Lay Theories in Consumer Behavior: Theory of Mind and Theory of Machine

Khon, Zarema

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Zarema Khon

A thesis submitted for the degree of Doctor of Philosophy

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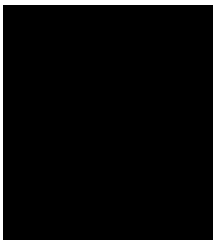
Zarema Khon

Declaration of Authorship

I am the author of this thesis, and the work described therein was carried out by myself personally.

Candidate's signature

Zarema Khon



Ethical Clearance Note

Current research follows fundamental standards of scientific integrity, human rights and dignity, and promotes collaboration between science and society. Participation in all studies was voluntary, informed, and safe for research participants.

All studies included the following information for participants before they gave their mandatory consent:

1) Voluntary participation—all research subjects were free to choose to participate without any pressure or coercion. All participants were able to withdraw from the study at any point without feeling an obligation to continue and a need to provide a reason for leaving the study. It was clearly stated that there were no negative consequences of their refusal to participate.
2) Informed consent—all potential participants received all the information they needed to decide whether they want to participate, including institutional ethics approval, what the study is about, how long the study will take, contact information of the researcher, and that they can email the researcher about anything with regards to the study.
3) Anonymity—participants were informed that the researcher would not know who the participants were and wouldn't be able to link any individual participant to their data, that their data would be kept confidential.

Furthermore, the studies were designed in a way to avoid any harm to participants, including (i) psychological harm such as sensitive questions or stimuli that trigger shame, restlessness, and other negative emotions, (ii) social harm such as stigma, (iii) physical harm such as pain, (iv) legal harm such as violation of one's privacy.

The results were analyzed and communicated without identifying information of any participant. To keep the analysis transparent and accessible for replications, all raw data and stimuli were included in supplementary materials and uploaded to OSF website, wherever possible.

All non-significant results were presented across the studies to avoid research misconduct (e.g., falsifying data or misrepresenting results). To gain more statistical power, internal meta-analyses were conducted, wherever the studies' design made it possible.

All studies included in this doctoral thesis were approved by the Ethics Chair of the Division of Marketing, Business, and Society at the University of Bath and University College London under supervision of Dr. Samuel G. B. Johnson. The ethical form (EIRA1) was downloaded online and attached with this doctoral thesis.

No conflicts of interests were identified.

Candidate's signature

Zarema Khon

Ethical Implications of Research Activity Form (EIRA1)

In order to deliver an Ethics Form that contains the appropriate project information, please answer the below. If you answer "No" to the first question you do not need to provide a PAM Reference Number.	
Is this ethics form in relation to a research grant application or a KTP?	No
What work stream does this relate to?	Unfunded Research
If yes please provide the Project Ref Number from PAM	

This form must be completed for all research activity, including consultancies, KTP and HEIF bids and unfunded research.

The form should be completed by the Principal Investigator/Project Lead and passed, via a second reader, to the Head of Department/Division for approval.

Once approved the Form will remain stored in this Forms environment. Department Research Ethics Officers will be informed by the system once the form is submitted and then again once the form is approved and will be able to access the form from their own view of the form environment.

Please note that this procedure is intended to help PIs/Project Leads consider the ethical implications of their activity. Researchers/Project Leads are responsible for deciding, in conjunction with their departmental/School guidelines and professional body standards, whether a more extensive review is necessary.

Project Details:	
Title of Project (In Full):	**Narratives, Theories, and Inference in Consumer Behaviour**
Date:	*10 March 2018*
Consultancy Project Reference	

/ Unfunded Project Name:	
Brief Description of Project (max 300 words)	**This project looks at the cognitive psychology of consumer behaviour, revolving especially around three questions:** **1. How do consumers use narratives to inform their choices? For instance, do consumers draw on past data to inform narrative explanations, which they then use to predict the future? Do investors look at past price history when predicting a stock's future price?** **2. What intuitive theories do consumers hold? For instance, how can we characterize consumers' intuitive notions of economic exchange? When do consumers view exchanges as positive-sum versus zero-sum?** **3. How do consumers make inferences? For instance, when do consumers generalize CSR failures to the company as a whole and when do they view them as one-off events? How do consumers infer information about unknown attributes of products? How do consumers infer whether a marketing communication is a persuasion attempt?** **As an example of a typical study, one component looks at which experts consumers defer to. Participants study biographies of two expert book reviewers, varying in their cultural/ideological values (more egalitarian [i.e., society should be organized flatly] or hierarchist values [society should be organized vertically]). Participants then read a series of excerpts from book reviews attributed to these two experts and choose which books they would like to read (with a subset actually receiving the book they choose). It is predicted that participants' own cultural views (measured by a standard scale) will predict which experts they trust, with this effect mediated by' inferences about the experts' judgment.** **Most participants in these studies will be online participants (e.g., through Amazon Mechanical Turk or Google surveys). However, in some cases we would like to recruit other populations of participants, such as students enrolled in management courses at the University of Bath**

	or townspeople approached in public places (such as a train station or park).
P.I	***P.I Name*** | ***Department*** | School of Management
Co.I	**Co.I. Name(s):** **Department:**
Project Partner	**Project Partner(s):** **University/Company**
Funder	**Funder Name:** **Amount**
Has this proposal had (or is it awaiting) ethical approval from elsewhere?	Yes
Please state which ethics body you received (or are awaiting) ethical approval from:	University College London
Date of Submission:	27/01/2017

Section 1 - ***Are there ethical implications concerned with the following general issues? If "yes", please provide details:***	
1. Funding source: **(e.g. Are there any implications for disinterested inquiry (i.e. ability to conduct dispassionate, objective, and critical investigation) or for reputational risks?)**	No.
2. Data collection, handling and storage: *(e.g. Confidentiality – for consultancy projects, please refer to the confidentiality clauses within*	Data will be anonymous because we will not collect personally identifying information about research participants. Data will be backed up (e.g., using Dropbox) and will be posted to data repositories as appropriate.

the contractual agreement, security, availability, length of storage, etc.) Please review the Introduction to Research Data Management website	
3. Security Sensitive Reporting *For material supporting terrorism how have you determined that its use is necessary and ethically justifiable? (Such research must also be reported to the University Secretary)*	No.
4. Freedom to publish the results?: **(e.g. Are there any restrictions raised by contract terms?)**	No.
5. Future use of findings: **(e.g. are there any ethical issues in how the findings will or could be used in the future?)**	No.
6. Risk assessment: *(e.g. Have hazards (a substance or situation that might cause harm) been identified and assessed? Is there likely to be any damage to / effect on the environment? Please consult the Hazard and Risk Management website)*	No.
7. Conflicts of Interest: *(e.g. Are you involved in any other activities/collaborations/* **relationships that may result in a conflict of interest with this research?)**	No.
8. Competency to conduct research/project: **(i.e. Do you lack any knowledge or skills compatible with the demands**	No.

of the investigation to be undertaken? If yes, indicate how you will address this?)	
9. Compliance with professional body Codes of Conduct: **(i.e. Is there anything that would prevent the research being conducted in compliance with professional body standards?)**	No.
10. Location of research: **(i.e. Will the research involve lone working or travel to areas that may be unsafe or at risk? In your considerations, you may find it helpful to review the Fieldwork website)**	No.
Demonstration of Ethical Considerations *Please outline the ethical issues which will need to be managed during the course of the activity.*	This research poses typical issues that arise when working with human subjects: 1. Confidentiality. We will address this issue by not collecting personally identifiable information about research participants whenever possible. In the event that researchers do possess information about individual participants (e.g., because they are students in a module or paid participants from the community), this information will not be associated at any point with the individual's data. Note that the Data Protection Act does not apply to such data: "The Data Protection Act 1998 covers the processing of all 'Personal Data'. This is data which constitutes information relating to a living individual, (a 'Data Subject') and from which (either on its own or together with other information held) the individual is identifiable, so data held purely in an anonymised form is not covered." (http://www.bath.ac.uk/data-protection/data-protection-act/index.html) 2. Informed consent. In general, research participants will complete an informed consent form prior to participating in the research. The only exception to this is in the event of a study for which the informed consent procedure would be lengthier than the study itself. For example, if a postgraduate student asked people in a public park or a train station to fill out a one-question survey, we would not ask for written informed consent because this would greatly increase the time burden on the

	participant, but would instead ask for oral consent to complete a short research study. In such cases, written consent actually increases the risk to the participant because it requires the participant to sign their name to a form. 3. Student populations. We would like to collect data from students enrolled in units at the University of Bath. This can pose additional ethical issues if students are compelled to complete the study as a course requirement. Therefore, we will make it explicitly clear to students that they are not required to complete the study for credit, that we will not know which students completed the study and which did not, and that their data would be anonymous should they decide to participate.
Does the research/project involve human participants in any way? *(Please note if you are processing personal data you need to tick 'Yes'.)*	Yes
Does the research/project involve animals in any way? *Please note that this includes all creatures (vertebrates and invertebrates) and their cells or tissues, whether living or post mortem*	No
Does the research require ethical approval by SSREC, REACH, Psychology Ethics Committee or the University Ethics Committee Panel?	No
If a project has more complex ethical implications, then review by an Ethics Committee is recommended: REACH (Research Ethics Approval Committee for Health) SSREC (Social Science Research Ethics Committee) Psychology Ethics Committee Ethics Committee Panel – The Committee has authority to establish a Panel to conduct ethical review on its behalf. Contact the Chair of the Committee	

Section 2 -
FOR COMPLETION IF YOUR RESEARCH/PROJECT INVOLVES HUMAN PARTICIPANTS
If any of the answers to these questions are 'yes', please confirm in the space below how the ethical issues will be managed during the course of the activity.

Compulsory question for consideration by all disciplines: ***Are there ethical implications concerned with the following general issues?***	
Will the study involve obtaining or processing personal data relating to living individuals, *(eg involve recording interviews with subjects even if the findings will subsequently be made anonymous)?* *Note: If the answer to this question is 'yes' you will need to ensure that the provisions of the Data Protection Act are complied with. In particular you will need to seek advice to ensure that the subjects provide sufficient consent and that the personal data will be properly stored, for an appropriate period of time). Information is available from the University Data Protection Website* http://www.bath.ac.uk/internal/data-protection/ *and* dataprotection-queries@lists.bath.ac.uk *Note: For Consultancy Projects you are encouraged to ask the client to arrange/liaise with living individuals and have the data delivered to you for analysis.*	No

Please complete this section if any of the answers to the above questions is Yes or if you anticipate that other ethics issues could arise during the course of your research or activity. You should state how such ethics issues will be managed.	
1. Does the study involve participants who are particularly vulnerable or unable to give informed consent? *(e.g. children, people with learning disabilities)*	No
2. Will the study require the co-operation of a gatekeeper for initial access to the groups or individuals to be recruited? *(e.g. students at school, members of self-help group, residents of a nursing home)*	Yes
3. Do you require a DBS (Disclosure and Barring Service) check and if so have you obtained the necessary documents and approval?	No
4. Will it be necessary for participants to take part in the study without their knowledge and consent at the time?*(e.g. covert observation of people in non-public places)*	No
5. Will the study involve discussion of sensitive topics? (e.g. sexual activity, drug use)	No
6. Are drugs, placebos or other substances (e.g. food substances, vitamins) to be administered to the study participants and/or will the study involve invasive, intrusive or potentially harmful procedures of any kind?	No
7. Will blood or tissue samples be obtained from participants? ***Note: If the answer to this question is 'yes' you will need to be aware of obligations under the Human Tissue Act, see further information at http://www.bath.ac.uk/research/governance/ethics/hta.html***	No
8. Is pain or more than very mild discomfort likely to result from the study?	No

9. Could the study induce psychological stress or anxiety or cause harm or negative consequences beyond the risks encountered in normal life?	No
10. Will the study involve prolonged or repetitive testing?	No
11. Will financial inducements (or other expenses and compensation for time) be offered to participants?	Yes
12. Will the study involve recruitment of patients or staff through the NHS? *Note: If the answer to this question is 'yes' you will need to submit an application to the NHS through IRAS, see: http://www.hra.nhs.uk/research-community/applying-for-approvals/ New web address*	No
Demonstration of Ethical Considerations for Section 2: *Please complete this section if any of the answers to the above questions is Yes or if you anticipate that other ethics issues could arise during the course of your research or activity. You should state how such ethics issues will be managed.'*	
The ethical issues raised on this page include: 1. Gate-keepers. In some cases, students may be contacted to participate who are not enrolled in units taught by the PI, and this would require the cooperation of the instructor(s) for the relevant units. In such cases, the gate-keeper would be made aware of the relevant issues discussed here, including emphasizing to students that the study is non-compulsory and anonymous. 2. Compensation. In some cases, compensation may be offered to research participants. For example, online (e.g., Mechanical Turk) or community participants are offered a fixed payment per study, and students could be incentivized using a lottery (e.g., 1 out of 20 students will receive a product they chose in the study).	

Section 3 - Are there ethical implications concerned with the following?	
1. Has the project been submitted to and approved by the Animal Welfare and Ethical Review Body? *You should contact the Arlo Animal Research Liaison Officer to register your project. All projects involving animals must be registered with the ARLO and approved by the local Animal Welfare and Ethical Review Body (AWERB).*	
2. If your project is governed by the Animals (Scientific Procedures) Act incorporating EU Directive 2010/63/EU [new A(SP)A], have you obtained the relevant Home Office licences?	
3. If your project is not controlled by the new A(SP)A, is it controlled by any other UK legislation? If so, please specify	
4. If the research is not controlled by any of the above legislation, have the ethical implications of the project been considered by the **Animal Welfare** and **Ethical Review Board**? Please complete the Ethical Review Form	
Demonstration of Ethical Considerations for Section 3:	

Please complete this section if any of the answers to the above questions are 'yes'.

Who is the Second Reader?	Debra Desrochers
Who is the Department Research Ethics Officer (DREO)?	Chris Dawson
Who is the Head of Department / Division responsible for approving this EIRA1?	Nancy Puccinelli
Who is the P.I ?	Samuel Johnson

Declaration

I confirm that the statements in Sections 1-3 describe the ethical issues that will need to be managed during the course of this research activity and that consideration has been given to whether further ethical approval is required and how this will be sought.

Samuel Johnson

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Acknowledgements

I would like to express my very great appreciation to the people who made this thesis possible.

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Thesis Abstract

Consumers rely on their intuitions to make sense of a complex and uncertain marketplace. Current research investigates (i) the factors and (ii) consequences of consumers' intuitive theories about the market economy, companies, the use of smart algorithms, and marketing manipulation. The analyses of factors show that consumers' beliefs about the marketplace are immensely affected by the evolutionary adaptations. Although consumers' beliefs are accurate representations of the marketplace in most cases, they are oftentimes corrupted because humans' mind has not changed much in the last 10,000 years when humans were living in small hunter-gatherer societies. Development of manufacturing, economic growth, technological advancement—all were too rapid and recent so that the advantages of modern economy might not only be beneficial to consumers, but also frighten them. This is because human cognition is not equipped to think about such complex and opaque phenomena. In addition, it is highly-attuned to threats (even though falsely). The analysis of consumer behavior showed that these intuitions have significant effect on consumers' brand attitudes, choice, and sentiments around the entire market economy. The three papers not only examine the connection between evolutionary factors and consumer behavior, but also test the ways of making consumers' beliefs more accurate. This has theoretical contributions to the corresponding literatures and important practical implications for marketers and policymakers.

But Jesus said to them: "It is easier for a camel
to pass through the eye of a needle than for a rich man
to enter the kingdom of God."

– Matthew 19:24

Introduction

In this doctoral thesis, I investigate the role of lay theories about the marketplace in consumer behavior. In the three articles, I examine how consumers' beliefs about companies, marketers, other customers, advertising, and capitalism are (i) formed and (ii) how they affect consumers' brand attitudes, choice, and willingness-to-purchase. The purpose of this research is to look at modern lay theories in consumer behavior through the prism of consumers' beliefs about manipulation and their own autonomy.

Lay theories are the informal, intuitive, common-sense explanations non-expert people give for particular social events (Furnham, 1988). "Shedding light on everything from prejudice to creativity, thinking, self-regulation, health, freewill, and religion" (Dweck in Zedelius, Muller, & Schooler, 2017, p. 5), lay theories have been studied in such domains as health (e.g., Bunda & Busseri, 2019; Xiaokang et al., 2019), education (e.g., Savani, Rattan, & Dweck, 2017; Yeager et al., 2016), personality (e.g., Plaks, Levy, & Dweck, 2009; Yeager, Trzesniewski, & Dweck, 2013), cognitive psychology (e.g., Kruglanski, 1990; Sternberg, 1985), finance (e.g., Krijnen et al., 2022; Shang, Duan, & Lu, 2021), economics (e.g., Caplan, 2001, 2002; Leiser & Aroch, 2009; Leiser & Drori, 2005), and several others.

Consider the questions such as "Are consumers generally malleable—is it easy to persuade them with advertising?", "Can the ubiquitous use by companies of artificial intelligence facilitate the rise of the machines causing threat to a human species?", "Where is

the line between companies' influence on consumers' choice and consumers' own autonomy and free will?"—the answers to these questions may represent lay theories about marketing. Despite its high importance for determining consumer behavior (e.g., Campbell, 1995; Kirmani & Zhu, 2007; Wentzel, Tomczak, & Herrmann, 2010), the literature on lay theories about the marketplace is still scarce (*cf*. Bhattacharjee, Dana, & Baron, 2017; Bolton, Warlop, & Alba, 2003; Friestad & Wright, 1995; Jain, Mathur, & Maheswaran, 2009).

Existing marketing literature discusses a lot how consumers explicitly behave (e.g., how often they purchase a particular product), suggesting what companies can do to increase sales (e.g., by executing particular sales tactics that can increase the frequency of purchase). However, only recently scholars began to look at consumers' *implicit* characteristics—particularly at their thoughts, intuitions, understanding, and beliefs that, as it turns out, immensely affect the way consumers behave. I contribute to this literature by showing that although understanding how things work objectively is very important, investigating how people *perceive* how they work is not less important. Specifically, I examine how consumers' own intuitions determine their (not always the best) decisions, and what marketers can do to make their assumptions and beliefs about reality as accurate as possible.

Lay Theories and The Ancient Mind

Human psychology is a collection of highly specialized mechanisms, each of which is designed to solve one kind of social problems recurrent in our ancestral environments (Kurzban, 2012). The great majority of these mechanisms have specialized to solve a class of problems that existed in the environment of evolutionary adaptation. For instance, there are separate mechanisms associated with language (Pinker, 1994), teaching (Boesch, 1991), sex and mating behavior (Buss, 1999). There are also mechanisms relevant to marketers and economists associated with exchange and monitoring of human behavior, such as

cooperation, coalition formation and management, dominance and subordination in hierarchies, inferring the intentions and values of groups (Buss, 2015; Cosmides & Tooby, 1992; Petersen, 2015).

Specific intuitions about social exchange are particularly important for the development and spread of beliefs about the modern market economy. These are not the product of cultural values, specialized scholarly training, or the result of political persuasion—instead, humans have developed intuitive psychology of interpersonal exchange because of adaptation in the context of small groups (Cosmides & Tooby, 2015). The very primitive understanding of economics and the marketplace appeared when our ancestors lived in environments with small societies (up to 150 individuals) (Rubin, 2003). Humans have changed very little since the appearance of the first civilizations (about 10,000 years ago), therefore much of their mind is designed for survival in hunter-gatherer societies (Rubin, 2002).

Because natural selection is a slow process, the mind of modern humans is not too different from the mind of our ancestors (Diamond, 2013). The rise of agriculture has been too quick, so that market economies appeared too recently, making the modern market environment immensely different from the ancestral exchange in terms of social scale and technological complexity. So, one should not expect special adaptations to the features of the modern marketplace (Boyer & Petersen, 2018; Rubin, 2003). Our ancestors hardly knew about comparative advantage, inflation, international delivery, or algorithmic advice. Yet, understanding how the societies functioned thousands of years ago is critical for understanding modern consumer behavior.

Accuracy of Lay Theories of The Marketplace

Over the past two centuries, automation and economic growth have increased living standards unimaginably quickly. Many more people can be fed, clothed, and housed; many

more of them survive to old age. Much of the world can dedicate decades of their lives for education, leisure, and favorite work. Yet, people have little faith in the power of markets to create and return value to society (Bhattacharjee et al., 2017; Cowen, 2019; Edelman, 2022). Recent research suggests that people may not fully understand the factors responsible for their prosperity. Given the fact that human mind is not equipped to readily understand the concepts of the market economy (Rubin, 2003), the marketplace representations, similarly to other lay belief systems, are mainly defined as socially shared ideas, anecdotes, opinions, and intuitions (Furnham, 1988). Thus, the main problem with the lay theories (unlike expert knowledge) is that they are oftentimes inaccurate.

The market mechanism is in principle opaque. A macro-economy, for instance, is based on intense trading of large-scale societies and, therefore, is not comprehensible for our ancient mind. Consumers systematically neglect inflation effects, even after being provided with explicit inflation rates and historical data; when looking across competitors, consumers associate retail price differences with profit rather than costs (Bolton, Warlop, & Alba, 2003). One explanation is that questions about social events (such as social exchange) are difficult and complex ones for laypeople to answer. As a result of such complexity, consumers, when forming their beliefs about the marketplace, cannot rely on feedback from their direct experience. Therefore, limited knowledge and restricted information processing resources leave consumers with what they can imagine or what others tell them.

Furthermore, when faced with questions for which intuitive answers are difficult to generate, people may substitute a related question with an easier approximation and answer that instead (Kahneman, 2011). Individuals' judgment and decision-making is oftentimes based on simplified mental models (Baron, Bazerman, & Shonk, 2006; McCaffery & Baron, 2006). Individuals' beliefs about the marketplace based on such unreliable pieces of information may keep them from questioning whether their experiences are incomplete and

inaccurate, contributing to an illusory understanding of the marketplace complexity (Sloman & Fernbach, 2017). Consequently, laypeople have a large range of inaccurate, or false, ideas about market economies (Boyer & Petersen, 2018).

Belief Accuracy and Evolution of Social Psychology

If we now know how corrupted our beliefs about the market economy are, can anything be done to solve this problem? Modern evolutionary psychologists answer that belief accuracy is not always a goal (McKay & Dennett, 2009; Mercier, 2020; Petersen, Osmundsen, & Tooby, 2020). Below I review literature discussing situations when accuracy is usually neglected.

Complete uncertainty is one situation when accuracy can be neglected—some false beliefs can help people cope with uncertainty better than unknown truths (Onishi & Baillargeon, 2005). Moreover, there are situation when humans can *deliberately* hold false beliefs as a useful psychological adaptation (Peterson et al., 2020). Sometimes, agreement with false beliefs can signal commitment to a group. For example, following odd cults and rituals or spreading extravagant beliefs may signal awareness of group-specific representations and exclusive belonginess to a particular group and not to the out-group. Also, sharing false information can solve coordination and mobilization problems within society: Members of the in-group can deliberately spread exaggerated or false rumors about the out-group to facilitate war actions against an enemy. In other situations, false information can help potential leaders demonstrate their ability to win in a conflict with a hostile group: Some research shows that such practice can signal dominance, strength, and motivations to escalate aggression against the out-group (Laustsen & Petersen, 2017). Rapid facilitation of collective action has been key to the survival of our ancestors and falsehoods were critical.

In addition to uncertainty and conflict management, individuals might be involved in spreading potentially false information just because there is a possibility for the information to be true, and if it is, those who spread this information will get social scores for forewarning others; if this information is false, others will not inflict neither social scores nor costs to the person who shared this information (Mercier, 2020). Therefore, rumors (even when they are dubious) spread so easily and quickly. (Also, during the recent pandemic of COVID-19, people were sharing appealing treatments with others (e.g., lemons with ginger etc.)—if a treatment seemed to work, they received social scores, if not—it was still fine, as no one promised a magic pill.)

All these situations show that under particular conditions, people are not motivated to hold and spread accurate and true beliefs. Thus, for psychologists and everyone who investigates the role of particular beliefs (including marketers, economists, and politicians), it is of key importance to understand that not all beliefs serve the function of representing the world accurately—some beliefs are evolved as psychological mechanisms that serve purely social functions.

Marketplace as a Zero-Sum Game

Consumers oftentimes hold negative attitudes towards markets. Paul Rubin (2014) coined the term *emporiophobia* for the generally negative belief that markets produce harmful outcomes for most participants. There is numerous evidence that lay people see markets not as the exchange between buyers and sellers mutually benefitting from trade, but as a place of struggle between sides with unequal bargaining power (Boyer & Petersen, 2018; Tetlock et al., 2000). Existing research on marketplace cognition suggests there is a potential for buyer-seller conflict, mistrust, and consumer dissatisfaction (e.g., Bolton et al., 2003) because

people often do not recognize the positive aspects of trade—instead viewing exchanges as zero sum (Baron & Kemp, 2004; Johnson, 2018).

Rubin (2003) suggests that lay economic thinking focuses almost exclusively on the *distribution* of wealth rather than its *creation*, arguing that one of the fundamental differences between laymen's versus economists' understanding of the marketplace activity is that economists view most transactions as *positive-sum*, whereas laypeople view them as a *zero-sum* game. In a zero-sum game, the only way for a company to grow is to take existing resources from others leaving them worse-off, just as people often erroneously view negotiations as having a winner and a loser (even in situations when they are win-win) (Baron et al., 2006).

This difference in lay versus expert views explains why consumers very often view profit as taken rather than created, resulting in *anti-profit beliefs* (Bhattacharjee et al., 2017). By overlooking the possibility of creating value and wealth instead of distributing existing resources, anti-profit beliefs treat profit as necessarily leaving others with smaller shares. Therefore, consumers oftentimes see profit as harming society.

In addition to that, as conflict management (both within and between groups) was an important part or our ancestors (Tooby & Cosmides, 2010), humans have strong evolved intuitions about supporting their in-group while fighting against their out-group (Boyer & Petersen, 2018). On this view, trade is possibly aversive because it involves transferring resources to the out-group even though one's own group also benefits. Thus, not only international trade is seen as aversive—even domestic trade and exchanges between individual consumers and retailers are seen as zero-sum (Johnson, 2018). So, it is also possible that marketers are seen as hostile out-group members to consumers.

Even if consumers enjoy the benefits of market economy, they may still maintain negative attitudes toward firms because of the greater intuitive appeal and saliency of all

negative aspects. Thus, judgments of firms are mostly influenced by immediate negative effects (e.g., costs), but positive long-term incentive effects are oftentimes neglected.

Fear of Being Manipulated

Consumers' desire to act on their own volition is the foundation of their behavior as consumers (Wertenbroch et al., 2020). People believe that they have free will and that it is greater than the free will of others (Pronin & Kugler, 2010). The core concept of autonomy and free will is a choice that fulfills one's desires and is free from internal or external constraints and influence (Monroe & Malle, 2009). Even though there is a growing number of studies demonstrating that free will is an illusion (e.g., Greene & Cohen, 2004; Harris, 2012), when consumers feel their free will is limited or violated, they tend to act with reactance (Brehm, 1966)—do whatever helps them restore their perceived free will.

Furthermore, people are strongly motivated to avoid being duped or exploited (Tooby & Cosmides, 1992), especially in situations involving economic exchange (Kahneman, Knetsch, & Thaler, 1986; Piron & Fernandez, 1995). Although recent research in marketing, psychology, and political science demonstrate evidence that people are not as easily tricked as they might think (Coppock, Hill, & Vavreck, 2020; Gerber et al., 2011; Krasno & Green, 2008; Mercier, 2020), awareness of others' selfish motives (e.g., of marketers) automatically triggers in consumers defensive measures against potential dishonesty (Campbell & Kirmani, 2000; Wright, 1985). This is because humans have a large range of psychological defense mechanisms against manipulations, sometimes referred to as *epistemic vigilance* (Mercier, 2020).

This anti-manipulation defense mechanisms oftentimes include exaggerated beliefs about being manipulated. When individuals receive information that is aligned with their own interests, these defenses are suspended (Druckman, Peterson, & Slothuus, 2013). But in

situations where other groups pose a threat to their own group (e.g., zero-sum "conflict" with retailers), the accuracy of the information is irrelevant here—such conflicts can better be managed by exaggerating reality (Petersen et al., 2020), because this is safer. In such cases, people don't assess the marketplace as an intelligible system but rather they activate their general mechanisms towards dangers (oftentimes not consciously).

Although companies can be involved in both beneficial and harmful practices, the harmful activity is more salient, immediate, and intuitive to people than the beneficial effects (Nichols & Knobe, 2007). For instance, to help consumers make the right choice or to entertain them, companies might use targeting techniques and recommendation algorithms that assist consumers in finding the products they would like. However, while such algorithms can be extremely helpful, they also run the risk of undermining consumers' autonomy (Wertenbroch et al., 2020).

Indeed, a vast amount of consumers' fears of being exploited emanate from the modern characteristics of an evolving marketplace that is progressively characterized by automation. Despite an increasing number of benefits, technological advances are facilitating novel threats to consumer autonomy: Artificial intelligence, recommendation systems, machine learning, and neuromarketing are reshaping the marketplace and consumption, with substantial implications for consumer autonomy. And these changes are common not only for marketing—policymakers, too, increasingly introduce new measures around redesigning choice architecture to nudge individuals toward better decisions (Sunstein, 2016; Thaler & Sunstein, 2008).

Consider a recent example of dream-hacking. Consumers are worried that marketers can use newly invented devices to intrude into their dreams to advertise the company's products while the consumers are asleep (Gupta, 2021). Despite that the scientists who invented these wearable devices are determined that such intervention is not possible at least now or in the

nearest future as the effectiveness of the gadgets is still very limited (Rosello, n.d.), lay public is nevertheless fears that there is another technology being developed for the companies to manipulate them.

In addition to new technologies advancement and increasing automation, there is another perceived threat to consumers' autonomous choice—neuromarketing. Neuromarketing is the use of neuroscience and physiological research techniques to gain new insights into consumers' behavior, preferences, and decision making (Stanton, Sinnott-Armstrong, & Huettel, 2016). Although neuromarketing is known to be quite limited in its potential of explicitly manipulating people, most ethical objections to neuromarketing refer to risks of harms and violations of consumers' rights of not to be deceived and subjected to experiments without consent, or their rights to dignity and privacy. The risks of harms include both immediate effects on individual consumers and long-term effects on society as a whole.

Despite increased concern about the privacy and autonomy threats posed by new technology and algorithms, there is relatively little evidence that consumers' concerns translate to corresponding behaviors (Joinson et al., 2010). Although these beliefs do not necessarily affect consumers' direct actions, yet such beliefs are *detrimental* to the consumers' *general understanding about how the marketplace is organized*.

Theory of Mind

Consumers rely on their intuitions to make sense of a complex and uncertain marketplace. One complication in the marketplace is the omnipresence of other people. Considering the overwhelming complexity of human behavior, it is notable how easily people seem to interpret the actions of others. A primary purpose of lay theories is to facilitate the understanding of complex information (Heider, 1958; Kelley, 1955). Much of this work is accomplished by the network of lay theories *about others* (Hong, Levy, & Chiu, 2001;

Molden & Dweck, 2006). Everyday decision-making by individuals considering the needs and expectations of others, such as face-to-face exchanges by consumers and salespeople, group decision-making in family or organizational buying centers, evaluating whether marketing claims are credible, involve strong, pervasive *theory of mind* processes (Shaw & Bagozzi, 2017). Theory of mind is the ability to attribute mental states—beliefs, emotions, intents, etc.—to oneself, and to others, and to understand that mental states of others are different from one's own (Premack & Woodruff, 1978).

Theory of mind has widely been studied as a part of social information processing (Yang, Rosenblau, Keifer & Pelphrey, 2015), in research on processing capacity and working memory (Lin, Keysar & Epley, 2010), mood and cognitive processing (Converse, Lin, Keysar & Epley, 2008), language comprehension (Ferguson, Scheepers & Sanford, 2010), conspiracy theories (van Prooijen & van Dijk, 2014), teleological beliefs (Banerjee & Bloom, 2014), religious and paranormal beliefs (Boyer, 2003), and in many other fields of brain studies. Also, research on theory of mind has been focusing on its development in children (e.g., Carruthers, 2013; Korkmaz, 2011; Wellman, Cross & Watson, 2001; Wimmer & Perner, 1983), and impairment in individuals with social deficits (e.g., in individuals with autism; see Baron-Cohen et al., 2001; Slessor, Phillips, & Bull, 2007). In a marketplace context, the ability to think about the thoughts of advertisers and to theorize about possible responses also depends on theory of mind (McAlister & Cornwell, 2009). The role of theory of mind in consumer behavior has been studied both in young children (McAlister & Cornwell, 2009, 2010) and adults (De Martino et al., 2013; Dietvorst et al., 2009). Although there have been a number of attempts to incorporate this knowledge into marketing, there is yet much to be done. Beyond marketing, understanding events is critical too—for instance, to the field of economics, such as decision analysis (Bazerman & Moore, 2013), finance

(Barberis & Thaler, 2003; Shefrin, 2001), and public policy (Shafir, 2013; Viscusi & Gayer, 2015).

Theory of Machine

But increasingly, theory of mind is not enough. More and more, technology has advanced to the point that algorithms and autonomous agents are becoming commonplace in consumers' experiences. To understand their interactions with technology consumers must rely on their *theory of machine*—the aggregate of ideas and knowledge that laymen rely on when thinking about how algorithms work as they interact more frequently with programmed agents in their cars, homes, and workplaces (Logg, Minson & Moore, 2019).

Comparatively to theory of mind, much less is known about theory of machine, because for the first time in human history, technology is replacing human judgment. Being a twist on the classic theory of mind, theory of machine similarly examines individuals' expectations of another agent's internal processes but, in contrast to theory of mind, theory of machine considers how consumers expect algorithmic judgment to differ from human judgment—as an output of a sequence of steps (Logg, 2021; Logg et al., 2019). Although lay beliefs about machines seem highly salient in the marketplace as consumers more frequently use algorithm-enabled services, research about such beliefs is scarce (Huang & Rust, 2018; Ngo & Krämer, 2021). This deficit in the literature is currently being rapidly compensated: After the so-called AI-winter (a period of reduced funding and interest in artificial intelligence research), research on algorithm aversion (Dietvorst, Simmons, & Massey, 2015) or algorithm preference (Banker & Khetani, 2019; Logg et al. , 2019) has mushroomed. The most prominent papers investigate consumers' understanding of how the algorithms operate (and offering solutions to decrease the perception that algorithms are "black boxes"; e.g., Yeomans et al., 2019), how algorithm preference varies across the tasks (e.g., Bigman &

Gray, 2018; Castelo, Bos, & Lehmann, 2019), and the main mechanisms that underlie consumers' attitudes towards machines (e.g., fear of losing job [Smith & Anderson, 2017]; trust [Dietvorst et al., 2015, 2016], recommendation accuracy [von Walter, Kremmel, & Jäger, 2022], and perceived uniqueness consideration [Longoni, Bonezzi, & Morewedge 2019]).

It is useful to mention that theory of machine is different from related but separate work around technology (Logg, 2021). For instance, theory of machine may seem similar to work on anthropomorphism—attributing human characteristics to machines. Studies have tested the contexts in which people anthropomorphize machines, the consequences of doing so, and how they respond to new technologies (Epley, Waytz, & Cacioppo, 2007; Gray, Gray, & Wegner, 2007; Waytz et al., 2010; Waytz, Heafner, & Epley, 2014). That work examines how people impart human judgment on algorithms. In contrast, theory of machine examines how people expect the two to differ and how people respond to an algorithmic numeric output (Logg, 2021).

Importantly, existing studies of the public's attitudes towards machines have provided participants with specific information about the quality of algorithmic advice (e.g., information about mistakes; Dietvorst et al., 2015). However, in real life, such information is not readily available for consumers, and they lack domain expertise to evaluate the accuracy of algorithmic advice. Instead, they rely on more *general cues* such as their lay beliefs about machines when deciding whether to use algorithmic advice or not. As consumers receive more and more information from algorithms—both in their jobs and personal lives—it is extremely important for science to understand how lay theory of machine is developed in individuals.

The Rise of the Machines: Bringing Together Theories of Mind and Machine

The rise of automation can make automatable skills of most people become devalued (so-called “bullshit jobs”; Graeber, 2018). On the one hand, more people will lose their jobs. On the other hand, if the majority of such jobs is automatized, humanity can be reeducated for more hard-to-automate forms of work.

With time we will see what effects automation will have on the economy, but there is already evidence that automation changes the way humans interact with each other, shaping social psychology. Studies show that when people feel like they are losing a zero-sum game to machines, they look for any out-group members to blame—people of a different ideology, religion, or immigrants. Introduction of artificial intelligence triggers intergroup threat by making differences between humans more salient and thus leading to strong negative attitudes and competition with out-group members (Gamer-Djokic & Waytz, 2020). This is how automation might tear us humans apart.

But there is also another side of the coin. Other studies show that the threat of artificial intelligence that is seen as a substitute to human workforce leads individuals to see other humans as more similar to themselves (Jackson, Castelo, & Gray, 2020). Humanlike workforce makes humans see similarities with other humans although they oftentimes have a hard time finding common ground with out-group members such as immigrants and people of different religions. Indeed, out-group members may believe in different deities, but at least they are made of flesh and blood and not of metal and batteries. This is how automation can bring us humans together.

Such unity of seemingly different humans against a different “species” such as machines brings into play the importance of both theory of mind and theory of machine in social psychology. As such, theory of mind can be helpful for understanding how humans interact

with each other, whereas theory of machine can complement this knowledge by showing how humans interact with each other in light of the rise of *artificial* intelligence.

Papers Overview

In this thesis, I study how our understanding of theories of mind and machine can be used to understand consumers' broader *lay theories* about the marketplace, companies' use of technology, and mass manipulation. I argue that consumers' beliefs about the marketers are greatly intertwined with their beliefs about own autonomy and the power of marketing persuasion. Such lay theories inevitably affect consumers' brand attitudes and purchase behavior even in the absence of any persuasion attempts from the companies' side.

The idea that persuasion is powerful is quite compelling—our world is full of persuasion. Ubiquity of marketing persuasion (including the use of technology) makes many consumers intuitively believe in the effectiveness of this persuasion—otherwise why would so many companies spend so much money on marketing communications and advertising? At the same time, Paper 1 of this thesis suggests that although consumers are capable of detecting persuasion in situations where it truly exists, they are also prone to many mistakes in persuasion detection by believing in persuasion with dubious effectiveness (e.g., hypnosis in personal selling). Although these doubtful persuasion tactics have effect only in consumers' imagination (each of us know that persuasion is extremely hard, although this idea is not too salient in our mind in light of the treat of possible manipulation), such beliefs nevertheless have huge effect on moral evaluation of these persuasion tactics. Paper 2 further suggests that consumers ascribe immorality to marketing tactics that have even trivial effect, but this immorality inevitably determines consumers' brand attitudes.

As technology becomes increasingly sophisticated, consumers may believe there is more scope than ever for companies to manipulate them. Despite positive aspects of algorithms'

use, many consumers share suspicion about algorithms as invisible, sneaky, and exploitative agents. These fears bring forward a stronger critique of companies, capitalism, and mass consumer manipulation, where personal autonomy is in danger (Ytre-Arne & Moe, 2021). Paper 3 does not investigate marketing manipulation directly but complements the research by demonstrating that consumers are averse not only to companies that use persuasion tactics but also to non-human algorithms because they likely consider the use of technology as a threat to autonomous choice.

Considering the general inaccuracy of lay beliefs, it is critical (i) to examine the nature of consumer lay theories and (ii) test the ways of making them as accurate as possible. In three papers, I try to address both points. I suggest that the three papers are united under a model connecting the two points and explaining consumer behavior with factors derived from cognitive and social psychology via lay theories (Figure 1).

Research Aims

In this thesis, I look at two big questions around the nexus of theory of mind and machine:

1. With the rise of neuroscience and technology sophistication, consumers may believe there is more scope than ever for companies using neuromarketing tricks and clever algorithms to manipulate them. What are the factors explaining the ease with which consumers believe they are easily manipulated? In Paper 1, I argue that consumers' intuitive theories of manipulation are linked to their more general propensities to detect agency. Previous research has shown that theory of mind plays an important role in the formation of religious, paranormal, as well as conspiracist beliefs (Boyer, 2003; van Prooijen & van Dijk, 2014), whereas religious (Leiser, Bourgeois-Gironde, & Benita, 2010) and conspiracist views (Leiser, Duani, & Wagner-Egger, 2017), in

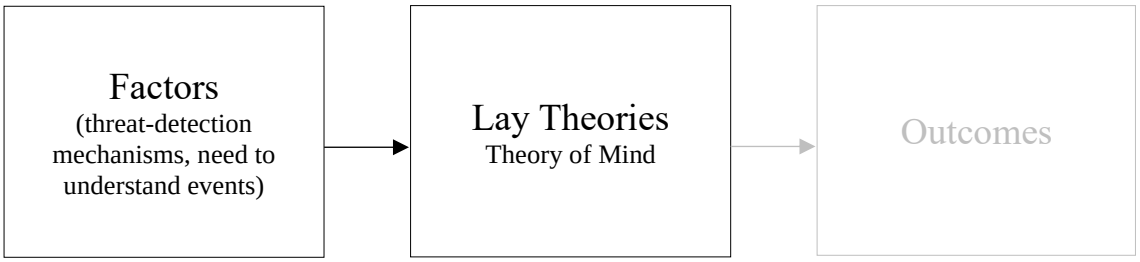
turn, predict intention-seeking in the market economy. Based on these findings, my prediction was that people with higher motivation to understand mental states of agents in the marketplace might be more likely to believe in the manipulations coming from these agents (algorithms or marketers). They have higher tendency to hyperdetect intentionality and be prone to false-positive errors (when there is no intention to manipulate consumer behavior coming from the agent) than people with lower motivation to understand others' mental states. What are the consequences of manipulation beliefs? Paper 2 extends this understanding but this time with respect to morality of marketing persuasion that inevitably shapes brand atittudes. The results may be beneficial both theoretically and practically and help marketers as well as policymakers to improve their tactics in reaching out skeptical consumers and voters.

2. As algorithms become more powerful and increasingly useful, there is growing potential for algorithms to benefit consumers. However, these benefits cannot materialize if consumers are averse to using these algorithms. How consistent is algorithm aversion and what are its moderators? Paper 3 investigates what intuitions lay people hold about algorithms, and how they affect perception and behavior. The idea is to understand how algorithm aversion varies among task domains performed by different algorithms. For instance, people are more reluctant to use algorithms in some tasks (e.g., deciding on bail and parole; making driving, legal, medical and military decisions; Bigman & Gray, 2018; Kleinberg et al., 2018), while more willing to rely on them in other tasks (e.g., predicting recommendations in consumer electronics, making numeric estimates about a visual stimulus, or forecasting popularity of songs; Banker & Khetani, 2019; Logg, Minson, & Moore, 2019). The reason might not only be in presence of moral judgment (Bigman & Gray, 2018) or seeing algorithms err (Dietvorst, Simmons, & Massey, 2015), but also in the

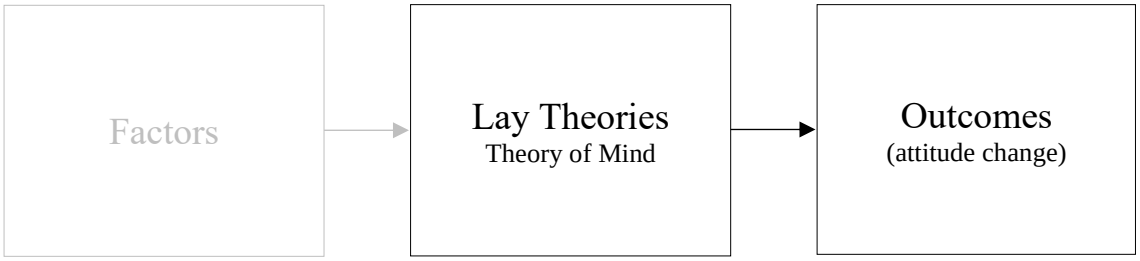
perceptions of these tasks by laymen. In some situations, people may be more averse because they do not understand how the algorithm operates and sophisticated and smart machines may frighten them. In other situations, however, they might think that the algorithm is too simple for solving a complex problem. In this project, I tested if increasing task complexity interacts with complexity of algorithms. In other words, do people want complex tasks (e.g., recommendations for financial investment) to be solved by complex (and not simple) algorithms? This interaction effect may shed light on ways of how to attenuate it, especially in situations where the use of algorithms is vital. This project contributes to our understanding of malleability of algorithm aversion in general by testing mechanisms that underpin this aversion and the foundations of consumers' theory of machine derived from general cognitive psychology.

Figure 1. *Conceptual Model for the Three Papers.*

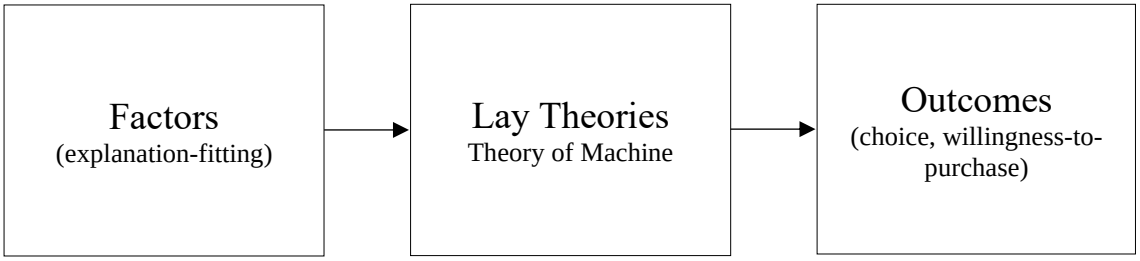
Paper 1 ("Lay Theories of Manipulation: Do Consumers Believe They are Susceptible to Marketers' Trickery?"):



Paper 2 ("Dual Process Intuitions: Consumers' Beliefs About Persuasion Processing Drive Morality of Marketing Communications"):



Paper 3: ("Consumers Prefer Complex Algorithms"):



Appendix 6B: Statement of Authorship

This declaration concerns the article entitled:								
Lay Theories of Manipulation: Do Consumers Believe They Are Susceptible to Marketers' Trickery?								
Publication status (tick one)								
Draft manuscript	V	**Submitted**		**In review**		**Accepted**		**Published**
Publication details (reference)								
Copyright status (tick the appropriate statement)								
I hold the copyright for this material	V	Copyright is retained by the publisher, but I have been given permission to replicate the material here						
Candidate's contribution to the paper (provide details, and also indicate as a percentage)	The candidate considerably contributed to: Formulation of ideas: 80% Design of methodology: 85% Experimental work: 90% Presentation of data in journal format: 80%							
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.							
Signed	Zarema Khon [redacted]				**Date**	13/01/22		

Lay Theories of Manipulation:

Do Consumers Believe They are Susceptible to Marketers' Trickery?

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HAIMING HANG

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CONTRIBUTION STATEMENT

Some consumers believe that marketers manipulate them. We propose a conceptual framework to account for factors increasing and decreasing manipulation beliefs. We contribute to existing literature in three ways: First, we explain why some consumers *false-positively* detect persuasion episodes even for persuasion tactics known to be ineffective. Previous researchers have mostly focused on applications of the Persuasion Knowledge Model to situations of true-positive (Hardesty, Bearden, and Carlson 2007) or false-negative (Wei, Fischer, and Main 2008) persuasion detection, and seldom considered the possibility that persuasion knowledge can also provide false-positive errors. Second, we examine *individual differences* that can affect motivation to use persuasion knowledge, linking those differences to core psychological processes. Despite a large literature on persuasion knowledge (Ahluwalia and Burnkrant 2004; Campbell and Kirmani 2000; Williams, Fitzsimons, and Block 2004), this research is the first in consumer behavior to identify the deep psychological roots of core inference-making that affect persuasion detection and over-detection. We also identify other traits that can be particularly predictive of persuasion knowledge access, such as conspiratorial thinking, free will beliefs, personality traits, gender, and age. Finally, we contribute to the literature on *lay theories* about persuasion (Briñol, Rucker, and Petty 2015; Friestad and Wright 1995) and the marketplace (Bolton, Warlop and Alba 2003) by studying how consumers' construal of persuasion episodes can be influenced by the relative salience of marketers' versus consumers' intentions.

ABSTRACT

Marketers know that persuasion is very hard. So, why are consumers determined that marketers can manipulate them? Across five studies, we show that the beliefs about marketing manipulation have deep psychological roots: Consumers higher in motivations to make sense of their environments tend to not only detect persuasion where it exists, but also where there is none. Such beliefs can be weakened when consumers think of themselves (vs. other consumers) in persuasion situations (study 3) and read concrete (vs. abstract) descriptions of these situations (study 4), but only in consumers with low sense-making drives. Whereas higher sense-making *motives* manifest in greater false-positive manipulation detection, corresponding *abilities* negatively affect false-positives and result in more accurate persuasion detection (study 5). The studies also revealed how manipulation beliefs are related to conspiracy ideation, personality traits, beliefs about free will, gender, and age. Implications for marketing segmentation and strategies for attenuating false-positive manipulation detection are discussed.

Keywords: persuasion knowledge, lay theories, beliefs, influence, sense-making, mentalizing

Misunderstandings and lethargy perhaps produce
more wrong in the world than deceit and malice do.
At least the latter two are certainly rarer.

– Johann Wolfgang von Goethe, *The Sorrows of Young Werther*

We are naturally skilled at persuading and detecting persuasion in others (Mercier 2017, 2020; Sperber et al. 2010). Although consumers can use persuasion knowledge to detect and respond to persuasion attempts (Friestad and Wright 1994), their persuasion armor is not perfect: Consumers can fail to detect persuasion when it in fact occurs (false-negatives) or to erroneously detect persuasion where none exists (false-positives). Anecdotally, many consumers appear to believe in the power of subliminal messaging when such tactics' effectiveness is marginal at best (Trappey 1996). Likewise, people seem to believe in the pervasive power of political advertising and propaganda, when political scientists have documented repeatedly that their effects on people's decision-making are trivial (Adena et al. 2015; Broockman and Green 2014; Davies 1997). Finally, there is growing evidence that the effects of commercial advertising are modest and ephemeral (Blake, Nosko, and Tadelis 2015; DellaVigna and Gentzkow 2010). Despite its questionable effectiveness, companies spend globally over $500 billion each year on advertising, with spending projected to grow even more in the next five years (GroupM 2018).

As many marketers and politicians will quickly admit, persuasion is tough—it is difficult to persuade consumers and voters to adopt a new opinion, attitude, or behavior. Then what explains the ease with which consumers seem to believe they can be manipulated? Although persuasion knowledge is an issue of longstanding interest (Ahluwalia and Burnkrant 2004; Campbell and Kirmani 2000; Williams, Fitzsimons, and Block 2004), we know little about

why some consumers seem especially prone to detecting persuasion attempts (rightly or wrongly). Existing models (Friestad and Wright 1994) do well in explaining how consumers *successfully* detect persuasion attempts but say less about consumers' mistakes. Here we extend prior theory to understand when and why consumers make *false-positive* errors about the presence of marketplace manipulation.

The Persuasion Knowledge Model (Friestad and Wright 1994) suggests that consumers' understanding of advertising and sales presentations rests in their basic cognitive skills and motivations to interpret everyday events. We extend this model by identifying factors that increase the likelihood of both true and false detection of persuasion. We examine two kinds of factors—individual differences that influence the saliency of *marketers' intentions to persuade*, and situational factors that influence the saliency of *consumers' intentions to cope with persuasion*. We argue that, in combination, these factors determine consumers' likelihood of detecting marketing manipulation—even when none exists.

CONCEPTUAL OVERVIEW

Persuasion knowledge rests in consumers' basic socio-cognitive skills and experience with persuasion, advertising, and marketing communications (Friestad and Wright 1994). According to attribution theory (Heider 1958), consumers often take a cause-and-effect orientation toward persuasion attempts, trying to understand why someone wants to influence their attitudes and choices. Such inferences typically (but not always; Isaac and Grayson 2017) lead consumers to resist persuasion attempts (Brehm 1966; Campbell and Kirmani 2000; Wright 1985). Previous researchers have mostly focused on applications of the Persuasion Knowledge Model to situations of true-positive (Hardesty, Bearden, and Carlson 2007) and false-negative (Wei, Fischer, and Main 2008) persuasion, and seldom considered that persuasion knowledge can lead to false-positive errors in persuasion detection. To understand why persuasion knowledge can produce both true- and false-positives, we need to dive deeper into the psychology underlying consumers' core inference-making mechanisms.

According to our conceptual model (figure 1), individuals' understanding of persuasion includes both marketers' intention to persuade and consumers' intention to cope with persuasion. We propose that beliefs in marketing manipulation depend on which of these is more salient: Higher salience of marketers' intention to persuade *increases* manipulation beliefs, whereas higher salience of consumers' intention to cope with persuasion *decreases* manipulation beliefs.

What influences the salience of marketers' versus consumers' intentions? We study two types of factors.

First, *individual differences* can influence the salience of marketers' intention to persuade. Consumers differ in the strength of their basic motivation to make sense of their environment. Although understanding the environment is crucial for detecting potential threats, they

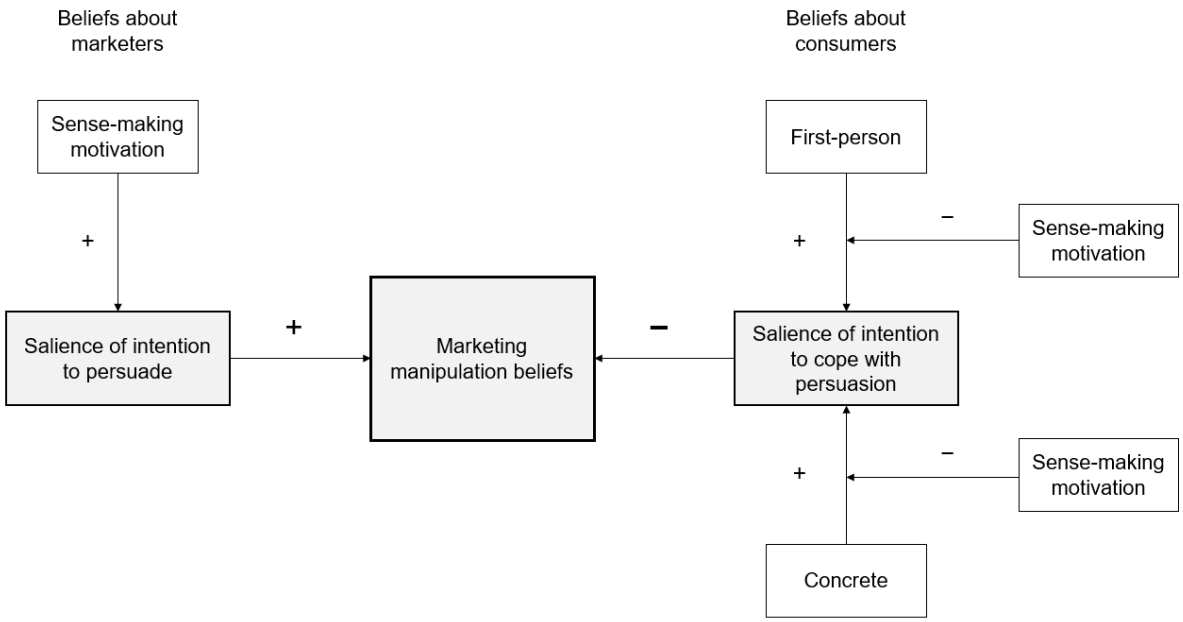
sometimes make errors in threat-detection—it is costlier to fail to notice a threat when it exists (false-negatives) than to detect a threat that does not exist (false-positives). Mistake a boulder for a hyena and you feel foolish; mistake a hyena for a boulder and *you're dead*—evolution has solved this problem by programming us to see patterns even where there are none (Atran 2002; Boyer 2001; Haselton and Buss 2000; Nesse 2001). This is one reason why many are attracted to conspiracy theories: Most conspiracy theories are false, but a few of them are true, so it can seem safer to assume they are *all* true. Likewise, as people have evolved to avoid trickery (Cosmides and Tooby 1992), some consumers may instinctively activate their "persuasion armor" and detect persuasion even if there is none. As such consumers focus on marketing manipulation as a threat (Higgins 1997), they are more prone to false-positive detection of persuasion and higher manipulation beliefs.

Second, *situational factors* can influence the salience of consumers' intention to cope with persuasion by affecting the psychological distance between the consumer and the persuasion situation. As consumers can more readily simulate their own mental states than those of others (Waytz and Mitchell 2011), using the self as their reference point, different ways in which persuasion is removed from that point—such as social distance or level of abstractness—increase psychological distance (Trope and Liberman 2010). When persuasion situations are framed in the first-person (vs. third-person), consumers' own persuasion-coping intentions should be more readily available to them, leading to lower manipulation beliefs. Similarly, we expect manipulation beliefs to be lower in the concrete (vs. abstract) framing, as intentions and free will are more available in concrete versus abstract situations (Kim et al. 2016, 2017; Nichols and Knobe 2007). However, the situational effects are likely to be lesser for consumers higher in threat-detection—as these consumers are naturally more sensitive to potential jeopardy, the intentions of marketers will always be top of mind. Thus, the effect of

individual differences is expected to counteract the effect of situational variation for these consumers.

FIGURE 1

CONCEPTUAL MODEL



Beliefs about Marketers' Intentions to Persuade: Sense-Making Motivation

Consumers are motivated to seek out hidden explanations to understand their experiences—a *sense-making motivation* (SMM) (Chater and Loewenstein 2016; Laurin, Kay, and Moscovitch 2008). Consumers search for structure or patterns and are particularly prone to seeking the causal explanations of events (Craik 1943), especially if an event is threatening (Legare, Gelman, and Wellman 2010) or inconsistent with prior beliefs (Khemlani and Johnson-Laird 2011) or if understanding its causes can reinstate a sense of control and predictability (Malle and Knobe 1997; Miller and Steinberg 1975). Consumers infer explanations through fallible but useful heuristics (Johnson, Valenti, and Keil

2019; Khemlani, Sussman, and Oppenheimer 2011; Lombrozo 2007, 2016) and intuitive theories (Bhattacharjee, Dana, and Baron 2017; Bolton, Warlop and Alba 2003; Fernbach et al. 2013; Johnson, Zhang, and Keil 2020; Sloman and Fernbach 2017).

For our purposes, a particularly powerful aspect of sense-making derives from consumers' constant attunement to the presence of other people in their environments, automatically inferring their beliefs, emotions, and intentions (Bateman and Fonagy 2006; Kovács, Téglás, and Endress 2010; Premack and Woodruff 1978). Evolution has produced in humans a *mentalizing* drive as a part of sense-making used to understand other species and social structures. Like a scientific theory, from early childhood consumers' intuitions posit unobserved entities (internal states of one's self and others) to support explanation and prediction (Gopnik and Wellman 1992).

Since consumers differ in their motivations both to seek structure (Kruglanski and Sheveland 2012) and to seek intentions (Liotti and Gilbert 2011), these differences plausibly would have downstream effects on persuasion knowledge activation. As mentalizing, and sense-making in general, partly function to facilitate threat detection and vigilance (Sperber et al. 2010), in our framework we operationalize SMM by measuring consumers' structure-seeking and mentalizing drives to predict beliefs about being manipulated.

Although our structure-seeking and mentalizing drives are essential for navigating life, they both lead to false-positives as in the hyena/boulder example: We often see structures and intentions where none exist. In some instances, unwarranted structure-seeking might be caused by a natural tendency to view the world in terms of specific purpose and design (Banerjee and Bloom 2014; Evans 2000, 2001; Kelemen 1999a, 1999b, 2004; Willard and Norenzayan 2013), which makes individuals sometimes turn to fallacious explanations (e.g., see images in noise or perceive conspiracies when there are none; Whitson and Galinsky 2008). Moreover, people differ in this tendency. For example, *hypermentalizers* over-attribute

mental states to others (Dziobek et al. 2006; Sharp and Vanwoerden 2015), experiencing overactive social threat perception (Green and Phillips 2004) and hypersensitivity to others' motives, intentions, and mental states. Thus, individuals dispositionally higher in intention- and structure-seeking may be especially prone to falsely detect intentions and threats, including marketing manipulation.

Although persuasion is not always effective (or intentional; Gass and Seiter 2015), three features of human psychology make high-SMM consumers especially prone to falsely detecting manipulation. First, consumers believe that intentions generally lead to the intended outcome (Boyer and Petersen 2018), so they perceive marketing persuasion as the result of marketers' planned actions and respond to it accordingly. Second, if consumers perceive persuasion as morally unacceptable or violating societal norms (Malle and Knobe 1997; Mandelbaum and Ripley 2012), they will see it as more intentional than consumers who do not have such a perception, because norms play an important role in mental states ascriptions (Uttich and Lombrozo 2010). Finally, intention-seeking may be especially prominent, if consumers believe that companies are motivated by selfish goals to make profits that are thought to necessarily lead to harmful social outcomes (Bhattacharjee et al. 2017). Such beliefs might make some consumers particularly prone to thinking that marketers are dishonest, deceptive, and manipulative. This tendency is expected to be higher in people with higher SMM because they are especially motivated to seek intentions, even where none exist.

Thus, on the one hand, higher SMM makes consumers correctly identify persuasion attempts where they exist. On the other hand, such motivation might also make them *misidentify* persuasion where there is none. To address both types of situations, we divided marketing persuasion tactics into valid (empirically tested and considered effective; e.g., targeted online advertising) and dubious (without practical effectiveness; e.g., hypnosis in personal selling). Based on this, we hypothesized:

H1a: Consumers with higher SMM are likelier to accurately detect marketing persuasion where it exists, believing that valid tactics are more effective than consumers low in these traits.

H1b: Consumers with higher SMM are likelier to erroneously detect marketing persuasion where it does not exist, believing that dubious tactics are more effective than consumers low in these traits.

Hypothesis 1 concerns the effects of sense-making *motivations* on beliefs about marketing manipulation, rather than sense-making *abilities*. Motivations to understand events can coincide with or deviate from corresponding abilities (Kunda 1990; Wechsler 1950), and, therefore, lead to accurate or illusory persuasion detection. Abilities, in contrast, will most likely lead to accurate persuasion detection, as they facilitate the skills needed to find the correct answers (Pennycook et al. 2012; Swami et al. 2014). We expect that:

H2: Consumers with better sense-making *abilities* will be less prone to false-positive persuasion detection and beliefs in dubious marketing manipulation.

Beliefs about Consumers' Intentions to Cope with Persuasion: Situational Factors

A full understanding of persuasion requires thinking about both sides of the interaction—marketers and consumers. Thus, persuasion should be believed less effective when consumers' persuasion coping strategies are made more salient relative to marketers' intentions. Our model considers two ways of framing situations to influence relative salience, both using the idea that smaller psychological distance (Trope and Liberman 2010) between

the consumer and the persuasion episode leads the consumers' (persuasion-resisting) intentions to be more salient.

First, *first-person versus third-person framing*. A passive observer of a persuasion episode may have less intuitive access to persuasion armor compared to a consumer actively immersed in the social interaction who is trying to use that armor (Friestad and Wright 1994; Gilbert, Jones, and Pelham 1987). Existing research shows that consumers, indeed, believe themselves less susceptible to mass media and social influence compared to others (Davison 1983; Duck and Mullin 1995; Innes and Zeitz 1988; Perloff 1999). This difference is explained by the *third-person effect*: Individuals' own intentions seem more salient to them than intentions of others (Kruger and Gilovich 2004), including their intentions to cope with persuasion. Moreover, consumers' introspection enhances this third-person effect (Pronin, Gilovich, and Lee 2004), so that individuals are motivated to think about their own coping intentions, but have little motivation to think about others' intentions to do the same.

Although the third-person effect has been studied in consumer behavior (Gunther and Thorson 1992; Sagarin et al. 2002), most of the studies concentrated on the third-person effect in persuasiveness of advertising, therefore, it is unclear whether the effect generalizes to marketing manipulation more broadly. To address this question, we hypothesize:

> **H3:** Consumers will evaluate marketing tactics described in the first-person framing as less effective than those in the third-person framing.

The second situational factor we consider is *abstract versus concrete framing*. Based on our theorizing that empathizing with consumers would lower manipulation beliefs by making persuasion armor more salient, we speculated that the level of concreteness of persuasion description should have a similar effect. When situations are described concretely, consumers

tend to ascribe more responsibility, controllability, and free will to people in those situations (De Brigard, Mandelbaum, and Ripley 2009; Nichols and Knobe 2007). This happens because concrete descriptions make psychological states, such as intentions, more salient than do abstract descriptions (Kim et al. 2016, 2017; Murray and Nahmias 2014; Sinnott-Armstrong 2008). Analogously to first-person framing, concrete framing should therefore make consumers' intentions to cope with persuasion especially salient, lowering manipulation beliefs:

> **H4:** Consumers will evaluate marketing tactics as less effective when described concretely rather than abstractly.

We argue that both situational framings are important in understanding beliefs about marketing manipulation. Consumers often think about manipulation in first-person (e.g., about their own retail experience) and third-person (e.g., when warning their friends about companies) terms. Similarly, consumers often think about manipulation abstractly (e.g., when thinking about public policy) and concretely (e.g., while shopping).

In the usual case, the first-person and concrete framings would reduce threat detection because they make the consumers' intentions to cope with persuasion more salient compared to the third-person and abstract framings. But this effect should not occur for consumers especially high in SMM because such consumers focus on the threat—the marketer—rather than the consumer resisting persuasion. Given the saliency of this threat for high SMM consumers, the risk of false-negatives would loom large and increasing the saliency of consumers' coping intentions should have little effect. Therefore, we hypothesize:

H5: Situational framings that increase salience of consumers' resisting intentions (first-person and concrete) will decrease manipulation beliefs only in consumers with low SMM; in consumers with high SMM there will be no such effect.

To the best of our knowledge, this research is the first in consumer behavior to empirically show that persuasion knowledge access has deep psychological roots in basic inference-making mechanisms, such as how we make sense of others' minds and events in the world more broadly. Separately, we identify other individual differences that might affect persuasion knowledge access. For instance, we argue that beliefs about marketing manipulation are part of a broader conspiracy ideation, and that beliefs about free will can explain manipulation beliefs. Also, we test whether personality traits and demographics can predict manipulation beliefs. Finally, we examine how inaccurate beliefs about the marketplace can lead to distortions in consumers' attitudes and behaviors contributing to the literature on lay theories (Bolton et al. 2003; Briñol, Rucker, and Petty 2015; Friestad and Wright 1995).

OVERVIEW OF STUDIES

We test our hypotheses across 5 studies, examining how individual differences and situational influences shape consumers' beliefs about marketing manipulation. Studies 1 and 2 test our core prediction—that SMM can predict variability in beliefs about marketing manipulation (hypotheses 1a and 1b)—using familiar and novel marketing tactics, respectively. In studies 3 and 4, we test our framework that manipulation beliefs depend on thinking about marketers' intentions to persuade and customers' intentions to cope with persuasion. Study 3 tests the effect of first- versus third-person framing of persuasion

situations, examining both the main effect and its moderation by SMM (hypotheses 3 and 5), while study 4 tests the analogous effects of concrete versus abstract framing (hypotheses 4 and 5). Next, study 5 examines whether sense-making *abilities* have the same predictive power on manipulation beliefs as the corresponding *motives* we examine in the other studies (hypothesis 2). Finally, since some results prove more consistent than others across studies, we conduct an internal meta-analysis on all studies to test hypotheses 1a and 1b on a much larger dataset. Throughout these studies, we also explore several other theoretically relevant individual differences as potential predictors of marketing manipulation beliefs, including personality traits, conspiratorial thinking, beliefs in free will, and demographics such as gender and age.

STUDY 1: BELIEFS ABOUT MARKETING MANIPULATION

Study 1a sought to establish basic relationship between individual differences in SMM and beliefs about the *prevalence* of various familiar marketing persuasion tactics. Study 1B was similar, but measured beliefs about the *effectiveness* of those tactics. We expected that consumers higher in SMM would believe the tactics are both more prevalent and more effective (hypotheses 1a for valid tactics and 1b for dubious tactics).

Method

Participants. For all studies, we recruited participants from Amazon Mechanical Turk website. Power calculations (using G*Power software; Faul et al. 2009) showed that we need to recruit at least 134 participants for .95 power with small to medium effect size equal to .3 (two-tails). We recruited 150 participants (M_{age} = 39.5, 52.3% female) for study 1a and 150 participants (M_{age} = 39.2, 53.2% female) for study 1b. These studies were conducted

simultaneously, and participants were randomly assigned to study 1a or 1b. Participants (N_{1a} = 20; N_{1b} = 26) were excluded for missing data or errors on attention checks. In this study, we used two attention checks—one after the main task (a recognition memory check) and one in the scale measuring individual differences ("please select '2'"). Any participant was excluded from analysis who either (i) answered more than one-third of the first check questions incorrectly or (ii) failed the second check. This criterion was selected without reference to the data and was used for all studies.

Procedure. Participants read eight vignettes describing marketing tactics (see web appendix A for full list). Six depicted empirically *valid tactics* (e.g., "Stores sometimes make promotions time-limited just so that customers feel a greater sense of urgency to buy at the sale prices"; Aggarwal and Vaidyanathan 2003) and two depicted *dubious tactics* lacking scientific support (e.g., "Door-to-door salespeople can use hypnotic words and body gestures to convince customers to buy things they do not really want"). For each vignette, participants rated their agreement with either the *prevalence* of the tactic ("To what extent do you agree that marketers use this technique?") in study 1a or the *effectiveness* of the tactic ("To what extent do you agree that this technique is effective?") in study 1b. The scale used for measuring their agreement was anchored at –5 ("Strongly disagree") and 5 ("Strongly agree"). Thus, tactic (valid vs. dubious) was manipulated within-subjects.

After the main task, participants completed SMM scale (9 items, α = .74) with two subscales. One subscale measured general structure-seeking motivation—need for structure (NFS). The NFS subscale (4 items, α = .78; "I enjoy having a clear and structured mode of life") was adapted from the Personal Need for Structure Scale (Neuberg and Newsom 1993; Thompson, Naccarato, and Parker 1989, 1992) and the Need for Cognitive Closure Scale (Kruglanski, Webster, and Klem 1993). Both scales contain questions about one's motivation to improve the explicability of the environment: The Personal Need for Structure Scale

measures individual differences in a desire to structure the world into a simplified, more manageable form in order to increase its predictability. Similarly, the Need for Cognitive Closure Scale measures individual differences in a desire to improve predictability by getting an answer on a given topic compared to uncertainty.

The second subscale measured motivation to understand people—need for mentalizing (NFM). The NFM subscale (5 items, $\alpha = .81$; "I believe that people can see a situation very differently based on their own beliefs and experiences") was adapted from the Interpersonal Reactivity Index (Davis 1983) and Reflective Functioning Questionnaire (Fonagy et al. 2016). We used the Perspective-Taking subscale of The Interpersonal Reactivity Index, which measures individual differences in one's desire to understand others by taking their perspective. The Reflective Functioning Questionnaire, in turn, measures individuals' motivations to understand that others have very different perspectives from their own (one of the key aspects in mentalizing).

All items were answered on 5-point scales (see web appendix B for all items and factor loadings). High scores on these scales point to individual differences in not only correct understanding of the environments, but also in faulty appraisals of non-existent threats.

Finally, participants answered demographic questions and were debriefed.

Results and Discussion

To test our main hypotheses (1a and 1b) that consumers higher in sense-making motivation (SMM) have higher beliefs about valid and dubious tactics, we used multiple regression to separately predict beliefs for valid and dubious tactics from SMM. (See web appendix C for detailed results, including means for each tactic.)

In study 1a, consistent with expectations, consumers higher in SMM more strongly believed in the prevalence of both valid and dubious marketing tactics (b_{valid} = 0.54, *SE* = 0.17, *p* = .002; $b_{dubious}$ = 0.83, *SE* = 0.32, *p* = .012). In study 1b, consumers higher in SMM more strongly believed in the effectiveness of valid but not dubious marketing tactics (b_{valid} = 0.64, *SE* = 0.20, *p* = .001; $b_{dubious}$ = 0.19, *SE* = 0.35, *p* = .590).

Across the two studies, participants' expressed higher beliefs for valid (*M* = 3.07, *SD* = 1.21) than dubious tactics (*M* = 0.65, *SD* = 2.12; *t*(253) = 19.44, *p* < .001, *d* =1.22) (table 1), indicating that they can distinguish between valid and dubious tactics. However, beliefs for dubious tactics were significantly higher than 0 (*t*(253) = 4.87, *p* < .001, *d* = 0.31), meaning that consumers on average believe in the validity of invalid marketing manipulations (e.g., hypnosis in personal selling). As shown in table 1, this finding was consistent across most studies (except study 2 for novel tactics). (In studies 3 and 4, dubious tactics were sometimes rated below 0, but this was generally due to effects induced by our experimental manipulation and predicted by our framework; see below.)

TABLE 1

MEAN RESPONSES FOR BELIEFS FOR VALID AND DUBIOUS TACTICS IN STUDIES 1–5

	N	*Valid tactics*	*Dubious tactics*
Study 1a	130	3.33 (1.17)	0.95 (2.17)
Study 1b	124	2.78 (1.19)	0.33 (2.03)
Study 2	162	1.04 (1.60)	1.17 (1.64)
Study 3, First-person	177	1.57 (1.71)	–0.59 (2.35)
Study 3, Third-person	180	2.04 (1.26)	–0.12 (2.26)
Study 4, Concrete	176	2.00 (1.18)	–0.30 (2.13)
Study 4, Abstract	174	2.43 (1.18)	0.33 (2.06)
Study 5	340	2.85 (1.20)	0.51 (2.19)

NOTE.—SDs are indicated in parentheses. Study 1a measures prevalence beliefs; studies 1b–5 measure effectiveness beliefs.

Overall, studies 1a and 1b provide initial evidence that sense-making motivation can explain variability in consumers' beliefs about valid and dubious marketing tactics. As the

results of individual studies were not always consistent with our predictions or with other studies (as in dubious tactics for study 1b), we later report a meta-analysis across all five studies to dramatically increase statistical power and the precision of our estimates. To foreshadow the result, this meta-analysis lends robust support to hypotheses 1a and 1b.

STUDY 2: BELIEFS ABOUT NOVEL MARKETING TACTICS

An alternative explanation of study 1 may simply be that consumers higher in SMM are more accurate in detecting persuasion—although this is plausible only if one believes that strong scientific support is forthcoming for our "dubious" marketing tactics such as subliminal messaging and hypnosis. To rule out this possibility altogether, study 2 relied on pairs of symmetrical and opposite tactics, where one version was valid (according to the literature) and the other dubious (the opposite of the literature). Reporting higher belief in both versions is contradictory and, therefore, inconsistent with the assumption that consumers with higher SMM are more accurate in persuasion detection. To systematically generate matched pairs of valid and dubious tactics, we chose 8 novel tactics reported in the recent consumer psychology literature (e.g., manipulating aisle width to influence variety-seeking; Levav and Zhu 2009). For each tactic, we created a version reporting the study's true result (narrow aisles cause more variety-seeking) and another version reporting the opposite (wider aisles cause more variety-seeking), assigning participants to read one version of each tactic.

A secondary goal was to test whether SMM has a predictive power beyond traditional personality traits studied in consumer behavior (Baumgartner 2002; He and Bond 2015; Matz, Gladstone, and Stillwell 2016). For example, individual differences in conspiracy beliefs are partly explained by personality traits (Bruder et al. 2013; Hollander 2017; Swami

et al. 2010, 2013), suggesting that adding personality traits as covariates can improve the robustness of our conclusions.

Method

Participants. G*Power calculations showed that we need to recruit at least 132 participants for .95 power with predicted effect equal to .1 (since these tactics were novel, expected effect size was lower than in study 1). We recruited 200 participants (M_{age} = 39.1; 51.2% female) from Amazon Mechanical Turk website. Participants (N = 38) were excluded for missing data or errors on attention checks (as in study 1, with an additional attention check in the personality scale).

Procedure. The method was similar to study 1b, with three changes. First, the marketing tactics were changed to four real ("Some researchers say that displaying healthy food items to the left of unhealthy food can promote healthier choices compared to displaying them to the right of unhealthy food items"; Romero and Biswas 2016) and four opposite ("Some researchers say that displaying healthy food items to the right of unhealthy food can promote healthier choices compared to displaying them to the left of unhealthy food items") versions of tactics from the consumer literature (see appendix A for full stimuli). Which tactics were presented in the real versus opposite versions was counterbalanced across participants.

Second, after the main task, participants filled out a short Big Five inventory (10 items; Rammstedt and John 2007).

Finally, we altered the NFS subscale in studies 2–5 to increase its reliability by substituting the Need for Cognitive Closure question with two Intolerance of Uncertainty (Freeston et al. 1994) questions. The Intolerance of Uncertainty scale measures individual differences in motivations to avoid uncertainty and to increase control over environment and

hence its predictability. Similar to structure-seeking, such motivations make individuals see patterns (and threats) where they do or do not exist. Therefore, we speculated (correctly, as it turns out) that combining structure-seeking and uncertainty avoidance questions could improve reliability of our NFS subscale (5 items, $\alpha = .87$) and overall SMM scale (10 items, $\alpha = .76$) (see web appendix B for updated factor loadings and improved reliability in each study).

Results and Discussion

We used regressions to predict beliefs about effectiveness of marketing tactics from SMM, with personality traits as covariates (VIFs < 1.92). SMM predicted beliefs for both valid ($b = 0.92$, $SE = 0.26$, $p < .001$) and dubious ($b = 0.68$, $SE = 0.27$, $p = .012$) tactics. Conscientiousness had a significant negative effect on beliefs (collapsed across valid and dubious tactics for greater statistical power): $b = –0.32$, $SE = 0.16$, $p = .050$, but no other personality trait was significantly associated with beliefs. (See web appendix D for detailed results and predictability of SMM over-and-above the Big Five personality traits). Overall, participants were unable to distinguish between the real ($M = 1.04$, $SD = 1.60$) and opposite versions ($M = 1.17$, $SD = 1.64$) of the tactics ($t(161) = –1.01$, $p = .314$, $d = –0.08$), and the ability to distinguish was not related to SMM ($ps > .10$).

The study was consistent with our hypotheses (1a and 1b) and showed that higher sense-making motivation does not necessarily lead to greater accuracy in persuasion detection—instead, SMM manifests both in more true-positives *and* more false-positives. Study 2 also represents an initial attempt to quantify consumers' beliefs in the power of novel marketing tactics—an important kind of persuasion knowledge, which future research might investigate further.

STUDY 3: PERSUASION OF SELF VERSUS OTHERS

In studies 3 and 4, we turn to situational factors that can influence beliefs in marketing manipulation by increasing the salience of consumers' persuasion armor as a result of decreased psychological distance (Trope and Liberman 2010) between the consumer and the persuasion episode. When consumers consider persuasion episodes from a first-person perspective, they are more likely to introspect and recognize their ability to cope with persuasion attempts, lowering their beliefs in the power of marketing manipulation (hypothesis 3). But we expected to see this effect only among consumers lower in sense-making motivation: For consumers higher in SMM, the threat of marketers' nefarious intentions would remain salient (hypothesis 5).

Study 3 also tests whether consumers who believe in conspiracies also believe in the power of marketing manipulation. Literature suggests that sense-making is linked to conspiratorial thinking (van Prooijen 2012; van Prooijen and van Dijk 2014). Therefore, we speculated that beliefs in marketing manipulation could be a part of a broader conspiracy ideation resulting from sense-making drive.

Method

Participants. G*Power showed that at least 328 participants are required for comparing the two conditions' means at .95 power with effect size at .4 (considered small to medium in this type of analysis). We recruited 400 participants (M_{age} = 41.2, 50.7% female) from Amazon Mechanical Turk website for this study. Forty-three participants were excluded from analysis for missing data or failing attention checks, using the same criteria as study 1.

Procedure. To simplify the study design, we used stimuli from study 1. The method was similar to study 1b, except three changes. First, participants were randomly allocated into two conditions. In the first-person condition, participants were asked to imagine that they are the consumers in each vignette, and they answered questions about effectiveness of marketing tactics from their perspective as consumers ("Stores sometimes make promotions time-limited just so that customers feel a greater sense of urgency to buy at the sale prices. To what extent do you agree that this is an effective tactic for making you buy more goods?"). In the third-person condition, participants were asked to imagine that some other people (Mark or Laura, manipulated between-subjects) are consumers in these scenarios ("To what extent do you agree that this is an effective tactic for making Mark [Laura] buy more goods?"). We speculated that gender of the protagonist in the vignettes might influence manipulation beliefs as the literature suggests that women are believed to be more gullible (Kray, Kennedy, and Van Zant 2014). Second, in addition to SMM, we also measured participants' metacognitive motivations (5 items, $\alpha = .77$; adapted from Fonagy et al. 2016; "I always know what I feel") as an exploratory measure, as we speculated that metacognition could potentially moderate the effect of condition on beliefs (similarly to SMM in hypothesis 5). Finally, we measured conspiracy beliefs using the Conspiracy Mentality Questionnaire (5 items, $\alpha = .83$; Bruder et al. 2013). All items were answered on 5-point scales.

Results and Discussion

First, we examined whether the results supported our prediction about persuasion and persuasion armor salience (hypothesis 3). They did: Marketing tactics seemed less effective to people in the first-person condition, and more effective in the third-person condition. This was true for both valid ($M_{\text{first}} = 1.57$, $SD = 1.71$, $M_{\text{third}} = 2.04$, $SD = 1.26$; $t(355) = -2.97$, $p =$

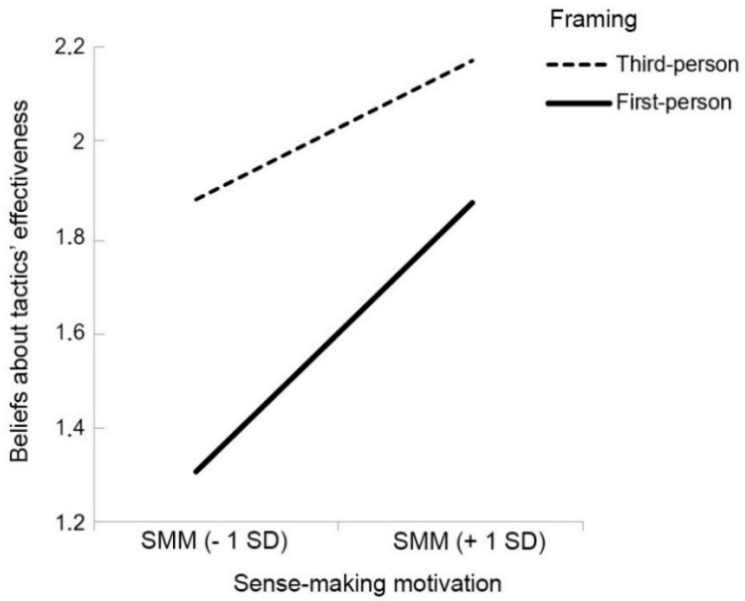
.003, d = –0.31) and dubious (M_{first} = –0.59, SD = 2.35, M_{third} = –0.12, SD = 2.26; $t(355)$ = –1.92, p = .056, d = –0.20) tactics. This suggests that first-person framing of persuasion can activate consumers' perception of controllability over their actions to cope with persuasion and, therefore, reduce the perceived effectiveness of the tactics. We did not find any effect of the protagonist's gender on beliefs about manipulation (collapsed across valid and dubious) within the third-person condition—either main effect ($F(1, 176) = 0.11$, p = .737) or interaction effect with participant's gender ($F(1, 176) = 0.31$, p = .579, $\eta^2 < .01$).

Second, we tested whether we could find further support to our main hypotheses that sense-making would drive manipulation beliefs (hypotheses 1a and 1b). Study 3 broadly replicated the results in studies 1b and 2: SMM significantly predicted beliefs for both valid (b = 0.42, SE = 0.15, p = .004) and dubious (b = 0.59, SE = 0.22, p = .009) tactics. Furthermore, SMM and condition had a marginally significant interaction effect (figure 2) on beliefs for dubious ($F(1, 353) = 3.52$, p = .062, η^2 = .01) but not valid ($F(1, 353) = 0.74$, p = .392, $\eta^2 < .01$) tactics: the effect of first-person (vs. third-person) condition was only significant for consumers with low SMM, or 1 standard deviation below the mean (b = –0.43, SE = 0.17, p = .012), but it was not significant for those higher in SMM, or 1 standard deviation above the mean (b = 0.02, SE = 0.17, p = .896). (For more detailed spotlight analyses, see web appendix C). This finding is consistent with our hypothesis that taking the perspective of consumers is effective for weakening manipulation beliefs only for consumers lower in SMM and not for those higher in SMM (hypothesis 5). Below we report the results of an internal meta-analysis of studies 3 and 4, where we tested this same effect using the two operationalizations of persuasion resistance salience—first-person versus third-person and concrete versus abstract—from both studies to maximize power.

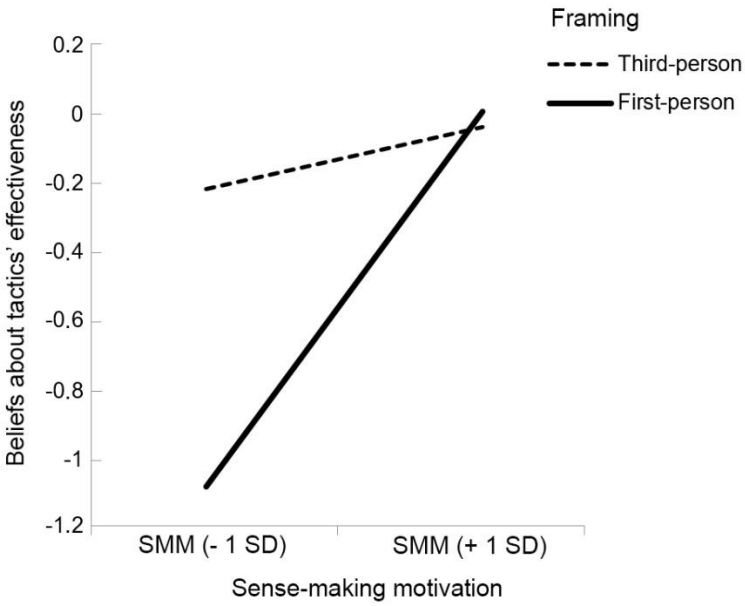
FIGURE 2

INTERACTION EFFECT OF SMM AND CONDITION ON BELIEFS ABOUT THE EFFECTIVENESS OF VALID (A) AND DUBIOUS (B) TACTICS FROM STUDY 3

A



B

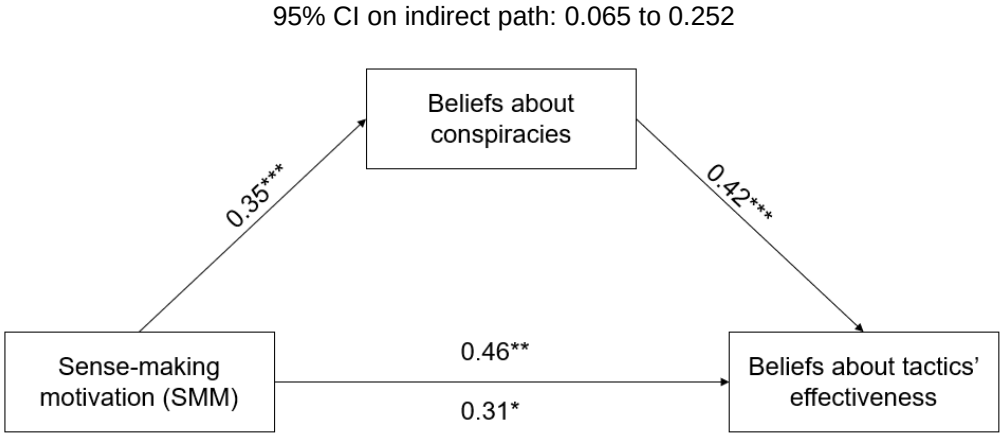


Next, we measured the correlation between manipulation beliefs (pooling together valid and dubious tactics for simplicity and statistical power) and conspiracy ideation: Beliefs in

conspiracies were significantly correlated with beliefs about marketing manipulation, $r(355) = .25$, $p < .001$. We used mediation analysis (PROCESS Model 4; Hayes 2013) to test whether conspiracy mentality mediates the relationships between SMM and manipulation beliefs (collapsing across valid and dubious) (figure 3). The indirect effect was significant: Conspiracy mentality partially mediated the effect of SMM on manipulation beliefs ($b = 0.15$, 95% CI: 0.065 to 0.252). Thus, beliefs in marketing manipulation may be part of a broader conspiracy ideation.

FIGURE 3

MEDIATION MODEL OF BELIEFS COLLAPSED ACROSS VALID AND DUBIOUS FROM STUDY 3



*$p < .05$; **$p < .01$; ***$p < .001$

Overall, study 3 showed that first- versus third-person thinking reduces manipulation beliefs as we predicted (hypothesis 3). Despite insignificance of the interactions, there was initial evidence that this effect may be not equally powerful for all consumers: The spotlight analyses results showed that for consumers low in sense-making motivation, manipulation beliefs may possibly be weakened when consumers think of themselves rather than others in persuasion situations, prompting consumers to recognize their persuasion armor. For consumers high in this motivation, conversely, the threat of marketers' manipulative

intentions may loom large regardless of how the situation is framed—we test this possibility (hypothesis 5) in internal meta-analysis (studies 3–4) with greater power. Finally, the study supported our main hypothesis that sense-making drives can indeed impact manipulation beliefs (hypotheses 1a and 1b).

STUDY 4: ABSTRACT VERSUS CONCRETE PERSUASION

A second situational factor that we predict would influence the salience of marketers' intention to persuade versus consumers' intentions to resist persuasion is abstract versus concrete framing. Just as people are more psychologically distant from the consumer in third-person rather than first-person framing, they are more psychologically distant in abstract rather than concrete framing (Trope and Liberman 2010). Indeed, people are more prone to attribute free will in concrete rather than abstract contexts (Kim et al. 2016, 2017; Nichols and Knobe 2007). Thus, we make the analogous prediction that consumers' intentions to resist persuasion attempts will be more salient in the concrete than in the abstract condition, dampening beliefs in the effectiveness of manipulation attempts (hypothesis 4). However, again analogous to the first-person versus third-person effect, this effect should only occur among consumers low in SMM (hypothesis 5). Consumers high in these motivations would always be on the lookout for threats, rendering the situational effects moot.

In this study, we also tested a mechanism explaining the effect of individual differences on manipulation beliefs. In our conceptual framework, we argue that individual differences in SMM increase manipulation beliefs, because high-SMM consumers tend to concentrate on the source of threats—marketers in this case—so that the salience of their intentions to persuade increases manipulation beliefs. High-SMM individuals might think about consumers' intentions to cope with persuasion; however, we expect this to have little effect

on manipulation beliefs, as this does not imply any threat and, therefore, is not salient. To test this, we measured the extent to which participants were thinking about the marketers' and consumers' side of each vignette.

Finally, we measured free will beliefs to explore their effect on manipulation beliefs, as research on free will beliefs shows that they coincide with beliefs about the controllability of one's own actions (Bandura 1982, 2008; Monroe and Malle 2010; Stillman, Baumeister, and Mele 2011). So, we speculated that higher free will beliefs might manifest in greater perceived controllability over consumers' actions to cope with persuasion and, therefore, lower manipulation beliefs.

Method

Participants. We recruited 400 participants (M_{age} = 40.8; 52.9% female) from Amazon Mechanical Turk website (power analysis was similar to study 3). Fifty participants were excluded from the analysis for missing data or failing attention checks.

Procedure. The method was similar to study 1b, except for three changes. First, the vignettes were either presented in a concrete ("Tu Apparel often appeal to customers' desire to 'get a deal' by writing two prices on a tag for their jeans—original price (which is often crossed out) and a new, sale price. This makes the offered price on their jeans seem more attractive, when in fact there was no sale discount.") or abstract ("Advertisers often appeal to customers' desire to 'get a deal' by writing two prices on a tag—original price (which is often crossed out) and a new, sale price. This makes the offered price seem more attractive, when in fact there is no sale discount.") version (manipulated between-subjects). The vignettes had been pretested for correspondence prior to the study (N = 60), where all pairs of vignettes were rated at least 7 on a scale from 1 ("A very poor example") to 9 ("A very good

example"). Second, after the main task, participants answered four questions about their thinking of companies and customers in the vignettes on a scale from –5 ("Hardly at all") to 5 ("All the time"). One question was measuring the extent to which participants were thinking about customers ("When you answered the questions about marketing techniques on the previous screens, how much were you thinking about these actions from the perspective of the customers?"), and three questions about companies ($\alpha = .40$; "How much were you thinking about these actions from the perspective of the company?"; see web appendix B for all 4 questions).

Third, participants filled out the Free Will Scale (11 items, $\alpha = .83$) adapted from the FAD-Plus Scale (Paulhus and Carey 2011) and Lay Dispositionism Scale (Chiu, Hong, and Dweck 1997; Yeager et al. 2011) on a 5-point scale. Higher scores correspond to higher belief in free will and controllability over traits and behavior.

Results and Discussion

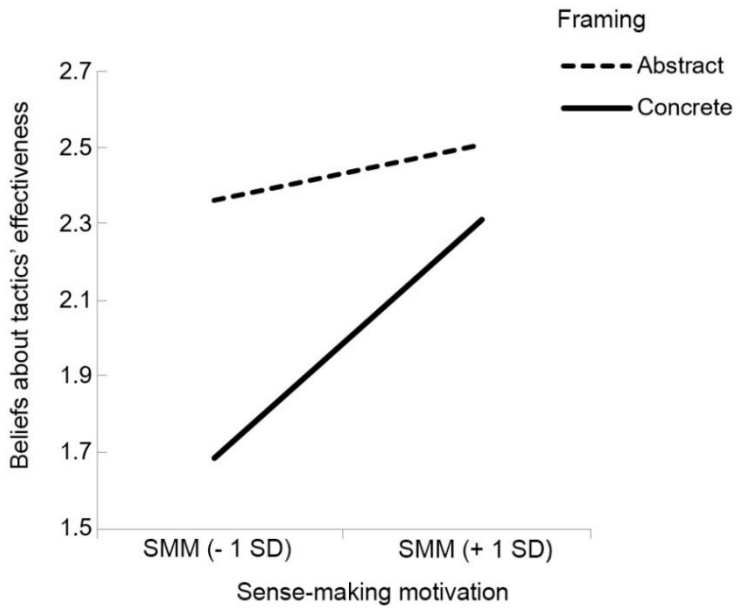
First, we tested whether consumers would have higher overall manipulation beliefs in the abstract than in the concrete condition. Participants were expected to think more about the intentions of consumers to resist persuasion in the concrete than in the abstract condition, where participants are better able to put themselves in the shoes of the consumer, leading to lower manipulation beliefs. Confirming this prediction, participants had higher beliefs in the abstract condition for both valid ($M_a = 2.43$, $SD = 1.18$; $M_c = 2.00$, $SD = 1.18$; $t(348) = 3.39$, $p < .001$, $d = 0.36$) and dubious ($M_a = 0.33$, $SD = 2.06$; $M_c = –0.30$, $SD = 2.13$; $t(348) = 2.78$, $p = .006$, $d = 0.30$) tactics. Consistent with our theory, this suggests that concrete framing, which makes persuasion armor more salient, can combat the perception of marketing manipulations, having potential implications for marketing practice.

Second, we tested whether we could replicate the effects of SMM on manipulation beliefs, collapsing across condition. The results were directionally similar but not identical to studies 1b, 2 and 3. SMM predicted beliefs for valid (b = 0.35, SE = 0.11, p = .002) but not dubious tactics (b = 0.29, SE = 0.20, p = .151). Furthermore, SMM and condition had a marginally significant interaction effect (figure 4) on beliefs for valid (F(1, 346) = 3.75, p = .054, η^2 = .01) but not dubious (F(1, 346) = 1.11, p = .294, η^2 < .01) tactics: the effect of concrete (vs. abstract) condition was significant only for consumers with low SMM, or 1 standard deviation below the mean (b = –0.56, SE = 0.09, p < .001) but not for consumers with high SMM, or 1 standard deviation above the mean (b = 0.10, SE = 0.09, p = .265). (See web appendix C for more detailed spotlight analyses.) This is consistent with our prediction that the concrete description of tactics would decrease beliefs in manipulation but only for consumers with lower SMM, whereas the effect is not significant for consumers with higher SMM (hypothesis 5).

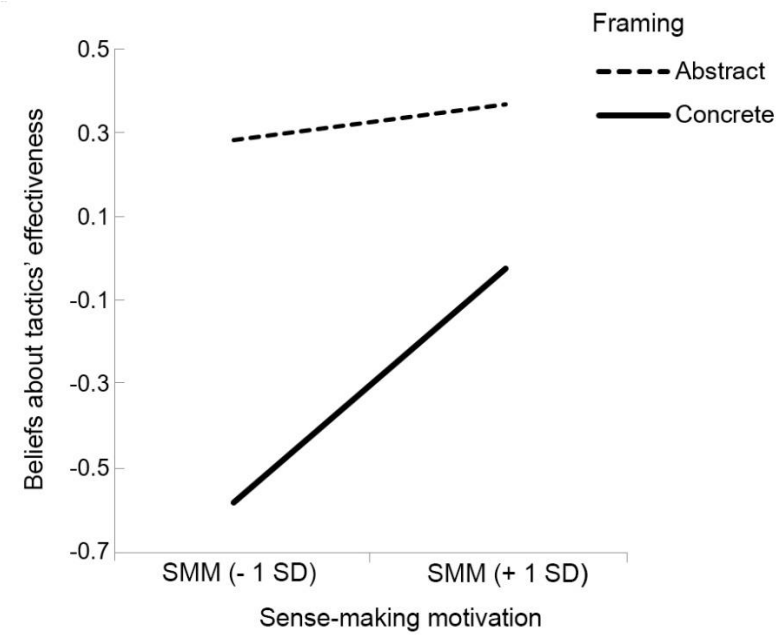
FIGURE 4

INTERACTION EFFECT OF SMM AND CONDITION ON BELIEFS ABOUT THE EFFECTIVENESS OF VALID (A) AND DUBIOUS (B) TACTICS FROM STUDY 4

A



B



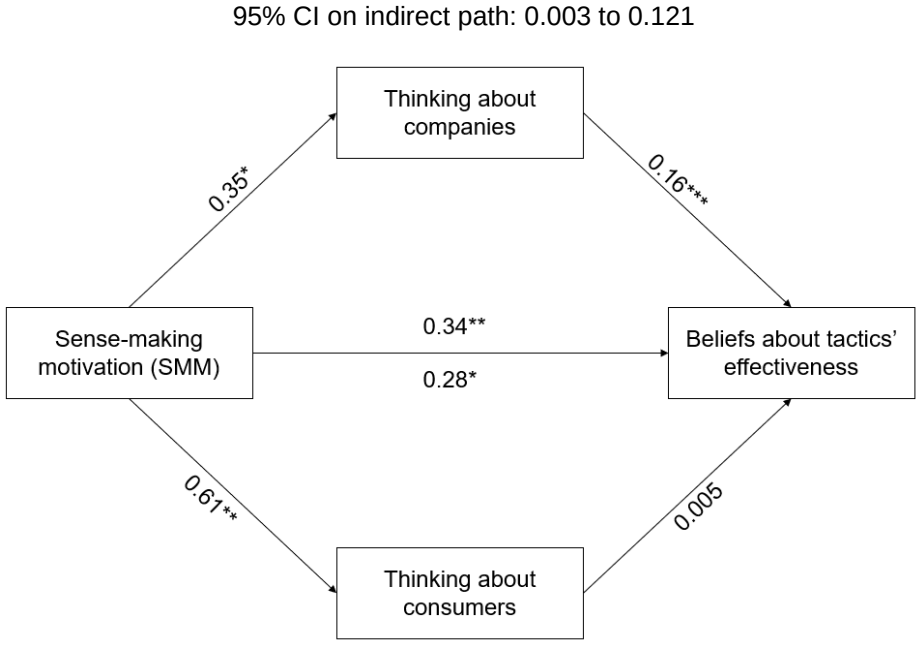
Next, we tested how SMM relates to thinking about both sides in persuasion: We expected that consumers higher on this scale will concentrate mostly on the side of the

marketers and not customers, as the threat of persuasion makes the intentions of marketers (and not customers) more salient. We found that SMM significantly correlates with thinking about companies ($r(348) = .12$, $p = .031$), and thinking about customers ($r(348) = .16$, $p = .002$). Parallel mediation analysis (PROCESS Model 4; Hayes 2013) showed that the effect of SMM on manipulation beliefs is partially mediated by thinking about companies ($b = 0.056$, 95% CI: 0.003 to 0.121), but not by thinking about customers ($b = 0.003$, 95% CI: –0.038 to 0.047) (figure 5). This shows that higher SMM results in thinking about both marketers' and customers' sides, but only thinking about marketers has a positive effect on manipulation beliefs, whereas thinking about customers does not. This is consistent with our conceptual framework stating that SMM increases the salience of marketers' intentions to persuade, but not customers' intentions to cope with persuasion[1].

[1] One might argue that the reliability of the construct measuring participants' thinking about companies is quite low, therefore, we ran an additional mediation analysis in an attempt to address this issue. When we removed one item to maximize scale reliability (2 items, $\alpha = .54$), the result was similar: Thinking about marketers mediated the effect of SMM on manipulation beliefs ($b = 0.04$, 95% CI: 0.000 to 0.101), but not thinking about customers ($b = 0.006$, 95% CI: –0.034 to 0.050).

FIGURE 5

PARALLEL MEDIATION MODEL OF BELIEFS COLLAPSED ACROSS VALID AND DUBIOUS TACTICS FROM STUDY 4



*p < .05; **p < .01; ***p < .001

Finally, we looked at how beliefs about free will relate to beliefs about manipulation. Free will beliefs did not predict beliefs for valid tactics (b = 0.05, SE = 0.10, p = .594), but had a significant negative effect on beliefs for dubious tactics (b = –0.43, SE = 0.17, p = .012) (see web appendix D for detailed results).

In general, the study confirmed our prediction that the concrete (vs. abstract) description of persuasion has a negative effect on manipulation beliefs (hypothesis 4). Despite insignificance of interactions between SMM and condition, the results of the spotlight analyses again showed promising support to hypothesis 5, where the effects of abstract vs. concrete condition on beliefs can be differential for high vs. low SMM consumers. Together, studies 3 and 4 support our framework (as shown by the results of the internal meta-analysis

on the next page): Manipulation beliefs are lower in situations that cue the saliency of consumers' intentions to resist persuasion, but only among consumers low in sense-making drives. The study also supported our framework stating that SMM makes intentions of marketers more salient (increasing manipulation beliefs) relative to intentions of customers (having no effect on manipulation beliefs).

INTERNAL META-ANALYSIS OF MODERATION EFFECTS (HYPOTHESIS 5)

Since individual studies' estimate of an effect is noisy, summarizing effects across studies using internal meta-analysis has increasingly been recognized as a best practice (McShane and Böckenholt 2017). As hypothesis 5 was tested in studies 3 and 4, we report a meta-analysis here to estimate the strength of the evidence more precisely. (We do so for hypothesis 1 as well after reporting study 5.) Data were analyzed using mixed effects models, where studies (3 and 4), participants, and tactic types (valid or dubious) were given random intercepts; SMM and conditions (first-person vs. concrete or third-person vs. abstract) were fixed effects. We relied on the lme4 (Bates et al. 2015) and the pbkrtest (Halekoh and Højsgaard 2014) packages in R to construct the models and extract p-values.

First, we grand mean-centered SMM across study 3 and 4. Second, we contrast coded conditions: Concrete and first-person were coded as 1 (we treated them as a framing increasing the salience of consumers' intentions to cope with persuasion) and abstract and third-person were coded as –1. Next, we built a model with condition, SMM, and their interaction as fixed factors, random intercepts for participant and item, and manipulation beliefs as the dependent variable. The results showed that all fixed effects were significant (table 2): SMM and condition significantly predicted manipulation beliefs (b_{SMM} = 0.38, SE = 0.09, $p < .001$; $b_{condition}$ = –0.22, SE = 0.05, $p < .001$). Furthermore, SMM and condition

(concrete vs. abstract, first-person vs. third-person) had a significant moderation effect (figure 6) on manipulation beliefs (p = .029). The effect of condition is significant for consumers 1 SD below the mean on SMM (b = –0.34, SE = 0.07, p < .001) but not for consumers 1 SD above the mean (b = –0.12, SE = 0.07, p = .102). This finding is consistent with the results of individual studies (3 and 4) and our predictions (hypothesis 5).

TABLE 2

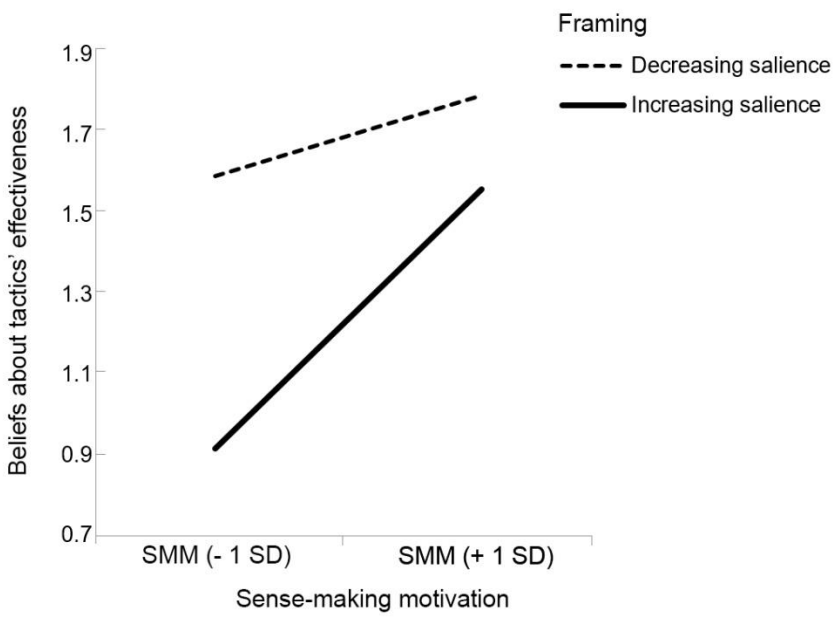
CUMULATIVE INTERACTION EFFECT OF SMM AND CONDITION (COLLAPSED ACROSS STUDY 3–4) ON BELIEFS (COLLAPSED ACROSS VALID AND DUBIOUS TACTICS)

	Estimate	SE	t	df	p
(Intercept)	1.47	0.45	3.30	8.92	.009
SMM	0.38	0.09	4.18	704.74	<.001
Condition (collapsed across S3–4)	-0.22	0.05	-4.51	703.83	<.001
SMM x Condition (collapsed across S3–4)	0.20	0.09	2.19	704.64	0.029

NOTE.—SMM was grand mean-centered across studies 3 and 4.

FIGURE 6

CUMULATIVE INTERACTION EFFECT OF SMM AND CONDITION (COLLAPSED ACROSS STUDY 3–4) ON BELIEFS (COLLAPSED ACROSS VALID AND DUBIOUS TACTICS)



NOTE.—Framings decreasing salience of consumers' intentions to cope with persuasion are the Third-person condition (study 3) and Abstract condition (study 4); framings increasing salience of consumers' intentions to cope with persuasion are the First-person condition (study 3) and Concrete condition (study 4).

STUDY 5: SENSE-MAKING MOTIVATIONS VERSUS ABILITIES

So far, we have been examining how differences in *motivation* to seek structure and intentions impact beliefs about marketing manipulation. But consumers may be motivated to do something without being skilled at it: Motivations and abilities may sometimes diverge (Kunda 1990; Wechsler 1950). Individuals can differ in their structure-seeking drive, measured by self-report scales (Cacioppo and Petty 1982; Neuberg and Newsom 1993; Webster and Kruglanski 1994) and cognitive abilities, measured by various intelligence tasks (Kaufman 2009). Likewise, although some studies have looked at mentalizing motivations (Baron-Cohen and Wheelwright 2004; Fonagy et al. 2016), more commonly researchers have studied mentalizing abilities (Baron-Cohen 1995; Corcoran, Mercer, and Frith 1995; Goldstein, Wu, and Winner 2010).

Our framework is about motivations: It is the *drive* to understand events and others that is responsible for false-positive detection of persuasion in the marketplace and beliefs about manipulation. Therefore, our SMM scale consisting of two subscales—Need for Structure (NFS) and Need for Mentalizing (NFM)—measures two motivations that correspond to abilities, measured by Raven's Progressive Matrices (RPM) and Mind in the Eyes Test (MITE), respectively. We expect these *abilities*, in opposite, to manifest in greater accuracy of persuasion detection (hypothesis 2), as intelligence and mentalizing skills are generally associated with less propensity to detect illusory structures (Pennycook et al. 2012; Swami et al. 2014). This study examines the relationship between consumers' structure-seeking and mentalizing abilities and motivations, and their effects on manipulation beliefs.

Method

Participants. We recruited 400 participants (M_{age} = 40.8, 59.4% female) from Amazon Mechanical Turk website (power analysis was similar to studies 3–4 due to two conditions). Participants (N = 60) were excluded for missing data or errors on attention checks.

Procedure. The procedure was similar to study 1b, except that before the main task participants solved one of two tests of their cognitive abilities. In one condition, they solved a test of objective mentalizing abilities (Mind in the Eyes Test [MITE]; Baron-Cohen et al. 2001), and in the other condition, they solved a test of objective pattern-detection abilities or fluid intelligence (Raven's Progressive Matrices [RPM]; Raven 1938). The MITE task consisted of 7 questions testing participants' ability to identify what emotion is portrayed in a black and white picture of a human's eyes and select the most appropriate of the four offered options. The RPM task consisted of 7 questions testing participants' ability to fill in the missing piece in a visual geometric design and select a proper option of the choices provided.

Results and Discussion

First, we tested how strongly ability and motivation are linked for mentalizing and structure-seeking subscales within SMM. Very weakly indeed: NFM and MITE scores were not significantly correlated ($r(178) = .08$, $p = .270$), nor were NFS and RPM scores ($r(158) = .08$, $p = .305$).

Second, we tested whether mentalizing and sense-making *abilities* predict manipulation beliefs in the same way as motivations (hypothesis 2). The effect was the opposite: Abilities task scores had a significant *negative* effect on beliefs for dubious tactics ($b = –0.25$, $SE = 0.08$, $p = .003$). Specifically, mentalizing abilities measured by MITE lowered beliefs for

dubious tactics (b = –0.27, SD = 0.12, p = .026), as did sense-making abilities measured by RPM (b = –0.23, SE = 0.12, p = .050). We did not find such effect for valid tactics (ps > .537): This means that abilities lead to a reduction in false-positives but not true-positives (hence greater accuracy) in persuasion detection. Thus, whereas strong motivations to seek patterns and intentions lead to greater false persuasion detection, strong abilities manifest in greater accuracy, as predicted.

Third, we tested whether we could replicate results in the previous studies and find support to our prediction that SMM affect beliefs about marketing manipulation. Collapsing across condition, SMM predicted beliefs for valid (b = 0.61, SE = 0.12, p < .001) and marginally for dubious (b = 0.38, SE = 0.22, p = .077) tactics. This broadly replicates the results in the previous studies and supports our main hypotheses (1a and 1b). (See web appendix C for regression results with NFS and NFM predicting manipulation beliefs.)

We included the MITE versus RPM manipulation *before* the main task because we speculated that the MITE task might prime participants to mentalize more, which could lead to higher false-positives for the dubious tactics. Consistent with that conjecture, there was a significant interaction between condition and SMM on beliefs for dubious (F(1, 336) = 4.97, p = .027, η^2 = .01) but not valid (F(1, 336) = 1.21, p = .272, η^2 < .01) tactics: After solving the MITE task, prompting more mentalizing, participants higher in SMM had much stronger beliefs in the power of dubious tactics (b = 0.84, SE = 0.30, p = .005), whereas we did not see this effect after RPM task (b = –0.12, SD = 0.31, p = .700). However, the result should be replicated before stronger conclusions are drawn. (See web appendix D for additional findings with MITE and RPM scores.)

The results of study 5 were consistent with our main hypotheses that SMM drives consumers' manipulation beliefs (except for marginal result predicting dubious beliefs—this is addressed by the internal meta-analysis below). Moreover, this study demonstrated that

sense-making and mentalizing motivations are different from similar cognitive abilities: Whereas higher motivations increase false-positive beliefs about dubious manipulation tactics, higher cognitive and mentalizing abilities actually decrease these false-positives.

INTERNAL META-ANALYSIS OF MAIN EFFECTS (HYPOTHESES 1A AND 1B)

To increase the precision of the estimates and gain clarity around points where the study results were inconsistent, we conducted a meta-analysis (N = 1,333) of all studies (except study 1a because it measured prevalence beliefs, whereas all other studies measured effectiveness beliefs about marketing manipulation) using the lme4 package in R (Bates et al. 2015). Data were analyzed using mixed effects models with SMM as a fixed factor, random intercepts for studies (1b–5), participants, and items, and manipulation beliefs as the dependent variable. (A table with individual studies' regression results is available in web appendix C.)

Overall, SMM was significantly associated with manipulation beliefs for both valid (b = 0.48, SE = 0.07, p < .001) and dubious (b = 0.41, SE = 0.10, p < .001) tactics. (Also, see web appendix E for results of mixed effects logistic regression where SMM explains true-positive and false-negative detection of valid tactics' effectiveness. It also explains true-negative and false-positive detection of dubious tactics' effectiveness—all findings are consistent with hypotheses 1a and 1b.)

The meta-analysis also allowed us to test demographic predictors of manipulation beliefs, collapsing across valid and dubious tactics. The effect of gender on manipulation beliefs was significant (b = 0.10, SE = 0.04, p = .006), where females had higher beliefs. Using PROCESS (Model 4; Hayes 2013) with study as a covariate (dummy-coded), we found that the effect of gender is mediated by SMM (b = 0.05, 95% CI: 0.032 to 0.072), because women

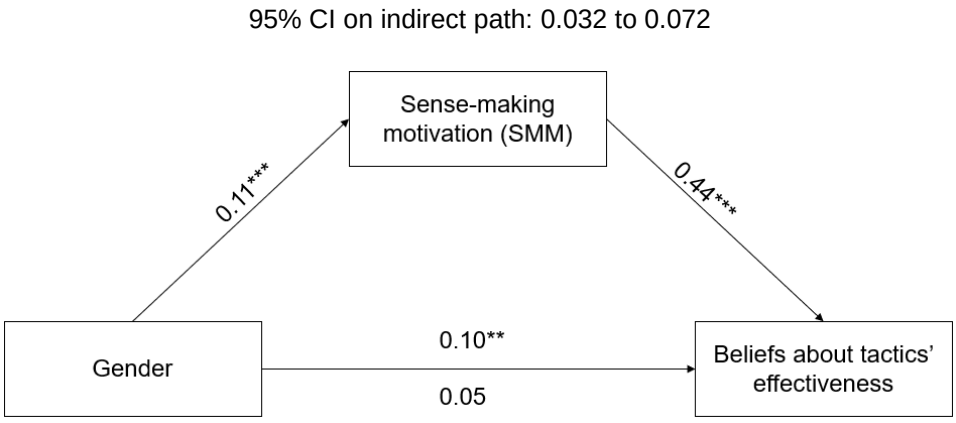
have higher SMM (b = 0.06, SE = 0.003, p < .001). This finding is consistent with existing literature on sex differences in mentalizing (Baron-Cohen and Wheelwright 2004; Carroll and Chiew 2006), where women demonstrate higher motivation to understand others, and in cognitive persistence (Tanaka, Panter, and Winborne 1988), where women show more motivation to apply effort to overcome mental challenges.

Age negatively predicted manipulation beliefs (b = –0.009, SE = 0.003, p < .001), such that younger consumers were more prone to believe in the effectiveness of marketing tactics. The effect of age was partially mediated by SMM (b = –0.001, 95% CI: –0.002 to –0.000), where younger consumers had higher SMM (b = –0.004, SE = 0.001, p < .001).

FIGURE 7

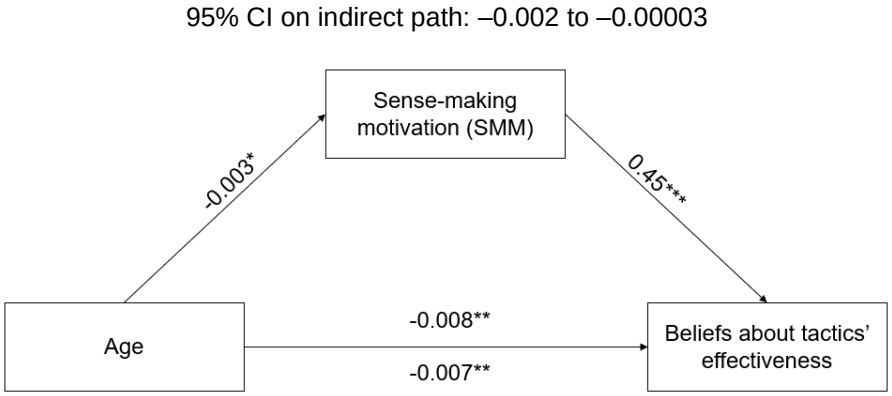
MEDIATION MODELS OF BELIEFS COLLAPSED ACROSS VALID AND DUBIOUS TACTICS FROM GENDER (A) AND AGE (B) VIA SMM FROM THE INTERNAL META-ANALYSIS

A



NOTE.—Gender was contrast coded: "–1" for men, "1" for women.
*p < .05; **p < .01; ***p < .001

B



*p < .05; **p < .01; ***p < .001

GENERAL DISCUSSION

There is a widespread perception that marketers manipulate consumers. Numerous trade books (Bullock 2004; Kilbourne 1999; Packard 1985) and a growing number of posts throughout the Internet (Gatignon 2016; Oldford 2018) warn consumers about marketing manipulations. For example, the "Dark Side of Subliminal Advertising" blog (darksidesubliminal.blogspot.com) catalogues numerous alleged examples of subliminal messages in food and drink advertising. A particularly intriguing post analyzes a Johnnie Walker ad, depicting a glass filled with six ice cubes, rendered in black and white. The author sees a dog in one ice cube, the Creature from the Black Lagoon in a second cube, a panda with an ace of spades above its head in a third cube, and a (photo-negative) man screaming in a fourth cube. It turns out that this represents "a glimpse into a heavy drinker's hellish nightmare." After all, the dog is a Scottish terrier (symbolizing the land of scotch whiskey) and the ace of spades is a symbol of death. A mystery wrapped in a riddle inside an enigma! One might question why alcohol advertisers want to emphasize the nightmare of alcoholism, but luckily the blog's commenters offer further dissection: "Very complex and deep mind procedures are involved, and scientists have discovered them only after decades of studies and experiments."

What explains such fanciful beliefs about the power of marketing? In this article, we introduced a theoretical framework for understanding when and why some consumers are prone to both correctly and erroneously detecting marketing manipulation. It posits that beliefs about marketing manipulations rest on the balance between beliefs about marketers' intentions to persuade and consumers' intentions to cope with persuasion, and that this balance depends on individual differences and situational framings. We found that those who have a natural drive to make sense of phenomena (both in general and for intention-seeking

in particular) tend to have higher manipulation beliefs. This applies both to true-positive (hypothesis 1a) and false-positive (hypothesis 1b) manipulation detection. We also found that abilities to solve intellectual and mentalizing tasks can, conversely, significantly lower beliefs about manipulation (hypothesis 2).

This model not only helps identify *who* might have pronounced beliefs about marketing manipulations, but also *how* to combat such false-positive beliefs. The key is making salient consumers' intentions to cope with persuasion. This is achieved by making them think of persuasion from their own perspective (hypothesis 3), or in more concrete terms (hypothesis 4). However, for consumers particularly high in sense-making motivation, these framings are reduced in effectiveness because such consumers are naturally more attuned to threats (hypothesis 5).

Theoretical Contributions

This research has shown that consumers access their persuasion knowledge not only in situations of true-persuasion, but also when there is no persuasion taking place. In addition to persuasion knowledge, our research contributes to several other conversations.

Individual differences linked to manipulation beliefs. To our knowledge, this research is the first to empirically show the connection between beliefs in manipulation and the core cognitive mechanisms. We also identified several other individual differences that play a role in true-positive and false-positive manipulation detection, having both theoretical and practical implications.

First, we found that beliefs about marketing manipulation are closely connected to consumers' beliefs in conspiracies, where conspiracy ideation mediates the effect of SMM on manipulation beliefs. This shows that those who believe in conspiracies are likely to think

that companies can manipulate their customers. Previous research found that individual differences in sense-making indeed influence conspiracy beliefs (van Prooijen 2012; van Prooijen and van Dijk 2014). Future research should investigate what effect other predictors of conspiracy mentality have on marketing manipulation beliefs, such as schizotypy (Barron et al. 2014; Darwin, Neave, and Holmes 2011), paranoia and boredom proneness (Brotherton and Eser 2015), and narcissism and self-esteem (Cichocka, Marchlewska, and Golec de Zavala 2016).

Second, we found another factor responsible for formation of manipulation beliefs—consumers' beliefs about free will. Those who believe in greater controllability and responsibility of people over their own behavior (Bandura 1982, 2008; Monroe and Malle 2010; Stillman et al. 2011) make fewer false-positive errors in persuasion detection. This might be relevant to our framework; however, in our study we did not find a direct relation of free will beliefs to SMM (only to NFS and NFM subscales separately, see web appendix D), showing that it goes beyond our framework. This finding still contributes to the literature on free will in marketing (Baumeister et al. 2008; Wilson, Gaines, and Hill 2008).

Third, in addition to our main expectation that SMM can predict manipulation beliefs, we also speculated that motivations to understand one's own mental states and actions (meta-cognitive motivations) will have a similar effect on manipulation beliefs. The results showed that the desire to think and analyze own thoughts and behaviors correlates with the mentalizing subscale of SMM (Carruthers 2006, 2009; Wilson 2002) and has a similar predictive effect of manipulation beliefs, providing promising avenues for future research.

Finally, we found that some personality and demographic types can also affect manipulation beliefs. As such, conscientiousness negatively affects manipulation beliefs: Greater motivation to think carefully and systematically manifests in lower beliefs. Although not directly relevant to our framework, we found that personality traits and SMM together

play an important role in formation of such beliefs, where SMM is another psychological factor beyond traditional Big Five personality traits. This finding contributes to knowledge about how personality traits manifest in consumer behavior (Baumgartner 2002; He and Bond 2015; Matz et al. 2016). Meta-analysis of demographic factors showed that women have higher motivations to mentalize (Baron-Cohen and Wheelwright 2004) and, therefore, tend to have higher manipulation beliefs.

Lay theories of the marketplace and attitudes towards marketers. Consumers' beliefs about the marketplace are not always accurate. But as they influence consumers' attitudes towards firms and brands, it is critical to identify these beliefs. For instance, consumers' erroneous understanding of firms' cost structures lead to unrealistic attitudes toward price fairness (Bolton et al. 2003); and consumers' mistaken view that more profitable firms engage in fewer corporate social responsibility activities likely causes resentment toward the most profitable companies (Bhattacharjee et al. 2017). But consumers' lay theories of marketing manipulation are not well-understood, even though the feeling of manipulation leads to reactance (Brehm 1966), manifesting in decreased purchase intentions (Campbell 1995; Kirmani and Zhu 2007; Wentzel, Tomczak, and Herrmann 2010). Our research contributes to the literature on marketing attitudes (Gaski and Etzel 2005) not only by identifying what consumers are more prone to detect manipulations where they do or do not exist, but also by investigating ways to combat such perceptions.

Marketing Implications

Given increasing beliefs in marketing tricks among consumers (Isaac and Grayson 2017), companies need to use them very carefully. With the rise of neuromarketing, some consumers are worried that marketers know how to control and influence their choice (Stanton, Sinnott-

Armstrong, and Huettel 2016). As neuroscientific explanations of psychological phenomena undermine belief in free will (Greene and Cohen 2004), development of neuromarketing can create even more fear of marketing manipulation (Grey et al. 2003). In reality, most of these fears are exaggerated as they state that neuromarketing is more powerful than it practically is (Stanton et al. 2016).

For instance, the Cambridge Analytica scandal of 2018 and Facebook emotional contagion study set the Internet ablaze and caused a wave of raging comments in the social media (Cadwalladr 2018; Steadman 2014), although the effects of Facebook content on voting behavior (Chen and Potenza 2018; Trump 2018) and users' emotions (Kramer, Guillory, and Hancock 2014) were modest at best. Still, many users were worried about being manipulated and duped. Some left comments in the news articles related to the Facebook experiment: "Don't be fooled, manipulating a mood is the ability to manipulate a mind. Political outcomes, commerce, and civil unrest are just a short list of things that can be controlled." (Hallinan, Brubaker, and Fiesler 2019, 1084). These sentiments, however, do not necessarily lead to particular withdrawing behavior—indeed, people's privacy-related concerns and their behavior frequently contradict (Barnes 2006; Norberg, Horne, and Horne 2007). Arguably, the real lesson of Cambridge Analytica and the Facebook experiment was less that they affected users' *behavior*, but that they made users *think* that such manipulations have great power.

One general piece of advice for weakening manipulation beliefs based on our framework is increasing the salience of consumers' intentions to cope with persuasion relatively to the salience of marketers' intentions to persuade. This can be achieved by making consumers think about themselves in persuasion or by making them think about persuasion more concretely—this will make them aware of their persuasion coping strategies.

Our research also points to strategies for marketing segmentation separately to each demographic. Marketers should be particularly wary of any tactics that might be perceived as manipulative by consumer segments higher in SMM, whereas consumers lower on these traits can be more safely marketed to with less fear of perceived manipulation. This difference in sense-making needs might explain why some consumers detect a shady intent from marketers and politicians where there is none (as in the examples described above).

But how do we identify consumers with higher sense-making needs? Our findings suggest that SMM can be predicted by gender and age, where women and younger consumers have higher motivations to understand their environments, leading them to have higher manipulation beliefs overall. Thus, women and younger consumers should be encouraged to think more about consumers' side rather than about marketers' side in persuasion as this might help attenuate manipulation beliefs. At the same time, this presents opportunities for younger consumers to receive messages that educate them about the limits of marketing persuasion. More generally, research exploring how demographics interacts with beliefs about marketing manipulation may be of great practical significance.

The idea that persuasion is powerful is quite compelling—our world is full of persuasion. Pervasiveness of advertising makes many people think that it is influential—otherwise why would so many companies and politicians pay for advertising? In reality, each of us, including marketers and politicians, know that persuasion is extremely hard. Scholars find new evidence that the effects of commercial and political advertising on consumers' and voters' behavior are trivial and ephemeral (Coppock, Hill, and Vavreck 2020; Gerber et al. 2011; Krasno and Green 2008; Tellis 2003). Is it possible that this sector of the economy is to some extent based on a cognitive illusion? In this case, such *self-fulfilling prophecies* (Merton 1948) make many people hold unbacked beliefs about the power of marketing (and political)

persuasion not because it is effective but because it is pervasive. Such influence might not be effective at all, but it makes us *think* that it is powerful.

Whether pervasive or not, consumers resent the feeling of manipulation and firms must prune such attitudes at their roots. Understanding the depths of those roots, as we have done here, is valuable both for consumer research and for firms' bottom lines.

Limitations and Future Research

Although we argue that the support for our core hypotheses is robust, several limitations should be borne in mind for future research.

First, the tests of hypotheses 1a and 1b are mainly correlational—we measure rather than manipulate sense-making motivation. On the one hand, this is likely to be the most ecologically valid way of operationalizing these constructs, since there is little evidence that sense-making motivations fluctuate across situations. On the other hand, we did provide initial evidence in study 5 that priming mentalizing can increase the effect of SMM on beliefs. This adds experimental support to our framework, while also providing a springboard for future research, both in consumer behavior and on more basic processes.

Second, our empirical case is stronger for the basic effects of SMM (hypotheses 1a and 1b) than the supporting process evidence. Of course, SMM is itself a measure of cognitive processes and, therefore, our results are informative about psychological mechanisms. Moreover, we provide some mediation evidence toward understanding the intervening variables between motivation and beliefs, particularly persuasion knowledge access in study 4. The mediating effects of free will beliefs (documented in the web appendix) and broader conspiracy ideation, are also consistent with the logic embedded in our theoretical

framework. Nonetheless, more systematically understanding these mechanisms would be a valuable goal for future research.

Finally, it would be valuable to identify further boundary conditions. We did identify some theoretically relevant boundaries: Our situational and individual difference variables interact such that the situational framing effects do not occur for participants high in threat-detection (SMM), and we argue below how this is managerially relevant. And priming mentalizing in study 5 increased manipulation beliefs even beyond their already-high baseline among consumers high in SMM. Still, future work might examine other potential boundary conditions, such as priming. For instance, priming sense-making motivations with situations containing potential threats might increase manipulation beliefs, whereas priming free will beliefs might potentially decrease manipulation beliefs.

DATA COLLECTION INFORMATION

All the studies were conducted between Spring 2019 and Spring 2020 using the Amazon Mechanical Turk panel. All the studies were programmed using Qualtrics. Data collection was managed by the first and second authors. The first author performed the data analysis, with input from the second author. Data were discussed on multiple occasions by all authors.

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WEB APPENDIX

Web appendix consists of five parts: Appendix A (methodological details), Appendix B (scale items), Appendix C (main results details), Appendix D (other results details), and Appendix E (internal meta-analysis details). Raw data were submitted to repository with the following link: https://osf.io/b9tyw.

APPENDIX A

Methodological Details

Stimuli used in studies 1, 3 and 5

Valid tactics:

Jack says that many social networking websites are able to convince customers to buy many unnecessary goods that they otherwise would not buy, by psychologically targeting advertisements based on users' personal data (e.g., their search history).

Bob says that the lowest shelves in stores have the best deals, because retailers place the most expensive brands at eye level so that more consumers notice and buy them.

Mark says that stores sometimes make promotions time-limited just so that customers feel a greater sense of urgency to buy at the sale prices.

Julia says that stores sometimes redescribe a product bundle (e.g., "ice cream and a cookie for $3.00") as including a free product (e.g., "buy a $3.00 ice cream and get a free cookie") to make the offer sound more exciting to customers.

Christine says that in stores, salespeople pay compliments to customers before telling them about a particular product; this flatters the customers, so it is easier to sell them the product.

Jill says that sales prices are often misleading – retailers trick consumers by writing a second, much higher, price on the tag, cross this price out, and lead consumers to think that the "new price" is a good deal.

Dubious tactics:

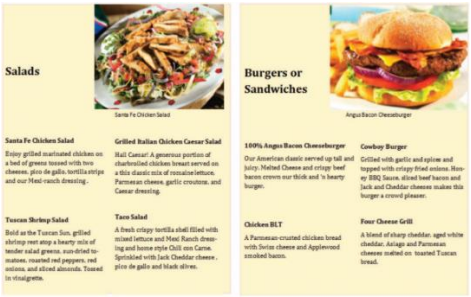
Ellen says that door-to-door salespeople can use hypnotic words and body gestures to convince customers to buy things they do not really want.

Steven says that marketers expose viewers to hidden advertising before or during movies, aimed at unconsciously influencing viewers' attitudes and behavior.

Stimuli used in study 2

Valid tactics (the "true" versions as used in original studies):

1. Some researchers say that displaying healthy food items to the left of unhealthy food can promote healthier choices compared to displaying them to the right of unhealthy food items. In other words, they claim that it is possible to promote healthy eating by displaying food items like this:



To what extent do you agree that it is possible to promote healthier choices by displaying food items as shown above and not vice versa?

2. Some scholars say that for organized assortments of candies, more actual variety (more options available) increases consumption quantities to a greater degree than it does with disorganized assortments.

To what extent do you agree that people will consume more candies when they are organized compared to when they are disorganized?

3. Some researchers claim that sellers can influence customers to choose a more expensive beer at a bar if the products are displayed from high to low (descending order)

Dubious tactics (the "false" versions (reversed)):

1. Some researchers say that displaying healthy food items to the right of unhealthy food can promote healthier choices compared to displaying them to the left of unhealthy food items. In other words, they claim that it is possible to promote healthy eating by displaying food items like this:

To what extent do you agree that it is possible to promote healthier choices by displaying food items as shown above and not vice versa?

2. Some scholars say that for disorganized assortments of candies, more actual variety (more options available) increases consumption quantities to a greater degree than it does with organized assortments.

To what extent do you agree that people will consume more candies when they are disorganized compared to when they are organized?

3. Some researchers claim that sellers can influence customers to choose a more expensive beer at a bar if the products are displayed from low to high (ascending order)

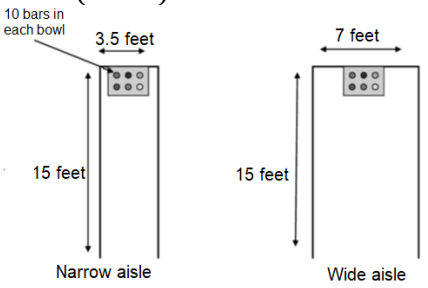
than from low to high (ascending order).

HIGH → LOW	
BEER 1	$10
BEER 2	$9
BEER 3	$8
BEER 4	$8
BEER 5	$7
BEER 6	$7
BEER 7	$7
BEER 8	$7
BEER 9	$6
BEER 10	$5
BEER 11	$4
BEER 12	$4
BEER 13	$4
AVG SALE	$6.02

LOW → HIGH	
BEER 1	$4
BEER 2	$4
BEER 3	$4
BEER 4	$5
BEER 5	$6
BEER 6	$7
BEER 7	$7
BEER 8	$7
BEER 9	$7
BEER 10	$8
BEER 11	$8
BEER 12	$9
BEER 13	$10
AVG SALE	$5.78

To what extent do you agree that displaying prices of beer from high to low is an effective tactic to increase revenue?

4. Some scholars asked a group of people to proceed down the aisle and choose three candy bars of any kind, in any combination they pleased. There were six different types of candy bars at the end of the aisle. When the aisle was narrow (3.5 feet), people tended to choose a greater variety of candy bars compared to when the aisle was wide (7 feet).



To what extent do you agree that making the aisle narrower is an effective way to influence customers to choose a greater variety of products?

5. Some scholars report the following results of their studies: when people were asked to choose a drink – either energy drink or iced tea – those who had been exposed to a very strong repulsive scent of grapefruit selected iced tea. Those people who had been exposed to a strong repulsive scent of lavender preferred the energy drink.

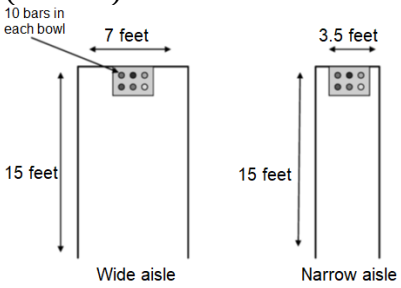
than from high to low (descending order).

LOW → HIGH	
BEER 1	$4
BEER 2	$4
BEER 3	$4
BEER 4	$5
BEER 5	$6
BEER 6	$7
BEER 7	$7
BEER 8	$7
BEER 9	$7
BEER 10	$8
BEER 11	$8
BEER 12	$9
BEER 13	$10
AVG SALE	$6.02

HIGH → LOW	
BEER 1	$10
BEER 2	$9
BEER 3	$8
BEER 4	$8
BEER 5	$7
BEER 6	$7
BEER 7	$7
BEER 8	$7
BEER 9	$6
BEER 10	$5
BEER 11	$4
BEER 12	$4
BEER 13	$4
AVG SALE	$5.78

To what extent do you agree that displaying prices of beer from low to high is an effective tactic to increase revenue?

4. Some scholars asked a group of people to proceed down the aisle and choose three candy bars of any kind, in any combination they pleased. There were six different types of candy bars at the end of the aisle. When the aisle was wide (7 feet), people tended to choose a greater variety of candy bars compared to when the aisle was narrow (3.5 feet).



To what extent do you agree that making the aisle wider is an effective way to influence customers to choose a greater variety of products?

5. Some scholars report the following results of their studies: when people were asked to choose a drink – either energy drink or iced tea – those who had been exposed to a very strong repulsive scent of lavender selected iced tea. Those people who had been exposed to a strong repulsive scent of grapefruit preferred the energy drink.

To what extent do you agree that such scent manipulation can affect people's choice as described?

6. Some researchers found that a car rental company managed to increase the number of members in their loyalty reward program after they changed the reward from a *$70 credit toward a future grocery bill at the local grocery store* to a *1-hour pampering Swedish massage*.

To what extent do you agree that the described tactic can be effective for increasing number of members in a loyalty program?

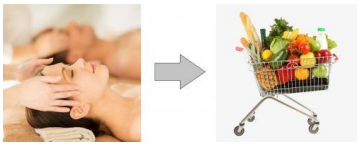
7. Some researchers found that male customers perceive greater savings when prices are displayed in red (compared to black).

To what extent do you agree that displaying prices in red is effective for increasing sales among men?

8. Some researchers showed people two lamps on a computer screen, one on the left and the other on the right. These people were asked to estimate the price of each lamp within a range of $20–$25.

To what extent do you agree that such scent manipulation can affect people's choice as described?

6. Some researchers say that a car rental company managed to increase the number of members in their loyalty reward program after they changed the reward from *a 1-hour pampering Swedish massage to a $70 credit toward a future grocery bill at the local grocery store*.



To what extent do you agree that the described tactic can be effective for increasing number of members in a loyalty program?

7. Some researchers found that male customers perceive greater savings when prices are displayed in black (compared to red).

To what extent do you agree that displaying prices in black is effective for increasing sales among men?

8. Some researchers showed people two lamps on a computer screen, one on the left and the other on the right. These people were asked to estimate the price of each lamp within a range of $20–$25.

People assigned a higher price to the lamp on the right-hand side of the screen than for the lamp on the left-hand side. This effect was not dependent on the type of lamp.

To what extent do you agree that people will perceive object on the right as more expensive than object on the left as described above?

People assigned a higher price to the lamp on the left-hand side of the screen than for the lamp on the right-hand side. This effect was not dependent on the type of lamp.

To what extent do you agree that people will perceive object on the left as more expensive than object on the right as described above?

Stimuli used in study 4

Abstract vignettes:

Social networks websites often use targeted advertising, a form of online advertising that is directed towards audiences based on their recent purchase and search history. This practice is able to convince customers to buy various goods that they otherwise would not buy by targeting advertisements based on their personal data.

Some companies use techniques aimed at unconsciously influencing viewers' attitudes and behavior without their being aware. This may involve the use of hidden ads that affect the audience at a level below conscious awareness.

Door-to-door salespeople sometimes use hypnotic words and body gestures to convince customers to buy things they do not really want.

Advertisers often appeal to customers' desire to "get a deal" by writing two prices on a tag – original price (which is often crossed out) and a new, sale price. This makes the offered price seem more attractive, when in fact there is no sale discount.

The lowest shelves in stores have the best deals, because retailers place the most expensive brands at customers' eye level. Companies know that shoppers look at the

Concrete vignettes:

Jello!, a social networking website, places ads on the sides of users' pages that change based on their recent purchase and search history. This practice is able to convince customers to buy various goods that they otherwise would not buy – from home appliances and apparel to electronic gadgets and eyewear – by targeting advertisements based on their personal data.

Bell Electronics uses techniques aimed at unconsciously influencing viewers' attitudes and behavior without their being aware. They place hidden advertising of their products before or during movies that affect the audience at a level below conscious awareness.

Door-to-door salesperson of Morning's Sunshine uses specific hypnotic words and body gestures to convince customers to buy vitamins and dietary supplements that they do not really want.

Tu Apparel often appeal to customers' desire to "get a deal" by writing two prices on a tag for their jeans – original price (which is often crossed out) and a new, sale price. This makes the offered price on their jeans seem more attractive, when in fact there was no sale discount.

The lowest shelves of breakfast cereals in Fresco Foods have the best deals, because retailers place the most expensive brands at eye level. Fresco Foods managers know that

brands positioned at eye level shelves more often than at those placed below.

Time-limited offers are those where a pricing offer is only available for a specified, usually short, period of time, so that customers feel a greater sense of urgency to buy at the discounted price.

Stores sometimes redescribe their usual product bundles ("Product X and product Y for $3.00") as including a free product ("buy Product X for $3.00 and get product Y for free") to make the offer sound more exciting to customers.

In stores, salespeople often pay compliments to customers before telling them about a particular product; this flatters the customers, so it is easier to sell them the product.

shoppers look at the brands positioned at eye level shelves more often than at those placed below.

Happy Baby Clothes often advertises time-limited offers that are only available for a specified, usually short, period of time, so that customers feel a greater sense of urgency to buy their products at the discounted price.

Donuts & Waffles sometimes redescribe their usual product bundle (e.g., “ice cream and a cookie for $3.00") as including a free product (e.g., “buy a $3.00 ice cream and get a free cookie”) to make the offer sound more exciting to customers.

At Jason & Partners, salespeople pay compliments to customers before telling them about a new perfume or facial cream; this flatters the customers, so it is easier to sell them the product.

APPENDIX B

Scale Items

Sense-Making Motivation (SMM) Scale

In studies 1a–1b we used the following scales to create our SMM scale. Motivation to seek structures (*need for structure*; NFS) was measured by 3 questions from the Personal Need for Structure Scale (Neuberg and Newsom 1993; Thompson, Naccarato, and Parker 1989, 1992) and 1 question from the Need for Cognitive Closure Scale (Kruglanski, Webster, and Klem 1993). Motivation to understand others (*need for mentalizing*; NFM) was measured by 4 questions from the Interpersonal Reactivity Index (Davis 1983) and 2 questions from the Reflective Functioning Questionnaire (Fonagy et al. 2016).

In studies 2–5, we substituted the Need for Cognitive Closure question by the two questions from the Intolerance of Uncertainty scale (Freeston et al. 1994) in an attempt to increase reliability (see Cronbach alphas in table B1 below).

NFS Subscale (studies 1a–1b):

Need for Structure:
I enjoy having a clear and structured mode of life.
I don't like situations that are uncertain.
I become uncomfortable when the rules in a situation are not clear.
Need for Cognitive Closure:
I feel uncomfortable when someone's meaning or intention is unclear to me.

NFS Subscale (studies 2–5):

Need for Structure:
I enjoy having a clear and structured mode of life.
I don't like situations that are uncertain.
I become uncomfortable when the rules in a situation are not clear.
Uncertainty Intolerance:
My mind can’t be relaxed if I don’t know what will happen tomorrow.
Uncertainty makes me uneasy, anxious, or stressed.

NFM Subscale (studies 1–5):

Perspective-Taking:
Before criticizing somebody, I try to imagine how I would feel if I were in their place.
I sometimes try to understand my friends better by imagining how things look from their perspective.
I believe that there are two sides to every question and try to look at them both.
I try to look at everybody's side of a disagreement before I make a decision.
Reflective Functioning:
I believe that people can see a situation very differently based on their own beliefs and experiences.

TABLE B1

ITEM LOADINGS FOR TWO-FACTOR SENSE-MAKING MOTIVATION SCALE

Item Loadings for two-factor model	Original Scale/Subscale	Study 1 (N=254)	2 (N=162)	3 (N=357)	4 (N=350)	5 (N=340)
Factor 1: Need for Structure (NFS)						
I enjoy having a clear and structured mode of life.	"Personal Need for Structure"	.591	.623	.605	.717	.598
I don't like situations that are uncertain	"Personal Need for Structure"	.851	.877	.864	.867	.880
I become uncomfortable when the rules in a situation are not clear.	"Personal Need for Structure"	.890	.840	.828	.823	.835
I feel uncomfortable when someone's meaning or intention is unclear to me.	"Need for Cognitive Closure"	.749				
My mind can't be relaxed if I don't know what will happen tomorrow.	"Intolerance of Uncertainty"		.783	.762	.729	.717
Uncertainty makes me uneasy, anxious, or stressed.	"Intolerance of Uncertainty"		.888	.856	.845	.858
Factor 2: Need for Mentalizing (NFM)						
Before criticizing somebody, I try to imagine how I would feel if I were in their place.	"Perspective-taking"	.820	.801	.820	.755	.807
I sometimes try to understand my friends better by imagining how things look from their perspective.	"Perspective-taking"	.804	.836	.825	.831	.811
I believe that there are two sides to every question and try to look at them both.	"Perspective-taking"	.679	.745	.819	.809	.774
I try to look at everybody's side of a disagreement before I make a decision.	"Perspective-taking"	.813	.826	.817	.860	.851
I believe that people can see a situation very differently based on their own beliefs and experiences.	"Reflective Functioning Questionnaire"	.628	.644	.569	.610	.489
KMO (SMM)		.777	.801	.793	.797	.768
Cronbach alphas						
Total scale (SMM)		.737	.762	.744	.766	.738
NFS		.784	.866	.845	.855	.843
NFM		.810	.830	.835	.835	.813

NOTE.—Extraction Method: Principal Component Analysis with Varimax rotation and Kaiser normalization. Questions in all studies fall into two components—NFS and NFM—based on eigenvalues.

Metacognitive Motivations Scale (study 3)

This scale was created using items adapted from the Reflective Functioning Questionnaire (Fonagy et al. 2016).

I always know what I feel.
I like to think about the reasons behind my actions.
I always know why I do what I do.
I enjoy thinking about my own thoughts.
I think I understand myself better than other people understand themselves.

Questions Measuring Persuasion Knowledge Access (study 4)

In study 4, we used the following questions measuring the extent to which participants were thinking about marketers' and customers' side after reading main task:

When you answered the questions about marketing techniques on the previous screens, how much were you *thinking about these actions from the perspective of the company*?
When you answered the questions about marketing techniques on the previous screens, how much were you *thinking about these actions from the perspective of the customers*?
When you answered the questions about marketing techniques on the previous screens, how much were you *thinking about the reasons why companies do it*?
When you answered the questions about marketing techniques on the previous screens, how much did you *think that the companies' actions were intentional*?

Free Will Beliefs Scale (study 4)

This scale was created using items adapted from the FAD-Plus Scale (Paulhus and Carey 2011) and Lay Dispositionism Scale (Chiu, Hong, and Dweck 1997; Yeager et al. 2011). The beliefs were measured on a 5-point scale. Higher scores correspond to higher belief in free will and controllability over traits and behavior.

Other people can easily change the kind of person they are.
The kind of person someone is is something very basic about them and it can't be changed very much.*
People can do things differently, but the important parts of who they are can't really be changed.*
Everyone is a certain kind of person and there is not much that can be done to really change that.*
People have complete control over the decisions they make.
People have complete free will.
People's biological makeup determines their talents and personality.*
Your genes determine your future.*
Science has shown how your past environment created your current intelligence and personality.*
No matter how hard you try, you can't change your destiny.*

Whatever will be, will be—there's not much you can do about it.*

*Reverse coded items

APPENDIX C

Main Results Details: Regressions, Mean Responses, and Spotlight Analyses

Regression results (studies 1–5)

TABLE C1

THE EFFECT OF SMM ON BELIEFS ABOUT EFFECTIVENESS (OR PREVALENCE IN STUDY 1A) OF VALID TACTICS

	b	SE	t	p
Study 1a	0.54	0.17	3.12	0.002
Study 1b	0.64	0.20	3.27	0.001
Study 2	0.50	0.22	2.23	0.027
Study 3	0.42	0.15	2.87	0.004
Study 4	0.35	0.11	3.12	0.002
Study 5	0.61	0.12	5.30	<0.001

TABLE C2

THE EFFECT OF SMM ON BELIEFS ABOUT EFFECTIVENESS (OR PREVALENCE IN STUDY 1A) OF DUBIOUS TACTICS

	b	SE	t	p
Study 1a	0.83	0.32	2.56	0.012
Study 1b	0.19	0.35	0.54	0.590
Study 2	0.43	0.23	1.92	0.057
Study 3	0.59	0.22	2.64	0.009
Study 4	0.29	0.20	1.44	0.151
Study 5	0.38	0.22	1.77	0.077

TABLE C3

THE EFFECT OF NFS AND NFM SUBSCALES ON BELIEFS ABOUT EFFECTIVENESS (OR PREVALENCE IN STUDY 1A) OF VALID TACTICS

		b	SE	t	p
Study 1a	NFS	0.06	0.11	0.57	0.571
	NFM	0.61	0.15	3.99	<0.001
Study 1b	NFS	0.25	0.14	1.84	0.068
	NFM	0.40	0.15	2.68	0.008
Study 2	NFS	0.13	0.13	0.94	0.347
	NFM	0.50	0.19	2.58	0.011
Study 3	NFS	0.19	0.09	2.00	0.046
	NFM	0.24	0.12	2.09	0.037
Study 4	NFS	0.05	0.07	0.65	0.516
	NFM	0.41	0.10	4.29	<0.001
Study 5	NFS	0.33	0.07	4.47	<0.001
	NFM	0.26	0.09	2.93	0.004

TABLE C4

THE EFFECT OF NFS AND NFM SUBSCALES ON BELIEFS ABOUT EFFECTIVENESS (OR PREVALENCE IN STUDY 1A) OF DUBIOUS TACTICS

		b	SE	t	p
Study 1a	NFS	0.16	0.22	0.74	0.458
	NFM	0.84	0.29	2.86	0.005
Study 1b	NFS	-0.26	0.24	-1.07	0.288
	NFM	0.51	0.26	1.95	0.053
Study 2	NFS	0.02	0.13	0.14	0.887
	NFM	0.64	0.20	3.23	0.002
Study 3	NFS	0.32	0.14	2.28	0.023
	NFM	0.25	0.18	1.40	0.163
Study 4	NFS	0.14	0.13	1.05	0.293
	NFM	0.17	0.17	0.95	0.344
Study 5	NFS	0.09	0.14	0.67	0.504
	NFM	0.34	0.17	1.99	0.048

TABLE C5

MEAN RESPONSES (SD) FOR BELIEFS FOR EACH TACTIC ACROSS STUDIES 1, 3–5

	Study 1a	Study 1b	Study 3		Study 4		Study 5
			First-person	Third-person	Conc-rete	Abs-tract	
Targeted advertising in social media	3.47 (1.80)	2.61 (1.93)	0.86 (2.78)	1.87 (2.09)	1.24 (2.11)	1.82 (2.32)	2.66 (2.03)
Most expensive products at the eye level on the shelves in stores	2.95 (2.14)	2.70 (2.08)	1.91 (2.25)	1.89 (2.20)	2.37 (1.97)	2.61 (1.94)	2.76 (1.98)
Time-limited promotions	4.01 (1.54)	3.54 (1.31)	2.45 (2.15)	2.74 (1.67)	2.34 (1.77)	3.07 (1.57)	3.62 (1.26)
Redescribing a product bundle (e.g. “ice cream and a cookie for $3.00") as including a free product (e.g., “buy a $3.00 ice cream and get a free cookie”)	3.85 (1.27)	3.12 (1.52)	2.23 (2.06)	2.56 (1.62)	2.30 (1.69)	2.89 (1.70)	3.13 (1.65)
Compliments to customers from salespeople in stores	2.72 (2.02)	1.91 (2.19)	0.39 (2.77)	1.08 (2.22)	1.62 (2.06)	1.59 (2.24)	2.09 (2.12)
The “new price” is a good deal (“retailers write a second, much higher, price on the tag, and cross it out”)	2.96 (2.44)	2.77 (1.89)	1.54 (2.66)	2.10 (2.02)	2.16 (2.10)	2.60 (1.96)	2.84 (1.92)
Hypnotic words and body gestures from door-to-door salespeople	-0.32 (3.05)	-0.86 (2.83)	-1.64 (2.81)	-0.95 (2.59)	-1.14 (2.54)	-0.79 (2.53)	-0.52 (2.80)
Subliminal advertising in the movies	2.22 (2.28)	1.52 (2.29)	0.45 (2.57)	0.71 (2.58)	0.55 (2.42)	1.45 (2.38)	1.54 (2.47)

NOTE.—Beliefs were measured on a scale from (–5) “strongly disagree” to (5) “strongly agree”.
All studies except 1a measured effectiveness of the tactics beliefs; study 1a measured prevalence of the tactics beliefs.

TABLE C6

MEAN RESPONSES (SD) FOR BELIEFS FOR EACH TACTIC ACROSS STUDY 2

	Valid (as in original publication)	Dubious (reversed version)
Displaying healthy food items relatively to unhealthy food items	0.43 (2.84)	0.89 (2.38)
Variety in organized and disorganized assortments of candies	2.02 (2.21)	1.53 (2.29)
Ascending or descending price and beer consumption	1.47 (2.48)	1.50 (2.08)
Aisle width and product variety	0.42 (2.50)	1.06 (2.12)
Scents and drink preference	1.08 (2.22)	1.49 (2.59)
Loyalty program rewards	0.09 (2.70)	3.08 (2.05)
Prices displayed in red vs. black	1.95 (2.35)	-0.27 (2.82)
Position of the lamp and its price	0.84 (2.56)	0.09 (2.77)

NOTE.—Beliefs were measured using a scale from (–5) “strongly disagree” to (5) “strongly agree”.

Spotlight Analyses Results for Interactions in Studies 3–4

TABLE C7

SPOTLIGHT ANALYSIS FOR VALID TACTICS BELIEFS PREDICTED BY SMM IN STUDIES 3–4

	Study 3				Study 4			
SMM	Effect	SE	t	p	Effect	SE	t	p
–1 SD	-0.29	0.11	-2.55	0.011	-0.34	0.09	-3.87	<0.001
0	-0.22	0.08	-2.75	0.006	-0.22	0.06	-3.53	<0.001
+1 SD	-0.15	0.11	-1.33	0.186	-0.10	0.09	-1.12	0.265
	Interaction Significance: $p = 0.392$				Interaction Significance: $p = 0.054$			

TABLE C8

SPOTLIGHT ANALYSIS FOR DUBIOUS TACTICS BELIEFS PREDICTED BY SMM IN STUDIES 3–4

	Study 3				Study 4			
SMM	Effect	SE	t	p	Effect	SE	t	p
–1 SD	-0.43	0.17	-2.53	0.012	-0.43	0.15	-2.74	0.007
0	-0.21	0.12	-1.70	0.091	-0.32	0.11	-2.82	0.005
+1 SD	0.02	0.17	0.13	0.896	-0.20	0.16	-1.24	0.215
	Interaction Significance: $p = 0.062$				Interaction Significance: $p = 0.294$			

TABLE C9

SPOTLIGHT ANALYSIS FOR VALID AND DUBIOUS TACTICS BELIEFS PREDICTED BY METACOGNITIVE MOTIVATIONS IN STUDY 3

Metacognitive motivations	DV: Valid tactics beliefs				DV: Dubious tactics beliefs			
	Effect	SE	t	p	Effect	SE	t	p
–1 SD	0.27	0.11	-2.45	.015	-0.45	0.17	-2.62	.009
0	0.23	0.08	-2.90	.004	-0.22	0.12	-1.86	.064
+1 SD	0.19	0.11	-1.65	.099	0.00	0.17	0.00	.997
Interaction Significance: p = 0.574					Interaction Significance: p = 0.066			

APPENDIX D

Other Results Details

Study 2: Big Five Personality Traits' Prediction of Tactics' Effectiveness Beliefs

Regression analysis of Big Five Personality Traits with SMM as a covariate showed that Conscientiousness had a significant negative effect on marketing manipulation beliefs (collapsed across valid and dubious): $b = –0.32$, $SE = 0.16$, $p = .050$. This makes sense: Conscientiousness is manifested in characteristic behaviors such as being neat, systematic, careful, thorough and thinking carefully before acting (Costa and McCrae 1992; Thompson 2008). Since critical thinking requires motivation and effort to reason whether a proposition is true or false (Sperber et al. 2010), greater conscientiousness leads to lower belief in marketing manipulation. Other personality traits defined by Big Five did not have a significant effect on beliefs, ps > .111.

Study 3: Metacognitive Motivations' Prediction of Tactics' Effectiveness Beliefs

In study 3, we tested what role metacognitive motivations play in formation of manipulation beliefs. We speculated that motivations to think about one's own mental states (e.g., beliefs, feelings) and actions might have the same effect on beliefs about tactics' effectiveness as the NFM subscale of SMM, because thinking about oneself is thought to rely on similar cognitive mechanisms as thinking about others (Carruthers 2006, 2009).

The desire to think about one's own mental states significantly predicted both valid ($b = 0.26$, $SE = 0.11$, $p = .020$) and dubious ($b = 0.36$, $SE = 0.17$ $p = .032$) tactics beliefs. Moreover, metacognitive motivations moderated the effect of condition in study 2 (first-person vs. third-person framing) on dubious tactics beliefs at marginal significance ($F(1, 353) = 3.41$, $p = .066$, $\eta^2 = .01$), but not on valid tactics beliefs (F (1, 353) = 0.32, $p = .574$, $\eta^2 = .01$).

Despite the fact that the moderation is not significant for valid tactics, and only marginally significant for dubious tactics, the spotlight analysis revealed that the effect of the first-person perspective can significantly reduce both valid and dubious tactics beliefs only in consumers with lower metacognitive motivations. The effect is not significant for consumers with higher metacognitive drives (table C9). This means that the first-person framing can reduce manipulation beliefs only in consumers with lower motivations to think about own mental states and behavior; in consumers with higher metacognitive motivations this framing is not helpful in decreasing manipulation beliefs. Therefore, they are more likely to detect manipulations even when they do not exist. This is directionally consistent with our other findings, although not as statistically robust.

Metacognitive motivations correlate with SMM ($r(355) = .28$, $p < .001$), but mainly because it correlates with the NFM subscale ($r(355) = .39$, $p < .001$), and not NFS subscale ($r(355) = .04$, $p = .381$). This finding is consistent with the idea that mentalizing about oneself highly correlates with mentalizing about others (e.g., Carruthers 2006, 2009; Wilson 2002). Overall, these results are in line with our main predictions about SMM (hypotheses 1a and 1b). (Please see the spotlight analyses separately in appendix C.)

Study 4: Free Will Beliefs' Prediction of Tactics' Effectiveness Beliefs

This study allowed us to test whether manipulation beliefs can be predicted by beliefs about free will. We speculated that consumers higher on the scale might believe in greater controllability over one's own actions to cope with persuasion (Bandura 1982, 2008; Monroe and Malle 2010; Stillman, Baumeister, and Mele 2011), and might therefore show lower belief in manipulation. Free will beliefs did not have significant effect on manipulation beliefs for valid tactics (b = 0.05, SE = 0.10, p = .594), but did have a significant negative effect on beliefs for dubious tactics (b = –0.43, SE = 0.17, p = .012), where more deterministic consumers evaluated dubious persuasion as more effective than consumers higher in free will beliefs. This is consistent with the proposition that people who think that their actions are determined and, therefore, little can be done to control situations' outcomes, think that persuasion tactics (even dubious ones) are effective.

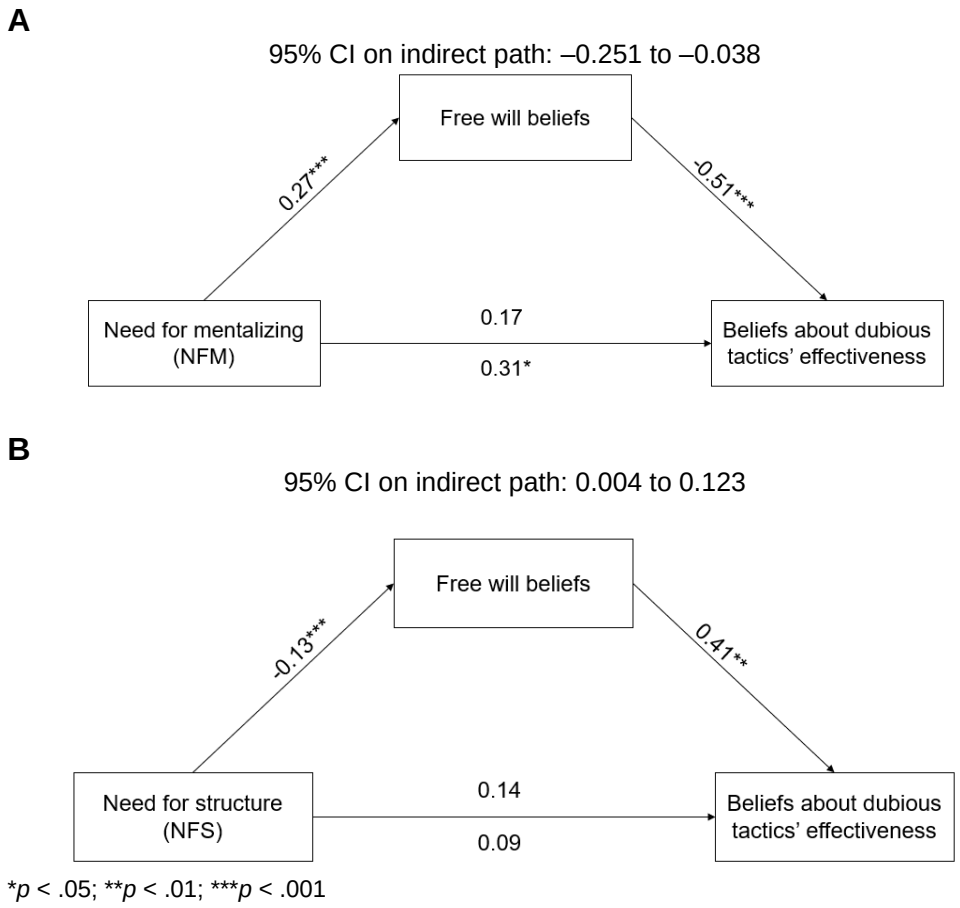
Based on prior literature, one could think that the free will beliefs should interact with condition, where the effect of concrete versus abstract is smaller for consumers high in determinism as in Nichols and Knobe (2007). However, in their studies, Nichols and Knobe measured beliefs about free will of characters in particular situations, whereas we measured more general free will beliefs that did not refer to our specific vignettes. Therefore, we did not expect (nor did we find, ps > .476) an interaction effect between condition and free will beliefs on valid or dubious tactics beliefs.

Furthermore, free will beliefs did not correlate with SMM (r(348) = .02, p = .692). Interestingly, however, free will beliefs were negatively correlated with the NFS subscale (r(348) = –.17, p = .001) but positively with the NFM subscale (r(348) = .27, p < .001) of SMM. Although this may seem puzzling, it actually is consistent with existing theorizing: Individuals high in uncertainty avoidance should favor the idea of fixedness and determinism, because such beliefs provide more closure and understanding (Kruglanski and Sheveland 2012). At the same time, individuals motivated to understand mental states have stronger perception of controllability over their actions (Pillow and Pearson 2015). However, more studies are required to support this conjecture.

How do free will beliefs relate to manipulation beliefs? A mediation analysis (PROCESS Model 4; Hayes 2013) showed that there was a significant indirect effect of NFM on dubious beliefs mediated by free will beliefs (b = –.14, 95% CI: –0.256 to –0.040), despite non-significant total effect (p = .325). Free will beliefs also partially mediated the effect of NFS on dubious beliefs (b = 0.05, 95% CI: 0.003 to 0.120), although the total effect was not significant (p = .277). Free will beliefs did not mediate the effect of NFM (CI: –.070 to .039) or NFS (CI: –.038 to .016) on valid tactics.

FIGURE D1

FREE WILL BELIEFS MEDIATION MODEL FROM STUDY 4 FOR NFM (A) AND NFS (B)



*p < .05; **p < .01; ***p < .001

Study 5: Mediation Analysis of MITE Scores

Interestingly, the Mind in the Eyes (MITE) task was better solved by women (b = 0.27, SE = 0.10, p = .007) and older people (b = 0.02, SE = 0.007, p = .001), however, there were no such effects in the RPM task scores (b_{gender} = 0.003, SE = 0.12, p = .977; b_{age} = –0.002, SE = 0.008, p = .818).

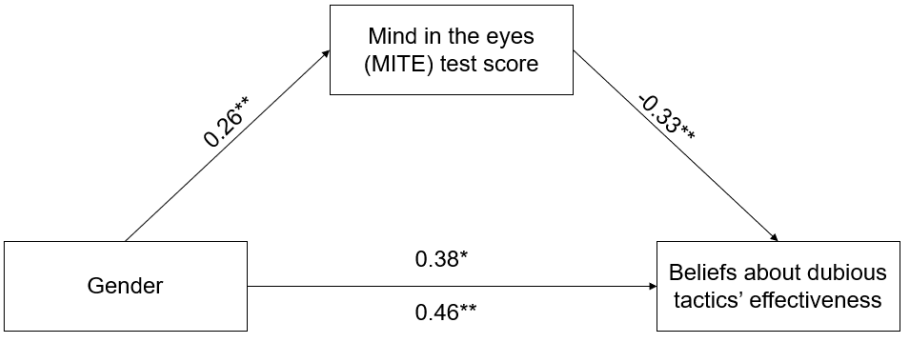
Moreover, the MITE task scores partially mediated the effect of gender on beliefs for dubious (b = –0.09, 95% CI: –0.188 to –0.011) but not valid (b = 0.002, 95% CI: –0.040 to 0.048) tactics, where women had overall higher beliefs for dubious tactics than men (b = 0.38, SE = 0.17, p = .025), but their ability to understand other people attenuated these beliefs. Together with the result that women have higher beliefs in manipulation because of their increased sense-making motivation (see internal meta-analysis), this finding might be quite interesting yet puzzling. Future studies might address this finding in more detail.

We did not find significant results in corresponding mediation testing of age and RPM scores (ps > .10).

FIGURE D2

MITE SCORE MEDIATION MODEL FROM STUDY 5

95% CI on indirect path: –0.251 to –0.038



*p < .05; **p < .01; ***p < .001

APPENDIX E

Internal Meta-Analysis of Studies 1–5

Mixed Effects Logistic Regression Results

In addition to testing our main hypotheses, we also dummy-coded manipulation beliefs to conduct a mixed effects logistic regression, where responses above the scale midpoint (0) were coded as 1. The idea was to investigate whether SMM can predict true-positive and false-negative valid tactics' effectiveness, and true-negative and false-positive dubious tactics' effectiveness.

For valid tactics, beliefs equal to 1 denote true-positive persuasion detection, while beliefs equal to 0 show false-negative persuasion detection. For dubious tactics, the reverse is true: Beliefs equal to 1 show false-positive persuasion detection, while beliefs equal to 0 mean true-negative persuasion detection. The results show that for valid persuasion detection, consumers 1 SD above the mean on SMM will correctly identify persuasion 92.2% of the time, while consumers 1 SD below the mean will do so only 90.3% of the time ($p = .014$). For dubious persuasion detection, consumers 1 SD above the mean on SMM will falsely identify dubious tactics as valid 78.7% of the time, whereas consumers 1 SD below the mean will do so only 71.3% of the time ($p < .001$). This is consistent with our predictions, stating that SMM might not only result in accurate true-positive persuasion detection (hypothesis 1a), but also in hyper-detection of dubious persuasion (hypothesis 1b).

Of course, the other way to think about this finding is that even low-SMM consumers thought that dubious tactics such as hypnosis and subliminal messaging were effective more than 70% of the time. Thus, even though SMM is linked to manipulation beliefs—implicating our proposed mechanism—being high in SMM is not a necessary condition for believing in dubious marketing manipulation.

NFM and NFS Correlation

The meta-analysis allowed us to conduct a more detailed analysis of our SMM scale. Specifically, we were interested in the relationship between our *subscales*— need for structure (NFS) and need for mentalizing (NFM). The meta-analysis revealed a modest relationship between these subscales, which were not significantly correlated in any of the individual studies ($p > .10$). For testing this, we used Metafor package in R and a random effects model (Viechtbauer 2010). We input correlation coefficients (r) from all the studies, including study 1a ($N = 1{,}463$). Overall, NFS and NFM are significantly correlated ($r = .05$, $p = .049$), although this relationship is quite small. This demonstrates that NFS and NFM might be conceptually related, but are far from identical. This finding is consistent with results from neuroscience suggesting that theory-of-mind is a domain-specific ability (Frith and Frith 2003; Saxe and Kanwisher 2003; Spunt, Satpute, and Lieberman 2011) separate from other kinds of processing such as general reasoning (Cabeza and Nyberg 2000; Van Overwalle 2010).

NFM was significantly associated with manipulation beliefs for both valid (b = 0.32, SE = 0.05, p < .001) and dubious (b = 0.32, SE = 0.09, p < .001) tactics. NFS significantly predicted beliefs for valid tactics (b = 0.19, SE = 0.04, p < .001) and marginally predicted beliefs for dubious tactics (b = 0.13, SE = 0.07, p = .048). These effect sizes are highly statistically robust given the large amount of data, with NFM having larger effects than NFS. Although NFM and NFS are conceptually related, as different kinds of motivations for seeking explanations, NFS measures structure-seeking motivations about events generally, whereas NFM measures more domain-specific motivations to understand mental states such as persuasive intentions (Falk et al. 2010). Therefore, it makes sense that NFM is a stronger predictor than NFS in a persuasion context (see tables C3 and C4 in appendix C).

Appendix 6B: Statement of Authorship

This declaration concerns the article entitled:			
Dual Process Intuitions: Consumers' Beliefs About Persuasion Processing Drive Morality of Marketing Communications			
Publication status (tick one) **Draft manuscript** [ ] **Submitted** [V] **In review** [ ] **Accepted** [ ] **Published** [ ]			
Publication details (reference)			
Copyright status (tick the appropriate statement) I hold the copyright for this material [V] Copyright is retained by the publisher, but I have been given permission to replicate the material here [ ]			
Candidate's contribution to the paper (provide details, and also indicate as a percentage)	The candidate considerably contributed to: Formulation of ideas: 80% Design of methodology: 85% Experimental work: 85% Presentation of data in journal format: 85%		
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.		
Signed	Zarema Khon [redacted]	**Date**	13/01/22

Dual Process Intuitions:

Consumers' Beliefs About Persuasion Processing Drive Morality of Marketing Communications

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Abstract

Marketers are often believed to manipulate their customers by using advertising and various promotion tactics. However, recent findings suggest that not every form of marketing persuasion is considered manipulative. How exactly do consumers decide what persuasion is credible (fair and helpful) and what persuasion is not credible (unfair and unacceptable)? Three studies show that moral credibility of persuasion depends on individuals' beliefs about information processing—*Dual Process Intuitions*. If people think persuasion is processed fast and without much effort (that is, by system 1), they consider it more immoral and less credible than persuasion thought to be processed more slowly and with much effort (that is, by system 2). This is because people find system 1 processing more automatic and leaving no room for a deliberate thinking than system 2 processing. Since system 2 persuasion is seen as more morally acceptable, there is a larger effect of system 2 persuasion on attitude change than that of system 1 (although both system 1 and system 2 persuasion can lead to a positive attitude change). These findings have both theoretical and practical implications, contributing to the literature on lay theories about persuasion, attitude change, and morality in marketing. Marketers (and potentially politicians) may find them useful to better tailor their persuasion messages, especially if their audiences usually reply to persuasion with reactance. In this case, it is important to give the audience the perception of autonomous choice and free will, which can be done via system 2 persuasion, as our research suggests.

Keywords: beliefs, dual process theory, persuasion knowledge, brand attitudes, lay theories

Firms are often believed to manipulate their customers' choices (Bullock, 2004; Kilbourne, 1999; Moog, 1990; Packard, 1980). One might criticize advertisers for using fear appeal to promote car insurance or sex appeal to promote upscale clothes because it is morally not acceptable to interfere with consumers' emotions. Yet Isaac and Grayson (2017) found that not all marketing persuasion seems manipulative to consumers, who discriminate between credible (e.g., helpful) and non-credible (e.g., manipulative) persuasion. Indeed, information leaflet about a new fitness program can be considered helpful and morally acceptable. Nonetheless, existing literature does not show *how* individuals form beliefs about persuasion credibility. We suggest that persuasion credibility, specifically its moral evaluation, can be explained by consumers' *beliefs about how the message is processed*: If consumers think persuasion aims at emotions and intuition—bypassing deliberative reasoning—they will evaluate it as more manipulative and immoral than persuasion processed rationally. This moral evaluation will drive credibility and, in turn, brand attitudes. So, understanding moral judgments of persuasion is important because it ultimately affects purchase intentions (Campbell, 1995; Kirmani & Zhu, 2007; Wentzel et al., 2010).

We make three major theoretical contributions. First, we contribute to the literature on morality in marketing (Campbell & Winterich, 2018; Grayson, 2014) by investigating *how* consumers make moral inferences about persuasion tactics. As morality-based attitudes are more resistant to persuasion and more stable over time (Krosnick & Petty, 1995), our results have direct implications for practitioners. Second, we contribute to the literature on marketing attitudes (Gaski & Etzel, 2005) by testing a new proposed relationship between dual process theory and moral evaluation of persuasion. Third, we examine how consumers' beliefs about the marketplace affect their attitudes and behaviors, contributing to the literature on lay theories about persuasion (Briñol et al., 2015; Friestad & Wright, 1995) and companies (Bhattacharjee et al., 2017; Bolton et al., 2003).

Conceptual Overview

Marketing is often believed to be charged with moral issues (Murphy & Laczniak, 1981), particularly around persuasion (Kimmel & Smith, 2001; Tybout & Zaltman, 1974). This is because consumers' lay concepts of free will rely on their ability to act on their own volition free of external influence (Bandura, 1989; Baumeister & Monroe, 2014), where autonomy provides the foundation of consumer choice (Wertenbroch et al., 2020). When consumers' free will and autonomy are threatened by companies, they become motivated to restore their freedom (Brehm, 1966).

How consumers interpret companies' influence is well-explained by the persuasion knowledge model (Friestad & Wright, 1994). It states that consumers hold beliefs about persuasion helpful for understanding if someone is trying to persuade them. However, this model does not explain how consumers decide whether marketing persuasion is morally acceptable or how lay theories of persuasion relate to beliefs about autonomy and free will. Isaac and Grayson (2017) found that persuasion knowledge leads to persuasion resistance for tactics perceived to be low-credibility, but not for tactics perceived to be high-credibility. Although they showed what makes a credible tactic (e.g., it is informative, honest, and fair), they did not examine *mechanisms* driving consumers' conclusions about credibility.

We suggest that a key dimension of consumers' moral evaluation of persuasion credibility relies on consumers' *beliefs* about information processing. Individuals usually know how persuasion is processed—primarily intuitively or primarily deliberately (Sunstein, 2016). Such lay distinction is in line with major persuasion theories—the Elaboration Likelihood Model (Petty & Cacioppo, 1986) and the Heuristic-Systematic Model (Chaiken, 1980)—stating that persuasion and attitude change may occur after either intense scrutiny or extremely superficial thinking. This is also consistent with the Dual Process Theory (Kahneman, 2011), where system 1 processing is fast and effortless, and system 2 processing

is slower and more thoughtful. As the two systems typically run in parallel, resulting in divergent conclusions, these models are usually called *dual process* models. However, persuasion aiming at fast system 1 processing is expected to leave no room for autonomy and free choice than persuasion aiming at slower system 2 processing, therefore, consumers might judge them differently (Sunstein, 2016).

Existing literature on this emotion-versus-reason concept explains well how individuals make moral conclusions about various life events (Greene, 2008; Greene et al., 2008; Haidt, 2001; Hardy, 2006). However, little is known about how individuals use their *own beliefs* about dual processes to shape their moral judgments (*cf.* Hsee et al., 2015; Johnson & Rips, 2015). Here we suggest that consumers may have a simplified version of dual process theory as their own intuitive theory—*Dual Process Intuitions* (DPI). In the DPI scale, lower scores indicate system 1 processing and higher scores indicate system 2 processing. We expect persuasion believed to be processed by system 1 (lower on the DPI scale) to be seen as more manipulative and less credible than persuasion believed to be processed by system 2 (higher on the DPI scale).

Why might this be the case? We further propose that system 1 persuasion is seen as more immoral because it is seen as more *automatic* than system 2 persuasion. When cognitive processes (e.g., stereotyping) appear quickly and effortlessly in consciousness, and the person is not aware of the processing that led to the outcome, it is considered automatic and uncontrollable (Bastick, 1982; Simon, 1992). Cognitive processes are considered non-automatic if they are intentional, effortful, and controllable and if the person is aware of them (Bargh, 1994). If persuasion is believed to violate individual autonomy and free will without one's ability to avoid it, people usually find it manipulative, having more negative attitudes towards the persuader (Wright, 1986). We suggest that consumers have strong beliefs about automatic processing, which most likely contradicts with their basic principles of autonomous

choice. Therefore, they will consider system 1 (vs. system 2) persuasion as more manipulative with beliefs about automaticity mediating this effect. Previous research (e.g., Sunstein, 2016) has made a similar assumption that system 2 persuasion leaves more room for deliberate response and room for human dignity than system 1 persuasion and, therefore, it is seen as morally more acceptable, but has not tested this mediating mechanism empirically. We hypothesize:

> **H1:** System 1 persuasion will be evaluated as more immoral compared to system 2 persuasion (a), because system 1 persuasion (compared to system 2 persuasion) is perceived as being based on more automatic processing (b).

As morality is a significant foundation for consumers' self-concepts, it is deemed an essential factor in shaping values, attitudes, and, ultimately, purchase intentions. A battery of existing research on morality in consumer behavior addresses question of morality from the position of deeper moral reasoning based on innate foundations—traditional *moral foundations* (Graham et al., 2011; Haidt, 2001). Researchers study how moral foundations affect climate-friendly consumption (Vainio & Mäkiniemi, 2016), meat consumption (De Backer & Hudders, 2015), political consumption (Watkins et al., 2016), luxury consumption (Hang et al., 2021). Although personal values and beliefs systems lie at the heart of consumers' everyday decision-making (Pitts & Woodside, 1991), little is known how moral foundations are related to moral evaluation of marketing persuasion. Here, we are interested to compare the effect sizes of our Dual Process Intuitions (DPI) and moral foundations on persuasion immorality. For instance, it is possible that consumers think that using sex appeal in advertising is immoral because it violates their broader moral principles (Gould, 1994;

LaTour & Henthorne, 1994) and not because it is processed by their system 1. We hypothesize:

> **H2:** Both moral foundations and Dual Process Intuitions (DPI) will have a significant effect on moral evaluation of marketing persuasion, with DPI having additional effect on persuasion (im)morality beyond traditional moral foundations.

Since beliefs about morality have downstream effects on attitudes (Alston, 1968; Brandt & Wetherell, 2011), we expect attitudes towards companies to be predicted by consumers' views about the morality of companies' persuasion arsenal. Our research connects morality with attitudes via credibility (Isaac & Grayson, 2017). Formally:

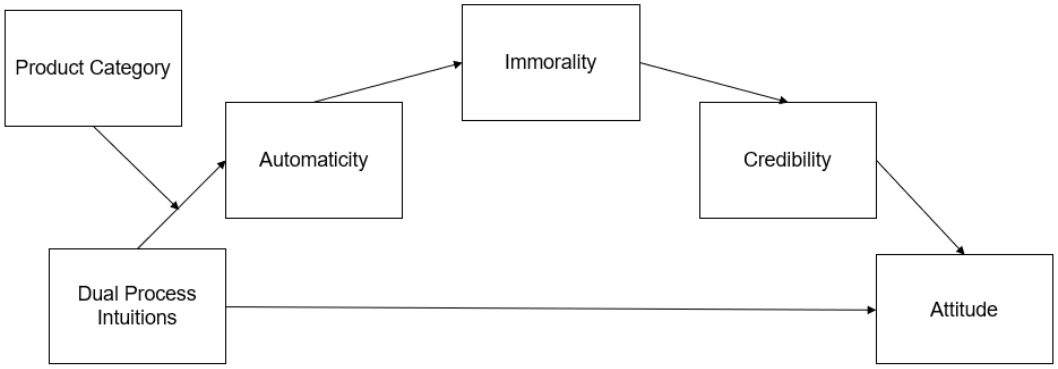
> **H3:** Persuasion immorality will drive brand attitudes (a) via persuasion credibility (b).

In addition to testing mediations, our framework will also test a moderation variable—product category. Specifically, system 1 persuasion may be evaluated as less immoral for products consumed mostly for hedonic (vs. utilitarian) benefits. This is because consumers have intuitions of whether the products are consumed for hedonic (vs. utilitarian) benefits (Khan et al., 2005), and they are simply used to the ways these products are traditionally advertised (e.g., emotions in fragrance ads compared to facts in insurance ads). Thus, we will explore whether the product is seen as more hedonic (primarily affectively driven and based on sensory or experiential pleasure) or utilitarian (more cognitively driven and based on functional and instrumental goals) (Botti & McGill, 2011) can potentially moderate the effect of DPI on ad immorality. As increase in our DPI scale is associated with increase in deliberative processing, we hypothesize:

H4: The effect of DPI on attitude change will be greater in products consumed primarily for utilitarian purposes than in products consumed primarily for hedonic purposes.

All four hypotheses are summarized in our conceptual model (Figure 1). Although both system 1 and system 2 persuasion types might be effective in their own way and eventually lead to positive attitudes, we suggest that this effect will be *differential*. We predict the following serial mediation: perception of persuasion being processed by system 1 (vs. system 2) will be evaluated as more automatic leading to its increased immorality. This immorality evaluation will, therefore, make it seem less credible, resulting in less positive attitudes. At the same time, perception of persuasion being processed by system 2 (vs. system 1) will be seen less automatic, therefore, considered more moral and more credible, leading to more positive attitudes. Although both system 1 and system 2 might bolster attitude change for reasons not covered in our framework (e.g., system 1 can boost consumers' mood), system 2 persuasion will be preferred by consumers over system 1 because of its positive moral evaluation. Importantly, the effect of DPI on attitude change is expected to be more substantial for utilitarian (vs. hedonic) products.

Figure 1. *Conceptual framework.*



In addition to testing our framework, we also test two theoretically derived individual difference moderators that might interact with our variables. First, there is a possibility that consumers who prefer to rely on their intuition (vs. rational thinking) when processing information do not think that system 1 persuasion restricts their autonomous choice, so that the use of system 1 persuasion by a company would not seem immoral to them.

Second, we speculate that consumers who have a pronounced desire to make sense of life events (vs. consumers with moderate desire) may believe in the effectiveness of both system 1 and system 2 persuasion more, as these consumers tend to exaggerate the effectiveness of marketing tactics in general (Khon et al., 2020).

Overview of Studies

We test our framework in three studies. Study 1 examines whether system 1 persuasion is seen as more immoral, and system 2 persuasion is seen as less immoral (H1a). Study 2 tests whether that Dual Process Intuitions (DPI) have an over-and-above effect on persuasion immorality (H2). Study 3 tests the mechanism of persuasion immorality on attitudes (H3a) via credibility (H3b). It also investigates whether automaticity explains the effect of DPI on persuasion immorality (H1b), and whether product category moderates the effect of DPI on attitude change (H4).

Study 1

Study 1 provided the initial test of H1a that system 1 marketing persuasion seem more immoral to consumers than system 2 marketing persuasion.

Method

Participants

In all studies, participants were recruited from Amazon Mechanical Turk. We recruited 60 participants (53% female, M_{age} = 40.0) for Study 1 (the within-subjects design with multiple items and using multi-level models for analysis allowed us to recruit a smaller sample without losing statistical power). Participants (N = 16) were excluded from analysis if they failed more than one-third of the recognition memory attention check.

Procedure

Participants read descriptions of 24 marketing tactics adapted from Isaac and Grayson (2017) and Mogaji and Danbury (2017) (e.g., "A company pays a celebrity to endorse its product"; see Web Appendix A for all 24 tactics). For each tactic, participants rated their agreement with the six statements (one item removed; see factor loading in Web Appendix B) describing how the tactic is processed (2 items for system 1, α = .95, "This tactic relies on emotion"; 3 items for system 2, α = .99, "This tactic relies on reason") and three questions measuring immorality of each tactic (α = .98; "I feel manipulated when I encounter this tactic") on 7-point scales.

Results and Discussion

First, the Principal Component Analysis showed that system 1 and system 2 belong to two different components (all three studies replicate this finding; see Web Appendix B). Averaging across each tactic, perception of system 1 processing is negatively correlated with perception of system 2 processing ($r(22) = –.89$, $p < .001$): Participants see system 1 and 2 processing as strongly opposing. These lay beliefs replicate the idea that automatic emotional responses and more controlled cognitive responses, in some cases, are mutually competitive (Chaiken & Trope, 1999; Greene et al., 2004; Greene et al., 2001; Lieberman et al., 2002).

To test H1 that consumers' intuitions about persuasion processing determine moral evaluation, we reverse-coded beliefs about system 1 processing and combined the responses with beliefs about system 2 processing. This allowed us to create a new scale—*Dual Process Intuitions* (5 items, $\alpha = .97$), where higher values indicate beliefs about system 2 processing ($M = 3.61$, $SD = 1.23$).

The regression results were obtained from multi-level models (Bates et al., 2015), with participants and tactics as random factors. The multi-level regression in Study 1 showed that perceptions of immorality significantly decrease when the DPI increases ($b = –0.41$, $SE = 0.04$, $p < .001$), i.e., when the tactic is seen to be processed more by system 2 rather than system 1 (see Web Appendix C for a full model description). This is consistent with H1a.

Furthermore, we regressed immorality on each of the dual process dimensions (system 1 and system 2 were separately input as fixed factors; see Web Appendix C). Higher perception of system 1 processing increased immorality of the tactics ($b = 0.09$, $SE = 0.03$, $p = .004$), while higher perception of system 2 processing decreased immorality of the tactics ($b = –0.47$, $SE = 0.03$, $p < .001$).

Overall, the study provided initial support to our predictions that morality of marketing tactics is related to consumers' intuitions about how these tactics are processed—either through system 1 or system 2—and that these processing paths are negatively correlated in consumers' understanding.

Study 2

Study 1 showed that consumers indeed have intuitions about how marketing communications are processed and that it determines their moral evaluation of these communications. Study 2 further examined the effect of how consumers think the stimuli are

processed—via system 1 or system 2—on consumers' *attitudes* towards brands (H3a), using video ads from real companies.

In addition to testing the relationship between dual-process intuitions and perceived morality (H1a) and attitude change (H3a), the study also examined how much variance in advertising immorality is explained by Dual Process Intuitions beyond traditional moral foundations (Graham et al., 2011; Haidt, 2001) (H2).

Method

Participants

We recruited 125 participants (51.7% female, M_{age} = 42.3) from Amazon Mechanical Turk for this study (although G*Power software indicated that we need to recruit at least 134 participants for this study, using multi-level model instead of linear regression allowed us to recruit smaller sample without losing statistical power). Participants (N = 7) were excluded following the procedure used in Study 1. In addition, a factual check question appeared after each item and a participant's response for that item was removed if the question was answered incorrectly (18 responses total from a total of 17 participants).

Procedure

Participants each watched 5 ads randomly selected from a larger set of 25 ads (see Web Appendix A for all materials used). Two online collections of video advertisements (in English or with English subtitles, approximately 30 seconds of length) were selected (Dua, 2019; Mulcahy, 2019). For each ad, participants indicated their general attitude toward the company before and after watching the video ("What is your attitude toward [company name]?") on a scale anchored at –5 ("Very negative") and 5 ("Very positive"). Then, they answered the dual process and immorality questions used in Study 1. Finally, participants

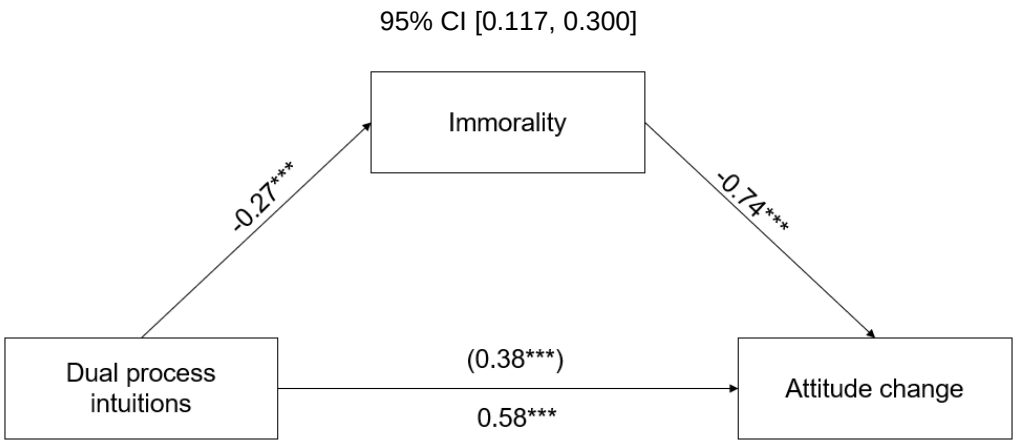
rated each advertising on items adapted from the Moral Foundations Scale (Graham et al., 2011) on a 7-point scale (see Web Appendix B for all items).

Results and Discussion

As in Study 1, we used multi-level models (Bates et al., 2015), where participants and ads were treated as random factors. First, we regressed immorality on DPI, which decreased ad immorality (b = –0.31, SE = 0.05, p < .001), consistent with H1a.

Next, we regressed attitude change (the difference between attitude before and after watching an ad) on DPI. The results showed that DPI increased attitude change (b = 0.45, SE = 0.09, p < .001), meaning that the perception that the ad is processed more by system 2 can positively affect attitudes towards the companies. Importantly, the effect of DPI on attitude change was mediated by ad immorality (b = 0.20, SE = 0.05, 95% CI [0.117, 0.300]) (PROCESS Model 4; Hayes, 2013), because DPI decreased ad immorality (b = –0.27, SE = 0.05, p < .001; Figure 2).

Figure 2. *Mediation Analysis with DPI from Study 2.*

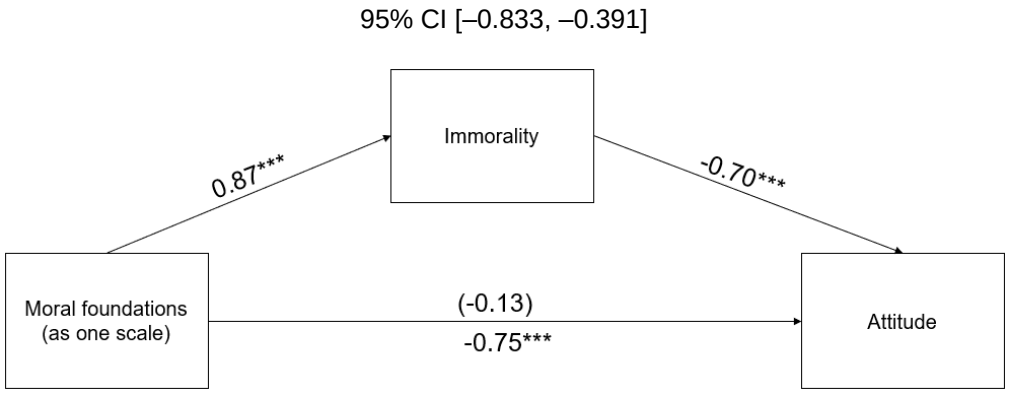


*p < .05; **p < .01; ***p < .001

Separately, we regressed immorality on system 1 and system 2 (in distinct models): This time only system 2 processing was a significant predictor (b = –0.31, SE = 0.04, p < .001) but not system 1 processing (b = 0.02, SE = 0.04, p = .553), meaning that system 1 perception does not always lead to considering ads immoral as it did in Study 1. System 2 also predicted attitude change (b = 0.49, SE = 0.06, p < .001) but not system 1 (b = 0.07, SE = 0.07, p = .306). Only the effect of system 2 on attitude change was mediated by ad immorality (b = 0.16, SE = 0.03, 95% CI [0.09, 0.23]), showing that system 1 has no effect on attitude change in this study.

Then, we tested how moral foundations relate to immorality and attitude change. The mixed-effect model showed that immorality was predicted by harm (b = 0.09, SE = 0.04, p = .021), fairness (b = 0.21, SE = 0.05, p < .001), authority (b = 0.18, SE = 0.04, p < .001), and purity (b = 0.40, SE = 0.04, p < .001), but not loyalty (b = –0.02, SE = 0.04, p = .678). Attitude change was predicted by fairness (b = –0.25, SE = 0.12, p = .037), authority (b = –0.27, SE = 0.10, p = .010), and purity (b = –0.28, SE = 0.10, p = .007). However, the first-order PCA (Web Appendix B) showed that all ten items of the five moral pairs fall into only two components, as they are quite highly correlated with each other (r(23) > .51, ps < .010). To try exploratory mediation analysis (Figure 3), we treated them as one scale (10 items, α = .96) because of the high correlation. This bigger scale significantly decreased attitude change (b = –0.74, SE = 0.07, p < .001) mediated by immorality (b = –0.62, SE = 0.11, 95% CI [–0.833, –0.391]). Thus, both DPI and moral foundations could predict attitude change via immorality (in separate models). However, those two constructs —DPI and moral foundations—are quite different, as shown by their marginal correlation (r(23) = –.38, p = .065).

Figure 3. *Mediation Analysis with Moral Foundations from Study 2*.



*p < .05; **p < .01; ***p < .001

Furthermore, we tested whether DPI has an effect on immorality over-and-above traditional moral foundations (H2). When immorality is regressed on DPI and each moral pair, DPI (b = –0.13, SE = 0.03, p < .001) has a significant effect on immorality, distinct from harm (b = 0.08, SE = 0.04, p = .033), fairness (b = 0.19, SE = 0.05, p < .001), authority (b = 0.18, SE = 0.04, p < .001), and purity (b = 0.40, SE = 0.04, p < .001) with loyalty (b = –0.02, SE = 0.04, p = .688) non-significant. When attitude change is regressed on DPI and each moral pair, DPI (b = 0.35, SE = 0.09, p < .001) has the *largest* effect, followed by purity (b = –0.28, SE = 0.10, p = .006), authority (b = –0.24, SE = 0.10, p = .002), and fairness (b = –0.22, SE = 0.11, p = .005), with harm (b = 0.00, SE = 0.09, p = .999) and loyalty (b = 0.12, SE = 0.11, p = .251) non-significant. These results are consistent with H2.

Finally, we tested whether we replicated the corresponding correlations from Study 1. Not quite: System 2 and system 1 were not correlated in this study, $r(23)$ = –0.30, p = .145 (although they belonged to two different components; see Web Appendix B for PCA). This might be because system 1 and system 2 processing are *not always* negatively correlated (Haidt, 2001; Kahneman, 2003, 2011).

Overall, this study supported our predictions that advertising considered processed by system 2 is seen as less immoral and, therefore, has a larger positive attitude change. In addition, it showed that DPI has a larger effect on immorality and attitude change than some of the traditional moral foundations.

Study 3

So far, our results showed that DPI can significantly predict not only immorality of marketing communications, but also attitude change towards companies. Study 3 will test the effect of DPI on attitude change via automaticity (H1b) and credibility (H3b), and whether this effect is differential in utilitarian versus hedonic consumption (H4), examining the relationship of the main elements in our framework.

Method

Participants

G*Power software showed that we need at least 328 participants for the analysis of the two conditions at power .95 and with effect at .4 (small to medium). We recruited 400 participants (48.3% female, M_{age} = 44.8) from Amazon Mechanical Turk. Participants (N = 27) were excluded from analysis if they either (i) answered more than one-third of the first check questions incorrectly (a recognition memory check) or (ii) failed the second check ("please select '2'" in the scale measuring individual differences).

Procedures

The study used a 2 (Framing: hedonic, utilitarian) by 2 (Advertising: celebrity endorsement, information) between-subjects design. In hedonic framing condition, participants read a description of Omega (company) and Omega Seamaster watch (product) stressing emotional benefits (e.g., "Omega Seamaster is bold yet elegant as the modern

gentleman"). In utilitarian framing condition, participants read a description of the same company and product but stressing functional benefits ("Omega uses 316L stainless steel, which is certainly the most conventional of watchmaking materials for outer craftsmanship and offers strength and affordability"). After reading about the company and the product, participants encountered a print advertising in a magazine. In celebrity endorsement condition, participants saw advertising of Omega Seamaster watch featuring James Bond (actor Daniel Craig) wearing the watch with a statement "James Bond. My choice". In information condition, participants saw advertising with a large picture of the same watch and a paragraph about improved mechanism and durability (see Web Appendix A for full stimuli). We used this advertising manipulation based on the results of Study 1 (see Web Appendix A for the list of tactics with means for system 1 and system 2).

Next, participants evaluated the product ("How would encountering this advertising change your overall evaluation of the advertised product—Omega Seamaster watch?") and the company ("How would encountering this advertising change your overall evaluation of the company Omega?") on a scale from (–5) "Make it more negative" to (5) "Make it more positive". For each ad, they answered the dual process and immorality questions used in Study 1, followed by the Moral Foundations Scale used in Study 2. In addition, participants also filled out some other measurements discussed below.

Manipulation Checks. To check if our *framing manipulation* worked, participants answered this question "Would you rate the advertised watch as primarily a functional product or an enjoyable product?" adapted from Kempf (1999) on a scale from (1) "Primarily for functional use" to (7) "Primarily for enjoyable use". The DPI Scale was used to check if our *advertising manipulation* worked.

Ad Credibility. Credibility (6 items, α = .90) and non-credibility (6 items, α = .89) of the ads was adopted from Isaac and Grayson (2017), as we speculated that immorality (which is predicted by DPI) is one of the factors driving credibility of advertising (H3b).

Automaticity. Participants rated 3 items for automaticity (α = .76), built on Bargh's (1994) theoretical framework on automaticity. (We also measured effort, which was excluded from the analysis based on the results of the PCA; see Web Appendix B.)

Individual Difference Scales. For exploratory purposes, participants filled out the Rational-Experiential Inventory (REI; Epstein et al., 1996) and Sense-Making Motivation scales (SMM; 10 items, α = .78; Khon et al., 2020). REI (which consists of Need for Cognition [NFC; 5 items, α = .89] and Faith in Intuition [FII; 5 items, α = .93]) measures intuitive-experiential and analytical-rational thinking styles, while SMM measures differences in motivation to understand events and people in one's environment.

Results and Discussion

Study 3 supports our main hypotheses. It revealed that system 1 persuasion is considered more immoral because it is perceived as relying on more automatic processing (H1b). Further, it showed that system 2 persuasion has a larger positive effect on attitude change than system 1 persuasion (although both are positive; H3a), because it is considered not only less immoral (H1a), but also more credible (H3b).

Main Variables. First, we checked how system 1 and system 2 relate to each other at the inter-subject level. (Note in Studies 1–2, these correlations were at the inter-item level, i.e., for each tactic or advertising.) System 1 and system 2 were negatively correlated ($r(370) = -.27$, $p < .001$) as in Study 1 (but not Study 2). As DPI once again formed a consistent scale, we averaged across system 1 and system 2. Second, automaticity score was reversed for the analysis, where higher values correspond to more automatic processing (e.g., "unable to

control"). Third, credibility was computed following the procedure from Isaac and Grayson (2017), where the credibility scores were significantly different between conditions: $M_{celeb.}$ = 7.44, *SD* = 6.02 vs. $M_{inform.}$ = 11.09, *SD* = 5.83; *t*(371) = –5.95, *p* < .001, Cohen's *d* = –0.62 (see Web Appendix B for computation details). This means that both ads are seen as credible with information being more credible than celebrity endorsement. Finally, attitudes towards company and product were significantly correlated (*r*(371) = .89, *p* < .001), so we treated the average of the two items as *attitude*.

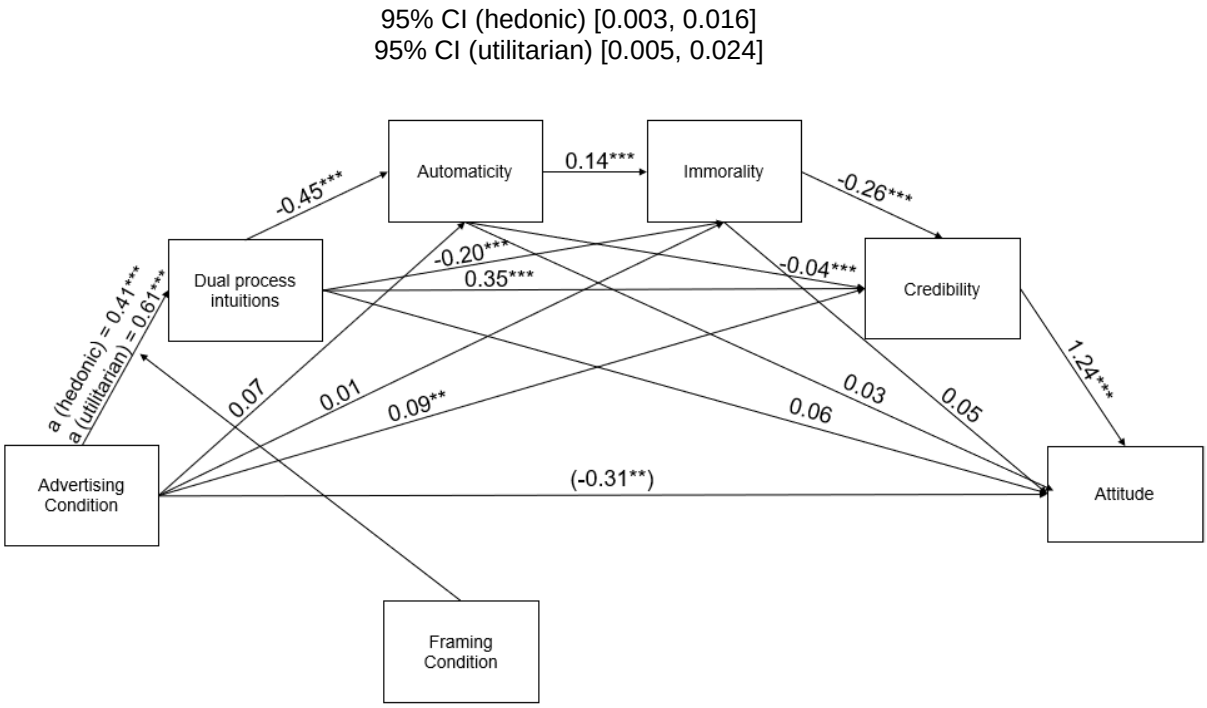
Manipulation Checks. In this study, both framing and advertising manipulations worked: Participants evaluated the watch as a marginally more enjoyable product in the hedonic (*M* = 4.26, *SD* = 1.63) than the utilitarian (*M* = 3.94, *SD* = 1.72; *t*(371) = –1.83, *p* = .068, Cohen's *d* = –0.19) framing condition. DPI (*M* = 3.58, *SD* = 1.04) was significantly higher in information (*M* = 4.08, *SD* = 0.99) than celebrity endorsement (*M* = 3.07, *SD* = 0.83; *t*(370) = –10.68, *p* < .001, Cohen's *d* = –1.11) condition. Therefore, the advertising manipulation worked as well.

Interaction Effects on Main Variables. There were significant simple main effects of advertising manipulation on DPI (*F*(1, 371) = 118.99, *p* < .001), immorality (*F*(1, 372) = 4.90, *p* = .027), credibility (*F*(1, 372) = 35.94, *p* < .001), but not on automaticity (*F*(1, 372) = 2.61, *p* = .107), or attitude change (*F*(1, 372) = 0.96, *p* = .328). There was a significant simple main effect of framing manipulation on DPI (*F*(1, 371) = 7.35, *p* = .007), marginal on immorality (*F*(1, 372) = 2.85, *p* = .092), but not on automaticity (*F*(1, 372) = 1.56, *p* = .213), credibility (*F*(1, 372) = 1.45, *p* = .229), or attitude change (*F*(1, 372) = 0.10, *p* = .758). Finally, there was a significant interaction effect between advertising and framing manipulations on DPI (*F*(1, 371) = 4.71, *p* = .031), marginal on credibility (*F*(1, 372) = 2.74, *p* = .099), but not on automaticity (*F*(1, 372) = 0.14, *p* = .712), immorality (*F*(1, 372) = 0.62, *p* = .431), or attitude change (*F*(1, 372) = 1.92, *p* = .167). Non-significant interactions on

main dependent variables show that our results mainly generalize across both hedonic and utilitarian products (except that the effect of DPI was higher in utilitarian (b = 0.61, SE = 0.07, p < .001) than in hedonic framing condition (b = 0.41, SE = 0.07, p < .001), which is expected given manipulation check results).

Moderated Mediation. Ultimately, to see how all measurements are related to each other and what effect our advertising manipulation has on attitude, we conducted a moderated mediation analysis (PROCESS, Model 83; Hayes, 2013). Although there is no effect of advertising manipulation on attitude (b = 0.09, SE = 0.10, p = .347), there is a significant indirect effect of advertising manipulation on attitude via the path DPI → automaticity → immorality → credibility ($b_{hedonic}$ = 0.01, SE = 0.003, 95% CI [0.003, 0.016]; $b_{utilitarian}$ = 0.01, SE = 0.005, 95% CI [0.005, 0.024]; see Figure 3). This effect was differential between hedonic and utilitarian conditions, because of the significant interaction on path a (advertising condition → DPI; F(1, 368) = 4.71, p = .031), supporting H4.

Figure 3. *Moderated Mediation from Study 3.*



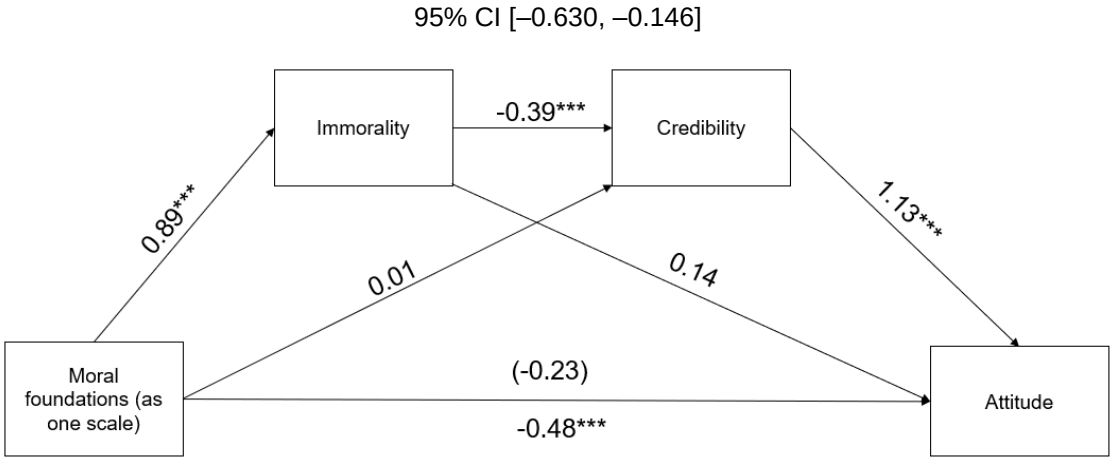
*p < .05; **p < .01; ***p < .001
In advertising condition, “celebrity endorsement ad” was coded as (-1), “information ad” was coded as (1).

Moral Foundations. As in Study 2, we checked how moral foundations are related to immorality and attitude change compared to DPI. In this study, a regression with five pairs (without DPI) showed that only fairness (other pairs not significant, ps > .273) could predict immorality (b = 0.37, SE = 0.06, p < .001) and attitude change (b = –0.35, SE = 0.15, p = .019). However, there was high collinearity in these models (VIFs ≥ 2.27; see Web Appendix C).

The PCA showed that all five moral pairs fall into one component (see Web Appendix B), as they were again very highly correlated with each other (r(371) > .43, ps < .001), as in Study 2. Therefore, for the mediation, we again treated them as one scale (10 items, α = .95). As in Study 2, this moral foundations scale significantly decreased attitude change (b = –0.48, SE = 0.13, p < .001), mediated by immorality and credibility in a serial mediation (b = –

0.38, *SE* = 0.13, 95% CI [–0.630, –0.146]; PROCESS, Model 6; Hayes, 2013; Figure 4). Thus, both DPI and moral foundations predict attitude change via immorality and credibility. However, DPI and moral foundation are quite different constructs, as shown by their modest correlation ($r(370) = –.10$, $p = .047$).

Figure 4. *Mediation Analysis for Moral Foundations from Study 3.*



*p < .05; **p < .01; ***p < .001

Additionally, the results provided further support to H2 and generally replicated Study 2: When immorality is regressed on DPI and each moral pair, only DPI ($b = –0.17$, $SE = 0.04$, $p < .001$) and fairness ($b = 0.29$, $SE = 0.06$, $p < .001$; other pairs, ps ≥ .099) had a significant effect on immorality. In a similar regression to predict attitude, only DPI had a significant effect on attitude ($b = 0.44$, $SE = 0.09$, $p < .001$; all moral pairs, ps ≥ .331).

Individual differences. Finally, we tested if there is any moderation effect of individual differences on ad immorality and attitude, which can be interesting for practitioners. The results showed that the sense-making motivation (SMM) has a significant interaction effect with DPI ($F(1, 368) = 6.45$, $p = .012$). In consumers 1 SD above the mean on SMM scale, the effect of DPI on immorality is significant ($b = –0.35$, $SE = 0.06$, $p < .001$), whereas in consumers 1 SD below the mean, this effect is marginal ($b = –0.13$, $SE = 0.07$, $p = .063$). This

result is consistent with Khon, Johnson, and Hang (2020), suggesting that consumers with the pronounced desire to understand their environment—SMM—have a higher tendency to interpret persuasion attempts than consumers with lower SMM, and, therefore, they might ascribe more effectiveness to persuasion, including its effect on immorality. There is no significant interaction between SMM and attitude change ($p = .208$).

We also speculated that Need for Cognition (NFC) and Faith in Intuition (FII) could moderate the effect of DPI on immorality. However, neither NFC nor FII moderated the effect of DPI on either immorality or attitude change ($p > .169$). (See Web Appendix D for more detailed analyses with system 1 and system 2 as separate factors.)

Discussion. Study 3 tested our conceptual model, providing support to several main predictions. It showed that system 1 advertising, such as celebrity endorsement, is indeed considered more automatic than system 2 advertising, such as providing more information (H1b). Attitude change can positively be affected by both system 1 and system 2, but our conceptual model shows that system 2 has a *larger* positive effect on attitudes (H3a) because it is seen as less immoral (H1a) and, therefore, more credible (H3b). The study also showed that the effect of DPI on attitude change is differential when product is perceived for utilitarian (vs. hedonic) purposes (H4).

In Study 2, we did not see a significant effect of system 1 on attitude change via immorality. This might be because system 1 advertising does not always seem immoral to consumers. In Study 3, after we had included automaticity in our mediation, we found that system 1 was considered to rely on automatic processing, and that's why it was seen as immoral and less credible, lowering attitude change via this path.

Replicating our previous results, Study 3 also showed that DPI have a differential effect on ad immorality, credibility, and attitude change than some traditional moral foundations (H2).

General Discussion

Ever since the advertising revolution in the 1960s, debate has raged about the best kind of persuasion messaging for building profitable brands. Some marketers argue that facts and rational arguments sell products and services best; others—that brands need to inspire strong emotional responses in consumers to create true engagement. Some practitioners insist that the latter is the best option for the companies. For instance, Pringle and Field (2008) in their book *Brand Immortality* argue that emotional campaigns are almost twice as likely to generate large profits as rational ones, with campaigns that use facts as well as emotions in equal measure fall somewhere between the two. The authors conducted an analysis on 30 years of the UK's Institute of Practitioners in Advertising Effectiveness Awards, and concluded that "emotional appeal is better than rational appeal" (Pringle, 2009).

Our research, however, shows that things are more complicated. Although the effect of emotional appeal ads might seem appealing to marketers, there are other reasons why rational appeal should be preferred. As we have found, although both "soft sell" (usually based on system 1 advertising) and "hard sell" (usually based on system 2 advertising) have positive impact on brand attitudes, only system 2 communication is explicitly preferred by consumers because they consider it less immoral and more credible. The reason is in the way how they think this communication is processed—their own beliefs, or *dual process intuitions*.

Theoretical Contributions

First, this research contributes to the literature on morality in marketing (Campbell & Winterich, 2018; Grayson, 2014) by investigating *how* consumers make inferences about persuasion tactics in terms of morality and what makes some tactics more credible than the others. One factor predicting consumer choice rests in consumers' moral foundations (Graham et al., 2011; Haidt, 2001)—if a persuasion tactic violates their moral principles,

consumers may counteract this persuasion attempt (Brehm,1966; Wright, 1986), boycotting the company (Campbell & Kirmani, 2000). We suggested that there is another important aspect of moral evaluation of persuasion tactics, which lies in consumers' beliefs about how persuasion is processed—dual process intuitions.

Second, we contribute to the literature on attitudes (Gaski & Etzel, 2005; Petty & Wegener, 1998) by testing a new relationship between dual process theory and attitude change via moral evaluation of persuasion. In the realm of communication and persuasion, our research reveals that consumers' understanding of what type of processing is induced by various marketing tactics might explain their moral evaluation of these tactics and attitudes towards companies. We suggest that consumers' own beliefs about how they process persuasion plays a crucial role in evaluation of morality of persuasion and, therefore, determining brand attitudes.

Third, we examine how consumers' beliefs about persuasion processing affect their attitudes and behaviors, contributing to the literature on lay theories about persuasion (Briñol, Rucker, & Petty, 2015; Friestad & Wright, 1995) and companies (Bhattacharjee, Dana, & Baron, 2017; Bolton, Warlop, & Alba, 2003) by investigating *what* determines persuasion credibility. Existing research (Sunstein, 2016) showed that individuals' beliefs about dual process models could predict their preferences for different types of nudges to promote social welfare. The results are quite in line with ours. However, in Sunstein (2016), the preference for system 2 was not fixed: After participants had been told that system 1 nudges are more effective because they require much fewer processing resources, they preferred system 1 nudges over system 2. Sunstein (2016) explains that if individuals appreciate social welfare in the first place, they are more likely to prefer system 1 nudges, whereas if promoting autonomy is most important for them, system 2 nudges will most likely be preferred. In the context of *marketing* persuasion, however, consumers are mostly concerned about their *own*

autonomous decision-making rather than social (or perhaps companies') welfare (Bhattacharjee et al., 2017; Thompson, 1993), and that is why their preference for system 2 persuasion is more stable in the marketing than in the policymaking context.

Practical Implications

Since morality-based attitudes are considered most stable over time (Krosnick & Petty, 1995), our results have practical implication for marketers and advertisers (and perhaps politicians). Our finding that individuals prefer system 2 persuasion over system 1 persuasion can help practitioners tailor their persuasion messages especially if their audiences are very sensitive to any external influence. Our research suggests that in this case, it is important to give them the perception of deliberate processing, which can be done via system 2 persuasion tactics.

Moreover, our research shows that the effect of dual process intuitions on both moral evaluations and attitudes is different for hedonic and utilitarian products, where consumers' intuitions in utilitarian products are more associated with system 2 (vs. system 1) advertising compared to hedonic products. This means that system 2 (vs. system 1) advertising has a larger effect on brand attitudes for products traditionally advertised using rational appeal, whereas system 1 (vs. system 2) advertising has a smaller (although positive) effect in utilitarian consumption. Importantly, our research showed that the same product can be framed as more utilitarian or more hedonic. Therefore, marketers should consider these findings when selecting advertising for products consumed for emotional or functional purposes.

We have also identified how consumers are different in their beliefs about ad immorality. Thus, individual differences in sense-making motivation can moderate the effect of dual process intuitions on immorality beliefs (but not on attitude change). Practitioners can use

these findings for segmenting customers and selective customization of advertising for each group of customers, when moral evaluation of their persuasion messaging is critical.

Limitations and Future Research

The main limitation that we have identified is that system 1 and system 2 beliefs are not always negatively correlated, meaning that this distinction is not always mutually exclusive in consumers' understanding. Other issues that remain unclear are related to the PCA (Web Appendix B), including low KMO scores and high cross-loadings in Studies 2–3, which makes the use of DPI scale as a one-component scale uncertain (despite high reliability of the scale in each study). In reality, although automatic emotional responses and more controlled cognitive responses are usually seen as competitive in human cognition (Greene et al., 2001, Greene et al., 2004), they are more often seen as a synthesis in the form of dual processes (Chaiken & Trope, 1999; Haidt, 2001; Kahneman, 2003). So, future research might shed more light on boundary conditions showing when beliefs about system 1 and system 2 processing are more competitive.

Furthermore, researchers might want to test more mediating mechanisms of what explains the effect of system 2 (vs. system 1) on immorality and attitude change. For instance, consumers may feel less responsible for their choices after watching a more system 1 ad, instead attributing more agency to the marketer. In other words, if consumers think that the ad that they watched caused them to buy a product they do not like, are they more likely to blame themselves for their choice if the original advertising was based on system 2? We think perceived responsibility for the choice might shed light on this issue.

Finally, even though we found quite a robust effect of dual process intuitions on various marketing tactics and advertising (TV and print), future research might examine these effects in more contexts (e.g., in social media marketing). Possibly consumers' beliefs about

manipulativeness of system 1 (and even system 2) advertising will overlap with their ideas about undermined autonomous choice and conspiracist views about advertising, because advertising is usually considered more targeted (and, therefore, immoral?) in social media.

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Web Appendix

Web Appendix consists of four parts: Appendix A (Methodological Details), Appendix B (Scale Items), Appendix C (Main Results Details), and Appendix D (Additional Results Details).

Web Appendix A

Methodological Details

Table A1. *Stimuli and Mean Values from Study 1.*

	Tactic	System 1		System 2		Immorality	
		Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
1	A company uses advertising to frighten customers into buying products.	5.84	1.32	2.11	1.27	5.77	1.24
2	A company promises to give back to society in their advertising.	5.70	0.98	3.98	1.64	2.87	1.41
3	A company's advertising describes how it uses eco-friendly practices	4.74	1.34	5.36	1.24	2.13	0.93
4	A company pays a celebrity to endorse its product.	5.68	1.07	2.68	1.37	3.41	1.46
5	A company compares its product with that of competitors.	3.66	1.63	5.45	1.06	2.58	1.42
6	A company advertises price discounts.	4.31	1.37	5.11	1.09	2.20	1.14
7	A company promotes products with long-term warranty.	3.75	1.78	5.63	0.95	1.95	1.04
8	A company pays actors to pretend to be end-users providing positive feedback in advertising.	4.82	1.44	2.40	1.21	5.30	1.64
9	A company uses advertising to make fun of their competitor.	5.19	1.26	2.66	1.25	4.37	1.49
10	A company uses advertising with fun visuals to entertain customers.	5.63	1.00	3.19	1.67	2.43	1.38
11	A company provides detailed information about their products in their advertising.	2.90	1.81	6.48	0.68	1.39	0.70
12	A company offers a free item in their advertising.	5.18	1.13	4.20	1.33	2.69	1.18
13	A company uses advertising to tell a creative story that is unrelated to the product.	5.48	1.30	2.59	1.42	3.45	1.56
14	A company uses advertising to tell a relevant story about how the product is useful.	4.25	1.36	5.55	0.97	2.05	1.00
15	A company uses an expert to explain the advantage of their product in their advertising.	3.84	1.68	5.82	0.94	2.21	1.12

16	A company uses advertising to describe an issue that could be solved by their product.	3.43	1.57	6.05	0.87	1.82	0.96
17	A company shows the ranking of their product in their advertising.	3.63	1.49	5.52	1.00	2.17	1.12
18	A company pays studios to place their product in Hollywood movies.	5.30	1.09	2.92	1.62	3.75	1.52
19	A company uses a popular song in their advertising to associate the product with that song.	5.70	1.12	2.63	1.37	2.62	1.36
20	A company uses advertising to make an analogy to compare the product to an unrelated item (e.g., a precious jewel).	5.23	1.15	2.99	1.49	3.27	1.57
21	A company's advertising repeatedly emphasizes that a discount lasts "for a limited time only."	5.56	1.05	3.56	1.51	3.73	1.57
22	A company's advertising uses hidden messages to influence consumers' choices without their awareness.	5.40	1.30	2.41	1.50	5.69	1.46
23	A company's advertising uses sex appeal by featuring very attractive models using the product.	5.91	0.98	2.21	1.46	4.27	1.61
24	A company's advertising tells a sad story to show the downside of not buying the product.	6.07	0.86	2.83	1.21	4.59	1.66
	Average	4.88		3.93		3.20	
	SD	0.93		1.47		1.26	
	Max	6.07		6.48		5.77	
	Min	2.90		2.11		1.39	

Table A2. *Stimuli and Mean Values from Study 2.*

Each participant watched 5 randomly presented videos out of 25 available in this Study. All 25 videos can be found at this link: https://osf.io/kdqp3/

	Company	System 1		System 2		Immorality		Attitude change	
		Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
1	Burger King	4.61	1.23	3.33	1.17	2.07	0.91	-0.28	0.81
2	MinMobile	4.80	1.43	3.97	1.46	2.92	1.57	0.02	1.81
3	Mountain Dew	5.00	0.95	3.74	1.21	1.87	0.86	0.42	0.85
4	Netflix	5.45	0.98	4.48	1.42	3.39	2.10	-1.51	3.46
5	Expensify	4.74	1.08	4.19	1.38	2.49	1.20	0.80	1.91
6	M&M's	5.05	0.92	3.77	1.02	2.29	0.93	0.04	1.24
7	Aldi	5.52	0.80	4.76	1.21	1.57	0.82	0.85	1.50
8	BON & VIV Spiked Seltzer	4.29	1.51	3.91	1.17	1.32	0.32	0.79	1.41
9	Burger King	4.65	1.48	4.59	1.34	3.19	1.36	-1.27	2.18
10	Doritos	4.98	1.23	3.89	1.13	2.19	1.16	-0.57	1.69
11	Burger King	5.00	1.05	3.55	1.29	2.56	1.20	-0.29	2.10
12	Ohio Department of Health	4.30	1.60	5.61	1.20	1.98	1.10	2.11	1.88
13	Dairy Farmers of Ontario	5.75	0.97	3.86	1.22	2.14	1.35	2.67	1.68

14	IKEA	5.57	0.71	4.44	1.05	2.09	0.82	0.54	0.54
15	Bubly Sparking Water	5.00	1.41	3.57	0.90	1.75	0.84	0.90	2.25
16	UK National Health Service	5.67	0.89	5.24	1.08	2.17	1.06	1.63	1.95
17	Planters	4.85	1.43	3.59	1.43	1.97	1.26	0.75	2.63
18	Pringles	5.25	1.02	3.44	1.24	2.32	1.29	-0.32	1.30
19	Specsavers	4.92	1.23	4.07	1.06	1.98	0.89	1.72	1.55
20	Tetley	5.44	1.31	3.51	1.00	1.83	1.05	1.22	1.47
21	TurboTax	4.63	1.11	5.46	1.08	1.74	0.89	0.28	0.55
22	TurboTax	4.90	1.20	4.55	1.47	1.72	0.99	0.54	1.12
23	Veganuary	5.60	0.94	3.29	1.16	3.19	1.39	-0.44	2.73
24	ADT Security	4.05	1.22	5.12	1.16	1.76	0.80	0.44	0.81
25	WiX	4.46	0.95	5.00	1.19	1.59	0.62	1.31	1.81
	Average	4.98		4.20		2.16		0.49	
	SD	0.46		0.69		0.54		0.99	
	Max	5.75		5.61		3.39		2.67	
	Min	4.05		3.29		1.32		-1.51	

Study 3: Stimuli (Printed Advertising)

1) Celebrity endorsement condition:

2) Information condition:

Study 3: Product Category Framing

1) Hedonic watch:

Omega is a Swiss company that has been distributing to customers with their watches serving as a testament to accuracy and toughness for over 100 years. Yet, it offers sleek modern designs centered around a true love of watches. Omega is committed to upholding this tradition with the high standard of watchmaking craftsmanship. It continues to grow, based on a winning formula, expressing through fresher designs backed by great technologies.

Omega Seamaster Professional Diver 300M is synonymous with luxury and elegance. Stylish, durable in extreme conditions, and representative of the Best of Swiss. It is prominent for its quality, reliability, ingenuity, and determination. Omega Seamaster is bold yet elegant as the modern gentleman. Seamaster Collection is appreciated for their fashion flair, adventurous spirit, and reliability. Omega Seamaster is a beautiful timepiece created to inspire people to spend their time doing what they love—whenever they want and under any conditions. Like a shining star in the night sky, the Seamaster is a radiant addition to any collection. Seamaster is always there with you, just a glance away. It ensures you will never miss what is really important to you.

2) Utilitarian watch:

Omega is a Swiss watchmaker founded in 1903. Britain's Royal Flying Corps chose Omega watches in 1917 as its official timekeepers for its combat units, as did the U.S. Army in 1918. Omega watches were the choice of NASA and the first watch on the Moon in 1969. In addition, Omega has been the official timekeeper of the Olympic Games since 1932. Omega is currently the timekeeper of the America's Cup yacht race. Omega Seamaster Professional Diver 300M watch model is crafted from stainless steel and includes a blue ceramic bezel with a white enamel diving scale. The dial is also polished blue ceramic and features laser-engraved waves and a date window at 6 o'clock. The skeleton hands and raised indexes are rhodium-plated and are filled with white Super-LumiNova, while the helium escape valve has been given a conical design. The watch is presented on a stainless steel bracelet and is driven by the Omega Master Chronometer Calibre 8800, which can be seen through the sapphire-crystal on the wave-edged caseback.

Omega uses 316L stainless steel, which is certainly the most conventional of watchmaking materials for outer craftsmanship, and offers strength and affordability. Known for its corrosion-resistance and high lustre after polishing, this material is often the ideal choice for watches in both daily-use and high-stress situations such as diving and adventure.

Web Appendix B

Scale Items

Studies 1–3 Immorality Items:

I find this tactic (ad) immoral

I feel manipulated when I encounter this tactic (ad)

I think it is acceptable for companies to use this tactic (ad)*

* Reverse-coded items

Table B1. *System 1 and System 2 Dimensions' Loadings with Promax Rotation (Studies 1-3).*

		Study 1* (*N* = 44)	**Study 2 (*N* = 118)**		**Study 3 (*N* = 373)**	
		DPI (one component)	System 1	System 2	System 1	System 2
1	This ad (tactic) relies on reason	.976		.888		.822
2	This ad (tactic) relies on emotion	–.918	.926		.857	
3	This ad (tactic) appeals to intuition rather than arguments	–.944	.917		.879	
4	This ad (tactic) provides useful information	.972		.936		.900
5	This ad (tactic) helps customers make their own decision about the product	.979		.920		.865
6	This tactic denies me the freedom to make up my own mind about the product.*	–.759				
	% Cumulative Variance Explained	86.07	86.85		77.19	
	KMO	.826	.678		.682	
	Cronbach's Alpha	.957	.820	.855	.701	.838

Note. In Studies 1–2, the PCA was conducted at the item-level (i.e., for each tactic or ad), whereas in Study 3, the PCA was conducted at the subject-level (i.e., for each participant).
*Item 6 was only measured in Study 1, but was removed from the analysis and further studies, because of low inter-item correlation with the other items (see Figure B1 and Table B2).

Figure B1. *PCA Plot from Study 1 (System 1 and System 2 Loadings)*

The graph is plotted using Promax rotation after forcing two components to identify any redundant items (see also scale reliability if item is deleted below):

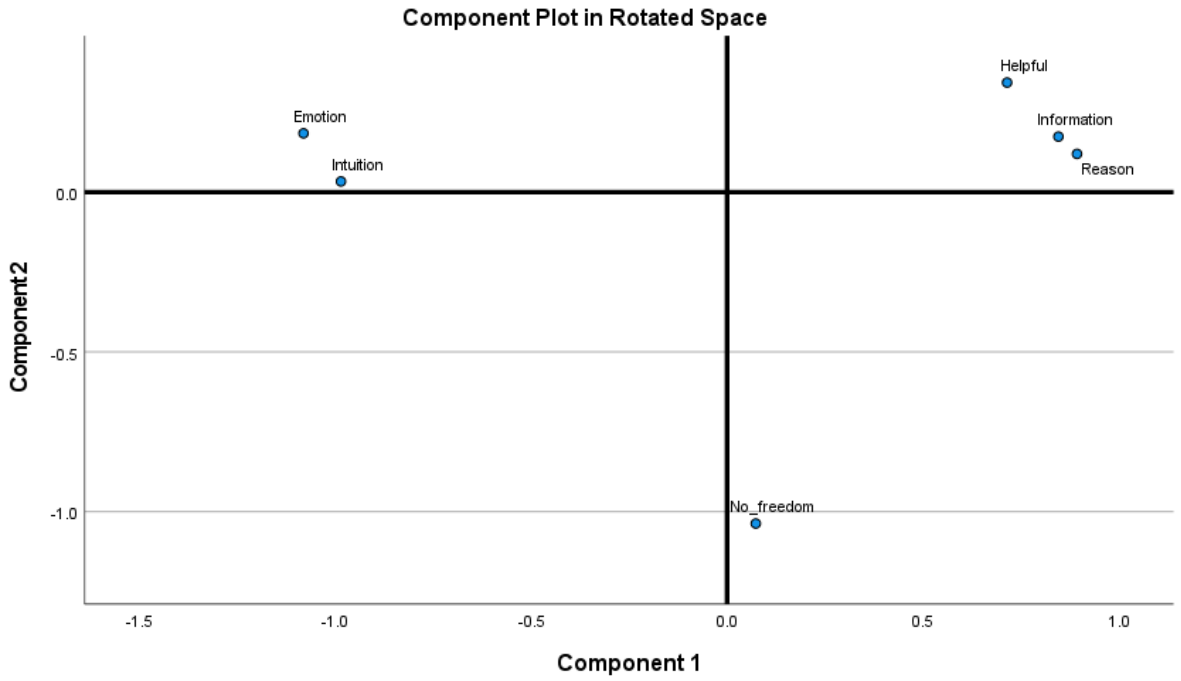


Table B2. *Change in DPI Scale Reliability if Each Item is Deleted (Study 1).*

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Reason	18.98	26.99	.969	.970	.940
Information	19.14	26.96	.965	.974	.941
Helpful	19.10	29.82	.975	.981	.936
Emotion_Rev	20.04	33.25	.876	.910	.949
Intuition_Rev	19.73	35.91	.916	.915	.953
No_freedom_Rev	18.03	37.54	.688	.738	**.968**

Table B3. *Moral Foundations Scale: Items Loadings with Varimax Rotation from Studies 2–3.*

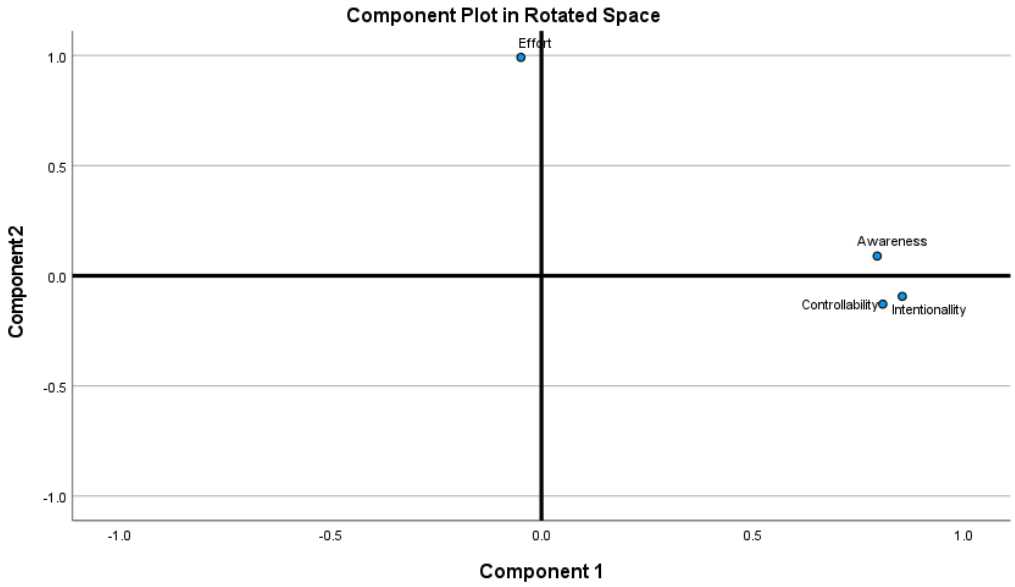
	Study 2 (*N* = 218)		**Study 3 (*N* = 373)**
	Component 1	Component 2	Component 1
This tactic/ad could cause some people to suffer emotionally.	.919		.852
This tactic/ad is cruel to someone or some people.	.855		.909
This tactic/ad implies some people should be treated differently from others.	.807		.607
This tactic/ad is unfair.	.792		.881
This tactic/ad encourages people to betray their group.		.751	.915
This tactic/ad encourages disloyalty.		.851	.906
This tactic/ad shows disrespect for authority.		.847	.918
This tactic/ad encourages disorder or chaos.		.902	.878
This tactic/ad violates standards of decency.	.671		.912
This tactic/ad disgusts the viewer.	.870		.828
% Cumulative Variance Explained	87.48		74.84
KMO	.864		.960
Cronbach's Alpha	.956	.932	.950

Table B4. *Automaticity and Effort* Items Loadings with Varimax Rotation from Study 3.*

	Component 1 (Automaticity)	Component 2 (Effort)
Controllability: Think of a person who was seeing this advertisement for the first time. Once they start to have thoughts or feelings about this advertisement, do you think they would be able to control the direction of those thoughts or feelings?	.809	
Awareness: Think of a person who was seeing this advertisement for the first time. To what extent do you think they would be aware of how the advertisement was affecting their thoughts or feelings?	.796	
Intentionality: Think of a person who was seeing this advertisement for the first time. To what extent do you think they could intentionally choose whether or not to think or feel a particular way about the advertisement?	.855	
Effort: Think of a person who was seeing this advertisement for the first time. How much effort do you think they would have to exert to understand the advertisement?		.991
% Cumulative Variance Explained	75.92	
KMO	.678	
Cronbach's Alpha	.755	

Note. All items were measured on a scale from –5 ("Extremely unable to control"/"Not aware at all"/"The thinking or feeling are completely unintentional"/"Very little effort") to 5 ("Extremely able to control"/"Absolutely aware"/"The thinking or feeling are completely intentional"/"A lot of effort")
*Effort was negatively correlated with the other items, having lower loading based on eigenvalue (51% variance explained by one component, see PCA plot below), therefore, we forced 2 components.

Figure B2. *PCA Plot from Study 3 (Automaticity and Effort Loadings).*



Credibility Score from Study 3

To compute credibility score, we followed the procedure from Isaac and Grayson (2017). We conducted PCA of the 12 characteristics to test whether they fall at the opposite ends of the same continuum. However, in our case, there were two components based on eigenvalue (see Table B4). After forcing the PCA to identify only one component, the loadings were positive for the six positively valenced (i.e., credibility-related) persuasion knowledge characteristics and were negative for the six negatively valenced (i.e., skepticism-related) characteristics, consistent with Isaac and Grayson (2017) (see Table B5). The absolute value of all factor loadings ranged from .62 to .84. We used the factor analysis results to create a summary score for each participant's rating of the corresponding ad. Collapsed across all conditions, we adjusted each participant's rating of each characteristic by multiplying it by the characteristic's factor loading. Then, we summed all 12 of these adjusted ratings to create a weighted-sum factor score at the participant level. The average weighted-sum factor scores were significantly different between conditions: $M_{\text{celeb.}} = 7.44$, $SD = 6.02$ vs. $M_{\text{inform.}} = 11.09$, $SD = 5.83$; $t(371) = –5.95$, $p < .001$, Cohen's $d = –0.62$. This means that both ads are seen as credible with information being more credible than celebrity endorsement.

Table B5: *Credibility Items Loadings with Varimax Rotation from Study 3 (Based on Eigenvalue).*

	Component	
	1	2
Helpful		.886
Credible		.829
Informative		.877
Appropriate	-.621	
Fair		
Believable		.798
Manipulative		
Dishonest	.830	
Fraudulent	.839	
Improper	.797	
Unfair	.847	
Deceptive	.790	
% Cumulative Variance Explained	70.84	
KMO	.903	
Cronbach's Alpha	.669	.631

Table B6. *Credibility Loadings with Varimax Rotation from Study 3 (1 Component).*

	Component 1
Helpful	-.671
Credible	-.810
Informative	-.623
Appropriate	-.817
Fair	-.795
Believable	-.715
Manipulative	.683
Dishonest	.836
Fraudulent	.757
Improper	.630
Unfair	.695
Deceptive	.834
% Cumulative Variance Explained	55.16
KMO	.903

Web Appendix C

Main Results Details

Study 1

Model 1.1: Mixed Effects Linear Regression with DPI to Predict Immorality.

Model Fit:

AIC = 3363.21, BIC = 3388.02

Pseudo-R^2 (fixed effects) = 0.12

Pseudo-R^2 (total) = 0.66

Fixed Effects:

	b	*SE*	*T*	*df*	*p*
(Intercept)	4.34	0.24	17.75	63.94	<0.001
DPI	-0.41	0.04	-10.98	1009.07	<0.001

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.92
Tactic	(Intercept)	0.90
Residual		1.03

Model 1.2: Mixed Effects Linear Regression with System 1 and System 2 to Predict Immorality.

Model Fit:

AIC = 3265.13, BIC = 3294.90

Pseudo-R^2 (fixed effects) = 0.22

Pseudo-R^2 (total) = 0.75

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	4.71	0.27	17.67	174.42	0.000	
System1	-0.01	0.03	-0.19	1006.49	0.851	1.06
System2	-0.47	0.03	-15.85	1003.56	0.000	1.06

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	1.15
Tactic	(Intercept)	0.75
Residual		0.95

Model 1.3: Mixed Effects Linear Regression with System 1 to Predict Immorality.

Model Fit:

AIC = 3464.10, BIC = 3488.91

Pseudo-R^2 (fixed effects) = 0.01

Pseudo-R^2 (total) = 0.63

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
System1	0.09	0.03	2.91	1039.46	0.004

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.82
Tactic	(Intercept)	1.17
Residual		1.09

Model 1.4: Mixed Effects Linear Regression with System 2 to Predict Immorality.

Model Fit:

AIC = 3263.16, BIC = 3287.97

Pseudo-R^2 (fixed effects) = 0.22

Pseudo-R^2 (total) = 0.75

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	4.68	0.22	21.74	74.70	<0.001
System2	-0.47	0.03	-16.23	962.16	<0.001

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	1.15
Tactic	(Intercept)	0.75
Residual		0.95

Study 2

Model 2.1: Mixed Effects Linear Regression with DPI to Predict Immorality.

Model Fit:

AIC = 1636.98, BIC = 1658.73

Pseudo-R^2 (fixed effects) = 0.05

Pseudo-R^2 (total) = 0.59

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	3.29	0.22	14.96	292.75	<0.001
DPI	-0.31	0.05	-6.15	525.86	<0.001

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.80
Clip	(Intercept)	0.45
Residual		0.80

Model 2.2: Mixed Effects Linear Regression with DPI to predict Attitude Change.

Model Fit:

AIC = 2316.46, BIC = 2338.21

Pseudo-R^2 (fixed effects) = 0.04

Pseudo-R^2 (total) = 0.37

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	-1.14	0.40	-2.87	260.14	<0.001
DPI	0.45	0.09	4.79	572.89	<0.001

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.77
Clip	(Intercept)	0.87
Residual		1.61

Model 2.3: Mixed Effects Linear Regression with System 1 and System 2 to Predict Immorality.

Model Fit:

AIC = 1606.1835, BIC = 1632.2783

Pseudo-R^2 (fixed effects) = 0.1096

Pseudo-R^2 (total) = 0.6304

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	3.40	0.27	12.76	411.11	0.000	
System1	0.01	0.03	0.35	534.10	0.729	1.00
System2	-0.31	0.04	-8.55	568.59	0.000	1.00

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.78
Clip	(Intercept)	0.48
Residual		0.78

Model 2.4: Mixed Effects Linear Regression with System 1 to Predict Immorality.

Model Fit:

AIC = 1673.2817, BIC = 1695.03

Pseudo-R^2 (fixed effects) = 0.01

Pseudo-R^2 (total) = 0.54

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	2.06	0.22	9.22	316.03	0.000
System1	0.02	0.04	0.59	540.80	0.553

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.79
Clip	(Intercept)	0.47
Residual		0.84

Model 2.5: Mixed Effects Linear Regression with System 2 to Predict Immorality.

Model Fit:

AIC = 1604.30, BIC = 1626.05

Pseudo-R^2 (fixed effects) = 0.11

Pseudo-R^2 (total) = 0.63

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	3.46	0.20	17.56	204.95	<0.001
System2	-0.31	0.04	-8.58	566.41	<0.001

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.78
Clip	(Intercept)	0.49
Residual		0.78

Model 2.6: Mixed Effects Linear Regression with System 1 and System 2 to Predict Attitude Change.

Model Fit:

AIC = 2281.97, BIC = 2308.07

Pseudo-R^2 (fixed effects) = 0.11

Pseudo-R^2 (total) = 0.41

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	-1.82	0.46	-3.99	345.02	<0.001	
System1	0.05	0.06	0.77	563.90	0.439	1.00
System2	0.49	0.06	7.74	503.74	<0.001	1.00

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.70
Clip	(Intercept)	0.86
Residual		1.57

Model 2.7: Mixed Effects Linear Regression with System 1 to Predict Attitude Change.

Model Fit:

AIC = 2338.18, BIC = 2359.92

Pseudo-R^2 (fixed effects) = 0.001

Pseudo-R^2 (total) = 0.32

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	0.151	0.39	0.38	268.38	0.701
System1	0.07	0.07	1.02	558.81	0.306

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.72
Clip	(Intercept)	0.89
Residual		1.66

Model 2.8: Mixed Effects Linear Regression with System 2 to Predict Attitude Change.

Model Fit:

AIC = 2280.58, BIC = 2302.32

Pseudo-R^2 (fixed effects) = 0.11

Pseudo-R^2 (total) = 0.41

Fixed Effects:

	b	*SE*	*t*	*df*	*p*
(Intercept)	-1.58	0.33	-4.73	168.96	<0.001
System2	0.49	0.06	7.77	500.39	<0.001

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.71
Clip	(Intercept)	0.86
Residual		1.57

Model 2.9: Mixed Effects Linear Regression with Moral Foundations to Predict Immorality.

Model Fit:

AIC = 1234.66, BIC = 1273.80

Pseudo-R^2 (fixed effects) = 0.64

Pseudo-R^2 (total) = 0.74

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	0.55	0.08	7.10	147.90	<0.001	
Harm	0.09	0.04	2.32	507.06	0.021	2.55
Fairness	0.21	0.05	4.44	499.39	<0.001	3.04
Loyalty	-0.02	0.04	-0.42	504.23	0.678	2.28
Authority	0.18	0.04	4.54	406.49	<0.001	2.12
Purity	0.40	0.04	10.35	328.37	<0.001	2.41

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.41
Clip	(Intercept)	0.02
Residual		0.62

Model 2.10: Mixed Effects Linear Regression with Moral Foundations and DPI to Predict Immorality.

Model Fit:

AIC = 1222.33, BIC = 1265.82

Pseudo-R^2 (fixed effects) = 0.64

Pseudo-R^2 (total) = 0.76

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	1.08	0.16	6.84	349.64	<0.001	
Harm	0.08	0.04	2.13	529.07	0.033	2.39
Fairness	0.19	0.05	4.08	532.20	<0.001	2.92
Loyalty	-0.02	0.04	-0.40	539.24	0.688	2.21
Authority	0.18	0.04	4.40	482.75	<0.001	2.10
Purity	0.40	0.04	10.35	396.37	<0.001	2.32
DPI	-0.13	0.03	-3.81	339.53	<0.001	1.04

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.42
Clip	(Intercept)	0.08
Residual		0.61

Model 2.11: Mixed Effects Linear Regression with Moral Foundations to Predict Attitude Change.

Model Fit:

AIC = 2271.44, BIC = 2310.58

Pseudo-R^2 (fixed effects) = 0.15

Pseudo-R^2 (total) = 0.38

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	1.72	0.23	7.42	84.79	<0.001	
Harm	0.00	0.09	-0.05	572.55	0.964	2.27
Fairness	-0.25	0.12	-2.10	569.65	0.037	3.07
Loyalty	0.15	0.11	1.34	570.06	0.179	2.39
Authority	-0.27	0.10	-2.58	576.87	0.010	2.32
Purity	-0.28	0.10	-2.72	571.68	0.007	2.39

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.64
Clip	(Intercept)	0.72
Residual		1.57

Model 2.12: Mixed Effects Linear Regression with Moral Foundations and DPI to Predict Attitude Change.

Model Fit:

AIC = 2257.87, BIC = 2301.36

Pseudo-R^2 (fixed effects) = 0.17

Pseudo-R^2 (total) = 0.41

Fixed Effects:

	b	*SE*	*t*	*df*	*p*	*VIF*
(Intercept)	0.38	0.41	0.92	347.17	0.361	
Harm	0.00	0.09	0.00	572.34	0.999	2.26
Fairness	-0.23	0.12	-1.94	569.22	0.053	3.05
Loyalty	0.12	0.11	1.15	571.03	0.251	2.38
Authority	-0.24	0.10	-2.32	577.01	0.021	2.32
Purity	-0.28	0.10	-2.77	572.12	0.006	2.37
DPI	0.35	0.09	3.92	572.07	<0.001	1.02

Random Effects:

Group	*Parameter*	*SD*
Response ID	(Intercept)	0.65
Clip	(Intercept)	0.73
Residual		1.55

Study 3

Model 3.1: Linear Regression with DPI to Predict Immorality.

Model Fit:
R-square: 0.03
Adjusted R-square: 0.03
df = 371

Coefficients:

	b	*SE*	*t*	*p*
(Intercept)	3.03	0.31	9.90	<0.001
DPI	-0.22	0.07	-3.42	0.001

Model 3.2: Linear Regression with System 1 and System 2 to Predict Immorality.

Model Fit:
R-square: 0.09
Adjusted R-square: 0.09
df = 371

Coefficients:

	b	*SE*	*t*	*p*	*VIF*
(Intercept)	2.82	0.30	9.42	<0.001	
System 1	0.02	0.04	0.54	0.591	1.08
System 2	-0.22	0.04	-5.77	<0.001	1.08

Model 3.3: Linear Regression with System 1 to Predict Immorality.

Model Fit:
R-square: 0.01
Adjusted R-square: 0.01
df = 371

Coefficients:

	b	*SE*	*t*	*p*
(Intercept)	1.57	0.22	7.29	<0.001
System 1	0.08	0.04	2.06	0.041

Model 3.4: Linear Regression with System 2 to Predict Immorality.

Model Fit:
R-square: 0.09
Adjusted R-square: 0.09
df = 371

Coefficients:

	b	*SE*	*t*	*p*
(Intercept)	2.95	0.16	18.08	<.0001
System 2	-0.23	0.04	-6.14	<.0001

Model 3.5: Linear Regression with Moral Foundations to predict Immorality.
Model Fit:
R-square: 0.42
Adjusted R-square: 0.42
df = 372

Coefficients:

	b	*SE*	*t*	*p*	*VIF*
(Intercept)	0.64	0.09	6.86	0.000	
Harm	0.18	0.12	1.49	0.137	5.72
Fairness	0.37	0.06	5.94	0.000	2.27
In-Group	0.08	0.15	0.54	0.593	7.17
Authority	0.14	0.15	0.92	0.359	7.75
Purity	0.09	0.12	0.68	0.495	5.45

Model 3.6: Linear Regression with Moral Foundations and DPI to predict Immorality.
Model Fit:
R-square: 0.45
Adjusted R-square: 0.44
df = 371

Coefficients:

	b	*SE*	*t*	*p*	*VIF*
(Intercept)	1.29	0.18	7.37	<0.001	
Harm	0.20	0.12	1.65	0.099	5.72
Fairness	0.29	0.06	4.50	<0.001	2.49
In-Group	0.17	0.15	1.17	0.243	7.31
Authority	0.12	0.15	0.83	0.410	7.74
Purity	0.07	0.12	0.55	0.586	5.45
DPI	-0.17	0.04	-4.35	<0.001	1.11

Model 3.7: Linear Regression with DPI to predict Attitude.
Model Fit:
R-square: 0.08
Adjusted R-square: 0.07
df = 371

Coefficients:

	b	*SE*	*t*	*p*
(Intercept)	0.05	0.33	0.17	0.869
DPI	0.49	0.09	5.49	<0.001

Model 3.8: Linear Regression with System 1 and System 2 to predict Attitude.

Model Fit:
R-square: 0.31
Adjusted R-square: 0.30
df = 371

Coefficients:

	b	*SE*	*t*	*p*	*VIF*
(Intercept)	-3.25	0.48	-6.77	<0.001	
System 1	0.35	0.07	5.31	<0.001	1.08
System 2	0.77	0.06	12.62	<0.001	1.08

Model 3.9: Linear Regression with System 1 to predict Attitude.

Model Fit:
R-square: 0.01
Adjusted R-square: 0.01
df = 371

Coefficients:

	b	*SE*	*t*	*p*
(Intercept)	1.14	0.40	2.87	0.004
System 1	0.13	0.08	1.71	0.088

Model 3.10: Linear Regression with System 2 to predict Attitude.

Model Fit:
R-square: 0.25
Adjusted R-square: 0.25
df = 371

Coefficients:

	b	*SE*	*t*	*p*
(Intercept)	-1.12	0.27	-4.11	<0.001
System 2	0.68	0.06	11.23	<0.001

Model 3.11: Linear Regression with Moral Foundations to predict Attitude.
Model Fit:
R-square: 0.05
Adjusted R-square: 0.04
df = 372

Coefficients:

	b	*SE*	*t*	*p*	*VIF*
(Intercept)	2.53	0.22	11.47	<0.001	
Harm	0.09	0.29	0.30	0.767	5.72
Fairness	-0.35	0.15	-2.37	0.019	2.27
In-Group	0.36	0.35	1.04	0.299	7.17
Authority	-0.22	0.36	-0.61	0.541	7.75
Purity	-0.32	0.29	-1.10	0.273	5.45

Model 3.12: Linear Regression with Moral Foundations and DPI to predict Attitude.
Model Fit:
R-square: 0.10
Adjusted R-square: 0.09
df = 371

Coefficients:

	b	*SE*	*t*	*p*	*VIF*
(Intercept)	0.86	0.41	2.09	0.037	
Harm	0.05	0.28	0.17	0.869	5.72
Fairness	-0.13	0.15	-0.89	0.374	2.49
In-Group	0.12	0.34	0.36	0.717	7.31
Authority	-0.18	0.35	-0.51	0.613	7.74
Purity	-0.28	0.29	-0.97	0.331	5.45
DPI	0.44	0.09	4.76	<0.001	1.11

Web Appendix D

Additional Results Details

Study 3 – Additional moderation analyses with individual difference

In Study 3, we tested if there is any moderation effect of individual differences on ad immorality and attitude. In addition to testing how sense-making motivation (SMM), need for cognition (NFC), and faith in intuition (FII) interact with DPI on immorality and attitude change, we also conducted moderation analyses with system 1 and system 2 as separate predictors. The results showed that SMM has a significant interaction effect with system 1 ($F(1, 368) = 6.08$, $p = .014$). Consumers with higher SMM (1 SD above the mean) tend to believe that ads processed by system 1 are immoral ($b = 0.17$, $SE = 0.05$, $p = .002$), whereas in consumers with lower SMM (1 SD below the mean), this effect is not significant ($b = –0.02$, $SE = 0.06$, $p = .693$). There is also a marginally significant interaction effect of SMM with system 2 ($F(1, 368) = 3.26$, $p = .072$): Consumers 1 SD above the mean on SMM scale believe that ad processed by system 2 is less immoral ($b = –0.29$, $SE = 0.05$, $p < .001$) than consumers 1 SD below the mean ($b = –0.16$, $SE = 0.05$, $p = .002$). These results are consistent with Khon, Johnson, and Hang (2020), suggesting that consumers with the pronounced desire to understand their environment have a higher tendency to explain persuasion attempts than consumers with lower sense-making desire, and, therefore, they might ascribe more immorality to persuasion than consumers with no such tendencies. There is no significant interaction between SMM and system 1 (or system 2) on attitude change (ps > .462). Then, NFC and FII can only marginally moderate the effect of system 2 on immorality: The effect is stronger in consumers with higher NFC ($b = –0.28$, $SE = 0.05$, $p < .001$) than lower NFC ($b = –0.18$, $SE = 0.05$, $p < .001$; $F(1, 368) = 2.85$, $p = .092$), meaning that consumers who prefer to rely on rational thinking more tend to have higher beliefs about morality of system 2 persuasion than those preferring to rely on rational thinking less. This is quite consistent with our finding that the effect of system 2 on ad immorality is stronger in consumers with lower FII ($b = –0.27$, $SE = 0.05$, $p < .001$) than in consumers with higher FII ($b = –0.16$, $SE = 0.05$, $p = .002$; $F(1. 368) = 2.85$, $p = .093$), where consumers who rely on their intuition more tend to ascribe less morality to system 2 persuasion than those who rely on intuition less. There were no other significant interactions with the REI-10 scale in this study, (ps > .10).

Appendix 6B: Statement of Authorship

This declaration concerns the article entitled:							
Consumers Prefer Complex Algorithms							
Publication status (tick one)							
Draft manuscript	V	**Submitted**		**In review**		**Accepted**		**Published**	
Publication details (reference)							
Copyright status (tick the appropriate statement)							
I hold the copyright for this material	V	Copyright is retained by the publisher, but I have been given permission to replicate the material here					
Candidate's contribution to the paper (provide details, and also indicate as a percentage)	The candidate considerably contributed to: Formulation of ideas: 85% Design of methodology: 85% Experimental work: 90% Presentation of data in journal format: 85%						
Statement from Candidate	This paper reports on original research I conducted during the period of my Higher Degree by Research candidature.						
Signed	Zarema Khon [redacted]			**Date**	13/01/22		

Consumers Prefer Complex Algorithms

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CONTRIBUTION STATEMENT

Despite the pervasiveness of algorithms in our everyday lives, consumers are often hesitant to use predictions and recommendations from algorithms, even when they are more accurate than those produced by humans. This algorithm aversion effect (Dietvorst, Simmons, and Massey 2014) depends on a variety of factors (e.g., Castelo, Bos, and Lehmann 2019; Longoni, Bonezzi, and Morewedge 2019). Yet, research on ways of attenuating algorithm aversion is still sparse, especially it is not clear how this aversion varies across the tasks that algorithms can do. We identified three main contributions of this research to the literature: First, we contribute to literature on ways of combating algorithm aversion (Bigman and Gray 2018; Dietvorst, Simmons, and Massey 2016) by introducing a new way of attenuating algorithm aversion—*framing algorithms as more complex*—and indicating ways in which the level of complexity can be attained. Next, we contribute to *task-dependent* algorithm aversion (Castelo et al. 2019; Longoni et al. 2019; Promberger and Baron 2006) by examining how willingness to use algorithms varies by an inherent characteristic of the task—its perceived complexity. Framing tasks as complex versus simple can affect consumers' enthusiasm about algorithms. Finally, we contribute to the literature on psychology of complexity (Ahl and Keil 2017; Lombrozo 2007) by investigating cues that consumers rely on when making inferences about complexity and boundary conditions for identifying when complexity is most preferred to simplicity (Johnson, Valenti, and Keil 2019; Lim and Oppenheimer 2020; Zemla et al. 2020). Our research suggests that tasks considered more complex or more objective especially require more complex algorithms.

ABSTRACT

Although algorithms are increasingly prevalent in the marketplace, consumers often dislike using them. The extent of this algorithm aversion effect depends on a variety of factors. Four studies examine a novel factor that drives consumers' adoption of algorithms—perceived complexity. The results showed that consumers generally prefer more complex algorithms to simple ones because complex algorithms are believed to have better goodness-of-fit (i.e., account for more nuances and details in the data). The effect is especially pronounced when complex algorithms are used for doing tasks that are perceived by consumers either inherently more complex or more objective. The results also showed that consumers prefer algorithms to human experts for doing simpler tasks, suggesting that to understand when the algorithms are preferred over humans, we must understand how consumers perceive both the algorithms and the tasks.

Keywords: algorithm aversion, complexity, beliefs, theory of machine, technology adoption

Algorithms can outperform even expert humans at an increasingly comprehensive list of tasks from diagnosing complex diseases (Grove et al. 2000; Simonite 2014), to providing legal advice (Turner 2016), to automating marketing decisions (Bucklin, Lehmann, and Little 1998), to detecting emotion in facial expressions (Kodra et al. 2013). However, existing research (*cf.* Logg, Minson, and Moore 2019) shows that many consumers are still reluctant to rely on algorithms even when they are superior to humans: Consumers prefer humans over algorithms after seeing an algorithm err (Dietvorst, Simmons, and Massey 2014), in particular domains, such as making medical (Longoni, Bonezzi, and Morewedge 2019; Promberger and Baron 2006) and legal (Bigman and Gray 2018) decisions, or if the tasks are considered too subjective (e.g., predicting joke funniness; Yeomans 2019). Although explanations for algorithm aversion have indeed been proposed in the past (Dawes 1979; Einhorn 1986; Grove and Meehl 1996; Highhouse 2008), there is little systematic study of how and why consumers' willingness to use algorithms varies across different types of tasks that algorithms can do.

In addition to the lack of exploration of how algorithm aversion varies across different tasks, there has been little investigation of interventions that practitioners can use to decrease consumers' reluctance to use algorithms, especially in tasks where algorithms are superior to expert humans. We explore a new factor that may influence consumer acceptance of algorithms—complexity. Inspired by research suggesting that complexity is an important determinant of people's acceptance of explanations (Lombrozo 2007; Zemla et al. 2017), we explore whether complexity of both *tasks* and *algorithms* influences consumers' acceptance of algorithms.

We test three main predictions with regards to task and algorithm complexity. First, as simpler tasks require less sophisticated skills and are associated with less risks, consumers will be fine using algorithms for simpler tasks, and their reluctance will grow as task

complexity increases. Second, as consumers are known for their preference for more complicated models (Gigerenzer and Brighton 2009; Meehl 1954; Rabinovitch, Bereby-Meyer, and Budescu 2020), we suggest a general preference for complex algorithms regardless of the task complexity, because laymen believe that such models can account for more nuances of the data. Third, as it has been shown that people prefer complex explanations for events that they perceive as complex (Johnson, Valenti, and Keil 2019; Lim and Oppenheimer 2020; Zemla et al. 2020), we predict a similar interaction, such that the consumers' preference for complex algorithms will be stronger for complex than for simple tasks.

We contribute to literature on algorithm aversion, which suggests that giving consumers an opportunity to modify the output produced by an algorithm (Dietvorst, Simmons, and Massey 2016), explaining how the algorithm operates (Yeomans et al. 2019), or limiting it to an advisory role (Bigman and Gray 2018) can decrease reluctance. We introduce a new way of attenuating algorithm aversion by framing algorithms as more complex, indicating ways in which this complexity can be attained—this has a direct implication for practitioners. We also contribute to the emerging literature on *task-dependent* algorithm aversion (Castelo, Bos, and Lehmann 2019). Although advances in artificial intelligence have massive social consequences, there has been little systematic exploration of how and why consumers' willingness to use algorithms varies across different types of tasks that algorithms can do. Here, we examine how willingness to use algorithms varies by an *inherent* characteristic of the task—its perceived complexity. Finally, we contribute to the literature on psychology of complexity (e.g., Ahl and Keil 2017; Lombrozo 2007) by investigating cues that consumers rely on when making inferences about complexity and boundary conditions for identifying when complexity is most preferred to simplicity (Johnson et al. 2019; Lim and Oppenheimer 2020; Zemla et al. 2020).

CONCEPTUAL OVERVIEW

Task Complexity

There are many dimensions along which tasks vary that can affect consumers' willingness to rely on algorithms. For example, Castelo, Bos, and Lehmann (2019) showed that consumers are more reluctant to use algorithms for doing tasks perceived as more subjective. Such tasks are open to interpretation and are based on personal opinion or intuition. Since algorithms are more associated with logical, rule-based analysis, they are considered more relevant for doing objective tasks based on quantifiable and measurable facts. Importantly, task objectivity is not fixed and can vary both among different people and over time (Castelo et al. 2019).

We suggest there is another characteristic of a task that can predict algorithm aversion—perceived complexity. Task complexity was previously described (i) in terms of primarily psychological experience (of the *person* doing the task), (ii) as a person–task interaction, or (iii) as objective characteristics of the task (see Campbell 1988 for task complexity review). As many tasks are currently done by both humans and algorithms, we were interested in identifying dimensions of complexity inherent to the task regardless of the task-doer. We distinguish between perceived complexity and difficulty, as difficulty is largely a characteristic of the task-doer and is not inherent to the task (Boy 2007).

Complexity of tasks has critical importance in Computational Complexity Theory—a major area of Computer Science—where algorithms are classified according to the intrinsic complexity of the problems that they solve (Rudich and Wigderson 2000). Complexity is either expressed in computational terms such as the amount of resources required to do the task (e.g., time and space) or in having no known tractable solution at all (Shahaf and Amir

2007). Paradoxically, many problems that appear simple for humans are considered complex for algorithms (Moravec 1988). For example, speech recognition requires more of an algorithm's resources than playing checkers, whereas it is the opposite for humans.

Currently, there are several ways of measuring complexity depending on approach and purposes (Hærem, Pentland, and Miller 2015). In our research, we relied on consumers' understanding of complexity to test whether their beliefs about this task characteristic drive algorithm preference. *Inherent* task complexity has been summarized as a set of thirteen complexity dimensions characteristic of the task (Gill and Hicks 2006), including amount of work required, amount of knowledge required, number of paths to the outcome, degree of uncertainty, where increases in each dimension result in a more complex task. Some tasks are also more consequential than others (i.e., more risky), where performing them improperly has more severe consequences. As algorithms are usually built to do a specified number of tasks or cannot address all risks (see discussion of algorithm complexity below), consumers may be less willing to trust and rely on algorithms for more complex and consequential tasks, because of increased number of components that might fail (Tversky and Kahneman 1974). Moreover, people are less likely to forgive algorithm errors and prefer humans to do the job even if humans make the same mistakes (Dietvorst et al. 2014). Consistent with this theorizing, we hypothesize:

> **H1:** Consumers will be more willing to use algorithms to do inherently simpler (vs. more complex) tasks.

Algorithm Complexity

As many of current algorithms, especially in marketing and other customer service-related spheres, are mostly used for making predictions and recommendations (e.g., predicting stock prices or recommending music), algorithms are built around procedures for making an inference from data—the process, which is very similar to how humans make predictions and explanations based on existing information (Heider 1958; Keil 2006). In other words, an algorithm builds an internal model of a user's preferences (an explanation) and uses that model to make further inferences (predictions). As algorithms can be viewed as an explanation for predictions, we will use literature on explanations from cognitive psychology to derive our hypotheses.

In explanations, individuals usually prefer simplicity to complexity because simple explanations are generally more likely to be true *a priori* (i.e., their prior probability is higher; Lombrozo 2007). Similarly, the reason to prefer simple algorithms is that they are more universal and less likely to overfit by being more generalized from situation to situation. At the same time, complex explanations often account for the data better than simple explanations (Johnson et al. 2019; Zemla et al. 2020), so that the reason to prefer complex algorithms is that they can capture nuances in the data and respond differently to different situations.

As consumers expect predictions and recommendations to account for all their unique individual circumstances (Longoni et al. 2019; Meehl 1954), they will either prefer expert humans, or, as we suggest, more complex algorithms. This is because consumers likely observe that algorithms are often built for specific tasks, expecting human experts to have a more comprehensive view on a situation and to be able to adjust their judgement than rigid and too focused machines (Logg, 2021). In reality, intuitive (also known as clinical)

judgments produced by humans are less accurate compared with statistical (also known as model-based) judgments produced by algorithms (Dawes et al. 1989; Kahneman, Sibony, and Sunstein 2021; Meehl 1954) mostly because people are not as good as machines when it comes to integrating existing data and assigning weights to the various predictors to make judgments (Dawes 1979; Dawes et al. 1989; Kahneman 2003; Kahneman, Slovic, and Tversky 1982). Very often, clinical judgment is worse than model-based judgment because it is *noisier*—it includes a lot of redundant data, which makes the model more complex but results in overfitting and poor generalization to newer cases.

Consistent with existing literature on model complexity and overfitting, we speculate that not only *task* complexity might define algorithm preference—perceived *algorithm* complexity is another important determinant of algorithm aversion. Complex algorithms will be preferred because they contain more data that can account for every nuance of the user to make a good recommendation or prediction. As consumers will mostly care about the algorithms' goodness-of-fit to account for all personal nuances, we hypothesize:

> **H2a:** Consumers will be more willing to use complex to simple algorithms.
>
> **H2b:** Consumers' willingness to use complex algorithms will be mediated by the perception that more complex algorithms explain (i.e., fit) more data to make more accurate predictions than simpler algorithms.

Further, in explanation literature, if the model is too complex, it has either a lower prior probability to be true (Johnson et al. 2019) or overfits the data (Gigerenzer and Brighton 2009), or both. If the model is too simple, it has a higher prior probability to be true, but it does not account for all the nuances of the phenomenon (Forster and Sober 1994). How do consumers balance these two factors when deciding whether an explanation is appropriate?

Johnson and colleagues (2019) suggest that in evaluating explanations consumers make use of *opponent heuristics*: They use simplicity to estimate prior probability of the explanation but couple it with complexity to estimate the explanation's goodness-of-fit. Lim and Oppenheimer (2020) further elaborate on this theory with their *complexity-matching hypothesis*, suggesting that individuals prefer simple explanations for simpler events, and complex explanations for complex events. Following this theorizing and our hypothesis 1, we suggest that individuals will likely prefer complex algorithms, because in evaluating algorithms, goodness-of-fit is more important to consumers than prior probability, and this preference will be larger in the tasks perceived more complex. Formally:

> **H3:** Consumers' preference for complex (vs. simple) algorithms will be greater in tasks that they perceive as complex (vs. simple).

OVERVIEW OF STUDIES

In the following four studies and an internal meta-analysis, we explore the effect of beliefs about task and algorithm complexity on algorithm preference. Study 1 identifies a list of most and least complex tasks and complexity dimensions to be used in studies 2–4. It also tests whether there is an initial correlation between task and algorithm complexity. Study 2 tests whether consumers will prefer algorithms to do simpler tasks (hypothesis 1) and whether complex algorithms will be preferred to simpler ones collapsed across all tasks (hypothesis 2a). It will also examine whether the preference for complex algorithms will be larger for tasks perceived more complex (hypothesis 3). Study 3 investigates the relationship between task complexity and task objectivity connecting our research to existing literature (Castelo et al. 2019) and establishing that the two constructs are different. Study 4 tests

whether the preference for complex algorithms is explained by the perception that more complex algorithms have a better fit to make allegedly more accurate recommendations (hypothesis 2b). Finally, internal meta-analysis explores several other theoretically relevant individual differences as potential predictors of task and algorithm complexity, including demographic variables and self-reported programming skills.

STUDY 1: SIMPLE AND COMPLEX TASKS

Study 1 has three main objectives. First, it aims at creating a list of most simple and most complex tasks. Second, it helps identify specific dimensions underlying perceptions of overall complexity for tasks and algorithms. Third, it tests if there is initial support to our predictions that task and algorithm complexities are correlated.

Method

Participants. We recruited 196 participants (M_{age} = 18.84, 70.93% female) for study 1 from a large British university (G*Power software [Faul et al. 2009] showed that we need to recruit at least 134 participants for correlation equal to .3 and .95 power level). Participants (N = 19) were excluded for errors on attention checks. We used two attention checks—one in the main task ("please select '0'") and one after the main task (a recognition memory check). Any participant was excluded from analysis who either (i) failed the first check or (ii) answered more than one-third of the second check questions incorrectly.

Procedure. For 87 randomly ordered tasks (web appendix A), participants rated either how complex the task itself was or how complex an algorithm to perform the task accurately needed to be, between-subjects. In addition to rating overall task or algorithm complexity,

participants rated a single dimension of complexity, as we were interested what potentially makes overall complexity. For task complexity, participants rated each task on one of the following: amount of specific information required, amount of uncertainty, amount of precision required to accurately complete the task, amount of customization of the task's result, amount of objectivity in the task's result, amount of creativity necessary. For algorithm complexity, participants rated each task on one of the following: number of steps in the algorithm, the degree of transparency of how exactly the algorithm does the task (i.e., "black box"), number of variables the algorithm considers, size of the database with training instances the algorithm uses, size of memory required. All measures were rated on scales from 0 ("Extremely simple" / "No specific information at all" / "No steps at all" / …) to 10 ("Extremely complex" / "A large amount of specific information" / "A large amount of steps" / …) . Thus, each participant read the list of tasks twice—either to rate (i) the overall task complexity and one of the task complexity dimensions, or (ii) the overall algorithm complexity and one of the algorithm complexity dimensions. The order of the two questions was counterbalanced across participants. For each of the dimensions of task or algorithm complexity, we provided them with a brief definition (see web appendix B). When rating task complexity, we asked participants to think about *inherent,* or objective complexity regardless of the task-doer—human or algorithm.

After the main task, for exploratory purposes, participants also answered 4 open-ended questions (e.g., "Think of targeted advertising online. How do you think it works? Please describe how exactly this advertising targets online users."; see web appendix B for all items) and filled out uniqueness scale (3 items, $\alpha = .77$) adopted from Longoni et al. (2019) to be used in internal meta-analysis. After filling out demographic questions (including computer programming skills), participants were debriefed.

Results and Discussion

First, the study allowed us to create a list of 87 tasks from the most simple (M = 0.89, SD = 1.46) to the most complex (M = 8.30, SD = 1.45). Each task's mean was averaged across all participants (web appendix A).

Second, to understand which dimensions underlie perceptions of overall complexity, we first correlated the overall task complexity measures with each of the dimensions of task complexity described above, and then repeated the procedure for algorithm complexity.

Overall task complexity was correlated with information ($r(85) = .92$, $p < .001$), uncertainty ($r(85) = .82$, $p < .001$), precision ($r(85) = .86$, $p < .001$), customization ($r(85) = .51$, $p < .001$), but not objectivity ($r(85) = –.09$, $p = .410$) or creativity ($r(85) = .08$, $p = .479$). A Principal Component Analysis with Varimax rotation showed that there are two components of task complexity (table 1). This shows that objectivity, creativity, and customization are a separate dimension of task characteristic than complexity (although customization is correlated with task complexity), whereas information, uncertainty, and precision—all are part of one component determining task complexity.

Overall algorithm complexity was correlated with all complexity dimensions: steps ($r(85) = .97$, $p < .001$), black box ($r(85) = .89$, $p < .001$), variables ($r(85) = .95$, $p < .001$), database ($r(85) = .91$, $p < .001$), memory ($r(85) = .90$, $p < .001$). Interestingly, black box was positively correlated with algorithm complexity, where the more participants understand how it operates, the more they think it is complex. The PCA showed that all these dimensions belong to one component (table 1).

TABLE 1

FACTOR LOADINGS FOR (A) TASK COMPLEXITY AND (B) ALGORITHM COMPLEXITY

A

	Component	
	1	2
Information	.966	
Uncertainty	.816	
Precision	.930	
Objectivity		-.966
Customization		.827
Creativity		.887
KMO	.71	
% Variance explained	88.34	
Cronbach's alpha	.89	.89

B

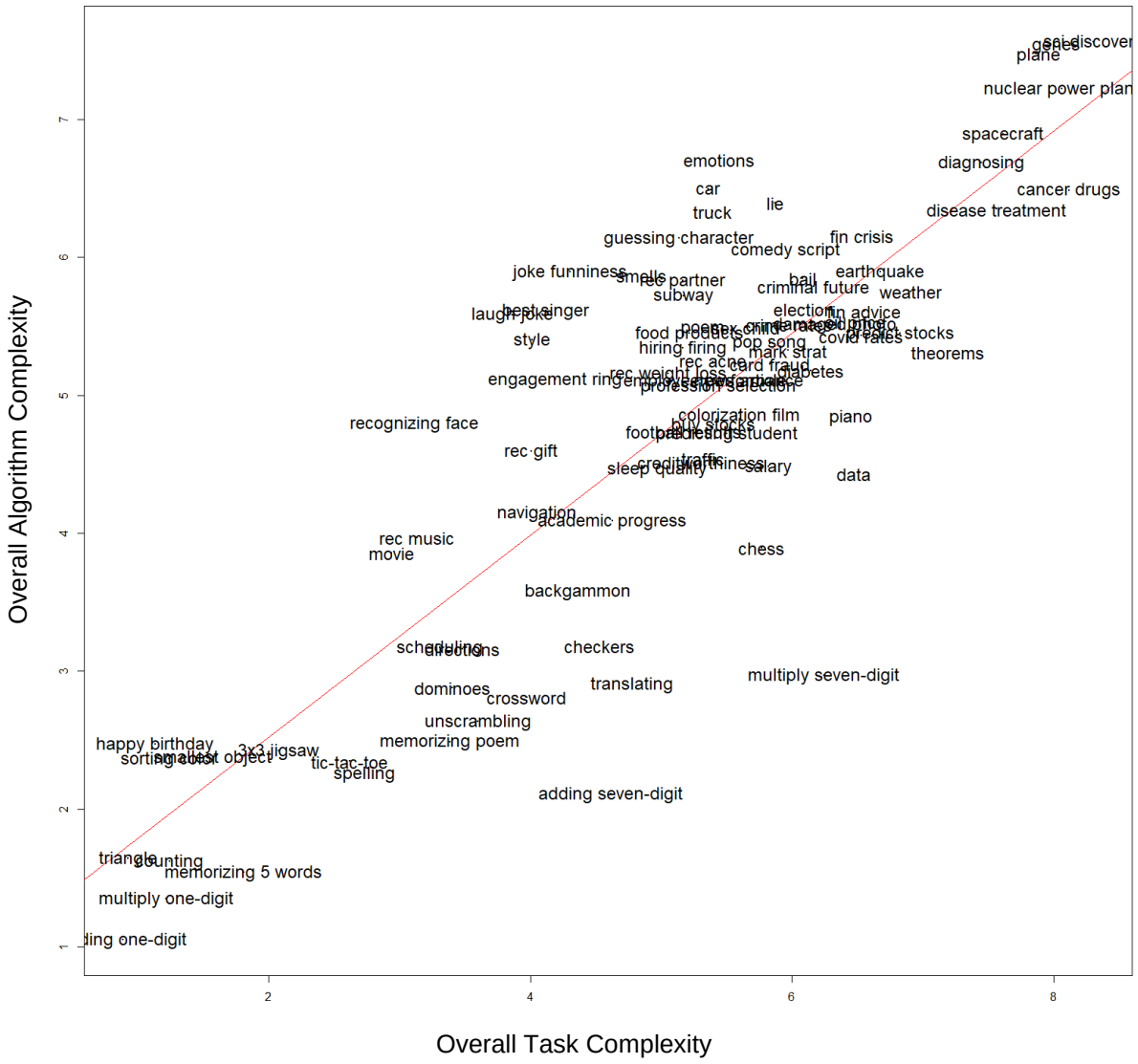
	Component
	1
Steps	.976
Blackbox	.890
Variables	.964
Database	.953
Memory	.936
KMO	.90
% Variance explained	89.13
Cronbach's alpha	.97

NOTE.—To compute Cronbach's alpha for component 2 in task complexity, objectivity was reverse-coded, as it was negatively correlated with the other items.
Only task complexity was based on PCA with Varimax rotation, as there was only 1 component extracted in algorithm complexity.

Next, to test our prediction that tasks that are perceived as more complex require more complex algorithms, we conducted correlation analysis between task and algorithm complexity. For this, we computed mean task and mean algorithm complexity for each task collapsed across all participants (web appendix A). Task and algorithm complexities were highly correlated, $r(85) = .84$, $p < .001$, providing preliminary evidence that consumers believe that more complex algorithms are needed to accurately perform more complex tasks (figure 1).

FIGURE 1

TASK AND ALGORITHM COMPLEXITIES CORRELATION



NOTE.—Full names of tasks are available in web appendix A.

In addition to testing our main predictions, we used open-ended questions to explore what intuitions consumers hold about how the algorithms work. Most participants (95%) could briefly explain how algorithms that they encounter operate (e.g., “I think it works by devices detecting what people most search or look at. This is then processed by cookies. Then presenting targeted adverts to the devices.”). The rest gave more vague answers most likely because they did not understand the question or did not pay enough attention (e.g., “Shock or

out of the ordinary things to catch people's attention"). Also, many participants shared conspiracist views, showing that aversion to algorithms was largely based on the reluctance to be manipulated (e.g., "It's scary because they know so much more about you than you think and its mad how much Google has learnt through your searches and what you like and engage with.")

Study 1 allowed us to create a list of the most simple and complex tasks for subsequent studies. It also helped us identify dimensions that underlie task and algorithm complexity for complexity manipulations in later studies. Finally, the results of study 1 also provided initial support to our prediction that task and algorithm complexities are correlated.

STUDY 2: PREFERENCE FOR COMPLEX ALGORITHMS IN COMPLEX TASKS

Study 2 tested whether consumers will prefer algorithms doing simple (vs. complex) tasks and whether they prefer complex (vs. simple) algorithms—that is, if there is a main effect of task complexity (hypothesis 1) and algorithm complexity (hypothesis 2a) on algorithm preference. It also examined whether there is an interaction between task and algorithm complexity (hypothesis 3), where the preference for complex algorithms is larger for complex (vs. simple) tasks.

Method

Participants. G*Power software indicated that we need to hire at least 98 participants for this within-subjects study (ANOVA repeated measures with the effect size at .15, power level .95). Participants (N = 100; M_{age} = 42.15, 44.21% female) were recruited from Amazon Mechanical Turk website. Participants (N = 3) were excluded from analysis if they did not

pass attention check. In this study, we used three attention checks—two comprehension checks used after algorithm complexity manipulation and one memory recognition check after the main task. Any participant was excluded from analysis who answered more than one-third of either comprehension check or memory recognition check questions incorrectly.

Procedure. The study used a 2 (task complexity: simple, complex) × 2 (algorithm complexity: simple, complex) within-subjects design. Participants first read a description of one algorithm, and for 10 tasks rated their willingness to rely on either expert humans (–5) or algorithms like the described one (5). Then they repeated the procedure for another algorithm for another 10 tasks. We used 10 tasks evaluated as most simple (e.g., adding one-digit numbers) and 10 tasks evaluated as most complex (e.g., predicting financial crisis) from study 1 (see web appendix A for all tasks used in study 2). Algorithm complexity was manipulated by providing different values for the dimensions most correlated to overall algorithm complexity in study 1: Memory size (1 Mb vs. 128 Gb), number of steps (4 vs. 480), number of variables (2 vs. 24), and database size (180 cases vs. 240,000 cases). We did not use black box for manipulation of algorithm complexity in this study as this dimension primarily depends on individual understanding of how an algorithm operates rather than on an algorithm's inherent characteristic. The order of tasks and algorithms was counterbalanced, so that one half of participants evaluated a set of 5 simple and 5 complex tasks done by a simple algorithm, and another set of 5 simple and 5 complex tasks done by a complex algorithm. The other half of participants evaluated the same tasks, but the algorithms were swapped.

Results and Discussion

First, we tested whether consumers preferred algorithms for completing simpler tasks compared to more complex ones (hypothesis 1). The results of paired t-tests demonstrated that averaged across algorithms, participants preferred algorithms more when the tasks were simple (M = 1.04, SD = 2.25) than when tasks were complex (M = –0.77, SD = 1.66; $t(96)$ = –6.28, $p < .001$, Cohen's d = –0.64).

Second, we tested whether consumers preferred complex algorithms to simple ones (hypothesis 2). The results of paired t-tests show that averaged across tasks, participants were less algorithm averse when the algorithm was complex (M = 0.97, SD = 1.59) than when the algorithm was simple (M = –0.70, SD = 1.67; $t(96)$ = –9.34, $p < .001$), even *preferring* the complex algorithm over human experts (one-sample t-test showed that this preference is higher than 0; $t(96)$ = 5.98, $p < .001$, Cohen's d = 0.61).

Third, we tested hypothesis 3 that the preference for complex algorithms will be larger for tasks perceived as complex. For this, increase in algorithm complexity was computed as the difference between complex and simple algorithms. As predicted, paired t-tests showed that there was a significant interaction, where increasing algorithm complexity has a larger effect on algorithm preference for complex (M = 2.82, SD = 2.49) than simpler tasks (M = 0.51, SD = 2.69; $t(96)$ = –5.96, $p < .001$; figure 2).

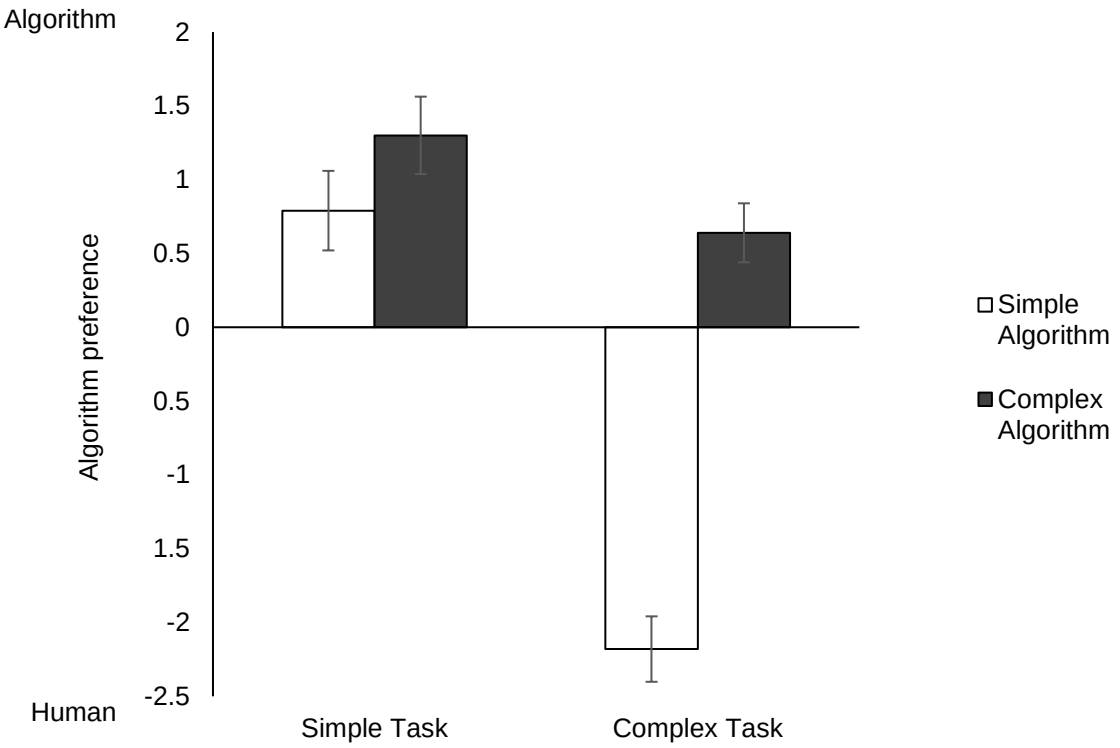
To check the robustness of the results, we also computed the mean preference for using an algorithm to perform each task averaged across participants. The main effects and the interaction were almost identical to the above analysis: Algorithms were preferred for doing simple than complex tasks ($M_{s.}$ = 1.01, SD = 0.98 vs. $M_{c.}$ = –0.75, SD = 1.75; $t(18)$ = 2.76, p = .013, Cohen's d = 1.23); complex algorithms were preferred to simple ones ($M_{c.}$ = 0.95, SD = 1.82 vs. $M_{s.}$ = –0.70, SD = 1.91; $t(19)$ = –4.24, $p < .001$, Cohen's d = –0.86), and this

preference was significantly larger in complex than simple tasks ($M_{c.}$ = 2.79, *SD* = 1.48 vs. $M_{s.}$ = 0.51, *SD* = 1.15; *t*(18) = –3.84, *p* = .001, Cohen's *d* = –1.72).

Consistent with our main predictions, the results of study 2 showed that algorithm aversion can be attenuated when either tasks are simple (H1), or algorithms are complex (H2a). The study also showed that complex algorithms are especially preferred when tasks that they do are perceived as more complex rather than simple (H3).

FIGURE 2

INTERACTION FROM STUDY 2



NOTE.—Algorithm preference was measured on a scale from –5 ("Human") to 5 ("Algorithm"). Error bars indicate standard errors of the mean.

STUDY 3: PREFERENCE FOR COMPLEX ALGORITHMS IN OBJECTIVE TASKS

Study 3 examined how complexity interacts with another moderator of algorithm aversion—task objectivity (Castelo et al. 2019). It was previously shown that algorithm

aversion is less pronounced in tasks perceived more objective. Study 1 showed that task complexity is conceptually and statistically distinct from task objectivity (although our pre-test and internal meta-analysis showed a modest correlation, see web appendices C and E). We further explored whether there is an interaction between objectivity and complexity and whether consumers would prefer more complex algorithms for more objective (vs. subjective) tasks.

Method

Participants. For this study, 100 participants (M_{age} = 40.71, 43.01% female) were recruited from Amazon Mechanical Turk (the power analysis was the same as in study 2). Participants (N = 7) were excluded from analysis following the procedure in study 2.

Procedure. The method was similar to study 2, but instead of complexity we manipulated task objectivity in a 2 (task: subjective, objective) × 2 (algorithm: simple, complex) within-subjects study. Participants rated 6 subjective (e.g., recommending a gift) and 6 objective (e.g., analyzing data) tasks from Castelo et al. (2019). After the main task, participants also evaluated each task based on its objectivity, complexity, and consequentialness. We were interested in testing how all three are related to better understand what task characteristics interact with algorithm complexity. All three questions contained a brief definition (see web appendix B).

Results and Discussion

First, a manipulation check confirmed that participants perceived the objective tasks as more objective than the subjective ones ($M_{subj.}$= –2.76, SD = 2.21; M_{obj} = 2.86, SD = 2.03; $t(92) = –15.19$, $p < .001$).

Second, we tested whether participants preferred complex to simple algorithms (H2): Averaged across tasks, participants preferred complex (M = –0.12, SD = 1.76) to simple algorithms (M = –2.62, SD = 1.53; $t(92) = –11.64$, $p < .001$, Cohen's d = –1.21). There was also a significant interaction, such that increasing algorithm complexity has a larger effect on preference for objective (M = 3.28, SD = 2.86) than subjective tasks (M = 1.72, SD = 2.28; $t(92) = –4.84$, $p < .001$; figure 3).

For robustness check, we also conducted the same analysis with mean preference computed for each task averaged across participants. The results were very similar to the above analysis: Complex algorithms were preferred to simple ones ($M_{c.}$ = –0.14, SD = 1.96 vs. $M_{s.}$ = –2.61, SD = 1.16; $t(11) = –7.35$, $p < .001$), and this preference was larger for objective than subjective tasks ($M_{obj.}$ = 3.24, SD = 0.89 vs. $M_{subj.}$ = 1.70, SD = 0.88; $t(10) = –3.03$, p = .013, Cohen's d = –1.75).

For exploratory purposes and potentially for future studies, we tested how consequentialness of tasks (i.e., riskiness) is related to task complexity averaged across tasks. Task consequentialness was significantly correlated with task complexity ($r(184) = .51$, $p < .001$), meaning that more consequential tasks are considered more complex or more complex tasks have more serious consequences if performed incorrectly. Therefore, consequentialness of a task can potentially be considered another dimension of task complexity (alternatively, it can be an external feature because it relates to human preferences and values about the

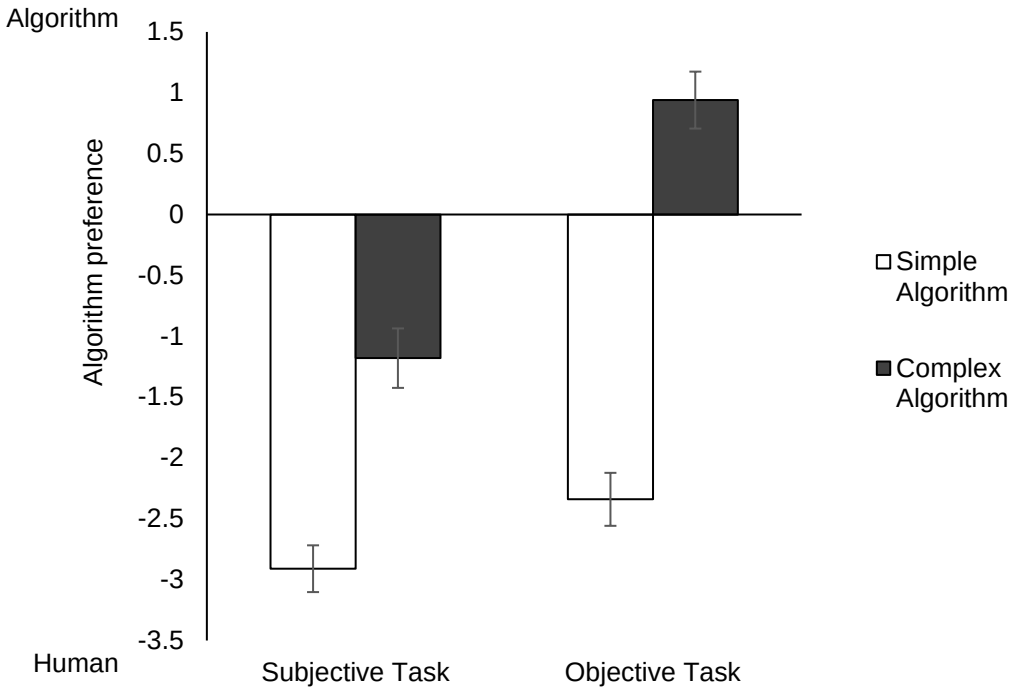
outcomes of a task rather than its inherent characteristic). This correlation was also confirmed for tasks averaged across participants ($r(10) = .78$, $p = .003$).

Then, averaged across tasks, task complexity was moderately correlated with task objectivity ($r(184) = .32$, $p < .001$), showing that complexity increases when objectivity increases. This is consistent with Inbar, Cone, and Gilovich (2010) and might potentially explain why the interactions in studies 2–3 are directionally similar. However, at the task-level averaged across participants, this correlation was only marginal, $r(10) = .55$, $p = .066$. This only marginal correlation, as well as non-significant correlation between complexity and objectivity in study 1, shows that complexity is not always related to objectivity (see also internal meta-analysis).

To sum up, study 3 provided further support to hypothesis 2 that complex algorithms are preferred to simple ones. It also showed that the effect of algorithm complexity is more pronounced for tasks perceived more objective than subjective. This interaction adds to Castelo et al.'s (2019) main finding showing that algorithms are indeed preferred when doing objective tasks, however, only when the algorithms are considered complex enough.

FIGURE 3

INTERACTION FROM STUDY 3



NOTE.—Algorithm preference was measured on a scale from –5 (“Human”) to 5 (“Algorithm”). Error bars indicate standard errors of the mean.

STUDY 4: FRAMING A TASK AS SIMPLE VERSUS COMPLEX

So far, we have seen that consumers prefer complex to simple algorithms. Study 4 aimed at understanding the mechanisms explaining such a preference. It tested hypothesis 2b that consumers’ general tendency to choose overfitting models with greater number of variables might explain this preference for complexity in algorithms. It further tested the main effects in hypotheses 1 and 2a and the interaction between task and algorithm complexity in hypothesis 3—this time between subjects and with a more realistic main task. In addition to testing main hypotheses, the study also examined whether the same task can be framed as simpler or more complex, having practical implications for marketers.

Method

Participants. For this study, we recruited 800 participants (M_{age} = 43.83, 54.56% female) from Amazon Mechanical Turk (power analysis using G*Power indicated that we need to hire at least 619 participants for the two-way interactions analysis with the small to medium effect at .2 and power level at .95). Participants (N = 30) were excluded for failing attention checks. In this study, attention checks were similar to study 2, except that there was only one comprehension check.

Procedure. Study 3 used a 2 (task: simple, complex) × 2 (algorithm: simple, complex) between-subjects design. Participants were asked to fill out a questionnaire called "Perfume quiz", at the end of which they would receive a personalized fragrance recommendation from an algorithm. To manipulate algorithm complexity, the algorithm used to make recommendations either used a lot of data from the participant or less data from the participant. In the simple algorithm condition, participants answered two questions (e.g., "What fragrance do you generally prefer?") with 3-4 available answers (e.g., "Woody & earthy"). Participants in the complex algorithm condition, answered eight dummy questions (e.g., "What does your wardrobe look like?") prior to answering the two questions used in the simple algorithm condition. The answers to the eight dummy questions did not affect the recommendations. Based on their answer, all participants received a recommendation out of 14 possible options (all unisex for simplicity of the quiz). These questions and recommendations were adopted from a real recommendation service ("Fragrance finder" available at Sephora personal care and beauty website, www.sephora.com).

To manipulate task complexity, we showed participants one of two different introductions to the quiz before they started. In the simple task condition, they read "although there are many different smells, they are all composed from just a few basic components, so it is

remarkably simple to predict what smells a particular person will like". In the complex task condition, they read "humans have the ability to detect and discriminate at least 10,000 different odorants, so it is remarkably complex to predict what smells a particular person will like" (see web appendix A for full stimuli and manipulation description). After getting the recommendation from the algorithm, participants filled out additional measurements.

In this study, the main dependent variable was choice measured by the three questions (α = .93; e.g., "I find this recommendation helpful"; web appendix B) on a scale from 0 ("Completely disagree") to 10 ("Completely agree"). Additionally, when receiving a recommendation, participants were offered an option of getting more information about the fragrance recommended. If they had selected this option, they were redirected to Sephora's website with the full description of the product, price, and possibility to order.

As a manipulation check, we asked participants to rate complexity of the task and the algorithm on a scale from 0 ("Too simple") to 10 ("Too complex"). A short definition from study 1 was added to foster thinking about inherent task complexity regardless of the task-doer.

To test whether consumers' general preference for longer models can explain their preference for complex algorithms, we asked them two questions about the algorithm's goodness-of-fit (α = .67; e.g., "How much information does the quiz collect in order to make a good recommendation?") on a scale from –5 ("Too little information") to 5 ("Too much information"), and a yes/no question if the algorithm needs to collect more information (see web appendix B for all items).

In addition to testing our main predictions, we also asked some questions for exploratory purposes. Thus, participants answered questions about task objectivity, algorithm black box and uniqueness from study 1, and task consequentialness from study 3, some of which to be tested in the internal meta-analysis.

Results and Discussion

First, the results revealed that our manipulations of task and algorithm complexity were successful: Algorithm complexity was higher in the complex algorithm (M = 4.31, SD = 1.46) than in the simple algorithm condition (M = 2.69, SD = 1.74; $t(768) = –13.91$, $p < .001$, Cohen's $d = –1.002$). Task complexity was also higher in the complex task (M = 6.84, SD = 2.16) than in the simple task condition (M = 5.37, SD = 2.13; $t(768) = –8.56$, $p < .001$, Cohen's $d = –0.69$).

Second, to test whether consumers were more willing to rely on the algorithm's advice if the task is seen as simpler (vs. more complex; H1), we conducted a linear regression predicting choice from task condition. In this regression, we controlled for gender as we speculated that women might have higher interest in perfumes than men. Indeed, both task condition ($b = –0.19$, SE = 0.09, p = .039) and gender (b = 0.26, SE = 0.09, p = .006; VIF = 1.00) significantly predicted choice (however, when gender was not controlled, task complexity condition was not significant, $b = –0.14$, SE = 0.09, p = .135). Consistent with H1, those in the simple condition were significantly more likely to choose recommended fragrance than those in the complex condition (while controlling for gender). Additionally (see web appendix D), the effect of gender on choice was mediated by uniqueness (b = 0.05, SE = 0.02, 95% CI [0.017 0.095]), because women believed they are more unique than men did (b = 0.15, SE = 0.05, p = .002).

Third, participants evaluated the complex algorithm as better fitting (i.e., accounting for more details) than the simpler one ($M_{s.} = –1.98$, SD = 1.71 vs. $M_{c.} = –0.50$, SD = 1.28; $t(768) = –13.57$, $p < .001$, Cohen's $d = –0.98$). Interestingly, they rated both algorithms as too short and poorly fitting, potentially indicating preference for even longer models. Similarly, the participants indicated that simpler algorithm should collect more data (M = 0.49, SD = 1.71),

while the complex one was *relatively* fine in this regard (M = –0.50, SD = 1.28; $t(768) = 8.10$, $p < .001$, Cohen's $d = 0.58$, where "no" was contrast-coded as –1).

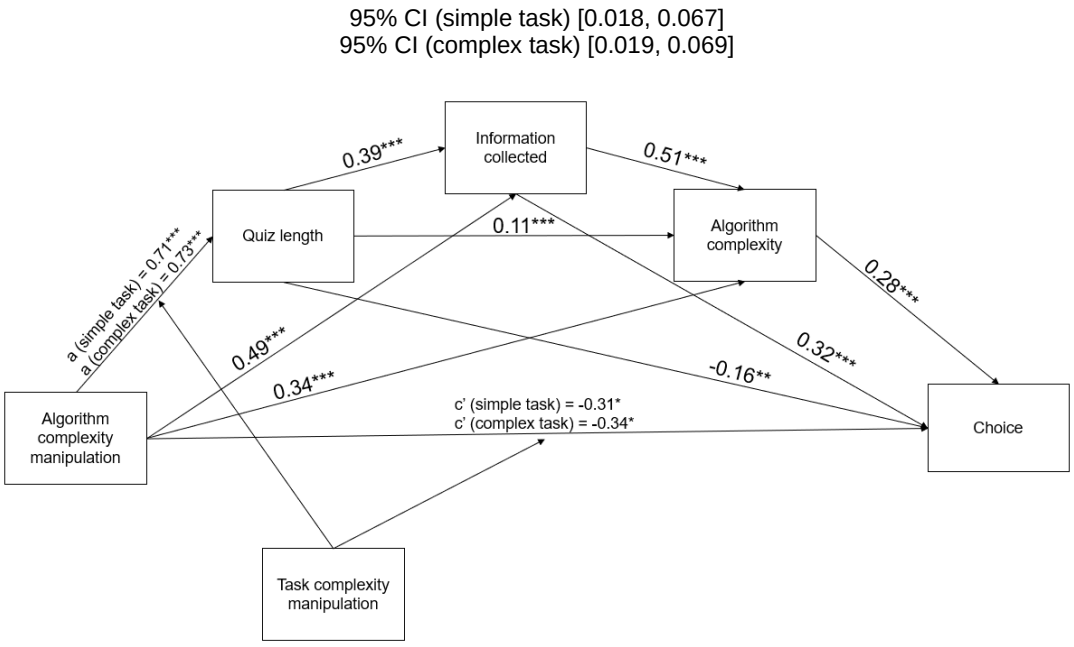
Next, we tested whether preference for complex algorithms is greater in tasks perceived as more complex (H3). For this, we used MANOVA, where choice and willingness to know more about the product were input as two dependent variables, and task and algorithm complexities were input as two factors. The results showed that there was no significant interaction between task and algorithm complexities ($F(2, 765) = .171$, $p = .843$), contrary to predictions.

In addition to the MANOVA results, to test H2b whether preference for complex algorithms is mediated by the perception that more complex algorithms are better fitting and H3 that this preference is greater in tasks perceived as more complex, we also run Model 86 (PROCESS; Hayes 2013), where goodness-of-fit (mediator) was operationalized with quiz length and amount of information collected. Although there was no effect of algorithm complexity manipulation on choice ($b = 0.27$, $SE = 0.09$, $p = .772$), there was a significant mediation effect on the path from algorithm complexity condition → quiz length → information collected → algorithm complexity → choice with moderations on the paths a and c' ($b_{\text{simple task}} = 0.04$, $SE = 0.01$, 95% CI [0.018, 0.067]; $b_{\text{complex task}} = 0.04$, $SE = 0.01$, 95% CI [0.019, 0.069]; figure 4). In this model, increasing algorithm complexity by adding more variables positively affected its perceived length ($b = 0.72$, $SE = 0.07$, $p < .001$), which, in turn, increased perception that enough information is collected ($b = 0.39$, $SE = 0.03$, $p < .001$), driving complexity of the algorithm ($b = 0.51$, $SE = 0.03$, $p < .001$), ultimately increasing choice ($b = 0.28$, $SE = 0.07$, $p < .001$). There was no significant interaction between conditions on number of variables ($F(1, 764) = .01$, $p = .912$; path a), as well as on choice ($F(1, 761) = .03$, $p = .867$; path c'), meaning that the effect of algorithm complexity manipulation on choice via our mediating variables is the same for simple and complex task

conditions. Thus, this study supported hypothesis 2b that goodness-of-fit mediates the effect of algorithm complexity condition on choice but did not support hypothesis 3 that complex algorithms are more preferred when the same task is framed more complex (vs. simple)—it showed that the preference for complex algorithms in simple tasks is the same as in complex ones. (The results were similar in the model where the dependent variable was willingness to know more about the product being redirected to Sephora, see web appendix D.)

FIGURE 4

MODERATED MEDIATION ANALYSIS FROM STUDY 4 WITH CHOICE AS A DEPENDENT VARIABLE



*p < .05; **p < .01; ***p < .001
NOTE.—Total effect is not available in PROCESS Model 86

To sum up, study 4 confirmed hypothesis 1, showing that consumers preferred algorithms doing the task when it was framed as simple (vs. complex), although only after controlling for gender due to the nature of the task. Thus, it is possible to frame tasks that consumers already know as simpler or more complex, helping practitioners weaken algorithm aversion.

Although this time the results did not show that consumers prefer complex to simple algorithms (H2a), the study demonstrated that there is an indirect effect of algorithm complexity on preference via individuals' general tendency to select models that are longer and have allegedly better fitting to generate accurate recommendations (H2b). However, in this study there was no significant interaction between task and algorithm complexities (H3), as we saw in study 2. It is possible that the interaction was not significant because the same task was framed as simple and complex (in study 2 the tasks were different for simple and complex categories), and although this manipulation worked, apparently, this was not enough for the significant interaction in hypothesis 3.

INTERNAL META-ANALYSIS

To address inconsistencies in our studies' results (e.g., around task objectivity and task complexity), we conducted an internal meta-analysis with greater statistical power using the lme4 package in R (Bates et al. 2015). Data were analyzed using mixed effects models with random intercepts for study number (including additional pre-tests from web appendix C). In addition to testing our conceptual model, we conducted some exploratory analyses for future research and additional contributions to the literature.

First, we ran the model to predict task complexity by task objectivity, task consequentialness, age, gender, and computer programming skills identifying what factors drive task complexity most. Task complexity was negatively predicted by task objectivity (b = –0.16 , SE = 0.03, $p < .001$) and positively predicted by task consequentialness (b = 0.13, SE = 0.03, $p < .001$), where more subjective or riskier tasks were seen as more complex. Although the literature (Inbar et al. 2010) suggests that subjective tasks are usually considered simpler than objective ones, in our studies, when it comes to algorithms,

consumers think that subjective tasks are more complex (although we had asked participants to concentrate on inherent task complexity, most likely they were still thinking about *algorithms* doing the tasks). Also, older participants evaluated tasks as slightly more complex (b = 0.02, SE = 0.01, p < .001), but there was no effect of gender (b = –0.04, SE = 0.08, p = .610) and programming skills (b = –0.04, SE = 0.03, p = .180). (See web appendix E for details.)

Second, we computed algorithm complexity as a function of black box, age, gender, and programming skills (we did not include task complexity, as there was only one study where both algorithm and task complexity were measured at the same time). Previously our results around black box were inconsistent (e.g., between study 1 and a pre-test in web appendix C). The meta-analysis with greater power (studies 1, 4, and a pre-test 1) showed that black box can significantly predict algorithm complexity (b = 0.11, SE = 0.03, p < .001), consistent with study 1. Again, the more consumers understand how an algorithm turns inputs into outputs, the more they think it is complex. Gender had a marginal effect on complexity (b = –0.12, SE = 0.06, p = .060), where men reported greater algorithm complexity, with age and programming skills having no significant effects (b = 0.01, SE < 0.01 , p = .200 and b = 0.02, SE = 0.02, p = .320, respectively).

Finally, programming skills were predicted by both gender (b = –0.75, SE = 0.07, p < .001) and age (b = 0.01, SE = 0.01, p = .001), where women systematically reported lower programming skills than men, and older participants reported slightly higher programming skills than younger participants. Uniqueness was predicted by gender (b = 0.14, SE = 0.04, p < .001), where women more than men believe they are unique, but not age (b < 0.01, SE < 0.01, p = .280).

GENERAL DISCUSSION

Today we have an unprecedented opportunity to use algorithms to make important forecasts, recommendations, and decisions under uncertainty. Despite such pervasiveness of algorithms in our everyday lives, consumers are often hesitant to use predictions and recommendations from algorithms, even when they are more accurate than those produced by humans. Whether consumers are averse to algorithms (or appreciate them) varies significantly depending on the type of task for which the algorithm is used and how that task is perceived (Castelo et al. 2019). In this paper, we argue that there is another relevant characteristic inherent to the task that affects consumers' willingness to rely on machines—perceived complexity. Our findings suggest that this willingness is greater when algorithms are used for doing simpler tasks. In addition to task complexity, algorithm complexity also matters: If algorithms are considered complex enough—because consumers think they have a better explanatory and predictive ability—they are more preferred. Moreover, we found that not only are there main effects of task complexity and algorithm complexity on algorithm aversion, but also the interaction between them. The preference for complex algorithms is most substantial when the tasks are considered complex, again, because of a greater number of components to be explained, or fit by the algorithm. However, there is no interaction effect on preference between algorithm complexity and task complexity for the same task framed as simple versus complex, as shown by study 4.

Theoretical Contributions

We contribute to literature on ways of combating algorithm aversion (Bigman and Gray 2018; Dietvorst et al. 2016; Yeomans et al. 2019) by introducing a new way—framing

algorithms as more complex. This can be achieved by increasing the number of variables, the number of steps in the algorithm, its memory size or training cases database that the algorithm relies on.

Next, we contribute to *task-dependent* algorithm aversion (Castelo et al. 2019) by providing an important moderator on the effect of task objectivity on algorithm preference. In our studies, consumers preferred algorithms for doing objective tasks only when the algorithms were *complex*, suggesting that to better understand when consumers will prefer algorithms over humans, we must understand how the characteristic of a task interacts with characteristics of an algorithm.

Finally, we contribute to the literature on psychology of complexity (Ahl and Keil 2017; Lombrozo 2007) by investigating cues that consumers rely on when making inferences about complexity and boundary conditions for identifying when complexity is most preferred to simplicity (Johnson et al., 2019; Lim and Oppenheimer 2020; Zemla et al. 2020). In our studies, complex algorithms were especially preferred to simple ones when they were doing tasks considered either more complex or more objective.

Marketing Implications

There has been little investigation of practical ways that marketers can use to increase individuals' willingness to rely on algorithms, especially when algorithms outperform humans. Our findings show that it is possible to increase willingness to rely on algorithms by framing these algorithms as being more complex especially when they solve more complex tasks. Thus, there are direct implications for practitioners, and marketers can nudge consumers towards or away from using algorithms by presenting tasks and algorithms as more or less complex using complexity dimensions examined in this paper. For instance,

companies selling fitness programs can extend questionnaires that consumers fill out prior to getting recommendations on healthy dieting or weight loss. Adding more variables that the algorithm takes into consideration may make algorithms be perceived as more complex and the recommendation more customized because it accounts for more personal information (even though these variables have no impact on the recommendation).

Limitations and Future Research

While our work has provided robust evidence for the phenomenon of complexity matching between tasks and algorithms, in our studies we could not directly test the mechanism explaining preference for complexity in algorithms. Our work was inspired by research on complexity-matching in explanations (Lim and Oppenheimer 2020) and probability/likelihood tradeoffs (Johnson et al. 2019). These authors argue that two factors drive how good people believe explanations to be—(i) how likely they are to have occurred (how probable they are) and (ii) how able they are to account for the totality of nuances in the event or phenomenon. While simple explanations tend to be more probable than complex ones, complex ones are more able to account for more variability. Unlike in explaining events, the probability of algorithms to happen is less relevant for lay consumers (but not for computer scientists; Solomonoff 1960), so that consumers likely focus on the algorithms' ability to account for nuances, thus preferring more complex algorithms over simpler ones. We conducted mediation analysis showing that complex algorithms account for greater information about consumers to generate seemingly more tailored recommendations. Yet, it is quite difficult to empirically test why people generally prefer models with a greater number of variables. As in Lim and Oppenheimer (2020), we consider this a limitation of our research and leave this question for future work.

Another factor that may influence consumer's preference for more complex algorithms is their beliefs about the *costs* of maintaining more complex algorithms. Future research might address the question of whether complexity will be preferred over simplicity if the costs of this complexity are emphasized. For instance, the extended length of the algorithm's code is normally accompanied by instability of this code (Boy 2007): Algorithms can "think" longer and even crash. Will consumers prefer more complex yet more likely to be buggy algorithms? This should serve as the impetus for future research.

DATA COLLECTION

All studies were conducted between Fall 2020 and Fall 2021 using the Amazon Mechanical Turk panel (except study 1). For study 1, participants were recruited from an undergraduate students' pool. All studies were programmed using Qualtrics. Data collection and data analysis were managed by the first author, with input from the second author. Data were discussed on multiple occasions by all authors.

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WEB APPENDIX

Web appendix consists of five parts: Appendix A (methodological details), Appendix B (scale items), Appendix C (additional pre-tests), Appendix D (main results details), and Appendix E (internal meta-analysis details).

APPENDIX A

Methodological details

Study 1 – Stimuli:

TABLE A1
MEAN VALUES FOR OVERALL TASK AND ALGORITHM COMPLEXITIES FROM STUDY 1

#	Task	Overall task complexity	Overall algorithm complexity
1	Drawing a triangle	0.93	1.64
2	Adding one-digit numbers	0.89	1.06
3	Recognizing "Happy birthday to you" tune	1.13	2.47
4	Sorting items by color	1.24	2.36
5	Counting objects	1.25	1.62
6	Multiplying one-digit numbers	1.22	1.35
7	Verifying spelling of a word	2.73	2.25
8	Memorizing 5 words	1.81	1.54
9	Winning at tic-tac-toe	2.62	2.35
10	Solving a 3x3 jigsaw puzzle	2.08	2.42
11	Identifying the smallest of a set of objects	1.58	2.38
12	Making someone laugh by telling a joke	3.86	5.58
13	Unscrambling words	3.60	2.64
14	Winning at checkers	4.53	3.18
15	Assisting someone in navigation from one point to another while driving	4.05	4.15
16	Recommending a gift	4.01	4.59
17	Recommending music	3.14	3.97
18	Recognizing a person's face	3.11	4.79
19	Assisting in the selection of a diamond engagement ring	4.19	5.11
20	Memorizing a short poem	3.39	2.49
21	Winning at dominoes	3.40	2.88
22	Giving advice on personal style (clothes and accessories)	4.01	5.40
23	Selecting the best singer in a contest	4.12	5.61
24	Solving a crossword	3.97	2.81
25	Adding seven-digit numbers	4.62	2.11
26	Translating a word into a different language	4.78	2.91
27	Recommending personal acne treatment	5.40	5.24
28	Identifying a person's emotions	5.45	6.71
29	Giving personal recommendations on weight loss	5.05	5.16

30	Winning at backgammon	4.37	3.58
31	Guessing what fictional or real-life "character" one is thinking of	5.14	6.14
32	Measuring academic progress of students	4.63	4.09
33	Giving advice on profession selection for school graduates	5.44	5.07
34	Predicting salary of university graduates	5.82	4.48
35	Giving recommendations on romantic partner selection	5.17	5.83
36	Making bail decisions	6.08	5.85
37	Hiring and firing employees	5.16	5.34
38	Assessing sleep quality using information collected with wearable devices	4.97	4.47
39	Quality control and inspection of food products	5.22	5.45
40	Writing a poem	5.32	5.48
41	Determining creditworthiness of a person (credit scoring)	5.31	4.52
42	Distinguishing smells (in perfume making)	4.85	5.87
43	Predicting sex of a future child	5.65	5.49
44	Detecting credit card fraud	5.83	5.23
45	Managing traffic signals to minimize traffic jams	5.32	4.55
46	Calculating the odds of having diabetes	6.15	5.18
47	Detecting a lie	5.87	6.39
48	Colorization of films that originally are black and white	5.59	4.87
49	Multiplying seven-digit numbers	6.24	2.97
50	Winning at chess	5.77	3.89
51	Predicting football game results	5.17	4.74
52	Composing new pop song	5.83	5.37
53	Predicting an election	6.09	5.63
54	Writing a script for a comedy	5.96	6.06
55	Predicting future crime rates in an area	5.97	5.51
56	Giving advice on financial investment	6.55	5.61
57	Predicting COVID19 mortality rate	6.53	5.43
58	Predicting the likelihood of a criminal committing a future crime	6.17	5.79
59	Reconstructing missing or damaged areas of digital photographs	6.33	5.51
60	Predicting future oil prices	6.49	5.52
61	Piloting a plane	7.88	7.46
62	Predicting weather for a month ahead	6.91	5.75
63	Predicting an earthquake	6.67	5.90
64	Predicting financial crisis	6.53	6.16
65	Predicting which combinations of drugs will be most effective for each patien to treat cancer	8.12	6.48
66	Proving mathematical theorems	7.19	5.31
67	Monitoring and detecting faults on a spacecraft	7.62	6.89
68	Finding new genes responsible for particular traits	8.02	7.53
69	Operating a nuclear power plant	8.06	7.22
70	Making scientific discoveries	8.30	7.56
71	Predicting joke funniness	4.30	5.89
72	Writing news article	5.61	5.11
73	Driving a truck	5.40	6.33
74	Driving a car	5.36	6.50
75	Recommending disease treatment	7.56	6.35
76	Predicting employee performance	5.40	5.10
77	Driving a subway	5.17	5.72
78	Recommending a marketing strategy	5.97	5.32
79	Recommending a movie	2.94	3.86
80	Buying stocks	5.40	4.79
81	Playing a piano	6.45	4.84
82	Predicting stocks	6.83	5.45
83	Scheduling events	3.31	3.17
84	Analyzing data	6.47	4.43
85	Giving directions	3.48	3.16
86	Predicting student performance	5.50	4.72
87	Diagnosing a disease	7.45	6.68

Study 2 – Stimuli:

Simple tasks

1. Adding one-digit numbers
2. Sorting items by color
3. Multiplying one-digit numbers
4. Winning at tic-tac-toe
5. Identifying the smallest of a set of objects
6. Recognizing "Happy birthday to you" tune
7. Counting objects
8. Verifying spelling of a word
9. Solving a 3x3 jigsaw puzzle
10. Memorizing 5 words

Complex tasks

1. Composing new pop song
2. Giving advice on financial investment
3. Predicting the likelihood of a criminal committing a future crime
4. Predicting an earthquake
5. Predicting which combinations of drugs will be most effective for each patient to treat cancer
6. Writing a script for a comedy
7. Predicting COVID19 mortality rate
8. Reconstructing missing or damaged areas of digital photographs
9. Predicting financial crisis
10. Monitoring and detecting faults on a spacecraft

Study 4 – Stimuli:

Simple task condition description:

~~~ Welcome to the perfume quiz! ~~~

Perfume is a great way to express ourselves, build our self-image, and engage with others. Fragrances accompany us in everyday life, raising memories and feelings.

It's actually a surprisingly simple task to determine what kind of fragrance a person likes. After all, we only have about five kinds of taste buds in our mouths that can
~~~

distinguish only between a few different flavors, and all flavors are just simple combinations of those few flavors. Similarly, although there are many different smells, they are all composed from just a few basic components, so it is remarkably simple to predict what smells a particular person will like.

Producers of perfumes use a fragrance wheel—a circular diagram showing the relationships among fragrance groups. This scheme simplifies classification and naming, as well as shows how the groups are related.

We hope this quiz will help you navigate a wonderful world of perfumes and find your perfect match!

Enjoy!

Complex task condition description:

~~~ Welcome to the perfume quiz! ~~~

Perfume is a great way to express ourselves, build our self-image, and engage with others. Fragrances accompany us in everyday life, raising memories and feelings.

Nonetheless, it's a surprisingly complex task to determine what kind of fragrance a person likes. After all, we have thousands of different olfactory receptors in our noses, each detecting a different scent. Humans have the ability to detect and discriminate at least 10 000 different odorants, so it is remarkably complex to predict what smells a particular person will like.

There are hardly any perfumes consisting of a single aromatic material—even a perfume designated as "single flower" will have subtle undertones of other aromatics. Nonetheless, perfume experts can become extremely skillful at identifying components of scents just like wine experts.

We hope this quiz will help you navigate an intricate world of perfumes and find your perfect match!

Enjoy!

Simple algorithm condition (shorter quiz):

1. What fragrance do you generally prefer? Floral / Fresh / Warm & Spicy / Woody & Earthy
2. I want it to smell like: Fruity florals (e.g., peach, pear) / Classic florals (e.g., rose, gardenia) / … / Citrus & Woods (e.g., bergamot, vetiver)

   See https://www.sephora.com/beauty/fragrance-gift-guide for all options
~~~

Complex algorithm condition (longer quiz):

1. What is your age?
2. What does your wardrobe look like? I'm all about all-black-everything / Rainbow brights all year round / It's sleek and sophisticated / It's comfortable and cozy
3. What inspires your interior design choices? I like to follow tips from design experts / I get inspiration from Instagram and Pinterest / I like to have my own unique style / I'm not interested in interior design
4. Where would you rather be? Private beach / Versailles gardens / Ski resort / Hiking on a mountain
5. What is your skin type? Oily / Dry / Normal / Sensitive
6. Which mood do you want your fragrance to express? Happy / Confident / Cozy / Classic
7. How would you describe yourself? Expressive, impulsive, outgoing / Results-oriented, impatient, wanting to win / Analytical, logical, careful / Agreeable, wanting to be liked, artistic
8. What is the most important thing in a perfume for you? Design of the bottle / Value for the money / Intensity and longevity / Scent uniqueness
9. What fragrance do you generally prefer? Floral / Fresh / Warm & Spicy / Woody & Earthy
10. I want it to smell like: Fruity florals (e.g., peach, pear) / Classic florals (e.g., rose, gardenia) / … / Citrus & Woods (e.g., bergamot, vetiver) (see shorter quiz questions above)

APPENDIX B

Scale Items

Study 1 – Task and algorithm complexity questions:

In task complexity, participants rated each task on overall task complexity:

> Each of the following tasks has a degree of objective, or inherent, complexity regardless of who is doing it—humans or algorithms.
>
> Although some tasks are easy for people and hard for machines (e.g., talking) and other tasks are hard for people and easy for machines (e.g., multiplication), these tasks nonetheless have an underlying inherent complexity. This is what we are asking you to judge here. Think of the task itself regardless of the task-doer.
>
> Given the above definition of inherent task complexity, **how complex do you think each of the following tasks is?**

and on one of the following:

> Information
> Both humans and algorithms rely on specific information and knowledge required for doing particular tasks; in other words, this information is essential for the task. Some tasks require more specific information and knowledge than others.
>
> Think of the task itself regardless of the task-doer.
>
> Given the above definition of specific information and knowledge, **how much specific information and knowledge do you think is required to carry out each of the following tasks**?
>
> Uncertainty
> Both humans and algorithms operate under uncertainty when doing particular tasks.
>
> Some tasks don't involve any uncertainty, as the answer is known. Some tasks involve a moderate amount of uncertainty, as the correct answer may not be known at the time one does the task. Some tasks involve a lot of uncertainty, as one will never know if the result is correct even after the task is completed.
>
> Think of the task itself regardless of the task-doer.
>
> Given the above definition of uncertainty, **how much uncertainty do you think each of the following tasks contains?**

Precision
Both humans and algorithms do tasks that require different levels of precision—different levels of accuracy and exactness of actions. Some tasks require more precision, other tasks allow less precision.

Think of the task itself regardless of the task-doer.

Given the above definition of precision, **how much precision do you think is required to carry out each of the following tasks?**

Objectivity
Both humans and algorithms sometimes do tasks that involve a large amount of objectivity, which means that these tasks have a limited number of correct outcomes and ways of doing them. Subjective tasks, in turn, have no intrinsically right or wrong outcomes.

Think of the task itself regardless of the task-doer.

Given the above definition of objectivity, **how objective do you think each of the following tasks is?**

Customization
Both humans and algorithms do tasks that involve different levels of customization of their outcomes, meaning that their outcomes must be personalized. Some tasks' outcomes fit everyone, while others require higher degree of customization.

Think of the task itself regardless of the task-doer.

Given the above definition of customization, **how much customization do you think each of the following tasks contains?**

Creativity
Both humans and algorithms sometimes do tasks that involve large amount of creativity, whereby something new and valuable is created. Tasks that have several acceptable outcomes or can be done in several ways involve a greater extent of creativity. Tasks that have only one possible solution or way of doing require less creativity (or no creativity at all).

Think of the task itself regardless of the task-doer.

Given the above definition of creativity, **how much creativity do you think each of the following tasks requires?**
For algorithm complexity, participants rated each task on overall algorithm complexity:

In algorithm complexity, participants rated each task on overall algorithm complexity:

> For each of the following tasks, imagine that an algorithm can accurately do it.
>
> Based on your own understanding of complexity, **how complex do you think the algorithm would have to be for completing each of the following tasks?**

and one of the following:

> Number of steps
> For each of the following tasks, imagine that an algorithm can accurately do it.
>
> Normally, algorithms rely on programmed mathematical computations, or steps, that need to be performed before the required result is achieved. In some tasks, algorithms will rely on more steps, and in other tasks, algorithms will require fewer such steps.
>
> Given the above definition of steps, **how many steps do you think each algorithm would require for completing each of the following tasks?**
>
> Black box
> For each of the following tasks, imagine that an algorithm can accurately do it.
>
> In some tasks, you might know how the result is carried out by the algorithm; that is, you would know and understand the step-by-step process of this algorithm. In other tasks, you might have little or no understanding of how exactly the algorithm operates.
>
> Given the above definition of algorithm understandability, **how understandable do you think each algorithm would be for completing each of the following tasks?**
>
> Number of variables
> For each of the following tasks, imagine that an algorithm can accurately do it.
>
> Normally, algorithms rely on different pieces of information for carrying out the task. These different pieces of information are called variables. In some tasks, algorithms will rely on more variables for solving these tasks, and in other tasks, algorithms will rely on fewer variables.
>
> Given the above definition of variables, **how many variables do you think each algorithm would rely on for completing each of the following tasks?**
>
> Database size
> For each of the following tasks, imagine that an algorithm can accurately do it.
>
> Algorithms usually require a database of examples to learn and do tasks properly. In some tasks, algorithms will require more examples for doing these tasks (a large database), and in other tasks, algorithms will require fewer examples (a small database).

Given the above definition of database size, **what database size do you think each algorithm would require for completing each of the following tasks?**

Memory size
For each of the following tasks, imagine that an algorithm can accurately do it.

Normally, algorithms require work memory to operate while doing the tasks. Memory is needed during calculation to hold the programmed code and temporary results. In some tasks, algorithms will require more memory for solving these tasks, and in other tasks, algorithms will require less memory.

Given the above definition of memory size, **how much memory do you think each algorithm would require for completing each of the following tasks?**

Study 1 – Open-ended questions:

1. Think of targeted advertising online. How do you think it works? Please describe how exactly this advertising targets online users.
2. Think of Netflix. Imagine Netflix recommended you a film Jumanji: The Next Level. How do you think it recommended this film to you specifically? Please describe what exactly Netflix does to make this recommendation.
3. Now think of online dating platforms and applications. How do you think online dating apps work? Please describe how exactly they make recommendations on romantic partners.
4. Imagine that you were shopping on Amazon.co.uk and Amazon recommended a particular book to you – The Blue Tiger by Patricia McFarland. How do you think Amazon decided to recommend this book rather than some other book for you specifically?

Study 3 – Task characteristics:

Objectivity/Subjectivity of Tasks

Each of the tasks on the previous screens can be classified as more objective or more subjective.

Objective tasks have a limited number of correct outcomes. Subjective tasks, in turn, have no intrinsically right or wrong outcomes, and any outcome can be considered correct by a task-doer.

Given the above definition of task objectivity and subjectivity, **how objective do you think each of the following tasks is?**

Complexity of Tasks

Each of the tasks on the previous screens has a degree of intrinsic, or inherent, complexity regardless of who is doing it—humans or algorithms.

For example, some tasks are easy for people and hard for machines, and other tasks are hard for people and easy for machines—but all these tasks nonetheless have an underlying inherent complexity. This is what we are asking you to judge here. Think of the task itself regardless of the task-doer.

Given the above definition of inherent task complexity, **how complex do you think each of the following tasks is?**

Consequentialness of Tasks

The tasks on the previous screens have different degrees of consequentialness. Some tasks are more consequential than others, in the sense that performing the task poorly will have more serious consequences.

Given the above definition of task consequentialness, **how consequential do you think each of the following tasks is?**

Study 4 – Variables

Dependent variables

Choice:

I would love to know more about this perfume

I would love to buy this perfume

I find this recommendation helpful

Willingness to learn more about the product (being redirected to Sephora's website):

If you want to learn where you can buy it, tick this option below (Optional)

Mediation variables

How would you evaluate this quiz in terms of its length?

How much information does the quiz collect in order to make a good recommendation?

Do you think the algorithm should get more information about users to make a good perfume recommendation?

APPENDIX C

Additional pre-tests

To create a list of tasks for study 1, we conducted two pre-tests. We recruited 350 participants (M_{age} = 41.3, 54.17% female) for pre-test 1 and 50 participants (M_{age} = 37.8, 45.0% female) for pre-test 2 from Amazon Mechanical Turk website. Participants (N_{1a} = 13; N_{1b} = 10) were excluded for errors on attention checks. In these studies, we used two attention checks—one in the main task ("please select '0'") and one after the main task (a recognition memory check). Any participant was excluded from analysis who either (i) failed the first check or (ii) answered more than one-third of the second check questions incorrectly.

In pre-test 1, the procedure was similar to study 1 with three main differences. First, instead of 87 tasks, participants evaluated 51 randomized tasks. Second, in the pre-test, we measured the amount of subjectivity in the task's result on a scale from 0 ("No subjectivity at all") to 10 ("A large amount of subjectivity") (in study 1, we measured objectivity instead). Third, participants did not answer open-ended questions and uniqueness scale.

In pre-test 2, participants were asked to evaluate the list of 70 randomized tasks (51 tasks from pre-test 1 with 19 additional presumably simpler tasks) based on the overall task complexity only.

The results of pre-test 1 were similar to study 1: Correlation analysis between task and algorithm complexity for each of the tasks showed that task and algorithm complexities are highly correlated, $r(49) = .90$, $p < .001$. Further analysis showed that task complexity is correlated with information ($r(49) = .87$, $p < .001$), uncertainty ($r(49) = .62$, $p < .001$), precision ($r(49) = .83$, $p < .001$), subjectivity ($r(49) = –.50$, $p < .001$), but not customization ($r(49) = .04$, $p = .800$), or creativity ($r(49) = –.09$, $p = .515$). The Principal Component Analysis with Varimax rotation showed that these dimensions belong to two components (table C1).

Algorithm complexity was correlated with steps ($r(49) = .95$, $p < .001$), variables ($r(49) = .91$, $p < .001$), database ($r(49) = .89$, $p < .001$), memory ($r(49) = .90$, $p < .001$), but not black box ($r(49) = –.14$, $p = .336$). The PCA with Varimax rotation showed that these dimensions also belong to two different components in this pre-test (table C1).

TABLE C1
PCA WITH VARIMAX ROTATION AND KAISER NORMALIZATION: FACTOR LOADINGS FOR (A) TASK COMPLEXITY AND (B) ALGORITHM COMPLEXITY

A

	Component	
	1	2
Information		0.924
Uncertainty		0.793
Precision		0.771
Subjectivity	0.853	
Customization	0.846	
Creativity	0.813	

B

	Component	
	1	2
Steps	0.962	
Black box		0.998
Variables	0.951	
Database	0.943	
Memory	0.951	

APPENDIX D

Main results details

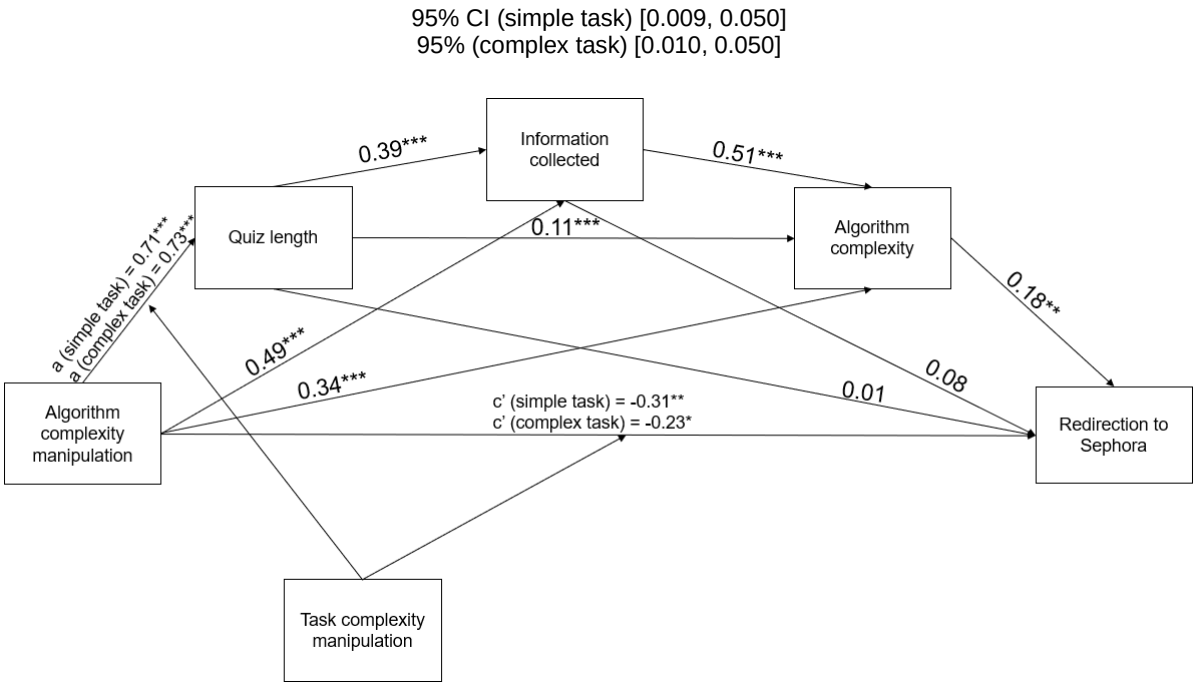
Study 4 – Moderated mediation analysis with Redirection to Sephora as a dependent variable

Although there was no total effect of algorithm complexity manipulation on willingness to learn more about the product (being redirected to Sephora), there was a significant serial mediation effect on the path algorithm complexity condition → quiz length → information collected → algorithm complexity → redirection to Sephora ($b_{\text{simple task}}$ = 0.03, *SE* = 0.01, 95% CI [0.009, 0.050]; $b_{\text{complex task}}$ = 0.03, *SE* = 0.01, 95% CI [0.010, 0.050]). In this model, increasing algorithm complexity by adding more variables positively affected its length (*b* = 0.72, *SE* = 0.07, *p* < .001), which, in turn, increased perception that enough information is collected (*b* = 0.39, *SE* = 0.03, *p* < .001), driving complexity of the algorithm (*b* = 0.51, *SE* = 0.03, *p* < .001), ultimately affecting willingness to get the link (*b* = 0.18, *SE* = 0.06, *p* = .002; figure C1). The direct and indirect effects were expressed in a log-odds metric since our dependent variable was dichotomous, and PROCESS coded "did not want to receive link" as 0 and "received link" as 1.

There was no interaction effects of conditions on number of variables (*F*(1, 764) = .01, *p* = .912; path a) , as well as willingness to know more about the product (being redirected to Sephora; $\chi^2(1) = .24$, *p* = .624; path c'), meaning that the effect of algorithm complexity manipulation on redirection to Sephora via our mediating variables is the same for simple and complex task conditions (figure D1).

FIGURE D1

MODERATED MEDIATION ANALYSIS FROM STUDY 4 WITH REDIRECTION TO SEPHORA AS A DEPENDENT VARIABLE



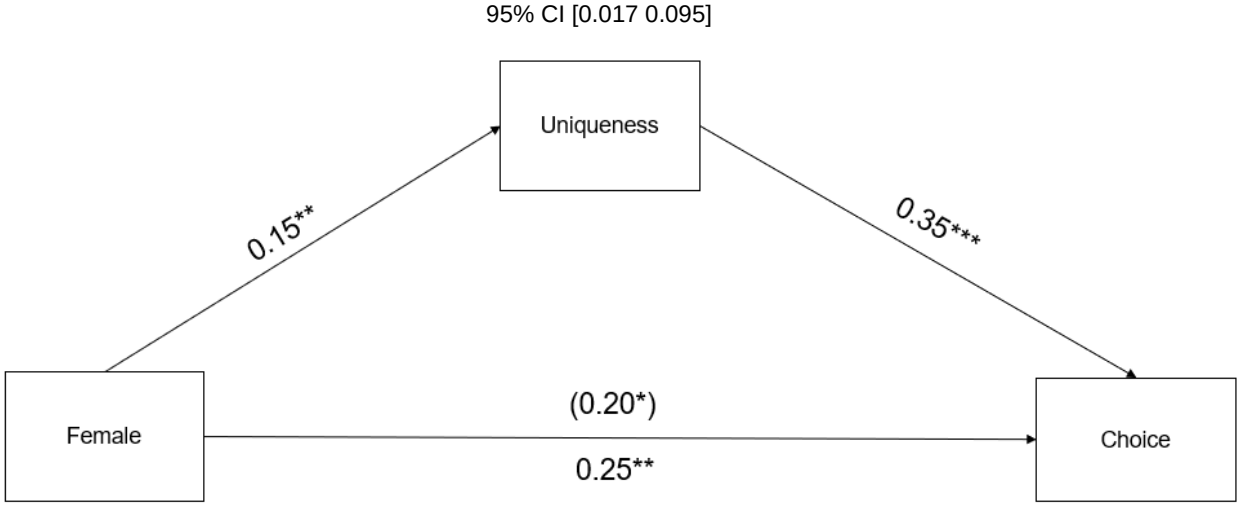
*p < .05; **p < .01; ***p < .001
NOTE.—Total effect model is not available with dichotomous Y in PROCESS

Study 4 – Mediation analysis, where gender predicted choice via uniqueness

Choice was predicted by gender (b = 0.25, SE = 0.09, p = .007) in a model where "females" contrast-coded as (1). Women were more interested in the product recommended to them than men. This effect of gender was mediated by uniqueness (b = 0.05, SE = 0.02, 95% CI [0.017 0.095]), because women believed they are more unique than men did (figure D2).

FIGURE D2

MEDIATION FROM STUDY 4 WITH CHOICE PREDICTED BY GENDER VIA UNIQUENESS



*p < .05; **p < .01; ***p < .001
NOTE.—Gender was coded with (-1) “males”, (1) “females”

APPENDIX E

Internal meta-analysis details

E1:

MODEL INFO:
Observations: 845
Dependent Variable: **Task complexity**
Type: Mixed effects linear regression

MODEL FIT:
AIC = 3660.41, BIC = 3698.33
Pseudo-R^2 (fixed effects) = 0.07
Pseudo-R^2 (total) = 0.07

FIXED EFFECTS:

	b	*SE*	*t*	*df*	*p*
(Intercept)	4.70	0.35	13.54	686.61	<0.001
Task objectivity	-0.16	0.03	-5.75	850.32	<0.001
Task conseq.	0.13	0.03	3.88	585.18	<0.001
Age	0.02	0.01	3.79	851.44	<0.001
Gender	-0.04	0.08	-0.52	851.69	0.610
Programming	-0.04	0.03	-1.34	849.36	0.180

RANDOM EFFECTS:

Group	*Parameter*	*SD*
Study	(Intercept)	<0.001
Residual		2.09

E2:

MODEL INFO:
Observations: 803
Dependent Variable: **Algorithm complexity**
Type: Mixed effects linear regression

MODEL FIT:
AIC = 3196.40, BIC = 3229.21
Pseudo-R^2 (fixed effects) = 0.03
Pseudo-R^2 (total) = 0.23

FIXED EFFECTS:

	b	*SE*	*t*	*df*	*p*
(Intercept)	3.69	0.70	5.30	5.92	<0.001
Black box	0.11	0.03	4.27	804.41	<0.001
Gender	-0.12	0.06	-1.89	804.96	0.060
Age	0.01	0.00	1.30	807.03	0.200
Programming	0.02	0.02	0.99	804.96	0.320

RANDOM EFFECTS:

Group	*Parameter*	*SD*
Study	(Intercept)	0.89
Residual		1.75

E3:

MODEL INFO:
Observations: 1486
Dependent Variable: **Programming skills**
Type: Mixed effects linear regression

MODEL FIT:
AIC = 7075.06, BIC = 7101.58
Pseudo-R^2 (fixed effects) = 0.08
Pseudo-R^2 (total) = 0.09

FIXED EFFECTS:

	b	*SE*	*t*	*df*	*p*
(Intercept)	3.22	0.23	14.00	55.01	<0.001
Gender	-0.75	0.07	-10.79	1288.06	<0.001
Age	0.01	0.01	2.75	144.62	0.010

RANDOM EFFECTS:

Group	*Parameter*	*SD*
Study	(Intercept)	0.13
Residual		2.60

E4:

MODEL INFO:
Observations: 925
Dependent Variable: **Uniqueness**
Type: Mixed effects linear regression

MODEL FIT:
AIC = 3057.64, BIC = 3081.79
Pseudo-R^2 (fixed effects) = 0.01
Pseudo-R^2 (total) = 0.05

FIXED EFFECTS:

	b	*SE*	*t*	*df*	*p*
(Intercept)	4.67	0.29	16.02	7.99	<0.001
Gender	0.14	0.04	3.12	928.94	<0.001
Age	<0.001	<0.001	1.07	632.31	0.280

RANDOM EFFECTS:

Group	*Parameter*	*SD*
Study	(Intercept)	0.25
Residual		1.25

Conclusion

A growing economy allows people to increase their living standards, facilitating economic and social mobility, giving individuals the ability to apply skills and talents, and increasing opportunities. Technology, too, has created much more jobs than it has destroyed in the last two centuries by saving people from dangerous or dull work. Automation has facilitated expertise-based professions—in medicine, law, and many other professional services. At the same time, consumers' beliefs in market economies and big business are at an all-time low (Cowen, 2019; Edelman, 2022). If people see business as so inherently evil and bad, why does it remain so integral to the basic functioning across many countries?

Until recently, cognitive scientists paid little attention to humans' intuitive theories about market economy (Johnson, 2019). Most of the time, people's heuristics work reasonably well for solving problems—biased but reasonable intuitions are better than no intuitions at all. This is not to say that heuristics and intuitions are always detrimental. As cognition without short-cuts is hardly possible (Chomsky, 1965; Keil, 1981), heuristics do sometimes lead to systematic biases, but they are usually adaptive (Johnson, 2019). This means, lay theories about market economies are not viewed as inaccurate and corrupted representations of economic processes, but rather as the outcome of adaptive cognitive systems that appeared in humans as a response to specific challenges.

Current doctoral thesis aims at answering the two fundamental questions to the modern consumer behavior stated in the introduction.

1) Why is there a widespread perception that marketers manipulate consumers? What explains such fanciful beliefs about the power of marketing? In this research, I investigated the reasons behind the ease with which consumers intuitively accept the idea that selling products is too simple for marketers—consumers' lay theories that are largely based on their evolutionary adaptations. First of all, such ease of believing

in the power of marketing persuasion is the concept of resource distribution in lay understanding. In other words, consumers think that when a product is sold and a company receives its revenues, it is taking away someone else's money, usually that of consumers, so that the consumers are becoming worse-off. In reality, when a product is sold, the profit of the company is derived from the new value created. Another foundation of manipulation beliefs tested in my research was threat-detection mechanisms. Consumers feel *safer* thinking that manipulations coming from marketers (Paper 1) or non-human agents (Paper 3) are effective and detrimental (even if it is not true)—forewarned is forearmed. Overcoming these default beliefs usually takes solid cognitive efforts.

2) Despite an unprecedented opportunity to enjoy the benefits from algorithms to make important forecasts and decisions under uncertainty, to use machines where it is impossible for humans to step, to fully utilize algorithms' capacity to operate huge datasets, consumers create a roadblock and refuse to accept superior machines. How stable is algorithm aversion and what are the boundary conditions to it? Paper 3 investigated and tests the connections between algorithm aversion with the consumers' broader and older cognitive mechanisms. In addition to understanding the reasons why consumers prefer complex machines and mechanisms underpinning this preference, I showed that it is possible to frame algorithms so that the consumers are less reluctant to use machines when they are better than humans. These might help not only to introduce artificial intelligence further in the society, but also be helpful in overcoming a broader problem such as a fear of being exploited.

Discussion of Consumer Autonomy

Until recently, marketing communications served not only as a source of information about a product and a company, but also as a source of entertainment—consumers shared amusing advertising in their social networks and visited web-pages entirely dedicated to advertising and creativity (e.g., vintageadbrowser.com and theinspiration.com). Nowadays, consumers view advertising and other marketing communications as a source of information in the first place, considering even humor appeal ad as manipulative (as demonstrated in Paper 2).

Although free choice has always been important for consumers, currently the worry about autonomy has become one of the most crucial issues for marketers. As the public's understanding and attitudes towards commercial advertising are transforming, more literature is calling marketing scholars' attention to studying consumer perceptions of autonomy and outline an agenda for doing so in a changing marketplace (Wertenbroch et al., 2020). Understanding how consumers perceive their autonomy as they navigate the markets is critical yet still understudied.

All three papers in my thesis discuss the importance of perceived autonomy in consumer behavior in light of the transforming markets. Although consumers become more and more educated about various marketing tactics, technology, and neuroscience, these things may scare them more than they seem helpful, so that consumers view companies as sources of threat. The more consumers know and hear about modern marketing activities, the more likely they are to react (Brehm, 1966), as suggested by Paper 2, for example. If consumers think they cannot help processing marketing stimuli, they tend to call these stimuli immoral and even reconsider their attitude towards the company.

In addition to the existing seemingly dangerous activities of businesses, the recent pandemic of COVID-19 has dramatically contributed to consumers' epistemic vigilance—an

excessive amount of information concerning the disease such that the solution is made more difficult and a wide spread of misinformation (collectively known as infodemic; World Health Organization, 2022) caused further confusion and suspicion among consumers.

Theoretical Implications

This research has shown that consumers fear manipulation not only in situations of true-persuasion, but also where no persuasion is possible. To my knowledge, mu findings are the first to empirically show the connection between manipulation beliefs and the core cognitive mechanisms such as threat-detection (operationalized via sense-making and mentalizing; Paper 1), beliefs about information processing (Paper 2), and innate preference for complexity under certain conditions (Paper 3). This shows wider connection with conspiracy ideation, and possibly other belief systems such as religion, paranormality, superstitions that are as old as human species. Thus, this research makes contributions to the corresponding literatures indicated in each paper.

In addition to the implications that each paper identifies, I believe this doctoral thesis contributes to the following literature. First, it contributes to the lay theories literature (Furnham, 1988; Haslam, 2017) by investigating how consumers' beliefs about the marketplace determine their behavior in daily situations. Second, it contributes to the literature on free will beliefs (Bandura, 1989; Monroe, Dillon, & Malle, 2014; Wertenbroch et al., 2020) because all three papers discuss how critical autonomous choice is for consumers, and how they react when any external influence (companies or algorithms, or both—sometimes seemingly) interfere with their decision-making.

Finally, the results of my studies show that some demographic types can also affect manipulation beliefs and, potentially, fear of algorithmic advancement. As such, the meta-analysis of demographic factors in Paper 1 showed that women have higher motivations to

understand others and, therefore, tend to report higher manipulation beliefs. The meta-analysis in Paper 3 indicated that women systematically report lower computer skills (than men), which might potentially affect their fear of algorithms (although this conjecture requires further investigation). Therefore, researchers who study demographic differences based on gender might find these results interesting.

Practical Implications

From a practical standpoint, I believe this doctoral thesis is useful too. For instance, it might raise many important managerial questions. Consider a case: A manager of a newly set company might think that they should launch a new advertising campaign *just because other companies do so*. Is it possible that this sector of the economy is to some extent based on a cognitive illusion? In this case, such *self-fulfilling prophecies* make many people hold unbacked beliefs about the power of marketing (and political) persuasion not because it is effective but because it is pervasive. Such influence might not be effective at all, but it makes us *think* that it is powerful. This premise once again illustrates that laymen must question the established causality between the events given the extreme complexity of the marketplace (Leiser & Aroch, 2009).

In addition to challenging the established norms, the research also offers several solutions to marketers. First, segmenting people based on individual differences can help better adapt educational programs about persuasion from companies and tailor the use of algorithmic advice. Second, the models in my papers not only help identify *who* might have pronounced beliefs about manipulations, but also *how* to combat such false-positive beliefs. In Paper 1, I discussed a possibility to make consumers' persuasion-coping intentions more salient to make beliefs accurate using situational framings. In Paper 2, I proposed using System 2 persuasion tactics to increase perceived autonomy of consumers in their decision-making

process. In Paper 3, I suggested that framing non-human algorithms as more complex might bring machine generation of recommendations closer resembling human generation of recommendations.

Together, the three papers address a pervasive managerial problem known as the *last mile problem* (Berinato, 2019). This concept is commonly used to describe how a superior good or service fails to be delivered to the end user for various reasons. In the context of lay theories, the difficulty oftentimes rests in the consumers' own prejudice about the companies.

Whether pervasive or not, consumers resent the feeling of exploitation and firms must prune such sentiments at their roots. Understanding the depths of those roots, as we have done here, is valuable both for consumer research and for firms' bottom lines—appropriate brand management and marketing communications. Following recommendations in my thesis might help make consumers' attitudes towards the marketplace, firms, and capitalism in general more accurate.

Broader Implications of the Research

Social Implications

The findings of each paper are beneficial not only to companies, but also to governments and policymakers who are often believed to manipulate voters and citizens. Consumers are known to be very good at detecting others' intentions and making sense of the social events (as discussed in Paper 1). Yet sometimes their beliefs and understanding do not accurately reflect reality.

In 2022, two of the biggest fears among consumers are losing freedom as citizens and experiencing job loss (Edelman, 2022). Although trust in business is the highest compared to governments and media (e.g., businesses are seen more competent and ethical than governments and media), still much work needs to be done to improve trust (52%

respondents believe that capitalism does more harm than good in the world). People expect companies to be more involved in the main societal issues such as jobs, economy, technology, automation, wage inequality, to support particular ideology etc.—at the same time, they think businesses do not engage enough on the issue of trustworthy information. As companies and governments are thought to go hand in hand, business and political leaders are anticipated to take actions to contribute to the ultimate societal well-being. Edelman (2022) recommends that the businesses, governments, and media provide only consistent, trustworthy, and fact-based information to breaking the cycle of distrust towards institutions.

However, as shown by this research and existing literature, the road to societal well-being is paved not only with good intentions but also with biases and prejudice, many of which are the results of evolutionary adaptations. This research demonstrates that individuals sometimes hold false beliefs as a result of their threat-detecting mechanisms, and that people are not as gullible as they are thought to be. Therefore, another way to return trust and accurate beliefs around governments and enterprise (over-and-above the strict control over information credibility from institutions as suggested above) is making lay public more aware of the obstacles created by evolution. I think, awareness and education about humans' *own* imperfections can also help increase trust in institutions and the entire system.

Understanding the nature of our own beliefs can be of a huge help to improve trust. For instance, from a policy perspective, if so many beliefs about the markets and capitalist society are indeed distorted and spring from misunderstanding, they are an important target for economic education (Bhattacharjee et al., 2017; Leiser, Bourgeois-Gironde, & Benita, 2010). Here, I can foresee at least two important education messages. First, *marketers do not create needs of consumers*—they can only address these needs by finding a match between a product and a customer who needs it. The effectiveness of marketing tactics is indeed limited (remember, persuasion is extremely hard!). Second, as market transactions are not a zero-sum

game, marketers help sell products that are *the outputs of economic growth and value creation,* and not the output of re-distribution of existing resources.

Economic Implications

How often do we hear a phrase "this is a useless product—another rubbish that marketers created and now want to sell us" (e.g., from detox products [Mohammadi; 2014] to facial flex devices [Graeme Law's Blog, 2011] to canned air [Kurichenko, 2020]). Usually, advertisers are blamed for aggressively pushing the sales sometimes using intrusion into consumers' decision-making without their awareness (e.g., darksidesubliminal.blogspot.com). In reality, expert economists know that selling even air is not too bad for the economy—it creates economic growth by creating job places and brings development to the life of consumers (even if it is very incremental). As Dan Ariely suggests: "The line is narrow indeed between being motivated to work and mortgaging the future—both your own and society's—to get stuff like bottled air. Still, as we continue to redefine capitalism, let's not discount the role of aspiration and the desire for incremental luxuries—things we want and don't necessarily need. They can fuel productivity and thus have a valuable function in our economy." (Ariely, 2011). I believe knowledge about market economy might facilitate better policymaking (Althaus, 2003; Pennycook & Rand, 2021). This is critical, as a misinformed public will systematically make poor decisions (Caplan 2002, 2007).

Ethical Implications

From the ethical point of view, the broader research questions in this thesis are aimed at dispelling the wide impression of lay public that marketing practice is based on unethical (manipulative) actions from firms—by studying consumers' marketing morality judgments and ways of attenuating them. Some results of the thesis are helpful to transform not only lay theories about the companies and brand attitudes toward specific firms, but also lay theories and attitudes towards marketing as a *business discipline*.

Limitations and Future Research

Despite the robustness and wide application of the findings, this research has some limitations. For instance, our empirical case is stronger for the basic effects of cognitive mechanisms than the supporting process evidence (e.g., in Papers 1 and 3). Some implicit psychological processes (e.g., salience of consumers to cope with persuasion or preference for complex explanations) can hardly be measured using self-report measurements only. On the contrary, sense-making motivation (SMM) in Paper 1, for instance, is itself a measure of cognitive processes and, therefore, our results *are* informative about psychological mechanisms. Moreover, we provide some mediation evidence toward understanding the intervening variables between implicit mechanisms and beliefs, particularly persuasion knowledge access in Paper 1 (Study 4) and preference for more variables in Paper 3 (Study 4). Nonetheless, more systematically understanding these mechanisms would be a valuable goal for future research.

Another limitation of measuring lay theories mainly lies at response sets (Furnham, 1988). Participants do not always accurately fill out self-report measurements because of various reasons, including social desirability bias (Nisbett & Wilson, 1977) and limits in their ability to understand own feelings and thoughts (Fonagy et al., 2016; Nosek, 2011). This is not to say that self-report is never accurate, but its accuracy is uncertain, and one should be aware of this limitation.

Another limitation lies at our samples—our consumer sample was, on average, well-educated and able to use online tools. Future research might investigate lay users who do not use online tools regularly and are unfamiliar with advanced technology systems.

Furthermore, though my research mostly examines American adults (and some studies British undergraduate students), there might be reasons of investigating lay beliefs in more diverse populations. Thus, the view of selfish behavior related to the understanding of profit-

making companies differs widely across cultures (Henrich et al., 2001; Mellers et al., 2010). For instance, consumers in countries with developing economies may more easily see the benefits of profit than consumers in developed countries whose economies experienced this economic development in the past. This is because developing economies are experiencing larger current wealth gains through business expansion (Bhattacharjee et al., 2017; Inglehart & Welzel, 2005). Moreover, such societal factors as the levels of corruption, the power of institutions, and beliefs about broader state of the world also impact understanding of profit-making motivations (Peysakhovich & Rand, 2016).

Finally, it would be valuable to identify further boundary conditions. We did identify some theoretically relevant boundaries: For instance, in Paper 1 internal meta-analysis, our situational and individual difference variables interact such that the situational framing effects do not occur for a particular group of participants, and we discuss how this is managerially relevant. Still, future work might examine other potential boundary conditions in each paper. For example, researchers might test priming consumers with situations containing potential threats—will this increase manipulation beliefs? Whereas will priming free will beliefs potentially decrease manipulation beliefs? Or if the participants are reminded that the persuasion is targeted at their own benefit (i.e., a paternalism scenario as in doctor-patient or parent-child relationships), will they still think that such persuasion is immoral? Finally, what will change if they are reminded that non-human "persuaders", such as algorithms, lack intentionality?

Final Conclusion

It is extremely important to understand the roots of beliefs about the marketplace and economy to foresee and avoid situations when people are guided mostly by their intuitions about economy and society and about how the resources should be allocated. A market

society relies on the willing participation of its members (Bhattacharjee et al., 2018), but individuals may be reluctant to participate in a system that they distrust. Even if the market is objectively an efficient means of allocating resources, general lack of trust can destroy the very foundation on which it relies for development.

In the three articles, I argue that understanding consumer behavior requires deeper insights into human cognition. Every day, consumers access a range of lay theories about the nature of companies, other customers, and the marketplace processes similarly to how they interpret and make sense of other complex phenomena (e.g., Furnham, 1988). These lay theories about the marketplace shape their brand attitudes, purchase intentions, and decisions in many ways.

First, consumers' understanding of how human mind works—theory of mind—is a critical basis for everyday interaction with companies and other consumers. Papers 1 and 2 demonstrate that consumers' beliefs about manipulativeness of marketing persuasion largely depend on consumers' understanding of human cognition and (sometimes) over-reacting to persuasion attempts because of evolutionary development. As a result, consumers may boycott not only companies, but also governments, as business and politics are often believed to go hand in hand. Such conspiracist views oftentimes lead to many irrational decisions in the end.

Second, because of unprecedented advancement of artificial intelligence, consumers must adapt and develop their theory of machine—understanding of how non-human cognition operates. This adaptation has critical consequences in many spheres of humans' daily life, including their behavior as consumers. Paper 3 argues that new technology adoption cannot do without psychology. Particularly, it argues that it is important to know how consumers understand the concept of complexity derived from cognitive psychology (e.g., Johnson et al., 2019; Lim & Oppenheimer, 2020). It demonstrates that consumers' beliefs about algorithm

complexity (as a part of their theory of machine) and their beliefs about explanation complexity (as a part of their theory of mind) are very related. If algorithms are not considered complex enough, consumers may refuse relying on them even if they are known to be superior to humans.

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