

# Chapter 2: How Could Preferences be Vague?

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**Abstract.** Preferences and credences are typically construed as actual and hypothetical choices and/or as mental states. The former ‘revealed preference’ view looks challenging for unsharpness in general—since we do or would choose, must we not have a preference?—and for unsharpness as vagueness in particular. How could something worldly like a choice be vague? In this chapter I answer both of these challenges.

In the last chapter I introduced Supersharp, which says that when an agent is unsharp—when she has incomplete preferences or imprecise credences—it is vague what her credences and preferences are. Given a tolerance-denying theory of vagueness, it’s supertrue that she has point-valued preferences and credences but vague what they are. Stipulatively, ‘complete’, ‘precise’, and ‘sharp’ are terms in the metalanguage, which has access to facts about vagueness, whereas ‘point-valued’ is a term in the object language, which doesn’t, as is ‘full’.

This theory faces two challenges, one general and one specific, stemming from the fact that preferences and credences are often considered somewhat worldly entities.

The general challenge is the question of whether it’s really plausible that—construed as worldly entities—preferences and credences can be vague. Whether or not we think that vagueness is *only* a linguistic or mental phenomenon, it certainly seems more at home in those areas. Consider a couple of very famous sentences by David Lewis:

The only intelligible account of vagueness locates it in our thought and language. The reason it’s vague where the outback begins is not that there’s this thing, the outback, with imprecise borders; rather there are many things, with different borders, and nobody has been fool enough to try to enforce a choice of one of them as the official referent of the word ‘outback’. (Lewis 1986, 212)

Lewis’s explanation works because the outback is something we discuss (‘don’t drive into the outback without adequate water’), but there are very many actual and hypothetical choices that we don’t discuss. At the extreme, a ‘language-first’ theorist of vagueness might claim that vagueness arises in a somewhat specialised way that manifests only in language, perhaps through interpersonal lin-

guistic negotiation. Such a language-firster could deny that beliefs and desires have vague contents.<sup>1</sup>

Mahtani (2019) defends a position similar to mine in explicitly linguistic terms, arguing that the *word* ‘credence’ is vague. We agree on many things, but hers is a linguistic account offering ‘a simple way of handling sentences relating the credences of different people, or of the same person at different times’ (p. 29). I don’t think this quite answers the challenge of a worldly revealed preference account. Mahtani appeals to some more worldly examples (‘height’ and ‘resting heart rate’) but her central claim is that ‘the orthodox Bayesian theory is true but expressed in vague language’ (p. 19).

My aim in this chapter is to explain how indeterminacy could arise in revealed preferences perhaps without *any* linguistic involvement, by appeal to the possible-worlds closeness or similarity relation. (Of course if indeterminacy in that relation turns out to be basically linguistic then my account moves rather closer to Mahtani’s.)

The specific challenge for incompleteness I call the ‘Choice Argument’, and it is my main foil. Briskly: suppose that X and Y are your only options, and that our theory says you prefer X to Y *iff* under some suitably spelt-out conditions you do or would choose X over Y. Since you (plausibly) *do* or *would* choose one way or another, it must be the case that you have complete preferences over all X and Y. I’ll reject the Choice Argument; we need to look more closely at the ‘hypothetical’ in ‘hypothetical choices’. Along the way, I’ll consider strict indifference, which is—as Buridan’s Ass shows us—itself somewhat puzzling.

First, let’s consider what preferences and credences are.

## 1 Mentalism and Revealed Preferences

Intuitively, preferences and credences have two aspects. First, a propositional, contentful aspect. To have a certain credence in a proposition p is to be in a mental state, to take a view about how likely p is to be true. If you assign p credence 0 then you are absolutely certain that it is false; if you assign p credence 1 then you are absolutely certain that it is true.

The preference case is less clear, but a preference for X over Y normally involves or is accompanied by a belief that X is better or more desirable than Y, or simply an intention to choose X over Y. A longstanding variant of this claim is the so-called *desire-as-belief* thesis, defended recently by Alex Gregory: to desire to  $\phi$  just is to believe that you have reason to  $\phi$ .<sup>2</sup>

Second, a dispositional, choice aspect. For preferences, it is natural to say that to prefer X to Y is to choose X over Y, all else equal. That’s the theory I gestured at above. How *could* we say that you prefer coffee to tea if you wouldn’t choose coffee over tea even when nothing else is at stake? You prefer tea, admit it! The

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<sup>1</sup>What I’ve called ‘language-firstism’ is one of the targets of Bacon (2018), though see Zardini (2022) pp. 1–2 for skepticism about how widespread language-firstism really is.

<sup>2</sup>Gregory (2021), p. 11.

‘all else equal’ and ‘if nothing else is at stake’ qualifiers are of course crucial, because you might well prefer coffee in general yet choose tea this time if you’ve had a lot of caffeine already today or the tea is cheap enough.

For credences, the idea is that to have a credence in  $p$  implies a willingness to bet on  $p$  at certain odds: if your credence in  $p$  is 0.5, then you will (all else equal) accept a bet that pays nothing if  $p$  is false, and pays 2.01 times your stake if  $p$  is true. Notice ‘implies’ here rather than the ‘is’ of the previous paragraph, because it’s somewhat less intuitive that to have a particular credence in some proposition *just is* to be willing to bet on that proposition at the relevant odds.

The choice-based construal of credences has some puzzling implications for standard decision theory. For example, it implies a willingness to accept almost absurdly risky bets, that someone with a sufficiently small credence in  $p$  will (if rational) accept a bet that pays a penny if  $p$  is false and costs a million years of torture if  $p$  is true. But the core idea that credences at least *imply* willingness to choose, perhaps subject to some risk-adjustment, seems undeniable.

So both preferences and credences seem to have a mental-state aspect and a choice-based aspect, with the mental perhaps seeming more central for credences and choices seeming so for preferences. There is a dispute in economics and its philosophy about which of these is primary or central. What mentalists think is clear from their name, whereas so-called ‘revealed preference’ theory is the view that preferences simply *are* choices (or dispositions to choose).<sup>3</sup> I’m clearly not going to settle that dispute here, but I hope to defend the revealed preference view against the charge (embodied in the Choice Argument) that it can’t cope with incompleteness.

I’ll focus on the choice aspect for two rather dialectical reasons. First, as we’ve just seen, mentalists might have an easier time accommodating vagueness and incompleteness, so revealed preferences are the harder case for my view. Second, this is an ecumenical matter. Even mentalists don’t deny that we *do* make choices, and that these choices bear some connection to credences and preferences. But revealed preference theorists sometimes deny the existence of mental states underlying preferences, or at least their fitness for economic study. I’ll follow (Walley 1991, 19): ‘we require only that beliefs and values entail certain behavioural dispositions; there may be more to them than that’.

So I’ll assume a revealed preference account of preferences and credences. I don’t intend talk of ‘dispositions’ to be taken too literally, and will henceforth avoid the word except where quoting others, because there are difficult issues in metaphysics about the connection between dispositions and counterfactuals. My concern will be about your actual and counterfactual choices.

Before digging into revealed preferences, I note an unfortunate terminological clash with an interesting account due to Alan Hájek and Michael Smithson, who defend what they call ‘indeterminacy’ but *not* vagueness, writing that “the word ‘vague’ has philosophical connotations that would be misleading”.<sup>4</sup> Their argument has two premises and could be repurposed to serve Supersharpe:

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<sup>3</sup>See Thoma (2021) and the references therein.

<sup>4</sup>Hájek and Smithson (2012), p. 35

- (1) Interpretivism: To possess a certain mental state simply is for an ideal observer to attribute that state to you.
- (2) '[R]ationality surely permits an agent to have dispositions that admit of multiple equally good interpretations'.<sup>5</sup>

Interpretivism is an independently-respectable view in the philosophy of mind, and so it is fair game to assume here. But our shared opponent the sharper may respond that the argument involves an unprincipled limitation in the amount of idealisation or rationalisation involved. Hájek and Smithson point to Lewis's version of interpretivism, which involves 'rationalization understood as expected utility maximization' of your dispositions.<sup>6</sup> But, the sharper can respond, since unsharpness is irrational why rationalise this far, no further? The same idealisation which would have us interpret agents as maximisers might also have us interpret them as *sharp* maximisers, and so interpreting rational agents as *sharp* expected utility maximisers can be justified in much the same manner as interpreting them as maximisers at all.

Let's turn to choices.

## 2 Preferences as Choices

Here is the most natural way to construe preferences as choices.

' $\Box \rightarrow$ ' is the counterfactual conditional.<sup>7</sup>  $A\Box \rightarrow B$  says that if A were the case, then B would be the case. For example, I am writing these words on a wet February afternoon, and so if I go to the shop I will get rained on: "Luke leaves the house after writing this sentence  $\Box \rightarrow$  Luke gets wet" is true. This example isn't tied to any particular account of counterfactuals; I simply wish to illustrate the notation and the basic idea.

A bit more notation:  $C(X, Y)$  is the 'choice antecedent', the proposition that you are offered a cost-free choice between X and Y. It's cost-free in that nothing else you care about is at stake.  $C(\text{Tea}, \text{Coffee})$  is the proposition that you are offered such a choice between Tea and Coffee. Two clarifications. First, this is a specific choice and the capital letters emphasise that Tea is a *particular* cup of tea and Coffee is a *particular* espresso shot. Second, your choice will have no consequences you care about beyond what you get to drink and consequences thereof.

Assume that you strictly prefer Coffee and Tea to anything else you might choose—this could be stipulated for example by saying that Coffee and Tea are free, but everything else costs £10 and you are sufficiently frugal that price makes them the clear winners. Assume also you are very thirsty so you prefer to drink *something*.

For the rest of this chapter, I'll assume that you are rational. You prefer Coffee and Tea to all other options (including nothing). Any other choice is outright

<sup>5</sup>Hájek and Smithson (2012), pp. 36–7.

<sup>6</sup>Hájek and Smithson (2012), p. 36.

<sup>7</sup>With ugly typesetting, sorry.

dispreferred. It seems undeniable that if you strictly prefer Coffee to Tea, then given such a cost-free choice, you *would* choose Coffee:

**Strict Preference Implies Choice.** If  $X \succ Y$ , then  $C(X, Y) \square \rightarrow X$ .

In English, if you strictly prefer X to Y then (were you offered a cost-free choice between X and Y, then you'd choose X). There's a minor terminological abuse here, where 'X' is used both for the option and for the proposition that you choose that option. But the principle really does seem undeniable. What else could it mean to construe strict preference in terms of choices, if not that someone who strictly prefers something will choose that thing, if they are rational and can do so at no cost? We may wish to qualify the principle somewhat to cover cases where you are *unable* to choose a certain way, and so on, but for my purposes only the core idea is required.

The other direction says that if you would choose Coffee over Tea, then you strictly prefer Coffee to Tea. In general:

**Choice Implies Strict Preference.** If  $C(X, Y) \square \rightarrow X$ , then  $X \succ Y$ .

This says that if you would choose X given a cost-free choice between X and Y, then you strictly prefer X to Y. I also find this claim plausible. If I tell you that I would choose Coffee over Tea in a choice with no other upshots I care about, haven't I told you that I prefer Coffee to Tea?

Before considering the Choice Argument, it's worth pausing to note how simple and intuitive this setup is. If you are going to interpret preferences as actual and hypothetical choices, then this seems like the way to do it.

### 3 The Choice Argument

Here's the problem. Richard Bradley speaks for many when he claims that revealed preference theory has a troubling upshot for incompleteness:

on the interpretation of preferences most favoured by economists, namely as actual or hypothetical choices, completeness is essentially built in.<sup>8</sup>

I'll call this the *Choice Argument*. The idea is that since we do or would act one way or another, incompleteness is impossible because what we do or would choose is what we prefer. If you do or would choose Tea then you prefer it to Coffee, and if you do or would choose Coffee then you prefer it to Tea. Since you are rational you do or would choose one of the two, so those are the only options. Thus your preferences between them weren't incomplete after all.

Ronald de Sousa also presents (and rejects) a version of the Choice Argument, which I'll quote at length:

the only empirical significance of the concept of utility lies in what value people actually set on available alternatives; and the only empirical access to those values are actual choices made. (Remember

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<sup>8</sup>Bradley (2018), pp. 233–4.

Mill's famous equation of the desirable with the desired.) But in any situation that presents an exclusive and exhaustive alternative, only two outcomes are possible: A is chosen over B, or B is chosen over A. It is allowed that the choice may on some occasions be a random one (one that does not reflect an asymmetric relation of preference between the two alternatives) and thus we have a total of three possible relations. A is preferred, B is preferred, or A and B are indifferent.<sup>9</sup>

Similarly, Martin Peterson thinks it 'plausible to assume full comparability in this context since preferences are ultimately linked to acts, and *some* alternative act is, by definition, certain to be chosen'.<sup>10</sup>

Based on what we have so far, we can mount a version of the Choice Argument for complete *strict* preferences:

Strict Choice Argument.

- (SC1) Given the choice between X and Y, either you would choose X or you would choose Y.
- (SC2) If you would choose X, then  $X \succ Y$ .
- (SC3) If you would choose Y, then  $Y \succ X$ .
- (SC4) So, either  $X \succ Y$  or  $Y \succ X$ .

There was nothing special about X and Y, so (SC4) is completely general and you have a strict preference between *any* two options, ruling out strict indifference. This seems untenable in two ways. It seems clearly false to say that I will always have a strict preference between any two £5 notes, for example. Even if I do choose one of two notes offered to me—because otherwise I get neither—the inference from that action to strictly preferring one note to the other is highly dubious. Perhaps I simply had to pick arbitrarily?

The standard response is to reject premises (SC2) and (SC3), replacing Choice Implies Strict Preference with

**Choice Implies Weak Preference.** If  $C(X, Y) \square \rightarrow X$ , then  $X \succsim Y$ .

This weaker principle says that if you would choose X over Y, then you either strictly prefer X to Y or are indifferent between X and Y. This weakening of the link between choice and preference deals with the £5 notes case because it allows for *picking* between indifferent options. de Sousa makes this move in the final sentences of his presentation of the argument, noting that it is 'allowed' for X and Y to be indifferent.

On the weaker principle, strict indifference remains but incompleteness must go:

Weak Choice Argument.

- (WC1) Given the choice between X and Y, either you would choose X or you would choose Y.
- (WC2) If you would choose X, then  $X \succsim Y$ .

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<sup>9</sup>de Sousa (1974), pp. 535–6

<sup>10</sup>Peterson (2006), p. 306 n. 12. Emphasis in original.

(WC3) If you would choose Y, then  $Y \succcurlyeq X$ .

(WC4) So, either  $X \succcurlyeq Y$  or  $Y \succcurlyeq X$ .

There was nothing special about X and Y, so (WC4) is once again general: it is simply Completeness. Given Choice Implies Weak Preference, complete weak (but not strict) preferences are indeed essentially built-in.

But the dialectic here is a little odd. The link between preference and choice in Choice Implies Strict Preference was initially plausible, but we wanted to avoid complete strict preferences and preserve indifference, so we weakened it to Choice Implies Weak Preference, retreating from the Strong Choice Argument to the Weak Choice Argument. This was a reasonable move, if a little *ad hoc*. But it saps the strength of the Weak Choice Argument against incompleteness. What principled reason do we have for accepting the conclusion of the Weak Choice Argument rather than making the same move again? That is to say, why not retreat once again to something like

**Choice Implies Weak Preference or Incompleteness.** If  $C(X, Y) \rightarrow X$ , then  $X \succcurlyeq Y$  or  $X \not\succcurlyeq Y$  (X is weakly preferred to Y or X and Y are incomplete).<sup>11</sup>

This even weaker principle says that if you choose X over Y, then either you strictly prefer X, or you are indifferent between them, or you are incomplete between them. If this looks question-begging or *ad hoc* to you, this may be because you've been too indoctrinated in favour of strict indifference and against incompleteness.

We can say quite a few things in favour of the even weaker principle. That we are sometimes incomplete is nearly—albeit perhaps not *quite*—as plausible as that we are sometimes strictly indifferent. So weakening the choice-preference link once again to accommodate incompleteness is nearly as plausible as the first time around. And whilst the even weaker principle looks excessively disjunctive, we can again find a companion in guilt. Choice Implies Weak Preference is disjunctive too, in a way masked by the ' $\succcurlyeq$ ' notation, which assuming completeness means ' $>$  or  $\sim$ '. Without assuming completeness, all that is implied by a choice of X over Y as ' $X \not\prec Y$ ', which leaves open the question of what *positive* relation if any holds between the two.

Choice Implies Weak Preference or Incompleteness is plausible once we think about decision rules for incompleteness. Much of that discussion is to come in the next chapter, but in Chapter 1 I argued that 'liberal' decision rules are plausible, which that if you are incomplete between two options, you may choose either. So the defender of incompleteness can quite plausibly say that from a rational choice of X over Y all we can infer is a disjunction of strict preference for X or indifference between them or incompleteness between them.

Thus the Weak Choice Argument looks question-begging against incompleteness. If not *outright* question-begging, at least unmotivated: why draw the line here against incompleteness when we didn't draw it earlier against indifference?

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<sup>11</sup>Reminder: I write 'X and Y are incomplete' to mean that the agent in question has incomplete preferences between X and Y, in a similar usage to de Sousa on 'indifferent' options.

We could in-principle accept the doubly-weakened Choice Implies Weak Preference or Incompleteness as a way to reconcile incompleteness with revealed preferences. But it is horribly uninformative, and so my approach will be somewhat more ambitious, keeping the strong Choice Implies Strict Preference—which is, as we’ve seen, intuitive—and attacking the Choice Argument on other grounds.

## 4 How to Rescue Incompleteness

In what follows I’ll assume Choice Implies Strict Preference and give a unified account of both indifference and incompleteness. The account can also be run on the standard Choice Implies Weak Preference by those who favour weakness.

As throughout, ‘+’ denotes small improvements, so for every  $Z$ ,  $Z+ > Z$ , and a similar principle holds for  $Z-$ . I’ll also assume that though  $X$  and  $Y$  are incomplete, they are preferred to everything *else* except small-improvements such as  $X+$ . Since I’m assuming that you are rational, this implies that  $C(X, Y) \square \rightarrow (X \vee Y)$ . Given a choice between them, you wouldn’t choose something *else*. This follows from Strict Preference Implies Choice, which is not in question.

Remember from Chapter 1’s Small-Improvement Arguments that the difference between strict indifference and incompleteness is that the former but not the latter is broken by small one-sided improvement or sweetening:

**Strict Indifference.**  $X \sim Y$  if and only if (i)  $X \not> Y$  and  $X \not< Y$ , but (ii)  $X < Y+$  and  $Y < X+$ , and (iii)  $X- < Y$  and  $Y- < X$ .

This says that if you are indifferent between  $X$  and  $Y$  if and only if you strictly prefer neither, but do a slight improvement to either (to  $X+$  or  $Y+$ ) makes you prefer the improved version and you similarly disprefer a slightly worse option ( $X-$ ,  $Y-$ ). Strict indifference is sensitive to (or, I prefer) broken by both sweetening (small improvement) and souring (small detriment).

So, for example, suppose that you prefer more carrots to fewer and more onions to fewer. On this definition, you are strictly indifferent between 463 onions and 247 carrots iff (i) you neither prefer 463 onions to 247 carrots, nor 247 carrots to 463 onions, but (ii) you prefer 464 onions to 247 carrots and prefer 248 carrots to 463 onions, and (iii) you prefer 463 onions to 246 carrots and prefer 247 carrots to 462 onions. (If you get tired of carrot and onion talk, you may imagine these as currencies: back when the pound was stronger, one might have been strictly indifferent between \$463 and £247.)

Let’s put this in counterfactual terms. It says that you are strictly indifferent between 463 carrots and 247 onions if and only if (suppressing all the qualifications about nothing else being at stake, and remember we are assuming the link between choice and strict preference)...

- (i) it’s not true that you’d choose 463 onions over 247 carrots, and not true that you’d choose 247 carrots over 463 onions; but
- (ii) you’d choose 464 onions over 247 carrots and you’d choose 248 carrots over 463 onions; and



- (iii) you'd choose 463 onions over 246 carrots and you'd choose 247 carrots over 462 onions.

So that's indifference. Incompleteness—which I'll write as ' $\approx$ '—is different, because it *is not* broken by sweetening or souring:

**Incompleteness.**  $X \approx Y$  if and only if (i)  $X \not\succ Y$  and  $X \not\prec Y$ , and (ii)  $X \not\prec Y+$  and  $Y \not\prec X+$ , and (iii)  $X- \not\prec Y$  and  $Y- \not\prec X$ .

This says that if you are incomplete between  $X$  and  $Y$  then—unlike under strict indifference—a slight improvement to one option (making  $X+$  or  $Y+$ ) would *not* be enough to make you strictly prefer the improved version, and a slight detriment to one option (making  $X-$  or  $Y-$ ) would *not* be enough to make you strictly disprefer the worsened version. In the onions and carrots example, if you are incomplete between 463 carrots and 247 onions, then a small sweetening or souring (adding or taking away one of either vegetable) wouldn't be enough to tip you into strict preference for the sweeter version or against the sourer.

Or to switch examples, to say that you are incomplete between Chapter 1's House and Flat is to say that (i) you neither prefer House to Flat nor Flat to House, (ii) you neither prefer House+ to Flat nor Flat+ to House, and (iii) you neither prefer House to Flat- nor Flat to House-. To put things in terms of choices again...

- (i) it's not true that you'd choose House over Flat and not true that you'd choose Flat over House; and
- (ii) it's not true that you'd choose House+ over Flat and not true that you'd choose Flat+ over House; and
- (iii) it's not true that you'd choose House over Flat- and not true that you'd choose Flat over House-.

So here it's not true that you'd choose either way (House or Flat), and also not true that any sweetening (+) or souring (-) of either option would be enough to make it true that you'd choose the sweeter or sourer option. The core idea is that such small improvements or detriments are not enough to 'break the tie'.

My definitions of indifference and incompleteness are two-sided, applying to both sweetening and souring of *either* option. Such two-sidedness seems overwhelmingly plausible for indifference. But we need to leave room for one-sided incompleteness. Let's suppose that I'm incomplete between House and Flat, and (what amounts to the same thing) that a £1 discount wouldn't tip the balance, but that a £5,000 discount *would*. I strictly prefer House with a £5,000 discount to Flat. Whether or not £5,000 is the right amount, in most cases there is *some* discount that would tip the balance for you in this fashion, and in *small*-improvement arguments a big improvement might well do the job. Since £1 is not enough of a discount to engender strict preference but £5,000 is, there must be a threshold number of pounds that tips you into strict preference.

Let's say for the sake of argument that £4734 is this threshold for you. Then let's look at your preferences between Flat and House with a £4733 discount, just £1 less than the threshold:

- (1) You neither prefer Flat nor House-discounted-£4733; but

- (2) You are not strictly indifferent because you neither prefer Flat nor House-discounted-£4732; but
- (3) You don't have two-sided incompleteness because you *do* prefer House-discounted-£4734 to Flat.

The comparison between Flat and House with a £4733 discount is sensitive to sweetening (an extra £1 discount makes you prefer House) but not to souring (a £1 smaller discount doesn't make you prefer Flat).

An analogue of this 'boundary' between incompleteness and preference plays an outsized role in the evaluative incommensurability debate. And just as in the House/Flat case, we should expect such a boundary whenever a small improvement doesn't tip the balance but a big improvement would. John Broome appeals to considerations around the boundary and its one-sidedness in his collapsing principle argument that incommensurability is vagueness, to which I turn in the next chapter. Compare also for example Ruth Chang's observation that even if Mozart and Michaelangelo are evaluatively incommensurate, Mozart is clearly better than Talentlessi, 'a very bad sculptor'.<sup>12</sup>

I don't think there's anything particularly problematic about such one-sidedness, but you might object to the claim that there must be such a threshold amount (here £4734). Especially in a context where I'm arguing that preferences are incomplete and that this incompleteness is vagueness, how can I justify the claim that there must be a precise boundary to the zone of vagueness, so to speak? The answer is that I don't make that claim: as in many instances of vagueness, we may have second-order vagueness, so the location of the threshold could itself be a vague matter. (Which is not to downplay the paradoxical nature of second-order vagueness.)

So that's how revealed-preference definitions of incompleteness and indeterminacy can be given. But let's turn to the main challenge of the chapter: how can we resist the Choice Argument?

## 5 Three Counterfactual Possibilities

Since revealed preferences involve counterfactual choices, we must say a little more about counterfactuals. The most popular semantics for counterfactual conditionals is the 'Lewis-Stalnaker' possible worlds account.<sup>13</sup> Its central idea is that a counterfactual conditional ( $A \Box \rightarrow B$ ) is true if and only if B is true at all relevant A-worlds (relevant possible worlds where A is true): if and only if all relevant A-worlds are B-worlds.

On one intuitive version of the idea, the only relevant world is the unique A-world closest or most similar to the actual world. Thus ( $A \Box \rightarrow B$ ) is true if and only if the nearest A-world is also a B-world. Things are a little abstract, so let's consider the example "if I'd started a fight, I would have won". We are interested

<sup>12</sup>Broome (1997); Chang (2002), p. 673.

<sup>13</sup>Classic statements are Lewis (1973) and Stalnaker (1980). It'll be obvious that I've been extremely influenced by the latter. Other accounts are available, of course.

in the status of  $(A \Box \rightarrow B)$  and  $(A \Box \rightarrow \neg B)$ : could they both be true? both be false?

Throughout my focus will be on examples where the antecedent  $A$  is *possible*—none of the example choice antecedents are so-called ‘counterpossibles’. For that reason it doesn’t seem possible that both  $(A \Box \rightarrow B)$  and  $(A \Box \rightarrow \neg B)$  could be true: it is very implausible that it could be true that I’d have won the fight and true that I wouldn’t have. There is an interesting question about whether a choice antecedent could ever be a counterpossible: even granted that  $X$  and  $Y$  might be metaphysically impossible, it’s not obvious to me that you being offered a *choice* between  $X$  and  $Y$  is impossible. Whether it is will depend on what is involved in choosing. If choosing  $X$  involves making  $X$  true then it will be impossible (it won’t be possible for you to choose that  $2+2=5$ , for example). But I don’t think we need adopt such a strong ‘making true’ conception of choice, and so I’ll set aside counterpossibles.

But beyond that, it’s much disputed whether all counterfactual conditionals have truth-values, especially determinate truth-values. Here are some possibilities.

## 5.1 Conditional Bivalence

I start with the most demanding:

**Conditional Bivalence.** For every  $A$  and  $B$ , either  $(A \Box \rightarrow B)$  is determinately true and  $(A \Box \rightarrow \neg B)$  is determinately false, or vice versa.

Conditional Bivalence says that one of “if I’d started a fight, I would have won” and “if I’d started a fight, I wouldn’t have won” must be determinately true—though we might not know which—and the other determinately false.

Here is a brief rationale. Every possible world is complete—each proposition is either true or false there—and so for example it’s either an  $A$ -world ( $A$  is true there) or not an  $A$ -world ( $A$  is false there). So in the nearest  $A$ -world, either  $B$  is true or  $B$  is false. If  $B$  is true there then  $(A \Box \rightarrow B)$  is true and  $(A \Box \rightarrow \neg B)$  is false; if  $B$  is false there then  $(A \Box \rightarrow B)$  is false and  $(A \Box \rightarrow \neg B)$  is true.

I think something like Conditional Bivalence lies behind the Choice Argument—in that context, it amounts to the assumption that there is a fact about what you would choose, even if we don’t know what it is. Conditional Bivalence implies that all the relevant choice-counterfactuals have truth-values with this pattern, so (assuming Choice Implies Strict Preference) either  $X \succ Y$  or  $Y \succ X$ . You have *strict* preferences between every pair of options, and this is what motivates the common retreat to Choice Implies Weak Preference.

So given Conditional Bivalence, it looks as if there’s no hope for genuine incompleteness or even strict indifference, given Choice Implies Strict Preference. The original, Strong Choice Argument succeeds and you have complete strict preferences.

Should we follow many economists and abandon incompleteness to save indifference by retreating to Choice Implies Weak Preference? I don’t think so, be-

cause this picture is also one that's very friendly to epistemicism about vagueness. Given Conditional Bivalence, you are likely to be shockingly ignorant about your complete preferences. In all the examples I've given to motivate unsharpness you have complete preferences and precise credences, though you likely don't or can't know them.

This is what we'd expect given Conditional Bivalence because the complexity of the possible-world similarity relation makes it extremely unlikely that we'll always know which choice-antecedent world is closest, and hence what we would choose therein—which is what we prefer. Moreover, much of the explanation for that lack of knowledge is that what we would do depends on very complex and shifting matters, about our brain chemistry and the like—and our brain chemistry is a big part of what ultimately what determines our choices. This is strikingly similar to a classic epistemicist explanation for why we don't know the extension of 'red', which is that the meaning-use relationship is very complex.<sup>14</sup>

More broadly, I suspect that matters of philosophical temperament would push someone towards (or away from) both epistemicism about vagueness and this kind of completeness about preference. Conditional Bivalence is a strong claim: all well-formed counterfactual conditionals are either determinately false or determinately true. If you are comfortable with this, then I suspect you are comfortable with complete but unknowable preferences.<sup>15</sup> Conversely, how comfortable are you with the thought that there may be no determinate fact of the matter, that things could be unsettled?

On a Conditional Bivalence picture, we should be as comfortable with complete *strict* preferences as we are with complete *weak* preferences. Rejecting the former but keeping the latter (by retreating from Choice Implies Strict Preference to Choice Implies Weak Preference) is an unmotivated halfway house. You *would* choose something given the opportunity—and it's determinate what you would choose—so why not fold that into your complex, unknowable (and presumably rather changeable and unstable) strict preferences?

It may seem absurd to abandon strict indifference. But whilst I think it would be difficult to abandon its evaluative counterpart—equal goodness—it's far more plausible to reject strict indifference *about preferences*. The claim that we can be strictly indifferent between two options doesn't automatically inherit the manifest plausibility of the claim that two options can have equal value. These are two quite different claims. In being revisionary about preferences but not betterness I'm making a somewhat similar move to (Andreou 2023, chap. 6) who tries to reconcile cyclic preferences with acyclic betterness.

Strict indifference has never been a comfortable fit with revealed preferences. (de Sousa 1974, 545) anticipates the problems with fitting strict indifference into the choice-based scheme, calling it 'quite a difficult thing to *establish*... a subject is said to be indifferent between two alternatives if he chooses each apparently at random about half of the time'.

<sup>14</sup>Classic defences of epistemicism are Sorensen (1988) and Williamson (1994).

<sup>15</sup>Mahtani (2019), p. 8 fn. 1 makes a similar point about unknown precise credences and externalism about knowledge.

My opponent does have options, of course, if she wants to keep Conditional Bivalence without complete strict preferences. For example, we could distinguish between your core and peripheral preferences. If it is stably the case that  $X \succ Y$  across a range of times and situations but your preferences between  $Y$  and  $Z$  are more changeable— $Y \succ Z$  today,  $Z \succ Y$  tomorrow or in slightly different circumstances—then one might want to say that the core/stable but not the unstable/peripheral preferences are really ‘yours’. The latter don’t reflect your stable character; your choice of  $X$  over  $Y$  is reliable and predictable, but your choice between  $Y$  and  $Z$  very much not.

I think this line could be pushed, but note that there could be *stable but unknown* preferences (so you may well not know your core preferences). Even in the unstable case I’d be willing to bite the bullet that here and now, you do have a strict preference between  $Y$  and  $Z$ . You can have a preference without it being central to your character, and since preferences are not primarily a mental matter, introspection has its limits. However a core/peripheral distinction might be more relevant for ethical assessment, such as the attribution of moral responsibility.

I think we could call this epistemic option a version of Supersharp. Given Conditional Bivalence you are likely ignorant about many of your preferences for the reasons just canvassed. If the ignorance is of a kind with that found in vague language—in that it can be folded in to epistemicism about vagueness—then we have epistemic-Supersharp: unsharpness is vagueness, and vagueness is ignorance. Strictly complete but unknowable preferences are the cousin of epistemicism about vagueness. (Why vagueness in particular and not some other kind of unknowability? Because of the susceptibility to sorites reasoning, as we’ll see in Chapter 5 especially.)

But even if we don’t call it a form of vagueness (perhaps because it’s ‘the wrong kind of ignorance’), the completeness implied by Conditional Bivalence has broadly the same decision-theoretic upshots as Supersharp, because you have point-valued preferences but it’s unknown (rather than indeterminate) what they are.

## 5.2 Conditional Excluded Middle

Conditional Bivalence is not popular, though its plausibility depends on your philosophical temperament. However there has been much dispute about its weaker cousin

**Conditional Excluded Middle (CEM).** For every  $A$  and  $B$ ,  $[(A \Box \rightarrow B) \vee (A \Box \rightarrow \neg B)]$  is determinately true.

Conditional Excluded Middle says that the disjunction  $(A \Box \rightarrow B) \vee (A \Box \rightarrow \neg B)$  is always determinately true, but allows that it could be indeterminate *which disjunct* is true. The disjuncts can never both be false. It can be indeterminate whether I’d have won or not but “if I’d started a fight, I would have won OR if I’d started a fight, I wouldn’t have won” is determinately true.

Conditional Bivalence implies Conditional Excluded Middle, but I’m focusing on a weaker case where every instance of (CEM) is true but some of the inde-

terminacy it permits does obtain. I'm talking about Excluded Middle *without* Bivalence, and that's what I mean by '(CEM)'.

The obvious rationale for such a position is that the similarity relation on possible worlds is complex and it can be indeterminate which is the closest A-world. Suppose it is determinate that one of  $A_1$  and  $A_2$  is the nearest A-world, but indeterminate which. Then if B is true at  $A_1$  and false at  $A_2$ , then it's indeterminate whether the nearest A-world is a B-world. Thus both  $(A \Box \rightarrow B)$  and  $(A \Box \rightarrow \neg B)$  are indeterminate, but on a broadly supervaluational picture their disjunction is supertrue. On every sharpening of the similarity relation one of the disjuncts is true and the other false.

This picture is *extremely* friendly to Supersharp. It effectively entails the view, because many of the relevant choice counterfactuals will be indeterminate.<sup>16</sup> This has far-reaching implications, because we can even accept the implication of the Choice Argument that preference orderings are determinately full. For each X and Y, it's determinate that  $[(C(X, Y) \Box \rightarrow X) \vee (C(X, Y) \Box \rightarrow Y)]$  is true, and hence that  $[X > Y \vee Y > X]$  is true. But *it can be indeterminate which of these is the case*:

**Choice Indeterminacy.** Both  $(C(X, Y) \Box \rightarrow X)$  and  $(C(X, Y) \Box \rightarrow Y)$  are indeterminate, but it's determinate that one of them is true.

(CEM) thus lets incompleteness-as-indeterminacy live with revealed preferences. When it's indeterminate what world is closest, it's indeterminate what I would choose, and thus I can have a full but indeterminate preference ordering.<sup>17</sup> That's what incomplete preferences are, on this view.

More generally, consider the following two preference orderings:

- O1: 248 carrots > 464 onions > 247 carrots > 463 onions > 246 carrots > 462 onions.
- O2: 464 onions > 248 carrots > 463 onions > 247 carrots > 462 onions > 246 carrots.

If O1 is your preference ordering, then you would choose 248 carrots over 464 onions over 247 carrots; if O2 is your preference ordering, then you would choose 464 onions over 248 carrots over 463 onions. But in both cases you would choose 248 carrots over 247 carrots, and in both cases you would choose 248 carrots over 463 onions.

Suppose that O1 and O2 are the only two possibilities for your preference ordering—the others have been ruled out. Conditional Bivalence said that one of them is determinately your preference ordering, though in the cases under consideration you don't know which. I argued above that this is epistemicism-friendly because it is similar to how we might not know the extension of 'tall'.

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<sup>16</sup>I'm not the first to see this. For example, (Hedden 2023, 756) notes that on his counterfactual decision theory, perhaps an indeterministic construal of (CEM) 'yields indeterminacy in what you ought to do'.

<sup>17</sup>Compare Bacon (2018), p. 144 fn. 19.

(CEM) on the other hand says that it's indeterminate which of the orderings is yours, but determinate that one of them is. Thus, assuming that each sharpening is complete, it's determinate that you have a full preference ordering. But it may be indeterminate whether you'd choose 464 onions over 248 carrots or vice versa.

(CEM) reconciles incompleteness with revealed preferences: it's indeterminate which relevant world is closest, so indeterminate what I would choose, and hence what I prefer. The mistake at the heart of the Choice Argument is the assumption that for my preferences to be incomplete, it would have to be *false* that I would choose one thing and false that I would choose the other.

Let me explain precisely how this vindicates Supersharp against the Choice Argument. Premise (SC1) of the strong argument was "given the choice between X and Y, either you would choose X or you would choose Y". Slightly more formally, " $C(X, Y) \Box \rightarrow (X \vee Y)$ ". But since X and Y are incompatible choices, the propositions X and Y cannot *both* be true at any world, and with vagueness in play we must disambiguate between

**what Conditional Bivalence implies** [determinately,  $C(X, Y) \Box \rightarrow X$ ] or [determinately,  $C(X, Y) \Box \rightarrow Y$ ]

and

**what (CEM) permits** determinately [ $C(X, Y) \Box \rightarrow X$  or  $C(X, Y) \Box \rightarrow Y$ ].

On the latter, the Choice Argument is no threat to incompleteness construed as vagueness: it can be determinately true that you would choose X or Y as the first premise of the Choice Argument has it, and thus determinately true that you prefer X or Y on a revealed preference account, *but indeterminate which*.

My definitions of indifference and incompleteness between X and Y both include ' $X \nprec Y$ ' and ' $X \nsucc Y$ '. Supersharp doesn't interpret the conjunction of these as 'determinately  $X \nprec Y$  and determinately  $X \nsucc Y$ ', which the Choice Argument would indeed make untenable. Instead, it interprets the conjunction as 'not determinately  $X \succ Y$  and not determinately  $X \prec Y$ ', which is compatible with the 'determinately ( $X \succ Y$  or  $X \prec Y$ )' implied by the Choice Argument. This may all look a little *ad hoc* but is simply an application of (CEM).

Remember that you prefer X to Y if and only if in the nearest  $C(X, Y)$ -world—the nearest possible world where you are offered X and Y (cost-free)—you choose X. To flesh out the view, I'll say a little more of how such indeterminacy could arise in choice counterfactuals. After all, (CEM) merely *permits* the latter disambiguation, rather than requiring it. So we need reasons to think that this permission is taken up.

There are three ways choice indeterminacy in our preferences could arise. First:

**Eligibility Indeterminacy.** There are some worlds which are borderline- $C(X, Y)$ -worlds.

Suppose that the closest non-actual world  $w_1$  is definitely an X-world, but  $C(X, Y)$  is indeterminate there. The next-closest world is  $w_2$ , where  $C(X, Y)$  and Y are determinately true (hence X is determinately false at  $w_2$ ). If this scenario

is coherent, it's indeterminate whether  $X$  is true at the nearest  $C(X, Y)$ -world, because it's indeterminate whether the nearest  $C(X, Y)$ -world is  $w_1$  (where  $X$  is true) or  $w_2$  (where  $Y$  is true).

Here is an analogy. The closest vehicle to you is a red borderline-truck. Slightly further away is a black truck. Is the closest truck to you red? It's indeterminate, because it depends on whether the closest vehicle to you is a truck, and that's borderline.

Eligibility Indeterminacy will be extremely common in choice counterfactuals.  $C(X, Y)$ -worlds are ones where nothing else the agent cares about is at stake, but there are many ways to fill this out. Here is some Eligibility Indeterminacy, parasitic on the ordinary predicate vagueness we just saw. You prefer red trucks to non-red trucks, and at a nearby possible world  $w_1$ :

- if you choose  $X$  then you will receive a black truck as well as the other consequences of  $X$ ;
- if you choose  $Y$  you will receive a borderline-red truck as well as the other consequences of  $Y$ .

All else is equal. Is  $w_1$  a  $C(X, Y)$ -world? If the truck is red, it isn't (you prefer the red truck to the black one); if the truck isn't red, then it isn't (you are indifferent between the trucks). But it's indeterminate whether it is red.

There will often be many nearby worlds where  $X$  is chosen, and many nearby worlds where  $Y$  is chosen. The human brain is complex, and when it comes to complex choices (such as between a slightly longer commute and a slightly smaller place to live), things can be on a knife edge. If today is cold you might avoid the commute, and if it's warm you might avoid the small place to live. Such choices are subject to a bizarre range of chemical and other influences—and it may be indeterminate whether the effect of cold falsifies 'all else equal'.

Second, the similarity or distance metric on worlds could itself be indeterminate:

**Ranking Indeterminacy.** There is indeterminacy in the similarity metric: it's indeterminate *which*  $C(X, Y)$ -world is closest.

There are small paired settlements on either side of the Thames between Reading and Oxford. These used to be connected by very small ferry services, but the ferries have gone and there are road and rail bridges 5 or 10 miles apart. You are standing in Cholsey, in Oxfordshire. On your side of the river half a mile away from you there is a red truck. On the other side of the river in Little Stoke there is a black truck, a few hundred yards away as the crow flies but a 5 mile walk via the nearest bridge. Is the nearest truck red or black? If it's indeterminate which distance measure matters, then the answer is indeterminate.

Ranking Indeterminacy does indeed look pervasive in choices. In many close-run choices the way you choose in the nearest  $C(X, Y)$ -worlds is *extremely* sensitive to the similarity relation. If there are many nearby worlds where you choose the longer commute, and many where you choose the smaller place to live, then whether *given the choice, you would choose the longer commute* is true will depend on precisely which is the nearest world where you are given the choice. Classic



cases of putative incompleteness—such as choosing a career or a house—often involve many features which must be weighed against each other. Whilst we can all agree that (within reason) more space is preferable to less space, and more money is preferable to less money, the kind of specific trade-offs involved (how much money per square metre?) look to be very finely-balanced. And so indeterminacy in the similarity relation—indeterminacy in which world is closer—will lead to indeterminacy in the truth-values of the conditionals.

Finally:

**Consequent Indeterminacy.** It's determinate which is the nearest  $C(X, Y)$ -world, but it's indeterminate whether  $X$  is true at that world.

Here we may imagine that in the nearest  $C(X, Y)$ -world, it's indeterminate whether you choose  $X$  or  $Y$ . Whether there is Consequent Indeterminacy in preferences will depend on how exactly we spell out the notion of choosing  $X$  at a world, and so I don't wish to rely on it because that would be too tendentious.

Nevertheless, it seems clear that if there's any indeterminacy in counterfactuals then there will be rampant Eligibility and Ranking Indeterminacy in our preference counterfactuals. It might be worried that I'm arguing circularly by assuming indeterminacy in my preferences to argue that there is indeterminacy in what I would choose, and thus indeterminacy in my preferences. But this isn't true, especially in the case of Ranking Indeterminacy, which I've tried to independently motivated by the complexity of the similarity relation amongst possible worlds and which as we've seen, is widely accepted by partisans of (CEM). Much discussion of such indeterminacy doesn't involve preferences, but broader questions about counterfactuals.

If you are inclined to reject the existence of such indeterminacy, and to think that the world-similarity relation must be wholly determinate, then this is not the subsection for you. If you instead endorse Conditional Bivalence, then might be receptive to an epistemic version of Supersharp.

### 5.3 Doing without Conditional Excluded Middle?

But what if you think (CEM) false? Then you're in good company. It was famously denied by David Lewis and defended by Robert Stalnaker.<sup>18</sup> In fact, Stalnaker's supervaluational defence of it anticipates a lot of what I just wrote.

If (CEM) is false, then there are some propositions  $A$  and  $B$  such that both  $(A \Box \rightarrow B)$  and  $(A \Box \rightarrow \neg B)$  are false: "If I'd started a fight, I would have won" and "if I'd started a fight, I wouldn't have won" could both be false. (Another popular example involves "if I'd tossed the coin, it'd have landed heads".)

So what if we do without Conditional Excluded Middle? This needn't show Supersharp to be false, because preference-counterfactuals need not be amongst the counterexamples to it. But it would be desperate to rely on this mere possibility without argument.

<sup>18</sup>Lewis (1973) pp. 80ff, Stalnaker (1980). More recent defenders of (CEM) include Williams (2010) and Swanson (2012).

So let's consider two ways (CEM) could fail, following Lewis. Despite his embrace of pervasive vagueness in counterfactuals—most notably in Lewis (1979)—he described two scenarios in the possible-worlds framework where both disjuncts of (CEM) look false. The central idea of both is that there may be more than one relevant world with no way to pick one as determining a truth-value for the counterfactual. This picture doesn't automatically engender the falsity of (CEM) of course—see Schulz (2014), for example, where Conditional Bivalence is true but which disjunct is true is determined by an arbitrary relevant world, meaning that often only the (CEM) disjunction is knowable—but it does push us towards (CEM) being false.

First, if the 'Limit Assumption' is false then there may be no closest  $C(X,Y)$ -world, only an infinite sequence of  $C(X,Y)$ -worlds asymptotically closer to the actual world. In Lewis's memorable example, consider a counterfactual with the antecedent *if the line '—' were slightly longer than it is*. There is in-principle no restriction on how slight the length increase could be, and so assuming closeness in line length tracks world similarity, there are infinitely many worlds each more similar than the last.<sup>19</sup>

I don't think the example works, because it's not always true that the shorter the length-difference the closer the world: it's not always true that 'the shorter we make the line [above its actual length] ... the closer we come, presumably, to our actual world'.<sup>20</sup> There is a minimum length increase that could be produced with the actual production technology at the printer, or even consistent with actual physics. Worlds where the line is longer by more than this minimum are closer in one way (the length) but much further in others (different printing technology or physical laws). So the closest world is that with the shortest longer line consistent with those background assumptions. You can see how ranking and eligibility indeterminacy would arise here. Lewis acknowledges this response, conceding merely that 'this and other examples are not quite decisive', but I think the response inflicts more damage than that.<sup>21</sup>

Second, the 'Uniqueness Assumption' says that there aren't two or more  $C(X,Y)$ -worlds tied for closest. If this Assumption is false and there are two tied  $C(X,Y)$ -worlds—one where you choose  $X$  and one where you choose  $Y$ —then it is indeed hard to see how Conditional Excluded Middle can be vindicated. (Not impossible, as we saw with Schulz's arbitrariness picture.)

Criticisms of the Uniqueness Assumption are reasonable arguments against Conditional Excluded Middle and I can't wish them away. They lead to a picture particularly friendly to hard-unsharpness. So let's look at that picture, and suppose that (CEM) does indeed fail for some preference counterfactual:

**Choice Falsity.**  $[C(X,Y) \Box \rightarrow X]$  and  $[C(X,Y) \Box \rightarrow Y]$  are both false.

Though she doesn't put things in these terms, Anna Mahtani's 'dispositional account' of credences—distinct from her earlier vague 'credence' account discussed above—is best understood as rejecting (CEM), leading to hard unsharp-

<sup>19</sup>Lewis (1973), pp. 19–21.

<sup>20</sup>Lewis (1973), p. 20.

<sup>21</sup>Lewis (1973), p. 20, footnote.

ness. Much of the setup is familiar. (Mahtani 2020, 729) claims that your credence in some proposition is determined by your actions in nearby relevant possible worlds: when you have a precise credence in a proposition such as that a fair coin will land heads, ‘we can define your credence in HEADS as *the* number that you would produce were you subjected to De Finetti’s test’. De Finetti’s test involves a forced choice to determine an agent’s credence  $p$  in some claim  $E$ :

an individual is obliged to evaluate the rate  $p$  at which he would be ready to exchange the possession of an arbitrary sum  $S$  (positive or negative) dependent on the occurrence of a given event  $E$ , for the possession of the of the sum  $pS$ <sup>22</sup>

In other words, for example, your credence that it will rain tomorrow is 0.7 *iff* you are ready to exchange a £10 coupon that is valid only if it rains tomorrow for £7 in cash. This construal of credences is familiar to us, and so far we are in the realm of the Choice Argument.

However, (Mahtani 2020, 729) sees that in classic cases of imprecise credences, in different relevant possible worlds you will produce different numbers because ‘the number that you produce in each of these worlds is to some extent arbitrary’. I might produce £6.90 in one nearby possible world and £7.05 in another, for example. She concludes that there is no such thing as *the* number that you would produce—only the set of numbers that you produce in nearby worlds.<sup>23</sup> And so your credence is represented by that set—a form of hard unsharpness. This final step is where the absence of (CEM) kicks in, and where our views differ. Without (CEM) there is only a set of numbers produced in nearby worlds. For me, given (CEM) there is such a thing as *the* number that you would produce, but it’s indeterminate or unknowable what it is.

The difference between our views has a semantic upshot. Consider the claim that for any propositions  $X$  and  $Y$ ,  $p(X \& Y) \leq p(X)$ . If this claim is vindicated at every nearby possible world, then Supersharps says that it’s determinately true because a supertruth. For (Mahtani 2020, 738) the supervaluational semantics don’t apply and so the inequality is simply a ‘shorthand’ for facts about every member of my representing set; Completeness is somewhat vindicated, but also as a kind of shorthand. Supersharps’s treatment of such claims is more elegant. It’s supertrue that we have point-valued credences, not a mere shorthand.

I must concede that given revealed preferences—or with Mahtani, counterfactual applications of De Finetti’s test for credences—and a denial of (CEM) we do end up with hard-unsharpness and Supersharps is in real trouble. (CEM) is essential to my goal of reconciling incompleteness, Supersharps, and revealed preferences, and so without it one of these other claims has to go.

We could follow Mahtani into hard unsharpness. This, at least, still shows that the Choice Argument need not rule out incompleteness. In this case, we can strongly reject the first premise of the Choice Argument because it is a disjunction both of whose both disjuncts are outright false. If the premise remains as a

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<sup>22</sup>de Finetti (1964), p. 102.

<sup>23</sup>Mahtani (2020), p. 730.

kind of shorthand as on Mahtani's view, this can provide a neat error theory for why the premise it looked plausible.

Or we could reject revealed preferences and embrace mentalism about preferences. Choice Falsity might even be instantiated *because* the mental states underlying choices are vague and thus don't determine a counterfactual choice. It may be that a vague mental state doesn't determine whether you would choose X or Y, and so a world in which you choose X and one in which you choose Y are equally close. In that case, vagueness in your preferences explains a violation of the Uniqueness Assumption and hence of Conditional Excluded Middle.

So there are options if (CEM) is false. But the most ambitious version of my project relies on its truth. Conditional Bivalence supports a kind of epistemicism about preferences, (CEM) supports an indeterminist Supersharper, and a denial of (CEM) is problematic for my project, forcing me either to hard-unsharpness or to mentalism.

## 6 Actual Choices

I've argued that Conditional Bivalence is a minority view and so we can't assume that there's always a determinate truth about what an agent would choose. Without this assumption, Choice Implies Strict Preference has been unfairly maligned. If it can be indeterminate what we would choose, then it can be indeterminate which way our strict preferences go.

But sometimes we *do* choose. The Choice Argument looks to be on stronger ground if I in fact choose X over Y with nothing else I care about at stake, because of the following principle about counterfactual conditionals:

**Actual-Counterfactual Link.** If  $A \& B$ , then  $A \Box \rightarrow B$ .

This principle is also called 'Conjunction Conditionalisation', because it allows us to turn a true conjunction ( $A \& B$ ) at a world into a true counterfactual conditional ( $A \Box \rightarrow B$ ) at that world. I prefer my terminology because I'm focusing on choices in the *actual* world, and the simpler versions of the centring principles I discuss here reflect that.

Sometimes Actual-Counterfactual Link is resisted on general counterfactual grounds that have little to do with preferences. Suppose I just tossed a coin but yet haven't lifted my hand, so we don't know which way it landed. Intuitively, neither "had I tossed a coin it would have landed heads" nor "had I tossed a coin it would have landed tails" is true—though in light of the previous discussion we shouldn't say they are both false!—because the whole point of tossing a coin is that it *might* go either way and it's not true that it *would* land one particular way.

But though we haven't peeked yet and thus don't know which way it landed, in fact either it landed heads in which case given Actual-Counterfactual Link "had I tossed a coin it would have landed heads" is true, or it landed tails in which case given Actual-Counterfactual Link "had I tossed a coin it would have landed

heads" is false. Even if Conditional Bivalence is not true in general, Actual-Counterfactual Link seems to force it on us in cases where the antecedent is true at the actual world.

Actual-Counterfactual Link quickly follows in the Stalnaker-Lewis framework if we assume

**Strong Centring.** If the actual world is an A-world, then it is the only relevant A-world.

Strong Centring says that the actual world is uniquely most similar to itself. We can see how it motivates Actual-Counterfactual Link: if A is true at the actual world, then the actual world is the unique closest A-world, so the truth so the truth value of  $A \Box \rightarrow B$  is that of B at the actual world.

Without Strong Centring, Actual-Counterfactual Link is on much weaker ground. We might accept Weak Centring, for example, which says that if the actual world is an A-world, then it is *one of* the relevant A-worlds but not always the only one.

So one can try to reject Actual-Counterfactual Link by, for example, rejecting Strong Centring. But this is somewhat fraught. Walters (2016) shows that rejecting Actual-Counterfactual Link in this manner risks unwelcome consequences, and so he instead rejects the assertability of the relevant counterfactuals, to some extent biting the bullet of the strange examples such as that of the coin.

Actual-Counterfactual Link seems to create particular problems for my attempt to reconcile revealed preferences with incompleteness. I escaped the Choice Argument by arguing that we need not interpret the first premise of the argument as "[determinately,  $C(X, Y) \Box \rightarrow X$ ] or [determinately,  $C(X, Y) \Box \rightarrow Y$ ]". But Actual-Counterfactual Link forces that interpretation on us in actual choices. If you actually buy House instead of Flat then ' $C(\text{House}, \text{Flat}) \Box \rightarrow \text{House}$ ' is determinately true, and so on my account above you prefer House to Flat. As the Choice Argument has it, we lose incompleteness for actual choices.

This is unacceptable: part of the point of incomplete preferences is that they are compatible with choosing either way. It's not plausible that actually making a choice somehow crystallises your preferences into completeness, and especially implausible that betting *necessarily* crystallises imprecise credences into precise ones.

I will sustain my strategy of accepting plausible principles then arguing that they are not fatal for incompleteness. We can live with Actual-Counterfactual Link.

The above inference from an actual choice of X to a preference for X relied on the claim that in the actual world  $C(X, Y) \& X$ , ie that you chose X *when nothing else you cared about was at stake*. But how often is the last clause true? Granted it will very often be the case that only trivial other cares are at stake and that they are often swamped by the main considerations of the choice. For example, perhaps I have a very weak preference for picking up shopping with my left hand than my right (thanks to an old but not-fully-healed shoulder injury) but the brand of beans on my left is horrible. Yet it will be rare that outright *nothing* else I care

about is at stake, that  $C(X, Y)$  is determinately true.

In particular, given revealed preferences the proposition  $C(X, Y)$  itself depends on a number of counterfactual claims. Whether I care about using my left or my right hand depends on which I would choose to use when nothing else is at stake, and this further counterfactual dependence allows for the introduction of further indeterminacy. It can often be vague whether I care about one of the things at stake, and the actual world can thus quite often be eligibility-indeterminate.

So somewhat surprisingly, Supersharp can easily live with the combination of Actual-Counterfactual Link and Choice Implies Strict Preference. Strong Centring implies that if the actual world is a  $C(X, Y)$ -world then it is the only relevant  $C(X, Y)$ -world. I've argued that it will be very rare that  $C(X, Y)$  is a determinate  $C(X, Y)$ -world, and so the antecedent of this conditional is rarely satisfied. (The other problem cases for Actual-Counterfactual Link lack this kind of 'and nothing else is at stake'-type clause, and so this escape hatch for preferences doesn't obviously apply to them.)

## 7 Conclusion: the Supersharp Picture

Let's take stock. I've argued that even if your preferences are determined by your actual and counterfactual choices—you would choose Tea over Coffee, all else equal, *iff* you strictly prefer Tea to Coffee—this is compatible with incompleteness because it's not always determinate what you would choose. It can be indeterminate which of them you prefer, and this can go in two ways:

- if your preference is sensitive to small improvements and detriments—if a slight sweetening or souring of either Tea or Coffee would make you choose the sweeter option—then you are *strictly indifferent* between Tea and Coffee.
- if your preferences are not sensitive to such small changes—if it's also indeterminate whether you'd take Tea or a slightly fresher cup of coffee Coffee+, and so on—then you are *incomplete* between Tea and Coffee. (I also considered one-sided versions of incompleteness.)

This picture allows us to keep the intuitive but unpopular Choice implies Strict Preference. This is a rather radical conclusion because Choice implies Weak Preference is far more popular. But I think incompleteness and indifference are companions in innocence.

I'm suggesting a demotion for strict indifference compared to its role in the standard picture. There is only one fundamental attitude—strict preference—understood as it being the case that you *would* choose something. Indifference and incompleteness are merely particular patterns of indeterminacy in strict preferences.

Despite such indeterminacy, it's determinate that you have a strict preference between any two options. The apparent paradox here is caused by supervaluationism or other ways of denying tolerance principles: you determinately have strict preferences between all options but it can be indeterminate what they are.

To be indeterminate in a way that is insensitive to sweetening and souring is to have incomplete preferences.

Or imprecise credences. On the choice construal of credences to have a certain credence in some proposition  $p$  is simply to be willing to bet on  $p$  at certain odds. To have unsharp credence in  $p$  is for your preferences over bets on  $p$  to be incomplete—for it to be indeterminate at what odds you would take a bet on  $p$ .

On methodological grounds, you might find the arguments of this chapter a bit unsatisfying. How can substantive claims about our preferences—that they can be incomplete, for example—depend on technical principles about conditionals? But on the choice-based construal of preference, to have a preference simply *is* for a given set of conditionals to be true of you. We should expect general claims about such conditionals to be implicated in our theory of preferences: (Stalnaker 1980, 87) claims that ‘a small distortion in the analysis of the conditional may create spurious problems with the analysis of other concepts’ and I think such a distortion underlies the Choice Argument.

Having defended the existence of unsharp agents, in the next chapters I’ll defend a decision theory for them, as a means to defending their (sometime) rationality.

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