



Assimilation and control: belief at the lowest levels

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Abstract The core of Zimmerman’s picture posits an inverse correlation between an action’s automaticity and belief’s role in the action’s execution. This proposal faces serious problems. First, high-attention, high-control actions don’t seem to heighten awareness of one’s beliefs. Second, low-attention, low-control actions are caused by the same states at play when executing high-attention, high-control actions, in which case there is no ontological difference in the states involved in these behaviors. Third, on Zimmerman’s view it is unclear what it is for a state to be involved in behaviors at all, as the basic realist response—that beliefs cause behavior—is unavailable to a Zimmerman-style pragmatist. Lastly, if Zimmerman’s view were right and low-level behaviors weren’t caused by beliefs, then we should turn our attention to those states instead, as most of our behavior isn’t executed under conditions of high control and attention.

Keywords Belief · Reasoning · Reflexes · Rationality · Intuition

The classic view of belief is functionalist, characterizing belief either by its role in folk generalizations (Lewis 1972; Braddon-Mitchell and Jackson 1996) or scientific ones (Fodor 1987; Quilty-Dunn and Mandelbaum 2018a). Functionalism connects belief to a host of other propositional attitudes and mental processes. The pragmatist view Zimmerman offers greatly narrows this focus, connecting belief to control and attention, and severing its tie to other canonical mental processes (e.g., memory, inference, perception) and states (e.g., desires, doubts, knowledge).

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Zimmerman seeks, in part, to answer the question: in which situations should we posit beliefs? He lets automaticity serve as the guide for belief attribution, positing an inverse correlation between an action's automaticity and belief's role in the action's execution. Let's begin with deliberate actions.

If you bring a given body of information to bear when paying full attention to the activity you're engaged in, we can say that you have at least minimally assimilated the information that guides you in that endeavor. Similarly, information is minimally assimilated when you bring it to bear when exercising complete control over the movement of your limbs though (sic) space or the progression of your thoughts over time (Zimmerman 2018, 2).

For the pragmatist, deliberate action serves as the paradigm case for belief attribution. In contrast, its inverse—distracted action (action performed in situations where one's self-control and attention are diminished)—utilizes “maximally assimilated” non-belief information. The more an action can be performed under distraction, the less belief-y the information involved in its execution is.

The connection between assimilation and belief is the heart of Zimmerman's story. But what the connection is supposed to be isn't straightforward. Take the above quote, which uses a variant of the locution “bringing a given body of information to bear.” What is it to do *that*? For the representational realist (e.g., Quilty-Dunn and Mandelbaum 2018a) one brings information to bear by activating the relevant representations (and then having them used in computations that eventuate in the production of behavior). But Zimmerman can't say that as he scoffs at talk of beliefs as relations to representations.¹ If information can't be activated (/ isn't literally causal) then it's unclear what role this putatively well-assimilated non-belief information can play in the production of behavior.

Zimmerman does offer up the following: “The idea here is that focusing attention and exercising control are the means by which you bring your beliefs to bear on an activity” (2018, 2). This still doesn't answer the question of what it is to bring something to bear but at least it gives us a way into his thinking. There are scenarios in which this claim seems innocuous enough—if you ask me to determine what the U.N. should do about Bashar Al-Assad I'll focus my attention, block out other thoughts and distractions, and think about the question using whatever information I have, i.e., my standing beliefs (e.g., that he used chemical weapons, that his father used chemical weapons, that those in power don't like ceding it, that the U.N. is generally ineffectual, etc.). But here I'm trying to figure something out, viz., what I should believe.

Yet just as frequently we may pay extremely close attention to actions in ways that don't bring our beliefs to the fore. If I'm shooting free throws to win a game, I'll attend to the action much more closely than if I'm just shooting around for fun, but that's not because any of my contentful mental states have changed. In both cases my beliefs are kept constant—when pressure is on I don't focus more on my

¹ He seems to scoff at mental representations general, which is of a piece of his general aversion to psychological reality (“an animal's psychology is its neurology”) (2018, 65).

beliefs (e.g., that this is a basketball, that is a rim, that the basket is ten feet high, etc.) What I want to achieve isn't the activation of a thought (thinking "If I miss, we'll lose!" won't help), but instead the attainment of a clarity of mind, removing all thought to let muscle memory take over.

But even if I do repeatedly deploy a particular belief in the high-pressure case—e.g., my belief that I should bend my knees—I don't stop believing that I should bend my knees to shoot free throws when I'm just goofing around. I may not activate that belief in one case and activate it in the other, but both times my possessing it seems the same. It ceases to be a different kind of state merely because I have decreased my attention to it. Attention really is a pragmatic matter—what I choose to attend to is, often enough, a function of my ends, but why should changing my goals change the ontological status of my informational states?

So much for high concentration cases. What about the distracted cases, where beliefs aren't supposed to enter the fray? Zimmerman motivates his view with the following example: say you just moved and you're asked where you live. You may immediately respond by reporting your previous address. In this case Zimmerman thinks you don't believe your wrong answer; instead you produce your response not by utilizing beliefs but via "relatively automatic linguistic habits" (2018, 3). His intuition is that if you attended to the question and thought more about it, you'd produce the correct answer—your current address—which would accord with your actual belief. The intuition is palpable—the pragmatist position is connecting what you'd reflectively endorse with what you believe.

One might wonder: what are these "automatic linguistic habits" if not beliefs? Perhaps Zimmerman thinks they are literally just linguistic reflexes, say phonetic strings with no contentful connection behind them, as when one learns to recite a quotation in a language one doesn't understand. The more these "automatic linguistic habits" look like beliefs, the worse the outlook for Zimmerman. Evidence sensitivity is a paradigmatically rational act, and not at all the sort of thing that e.g., the deep tendon reflexes show. So if relatively automatic action—the action caused by "automatic linguistic habits" and the like—can be modulated by evidence, then those low-level states that cause the actions would seem a lot like beliefs.

The more one investigates these cases, the more one can see the effects of evidence on low-level behaviors. One sees it in misattribution of affect and celebrity contagion cases (Mandelbaum 2013), in unconscious effort justification (Quilty-Dunn and Mandelbaum 2018a), in preference formation (ibid.), in unconscious inference (Quilty-Dunn and Mandelbaum 2018b), and implicit attitude modulation (Mandelbaum 2016). In fact, low-level states are often more evidence-responsive than the states that we reflectively endorse [particularly when we self-identify with them (Mandelbaum 2019)].

To press the point further, here are two sample cases. Let's start with placebo effects. If you change subjects' beliefs about whether the cigarettes they are smoking contain nicotine or not, you'll change a host of their behavior, including their *extremely* low-level ones (Gu et al. 2015). For example, reward-prediction error learning is the normal learning mechanism involved in addiction, and it is detectable via elevated levels of bilateral striatum activity. People who think they are smoking nicotine-laden cigarettes, and who are indeed smoking them, show

elevated activity in the bilateral ventral striatum; those who correctly believe they are smoking non-nicotine laden cigarettes show low levels of activity. Ho-hum stuff. Now for the interesting part: those who think they are smoking nicotine-laden cigarettes but are in fact receiving a nicotine-less placebo show the same elevated levels of activity as those who were actually smoking cigarettes with nicotine. And those who thought they were smoking nicotine-less cigarettes but were actually receiving nicotine again showed the lowered activation levels. Thus, what mattered for the bilateral ventral striatum activation—as low a level behavior as we’ll find—wasn’t how much of the actual drug participants ingested but was instead what they believed they were ingesting. The placebo effect not only caused false positives and negatives but affected both the value signal and the reward prediction error signal separately (ibid., 2541).²

The previous example shows the deep reach of belief. The reader may think that neural activation and computational learning processes are too low-level to count as behavior. Yet moving to more paradigmatic low-level behavior doesn’t change the theme: practically anywhere you investigate low-level behavior, their causal antecedents look much less like the deep tendon reflex and much more like a highly intelligent computational process (Mandelbaum 2015). The production of intuitive behavior is due to a complex mesh of factors that exemplify the vast underintellectualization of behavior by theorists (Quilty-Dunn 2017). Even the production of behavior under cognitive load is due to extremely flexible and intelligent computational processes, ones that very much seem to implicate beliefs.

Intuitive responses (such as responses given under load) are often incorrect, but they are never the result of computationally null or downright stupid processes. When Zimmerman talks about intuitive responses, he has in mind something like the example of your old house number—a response that is stored in semantic memory.³ But during most of our daily life we toil under load, with our attention and self-control distracted, and yet nonetheless take in new information and respond to new problems (Mandelbaum and Quilty-Dunn 2015). If Zimmerman is right, then these informational bearing states should be the real focus of inquiry, as the vast majority of behavior is produced under these non-ideal conditions. It is the rare action that is executed with maximum attention and self-control, thus for Zimmerman belief should be surprisingly rare.

But back to the central challenge Zimmerman’s work poses: can we find uncontroversial low-attention, low-control behaviors that utilize belief? The dual-process literature is littered with such examples. “System 1” responses are intuitive responses that can be produced under cognitive load. At first blush they may seem rigid and dumb, but they are surprisingly flexible and can be created without the

² This situation has nothing to do with nicotine per se—one can find the same effects for alcohol, cocaine, and opioids; see Porot and Mandelbaum (forthcoming).

³ Zimmerman does not like talk of belief storage (“the belief box”), and he offers up some old canards against it [i.e., there is no neural evidence for localized beliefs, (Zimmerman 72; cf. Quilty-Dunn and Mandelbaum 2018a)]. This makes one wonder if he’d apply the same arguments to semantic memories, thereby showing their putative non-existence. It would be just as sensible for him to do so, for what are semantic memories if not beliefs?

overlearning involved in Zimmerman's automatic habits. A mere glance at the S1 responses tested in the heuristics and biases literature shows that the questions rely on unlearned responses—they are people's novel intuitions to problems they've never seen before.

Even when subjects get these questions wrong, they use their beliefs. Take the "Cognitive Reflection Task." In the typical CRT subjects are told that a bat and a ball cost \$1.10 and the bat costs \$1 more than the ball. They are then asked to say how much the ball costs. Put subjects under cognitive load (e.g., have them remember a dot configuration) and make them respond as soon as possible (e.g., have them respond instantly, another form of load) and they'll get the answer wrong a lot, even more than the normally high miss rate (see, e.g., Bago and De Neys 2019). But even to produce that incorrect response (10c) the subjects have to use their beliefs—i.e., that the total was \$1.10, the bat cost \$1 more than the ball, that you click the box to note your answer, etc. Moreover, one's beliefs about the relative prices of the bat and ball weren't "maximally assimilated" pieces of information. How could they be, since the subjects had just learned them immediately before they were asked to answer! Instead, the subjects learned the information and used their new beliefs to make instantaneous inferences.

More evidence for the idea that S1 responses are caused by beliefs arises when one compares responses in the load condition versus the unloaded one. One would expect that if you weren't bringing your beliefs to bear in the loaded case (because beliefs aren't involved in low-level responding) then in the unloaded case you would have different answers, for here you have all the time in the world to utilize your beliefs (which, by Zimmerman's hypothesis, weren't available earlier). But in fact, people are extremely stable in how they respond to the loaded and unloaded cases—about 90% don't change their response between loaded and unloaded cases (and that's even though their initial response was only correct on about 14% of trials) (ibid.).⁴

The challenge facing Zimmerman is to give some criteria for why these extremely low-level behaviors implicate "maximally assimilated" states that are not beliefs, when the functional role of these states look very similar to the ones at play in minimal assimilation cases and not at all like overlearned linguistic reflexes. What the CRT load and unloaded conditions suggest is that the same states are at play whether you're focused on solving a word problem and have all the time in the world, or whether you have to respond to the same exact problem the second you have completed reading it.

A related challenge for Zimmerman is to explain how information can be maximally assimilated even though one just encountered it at this very instant (Mandelbaum 2014). Zimmerman writes that the "acceptance of the pragmatist definition of 'belief' is best seen as a philosophical choice among empirically equivalent but socially divergent alternatives" (2018, 21). But the alternatives aren't empirically equivalent when the theory can't handle a legion of

⁴ Note that the CRT isn't in itself interesting. The same morals—and generally the same rates—hold if instead one focuses on syllogistic reasoning or base rate cases (Bago and De Neys 2017).

data that it is tailor-made to explain. If the pragmatist theory gets the cases wrong when we're under load (because we are using beliefs), as well as gets the cases wrong when we focus (because it doesn't necessarily cause any heightening of belief), which cases does it get right? And that's just focusing on the core cases that the theory is designed to explain, never mind the wide range of other undiscussed desiderata one might want a theory of belief for (Mandelbaum 2010).⁵

Assimilation's connection to belief is the heart of theory, so this isn't quibbling at the margins. But it may be probative to search for the deeper motivations that brought Zimmerman here. Part of the larger problem is that Zimmerman seems to tie belief to endorsement. But what we endorse and what we believe come apart. Though the things we endorse may be a good guide to what we believe, the inverse inference—that the contents we fail to endorse we don't believe—is where many theories of belief go awry. The beliefs that control our low-level behaviors are often (maybe always) unconscious. A more fruitful model severs the tight connection between belief and endorsement thereby helping explain how we have so many contradictory pairs of beliefs, yet only normally endorse (at most) one of them (Bendaña and Mandelbaum forthcoming).

Pragmatism has much to offer but perhaps its most regressive trait is on display in Zimmerman's book: not taking one's theoretical posits seriously. Ironically, Zimmerman rejects a Dennettian view, but then falls prey to the same problem as Dennett—not truly owning up to the states his theory posits, so foundering on the question of whether beliefs cause behavior. One can see this distancing—redolent of Dennett's pragmatism—in his use of shudder quotes: “The pragmatists claim that your beliefs are “brought to bear” on both your more controlled, attentive transitions in thought and your more controlled, attentive movements through space” (2018, 12). Earlier I wondered what being brought to bear was and it turns out Zimmerman doesn't even want to commit himself to the mental activity denoted by that noncommittal phrase. For the pragmatist, the explanation of belief's role in the production of behavior is, like Zimmerman's book, elusive.

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⁵ The book fails to engage with many core questions, such as belief's functional role (e.g., how beliefs are acquired, changed, stored, and used in inference) and its metaphysics (e.g., whether beliefs are relations to mental representations, where their opacity comes from). When these topics do arise the treatment generally lasts a sentence. For instance, Zimmerman rejects propositional attitude talk entirely, by writing, “Of course, humans use sentences to attribute beliefs to themselves and other animals. But there is no further sense in which belief is itself a ‘propositional attitude’” (p 20). That is the whole argument. For other senses in which belief may be deemed a propositional attitude see Richard (1983), Dretske (1988), Crimmins (1992), Spohn (2012), Gluer and Wikforss (2013), Leitgeb (2017) and Friedman (2019).

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