# Deciding to be authentic: Intuition is favored over deliberation when authenticity matters

Kerem Oktar [*], Tania Lombrozo

*Department of Psychology, Princeton University, United States of America*

## ARTICLE INFO

## ABSTRACT

Deliberative analysis enables us to weigh features, simulate futures, and arrive at good, tractable decisions. So why do we so often eschew deliberation, and instead rely on more intuitive, gut responses? We propose that intuition might be prescribed for some decisions because people's folk theory of decision-making accords a special role to authenticity, which is associated with intuitive choice. Five pre-registered experiments find evidence in favor of this claim. In Experiment 1 ($N = 654$), we show that participants prescribe intuition and deliberation as a basis for decisions differentially across domains, and that these prescriptions predict reported choice. In Experiment 2 ($N = 555$), we find that choosing intuitively vs. deliberately leads to different inferences concerning the decision-maker's commitment and authenticity—with only inferences about the decision-maker's authenticity showing variation across domains that matches that observed for the prescription of intuition in Experiment 1. In Experiment 3 ($N = 631$), we replicate our prior results and rule out plausible confounds. Finally, in Experiment 4 ($N = 177$) and Experiment 5 ($N = 526$), we find that an experimental manipulation of the importance of authenticity affects the prescribed role for intuition as well as the endorsement of expert human or algorithmic advice. These effects hold beyond previously recognized influences on intuitive vs. deliberative choice, such as computational costs, presumed reliability, objectivity, complexity, and expertise.

In the months leading up to his engagement, Charles Darwin evaluated the merits of marriage. An entry in his journal reveals systematic deliberation and analysis: a list of reasons favoring 'marry' on one side, those favoring 'not marry' on the other (Darwin, 1838). Darwin's analysis is amusing not only because of the reasons he enumerates (notably "charms of music and female chit-chat" up against "less money for books" and "terrible loss of time"), but because he engaged in this analysis at all. For at least some modern readers, decisions about marriage should reflect love and commitment, not deliberation and enumeration. And yet, for plenty of other decisions—from choosing a stock portfolio to a medical treatment—Darwin's strategy seems just right. Plenty of advice columns tout the value of going with your gut when it comes to romantic relationships; less so when it comes to choosing a retirement plan.

What accounts for this variation in decision-making across domains? After all, deliberative analysis—a foundational component of critical thinking—enables us to weigh features, simulate futures, and arrive at good, tractable decisions. Many studies have documented sub-optimal decision-making due to over-reliance on intuitive responses and

heuristics, both in experimental (Dana, Dawes, & Peterson, 2013; Kruger, Wirtz, & Miller, 2005) and real-world settings (Kahneman & Tversky, 1984; Kuran & Sunstein, 1998). Combined with recent work demonstrating the academic, financial, and health-related benefits of critical-thinking skills to individuals (Butler, Pentoney, & Bong, 2017) and society (Bago, Rand, & Pennycook, 2020), we're left with the puzzle of why deliberation isn't universally prescribed.

Prior work offers partial answers: Deliberation requires time and effort (Gigerenzer & Goldstein, 1996; Lieder & Griffiths, 2017; Sloman, 1996; Tversky & Kahneman, 1974), whereas "intuition" – relatively fast, effortless, and uncontrolled processing – can sometimes offer a reliable basis for choice, or provide relevant information about decision satisfaction (Mikels, Maglio, Reed, & Kaplowitz, 2011; Pham, 1998; Wilson & Schooler, 1991). But new research suggests additional possibilities: Decisions made on the basis of intuition are associated with greater authenticity (Maglio & Reich, 2018; Morewedge, Giblin, & Norton, 2014) and stronger commitment (Critcher, Inbar, & Pizarro, 2012; Merritt & Monin, 2011; Tetlock, 2003). Could judgments about how decisions ought to be made stem from these considerations? In

particular, could a concern for authenticity or commitment in some domains drive the prescription of intuition as a basis for choice?

In this paper, we argue that people's folk theory of decision-making accords a special role to authenticity, where authenticity is uniquely associated with decisions made on the basis of intuition. A concern with authenticity in turn drives the judgment that some decisions – contra Darwin – *ought* to be made on the basis of intuition. To our knowledge, our studies are the first to investigate the possibility that cross-domain variation in the prescribed role of intuition relates to authenticity, and to investigate folk judgments of intuition and deliberation while carefully controlling for the "cost" and informational value of deliberation across domains.

In the remainder of the introduction, we review prior work on reasoning across domains, focusing on people's beliefs about when intuition and deliberation are typically employed or should be employed. We then motivate the two hypotheses we go on to test: that intuition is prescribed when it's important to be authentic and reflect one's true self, or when it's important to signal confidence in and commitment to one's choice.

## 1. Decision-making across domains

Prior work has found that the extent to which people rely on intuition and deliberation varies not only across individuals (Cacioppo & Petty, 1982; Epstein, Pacini, Denes-Raj, & Heier, 1996), but also across domains (Gallo, Sood, Mann, & Gilovich, 2017; Hammond, Hamm, Grassia, & Pearson, 1987; Inbar, Cone, & Gilovich, 2010; Pham, 1998).[1] For instance, people report that they rely heavily on intuition when making decisions about romantic partners or clothing, and on deliberation when making decisions about medical treatments or electronics purchases (Pachur & Spaar, 2015).

To investigate variation in the prescribed role for intuition (vs. reasoning) across domains, Inbar et al. (2010) presented participants with 25 choice scenarios (e.g., "selecting an entrée," and "choosing a college to attend"). Participants rated either how much they thought one should rely on intuition vs. reason in making that decision, or how objectively evaluable outcomes are in that domain. They found systematic variation across domains, with a greater prescribed role for intuition associated with lower objectivity (r ~ 0.85). A subsequent study also found a negative association between the prescribed role for intuition and decision complexity. Based on these findings, they proposed a task-cuing hypothesis, according to which people are cued to adopt the type of processing associated with features of the decision problem, such as its objectivity and complexity (see also Gallo et al., 2017, where the experientiality and materiality of choices cue processing; and Martinez, Gorlin, & Lombrozo, 2019, where participants show cross-domain sensitivity to the objectivity of means and ends).

Pachur and Spaar (2015) similarly found evidence of systematic preferences for intuition vs. deliberation across domains. They asked participants to complete a decision-style questionnaire for decisions in six domains ranging from purchasing clothing to electronics shopping. In addition to documenting systematic variation across domains in preferences for intuition and deliberation, they found that preferences for intuition (but not deliberation) were correlated with self-rated

domain expertise (r ~ 0.40), a factor thought to bolster the reliability of intuition as a guide to better decision-making (Dane, Rockmann, & Pratt, 2012).

Finally, Berman, Barasch, Levine, and Small (2018) investigated processing preferences for decisions about charities and investments. They found cross-domain variation in the extent to which people believe they ought to rely on 'objective measures' vs. 'personal feelings' for these decisions. They also found cross-domain variation in the *use* of objective metrics, even when objective measures were available in both cases. These findings indicate that people do not simply rely on their intuitions in some domains due to the unavailability of objective information, or the effort required to obtain it—rather, they have decision-making preferences that lead them to differentially value such information, even when it is readily available.

The results of Inbar et al. (2010) and Pachur and Spaar (2015) suggest that preferences for intuition vs. deliberation could stem from lay beliefs about the *reliability* of each process across domains, and about whether the cost of deliberation is likely to pay off in better decisions. Relatedly, work on affect-as-information theory – which conceptualizes feelings as sources of information that can be leveraged in decision-making – supports the idea that people rely on their emotions when they are likely to serve as good cues to option quality and utility (Clore, Gasper, & Garvin, 2001; Pham, 1998). However, Berman et al.'s (2018) results suggest that the computational cost of deliberation may not fully explain variation across domains, and other evidence indicates that the evidential value of intuition may not be sufficient either. For instance, people sometimes ignore costless and useful information in order to make and protect sub-optimal, intuitive decisions (Woolley & Risen, 2018), often prefer intuitive strategies over equally simple and more effective but unintuitive ones (Koehler & James, 2010), and, even when explicitly aware of the inaccuracy of their intuitions, fail to discount them to a sufficient extent (Epley & Gilovich, 2001, 2006). These results suggest that people's cross-domain processing preferences may be driven by factors beyond efficiency and perceived reliability. In the next two sections, we describe two hypotheses about what these additional factors might be.

## 2. Authenticity

Our first hypothesis is that intuition is favored in decisions for which it is important to reflect one's authentic, 'true' self. There is a rich body of work that details the properties of this folk psychological notion (for an overview, see Strohminger, Knobe, & Newman, 2017). This work shows that one's true self is seen as being inherently good (e.g., Molouki & Bartels, 2017) and moral (e.g., Prinz & Nichols, 2016). Furthermore, people attribute emotions, desires, and mental states to this notion of self (Andersen & Ross, 1984), though feelings are seen as particularly constitutive (Haslam, Bastian, & Bissett, 2004). If decisions based on intuition (vs. deliberation) are seen as more authentic or reflective of the true self, then people may think decisions ought to be made on this basis when such concerns outweigh potential costs. In a similar vein, some philosophers argue that "the ethic of authenticity introduces the idea that there are motives, desires and commitments that sometimes should outweigh the restrictions of rational reflection" (Varga & Guignon, 2020).

Three studies provide evidence in support of the link between intuition and judgments of the self. Morewedge et al. (2014) asked participants to recall events from their past and to evaluate the self-insight that would be generated if these recollections had occurred spontaneously or deliberately. Spontaneous thoughts (including intuitions) were rated as generating significantly more self-insight than deliberative methods of reasoning. Relatedly, Maglio and Reich (2020) found that when individuals made decisions based on feelings (vs. deliberation), they perceived their choices as reflecting their true selves to a greater extent, and they reported increased certainty in their decision-making. Finally, there is evidence that self-construal can have a causal impact on

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[1] A diverse set of properties, measures, and definitions have been used in this literature to conceptualize intuition and deliberation. A detailed analysis of the history concerning these concepts is not within the scope of this paper (for an overview, see Evans & Stanovich, 2013). However, we consider the ubiquity of theories that include intuition- and deliberation-like decision processes as prima facie evidence that people think about decision-making in such terms. This point is important, as our hypotheses concern the ways in which people *conceptualize* the roles of intuition and deliberation in decision-making, whether or not this conceptualization accurately reflects the underlying mechanics of the mind.

intuitive ("feeling-based") versus deliberative ("reason-based") choice: Hong and Chang (2015) found that participants prompted to adopt an independent (vs. interdependent) self-construal, or who reported a higher independent self-construal on an individual difference measure, were more likely to favor choices that were better along affective dimensions versus "reason-based" dimensions.

An important challenge for notions of authenticity and the self is the presence of much controversy in philosophy and psychology over the definitions and properties of these concepts. Some have forcefully argued that a true self exists (e.g., Rogers, 1961), whereas others consider the claim preposterous (e.g., Foucault, 1982). Furthermore, 'authenticity' is a term used by scholars across many disciplines to capture importantly distinct phenomena (Newman & Smith, 2016), and whose meaning may be context-dependent (Chen, 2019). Our hypothesis neither speaks to nor assumes a particular stance on these questions. We simply appeal to the robust folk notion of the true, authentic self, and its perceived link to intuition.

Though relying on lay concepts allows us to avoid definitional challenges, this strategy cannot address an important question: Why should authenticity be considered a virtue in decision-making at all? A potential source of insight comes from philosophy (e.g., Smart & Williams, 1973; Williams, 1981). In recent work, Paul (2017) has argued that there's something problematic about making some decisions (such as the decision to have a child) based on certain deliberative processes (e.g., relying on experts). Such reliance might support *knowledge* of which choice is best, but it cannot support genuine *understanding* of which choice is best, where self-understanding is understood as an epistemic virtue. Though there is ongoing debate about whether authenticity is an independent virtue of this kind (see Paul & Bloom, n.d, forthcoming), this work offers one way to think about why authenticity might be desirable: Authenticity requires deep personal engagement with a decision, and this engagement might itself generate practically useful self-insight—e.g., allowing individuals to learn their own preferences or values. We revisit these ideas in the General Discussion.

Summarizing work to date, there is empirical evidence linking authenticity and intuition (Hong & Chang, 2015; Maglio & Reich, 2020; Morewedge et al., 2014), as well as theoretical proposals pointing to authenticity as an important dimension of choice (Paul, 2017; Strohminger et al., 2017; Varga & Guignon, 2020). Our own proposal goes beyond this prior work in hypothesizing that the perceived link between authenticity and intuition partially *explains why* intuition is sometimes prescribed as a basis for choice.

## 3. Commitment

Our second hypothesis is that intuition may be favored over deliberation when it is important to signal commitment to one's decisions. We can certainly imagine that Emma Wedgewood – the cousin Charles Darwin eventually proposed to and married – might have felt more secure in Darwin's attachment were it accompanied by declarations of unconditional love, rather than a cost-benefit analysis subject to future re-evaluation. Indeed, one hypothesis is that emotions can serve as a "commitment device" that enables rational coordination among individuals (Frank, 1988). Generalizing from emotion (vs. dispassionate calculation) to intuition (vs. deliberation), it is plausible that decisions based on intuition more reliably signal the kind of commitment that would allow an individual or decision partner to commit to a chosen course of action.

A role for intuition in signaling commitment seems especially relevant to decisions in cooperative domains, where commitment can enhance mutual payoffs, but exposes decision-makers to the risk of defection. Formalizing this idea, Rand et al. (2014) propose an evolutionary account of intuition as a cognitive enabler of trust and collaboration at the group level. This link is illustrated well by Bear and Rand (2016) models of Prisoner's Dilemma games, where dual process decision-making agents only reach cooperative equilibria through

'intuitive' collaboration—'deliberation,' on the other hand, only ever promotes selfish defection. Many other theoretical accounts (Bowles & Gintis, 2002; Everett, Pizarro, & Crockett, 2016; Zaki & Mitchell, 2013), as well as empirical findings (Jordan, Hoffman, Nowak, & Rand, 2016; Jordan, Sommers, Bloom, & Rand, 2017; Small, Loewenstein, & Slovic, 2007) also identify intuitive or emotional decision-making as a key driver of cooperation.

Recent studies have also shown that people draw strong social inferences on the basis of others' decision processes (e.g., Barasch, Levine, Berman, & Small, 2014; Merritt & Monin, 2011; Simmons & Nelson, 2006; Tetlock, 2003). Despite using varying terminology and constructs (for instance, some find effects on judgments of willingness to punish and condemnation; Tetlock, 2000, others find effects on certainty and moral character evaluations; Critcher et al., 2012), these studies converge on the idea that an individual's decision-making can shed light on their commitment to particular *values.* For instance, Tetlock, Kristel, Elson, Green, and Lerner (2000) report studies of "taboo" trade-offs, such as saving lives versus saving money. In one vignette, participants were asked to consider a hospital administrator faced with a choice between spending a million dollars on saving a boy's life or using it for other hospital needs. Half of the participants read that the administrator found the decision to save the boy's life difficult, necessitating much contemplation; the other half read that the administrator found the decision easy and decided quickly. Participants expressed substantially more moral outrage in the slow, contemplative decision condition. In a follow-up to Tetlock et al.'s (2000) study, Critcher et al. (2012) extend these results, and elaborate on why speed of decision-making can lead to such inferences: "If deciding between two courses of action involves something of a tug-of-war between competing moral and immoral motives, the decision will be made quickly if one motive is much stronger than the other, but slowly if the strength of the competing motives is nearly equal" (pg. 309; see also Gates, Callaway, Ho, & Griffiths, 2021, linking decision speed to the strength of preferences in non-moral domains). Thus, deliberation under such circumstances can reveal "ignorance or contempt" for societally enforced norms and values (Tetlock et al., 2000). Given that people show much prejudice and animosity towards those who do not share their values and beliefs (Crawford, Brandt, Inbar, Chambers, & Motyl, 2017; Haidt, Rosenberg, & Hom, 2003; Iyengar & Westwood, 2015), people might prescribe intuition in order to signal commitment to a common set of values (and thus avoid the negative appraisal of others).

In sum, prior empirical and theoretical work on decisions in cooperative and moral domains identifies two important senses in which intuitive decisions might signal commitment: by indicating a commitment to one's choice, or by indicating a commitment to the values that underlie that choice. Our hypothesis goes beyond this prior work in suggesting that intuition may be prescribed in some decision-making contexts *because* it signals commitment.

## 4. Overview of experiments

As just reviewed, there is compelling evidence that decisions made on the basis of intuition (vs. deliberation) are thought to better reflect one's authentic self, and are regarded as better signals of commitment. However, it remains unknown whether these factors influence people's judgments of whether decisions ought to be made intuitively or deliberatively. Moreover, with few exceptions (e.g., Berman & Small, 2018), these features of intuitive decision-making have been considered within the moral domain, leaving open the question of whether and how they might account for variation across domains more broadly. Our experiments address these important lacunas.

We report five pre-registered studies that test our hypotheses (see Tables 1 and 2 for an overview). In Experiment 1, we confirm the existence of robust cross-domain variation in the prescribed roles of intuition and deliberation. In Experiment 2, we investigate whether decisions made on the basis of intuition versus deliberation are judged

**Table 1**
Overview of Experiments 1–3.

| Exp | Key Questions | Key Results | Key Measures |
|---|---|---|---|
| 1 | Do people prescribe different roles for intuition and deliberation across domains? | Yes: Intuition is prescribed more in some domains (e.g., *romance*) than others (e.g., *investment*), with inverse patterns for deliberation. | **Prescriptive intuition [deliberation]**: One ought to rely on intuition and gut feeling [reasoning and deliberative analysis] when making this type of decision. |
| | Do people differentiate how decisions *should* be made from how they *typically are* made? | Yes: Participants report relying on intuition more than they should, and on deliberation less than they should. | **Descriptive intuition [deliberation]**: I rely on intuition and gut feeling [reasoning and deliberative analysis] when making this type of decision. |
| | Does the prescribed role for intuition and deliberation predict choice? | Yes: Prescribed intuition / deliberation predict choice, even controlling for objectivity and expertise. | **Descriptive choice**: Which option would you choose? (intuitive choice…deliberative choice) **Control measures**: perceived objectivity, perceived expertise |
| 2 | Does the basis for a decision (intuition / deliberation) license domain-variant inferences about *authenticity* or *commitment*? | Yes & No: Intuitive decisions are generally seen as more authentic and committed - but only inferences of authenticity show domain sensitivity. | <u>Authenticity Measures</u> **Authenticity**: Sarah made her choice authentically. **Self-reflection**: Sarah's choice was reflective of her true self. |
| | Do inferences from Exp 2 predict the prescribed role for intuition / deliberation in Exp 1? | Yes & No: Measures of authenticity significantly predict prescribed intuition/deliberation; measures of commitment do not. | <u>Commitment Measures</u> **Commitment**: How committed was Sarah to her choice? **Confidence**: How confident was Sarah in her choice? **Control measures**: Domain & case reliability |
| 3 | Does the basis for a decision (intuition / deliberation) license different inferences across domains, even when evidence about the quality of options is matched? | Yes & No: Intuitive decisions are more authentic, self-reflective, and signal commitment to values (w/ variation across domains), but intuitive and deliberative decisions are comparable on commitment and confidence. | **Prescriptive intuition/deliberation** **Authenticity / Self-Reflection**: (i) Who made her decision more authentically? (ii) Whose decision is more reflective of her true self? **Commitment/Confidence**: (i) Who is more committed to her decision? (ii) Who has greater confidence in her decision? |
| | Do inferences about authenticity or commitment predict the prescribed role for intuition and deliberation? | Yes: Authenticity, self-reflection, commitment/confidence, and commitment to values all predict prescribed intuition and deliberation; but the relation is only moderated by domain for authenticity and self-reflection. | **Commitment to Values**: Who made her decision in a way that reflects commitment to her personal values? + **Candidate mediators** |

differentially authentic and committed, using the same domains as Experiment 1. We then relate the cross-domain variation across these two experiments to see if the inferences we explore in Experiment 2 could plausibly account for the prescribed role for intuition and deliberation in Experiment 1.

Experiment 3 addresses an alternative account of our previous results. If intuition and deliberation are thought to be differentially reliable across domains, people may conclude that intuitive decision-makers in intuitive domains made more 'authentic' decisions merely because they made *better* decisions (and vice versa). We test whether this explanation can account for our results by presenting participants with vignettes in which different evaluations of a decision-maker *must reflect the decision basis alone*. We additionally replicate results obtained by correlating judgments across Experiments 1 and 2 within the same dataset.

Experiments 4 and 5 (see Table 2) shift from correlation to causation, testing the hypothesis that variation in the importance of authenticity has a causal impact on whether intuition is perceived to be the appropriate basis for choice, both when the domain of choice is unspecified (Experiment 4) and when it is specified (Experiment 5). These experiments also explore a potential consequence of authenticity for real-world decision making: whether deference to an expert – human or algorithmic – is recommended as a basis for choice. This extension is valuable because it demonstrates that the effects of authenticity are not restricted to explicit prescriptions of intuition and deliberation, but instead extend to a natural and consequential dimension of everyday choice—a dimension becoming increasingly pertinent to quotidian decision-making as cheap advice from algorithmic advisors proliferates across domains (Castelo, Bos, & Lehmann, 2019). Finally, Experiment 5 also goes beyond Experiment 4 in showing that effects stemming from the perceived *importance* of authenticity are additionally moderated by whether it is *possible* for a given decision to signal authenticity – a nuance we introduce in the discussion of Experiment 2 and elaborate in Experiment 5.

Together, these studies illuminate the folk theory of decision making that guides our judgments of others, and that can prompt us to rely on

**Table 2**
Overview of Experiments 4–5.

| Exp | Key Questions | Key Results | Key Measures |
|---|---|---|---|
| 4&5 | Does the importance of authenticity have a causal influence on prescribed intuition / deliberation? | Yes & No: Intuition is prescribed more when authenticity is important, whether domain is specified (Exp 5) or not (Exp 4), controlling for objectivity, expertise, and complexity. But no effect for prescribed deliberation. | **Prescriptive intuition [deliberation]** **Expert Advice**: "Alex should base his decision on an expert's recommendation." **Algorithmic Advice**: "Alex should base his decision on an artificial intelligence's recommendation." |
| | Does the importance of authenticity have consequences for expert / algorithmic advice? | Yes: When authenticity is important, advice is devalued, whether domain is unspecified (Exp 4) or specified (Exp 5), controlling for objectivity, expertise, and complexity. | **Control**: perceived objectivity, expertise, complexity |
| 5 | Does possibility of signaling authenticity through choice explain cross-domain variation in prescribed intuition / deliberation? | Yes & No: Intuition is more strongly prescribed when authenticity can be signaled, even when controlling for domain reliability. But no effect for prescribed deliberation. | **Signaling possibility**: "Decisions about [romance / donations / investment] (more so than decisions in other domains) have the potential to reflect one's true, authentic self." **Control**: domain reliability |

our gut over our thoughts. Intuition is believed to possess unique capacities, such as access to one's true self. This in turn causes intuition to be judged a more appropriate basis for decisions when authenticity is valued.

## 5. Experiment 1

In Experiment 1, participants were presented with a hypothetical decision between two options. Their deliberative analysis favors one option, but their intuition favors the other. Across participants, we varied the domain of the decision from romance and hiring to politics and investment, with a total of twelve domains. Participants were asked to indicate which option they would and should choose, and how common and appropriate it would be to rely on intuition and deliberation when making decisions within those domains.

Our first aim in Experiment 1 was to establish cross-domain variation in the prescribed roles of intuition and deliberation, thus setting the stage for our subsequent inquiry. While this aspect of our design offers a conceptual replication of prior research, we went beyond this prior work in two important ways. First, prior work has solicited judgments about whether decisions *should be made* or *typically are made* on the basis of intuition versus deliberation (e.g., Inbar et al., 2010; Pachur & Spaar, 2015), where deliberation is plausibly associated with additional computational costs. By contrast, we presented participants with scenarios in which deliberation has *already* occurred. Thus, if our results demonstrate a domain-sensitive distaste for deliberation, or a preference for intuition, this cannot readily be attributed to the differential cognitive cost of engaging in deliberation across domains. Instead, our paradigm allows us to home in on people's beliefs about how much intuitive and deliberative processes should guide choice. Second, by eliciting judgments about how decisions *should be made* and *typically are made* within the same design, we can examine whether decision making norms (namely beliefs about when intuition and deliberation ought to be employed) meaningfully depart from descriptive beliefs about their roles.

Finally, past studies have not explored how cross-domain variation in prescriptive processing judgments relate to judgments of choice. These studies have either investigated choice judgments in domain-invariant experimental set-ups (e.g., Inbar et al., 2010), or simply did not measure choice at all (e.g., Pachur & Spaar, 2015). We aimed to take a first step towards bridging this important gap by measuring the relationship between descriptive and prescriptive judgments of intuition and deliberation on the one hand, and choice judgments on the other. We hypothesized that prescriptive judgments would predict choice judgments, and that this relationship would hold even when accounting for two features of decisions identified as relevant by prior work, namely objectivity (Inbar et al., 2010) and expertise (Pachur & Spaar, 2015).[2]

The study was pre-registered (see our OSF repository for all pre-registrations, materials, data, and analysis scripts, available at https://osf.io/mr9zk/); any departures from pre-registered analyses are noted.

### 5.1. Methods

#### 5.1.1. Participants

Participants were 654 adults (319 male, 333 female, 2 other, mean age = 40) recruited on Amazon Mechanical Turk in exchange for monetary compensation ($0.67 for a 5-min survey). An additional 346 participants were eliminated for failing attention checks (described below) or failing to meet the minimum time on task (2.5 mins). Minimum time limits for each task were based on the time we anticipated that it would take participants to read all instructions and materials carefully. In all studies, the sample sizes and exclusion criteria were pre-registered. Participation across all studies was restricted to users with an IP address within the United States, and with an approval rating of at least 98% on 500 previous tasks. Repeat participation within or across Experiments 1 and 2 was restricted using the TurkGate platform (Goldin & Darlow, 2013). All reported studies were approved by the Princeton Institutional Review Board (IRB).

#### 5.1.2. Materials and procedure

Participants were randomly assigned to one of twelve real-life decision domains: romance (choosing someone to start a relationship with), vacations (choosing a vacation destination), pet adoption (choosing a kitten), politics (choosing a politician to vote for), investing (choosing a stock), hiring (choosing a candidate for a job), electronics shopping (choosing a laptop), medical (choosing treatments), songs (picking songs for a party), housing (choosing a house to bid on), donations (choosing a charity to donate to), and movies (choosing a movie to watch alone). Domains were selected from those utilized in past research (Pachur & Spaar, 2015; Inbar et al., 2010; Berman et al., 2018; except for politics and pet adoption), with an eye towards those for which participants are most likely to have real world experience (omitting, for example, decisions about military tactics), and with a range of lower and higher stakes decisions spanning the expected range from more intuitive to more deliberative domains.

Participants received a vignette involving a binary decision within their assigned domain, where intuition pointed to one choice and deliberation pointed to the other. Our vignettes included detailed descriptions of the context in which the options were encountered, the kinds of experiences the participants had with the options, and participants' direct evaluations of the qualities of their options. This allowed us to control for variance in the scenarios participants might imagine when directly asked about decisions in a given domain—a concern raised about prior work (Olds & Link, 2016). This granularity also allowed us to keep the decision scenarios highly consistent, with only minor differences across vignettes (see our OSF page for all vignettes used across experiments).[3] For example, in the domain of romance participants read:

> Suppose that you are interested in starting a new romantic relationship. You were recently at a café and separately met two individuals: Alex and Taylor. At the café, you really felt in your gut that you and Alex were likely to be a good fit for each other. When you were interacting with Taylor, you did not feel like you and Taylor were a good fit for each other at all. Both interactions were long

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[2] We chose to focus on objectivity as our main alternative factor of interest from Inbar et al.'s work instead of sequentiality and complexity for the following reasons. We omitted complexity as the notion of complexity they appeal to is best suited for comparing decisions across simple economic purchases (e.g., purchasing a chocolate bar vs. a car) rather than across decisions that involve different domains (for example, there is no clear way in which adopting a pet is a more or less complex decision than choosing an investment). We omitted sequentiality as the decision processes are pre-specified in our prompts, so we cannot investigate it in our paradigm. Given the high correlations across these measures in their studies (*r* ~ 0.7), we consider objectivity to be broadly indicative of the predictions of these factors.

[3] Note that domains naturally vary across many dimensions—it is extremely difficult to control for all of these dimensions across vignettes while preserving ecological validity. Even if artificial scenarios where all factors are roughly equivalent could be contrived, it would be undesirable to do so, as we do not expect domain variation to arise from simple mappings between the names of domains and other folk notions. Instead, we expect folk theories of decision making to be responsive to the complex relationships between the many dimensions that characterize domains (e.g., sociality, experientiality). We thus try to strike a balance between keeping the formal structure across our vignettes consistent (to prevent artificial confounds) while preserving naturalistic variation across domains.

enough that you are convinced your gut feelings about them would not change even if you had an opportunity to chat further.

Later, you consult a relationship counselor and spend an afternoon listing out and weighting the characteristics that are important to you about potential romantic partners like Alex and Taylor (such as their personality, priorities, etc.). After developing the list, you are convinced of two things: first, that scores generated from the list would truly reflect the extent to which Alex or Taylor is a good match for you, and second, that even if you had more time to think about the list, your analysis would not change.

That evening, you score Alex and Taylor using the criteria that you developed with the relationship counselor. You calculate a score of 35% match for Alex and 65% for Taylor. These scores run counter to your gut reactions.

We note that, across our studies, we intentionally aimed to operationalize intuition and deliberation in highly familiar ways—for instance, by having the intuitive evaluation occur fast and unintentionally, whereas the deliberative analysis involved slow, explicit reasoning. In constructing our scenarios to match folk notions and everyday experiences of these processes (as detailed, for example, in Evans, 2010), we aimed to create highly naturalistic stimuli—whether or not these descriptions accurately reflect the actual psychological properties of these processes (on which there is much debate; see Evans & Stanovich, 2013, for a review). The consequences of this decision are given consideration in the General Discussion.

Participants were asked to either provide prescriptive or descriptive judgments first. Within each set of judgments, they first indicated which option they would choose (*descriptive choice judgment*) or should choose (*prescriptive choice judgment*). These judgments were measured using the items below (presented here with labels not seen by participants, illustrated for the domain of romance) on 5-point scales from "definitely [the deliberative choice]" (1) to "definitely [the intuitive choice]" (5):

**Descriptive:** You're now faced with a decision: which person will you try to pursue a relationship with, Alex or Taylor? Please do your best to respond as you would actually behave in real life. I would:

**Prescriptive:** You're now faced with a decision: which person should you try to pursue a relationship with, Alex or Taylor? Please do your best to respond as you think you really should behave in real life. I should:

After these choice judgments, participants indicated their agreement on a 7-point scale with the following two sets of *intuition/deliberation judgment* items (presented here with labels not seen by participants):

**Descriptive:** I rely on intuition and gut feeling [reasoning and deliberative analysis] when making this type of decision.

**Prescriptive:** One ought to rely on intuition and gut feeling [reasoning and deliberative analysis] when making this type of decision.

These items were also presented in a random order. Participants subsequently responded to two additional items. The *objectivity* item, drawn from Inbar et al. (2010), asked, "To what extent are the outcomes of decisions in this domain a matter of objective or subjective determination?" Participants responded on a 9-point scale, ranging from "outcomes in this domain tend to be mainly a subjective matter" (1) to "... mainly an objective matter (9). The *expertise* item, motivated by the findings from Pachur and Spaar (2015), asked, "How much expertise do you have in making decisions similar to the one you encountered in the prompt...?". Participants responded on a 7-point scale, ranging from "Far Below Average" (1) to "Far Above Average" (7). Randomly

intermixed with these items were two attention checks: the first asking participants whether they had seen a politician's picture in the previous section (the correct response was "no"), and the second asking participants to only select two options across four multiple choice questions with four possible answers. Finally, participants provided demographic information.

## 6. Results

To investigate whether judgments for intuition and deliberation varied systematically across domains, and whether prescriptive judgments (of how one ought to decide) were reliably differentiated from descriptive judgments (of how one in fact decides), we conducted mixed ANOVAs with domain as a between-subjects factor and judgment type (descriptive or prescriptive) as a within-subjects factor.[4]

With intuition ratings as the dependent variable, this analysis yielded significant main effects of domain, $F(11,642) = 15.77$, $p < .001$, $\eta^2_G = 0.19$, and judgment type, $F(1,642) = 91.65$, $p < .001$, $\eta^2_G = 0.02$ (see Fig. 1a, c), such that participants reported relying more on intuition ($M = 4.69$, $SD = 1.72$) than they thought they should ($M = 4.25$, $SD = 1.73$). A mixed ANOVA with the same factors but with deliberation ratings as the dependent variable mirrored the results for intuition: We obtained significant main effects of domain, $F(11,642) = 15.90$, $p < .001$, $\eta^2_G = 0.18$, and judgment type, $F(1,642) = 54.27$, $p < .001$, $\eta^2_G = 0.02$ (see Fig. 1a, c), such that participants reported that they should rely *more* on their deliberation ($M = 5.03$, $SD = 1.51$) than they think they do ($M = 4.69$, $SD = 1.59$).

Having analyzed patterns in judgments of intuition and deliberation, we turn to our analyses of choice. First, although this analysis was not pre-registered, we note that cross-domain variation in processing judgments was mirrored in choice: a mixed ANOVA with domain as a between-subjects factor and judgment type (descriptive/prescriptive) as a within-subjects factor (see Fig. 1b, d) revealed a main effect of domain, $F(11,642) = 13.76$, $p < .001$, $\eta^2_G = 0.17$, as well as a main effect of judgment type, $F(1,642) = 75.47$, $p < .001$, $\eta^2_G = 0.02$. Descriptive choices were closer to the intuitive option ($M = 3.37$, $SD = 1.21$) than were prescriptive choices ($M = 3.06$, $SD = 1.28$).

Finally, we investigated the relationship between *descriptive choice judgments* and *prescriptive processing judgments*, even after taking objectivity and expertise into account.[5] A regression with prescriptive intuition and deliberation judgments, as well as objectivity and expertise judgments, revealed that both prescriptive intuition and deliberation ratings significantly predicted choice (see Table 3), though the effect of intuition judgments was approximately three times larger than the effect of deliberation judgments. In other words, participants were more likely to favor the intuitive choice over the deliberative choice if they thought intuition was appropriate (and vice versa), where this effect held above
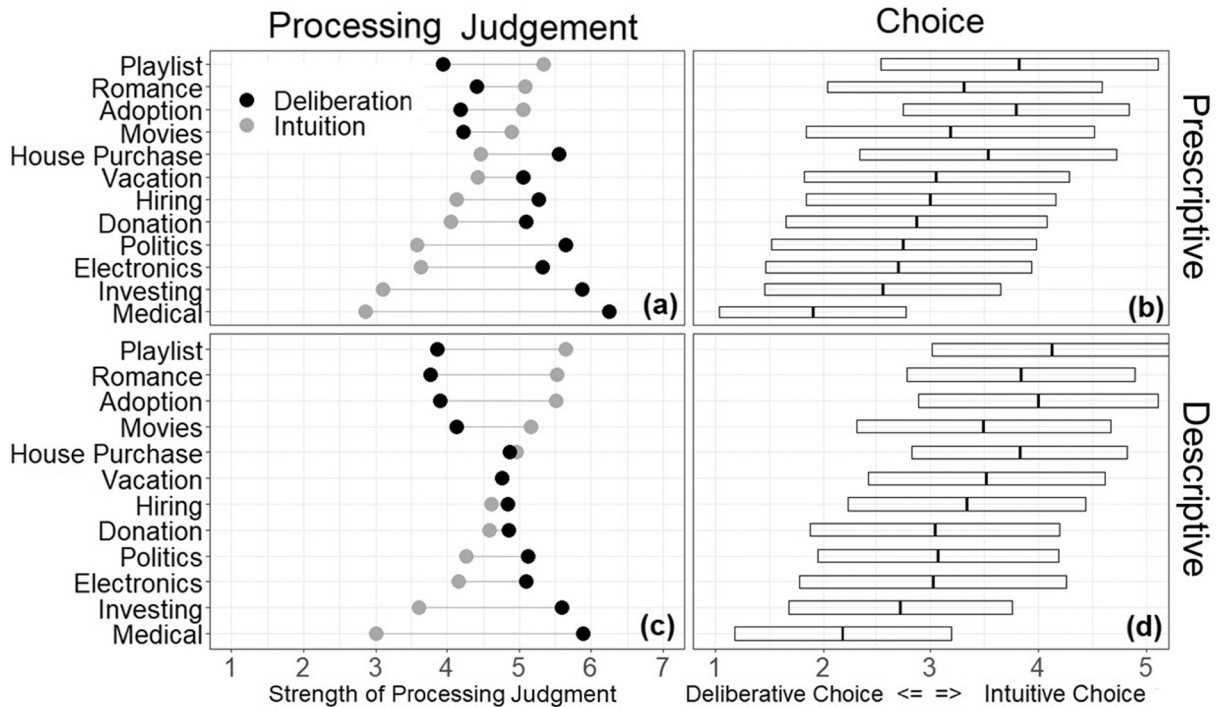
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**Fig. 1.** Cross-domain descriptive and prescriptive processing judgment results from Experiment 1.
*Note.* (a) and (c) show variation in processing judgments for deliberation (black) and intuition (gray). (b) and (d) shows mean choice ratings (±1 SD).

**Table 3**
Regression Analysis Predicting Descriptive Choice from Prescriptive Processing Judgments, Objectivity, and Expertise in Experiment 1.

| Predictor | b | 95% CI | β | r |
|---|---|---|---|---|
| (Intercept) | 2.96** | [2.43, 3.49] | | |
| Prescriptive Intuition | 0.33** | [0.28, 0.38] | 0.46 | 0.64** |
| Prescriptive Deliberation | −0.13** | [−0.19, −0.07] | −0.16 | −0.54** |
| Objectivity | −0.08** | [−0.12, −0.05] | −0.16 | −0.45** |
| Expertise | 0.01 | [−0.04, 0.07] | 0.01 | 0.08* |

*Note.* $R^2 = 0.45$, 95% CI [0.40, 0.50], $F(4, 649) = 133.46$, $p < .001$. *b* represents unstandardized regression weights. *β* indicates the standardized regression weights. *r* represents the zero-order correlations. Square brackets are used to enclose the lower and upper limits of a confidence interval. Diagnostic plots do not show significant violations of homoskedasticity or normality.

  * indicates $p < .05$.
  ** indicates $p < .01$.

and beyond effects of objectivity and expertise.[6]

## 7. Discussion

The results of Experiment 1 successfully lay the foundation for our primary research questions. First, consistent with prior work, we found systematic variation across domains in the extent to which participants reported and prescribed a role for intuition and deliberation. Going beyond prior work, however, we found that reliance on intuition vs. deliberation was differentially expected and prescribed *even though deliberation always took place*. Thus any preference for intuition, and

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[6] We note that including descriptive intuition and deliberation judgments as covariates in this analysis results in the comparatively weak effect of prescriptive deliberation losing significance, whereas the effect of prescriptive intuition judgments remains robust. See Supplementary Materials, Section 1.

differential preferences across domain, cannot be attributed to the cost of deliberation, or to the negative signal of having chosen to deliberate (cf. Critcher et al., 2012; Merritt & Monin, 2011; Tetlock, 2003). Second, we found that prescriptive judgments (of how one ought to decide) reliably differed from descriptive judgments (of how one in fact decides), with the former playing a significant role in predicting choice, above and beyond previously-identified factors of objectivity and expertise.

Having established that people's folk theory of choice prescribes different roles for intuition and deliberation across domains, and that these roles are not a simple function of assumed cognitive efficiency, objectivity, or expertise, we can move on to investigating two additional factors that might play a role: authenticity and commitment.

## 8. Experiment 2

In Experiment 2, participants read about a character faced with one of the same 12 binary decisions used in Experiment 1. In these scenarios, the character's intuition points to one choice, and their deliberative analysis points to the other. Across participants, we varied whether the character pursues the intuitive or the deliberative choice, and we elicited participants' judgments about the character. Most crucially, we probed authenticity (whether the character decided authentically and in a manner that reflected her true self) and commitment (whether she was confident in and committed to her choice).

This design allowed us to assess whether the basis for a decision (intuition versus deliberation) licenses different inferences about authenticity and commitment. Based on the work reviewed in the introduction, we would expect intuitive decisions to be regarded as more authentic and committed than those based on deliberation. Unlike prior work, however, in our vignettes deliberation always took place. Thus higher authenticity or commitment ratings for intuitive decisions could not reflect a simple penalty for having engaged in deliberation at all (since deliberation always occurred). In addition, our study is the first (to our knowledge) to systematically investigate inferences from intuitive versus deliberative choice across domains.

If people favor intuitive (vs. deliberative) decision making in some domains in part because intuitive decisions are taken to reflect greater authenticity or commitment in those domains, then we would expect the cross-domain variation in prescriptive processing judgments from Experiment 1 to be mirrored in inferences in Experiment 2. In the intuition-dominant domain of romance, for instance, a decision made on the basis of intuition should be judged more authentic than a decision made on the basis of deliberation. But in the domain of investment, where deliberation is seen as more appropriate than intuition, the effects of decision basis on authenticity judgments should be attenuated or reversed.

We chose to have participants in Experiment 2 evaluate the decisions of a third person – rather than their own – for two reasons. First, we were concerned that stipulating a decision for participants would render that decision highly artificial, as well as trivially inauthentic. In addition, people typically provide positively biased self-assessments, which makes capturing fine-grained variance across domains and conditions a challenge (Pronin, Lin, & Ross, 2002). Fortunately, prior work has successfully employed evaluations of third parties (Berman et al., 2018), and we would expect such judgments to accurately reflect people's folk theory of choice.

## 8.1. Methods

### 8.1.1. Participants

Participants were 555 adults (246 male, 308 female, 1 other, mean age = 40) recruited from Amazon Mechanical Turk in exchange for monetary compensation ($0.50 for a 4-min survey). An additional 165 participants were eliminated from the original sample following the same pre-registered criteria as Experiment 1, except that the minimum time threshold was set at 1.5 min instead of 2.5, given the shorter task.

### 8.1.2. Materials and procedure

Participants were randomly assigned to one of 24 conditions. In each condition, participants saw a prompt drawn from one of the 12 decision domains from Experiment 1, and received a vignette involving a character who either relies on her intuition or on deliberation to make a decision between the same two options that participants from Experiment 1 were asked to choose from. For example, participants who received the vignette in the domain of hiring employees, with a character who decided on the basis of deliberation, read:

Sarah is someone working as a recruiter for a large firm that is hiring. She recently interviewed two candidates for a position at the firm: Riley and Jessie. During the interviews, she really felt in her gut that Riley was a candidate who was likely to succeed at the firm. When she was interviewing Jessie, she did not feel that Jessie would succeed at the firm at all. Both interviews were long enough that Sarah is convinced her gut feelings about them would not change even if she had an opportunity to interview them further.

Later, Sarah consults with an experienced recruiter at her firm and spends an afternoon listing out and weighting the characteristics that are important to the future performance of job candidates like Riley and Jessie (such as their relevant experiences, education, etc.). At the end of the session, she is convinced of two things: first, that scores generated from the list would truly reflect the fit of a candidate to her firm, and second, that even if she had more time to think about the list, her analysis would not change.

That evening, Sarah scored Riley and Jessie using the criteria she developed with the experienced recruiter. She calculated a score of 35% match for Riley and 65% for Jessie. These scores run counter to her gut reactions.

Faced with this information, Sarah decides to hire Jessie.

Note that across all vignettes, the characters have already undergone identical deliberation processes by the time the participants make inferences about their decision-making. This effectively controls for differences in processing costs across vignettes. A pilot study verified that character gender did not affect relevant patterns (see Supplementary Materials, Section 2 for analyses); in this study the character was always "Sarah." Another pilot verified that the relevant patterns also hold when the deliberation is undertaken solely by the decision-maker, without the involvement of the expert (see Supplementary Materials, Section 3 for analyses). The inclusion of the expert in these vignettes was intended to control for cross-domain variation in the extent to which participants may feel qualified to deliberate or capable of deliberation.

Participants then responded to all of the following items in randomized order. These items included our four main measures of their perceptions of the character:

**Measures of commitment:**

**Commitment:** "How committed was Sarah to her choice?" (1) *very uncommitted* - (7) *very committed.*

**Confidence:** "How confident was Sarah in her choice?" (1) *very unconfident* - (7) *very confident.*

**Measures of authenticity:**

**Self-reflection:** "Sarah's choice was reflective of her true self." (1) *strongly disagree* – (7) *strongly agree.*

**Authenticity:** "Sarah made her choice authentically." (1) *strongly disagree* – (7) *strongly agree.*

We decided to utilize two measures for each of our constructs to better capture the multifaceted notions of authenticity and commitment. Our data also show consistently high correlations between these measures (e.g., $r \sim 0.60$ for both pairs in this Experiment), as compared to the correlations we observe between these items and other related measures. Note that these measures both capture commitment to one's *choice* rather than one's *values*; we measure the latter in Experiment 3.

In addition, participants responded to two items designed to assess the extent to which they regarded the relevant process as a reliable basis for choice in that domain:

**Domain reliability:** By relying on intuition [deliberation], Sarah followed a good strategy for making decisions about [domain]. (1) *strongly disagree* – (7) *strongly agree.*

**Case reliability:** By relying on intuition [deliberation], Sarah made the best choice in this particular case. (1) *strongly disagree* – (7) *strongly agree.*

Finally, participants completed measures included for exploratory purposes (reported in Supplementary Materials, Section 4), and they reported their age, sex, and level of education.
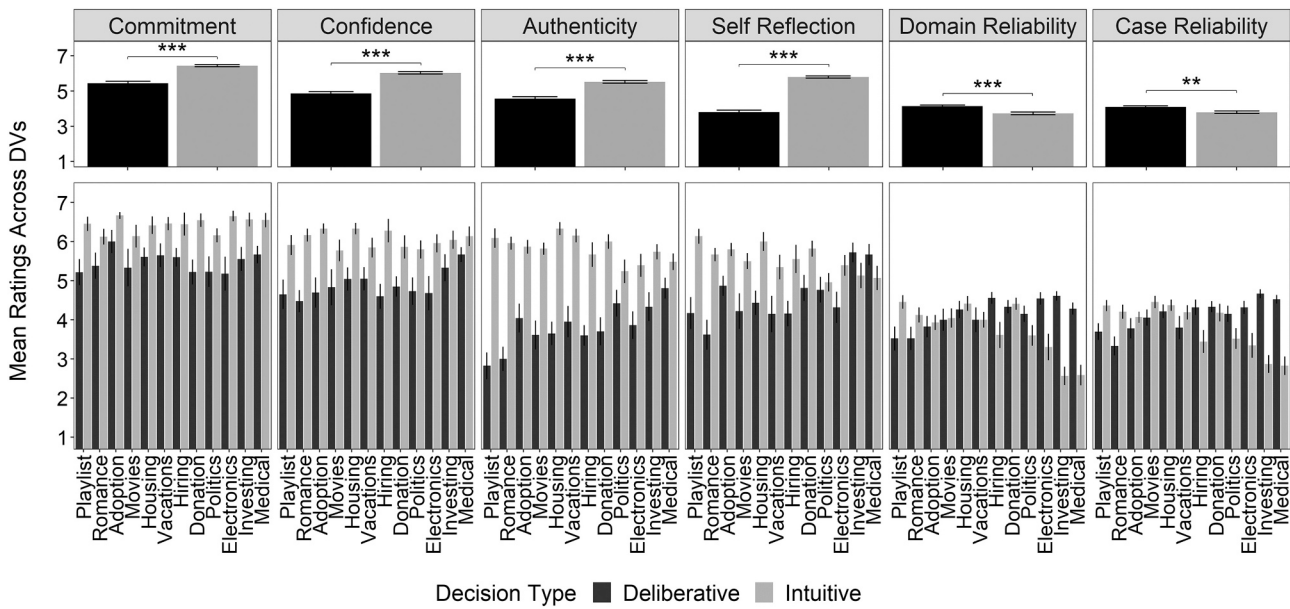
**Fig. 2.** Mean ratings for four inferential judgments of a character based on their choice types.
*Note.* The top six panels show mean ratings for four inferential judgments of a character based on her choice type, followed by our two judgments of reliability. The bottom six panels show cross-domain variation in each of these measures. To help illustrate trends, the bottom panels order domains according to the mean processing difference scores from Fig. 1, such that the left-most domains are the most intuition-dominant. Error bars display the standard error of the mean for both sets of figures. *** indicates significance at $p < .001$, ** at $p < .01$.

### 8.2. Results

To investigate whether participants drew different inferences about decision-makers when the decision-maker relied on intuition versus deliberation (see Fig. 2), we performed two-way ANOVAs with character decision (intuitive choice, deliberative choice) and domain as between-subjects variables, and each of commitment, confidence, self-reflection, and authenticity as dependent variables. Because we tested four distinct measures, we adopted a Bonferroni-corrected *p*-value of $p < .0125$. The analyses and rejection thresholds were pre-specified in our pre-registration.

For commitment, we found a significant main effect of choice type, $F(1,531) = 77.61, p < .001, \eta^2_G = 0.13$, but no significant main effect of domain, $F(11,531) = 1.01, p = .44, \eta^2_G = 0.02$, and no significant interaction, $F(11,531) = 0.45, p = .93, \eta^2_G = 0.01$. Similarly, the analysis of confidence revealed a significant main effect of choice type, $F(1,531) = 95.74, p < .001, \eta^2_G = 0.15$, but no significant main effect of domain, $F(11,531) = 1.00, p = .44, \eta^2_G = 0.02$, and no significant interaction, $F(11,531) = 0.94, p = .50, \eta^2_G = 0.02$. An intuitive choice (vs. a deliberative choice) was seen as indicating both greater commitment to the choice and greater confidence in the choice, without significant variation in this effect across domains.

The analysis of self-reflection, by contrast, revealed a significant main effect of choice type, $F(1,531) = 297.14, p < .001, \eta^2_G = 0.36$, and no significant main effect of domain, $F(11,531) = 1.32, p = .20, \eta^2_G = 0.03$, but did find a significant interaction, $F(11,531) = 4.06, p < .001, \eta^2_G = 0.08$, indicating that the inferences drawn from intuitive or deliberative decisions varied across domains (Fig. 2, third bottom panel). Similarly, the analysis of authenticity revealed a significant main effect of choice type, $F(1,531) = 58.04.14, p < .001, \eta^2_G = 0.10$, and no significant main effect of domain, $F(11,531) = 1.61, p = .09, \eta^2_G = 0.03$, but did find a significant interaction, $F(11,531) = 4.00, p < .001, \eta^2_G = 0.08$ (Fig. 2, fourth bottom panel). For intuition-dominant domains such as Playlists and Romance, participants indicated greater authenticity and self-reflection for intuitive choices versus deliberative choices. For deliberation-dominant domains such as Investment and Medical, there

were much smaller differences in inferences drawn from intuitive vs deliberative decisions.[7]

These analyses were repeated for our two measures of reliability. The analysis of domain reliability revealed a significant main effect of choice type, $F(1,531) = 15.82, p < .001, \eta^2_G = 0.03$, and a significant main effect of domain, $F(11,531) = 2.63, p < .01, \eta^2_G = 0.05$, as well as a significant interaction, $F(11,531) = 7.55, p < .001, \eta^2_G = 0.13$, indicating that the inferences drawn from intuitive or deliberative decisions varied across domains (Fig. 2, fifth bottom panel). Similarly, the analysis of case reliability revealed a significant main effect of choice type, $F(1,531) = 10.51, p < .01, \eta^2_G = 0.02$, and a significant main effect of domain, $F(11,531) = 2.00, p < .01, \eta^2_G = 0.04$, as well as a significant interaction, $F(11,531) = 8.97, p < .001, \eta^2_G = 0.16$, indicating that the inferences drawn from intuitive or deliberative decisions varied across domains (Fig. 2, sixth bottom panel).

Since the prompts used in Experiments 1 and 2 feature essentially identical scenarios, we can directly examine whether the cross-domain variation observed for our authenticity or commitment items in Experiment 2 corresponds to the cross-domain variation in prescriptive processing judgments in Experiment 1 through correlation analyses of difference scores across experiments.

To investigate whether these measures could explain the cross-domain variation in prescriptive commitments found in Experiment 1, we performed the following pre-registered analysis. We first standardized (i.e., Z-scored) the prescriptive intuition and deliberation judgments obtained in Experiment 1 and the character inference ratings obtained in Experiment 2. For Experiment 1, we calculated difference scores for each domain by subtracting prescriptive deliberation ratings

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[7] We note that all of these analyses revealed significant heteroskedasticity in Levene's tests for homogeneity of variance. However, switching to robust standard error estimators does not result in any changes in the pattern of our findings (i.e., all factors identified as significant remain significant, and all non-significant factors remain as such). Both sets of analyses are included in our open-access datasets and analysis scripts at OSF.
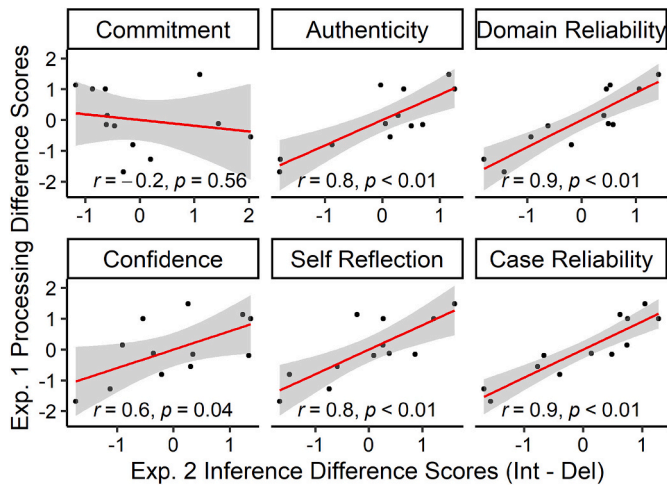
**Fig. 3.** Correlations between Prescriptive Judgments and Character Inferences in Experiments 1 and 2.

*Note.* The figure displays correlations between standardized difference scores for six inferential judgments (*character inference for intuitive – deliberative choice*) from Experiment 2 and Experiment 1's cross-domain processing difference scores (*intuition – deliberation prescriptive preference score*). Shaded area indicates the 95% confidence interval for the linear model, text at the bottom reports Pearson correlation coefficient (labeled *r*) and its significance.

from intuition ratings, such that a higher value indicates a stronger relative rating for intuition. For Experiment 2, we calculated difference scores for each domain by subtracting inference ratings for the deliberative choice from inference ratings for the intuitive choice, such that a higher value indicates a stronger inference from an intuitive choice.

These difference scores were significantly correlated for self-reflection, $r(10) = 0.80$, 95% CI [0.40, 0.94], $p < .01$, and authenticity, $r(10) = 0.82$, 95% CI [0.47, 0.95], $p < .01$, but not (after our Bonferroni correction) for confidence, $r(10) = 0.60$, 95% CI [0.03, 0.87], $p = .04$, or commitment $r(10) = -0.18$, 95% CI [−0.68, 0.43], $p = .56$ (see Fig. 3). A test of the equality of the correlation coefficients for authenticity and commitment items reveals that they are significantly different, $z = 2.00$, $p < .05$. We note, however, that small-sample correlations must be interpreted with caution. For this reason, we revisit the relationship between inference and processing judgments in Experiment 3 with a more powerful design.

We also found that domain reliability and case reliability were significantly correlated with prescriptive judgments from Experiment 1 (domain reliability: $r(10) = 0.88$, 95% CI [0.60, 0.97], $p < .001$; case reliability: $r(10) = 0.91$, 95% CI [0.70, 0.97], $p < .001$). Although these correlations are large, we note that reliability is unlikely to account for effects of authenticity. The correlations between our reliability and authenticity measures in this study were low (ranging from $r(553) = 0.16$, 95% CI [0.08, 0.24], $p < .001$, for the correlation between self-reflection and domain reliability, to $r(553) = 0.35$, 95% CI [0.27, 0.42], $p < .001$, for the correlation between authenticity and case reliability), especially in comparison to the magnitude of the cross-experiment correlations. (That said, we revisit the evidence for authenticity, as distinct from reliability, in Study 3.)

### 8.3. Discussion

Experiment 2 investigated whether people draw different inferences regarding others based on whether their choice stemmed from intuition or deliberation. Collapsing across domains, an intuitive choice (vs. a deliberative choice) was taken to signal greater commitment to and confidence in one's choices, to better reflect the self, and to suggest a more authentic decision. In addition, for both self-reflection and authenticity, these judgments were moderated by domain. Decisions in

intuition-dominant domains (such as *playlist* and *romance*) were judged more authentic when made on the basis of intuition, but for deliberation-dominant domains (such as *investment* and *medical*) this difference was attenuated. Crucially, the cross-domain variation in inferences about self-reflection and authenticity observed in Experiment 2 closely matched the cross-domain variation in the prescribed role for intuition observed in Experiment 1, suggesting that these normative commitments may drive, or be driven by, the inferences about self-reflection or authenticity that different types of decisions can license.

These results are consistent with the authenticity hypothesis insofar as intuition is more likely to be prescribed (as found in Experiment 1) when an intuitive decision signals authenticity (as found in Experiment 2). However, they do not speak directly to the idea that intuition is more likely to be prescribed when signaling authenticity is *important*, as motivated in the Introduction. While it is plausible that signaling authenticity (to oneself or to others) is more important in domains such as *romance* versus *investing*, an alternative hypothesis is that authenticity is always important, and instead what varies across domains is how authenticity is linked to deliberation (see Fig. 2), and as a result whether intuition is seen as any more authentic than deliberation. To offer a more direct connection between the prescription of intuition and the perceived *importance* of authenticity, we conducted an additional study (Experiment S1, reported in Supplementary Materials), asking participants to report how important it is to be self-reflective and authentic in making decisions from all twelve domains included in Experiments 1–2, as well as many others. We found that the importance of authenticity and self-reflection both predicted a larger prescribed role for intuition, but not for deliberation.[8] This bolsters support for the authenticity hypothesis as formulated in the Introduction (though we revisit a role for the importance of authenticity in Experiments 4–5, and the question of how the importance of authenticity might be moderated by the possibility of signaling authenticity in Experiment 5).

Despite strong support for the authenticity hypothesis, the evidence from Experiment 2 for commitment-signaling is mixed. Intuitive decision-making was associated with greater confidence and commitment, but inferences to confidence and commitment were not reliably associated with the domain-variation observed in Experiment 1. So while commitment signaling could potentially explain a domain-general preference for intuitive decision-making, additional factors would need to be invoked to explain why commitment-signaling would translate into differences for prescribed choice across domains. Indeed, one possibility is that what varies across domains is the *importance* of signaling commitment (versus the level of commitment actually signaled by a decision, which is relatively invariant across domains). To test this, Experiment S1 additionally asked participants to report how *important* it is to be committed and confident in making decisions from all twelve domains included in Experiments 1–2, as well as many others. Most importantly for present purposes, we did *not* find that it was more important to be committed or confident in those domains for which intuitive decision making was more often prescribed. In fact, the importance of commitment and confidence was associated with a larger prescribed role for deliberation. Combined with the data from Experiments 1–2, these findings challenge the commitment-signaling hypothesis, at least as operationalized in terms of our measures of commitment and confidence.

Finally, it is worth noting that judgments for self-reflection were actually higher for deliberative decisions than for intuitive decisions in

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[8] We additionally replicated these analyses with only the 12 domains included in Experiments 1–2. Although an analysis at the level of domain was thus under-powered (and did not reveal significant effects), we replicated the finding that the importance of authenticity and self-reflection predicted a larger prescribed role for intuition, but not for deliberation, at the individual (vs. domain) level. These analyses are provided in our Supplementary Materials (in the Results of Supplementary Experiment S1).

the most deliberation-dominant domains (namely investment and medical decisions). These findings challenge the idea that when it comes to authenticity, there is a domain-independent 'penalty of deliberation' (e.g., Tetlock, 2003) or 'benefit of intuition' (e.g., Morewedge et al., 2014).

## 9. Experiment 3

In Experiment 3, participants evaluated a character on the basis of that character's intuitive or deliberative choice, as in Experiment 2. However, for the vignettes in Experiment 3, both intuition and deliberation pointed to the same choice, and what varied was whether the decision was *based* on intuition or on deliberation. In addition, the manipulation of decision basis (intuition vs. deliberation) occurred within participant. These two changes allowed us to address a potential confound in Experiment 2, and a limitation of the cross-experiment comparison between Experiments 1 and 2. We explain each in turn.

In Experiment 2, effects of decision basis (intuition vs. deliberation) were potentially confounded with the strength of evidence about the quality of each choice. To illustrate, suppose that people consider intuition a reliable basis for assessing the quality of romantic partners (but not of investments), and deliberation a reliable basis for assessing the quality of investments (but not of romantic partners). If intuition points to one romantic partner and deliberation to the other, then the character's evidence in fact favors the intuitive choice, and a decision based on intuition is also a decision based on better evidence about the quality of each choice. By contrast, if intuition points to one investment option and deliberation to the other, then the character's evidence in fact favors the deliberative choice, and a decision based on deliberation is also a decision based on better evidence about the quality of each choice. In this way, the basis for a decision (intuition vs. deliberation) cannot be dissociated from the quality of the evidence supporting each choice. Experiment 3 circumvents this challenge by having intuition and deliberation point to the same choice, and varying only the process on which the character chooses to base her decision. We therefore call our vignettes "matched-information scenarios," and they offer a highly stringent test of whether decision basis itself affects our judgments of others, and of whether decision basis is evaluated differently across domains.

A second aim of Experiment 3 was to allow us to revisit the associations between prescriptive judgments of intuition and deliberation on the one hand, and inferences from decision basis on the other. Our comparison of Experiments 1 and 2 revealed an association between prescriptive judgments and inferences about authenticity, but because this analysis was performed on mean difference scores across domains, it was limited to a small sample size. In Experiment 3, the manipulation of decision basis occurred within-subjects, and all participants additionally indicated the extent to which decisions in a given domain ought to be based on intuition and deliberation. We could thus revisit the association between prescriptive processing judgments and inferences about authenticity and commitment at the level of participants, rather than domains.

### 9.1. Methods

#### 9.1.1. Participants

Participants were 631 adults (266 male, 362 female, 2 other, mean age = 42) recruited on Prolific Academic in exchange for monetary compensation ($0.60 for a 5 min study). An additional 170 participants were excluded for failing to meet pre-registered criteria for minimum time (1.5 mins) or failing any of three comprehension/attention checks. Participation across both studies was restricted to users within the U.S. with an approval rating ≥ 98% on 500 or more previous tasks. Repeat participation was restricted using the Prolific platform.

#### 9.1.2. Materials and procedure

Participants were randomly assigned to one of three decision domains: romance, donations, or investment. These domains were chosen to range from the highly intuitive (romance) to the highly deliberative (investment). Participants read about two characters making a binary decision within that domain, where for both characters, intuition and deliberation pointed to the same choice. However, one character ultimately bases her choice on intuition, and the other on deliberation. In the domain of romance, for example, participants read:

> Sarah is interested in starting a new romantic relationship. She was recently at a café and met two individuals: Alex and Taylor. At the café, she really felt in her gut that she and Alex were likely to be a good fit for each other. When she was interacting with Taylor, she did not feel like she and Taylor were a good fit for each other at all.

> Later, Sarah spends an afternoon listing out and weighting the characteristics that are important to her about potential romantic partners like Alex and Taylor (such as their personality, priorities, etc.). She scores Alex and Taylor using this list, and concludes Alex is a much better fit for her than Taylor, in line with her intuition.

They then read a similar prompt about another character (Jane) deciding between two different romantic partners (Sam vs. Casey), where once again intuition and deliberation point to the same choice. Participants then read:

> Here is how Sarah and Jane ultimately make their decisions.

> Sarah, on the basis of her intuitive, gut reaction, decides to ask Alex out. That is, although both her intuition and her deliberative analysis point to Alex, it is her intuition and gut feeling that makes Sarah ultimately decide to pursue Alex.

> Jane, on the basis of her deliberative analysis, decides to ask Sam out. That is, although both her intuition and her deliberative analysis point to Sam, it is her deliberative analysis that makes Jane ultimately decide to pursue Sam.

Participants then answered the following questions in a partially randomized order.[9] One set was comprised of Likert items from 'definitely [decision-maker A]' to 'definitely [decision-maker B]' [1–6], with no neutral midpoint. These items are reproduced below:

**Decision process:** (i) Who made her decision in the right way? (ii) Who made her decision for the right reasons?

**Authenticity/Self-Reflection:** (i) Who made her decision more authentically? (ii) Whose decision is more reflective of her true self?

**Commitment/Confidence** (i) Who is more committed to her decision? (ii) Who has greater confidence in her decision?

The first set of items was included as a direct measure of sensitivity to decision process. The authenticity and commitment items were included to test our primary hypotheses. However, one concern about the commitment items – which were also used in Experiment 2 – is that they assess commitment to a choice, which might not be the same as commitment to the values that underlie that choice (e.g., Critcher et al., 2012), as discussed in the introduction. For this reason, we also included an item intended to more directly assess commitment to values:

**Commitment to values:** Who made her decision in a way that

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[9] Questions were presented in three sets, with questions randomized within set. The first set included decision process, authenticity, commitment, and future reliability. The second set included goals, autonomy, values, and objectivity. The third set included commitment to values.

**Table 4**

Regression analyses predicting outcome variables of interest from domain.

| Dependent Variable | Intercept | Intercept 95% CI [LL, UL] | b | | b 95% CI [LL, UL] | | $R^2$ | $R^2$ 95% CI [LL, UL] |
|---|---|---|---|---|---|---|---|---|
| | | | Donation | Investment | Donation | Investment | | |
| Decision Process | 3.68** | [3.52, 3.84] | −0.62** | −1.18** | [−0.85, −0.39] | [−1.40, −0.95] | 0.15** | [0.10, 0.19] |
| Authenticity | 4.27** | [4.08, 4.46] | −0.37** | −0.61** | [−0.63, −0.10] | [−0.87, −0.35] | 0.03** | [0.01, 0.07] |
| Self-Reflection | 4.29** | [4.13, 4.45] | 0.12 | 0.1 | [−0.11, 0.34] | [−0.13, 0.32] | 0 | [0.00, 0.01] |
| Commitment/Conf. | 3.53** | [3.36, 3.69] | −0.05 | −0.12 | [−0.28, 0.18] | [−0.35, 0.11] | 0 | [0.00, 0.01] |
| Com. to Values | 4.01** | [3.90, 4.11] | −0.47** | 0.21** | [−0.62, −0.33] | [0.07, 0.36] | 0.06** | [0.03, 0.10] |
| Intuition | 4.83** | [4.63, 5.03] | −0.78** | −1.79** | [−1.06, −0.51] | [−2.07, −1.52] | 0.21** | [0.16, 0.26] |
| Deliberation | 4.45** | [4.30, 4.61] | 0.71** | 1.51** | [0.49, 0.92] | [1.29, 1.72] | 0.24** | [0.18, 0.29] |

*Note.* Each line is a separate regression predicting the dependent variables (leftmost column) from domain, with romance as the reference category. All dependent variables except for intuition and deliberation were coded such that higher numbers represent the character who chooses on the basis of intuition. b represents unstandardized regression weights. *LL* and *UL* indicate the lower and upper limits of the confidence interval. * indicates $p < .05$. ** indicates $p < .01$.
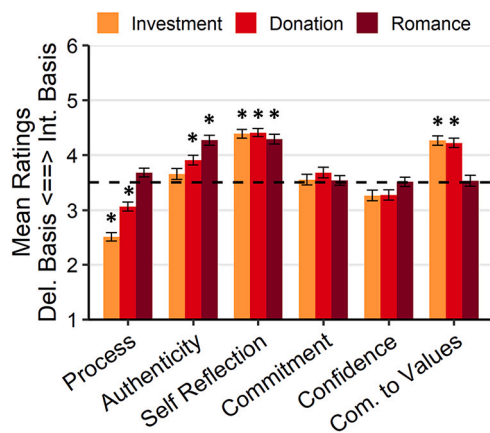


**Fig. 4.** Mean ratings for inferential judgements between two characters based on their basis for choice.

*Note.* Error bars show the standard error of the mean, dotted line shows the average expected response (3.5) under a null effect. Asterisks indicate that mean responses from the measures differed from the scale mid-point, as assessed by one-sample *t*-tests (* indicates $p < .001$). Commitment and Confidence shown separately here for illustrative purposes—all analyses were conducted on the composite score, as pre-registered.

reflects commitment to her personal values?

Participants responded to six additional items: two considered future reliability (e.g., "Who would you expect to choose the better option in this domain in the future?"), and the other four were designed to identify relevant aspects and/or mediators of authenticity (experiential goals in decision making, importance of autonomy in decision making, importance of authenticity, and objectivity). As the data from these measures were not very illuminating, we report relevant analyses in the Supplementary Materials (see Section 5).

Finally, participants responded to the following two prescriptive processing items, both Likert scales from 'strongly disagree' to 'strongly agree' [1–7]:

**Intuition:** One ought to rely on intuition and gut feeling when making [domain] decisions like this one.

**Deliberation:** One ought to rely on reasoning and deliberative analysis when making [domain] decisions like this one.

Participants then provided demographic information before concluding the study.

### 9.2. Results

#### 9.2.1. Inferences from decision basis

As pre-registered, we created composite scores for the pairs of items

measuring decision process (α = 0.83) and commitment (α = 0.72). The two items measuring authenticity were not collapsed, as they did not meet our specified level of 0.7 for Cronbach's α (α = 0.52). Scores were then analyzed in linear regressions with domain as a categorical predictor, using romance as the reference category (see Table 4).

These analyses revealed effects of domain on decision process, reliability, and authenticity (see Fig. 4). We followed up these regressions with pre-planned one-sample *t*-tests comparing the means of these judgments to the scale mid-point (3.5) across domains. Deliberative decision-makers were seen as having relied on a better decision process for investment decisions, but not for romantic decisions. By contrast, intuitive decision-makers were judged more authentic for romantic decisions, but not for investment decisions (see Table 4 and Fig. 4). Donation decisions fell in between.

Judgments for self-reflection revealed a different pattern: while the intuitive decision maker's decision was reliably judged to be more self-reflective than the deliberative decision-maker's, this pattern did not vary across domains (see Table 4 and Fig. 4).

Commitment and confidence judgments did not show significant domain variation, nor effects of decision basis (see Table 4 and Fig. 4). This suggests that the average difference in commitment between intuitive and deliberative decision-makers found in Experiment 2 might be a consequence of inferred differences in choice quality or reliability – factors that we held fixed with information-matched scenarios. It is also possible that *having* a particular intuition signals some level of commitment or confidence (as in Experiment 2), but basing a decision on that intuition does not (as in Experiment 3).

Finally, the *Commitment to Values* item behaved more like the authenticity items than the commitment items, with significant moderation by domain (see Table 4 and Fig. 4). Decisions made on the basis of intuition received higher values for investment, and donation decisions, though (surprisingly) not for romantic decisions.

#### 9.2.2. Prescriptive processing ratings

For prescriptive processing ratings (see Table 4), we replicated our prior studies, with deliberation judged more appropriate for investment than for romance ($M_{del} = 4.45$ vs. $M_{del} = 5.96$), intuition judged more appropriate for romance than for investment ($M_{int} = 4.83$ vs. $M_{int} = 3.04$), and donation falling in between ($M_{del} = 5.16$, $M_{int} = 4.05$).

#### 9.2.3. Relationship between inferences and prescriptive processing judgments

We next considered the relationship between inferences about the decision-maker and prescriptive processing judgments with the following pre-registered analysis. We created a difference score from the two processing ratings (intuition – deliberation) and then regressed this difference score on each of our core variables, with domain as a potential moderator. These analyses revealed reliable relationships between inferences and difference scores for decision process, authenticity, self-reflection, commitment, and commitment to values (see Table 5,

**Table 5**
Regression analyses predicting processing preference difference scores from domain, independent variables of interest, and their interactions in Experiment 3.

| Independent Variable | Intercept | *b* I.V. | *b* Domain (Donation) | *b* Domain (Investment) | *b* I.V. *x* Donation | *b* I.V. *x* Investment | $R^2$ | $R^2$ 95% CI [LL, UL] |
|---|---|---|---|---|---|---|---|---|
| Process | −3.78** | 1.13** | −0.39 | −2.01** | −0.13 | 0.02 | 0.54** | [0.48, 0.58] |
| Authenticity | −2.61** | 0.70** | −0.7 | −1.57* | −0.14 | −0.36* | 0.37** | [0.31, 0.41] |
| Self-Reflection | −2.85** | 0.75** | −0.74 | −1.1 | −0.19 | −0.52** | 0.35** | [0.29, 0.40] |
| Commit/Conf. | −1.94** | 0.66** | −1.15 | −2.22** | −0.09 | −0.29 | 0.35** | [0.29, 0.39] |
| Com. to Values | −1.50** | 0.53** | −2.50** | −2.55** | 0.15 | −0.27 | 0.36** | [0.30, 0.41] |

*Note.* Each line is a separate regression predicting processing preference difference scores from independent variables of interest (Column 1), domain (with Romance as the reference category), and their interactions. *I.V.* indicates the independent variable used in the regression from Column 1. *b* represents unstandardized regression weights. *LL* and *UL* indicate the lower and upper limits of the confidence interval. *Com. to Values* refers to the Commitment to Values item.
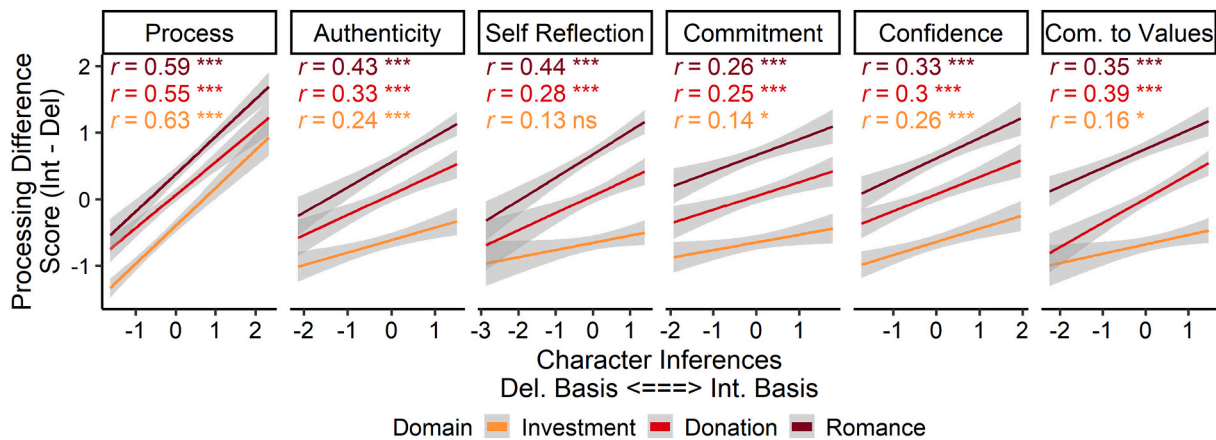
\* indicates $p < .05$.
\*\* indicates $p < .01$.



**Fig. 5.** Correlations between processing preference difference scores and inference judgments in Experiment 3.
*Note.* The figure displays correlations between standardized (i.e., z-scored) prescriptive processing judgments (x-axis) and character inferences (y-axis), by domain, from Experiment 3. Shaded area indicates the 95% confidence interval, and the subtext displays Pearson correlation coefficients (*r*) by Domain. Commitment and Confidence shown separately here for illustrative purposes—all analyses were conducted on the composite score, as pre-registered. * indicates $p < .05$. *** indicates $p < .001$. ns indicates a non-significant result.

Fig. 5). However, only authenticity and self-reflection predicted processing ratings in a manner that depended significantly on domain, with stronger relationships for *romance* than for *donation*, and for *donation* than for *investment*. This suggests that the relative *importance* of authenticity and self-reflection was greater in intuition-dominant domains, such that inferences of authenticity/self-reflection played a larger role in prescriptions about how decisions ought to be made. Consistent with this interpretation, Supplementary Experiment S1 found that authenticity and self-reflection were judged more important for *romance* than for *donation*, and for *donation* than for *investment*, consistent with the ordering we observe in Experiment 3. (By contrast, the ordering for the importance of commitment and confidence was more variable across these domains, with numerically smaller mean differences in ratings across domains.)

### 9.3. Discussion

The results from Experiment 3 support the hypothesis that decision makers are evaluated differently depending on the basis for their decision, even when decision basis is unconfounded from the cost of deliberation, the choice to deliberate, and even the evidence for choice quality suggested by each processes' output. Under these conditions, decisions based on intuition (vs. deliberation) were judged to be more self-reflective, as well as more authentic and reflective of personal values (with some variation across domains). By contrast, decisions based on intuition (vs. deliberation) were seen as no more indicative of commitment or confidence. Moreover, authenticity and self-reflection

were unique in tracking the prescribed role of intuition (vs. deliberation) differentially across domains, with the strongest association for *romance*, and the weakest for *investment*. Like the patterns of association for Experiments 1–2, these findings support the authenticity hypothesis, while offering a prima facie challenge to the commitment hypothesis, at least as operationalized through our measures of commitment and confidence.

Experiment 3 also included a new measure tracking *commitment to values*: that the decision-maker made her decision in a way that reflects commitment to her personal values. This item was included in part to address the concern that our operationalization of commitment was too narrow. As mentioned in the introduction, it might be important to differentiate commitment to one's choice (which our commitment and confidence items plausibly capture) from a commitment to the values that underlie one's choice. The commitment to values item was intended to capture the latter. Interestingly, this measure behaved more like authenticity than it did like commitment and confidence in that decisions based on intuition (vs. deliberation) were judged more favorably. In addition, ratings for commitment to values were more strongly correlated with those for self-reflection ($r = 0.46$, $p < .001$) than those for other measures (authenticity: $r = 0.29$, $p < .001$; commitment: $r = 0.26$, $p < .001$; confidence: $r = 0.20$, $p < .001$). We take this as tentative evidence that a commitment to personal values is related to the aspects of identity reflected in the true self (and related to intuitive choice), and distinct from the facets of commitment highlighted in the Introduction.

In sum, Experiment 3 offers a conceptual replication of Experiments 1–2, but with more stringent controls and a stronger statistical basis for

relating judgments of authenticity to the prescribed role of intuition (vs. deliberation). Like Experiments 1–2, Experiment 3 offers little support for the commitment-signaling hypothesis. In our final experiments, we thus focus on the authenticity hypothesis, and we go beyond correlation to test for causal effects of authenticity on prescribed intuition.

## 10. Experiment 4

In Experiment 4 we go beyond correlation to test the causal role of authenticity on prescriptive processing preferences. We hypothesized (i) that decisions that demand greater authenticity would be prescribed a greater role for intuition, and (ii) that this impact would not be reducible to effects of previously-established predictors (namely objectivity, complexity, and expertise). Our first aim was therefore to test the causal hypotheses that motivated Experiments 1–3, and to verify that effects of authenticity reflect a novel phenomenon.

A second aim of Experiment 4 was to highlight one way in which people's folk theory of decision making is likely to be consequential. Recent work has shown the presence of strong egocentric biases in advice-taking, from both human experts (Yaniv & Kleinberger, 2000) and algorithms (Castelo et al., 2019). Furthermore, there is substantial domain variation in the extent of bias against reliance on advice from algorithms – people are more likely to defer to algorithms in deliberative domains vis-à-vis intuitive domains (Castelo et al., 2019). Given our findings from Experiments 1–3 and this connection between processing preferences and advice-taking, we speculated that authenticity would also have an effect on advice-taking behavior. We hypothesized that to the extent a decision is perceived to demand greater authenticity, people may be more reluctant to defer to expert advice – whether it comes from humans or AI. Our third and final prediction was thus (iii) that authenticity would have important downstream effects, namely on the endorsement of pursuing expert/algorithmic advice.

## 11. Methods

### 11.1. Participants

Participants were 177 adults (85 male, 89 female, 3 other, mean age = 37) recruited on Prolific Academic in exchange for monetary compensation ($0.37 for a 3-min study). An additional four participants were eliminated for failing to meet pre-registered criteria for minimum time (1 min) or failing the same attention check as Experiment 3.

#### 11.1.1. Materials and procedure
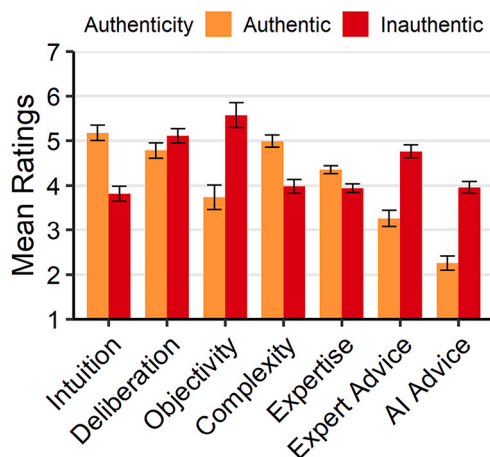Participants were randomly assigned to one of two conditions:



**Fig. 6.** Mean ratings for seven judgements from Experiment 4.
*Note.* Error bars indicate the standard error of the mean.

*authentic* or *inauthentic*. Participants first read one of two versions of the same vignette [authentic / inauthentic]:

> Imagine Alex is making an important decision. Alex thinks that it is [extremely important / not important at all] that he makes this decision in a way that reflects his true, authentic self. That is, Alex thinks that this decision [should / need not] reflect his deep, most sincere sense of who he is.

Participants then responded to the objectivity, intuition, and deliberation items from the previous study, in addition to the following items, presented in a random order and with Likert scales from 'strongly disagree' to 'strongly agree' [1–7]:

**Complexity:** "Alex faces a complex choice."
**Expertise:** "Alex has significant expertise in making decisions like this."

**Expert advice:** "Alex should base his decision on an expert's recommendation."

**Algorithmic advice:** "Alex should base his decision on an artificial intelligence's recommendation."

Finally, participants provided demographic information.

### 11.2. Results and discussion

To test our hypothesis that the authenticity manipulation would have an effect on prescriptive processing judgments, we performed linear regressions predicting these judgments from authenticity as a binary categorical variable. As predicted, this analysis revealed positive and significant effects of authenticity on intuition ratings, $b = 1.36$, $t(175) = 5.73$, $p < .001$, $R^2 = 0.15$, $F(1, 175) = 32.87$, $p < .001$. However, there was no significant effect on deliberation, $b = -0.33$, $t(175) = -1.42$, $p = .16$, $R^2 = 0.01$, $F(1, 175) = 2.02$, $p = .16$ (see Fig. 6).

To test our hypothesis that these effects were not aliasing for the impact of authenticity on other determinants of processing preferences, we included three of the strongest predictors identified in the literature: objectivity, complexity (Inbar et al., 2010), and expertise (Pachur & Spaar, 2015). The inclusion of these covariates did not eliminate effects of authenticity—in fact, the estimated effect was remarkably robust to the controls, $b = 1.12$, $t(175) = 4.12$, $p < .001$. Among the covariates, only objectivity had a significant (though small) effect on intuition ratings, $b = -0.14$, $t(175) = -3.09$, $p < .001$.

To investigate whether the authenticity manipulation had downstream consequences for advice, we conducted linear regression analyses predicting Expert and AI advice ratings from authenticity condition. Authenticity had a negative impact on advice utilization for both Expert, $b = -1.50$, $t(175) = -6.44$, $p < .001$, $R^2 = 0.19$, F(1, 175) = 41.48, $p < .001$, and Algorithmic, $b = -1.70$, $t(175) = -8.26$, $p < .001$, $R^2 = 0.28$, F(1, 175) = 68.15, $p < .001$, recommendations. Again, the effect of authenticity was not eliminated by including covariates, for either Expert advice, $b = -1.35$, $t(172) = -5.23$, $p < .001$, or Algorithmic advice, $b = -1.48$, $t(172) = -6.38$, $p < .001$. In the former case, objectivity, $b = 0.16$, $t(172) = 3.90$, $p < .001$, and complexity, $b = 0.22$, $t(172) = 2.79$, $p < .001$, both had significant effects. In the latter case, the only significant factor besides authenticity was objectivity, $b = 0.16$, $t(172) = 4.20$, $p < .001$.

### 11.3. Discussion

The findings from Experiment 4 confirm all three hypotheses the experiment was designed to investigate. First, merely manipulating authenticity, holding all else constant, led to a greater prescribed role for intuition, but not deliberation. In light of the result from Experiment 1

that prescribed intuition judgments play a substantially (3×) larger role in predicting choice judgments than prescribed deliberation judgments, the finding that there is an exclusive *causal* relation between intuition and authenticity carries even more weight. Second, the influence of authenticity on prescribed intuition judgments was robust to the inclusion of well-established covariates in the analysis, in keeping with our previous results. A compelling explanation of this robustness is that the most reliable covariates (e.g., objectivity) may be stronger drivers of the prescribed role for *deliberation*, rather than intuition. Finally, we had hypothesized that authenticity would not have a superficial, isolated impact on intuition—rather, we anticipated downstream effects on advice-taking judgments. As expected, we found large effects of authenticity on advice-taking judgments (~ 20%), both for human and algorithmic advisors. This is an exciting initial result that indicates a fruitful direction for future inquiry: might the ego-centricity bias in advice-taking (Yaniv & Kleinberger, 2000) or preference for reliance on algorithmic advice for deliberative domains (Castelo et al., 2019) be driven not by considerations of expected performance, but by the perceived importance of authenticity?

## 12. Experiment 5

The primary aim of Experiment 5 was to further investigate the causal role of authenticity on prescriptive processing preferences. In Experiment 4, we demonstrated that when the authenticity of a decision is important (vs. unimportant), intuition is more likely to be prescribed as a basis for choice, and deference to experts (human or machine) is less likely to be endorsed. However, there is an alternative interpretation of these results. Since our vignettes in Experiment 4 abstracted away all contextual detail to isolate the effect of authenticity, participants may have assumed that the *authentic* decision took place in an *intuitive* domain, and thereby prescribed intuitive decision-making—rather than prescribing intuition on the basis of authenticity per se.[10] Therefore, in Experiment 5, we tested whether our prior findings hold across domains using more detailed vignettes that specify the domain of the decision.

A secondary aim of Experiment 5 was to test an additional pathway through which domain could shift the prescribed role of intuition via authenticity. Experiment 4 suggested that the *importance* of authenticity increases the prescribed role for intuition (and the experimental manipulation in Experiment 5 offers an opportunity to replicate this result within specified domains). But as noted in the discussion of Experiment 2, our prior measures did not measure the importance of authenticity per se – instead, they measured the extent to which authenticity was inferred on the basis of an intuitive (vs. deliberative) choice. The results from these studies suggest that in domains such as *romance*, it is possible to signal authenticity through an intuitive choice, whereas in domains such as *investment*, intuitive decisions are not always seen as more authentic then deliberative decisions, with the consequence that it may not be possible to differentially signal authenticity through decision basis. Put differently, even if the *importance* of signaling authenticity is consistent across domains, the *possibility* of signaling authenticity could differ from domain to domain.

We test for this possibility in Experiment 5 by having participants indicate the extent to which decisions in each domain have the potential to reflect one's true, authentic self, and whether this judgment mediates effects of domain on the prescribed role for intuition. We also include a measure of the perceived reliability of intuition and deliberation across domains to ensure that effects of signaling possibility, if found, are not simply capturing domain variation in the perceived reliability of intuition (vs. deliberation).

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[10] We thank our reviewers for pointing out this important possibility.

## 13. Methods

### 13.1. Participants

Participants were 526 adults (229 male, 288 female, 9 other, mean age = 35) recruited on Prolific Academic in exchange for monetary compensation ($0.37 for a 3-min study). An additional ten participants were eliminated for failing to meet pre-registered criteria for minimum time (1 min) or failing the same attention check as Experiment 4.

#### 13.1.1. Materials and procedure

Participants were randomly assigned to one of two conditions (authentic or inauthentic) and one of three domains (romance, donation, and investment). They then read one of six versions of a vignette, illustrated here for the domain of donations [authentic / inauthentic]:

> Imagine Alex is making an important donation decision. He will be choosing between two options: donating to BetterDays or WeHelp, two charities.
>
> Alex thinks that it is [extremely important / not important at all] that he makes this donation decision in a way that reflects his true, authentic self. That is, Alex thinks that this decision [should / need not] reflect his deep, most sincere sense of who he is.

Participants then responded to the intuition, deliberation, objectivity, complexity, expertise, expert advice, and algorithmic advice items from Experiment 4. Additionally, they responded to the following items, presented in random order and with Likert scales from 'strongly disagree' to 'strongly agree' [1–7]:

> **Reliability:** "Deliberation is a more reliable process than intuition when making decisions about [romance / donations / investment]."

> **Signaling possibility:** "Decisions about [romance / donations / investment] (more so than decisions in other domains) have the potential to reflect one's true, authentic self."

Finally, participants provided demographic information.[11]

### 13.2. Results and discussion

To test our hypothesis that the authenticity manipulation would affect prescriptive processing judgments, we performed two-way ANOVAs predicting these judgments from authenticity and domain as categorical variables. In accordance with the results of Experiment 4, this analysis revealed a significant main effect of authenticity on intuition ratings, $F(1, 520) = 9.87$, $p < .01$, $\eta^2_G = 0.02$, as well as a main

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[11] Our study additionally included a *signaling value* measure that assessed the importance of signaling authenticity in a given domain. As a manipulation check, we asked participants to indicate how important they thought it was to signal authenticity: "When it comes to decisions about [domain] (more so than decisions in other domains), there is value in being authentic."; Likert-type item from 0 (strongly disagree) to 7 (strongly agree). We found that signaling authenticity was viewed as more important to participants in the authentic condition across all our domains (Investment: $M_{authentic} = 4.40$, $SD_{authentic} = 1.57$, $M_{inauthentic} = 4.10$, $SD_{inauthentic} = 1.56$; Donation: $M_{authentic} = 5.83$, $SD_{authentic} = 1.13$, $M_{inauthentic} = 5.50$, $SD_{inauthentic} = 1.15$; Romance: $M_{authentic} = 6.47$, $SD_{authentic} = 0.78$, $M_{inauthentic} = 6.43$, $SD_{inauthentic} = 0.78$). However, this difference was only significant when pooling donation and investment ($M_{dif} = 0.33$, 95% CI [0.07, 0.60], $SE = 0.16$, $t = 2.05$, $p < .05$, Cohen's $d = 0.22$). We speculate that the manipulation check did not reach significance for Romance due to ceiling effects, but either way this does not undermine the interpretation of our experimental manipulation.
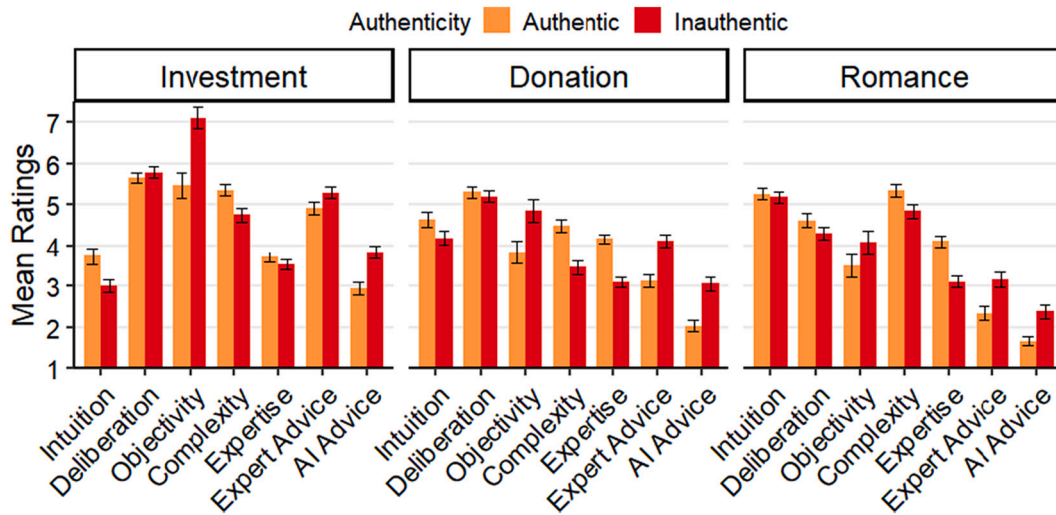
**Fig. 7.** Mean ratings for seven judgements from Experiment 5.
*Note.* Error bars indicate the standard error of the mean.

effect of domain, $F(2, 520) = 44.2$, $p < .001$, $\eta^2_G = 0.15$, but no interaction, $F(2, 520) = 1.88$, $p = .15$, $\eta^2_G = 0.01$.[12] We once again did not find an influence of authenticity on deliberation judgments, $F(1, 520) = 0.79$, $p = .51$, $\eta^2_G = 0.0$, though there was domain variation in deliberation, $F(2, 520) = 28.3$, $p < .001$, $\eta^2_G = 0.10$, and no interaction $F(2, 520) = 1.29$, $p = .28$, $\eta^2_G = 0.0$ (see Fig. 7).

To test our hypothesis that these effects were not aliasing for the impact of authenticity on other determinants of processing preferences, we included objectivity, complexity, and expertise as covariates in a linear regression equivalent to the analysis above. In keeping with the results of Experiment 4, the inclusion of these covariates did not eliminate effects of authenticity, $b = 0.51$, $t(517) = 2.23$, $p < .05$. Among the covariates, objectivity had a significant negative effect on intuition ratings, $b = -0.11$, $t(175) = -4.64$, $p < .001$, and expertise had a significant positive effect, $b = 0.15$, $t(175) = 2.66$, $p < .01$. The analysis as a whole accounted for a significant amount of variation in the prescription of intuition, $R^2 = 0.24$, $F(8, 517) = 22.25$, $p < .001$.

To investigate whether the authenticity manipulation had downstream consequences for advice, we conducted two-way ANOVAs predicting Expert and AI advice ratings from authenticity and domain as between-subjects factors. We found a significant main effect of authenticity on Expert advice ratings, $F(1, 520) = 33.03$, $p < .001$, $\eta^2_G = 0.06$, such that expert advice was less likely to be endorsed when authenticity was important. We also found a main effect of domain, $F(2, 520) = 119.16$, $p < .001$, $\eta^2_G = 0.31$, such that advice endorsement was lowest for the most intuitive domain (romance) and highest for the most deliberative domain (investment). However, we did not find a significant interaction between domain and authenticity, $F(2, 520) = 2.00$, $p = .14$, $\eta^2_G = 0.00$. We similarly found significant main effects of authenticity on AI advice ratings, $F(1, 520) = 49.19$, $p < .001$, $\eta^2_G = 0.09$, as well as a main effect of domain, $F(2, 520) = 41.86$, $p < .001$, $\eta^2_G = 0.14$, but no interaction, $F(2, 520) = 0.54$, $p = .58$, $\eta^2_G = 0.00$.

The effect of authenticity was robust to the inclusion of objectivity, complexity, and expertise as covariates for algorithmic advice, $b = -0.69$, $t(517) = -3.21$, $p < .001$, but not for expert advice, $b = -0.27$, $t(517) = -0.99$, $p = .32$. This latter finding is discrepant with the results we obtained for in Experiment 4. Upon further inspection, the presence of a higher-order pairwise interaction between domain and authenticity



**Fig. 8.** Domain Differences in the Distribution of Mediators from Experiment 5.
*Note.* Plot shows probability density estimates of mediators across domains. 'Signaling' refers to the possibility of signaling authenticity in a given domain, and 'Reliability' to the perceived reliability of deliberation (over intuition). Points on the densities indicate the mean, and the error bars indicate the standard error of the mean. Dotted line indicates the expected mean of the null distribution.

(from investment to donations), $b = -0.65$, $t(517) = -2.13$, $p < .05$, was likely the cause for the null appearance of the main effect.[13] Indeed, running the same regression without the interaction between domain and authenticity reveals a significant effect of authenticity, $b = -0.60$, $t(519) = -4.39$, $p < .001$. Among the covariates, only objectivity had a significant effect on expert advice utilization, $b = 0.10$, $t(517) = 4.58$, $p < .001$, and only complexity had a significant effect on algorithmic advice utilization, $b = 0.08$, $t(517) = -2.03$, $p < .05$.

Having found robust effects of our manipulation of the importance of authenticity that replicate our prior results, we turn to our analysis of our two candidate mediators: signaling possibility and reliability. For these variables to mediate the effect of domain on the prescription of intuition, they would need to show variance across domains. We therefore conducted one-way ANOVAs predicting these measures from domain as a between-subjects factor. Both our signaling, $F(2, 523) = 150.10$, $p < .001$, $\eta^2_G = 0.36$, and reliability, $F(2, 523) = 56.91$, $p < .001$, $\eta^2_G = 0.18$, measures showed substantial variation across domains (see Fig. 8).

Given the presence of significant variation across domains for both

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[12] Despite the statistical test not revealing an interaction, a visual inspection of Figure 9 suggests that the effect of the authenticity manipulation was larger in the non-intuitive domains as opposed to romance. As pointed out by a reviewer, this might be due to ceiling effects.
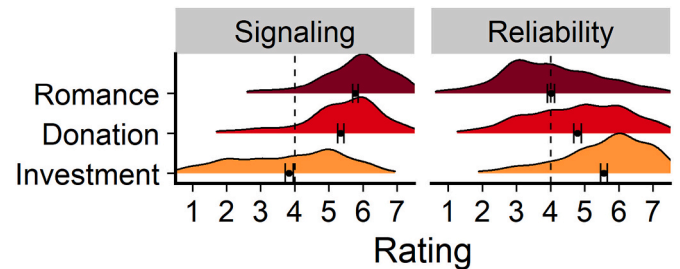
[13] No higher-order interaction terms were significant in the prior regression analyses for this experiment, and were thus omitted here for the sake of space. For complete documentation of all analyses, see 'Experiment5Analysis,' available on our OSF page.
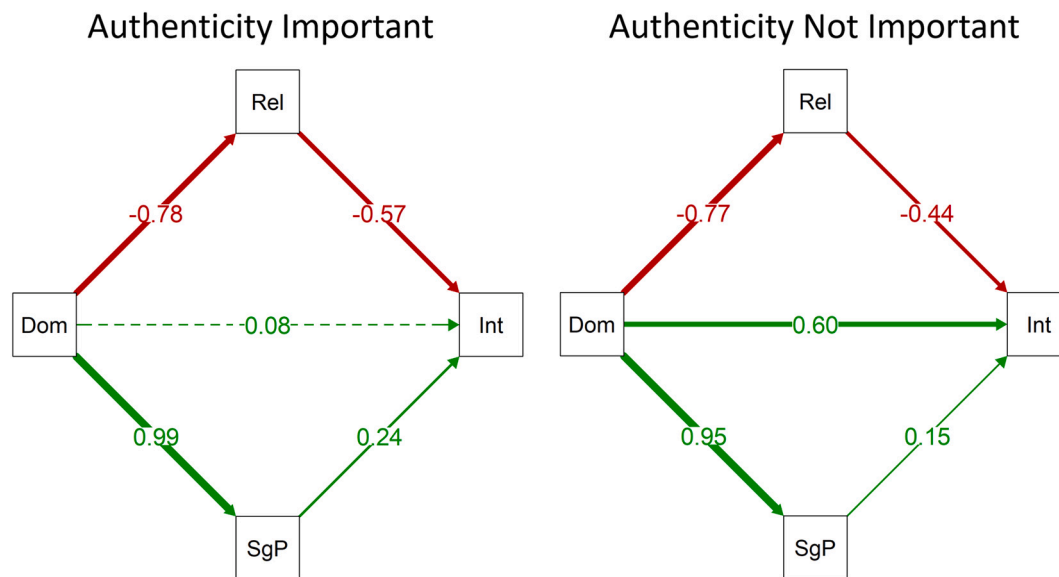
## Authenticity Important

## Authenticity Not Important



**Fig. 9.** Path Diagrams of Mediation Analyses of Prescriptive Intuition Judgments from Experiment 5.
*Note.* Variable names were abbreviated for the plots. Figures show the covariation between Domain (*Dom*), Signaling Possibility (*SgP*), and Reliability (*Rel*) in ultimately predicting the prescription of Intuition (*Int*). Domain is coded such that more intuitive domains are assigned higher values. Plot on the left shows standardized path coefficients for the *authentic decision* condition, whereas the plot on the right shows estimates for the *inauthentic decision* condition. Solid lines indicate paths significant at $p < .01$, dashed lines indicate non-significant paths. All indirect paths are significant at $p < .05$.

measures, we proceeded with our mediation analyses. We opted to employ multiple mediation analyses using the "lavaan" R package (Rosseel, 2012), which contrasts both mediators within a single analysis to minimize potential Type 1 errors due to correlated residuals, and which allows us to investigate effects of signaling possibility while taking reliability into account. Further, instead of using analytically-derived standard errors, we report bootstrapped confidence intervals generated with a thousand samples to avoid bias arising from the non-normality of indirect effects (Preacher & Hayes, 2008).

A challenge for testing mediation in this study is the dependence of our key measure, the prescription of intuition, on an experimental manipulation (authenticity), which could affect the causal pathways of interest. In particular, stipulating that authenticity is *irrelevant* for a given decision could weaken the link between the prescription of intuition for that decision and any domain-level measures related to authenticity (e.g., signaling possibility). The prescription of intuition could still depend on domain, but likely through other determinants of processing preferences (such as the perceived reliability of intuition relative to deliberation). On the other hand, stipulating that authenticity *is* important should preserve the influence of factors like signaling possibility.

In light of these observations, we conducted the same mediation analysis separately on data obtained from participants in our two experimental groups (see Fig. 9). For participants in the authentic group, a multiple mediation analysis of the effect of domain on processing judgments revealed a significant indirect effect of domain on the prescription of intuition through signaling possibility, $b = 0.24$, 95% CI [0.07, 0.43], $p < .01$ and reliability, $b = 0.44$, 95% CI [0.30, 0.60], $p < .001$. Once the mediated pathways are taken into account, the direct relationship between authenticity and intuition is reduced to non-significance, $b = 0.08$, 95% CI [−0.20, 0.35], $p = .60$, indicating full mediation. The total standardized effect is large, $b = 0.77$, 95% CI [0.53, 1.00], $p < .001$, so the model as a whole predicts a substantial amount of variation in intuition judgments. These results suggest that signaling possibility, in addition to other factors like reliability, may play a role in guiding the prescription of intuition.

Conducting the same analysis for participants in the *inauthentic* group once again revealed a significant (albeit weaker) indirect effect of

domain on the prescription of intuition through signaling possibility, $b = 0.14$, 95% CI [0.05, 0.27], $p < .05$, and reliability, $b = 0.34$, 95% CI [0.21, 0.50], $p < .001$. Unlike our previous analysis, the direct relationship between authenticity and intuition for this group remained significant after taking the mediators into account, $b = 0.60$, 95% CI [0.35, 0.85], $p < .001$, indicating partial mediation. The total standardized effect was once again large, $b = 1.08$, 95% CI [0.87, 1.29], $p < .001$, so the model as a whole predicts a substantial amount of variation in judgments of intuition. We note that the difference between the direct path estimates across the two groups was significant, $z = 2.81$, $p < .01$, which supports the possibility that our experimental manipulation, in weakening the link between authenticity and intuition, in fact shifted patterns of covariation in the data. Importantly, despite this effect, we found signaling possibility to consistently mediate the relation between domain and the prescription of intuition.

### 13.3. Discussion

The results of Experiment 5 confirm the hypotheses we set out to investigate and replicate our findings from Experiment 4. First, manipulating the importance of authenticity led to an increase in the prescription of intuition, but not deliberation—and this effect held across domains, in concrete decision scenarios, even after controlling for important covariates. Second, we once again found large and robust downstream effects of manipulating the importance of authenticity on advice-taking judgments, both for human and algorithmic advisors. Finally, mediation analyses on additional measures indicate that when authenticity matters, the possibility of signaling one's values explains variation in the prescription of intuition across domains that is not reducible to reliability.

## 14. General discussion

Across five studies, we investigate the hypothesis that people's beliefs about how they *ought to* make decisions guide their decisions, and we offer a causal account of the origins of these metacognitive judgments rooted in concerns about authenticity. Our findings reveal that people have systematic beliefs concerning the domains in which they

ought to rely on intuition vs. deliberation, that these beliefs are distinct from descriptive beliefs, and that they play a role in predicting choice (Experiment 1). We also show that decisions made through intuition (vs. deliberation) are generally thought to signal greater commitment, confidence, self-reflection, and authenticity, with the latter two varying across domains (Experiment 2). Crucially, we find that inferences about self-reflection and authenticity drawn from intuitive vs. deliberative choices show the same cross-domain variation as prescriptions for intuition vs. deliberation in making decisions. This finding is consistent with the idea that intuition is sometimes prescribed in part because of its association with authenticity. Experiment 3 bolsters our interpretation of Experiments 1–2 by showing that our key findings are not driven by differences in the information available about each choice, and by replicating – with a more powerful and better controlled within-subjects design – the association between inferences about intuitive vs. deliberative decision makers and judgments about how decisions ought to be made. Finally, the results of Experiments 4–5 show that the relationship between authenticity and intuition is not merely correlational: a targeted manipulation of the importance of authenticity has effects on the prescription of intuition, without affecting the prescription of deliberation, whether the domain of a decision is unspecified (Experiment 4) or specified (Experiment 5).

Our theory and results are broadly consistent with prior work on cross-domain variation in processing preferences (e.g., Inbar et al., 2010), as well as work showing that people draw social inferences from intuitive decisions (e.g., Tetlock, 2003). However, we bridge and extend these literatures by relating inferences made on the basis of an individual's decision to cross-domain variation in the prescribed roles of intuition and deliberation. Importantly, our work is unique in showing that neither judgments about how decisions ought to be made, nor inferences from decisions, are fully reducible to considerations of differential processing costs or the reliability of a given process for the case at hand. Our stimuli—unlike those used in prior work (e.g., Inbar et al., 2010; Pachur & Spaar, 2015)—involved deliberation costs that had already been incurred at the time of decision, yet participants nevertheless displayed substantial and systematic cross-domain variation in their inferences, processing judgments, and eventual decisions. Most dramatically, our matched-information scenarios in Experiment 3 ensured that effects were driven by decision basis alone. In addition to excluding the computational costs of deliberation and matching the decision to deliberate, these scenarios also matched the evidence available concerning the quality of each choice. Nonetheless, decisions that were based on intuition vs. deliberation were judged differently along a number of dimensions, including their authenticity.

Beyond linking social inference to the prescribed role of intuition, our work highlights a novel role for authenticity. Consistent with prior work, we find evidence of an association between intuition (vs. deliberation) and the true or authentic self. But going beyond this prior work, we find that authenticity can play a causal role in decision making, and that it does so by elevating the role that decision-makers think intuition should play. Furthermore, we explore two distinct ways in which authenticity could drive cross-domain differences in intuition: importance and possibility. To reiterate, it could be that in some domains, it is more *important* to be authentic than in other domains—or it could be the case that authenticity is always important across domains, and that what differs is instead the *possibility* of being authentic or of signaling authenticity through one's decision process. In our last experiment, we outline a candidate mechanism for how these two notions relate to each other: We propose that the possibility of authentic decision-making mediates the influence of importance and find preliminary evidence in support of this hypothesis.

Of course, many questions remain about precisely what authenticity amounts to (Newman & Smith, 2016; Varga & Guignon, 2020). For instance, we do not offer an account of why our measures of authenticity and self-reflection sometimes diverged. Relatedly, though our results clearly show that authenticity has an influence on judgments of

decision-making that is distinct from relevant factors (e.g., objectivity), our experiments are not designed to investigate potential interrelationships *between* these factors and authenticity, which might be an interesting direction for future work. For instance, it could be that authenticity matters not because it relates to narrow notions of reliability concerning a given decision or domain, but to a broader notion of self-knowledge in virtue of which a decision-maker is thought to be trustworthy. That said, our results contribute to a growing body of work suggesting that these notions play a role in our folk psychological conceptions of others and ourselves (Strohminger et al., 2017), with downstream consequences for judgments and behavior (Hong & Chang, 2015).

While both intuition and one's own deliberation constitute internal or "first-personal" processes, the association between intuition and the true self (Maglio & Reich, 2018) suggests that first-personal sources are not created equal: intuition may be regarded as a stronger indicator of self-understanding, where the strength of this association (or the importance of achieving self-understanding) varies across domains. If these suggestions are correct, we would predict that deliberation-dominant domains are also those for which deference (to another human or to an algorithm) will be regarded as more appropriate, and Experiments 4–5 offer evidence to this effect. For example, it should be regarded as more appropriate to defer to experts in making medical or investment decisions than when choosing romantic partners or songs (as found in recent research for algorithmic advisors, see Castelo et al., 2019). We might also expect that intuition-dominant domains are those more closely tied to personal identity – for instance, a romantic partner or a favorite song might say more about who you are deep down than an electronics purchase or a medical decision. However, an important caveat is that "domain" (as operationalized in our studies) is likely to be a proxy for other features of decision scenarios that affect the importance or nature of intuition-based self-understanding. Even within a domain, we might expect decisions that are more closely tied to first-personal properties and to identity (e.g., a smartphone versus a router) to show a stronger role for intuition.

Open questions remain concerning the role of intuition in signaling confidence and commitment. Though Experiment 2 replicated the general finding that intuitive decisions signal greater commitment (e.g., Merritt & Monin, 2011) and confidence (e.g., Simmons & Nelson, 2006), these effects did not emerge in Experiment 3's matched-information scenarios, which controlled for the costs of deliberation, the decision to deliberate, and the information concerning the quality of each choice. This suggests that prior studies may have found effects of faster or more intuitive decisions because the decision to deliberate, or the time required for deliberation (e.g.,Critcher et al., 2012; Gates et al., 2021), signals lower confidence and commitment. We also considered the possibility that cross-domain variation in the *importance* of confidence and commitment could explain the prescribed role for intuition, even if intuitive decisions are always judged more confident and committed. Intriguingly, our supplementary experiment (Experiment S1) instead revealed that the importance of confidence and commitment predicts a greater prescribed role for *deliberation*, not for intuition. On the face of it, this is a puzzling result: people prescribe greater deliberation when confidence and commitment are important, yet judge intuitive decisions to signal greater confidence and commitment. One possibility is that *having* an intuition is taken to signal confidence and commitment (Experiment 2), but basing one's decision on intuition is not (Experiment 3) – instead, for this more controllable aspect of decision-making, investing in deliberation is what signals commitment. It is also plausible that commitment plays a different or more important role in a limited subset of decision contexts where cooperation is crucial (e.g., moral or social decisions). This is a valuable question for future research.

Importantly, our findings regarding commitment and confidence do provide convincing evidence against a deflationary account of our findings regarding authenticity. One might think that there is cross-domain variation in intuition, and that intuition is typically associated

with positive virtues, and on that basis conclude that our results regarding cross-domain variation in authenticity obtain simply because it is a positive virtue. However, we consistently find strong evidence against such accounts, as we show that cross-domain variation in inferences may not occur for even the most obvious and desirable positive virtues, such as confidence and commitment.

Our findings also raise new questions about the perceived independence of intuition and deliberation as inputs to choice. In Experiments 4 and 5, manipulating the importance of authenticity had a causal impact on the prescribed role for intuition, but not for deliberation. Supplementary Experiment S1 similarly found that the importance of authenticity predicted the prescription of intuition, but additionally found that the importance of commitment was correlated with prescribed deliberation, and not with prescribed intuition. These findings suggest that the prescribed roles for intuition and deliberation are governed by nonoverlapping factors, such that the *relative* importance of intuition versus deliberation may be difficult to interpret. Measuring the prescribed role for intuition and deliberation separately as we do (vs. as separate anchors on a unidimensional scale, cf. Inbar et al., 2010) is therefore likely to be a worthwhile feature to preserve in future research.

In our studies, we did not consider the important role of individual variation. This was an intentional choice of focus, as individual variation in the perceived roles of intuition and deliberation have been investigated by many productive research programs (e.g., Cacioppo & Petty, 1982; Frederick, 2005; Pacini & Epstein, 1999; Ståhl, Zaal, & Skitka, 2016), whereas variation across domains and contexts has received much less attention. It is an open question how these individual differences might interact with our findings. We hope that individual and cultural variation in our effects will be the subject of future work. Another important limitation of the present work is that we only considered hypothetical choice (in Experiment 1) – it would be valuable to investigate the role of prescriptive beliefs concerning the roles of intuition and deliberation in real-world decision making.

A related limitation is that we operationalize intuition and deliberation in particular ways throughout our experiments; as having differing properties (e.g., speed, intentionality) that may or may not correspond to the underlying mechanisms of intuition and deliberation (about which there is much debate; see Evans & Stanovich, 2013). Though we chose these properties in the service of creating naturalistic stimuli, future work could explore which properties of intuition and deliberation in fact drive the prescription of one process over the other, and whether downstream judgments are significantly impacted by the chosen method of operationalization. Another limitations is that our third-party scenarios explicitly specified an individual's decision process, but in realworld cases such information is typically unavailable, and an individual's decision process (like their mental states and character) must instead be inferred. One plausible cue to decision process is decision speed, which is directly observable and has already been shown to drive social inferences (Critcher et al., 2012; Gates et al., 2021). However, inferences to decision process have been relatively underexplored, and there are likely to be many additional cues. Newly emerging work on lay decision theory and rationalism may help elucidate the commonality and psychological significance of such inferences (Hsee, Yang, Zheng, & Wang, 2015; Jara-Ettinger, Gweon, Schulz, & Tenenbaum, 2016). Our work contributes to this literature by demonstrating the latent complexity of lay notions of decision-making: from authenticity to reliability, people actively draw inferences from (and utilize information about) sophisticated concepts in evaluating their own and others' decisions.

An implication of our work is that people's beliefs about the value of authenticity – or its association with intuition – could be a loci for interventions designed to promote more deliberative decisions. There is a large body of work on improving decision-making, with many efforts targeting over-reliance on heuristics and other forms of intuitive reasoning by providing people with effective reasoning strategies and other 'thinking tools' (e.g., Maule & Maule, 2016). Our results are

significant as they suggest an alternative point of intervention: people might have all the tools they need, but if they consider their use to be inappropriate in some cases, then they will rely on their intuitions regardless of their access to objective information or deliberative thinking strategies (see also Cusimano & Lombrozo, 2021). An important question for future research is therefore when such prescriptive commitments interfere with good decisions, and how these decisions can be improved.

Beyond this potential practical value, our work helps articulate people's folk theory of decision making. This is important because a folk theory of choice is likely to guide people's own decisions (as suggested by our results for hypothetical choice in Experiment 1), as well as the inferences they draw from them. In addition, we have shown that beliefs about decision making affect how we evaluate others (Experiments 2–3), and the prescribed role for outside advice (Experiment 4–5). Finally, our work helps explain why Darwin's marital deliberation might seem wrong: he did not decide to be authentic.

## Declaration of Competing Interest

We have no known conflicts of interest to disclose.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cognition.2022.105021.

## References

Andersen, S. M., & Ross, L. (1984). Self-knowledge and social inference: I. The impact of cognitive/affective and behavioral data. *Journal of Personality and Social Psychology, 46*(2), 280–293. https://doi.org/10.1037/0022-3514.46.2.280

Bago, B., Rand, D. G., & Pennycook, G. (2020). Fake news, fast and slow: Deliberation reduces belief in false (but not true) news headlines. *Journal of Experimental Psychology. General, 149*(8), 1608–1613. https://doi.org/10.1037/xge0000729

Barasch, A., Levine, E. E., Berman, J. Z., & Small, D. A. (2014). Selfish or selfless? On the signal value of emotion in altruistic behavior. *Journal of Personality and Social Psychology, 107*(3), 393. https://doi.org/10.1037/a0037207

Bear, A., & Rand, D. G. (2016). Intuition, deliberation, and the evolution of cooperation. *Proceedings of the National Academy of Sciences, 113*(4), 936–941. https://doi.org/10.1073/pnas.1517780113

Berman, J. Z., Barasch, A., Levine, E. E., & Small, D. A. (2018). Impediments to effective altruism: the role of subjective preferences in charitable giving. *Psychological Science, 29*(5), 834–844. https://doi.org/10.1177/0956797617747648

Berman, J. Z., & Small, D. A. (2018). Discipline and desire: On the relative importance of willpower and purity in signaling virtue. *Journal of Experimental Social Psychology, 76*, 220–230. https://doi.org/10.1016/j.jesp.2018.02.007

Bowles, S., & Gintis, H. (2002). Prosocial emotions. In L. Blume, & S. N. Durlauf (Eds.), *The Economy as a Evolving Complex System 3* (pp. 339–364). Oxford: Oxford University Press.

Bondell, H. D., & Reich, B. J. (2009). Simultaneous factor selection and collapsing levels in ANOVA. *Biometrics, 65*(1), 169–177. https://doi.org/10.1111/j.1541-0420.2008.01061.x

Butler, H. A., Pentoney, C., & Bong, M. P. (2017). Predicting real-world outcomes: Critical thinking ability is a better predictor of life decisions than intelligence. *Thinking Skills and Creativity, 25*, 38–46. https://doi.org/10.1016/j.tsc.2017.06.005

Cacioppo, J. T., & Petty, R. E. (1982). The need for cognition. *Journal of Personality and Social Psychology, 42*(1), 116. https://doi.org/10.1037/0022-3514.42.1.116

Castelo, N., Bos, M. W., & Lehmann, D. R. (2019). Task-dependent algorithm aversion. *Journal of Marketing Research, 56*(5), 809–825.

Chen, S. (2019). Authenticity in context: Being true to working selves. *Review of General Psychology, 23*(1), 60–72. https://doi.org/10.1037/gpr0000160

Clore, G. L., Gasper, K., & Garvin, E. (2001). Affect as information. In J. P. Forgas (Ed.), *Handbook of affect and social cognition* (pp. 121–144). Lawrence Erlbaum Associates Publishers.

Crawford, J. T., Brandt, M. J., Inbar, Y., Chambers, J. R., & Motyl, M. (2017). Social and economic ideologies differentially predict prejudice across the political spectrum, but social issues are most divisive. *Journal of personality and social psychology, 112*(3), 383.

Critcher, C. R., Inbar, Y., & Pizarro, D. (2012). How quick decisions illuminate moral character. *Social Psychological and Personality Science, 4*, 308–315. https://doi.org/10.1177/1948550612457688

Cusimano, C., & Lombrozo, T. (2021). Reconciling scientific and commonsense values to improve reasoning. *Trends in Cognitive Sciences.* https://doi.org/10.1016/j.tics.2021.06.004

Dana, J., Dawes, R., & Peterson, N. (2013). Belief in the unstructured interview: The persistence of an illusion. *Judgment and Decision making, 8*(5), 512.

Dane, E., Rockmann, K. W., & Pratt, M. G. (2012). When should I trust my gut? Linking domain expertise to intuitive decision-making effectiveness. *Organizational Behavior and Human Decision Processes, 119*(2), 187–194. https://doi.org/10.1016/j.obhdp.2012.07.009

Darwin, C. (1838). *Cambridge University Library, Department of Manuscripts and University Archives, Charles Darwin Papers, MS DAR. 280* p. 8).

Epley, N., & Gilovich, T. (2001). Putting adjustment back in the anchoring and adjustment heuristic: Differential processing of self-generated and experimenter-provided anchors. *Psychological Science, 12*(5), 391–396. https://doi.org/10.1111/1467-9280.00372

Epley, N., & Gilovich, T. (2006). The anchoring-and-adjustment heuristic: Why the adjustments are insufficient. *Psychological Science, 17*(4), 311–318. https://doi.org/10.1111/j.1467-9280.2006.01704.x

Epstein, S., Pacini, R., Denes-Raj, V., & Heier, H. (1996). Individual differences in intuitive–experiential and analytical–rational thinking styles. *Journal of Personality and Social Psychology, 71*(2), 390. https://doi.org/10.1037/0022-3514.71.2.390

Evans, J. S. B. (2010). Intuition and reasoning: A dual-process perspective. *Psychological Inquiry, 21*(4), 313–326. https://doi.org/10.1080/1047840X.2010.521057

Evans, J. S. B., & Stanovich, K. E. (2013). Dual-process theories of higher cognition: Advancing the debate. *Perspectives on Psychological Science, 8*(3), 223–241. https://doi.org/10.1177/1745691612460685

Everett, J. A., Pizarro, D. A., & Crockett, M. J. (2016). Inference of trustworthiness from intuitive moral judgments. *Journal of Experimental Psychology: General, 145*(6), 772.

Foucault, M. (1982). The subject and power. *Critical Inquiry, 8*(4), 777–795.

Frank, R. H. (1988). *Passions within reason: The strategic role of the emotions.* W. W. Norton & Co.

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives, 19*(4), 25–42. https://doi.org/10.1257/089533005775196732

Gallo, I., Sood, S., Mann, T. C., & Gilovich, T. (2017). The heart and the head: On choosing experiences intuitively and possessions deliberatively. *Journal of Behavioral Decision Making, 30*(3), 754–768. https://doi.org/10.1002/bdm.1997

Gates, V., Callaway, F., Ho, M. K., & Griffiths, T. (2021). A rational model of people's inferences about others' preferences based on response times. *Cognition, 217,* 104885.

Gigerenzer, G., & Goldstein, D. G. (1996). Reasoning the fast and frugal way: models of bounded rationality. *Psychological Review, 103*(4), 650. https://doi.org/10.1037/0033-295X.103.4.650

Goldin, G., & Darlow, A. (2013). *TurkGate [Software]*.

Haidt, J., Rosenberg, E., & Hom, H. (2003). Differentiating Diversities: Moral Diversity Is Not Like Other Kinds 1. *Journal of applied social psychology, 33*(1), 1–36.

Hammond, K. R., Hamm, R. M., Grassia, J., & Pearson, T. (1987). Direct comparison of the efficacy of intuitive and analytical cognition in expert judgment. *IEEE Transactions on Systems, Man, and Cybernetics, 17*(5), 753–770. https://doi.org/10.1109/TSMC.1987.6499282

Haslam, N., Bastian, B., & Bissett, M. (2004). Essentialist beliefs about personality and their implications. *Personality and Social Psychology Bulletin, 30*(12), 1661–1673. https://doi.org/10.1177/0146167204271182

Hong, J., & Chang, H. H. (2015). "I" follow my heart and "We" rely on reasons: The impact of self-construal on reliance on feelings versus reasons in decision making. *Journal of Consumer Research, 41*(6), 1392–1411. https://doi.org/10.1086/680082

Hsee, C. K., Yang, Y., Zheng, X., & Wang, H. (2015). Lay rationalism: Individual differences in using reason versus feelings to guide decisions. *Journal of Marketing Research, 52*(1), 134–146.

Inbar, Y., Cone, J., & Gilovich, T. (2010). People's intuitions about intuitive insight and intuitive choice. *Journal of Personality and Social Psychology, 99*(2), 232–247. https://doi.org/10.1037/a0020215

Iyengar, S., & Westwood, S. J. (2015). Fear and loathing across party lines: New evidence on group polarization. *American Journal of Political Science, 59*(3), 690–707.

Jara-Ettinger, J., Gweon, H., Schulz, L. E., & Tenenbaum, J. B. (2016). The naïve utility calculus: Computational principles underlying commonsense psychology. *Trends in Cognitive Sciences, 20*(8), 589–604.

Jordan, J. J., Hoffman, M., Nowak, M. A., & Rand, D. G. (2016). Uncalculating cooperation is used to signal trustworthiness. *Proceedings of the National Academy of Sciences, 113*(31), 8658–8663.

Jordan, J. J., Sommers, R., Bloom, P., & Rand, D. G. (2017). Why do we hate hypocrites? Evidence for a theory of false signaling. *Psychological science, 28*(3), 356–368.

Kahneman, D., & Tversky, A. (1984). Choices, values, and frames. *American Psychologist, 39*, 341–350. https://doi.org/10.1037/0003-066X.39.4.341

Koehler, D. J., & James, G. (2010). Probability matching and strategy availability. *Memory & Cognition, 38*(6), 667–676. https://doi.org/10.3758/MC.38.6.667

Kruger, J., Wirtz, D., & Miller, D. T. (2005). Counterfactual thinking and the first instinct fallacy. *Journal of Personality and Social Psychology, 88*(5), 725–735. https://doi.org/10.1037/0022-3514.88.5.725

Kuran, T., & Sunstein, C. R. (1998). Availability cascades and risk regulation. *Stanford Law Review, 51*, 683.

Lieder, F., & Griffiths, T. L. (2017). Strategy selection as rational metareasoning. *Psychological Review, 124*(6), 762–794. https://doi.org/10.1037/rev0000075

Maglio, S. J., & Reich, T. (2018). Feeling certain: Gut choice, the true self, and attitude certainty. *Emotion.*. https://doi.org/10.1037/emo0000490

Maglio, S. J., & Reich, T. (2020). Choice protection for feeling-focused decisions. *Journal of Experimental Psychology: General, 149*(9), 1704–1718. https://doi.org/10.1037/xge0000735

Martinez, A., Gorlin, E., & Lombrozo, T. (2019). The influence of implicit normative commitments in decision-making. In *Proceedings of the 41st annual meeting of the cognitive science society*.

Maule, A. J., & Maule, S. (2016). Aiding lay decision making using a cognitive competencies approach. *Frontiers in Psychology, 6*, 1884. https://doi.org/10.3389/fpsyg.2015.01884

Merritt, A. C., & Monin, B. (2011). The trouble with thinking: People want to have quick reactions to personal taboos. *Emotion Review, 3*(3), 318–319. https://doi.org/10.1177/1754073911402386

Mikels, J. A., Maglio, S. J., Reed, A. E., & Kaplowitz, L. J. (2011). Should I go with my gut? Investigating the benefits of emotion-focused decision making. *Emotion, 11*(4), 743. https://doi.org/10.1037/a0023986

Molouki, S., & Bartels, D. M. (2017). Personal change and the continuity of the self. *Cognitive Psychology, 93*, 1–17. https://doi.org/10.1016/j.cogpsych.2016.11.006

Morewedge, C. K., Giblin, C. E., & Norton, M. I. (2014). The (perceived) meaning of spontaneous thoughts. *Journal of Experimental Psychology: General, 143*(4), 1742. https://doi.org/10.1037/a0036775

Newman, G. E., & Smith, R. K. (2016). Kinds of authenticity. *Philosophy Compass, 11*(10), 609–618. https://doi.org/10.1111/phc3.12343

Olds, J. M., & Link, D. (2016). Unpacking Decision Domains–Commentary on "Domain-Specific Preferences for Intuition and Deliberation in Decision Making". *Journal of Applied Research in Memory and Cognition, 5*(3), 325–328.

Pachur, T., & Spaar, M. (2015). Domain-specific preferences for intuition and deliberation in decision making. *Journal of Applied Research in Memory and Cognition, 4*(3), 303–311. https://doi.org/10.1016/j.jarmac.2015.07.006

Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and the ratio-bias phenomenon. *Journal of Personality and Social Psychology, 76*(6), 972–987. https://doi.org/10.1037/0022-3514.76.6.972

Paul, L. A. (2017). First personal modes of presentation and the structure of empathy. *Inquiry, 60*(3), 189–207.

Paul, L. A., & Bloom, P. (2022). Uncomfortable Decisions. In T. Chen, & Urmansky (Eds.), *Experimental philosophy of identity and the self*. Bloomsbury Press. forthcoming.

Pham, M. T. (1998). Representativeness, relevance, and the use of feelings in decision making. *Journal of Consumer Research, 25*(2), 144–159. https://doi.org/10.1086/209532

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior research methods, 40*(3), 879–891.

Prinz, J. J., & Nichols, S. B. (2016). Diachronic identity and the moral self. In *The Routledge handbook of philosophy of the social mind* (pp. 449–464). Taylor and Francis. https://doi.org/10.4324/9781315530178.

Pronin, E., Lin, D. Y., & Ross, L. (2002). The bias blind spot: Perceptions of bias in self versus others. *Personality and Social Psychology Bulletin, 28*(3), 369–381. https://doi.org/10.1177/0146167202286008

Rand, D. G., Peysakhovich, A., Kraft-Todd, G. T., Newman, G. E., Wurzbacher, O., Nowak, M. A., & Greene, J. D. (2014). Social heuristics shape intuitive cooperation. *Nature Communications, 5*, 3677. https://doi.org/10.1038/ncomms4677

Rogers, C. R. (1961). *On becoming a person.* Houghton Mifflin.

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. *Journal of Statistical Software, 48*(2), 1–36.

Small, D. A., Loewenstein, G., & Slovic, P. (2007). Sympathy and callousness: The impact of deliberative thought on donations to identifiable and statistical victims. *Organizational Behavior and Human Decision Processes, 102*(2), 143–153.

Simmons, J. P., & Nelson, L. D. (2006). Intuitive confidence: Choosing between intuitive and nonintuitive alternatives. *Journal of Experimental Psychology: General, 135*(3), 409–428. https://doi.org/10.1037/0096-3445.135.3.409

Sloman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin, 119*(1), 3. https://doi.org/10.1037/0033-2909.119.1.3

Smart, J. J. C., & Williams, B. (1973). *Utilitarianism: For and against.* Cambridge University Press.

Ståhl, T., Zaal, M. P., & Skitka, L. J. (2016). Moralized rationality: Relying on logic and evidence in the formation and evaluation of belief can be seen as a moral issue. *PloS one, 11*(11), Article e0166332.

Strohminger, N., Knobe, J., & Newman, G. (2017). The true self: A psychological concept distinct from the self. *Perspectives on Psychological Science, 12*(4), 551–560. https://doi.org/10.1177/1745691616689495

Tetlock, P. E. (2003). Thinking the unthinkable: Sacred values and taboo cognitions. *Trends in Cognitive Sciences, 7*(7), 320–324. https://doi.org/10.1016/s1364-6613 (03)00135-9

Tetlock, P. E., Kristel, O. V., Elson, S. B., Green, M. C., & Lerner, J. S. (2000). The psychology of the unthinkable: taboo trade-offs, forbidden base rates, and heretical counterfactuals. *Journal of Personality and Social Psychology, 78*(5), 853. https://doi. org/10.1037//0022-3514.78.5.853

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185*(4157), 1124–1131. https://doi.org/10.1126/science.185.4157.1124

Varga, S., & Guignon, C. (2020). Authenticity. In E. N. Zalta (Ed.), *The stanford encyclopedia of philosophy*. https://plato.stanford.edu/archives/spr2020/entries/ authenticity/.

Williams, B. (1981). *Moral luck*. Cambridge: Cambridge University Press.

Wilson, T. D., & Schooler, J. W. (1991). Thinking too much: introspection can reduce the quality of preferences and decisions. *Journal of Personality and Social Psychology, 60* (2), 181. https://doi.org/10.1037/0022-3514.60.2.181

Woolley, K., & Risen, J. L. (2018). Closing your eyes to follow your heart: Avoiding information to protect a strong intuitive preference. *Journal of Personality and Social Psychology, 114*(2), 230. https://doi.org/10.1037/pspa0000100

Yaniv, I., & Kleinberger, E. (2000). Advice taking in decision making: Egocentric discounting and reputation formation. *Organizational behavior and human decision processes, 83*(2), 260–281.

Zaki, J., & Mitchell, J. P. (2013). Intuitive prosociality. *Current Directions in Psychological Science, 22*(6), 466–470.

Oktar, K., & Lombrozo, T. (2020). You should really think this through: cross-domain variation in preferences for intuition and deliberation. In *Proceedings of the 42nd annual meeting of the cognitive science society*.

Oktar, K., & Lombrozo, T. (2021). Deciding to be authentic: Intuition is favored over deliberation for self-reflective decisions. In *Proceedings of the 43rd annual meeting of the cognitive scIENCE society*.