliminal techniques from a historical point of view. The paper is devoted largely to a description of the study, which found a significant effect on selection behavior with subliminal cues when reaction time was less than one second. There is also a discussion of potential challenges in the design and
implementation of what is referred to by the authors as “covert persuasive technology” (Barral, et al., 2014, p. 2).

Since the use of subliminal cues is, by definition, covert, the authors recognize and discuss the ethical concerns of designing systems with this capability. A short section at the end of the paper explores these concerns, and concludes that “users always need to be aware of the persuasion techniques employed by such systems” (Barral, et al., 2014, p. 10). On the surface, this would seem to rule out the use of any subliminal persuasive techniques - but the authors go on to say that subliminal information can be used to influence behavior as long as the intended influence is not “inconsistent with the participants’ goals and intentions” (Barral et al., 2014, p. 10). While this seems well-intentioned, it’s somewhat disingenuous, since the designer cannot know the participants’ goals and intentions.

Timmer, Kool, & van Est (2015) consider transparency to be of critical importance, beginning their paper by restating the generally accepted understanding among designers of persuasive technologies: that the user “should always be informed about persuasion and should consent to be subjected to it” (p. 197) and the users’ autonomy is respected only when they are free to choose the goals and methods of persuasion of their own accord. The paper goes on to explore the expansion of persuasive technologies in ways that raise potential issues with adhering to this principle. In particular, it references the application of persuasive technologies in a collective environment, which the authors refer to as “proliferation” (p. 197) and the increasing use of persuasion in “smart” (p. 196) environments, referred to as “integration” (p. 197).

An example of proliferation given in the paper is that of an employer providing persuasive technology to employees to promote participation in a health improvement program.
Questions arise as to whether the users and the provider share the same goals, whether the users can choose to refrain from using the system, and ultimately whether the users’ autonomy is violated. As for integration, the more that technology is incorporated in everyday activities, the more it can “fade into the background” (p. 199) and lead to “ambient persuasion” (p. 200) and “situations in which the user is being influenced without consciously being aware of it” (Timmer, et al., 2015, p. 200).

The authors conclude that the challenge for persuasive technology is to design systems that inform and explain their behavior to users, maintaining transparency about the goals, methods, and interests of the provider. Methods such as value sensitive design and participatory design are proposed as ways to take users as stakeholders into account when developing persuasive technology.

Further exploring the voluntary nature of persuasive technologies is a paper by Smids (2012), who considers this aspect to be of primary importance. He says that although researchers in the field of persuasive technology have fairly consistently defined persuasion to specifically exclude the strategies of coercion, deception, or manipulation, the definition alone is not enough to ensure that designers do not include those strategies in their designs. Technologies that use those techniques should not be considered persuasive since the users lose the choice of voluntary participation in the persuasion.

For example, the author considers alarms warning drivers to wear their seatbelts to be coercive, not merely persuasive, since they continue until the driver relents and fastens the seatbelt. To be genuinely persuasive, Smids (2012) suggests that the annoying reminders should stop after a few seconds, so that the driver is reminded, but subsequently is free to choose whether to follow or ignore the advice. In the category of manipulative technology, Smids
includes so-called “unconscious persuasion” (p. 127) such as subliminal advertising. In conclusion, Smids recommends that in order to avoid public distrust of technology, designers of persuasive technology should perform an assessment of the voluntary aspect of any behavior that the design is intended to encourage.

Attempts have been made to classify the ways in which consumers of technology can be influenced, including Tromp, Hekkert, & Verbeek (2011), who classify influence into four types (coercive, persuasive, seductive, and decisive) and assert that “[t]he extent to which a user considers the implication as personally beneficial defines what type of influence is possible or most appropriate” (p. 4). There is a compelling discussion of examples of each type of persuasion, and the conclusion is a relatively forceful one: that “[d]esigners no longer can hide behind the needs and wishes of the consumer; instead they have to take responsibility as ‘shapers’ of society. Doing so entails a shift from a user-centered approach to a society-centered one” (Tromp, et al., 2011, p. 19).

While the sentiment is admirable on the surface, the article largely avoids a discussion of the ethics of such a shift. The limitations to this approach are mentioned in terms of the complaints that are likely to arise when persuasion goes too far for individual users to accept, but this fails to address the ethics of the designer when implementing the persuasive strategy. It also misses the cases in which the influence was less overt (the seductive and decisive techniques, in the authors’ terminology) so the users were not aware enough of being persuaded to raise a concern.

A 2011 paper by Lee, Kiesler, & Forlizzi (2011) presents the results of three studies that attempted to apply behavioral economics strategies to the design of persuasive technology in the domain of healthy snacking. The first study investigated whether planning and default choices
effectively promoted healthy snack choices. The second explored whether default choices work when snacks are offered by a robot, and whether the default choice can be strengthened by the robot’s dialogue. The third study examined the effectiveness of default choices on a screen-based interface, compared this approach to other possible designs, and explored whether the effect of the default can be strengthened by manipulating perceptual load.

In summary, the studies found that simple changes in user interfaces had significant impact on people’s choices. The authors express the hope that Human-Computer Interaction (HCI) researchers and designers will use behavioral economics in their thinking as they develop products and services that benefit users.

These studies are valuable contributions to the field of persuasive design, and a section on ethics is included. The section is fairly short, mainly acknowledging that ethics comes into play and describing some of the ways in which ethical issues are relevant to the study of persuasive technology. It concludes by stating that “[e]thical analysis of designs derived from behavioral economics would be a fruitful and important area for future work in HCI” (Lee, et al., 2011, p. 333).

A 2013 paper by Karppinen and Oinas-Kukkonen begins by observing that there is no single solution to easily resolve ethical issues in all cases. In recognition of this, the authors analyze what they consider to be the three main approaches: guideline-based, stakeholder analysis, and user involvement; and then explore the strengths and weaknesses of each.

The focus of their research is on the design of “behavioral change support systems (BCSS)” (Karppinen & Oinas-Kukkonen, 2013, p. 87) in which a person uses the technology to change his or her own behavior or attitude – as opposed to systems that are designed to influence
others. This focus on self-targeted behavior change makes the persuasion “morally less problematic” (Karppinen & Oinas-Kukkonen, 2013, p. 88) than other persuasive technologies.

The authors refer to eight studies related to persuasive technology, categorize them according to the three approaches, and then comment on the strategies used in each of the studies, comparing and contrasting them in an effort to demonstrate that the appropriate strategy in each case may differ depending on circumstances.

The discussion raises interesting considerations, and even includes a refreshingly straightforward piece of advice for designers: “If you feel that what you are doing is unethical – just do not do it” (Karppinen & Oinas-Kukkonen, 2013, p. 96). The conclusion, however, is weaker than expected, given the promising goals regarding the three approaches, and there is little in the way of concrete recommendations, beyond a suggestion that more study and evaluation are needed.

In a paper with significant foresight and far-reaching implications, Kaptein and Eckles (2010) explore the idea of persuasion profiles – adapting persuasive technology to individual differences in the effectiveness of a particular persuasion strategy. The ethical concerns of this approach arise from two aspects: that this “means adaptation” (Kaptein & Eckles, 2010, p. 85) strategy is not disclosed, and that a persuasion profile developed in one context might be used in another.

The authors note that the designers may have an incentive not to disclose the use of means adaptation, since this disclosure might reduce the effectiveness of the persuasion. Designers, or the corporations they work for, may likewise have an incentive to build persuasion
profiles of their users in order to sell them to other organizations for use in other domains, raising potential privacy issues in addition to ethical concerns about the use of this data.

The authors acknowledge that “Persuaders have long stood upon uneasy ethical grounds” (Kaptein & Eckles, 2010, p. 90). Nevertheless, they see potential positive uses for adaptive persuasive technologies, going so far as to say that in some cases persuasive profiling may be the most ethical course of action. The example used to justify this position is one in which a persuasive technology backfires due to having used a strategy unsuited to a particular individual – this seems to be a bit of a logical stretch.

And in fact, one of the most recent topics of discussion in this field is the growing use of persuasive profiling by social media and apps on smart devices. In an online article on Medium, Tristan Harris (2016), a former Design Ethicist at Google, describes ten ways in which technology hijacks user’s minds and persuades them to act in ways that benefit the technology company rather than the users themselves. With a focus on social media, strategies ranging from the design decisions for what to include on menus to the exploitation of peoples’ desire for social approval are discussed.

Harris (2016) points out that the goal of social media companies, to increase user participation on their platforms, does not necessarily align with the best interests of users. This may seem obvious, since the companies’ reasons for existence is to be successful in business, not necessarily to serve users, but the tendency is to think that both goals can be accomplished at once. This article makes it clear that this is not always true, and importantly, that it doesn’t have to be this way.
The article doesn’t explicitly mention ethics at all, but the entire basis for the discussion is that product designers should consider whether it is ethical to persuade users to continue interacting with the product and to convince others to do likewise. This piece effectively articulates exactly why the ethics of persuasion needs further study and evaluation – so that arguments in favor of better serving users can be developed and presented.

A recently developed concept related to persuasive technology is the idea of the “dark pattern” (Brignull, 2010). This is a term first coined in a blog post by user experience (UX) practitioner and cognitive scientist Harry Brignull (2010), and later defined as “instances where designers use their knowledge of human behavior (e.g., psychology) and the desires of end users to implement deceptive functionality that is not in the user’s best interest” (Gray, Kou, Battles, Hoggatt, & Toombs, 2018, p. 1). Types of dark patterns mentioned in this paper include Bait and Switch, Disguised Ad, Hidden Costs, Misdirection, Trick Questions, and more. These UX design patterns often cross the line from persuasion to deception, resulting in outright manipulation of software consumers. As noted by Fansher, Civukula, & Gray, in a 2018 paper, “the concept of dark patterns has evolved … primarily within design practice, with limited reference in the academic literature” but “it seems to have resonance with academic knowledge that is focused on higher-level ethical theories and methods such as strategies of persuasion” (p. 2). This paper focused on the active UX practitioner community online by examining mentions of the #darkpatterns hashtag on Twitter and analyzing the apparent intentions of the practitioners. The study found that “practitioners are using social media as a tool to generate others’ awareness of dark patterns through the sharing of exemplars, hold companies accountable through public shaming, and to promote a conversation about ethical design practices” (Fansher, et al., 2018, p. 20).
The dark patterns concept is closely related to the use of persuasive technology in an unethical way, and this is explored further in the discussion section of this paper.

One significant academic attempt to directly address the topic of ethics in persuasive technology is a paper by Janet Davis (2009) titled “Design Methods for Ethical Persuasive Computing,” in which the author describes two methodological frameworks: Value Sensitive Design and Participatory Design; and argues that these methods are applicable to persuasive technology. As described by Davis (2009), Value Sensitive Design, “emphasizes values of moral import – values such as fairness, autonomy, privacy, and human welfare – and thus speaks to ethical concerns in technology design” (p. 3), while Participatory Design “is a family of theories and methods that involve potential users as full participants in design processes” (p. 5). Several case studies are described, and while there are many questions remaining, the author concludes that both methodologies “have great potential for the design of persuasive technology” (Davis, 2009, p. 7).
3 Survey of Software Consumers

3.1. Methodology

The survey, included in Appendix A: Consumer Survey, was developed in an effort to learn whether computer software users (consumers) recognize the use of persuasion in software, whether they consider the use of persuasion to be ethical, and if so, under what circumstances, and whether consumers are in fact persuaded by interfaces designed to do so. The design of this survey reflects these goals, as follows:

• The first question presents a mockup of a user interface, which differs among four conditions, selected randomly for each participant: a neutral design; a persuasive design with a morally admirable goal; a persuasive design with a neutral goal; and a persuasive design with a morally questionable goal. The following research questions are addressed by this survey question:
  - RQ1.1: Are consumers persuaded using technology when the goal is for their own benefit?
  - RQ1.2: Are consumers persuaded using technology when the goal is neutral?
  - RQ1.3: Are consumers persuaded using technology when the goal is for the benefit of the designer?

• The next seven questions (2 through 8) are intended to determine whether consumers recognize persuasion without the use of technology and how ethical they consider it to be. This is accomplished by asking a question with a seven-point Likert scale to obtain the participant’s initial opinion, followed by a straightforward attempt to persuade using the
wording of the question, and finally a set of questions about the participant’s reaction to the persuasion attempt.

- **RQ2**: Are consumers persuaded without the use of technology?
- **RQ3**: Do consumers recognize persuasion without the use of technology?
- **RQ4**: Do consumers consider persuasion without the use of technology to be ethical?
- **RQ5**: Do consumers consider persuasion without the use of technology to be deceptive?

- The next four questions (9 through 12) are intended to determine if consumers recognized the attempt at persuasion, if any, in the initial UI mockup, and whether the attempt was considered to be deceptive.
  - **RQ6.1**: Do consumers recognize persuasion using technology when the goal is for their own benefit?
  - **RQ6.2**: Do consumers recognize persuasion using technology when the goal is neutral?
  - **RQ6.3**: Do consumers recognize persuasion using technology when the goal is for the benefit of the designer?
  - **RQ7**: Do consumers consider persuasion using technology to be deceptive?

- The next two questions (13 and 14) vary depending on the category to which the participant was randomly assigned, and in all conditions except A, are intended to determine consumers’ reaction to the attempts at persuasion. The attempt at persuasion is
revealed, and the designer’s motivation for the persuasion is stated before the question is asked.

  o RQ8.1: Do consumers consider persuasion using technology to be morally admirable when the stated goal is for their own benefit?

  o RQ9.1: Do consumers consider persuasion using technology to be ethical when they consider it to be morally admirable?

  ***

  o RQ8.2: Do consumers consider persuasion using technology to be morally neutral when the stated goal is neutral?

  o RQ9.2: Do consumers consider persuasion using technology to be ethical when they consider it to be morally neutral?

  ***

  o RQ8.3: Do consumers consider persuasion using technology to be morally questionable when the stated goal is for the benefit of the designer?

  o RQ9.3: Do consumers consider persuasion using technology to be ethical when they consider it to be morally questionable?

  • Several demographic questions are included as a general check for whether responses to the survey differ significantly depending on age, gender, or level of education.

  The survey was developed using the Qualtrics platform and administered via email distribution to the RIT mailing list including students, faculty, and staff. Four different variants of the survey were created, based on the differing conditions described in Appendix A: Consumer Survey. A web page was developed and deployed on the RIT server at the following location:
https://people.rit.edu/cb3741/capstone/survey/index.shtml#

The page contained the introductory text shown in Appendix A: Consumer Survey and a link that used JavaScript to randomly direct participants to one of the four variants. The survey was active for approximately one month between July and August, 2019, and 438 responses were received across all four variants of the survey. The collected data was exported to an Excel spreadsheet and the answers to the quantitative questions were analyzed using the Pearson’s chi-square test for significance to determine whether the results differed significantly from answers that would be expected if randomly chosen. The desired level of significance was 0.05 for all questions analyzed, so results were considered significant only if the resulting $p$ value was below that level.
3.2. Results

**Persuasion without the use of technology**

While the first question involved the presentation of the user interface mockup, before considering the response to that question, we want to establish a baseline understanding of participants’ reactions to persuasion *without the use of technology*. Therefore, we begin the analysis with data that will allow us to answer research questions RQ2, RQ3, and RQ4.

To answer RQ2, we use question 3 of the survey, across all four conditions. The question, “Please select a tasty treat from the list below,” was an attempt at verbal persuasion without the use of technology. By including the wording “tasty treat,” the expectation was that participants would be influenced to choose option 1 (doughnut) or option 3 (cookie) rather than option 2 (apple) or option 4 (celery). There were 435 valid responses across all four conditions, and of these, 300 participants chose option 1 or option 3, while 135 chose option 2 or option 4. Using Pearson’s chi-square test for significance we find a value of $p < .001$, which is well below the desired level of significance of 0.05. Therefore, we conclude that participants were in fact persuaded by the wording of the question.

To answer RQ3, we use the answer to question 4 of the survey, across all four conditions, which asked users whether or not they felt persuaded by the previous question. Of the 434 valid responses to this question, we find that 206 answered “Yes” and 228 answered “No.” Testing for significance, we find a value of $p = 0.29$, which is above the desired level of significance, and therefore we cannot determine whether participants felt that they were persuaded.
For RQ4, we have two potential sources of data. Question 2 asked participants how ethical they consider persuasion without the use of technology, on a seven item Likert scale. Discarding the 121 neutral responses, across all four conditions, there were 314 valid responses, and of these, 223 were that persuasion is always, usually, or occasionally ethical, while 91 were that persuasion is always, usually, or occasionally unethical. Testing for significance, we find a value of \( p < .001 \), which is below the desired level of significance of 0.05, so we can conclude that most participants find persuasion without the use of technology to be ethical. Question 6 revealed that question 3 was an attempt at persuasion, and asked participants for their positive or negative reaction to that attempt, again using a seven item Likert scale. In this case, the largest number of participants (288), found the attempt at persuasion to be neither positive nor negative. Interestingly, of those who chose one of the positive or negative answers, 61 reported having a reaction that was extremely, moderately, or slightly positive, while 86 responded with an extremely, moderately, or slightly negative reaction. The test for significance in this case gives a value of \( p = .04 \), just under the desired level of significance.

Taking these two results together, we can interpret this to mean that participants viewed the use of verbal persuasion in general to be ethical, however, they viewed an attempt at persuading them in particular to be more negative than positive.

Finally, to address RQ5, we use the responses to question 7, which asked whether participants viewed the verbal persuasion in question 3 as deceptive. Of the 434 responses to this question, 99 answered “Yes” and 335 answered “No.” The chi-square test for significance yields a value of \( p < .001 \), a highly significant result that allows us to conclude that participants did not consider the verbal attempt at persuasion to be deceptive.
Moving on to persuasion using technology, we return to the first question in the survey, which presented different interfaces depending on the randomly chosen condition for each participant. To answer RQ1.1, we wanted to learn whether participants were persuaded by the user interface presented in condition B, shown in Figure 1. By prominently displaying four items with photos as “Featured items,” the intention was to persuade participants to choose one of these items rather than one of the less prominently positioned, text-only “Additional choices.” Since the featured items were all fruits or vegetables, expected to be viewed as healthy snacks, while the additional choices included less healthy options, such as chocolate, baked goods and potato chips, this condition represented an attempt at persuasion with a motivation that would be considered morally admirable: to encourage healthy snacking.

There were 74 valid responses to this question, and of these, 53 chose one of the four featured items, while 21 chose one of the six
additional choices. The expected proportion, if participants had an equal chance of selecting any item, would have been 29.6 and 44.4, respectively. The chi-square test for significance on these actual and expected proportions gives a value of $p < .001$, a significant result that is well below the desired level of confidence of 0.05. Therefore, we conclude that participants were indeed persuaded by the interface.

Participants were also asked whether they felt they were persuaded by the user interface, in order to address RQ6.1. In this case, the results were inconclusive, with 58 participants answering “Yes” and 43 answering “No.” This yields a significance of $p = .14$ which is above the desired level of confidence. Therefore, we cannot determine whether participants were aware of having been persuaded by the interface mockup.

To answer RQ1.2, we wanted to learn whether users were persuaded by the user interface displayed in condition C, shown in Figure 2. Similarly to condition B, by prominently displaying two items with photos as “Featured items,” the intention was to persuade participants to
choose one of these items rather than one of the less prominently positioned, text-only

“Additional choices.” The difference in this condition was that all items in both the featured
items and the additional choices categories were fruits or vegetables, and thus considered to be
healthy choices, so the persuasion attempt here was intended to be morally neutral – with no
obvious motivation on the part of the designer. The results here were that 44 participants chose
one of the featured items, while 61 chose one of the additional choices – almost exactly the
expected proportion, yielding a significance of \( p = .69 \), above our desired level, and thus we
cannot conclude that participants were persuaded by this mockup. It is perhaps interesting to
note that an approximately equal number of participants chose the apple (30) and the grapes (29),
even though the choice of grapes was much less prominent, suggesting a real preference for one
of these two items among participants, regardless of the attempt at persuasion.

The associated question to determine whether participants recognized the attempt at
persuasion and address RQ6.2 was likewise inconclusive, with 54 participants responding “Yes”
and 58 responding “No,” resulting in a significance level of \( p = .71 \).

Condition D was the final attempt at persuasion, an effort to answer RQ1.3 using the
interface mockup shown in Figure 3. Here the “Featured items” category contained exclusively
items that would be considered less healthy alternatives, while the healthier items were all listed
under “Additional choices.” In this case, there were 83 valid responses, with 43 participants
choosing one of the four featured items, while 40 selected one of the six additional choices. The
chi-square test results in a significance level of \( p = .03 \), which is not as strong as the finding in
case B, but nevertheless below the desired level of confidence, so we can conclude that
participants were indeed persuaded by this mockup.
The question of whether participants recognized the persuasion, RQ6.3, is yet again inconclusive, with 59 answering “Yes” and 51 answering “No,” resulting in a significance level of \( p = .45 \), above our desired confidence level.

Finally, we return to the interface mockup that was presented in condition A, shown in Figure 4. This was intended as a control condition, in which there was no attempt at persuasion. The snack choices were presented in alphabetical order, each with both a text label and a small photo of the snack. Healthy items were alternated with less healthy choices, with the expectation that users would choose the snack that they truly preferred, rather than being influenced by the UI. In fact, the results suggest that

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Choose a snack!

**Featured items**

- brownie
- cookie
- doughnut
- potato chips

**Additional choices**

- apple
- celery
- chocolate bar
- grapes
- carrots
- banana

Figure 3: Condition D
this was indeed the case. While the chi-square test across all possible actual and
expected results yield a significance level
of $p < .001$, below our confidence level
for significance, this reflects only the
unlikelihood that the results would occur
by chance. For this condition, it’s
valuable to look more closely at the data.
The breakdown of the 98 valid responses
is shown in Table 1.

By chance, the expected number
of responses for each selection would
have been 9.8. In contrast, we observe
that participants chose brownie, apple,
grapes, potato chips, cookie, and banana
– a mixture of both healthier and less
healthy snacks – at a higher rate than
expected, while they chose carrots,
chocolate bar, and doughnut at a
significantly lower rate than expected –
again, these results being mixed across healthy and less healthy snacks. While it’s possible that
the interface mockup unintentionally persuaded participants to choose the items displayed at the
top of the image because they were viewed first, this would not explain the high
response rates for the two lowest items in the image. Therefore, it seems reasonable to conclude that the choices here were truly based on the natural preferences of participants and not due to any influence of the interface.

<table>
<thead>
<tr>
<th>apple</th>
<th>brownie</th>
<th>banana</th>
<th>cookie</th>
<th>carrots</th>
<th>celery</th>
<th>chocolate bar</th>
<th>doughnut</th>
<th>grapes</th>
<th>potato chips</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>16</td>
<td>11</td>
<td>12</td>
<td>3</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>15</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 1: Condition A - Detailed Results

In fact, on the question of whether participants felt persuaded by the interface, a significant result was found, with 23 of the 109 valid responses being “Yes” and 86 being “No,” for a significance level of $p < .001$, below our confidence level of 0.05, so in this condition, participants clearly recognized, correctly, that they were not being persuaded.

To summarize, when participants were presented with UI mockups intended to persuade them to choose a featured snack for their own benefit (condition B) or for the benefit of the UI designer (condition D), results suggest that the persuasion was effective. In the case of persuasion with a neutral motivation, we could not conclude from the results whether participants were persuaded or not. In all three experimental conditions, B, C, D, the question of whether participants recognized the persuasion was inconclusive. And in the control scenario, condition A, results show that participants were not systematically persuaded in any discernable way, and they correctly recognized the lack of persuasion in the UI.

To answer RQ7, we use the responses to question 11, which asked participants whether or not they felt that the persuasion attempted by the UI mockup was deceptive. Since only conditions B, C, and D involved an attempt at persuasion, we consider only those responses, of which there were 323. These results consisted of 156 “Yes” responses and 167 “No” responses.
Testing for significance, we find a value of \( p = .54 \), which is above our desired level of confidence, and therefore we cannot conclude whether participants found any of these interface mockups to be deceptive. However, examining the results to this question for the control scenario, condition A, we find that only 12 participants answered “Yes” and 95 answered “No” to this question, yielding a significance level of \( p < .001 \), indicating that participants overwhelmingly recognized that this interface mockup was not intended to be deceptive. When contrasted with the inconclusive results in the three experimental conditions, it seems likely that more participants than would be expected found the interfaces to be deceptive, even if not to a statistically significant degree.

We turn next to the issue of whether participants considered the interfaces designed for persuasion to be ethical, when the attempt at persuasion and its motivation were revealed. For this we use the responses to questions 13 and 14, which asked participants how they viewed the motivation of the designer and for their reaction to the attempt at persuasion, respectively.

For condition B, it was explained to participants that the motivation of the designer was for the benefit of the software consumer, in an effort to encourage the selection of healthy snacks. The answers to questions 13 and 14 in this condition are used to address research questions RQ8.1 and RQ9.1, respectively. Of the 101 responses to question 13, we discard the responses of the 22 participants who considered the designer’s motivation to be morally neutral. Of the remaining 79 answers, 64 participants responded that the designer’s motivation was extremely, moderately, or slightly morally admirable, while 19 responded that the motivation was extremely, moderately, or slightly morally questionable. Testing this data for significance yields a value of \( p < .001 \), a result that is below our desired level of significance, so we can conclude that most participants found the motivation to be morally admirable. For question 14,
there were 37 neutral responses, which we discard. Of the remaining 63 responses, there were 44 participants who reported their reaction to this attempt at persuasion to be extremely, moderately, or slightly positive, while 19 had reactions that were extremely, moderately, or slightly negative. Using the chi-square test, we find a significance level of $p < .001$, which is below our desired level, so we can conclude that most participants reacted positively to this attempt at influencing their choice.

For condition C, it was explained that the motivation of the designer was neutral, with no particular intent. The answers to questions 13 and 14 in this condition are used to address RQ8.2 and RQ9.2, respectively. In this case, we are interested in the number of participants who viewed the persuasion attempt as morally neutral, as compared to those who found it to be morally admirable or morally questionable. Of the 113 responses to this question, 55 found the motivation to be morally neutral, while 58 participants chose one of the other six options on the Likert scale. Testing for significance, we find a value of $p < .001$, so we can conclude that participants generally considered the motivation to be morally neutral. Similarly, for question 14, there were 49 participants whose reaction to the attempt at persuasion was neither positive nor negative (neutral), while 64 participants chose one of the six positive or negative responses. The significance level here is $p < .001$, so we can conclude that participants in general had neither a positive nor negative reaction to the attempt at persuasion.

For condition D, it was explained that the motivation of the designer was for the benefit of snack food manufacturers, in an effort to sell more snacks. The answers to questions 13 and 14 in this condition are used to address RQ8.31 and RQ9.3, respectively. Of the 110 responses to question 13, we discard the responses of the 31 participants who considered the designer’s motivation to be morally neutral. Of the remaining 79 answers, 6 participants responded that the
designer’s motivation was extremely, moderately, or slightly morally admirable, while 73 responded that the motivation was extremely, moderately, or slightly morally questionable. Testing this data for significance yields a value of \( p < .001 \), so we can conclude that a large majority of participants found the motivation to be morally questionable. For question 14, there were 42 neutral responses, which we discard. Of the remaining 68 responses, there were 10 participants who reported their reaction to this attempt at persuasion to be extremely, moderately, or slightly positive, while 58 had reactions that were extremely, moderately, or slightly negative. Using the chi-square test, we find a significance level of \( p < .001 \), which is below our desired level, so we can conclude that most participants reacted negatively to this attempt at influencing their choice.

To summarize, these findings show that participants correctly recognize differing motivations as being morally admirable, morally neutral, or morally questionable, and they reacted positively to persuasive technology with a morally admirable motivation, negatively to persuasive technology with a morally questionable motivation, and neither positively nor negatively to persuasive technology with a morally neutral motivation.
4 Interviews with Software Producers

4.1. Methodology

The interview questionnaire, included in Appendix B: Producer Interview, is an attempt to learn whether computer software professionals (producers) consider the development of persuasive technology to be ethical, and if so, under what circumstances. The design of this interview reflects this goal, in the following ways:

- The first four questions are intended to gather some background about the participants, including the software development roles they have performed, whether they ascribe to a particular moral framework, and whether they adhere to a formal code of ethics.
- The next two questions (5 and 6) are intended to determine whether producers find it necessary to consider the ethical implications of their work, and if so, in what circumstances.
- The next three questions (7 through 9) are intended to determine if producers have been involved in the development of software that they consider to be persuasive, and if not, whether they would consider doing so.
- The final three questions (10 through 12) are intended to determine if producers have been involved in the development of software that they consider to be deceptive, and if not, whether they would consider doing so.

Interviews were conducted in person where possible and recorded using the iPhone Voice Memos app, and then transcribed. The questions were asked in the same order and with the same wording for all participants. When answering, participants were allowed to speak at length with no specified limitation as to time. Where in person meetings were not
feasible, some interviews were conducted by sending the questionnaire via email and allowing participants to type their responses to the questions.

The answers to the questions were analyzed in various ways, depending on what was logical for the particular question. In some cases, a simple count of yes or no responses was possible, while in other cases key words were highlighted and categorized with related words.
4.2. Results

Interviews were conducted with 12 participants, who ranged in experience from 1.5 years up to 37 years in software development. All of the participants had performed multiple roles in their careers, with the largest number having been developers (11) followed by designers (6) and first line managers (6). Five participants had been software architects or second line managers, four had been testers, and three reported a role of junior/senior software engineer. The following roles were reported by one participant each: UX designer, tech lead, team leader, product owner, embedded real time developer, web developer, salesperson, director, and vice president.

Of the 12 participants, four answered “Yes” to the question about adhering to a particular moral framework; four others answered “No,” and the remaining four answered in ways that were less straightforward, but for whom the answer was closer to “No” than “Yes.” Many participants, even those who answered in the negative, went on to describe their personal moral positions, suggesting that most participants do follow a moral framework, but not one that is easily or conveniently named or even described, without more time and effort than they considered reasonable to expend in a brief interview.

When asked to describe their moral framework, there were a variety of answers (including from some participants who answered negatively to the previous question) which could be categorized into the following four roughly defined groups.

1. **Basic moral philosophical positions**: Two participants mentioned “humanitarian” or “humanistic” philosophies, while two mentioned “Christian ethics,” and one referred to “The Golden Rule,” by name, while two stated it as “do unto others as you would
have done to you.” The concepts of “fairness” and “equality” were mentioned once each, as well as the idea that “everyone should be given the same opportunities” and that we should strive to “help people; show love and care” as well as “not assume bad intent” of others. Finally, one participant reported a moral framework that includes “open mindedness, supported by facts.”

2. **Work ethic**: One participant focused on the application of ethics to a work environment, and answered that “honest work,” “quality work,” and “no short cuts” are what constitutes a moral framework. Another participant echoed the emphasis on honesty, responding that “honesty about everything” qualifies as a moral framework.

3. **Avoidance of harm**: Four participants discussed the moral imperative to develop products that are safe, with one stating that “we don’t want to hurt anybody” and that developers should avoid doing “anything that would disrupt people’s lives in a negative fashion.” One added that developer should not “try to deceive customers.”

4. **Software-centric moral goals**: Two participants focused on the goals that developers should keep in mind as part of applying one’s moral framework to their work, including concerns about identity theft, the protection of personal information, and an emphasis on accessibility for software consumers with disabilities.

Three participants also answered “Yes” to indicate that they adhere to a formal code of ethics such as the ACM Code of Ethics. Five answered “No,” and four answers were less straightforward. The answers overall suggest that some participants believed their behavior would be in agreement with a formal code of ethics, but since they could not claim to have read and agreed to the code, they could not be certain. For example, one participant answered “I think I do,” but that “I can’t say that I’m familiar with the details.” Another responded “Not
formally,” and one pointed out that many companies have a formal code of ethics that one must agree to follow as a condition of employment.

On the question of whether participants had found it necessary to consider the ethical implications of their work, there was an even split, with six participants who responded “Yes” and six who responded “No.” Of those who answered “Yes,” there was little commonality among the responses, with each answer being a distinct situation. The answers are shown in Table 2 along with some aspects of each situation obtained from the interview.

<table>
<thead>
<tr>
<th>Situation</th>
<th>Positive / negative / unspecified</th>
<th>Participant reaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of copyrighted material in a</td>
<td>negative</td>
<td>Explained the risks but was told to proceed.</td>
</tr>
<tr>
<td>development project.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of technology in missiles /</td>
<td>negative</td>
<td>“Chose to leave.”</td>
</tr>
<tr>
<td>weapons.</td>
<td>“pretty uncomfortable”</td>
<td></td>
</tr>
<tr>
<td></td>
<td>“I don’t feel good about this”</td>
<td></td>
</tr>
<tr>
<td>Mistreatment of employees by CEO</td>
<td>negative</td>
<td>“I decided to leave the company.”</td>
</tr>
<tr>
<td></td>
<td>“My moral code of ethics would</td>
<td></td>
</tr>
<tr>
<td></td>
<td>discourage such behavior”</td>
<td></td>
</tr>
<tr>
<td>Personnel decisions (layoffs, etc.)</td>
<td>unspecified</td>
<td>unspecified</td>
</tr>
<tr>
<td>Business decisions (financial, etc.)</td>
<td>unspecified</td>
<td>unspecified</td>
</tr>
<tr>
<td></td>
<td>“what money or what business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>would we potentially lose”</td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>positive</td>
<td>“I directly think about and abide by those</td>
</tr>
<tr>
<td></td>
<td></td>
<td>standards of accessibility.”</td>
</tr>
</tbody>
</table>

Table 2: Occasions when it was necessary to consider the ethical implications of work

The next several questions are those most directly of interest to the topic of this thesis: whether the participant has ever been involved in the development of persuasive technology, if not, whether they would consider doing so, and why or why not. On the first question, six participants responded “Yes” and six responded “No.” Five participants also expanded on their answer with details of the occasions, including positive or negative reactions. Of those who
answered “Yes,” there was one negative comment, a participant who “did not enjoy developing for a client that used such marketing techniques on a public facing web site.”

Four of the comments from those who answered “Yes” were positive, with participants emphasizing the use of persuasion as a means of guiding the user through the proper use of the software itself. One participant said that the goal is “designing systems that are easy to use and intuitive.” Another expressed the intention to develop “software that creates triggers for people to react to things,” adding that “we want to be persuasive, and enable people to accomplish tasks by providing triggers for them to do something in the software.” There are “certain scenarios that we want people to accomplish,” said one participant, and another stated that we are “trying to design software that persuades them through the proper way of using it … we guide them through the use of the software.”

Four participants in this category also expressed the opinion that “everything we do influences people,” stating that “the way we design software is intended for the user to do something,” and that “the way we lay things out is intended to influence the user’s behavior; that’s not done in a negative way.” One participant concluded that “you can’t avoid doing it, because otherwise you can’t create a product.”

One participant focused on the philosophical question, and answered that “I don’t think influencing behavior is intrinsically bad,” and that “as long as the persuasiveness is in general beneficial to the user, is clearly spelled out, and can be configured, I don’t have a problem with it.” This participant also referenced Nudge (Thaler & Sunstein, 2009) in support of this position.

Of the six participants who answered that they had not been involved in the development of persuasive software, four said they would consider doing so, while two said that they would
not consider doing so. Of the six participants who had previously been involved in the development of persuasive technology, four of them nevertheless volunteered a response to this question, with three of them saying “Yes,” they would consider doing this (again) and the fourth answering “No.” Of the seven participants who answered “Yes” or “Maybe,” many provided conditions for their agreement. Three of them argued that it’s reasonable and expected to use persuasion to encourage sales of the product, with one stating that “selling a product, I probably would,” because “marketing products is a part of our culture.” Another participant said that “as long as the behavior is ethical, it could be considered a type of sales,” and the third said that “we want people to be engaged,” and “we want people using the software,” because “you want to sell a product you’re making.” The fourth participant focused on the moral philosophy of the persuasion, expressing the opinion that “persuasive software is acceptable as long as it is developed to influence the user toward positive ethical outcomes.”

Of the three participants who stated that they would not consider developing persuasive technology, two provided explanations for their reasoning. One participant referred to the use of loot boxes in video games, and expressed the opinion that “a lot of that software moves toward the predatory,” further pointing out that these “technologies are drawing a lot from slot machines and the gambling industry,” and are “targeting people who are making impulsive decisions.” “We all have moments of poor impulse control,” said this participant, and “I think targeting those people is unethical.” Another participant implied that persuasion can be deceptive by its nature, stating that “as a customer I wouldn’t want to be deceived in any way, so I do not want to contribute to that.”

To summarize, the majority of interview participants (nine out of twelve) consider it acceptable to be involved in the development of persuasive technology, at least under some
conditions. The conditions varied among participants, and fell into three categories: guiding the user in the most efficient and effective use of the software itself, using persuasive technology as part of a sales or marketing effort, and persuading the user to do something that the participant would not find to be unethical.

The final three questions were intended to learn the opinions of software professionals when it comes to deception in software. Of the 12 interview participants, two said that they had been involved in the development of deceptive software, while 10 responded that they had not. Of those 10, when asked if they would consider doing so, there were six who answered “No,” three who answered “Yes” or “Maybe,” and one who did not offer a response. When asked why or why not, the two participants who had been involved in the past both expressed that they would prefer not to do so again, with one answering “I don’t enjoy building sites that market products in a deceptive way,” and the other stating that “I wouldn’t want to use software that’s deceptive. I want to understand and be able to trust what I’m working with, so I don’t want to build software that others don’t trust or can’t rely on.”

Of the six who said that they would not consider it, three of them provided their reasoning, with one saying “I would not like to do things to others that I would not like others to do to me.” Another responded that “It feels like it’s crossing a moral boundary,” and the third answered “I think by nature that’s dishonest, and I think that would do harm.”

The three who answered “Yes” or “Maybe” explained their reasoning in several ways – two of them mentioned the software itself as a deciding factor, with one answering that “It depends on the nature of the intended software product,” and another saying that “It would depend on the circumstance and the ultimate goal of it. If the proverbial good versus evil can be achieved, my morals would not prevent me from working on it if I believed it was for the greater
good.” Two of the three also mentioned personal circumstances, with one saying that “given some (extreme) preconditions, I’d consider it.” The preconditions mentioned included the need for health insurance for a spouse’s (but not the participant’s own) serious condition. The other offered the opinion that “the world isn’t black and white,” but said that “the bar would be set pretty high. I don’t think I would ignore that and just do it because it’s a job.”

In summary, the majority of the interview participants (eight out of 12) do not consider it acceptable to be involved in the development of deceptive software. The minority who would consider it would do so only given certain conditions of the software or of their personal situations.

Cross-referencing with the answers to earlier questions, we find that of the four participants who decisively indicated that they adhere to a specific moral framework, two of them would consider development of persuasive software under some conditions, while two would not. None of the four would consider development of deceptive software. The same results were found for the four who indicated that they adhere to a formal code of ethics, with two participants being members of both groups. Therefore, with respect to persuasive technology, the adherence to a particular moral framework or to a formal code of ethics does not appear to be related to whether a participant considers the development of persuasive technology to be acceptable. It does appear to correlate with an unwillingness to develop deceptive software, but since the majority of the remaining participants expressed the same unwillingness, we cannot definitively conclude that this relationship exists.
5 Discussion

The responses to the survey allow us to answer many, but not all, of the research questions with our desired confidence level.

Regarding the use of persuasion with technology, the first question was **RQ1.1: Are consumers persuaded using technology when the goal is for their own benefit?** Yes, they are, even with the primitive interface mockups used in this study, the persuasion was effective in this case. Next, **RQ1.2: Are consumers persuaded using technology when the goal is neutral?** In this case, no, the answer could not be determined from the responses received. And finally, **RQ1.3: Are consumers persuaded using technology when the goal is for the benefit of the designer?** As with the persuasion for their own benefit, the answer here is yes.

Regarding the use of persuasion by verbal means, the first question was **RQ2: Are consumers persuaded without the use of technology?** Yes, the use of wording alone was enough to persuade participants. The next research question was **RQ3: Do consumers recognize persuasion without the use of technology?** The answer here was inconclusive. The next question was **RQ4: Do consumers consider persuasion without the use of technology to be ethical?** Results show that yes, they do, the final question in this area was **RQ5: Do consumers consider persuasion without the use of technology to be deceptive?** The answer here was decisively no, they do not.

Returning to the use of technology in persuasion, the next three research questions were **RQ6.1: Do consumers recognize persuasion using technology when the goal is for their own benefit?** **RQ6.2: Do consumers recognize persuasion using technology when the goal is neutral?** and **RQ6.3: Do consumers recognize persuasion using technology when the goal is...**
for the benefit of the designer? For all three of these questions, the results were inconclusive.

The next question was **RQ7: Do consumers consider persuasion using technology to be deceptive?** Using the responses to questions in the experimental conditions of the survey, the results were inconclusive on this question. Participants significantly did not find the UI in the control condition to be deceptive.

Turning to the moral intentions of persuasion, recall that there were three sets of related questions, as follows. Regarding persuasion with morally admirable intentions, the questions were:

**RQ8.1:** Do consumers consider persuasion using technology to be morally admirable when the stated goal is for their own benefit?

**RQ9.1:** Do consumers consider persuasion using technology to be ethical when they consider it to be morally admirable?

Regarding persuasion with neutral intentions, the questions were:

**RQ8.2:** Do consumers consider persuasion using technology to be morally neutral when the stated goal is neutral?

**RQ9.2:** Do consumers consider persuasion using technology to be ethical when they consider it to be morally neutral?

And final, regarding persuasion with morally questionable motives, the research questions were:

**RQ8.3:** Do consumers consider persuasion using technology to be morally questionable when the stated goal is for the benefit of the designer?
RQ9.3: Do consumers consider persuasion using technology to be ethical when they consider it to be morally questionable?

The answer was yes to all of the above questions.

Taking the answers to these research questions, and looking further into the data, the first interesting finding is indirectly related to the primary intention of this thesis, and involves the perception of verbal persuasion without the use of technology. Most participants considered the use of this type of persuasion in general to be ethical, but when asked for their reaction to an attempt to persuade them personally, more participants reacted negatively than positively. This suggests that when considering persuasion applied to them in particular, as opposed to in the abstract, participants take other factors into consideration, perhaps including the motivation of the persuader or their relationship to the persuader. It’s also possible that the question used in this survey to persuade the participants was viewed negatively by participants for some intrinsic reason, and the results may have been different depending on the details of the persuasion attempt. In any case, it’s worth noting that participants are not entirely consistent in their attitudes toward persuasion in the abstract compared to persuasion that targets them personally.

Since the primary motivation of this thesis is to understand the views of both consumers and producers of software when it comes to the use of persuasive technology and whether they can be reconciled, we now turn to the findings that shed light on these views.

The most interesting finding from the UI mockups presented in the survey was that in two of the three conditions in which persuasion was present, it was, in fact, effective at persuading the participants, regardless of whether the designer’s motivation was intended to be positive or negative toward the participant. This finding is confirmed by the control scenario, in
which no persuasion was present, as participants appeared to respond in accordance with their own natural preference, and not as a reaction to any systematic influence from the UI design. Additionally, although it was inconclusive whether participants recognized the attempts at persuasion in the conditions where persuasion was present, the lack of persuasion in the control condition was clearly identified.

The finding that persuasive technology really works is to be expected, but it’s significant here because the persuasion used in this study was rudimentary – involving no more than prominent placement and the use of stock images for items that users were persuaded to choose. Modern software used in mobile applications and websites – especially online shopping, social media and networking applications – uses far more advanced approaches, including not only interactive graphics and language, but constructions such as false or hidden signals of affordance, and highly sophisticated techniques such as those mentioned by former Google design ethicist Tristan Harris: providing the illusion of choice by presenting a limited set of menu options, providing intermittent variable rewards to encourage addiction, leveraging the human desire for social approval and adherence to social obligations (Harris, 2016). He notes that there are thousands more. These techniques often are able to personalize their persuasive efforts by using software consumer’s personal data, collected as part of signing up and using the software. And since the rudimentary designs used in the current study can easily be shown to be effective, we can be confident that the more advanced techniques are at least as effective, and likely much more so.

This is the point at which the perceptions of persuasion by software consumers and those of software producers have the potential to come into conflict, because these designs are not accidental. In order for these manipulative interfaces to have proliferated throughout modern
software applications, they certainly had to be conceived, designed, implemented, tested, and deployed intentionally by professional software producers.

Why would software producers intentionally create software that is unethical? The 2013 book *Evil by Design: Interaction Design to Lead Us Into Temptation*, by Chris Nodder, provides, perhaps inadvertently, a telling explanation. The author presents and describes the variety of methods used by software producers to persuade software consumers to behave in ways that benefit the designer. He frames the discussion in terms of the Biblical “seven deadly sins” as a way of linking modern uses of technology to aspects of psychology that have existed throughout human history.

While the book is engagingly written and informative (if already a bit dated in its web site references), Nodder (2013) avoids taking an ethical stand against the use of these techniques. He leaves it largely up to the reader as to how this information is to be used, and has no qualms about explicitly providing advice to designers that could objectively be considered unethical. For example, in the chapter on Pride, he suggests that designers “Persuade your users to give you access to post to their social media accounts. You probably don't have to be deceptive …” (Nodder, 2013, p. 18), and in the chapter on Greed, he recommends: “Artificially inflate the cost of your secondary object or reduce its feature set/desirability to make the primary object appear as a comparatively good value for money, even though it is more expensive” (Nodder, 2013, p. 243) – a marketing strategy referred to as “second-best first.”

The author points out justifications for using persuasive techniques, including that “There is a continuum from persuasion to deception” (Nodder, 2013, p. 249) and provides several anecdotes, including the use of an “anti-monster” spray for scared children and the use of a fake bus stop near a facility for Alzheimer’s patients to give them a sense of agency. First, it should
be noted that these chosen cases involve precisely examples of vulnerable populations (children and those with mental illness) whose members should not be subjected to potentially unethical tactics. In fact, Davis (2009) declares that “These concerns [about persuasion] only increase when the target of persuasion is emotionally vulnerable – say, lonely or bereaved – or cognitively vulnerable – a child or an elderly person with dementia” (p. 2). Second, these are undeniably exceptional cases, so even if these situations do justify the ethical use of deception, this does not make it valid for a software producer to conclude by extension that the use of persuasion or deception is ethical in the particular case with which they are concerned.

Nodder (2013) even pushes back against the “Golden Rule” of persuasion proposed by Berdichevsky and Neuenschwander in their 1999 paper. As an argument against the idea that “The creators of a persuasive technology should never seek to persuade anyone of something they themselves would not consent to be persuaded of” (Berdichevsky & Neuenschwander, 1999, p. 58), Nodder (2013) asks, for example: “Is it okay for a smoker to make an iPhone app to help others quit smoking?” (p. 254) and concludes that even deception and coercion “can be very practically applied toward positive ends” (p. 254). Further, he reminds the reader that “it’s okay to make money” (p. 255), and suggests that software producers will need to discover for themselves the “boundary that distinguishes good business practice from evil design” (p. 255).

Returning to the interviews conducted as part of the current study, we found that the majority of participants considered the development of persuasive technology to be acceptable under some conditions; in particular: when guiding the user in the most efficient use of the software, as part of a sales or marketing effort, or when the software producer does not consider the persuasion to be unethical. But as shown by Nodder (2013), it can be all too easy for software producers to determine that their scenario falls into one of these categories. Four
interview participants made comments that broadly justified persuasion by echoing a statement in Gray et al. (2018): “acknowledge the persuasive intent underlying all of design activity” (p. 3). And of course, most software is developed as part of an effort to make money for the developers. If the use of persuasion for sales and marketing is acceptable, then virtually anything the designer chooses to do in service of that goal becomes acceptable.

Among the findings of the survey in the current study were that while software consumers consider persuasion in general to be ethical, they react negatively to attempts to persuade them personally, particularly when the motivations of the designer are seen as morally questionable. Since the explicitly stated motivation of the morally questionable UI mockup variant in the survey was an attempt by a manufacturer to sell snacks, this appears to be in direct contradiction with the attitude of software producers that it is acceptable to use persuasion in the service of sales.

The next interesting finding involves whether consumers of software recognize that persuasive technology is being applied. Recall from the survey that results were inconclusive as to whether participants recognized the attempts at persuasion in the cases where persuasion was indeed present. In the case where the interface was intentionally neutral, however, incorporating no persuasive technology, participants did correctly recognize, in a statistically significant finding, that there was no persuasion. Since participants did not clearly recognize this in the persuasive conditions, there is at least the suggestion that some or all people were not aware of the persuasion. Again, it’s worthwhile to note that the attempts at persuasion presented in this survey were primitive. With the more sophisticated techniques actively in use in modern software applications, it is entirely reasonable to conclude that many software consumers are not only successfully being persuaded, but are unaware of the persuasion.
The final significant finding is also one that might be expected: the results of the survey suggest that people react positively to persuasion attempts that they view as morally admirable and negatively to those that they view as morally questionable, while reacting neither positively nor negatively to those whose motivation was considered morally neutral. In this, the views of software consumers largely align with those of software producers, who, as suggested by the results of the interviews, find it acceptable to be involved in the development of persuasive technology if they consider the effort to be morally admirable. The issue, of course, is in the interpretation of the motivation. As noted, it may be relatively easy for software producers to justify their own behavior as morally admirable, even in cases in which a disinterested observer might not agree. For example, they may consider it an ethical duty to develop software in accordance with their employer’s specifications, or they may consider it a moral good to earn money so they can use it for a cause that they consider worthwhile. This reasoning could reduce or override any concerns they might have regarding the effect of the persuasive technology on its users.

Although the number of responses to the survey in the current study allowed for a significant amount of data collected, it may be considered a limitation that all survey respondents were associated with the same institution, RIT, and that the population was self-selected. Since no compensation or other incentive was offered for participation, presumably only those recipients of the email who had some interest in the topic and had the time to spend on the survey chose to participate.

Another possible limitation is that while the persuasion attempts involved snacks, it was clear to participants that the snacks they were choosing were hypothetical, since the survey was conducted via email, so if participants had been presented with actual snacks that they would
then proceed to eat, it’s possible that this would have resulted in different choices. The results may also have been different if the UI designs had been more complex, possibly involving several screens of non-persuasive mockups, followed by a persuasive mockup, although it seems likely that this technique or other more advanced attempts at persuasion might have created an even stronger effect.

The control group presumably demonstrated the actual preferences of participants for the snack choices, so a more advanced analysis of the data could have been done to take these preferences into account when considering whether the persuasion attempts were effective, or were influenced to some extent by a real preference for the featured items.

Regarding the interview portion of the study, the main limitation was likely the small sample size, and the fact that participants were chosen by convenience from the set of the author’s professional contacts. Also, for this reason, the backgrounds of most of the participants were largely in either the telecommunications industry or the physical security industry. Results may have been different if participants included those involved in the development of more directly end-user-facing software such as social media applications or online sales web sites.

Another limitation may have been the self-reporting of adherence to moral frameworks. Results may have been influenced by participants’ desire to make a positive impression on the interviewer. And finally, there is the matter of scale – it’s possible that interviewees responded in terms of software that they expected to affect a relatively small number of people, and in these cases, some level of persuasiveness may be better tolerated. If it had been made clear that the persuasive technology in question had the potential to influence millions or even billions of people, as is the case for some social media applications, the results may have been different.
6 Conclusion

This paper has explored the perceptions of the ethics of persuasive technology. Findings within this study include:

- Persuasive technology works. Even the rudimentary attempts in the survey used in this study were shown to be effective.
- Software consumers do not necessarily recognize persuasion, although they correctly identify cases where it is not present.
- Software consumers do not wish to be persuaded, unless they view the motivation of the persuader as being morally admirable.
- Software producers do not want to behave unethically, but they are largely open to the development of persuasive technology, and a minority would also not rule out the development of deceptive technology, as long as their personal moral boundaries are not crossed.
- The academic literature on ethics in the use of persuasive technology is not extensive. Some significant work has been done to describe, analyze, and predict many aspects of persuasive technology, but often the ethical considerations have been given only secondary importance. In a few cases, authors have expressed strong opinions that ethics can and should be considered when designing and developing software.
- Recent discussions among software producers online have demonstrated that there are growing concerns about the use of persuasive technology, even if these concerns have not been extensively explored in academic study.
It's reasonable to conclude that software producers are not being intentionally malicious when they develop persuasive or deceptive software – rather, they are driven by the same long-standing incentives, financial and otherwise, that affect all of us. Self-justification of decisions and behaviors is, of course, yet another aspect of human psychology that has existed throughout history. But given the amount of persuasion taking place today via the technology on which many of us have become dependent, it's worth asking whether we want to live in a world in which developers are encouraged to use such tactics. Persuasion and deception are indeed points on a continuum, and while most interview participants denied that they would participate in the development of deceptive software, there were a significant number of notable exceptions (four of the 12), who expressed their reluctance to reject categorically the possibility that they might be willing to develop deceptive software in the future. This suggests a level of honesty and self-knowledge that most of us probably possess, but that many of us might not affirm. It’s likely true that, depending on the circumstances, the use of deception would easily be justifiable.

Ideally, innovations in software should benefit the consumers of that software. If software producers also benefit, that is a bonus, but when the most powerful incentive is for software to be commercially successful, this can override the potential benefit to consumers. The tracked behavior and personal information available from users can too easily become part of a financial equation in which the profits of software producers are maximized at the expense of consumers’ best interests. In order to avoid descending further into a world where this equation holds true, it may be necessary to recognize that it doesn’t have to be this way. The fact that persuasion has always existed is not a justification for embedding it in products of technology without careful consideration of the intentional and unintentional effects of its usage. This analysis of perceptions suggests that consumers and producers are largely in agreement
regarding the use of persuasion in technology, but there is a danger that incentives can become misaligned, resulting in software that is used to unjustly prey upon those who are most susceptible to its effects. Given these findings, it’s important to recognize that these incentives can and should be changed if necessary, to allow software professionals to pursue their craft ethically and without ill effects on the users of their products.

Future work might be done to address some of the limitations in the current study. For example, the survey could be repeated and targeted toward a more diverse group of software consumers. To counter the possible effect of survey participants knowing that they would not actually be eating their chosen snacks, a study could be done in which the participant is aware that they will actually be given the snack that they choose.

From the software producer point of view, future work could be done involving a larger group of software professionals across a wider variety of industries in order to confirm or deny that the findings hold for a broader population. As noted earlier, it might also be possible to use more advanced research methods to more accurately determine the moral frameworks of participants.

Finally, the idea of incentives could be explored further. Given sufficient funding or access to a cooperative corporate environment, a study could be arranged that would actually pay software professionals to be involved in the development of persuasive or deceptive technology, in order to more precisely determine the conditions under which they would be willing to participate.
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8 Appendix A: Consumer Survey

8.1. Survey Introduction

Dear Participant:

As part of the graduate program in Human-Computer Interaction at the Rochester Institute of Technology (RIT), I am researching perceptions of the ethics of persuasive technology. You are invited to participate in this research by completing this survey.

The survey consists of 19 questions, and should take approximately 15 minutes to complete. There is no compensation for your participation, and there are no known risks. If you choose to participate in this project, please answer the questions as honestly as possible. Participation is strictly voluntary and you may refuse to participate at any time. You are not required to answer all questions, although the more data that can be gathered from the survey, the higher the potential for a meaningful outcome of the research.

Thank you for your time in assisting me with this educational endeavor. The data collected will be analyzed to gain a better understanding of consumers’ perceptions of the ethics of persuasive technology, with an eventual goal of contributing to improvements in the design and implementation of computer hardware and software using the knowledge gained.

If you have any questions or concerns, please send me an email at cb3741@rit.edu.
8.2. Survey Questions

1. Choose a snack!

**Condition A:** A neutral design that does not attempt to persuade the user to make a particular choice.

**Condition B:** A persuasive design that attempts to persuade the user to make a particular choice, with a motivation that is expected to be considered morally admirable.

**Condition C:** A persuasive design that attempts to persuade the user to make a particular choice, with a motivation that is expected to be considered morally neutral.

**Condition D:** A persuasive design that attempts to persuade the user to make a particular choice, with a motivation that is expected to be considered morally questionable.
2. (all conditions) How ethical do you consider persuasion without the use of technology (verbal or written attempts at persuasion)?

1: Always ethical
2: Usually ethical
3: Occasionally ethical
4: Neither ethical nor unethical
5: Occasionally unethical
6: Usually unethical
7: Always unethical

3. (all conditions) Please select a tasty treat from the list below:

1: doughnut
2: apple
3: cookie
4: celery

4. (all conditions) Did you feel persuaded to answer in a particular way to question 3?

1: Yes
2: No

5. Why or why not?
6. (all conditions) Question 3 was intended to persuade you to answer in a particular way.

What is your reaction to that attempt at persuasion?

1: Extremely positive
2: Largely positive
3: Somewhat positive
4: Neither positive nor negative
5: Somewhat negative
6: Largely negative
7: Extremely negative

7. (all conditions) Did you consider the persuasion attempt in question 3 to be deceptive?

1: Yes
2: No

8. Why or why not?

9. (all conditions) Did you feel persuaded to choose a particular option in response to the UI mockup in question 1?

1: Yes
2: No

10. Why or why not?
11. (all conditions) Did you consider the persuasion attempt in the UI to be deceptive?

   1: Yes
   2: No

12. Why or why not?

13. (all conditions except A):

   The interface was designed to persuade you to choose...

   B: a healthy snack.
   C: the apple or the celery
   D: an unhealthy snack

   The designer’s motivation for persuading you was...

   B: for your own benefit, based on the general opinion of health professionals
   C: neutral, with no particular intent
   D: for the benefit of snack food manufacturers, in an attempt to sell snacks

   How do you view this motivation?

   1: Extremely morally admirable
   2: Moderately morally admirable
   3: Slightly morally admirable
   4: Morally neutral
   5: Slightly morally questionable
   6: Moderately morally questionable
   7: Extremely morally questionable
14. (all conditions except A)

What is your reaction to that attempt at persuasion?

1: Extremely positive
2: Largely positive
3: Somewhat positive
4: Neither positive nor negative
5: Somewhat negative
6: Largely negative
7: Extremely negative

15. What type of food do you typically snack on?

16. What is your age?

1: 17 or younger
2: 18-29
3: 30-39
4: 40-49
5: 50-59
6: 60-69
7: 70-79
8: 80 or older
17. What is your gender?

1: Male
2: Female
3: Other (specify if desired)

18. What is your highest level of education?

1: high school or less
2: some college
3: undergraduate degree
4: some graduate school
5: graduate degree
9 Appendix B: Producer Interview

9.1. Interview Introduction

Dear Participant:

As part of the graduate program in Human-Computer Interaction at the Rochester Institute of Technology (RIT), I am researching perceptions of the ethics of persuasive technology. As a software development professional, you are invited to participate in this research by being interviewed on the subject.

The interview consists of 12 questions, and should take approximately 15 minutes. There is no compensation for your participation, and there are no known risks. If you choose to participate in this project, please answer the questions as honestly as possible. Participation is strictly voluntary and you may refuse to participate at any time. You are not required to answer all questions, although the more data that can be gathered from the interview, the higher the potential for a meaningful outcome of the research.

Thank you for your time in assisting me with this educational endeavor. The data collected will be analyzed to gain a better understanding of software producers’ perceptions of the ethics of persuasive technology, with an eventual goal of contributing to improvements in the design and implementation of computer hardware and software using the knowledge gained.

If you have any questions or concerns, please send me an email at cb3741@rit.edu.
9.2. Interview Questions

1. What software development roles have you performed during your career (architect, designer, developer, tester, manager, etc.)?

2. Do you consider yourself as ascribing to a particular moral framework?

3. If so, can you describe it?

4. Do you adhere to a formal code of ethics, such as the ACM Code of Ethics and Professional Conduct (https://www.acm.org/code-of-ethics)?

5. Have you ever found it necessary to consider the ethical implications of your work?

6. If so, can you provide details of those occasions?

7. Have you ever been involved in the development of software that you considered persuasive (intended to influence the user to behave in a particular way)?

8. If not, would you consider doing so?

9. Why, or why not?

10. Have you ever been involved in the development of software that you considered to be deceptive (intended to trick the user into behaving in a particular way)?

11. If not, would you consider doing so?

12. Why, or why not?