Chapter 4: Diachronic Decisions under Supersharp

Luke Elson

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Abstract. Having defended the synchronic Hierarchical Liberal in the previous chapter, I now turn to the diachronic case involving sequential or *compound* action. Under unsharpness, sequences of E-admissible actions can lead to a sure loss, and I defend a decision rule that forbids being 'value-pumped' in this manner. I defend this rule 'Compound' against the charge that it violates orthodox rational choice theory, in particular that it is non-consequentialist.

I have incomplete preferences. It's indeterminate what price I regard as fair for my favourite coffee, but it is somewhere between £3.70 and £4. I buy the coffee for £4, which is E-admissible. Then the next customer offers me £3.70 for my coffee and I accept—also E-admissible. Now I've value-pumped myself out of 30p.

These actions seem bizarre and manifestly irrational. Each of the two transactions was E-admissible but *combined* they are not. In the previous chapter I appealed to this feature of E-admissibility to give an account of structural rationality, explaining why Bebe's incoherent intentions are impermissible. But that case was synchronic, about the cotenability of certain intentions. The diachronic case is tougher.

Let's start from the beginning. The unsharp agent has a non-singleton representor, and different functions (sharpenings) in that representor sanction different actions. If they didn't disagree on at least one possible action, then the agent wouldn't be unsharp, because the sharpenings would be different representations of the same preferences.

I use [square brackets] to indicate diachronic sequences of action. So for example [$\phi \& \psi$] means that the latter happens *after* the first. Then the following can happen. Suppose that there are two sharpenings, for simplicity. The first sharpening regards £3.70 as the fair price for the coffee and so sanctions the sequence of actions [buy at £3.70 & sell at £3.70]. The second regards £3.70 as the fair price and so sanctions [buy at £4 & sell at £4]. Both of those sequences are merely E-admissible, but [buy at £4 & sell at £3.70] is determinately inadmissible, even though it is composed of two separately E-admissible actions.

For another example, return to Chapter 1's Job Hopper. Suppose he works at

Academic and is unsharp between the following preference orderings:

(O1) ... $\succ$ Banking+ $\succ$ Academic+ $\succ$ Banking $\succ$ Academic $\succ$ Banking- $\succ$ ...

(O2) ... $\succ$ Academic+ $\succ$ Banking+ $\succ$ Academic $\succ$ Banking $\succ$ Academic- $\succ$ ...

As usual '+' and '-' represent small improvements and detriments (sweetenings and sourings). Ordering (O1) places slightly more weight on money, whereas (O2) places slightly more weight on free time. According to Supersharp, Hopper's 'exchange rate' between money and leisure time is indeterminate. There are no transaction costs or other awkwardnesses involved in switching jobs.

[switch from Academic to Banking & switch from Banking to Academic-] is determinately inadmissible, and intuitively irrational: he's now doing the same academic job but for slightly worse money. Neither of his preference orderings permits both of these switches, but they disagree on which is impermissible.

The challenge is to give a decision rule that prevents him doing it. Switching from Academic to Banking is E-admissible and there are no T-admissible options around, so permitted by Hierarchical Liberal. The same is true of switching from Banking to Academic-. So if he switches in two steps, it looks like he does nothing wrong, according to that rule anyway. Indeed, Hierarchical Liberal would permit Hopper to continue this value pump until he is at Banking-minus-300, doing closing billion-dollar deals for the legal minimum wage.

Both of those cases involved incomplete preferences. To my knowledge, on the credal side the problem was introduced by Peter Hammond, and put especially clearly by Paul Weirich:

> ... some may object to applying Good's rule to a series of decisions. For example, if the probability of rain tomorrow ranges from 0.4 to 0.6, then, under standard simplifying assumptions about the utility of money, the rule authorizes paying \$0.6 for a gamble that pays \$1 if it rains, and paying \$0.6 for a gamble that pays \$1 if it does not rain. But if one makes both bets, one is sure to lose money.[1]

The problem is that making both bets—and surely losing money—is surely impermissible. Here is Adam Elga's influential version, which will be my main working example:

> **Sally's Bets.** Sally will be sequentially offered two bets, Bet A and Bet B. She has utilities linear in dollars, and stable credence $c(H)$ in some proposition H, and full foreknowledge that she will be offered both bets. Table 1 shows her payoff table.

Table 1: Sally's Bets payoff table (in dollars) from (Elga 2010)

	H true	H false	Expected payoff
Bet A	15	-10	$15c(H) - 10(1 - c(H)) = 25c(H) - 10$

[1]Weirich (2001), pp. 439-440. See also Hammond (1988), pp. 294–6.

	H true	H false	Expected payoff
Bet B	-10	15	$15(1 - c(H)) - 10c(H) = 15 - 25c(H)$

If Sally accepts both bets, her expected payoff is the sum of that for Bet A and for Bet B—a risk-free \$5.

Figure 1 shows the expected payoff (and hence, utility) for the four sequences of action open to Sally. You can see that if she has precise credences and seeks to maximise expected utility, she will will act as follows:

- if she has $cr(H) > 0.6$, accept Bet A and reject Bet B;
- if she has $cr(H) \in [0.4, 0.6]$, accept both bets;
- if she has $cr(H) < 0.4$, reject Bet A and accept Bet B;

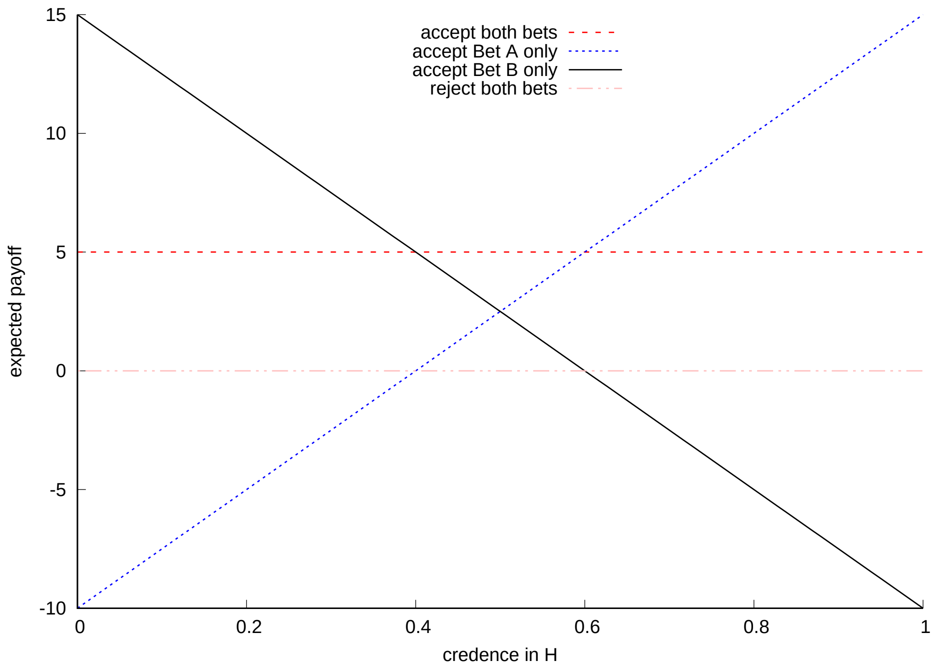

Figure 1: Sally's expected payoffs

No sharp maximising agent will reject both bets. Sally is unsharp, but it nevertheless seems intuitively obvious that she shouldn't reject both bets, especially since she has full foreknowledge of being offered them. But suppose that her credal set contains three functions: $\{c_1(H) = 0.2, c_2(H) = 0.5, c_3(H) = 0.7\}$. Then rejecting Bet A is permissible according to Hierarchical Liberal and so is rejecting Bet B, even though rejecting both bets is not.[2]

Informally, the problem is that in isolation broadly Liberal decision rules permit Sally to either accept or reject Bet A. Similarly, they are permissive about accepting or rejecting Bet B in isolation. And yet rejecting *both* is clearly impermissible, something that we want to forbid. (Elga 2010, 4) claims that rejecting both bets is incompatible with perfect rationality, and (Mahtani 2018, 71) is more forceful:

[2]For another example in a different context, see Herlitz and Sadek (2021), pp. 386–7.

'rejecting both bets would just be a stupid thing to do—not something that *you* would do'. I agree.

Elga argues that no acceptable decision rule forbids rejecting both bets, and that this is a fatal problem for the rationality of unsharpness. The absence of such a rule is the argument is Normative Credal Precision. Finding such a rule is my task in this chapter.

Sally's rejecting both bets is what I'll call a *foolish* sequence of actions:

Foolish Sequence. In a foolish sequence, there are n actions $\phi_1, ..., \phi_n$ where each ϕ_k is not impermissible, but the combined action $[\phi_1 \& ... \& \phi_n]$ is impermissible.

Given that our decision theory is Hierarchical Liberal, foolish sequences will be cases where each individual action is E-admissible, but the sequence as a whole is inadmissible. You might wonder whether there could be infinitely-long foolish sequences. I think there could—perhaps there are countably many bets, and Sally is foolish if she doesn't accept at least one of them—but our question is about the rationality of *completing* foolish sequences, which is obviously less of a concern for infinite sequences.

1 Maybe Foolish Sequences are not so Foolish?

Sarah Moss argues that foolish sequences are not always forbidden. On her picture of unsharpness, agents 'identify' with one sharpening of their representor for the purposes of action. A foolish sequence can be permitted if that identification changes (if the agent 'changes her mind') along the way. (Moss 2015, 673) argues that 'there is no rule of rationality saying that an agent cannot change which mental state she identifies with'. A similar view is defended by (Broome 2001, 114ff), though he is concerned with incommensurable values.

(Moss 2015, 669–70) claims that moral dilemmas offer 'a host of additional examples where agents can rationally change their minds'. She appeals to Sartre's student who has incompatible obligations to his mother and to France; she claims that if he first decides to stay with his mother, but then has 'second thoughts' and goes to fight for France, then 'he is not irrational in virtue of having missed the earliest possible convoy'.[3] If this argument succeeds, then the example looks to be a foolish sequence which isn't irrational. And the example doesn't depend on the Mossian picture of unsharpness, so potentially offers a more general defence of foolishness.

But to make this point, the case needs some distinctive features. The student's mind-changing can't be a simple update or change in his representor. And even though his sequence of actions must impose some expected cost—otherwise it wouldn't be foolish—it must not be irrational. We want a rational foolish sequence.

[3]The example is from Sartre (1948).

I'm not sure that the Sartre case does the job: it's at least possible that the student's vacillating helps his mother (who gets some more time with him) and doesn't hurt France (would his being on an earlier convoy really have made any military difference?), so is not foolish. In that case, we can grant its rationality without hesitation. But suppose his actions *are* foolish: his delay doesn't benefit his mother (he turns around before reaching her) but it does cost France: without him a mission failed, costing 10 French lives. Then his delay was irrational—losing French lives for no compensating benefit—and his compatriots might have some forceful complaints.

Perhaps another example can be found that meets Moss's needs. But I think a sequence of actions that predictably imposes avoidable costs, but which we nevertheless don't think irrational, will be hard to come by.

There are general reasons to be skeptical about the analogy between moral dilemmas and unsharpness. In unsharpness, there are various considerations pulling in each direction, but it is not clear how they balance (each sharpening in the representor corresponds to one way of balancing them). In a true moral dilemma, the considerations do not balance: each consideration pulls us completely, in a different direction. If the student is in a genuine moral dilemma, with tragically incompatible obligations, then he violates an obligation whatever he does. If a moral obligation is associated with a decisive reason, then he fails to comply with a decisive reason whatever he does. The credal analogue of the moral dilemma is not the unsharp representor, but the paradox. Here too, there seem to be absolutely decisive reasons to believe both a proposition and its negation. Moral dilemmas are not good test cases for whether mind-changing is permissible under unsharpness.

So, I've argued, credal dilemmas don't provide sufficient grounds to reject the intuitive claim that foolish sequences are not permissible.

Similarly, Brian Hedden's Time-Slice Rationality says that all norms are synchronic, and rests on a rejection of temporally-extended agents as a basis for decision theory.[4] Hedden takes the traditional problem-cases for personal identity (such as fission and fusion) more seriously than most, and mounts a sustained attempt to recast all norms of rationality in synchronic terms. I won't directly engage with Hedden's ingenious arguments, but perhaps as a matter of philosophical temperament, I do not think they succeed against the *clear* irrationality of Sally rejecting both bets.

So I will look for a rule that vindicates the irrationality of rejecting both bets.

2 Always Accept Bet A?

Since Sally had full foreknowledge, perhaps her irrationality lies in rejecting Bet A? By accepting it she could have avoided all this fuss—fuss she knew she would invite.

[4] Hedden (2015).

That's the core idea behind Rohan Sud's rule 'Forward Looking', which is a combination of Liberal with the requirement to avoid 'sequence-dominated' actions. Rejecting Bet A is sequence-dominated because every sequence of actions beginning with accepting Bet A is E-admissible, but not every sequence beginning with rejecting Bet A is E-admissible. If Sally accepts Bet A, 'she will *guarantee* herself an admissible sequence of future actions, no matter what her future self chooses to do'.[5]

There are two limitations to this rule, which Sud of course sees. The first—that there are many foolish sequences it doesn't forbid—is, I think, devastating.[6] Consider a modified version of Sally's Bets. The only modification is that Sandra's representor $\{c_1(H) = 0.2, c_3(H) = 0.7\}$ has one fewer sharpening than Sally's does. On the former sharpening, as we saw above, only reject Bet A & accept Bet B is admissible; on the latter, only accept Bet A & reject Bet B is admissible. Unlike Sally, Sandra doesn't have a sharpening that sanctions accepting both bets.

This means that the only non-foolish sequences are accepting one of the bets and rejecting the other. If Sandra is rational, it seems clear that she won't either accept both bets or reject both. But Forward Looking is no help here, because whether Sandra accepts or rejects Bet A, she is at risk of a foolish sequence: whatever she does in Bet A, to be rational she must do the opposite in Bet B. There are no sequence-dominated actions, and so Forward Looking doesn't prevent Sandra from being foolish.

The second limitation of Forward Looking is that it requires foreknowledge. To render the right verdict, Sally be told in advance that she will be offered both bets; Sally may permissibly reject both bets if Bet B is a surprise. (Sud 2014, 130–31) tentatively endorses this permission.

But I think that even *without* forewarning, foolish sequences can be impermissible. Consider the two examples. In Sally's Surprise, she is offered Bet A, rejects it, and then is suprised with Bet B, briefed about the unsharpness in play, and shown Figure 1. I think insofar as she is rational, Sally will accept Bet B—"I wasn't expecting this, but the situation is salvageable". I concede that such 'surprise!' foolish sequences are not so obviously irrational as those with foreknowledge, but if at all possible we should hold on to this verdict. To echo Mahtani, for Sally to reject Bet B even in the surprise case would be, if not stupid exactly, at least questionable.

This is especially so in the case of *repeated* surprises. In Hopper's Surprise, Hopper is very much in demand. So when he works at Academic, he is offered Banking-; when he works at Banking-minus-two, he is offered Academic-minus-three, and so on. He has accepted seven such job offers in a row, the recruiter is richer, and Hopper is poorer. But each time, he is surprised by the recruiter's return. Hopper does seem clearly irrational to have been value-pumped, even without forewarning of the job offers. In the original Job Hopper case we judge

[5] Sud (2014), especially pp. 126-7. See also Chandler (2014).

[6] Sud (2014), pp. 133ff. My example is a simplified (and I think clearer) version of his, though my setup may be more tendentious in that the credal set has only two members.

him irrational for ending up at minimum wage, and I think we would judge him so here too.

My opponent could respond that after the third or fourth offer Hopper should not be surprised at the recruiter's return and that's where the irrationality is—a failure of induction. But that response is not available in the Sally's Surprise case, since she is only surprised once—and there's no reason Hopper can't be stupid in *two* ways. So I'll seek a decision rule that forbids completing 'surprise' sequences.

The rationale for Forward Looking is slightly awkward. It tells Sally to avoid sequence-dominated actions because they open the door to the completion of foolish sequences, which suggests that the completion of such sequences is something to avoid. It 'guarantees [the agent] an acceptable sequence of actions'.[7]

And yet this rationale isn't carried through to the decision-theoretic verdict. Consider the original Sally case, with forewarning. If she rejects both bets in that scenario, then Forward Looking locates her irrationality entirely in the rejection of Bet A, even though there is also available a non-foolish sequence beginning with that rejection. And if she does reject Bet A, then Forward Looking is silent when she is offered Bet B: it doesn't tell her what to do in the second bet, even though its rationale is to guarantee an acceptable sequence of betting and there is such a sequence available. I think these verdicts are the wrong way around: Sally doesn't act irrationally until she rejects both bets.

Now suppose that despite the silence of the rule, Sally avoids the foolish sequence by doing [reject Bet A & accept Bet B]. Should she really be condemned, as Forward Looking does? She has completed an acceptable sequence.

To my eyes, if Sally can still complete an acceptable sequence at some point, then that is what rationality requires. If she rejects Bet A then our decision rule should tell her to accept Bet B. Imagine we are friends with Sally, she's just rejected Bet A, and she asks our advice when offered Bet B. I think it highly likely we'd say 'you should accept Bet B, because you rejected Bet A and it's irrational to reject both bets'. We'd like to find a decision rule that formalises this kind of advice, because it seems like the right advice.

3 Compound

I claim that unsharp agents may start foolish sequences, but must not finish them, even if they weren't warned in advance.

If only rejecting both bets is impermissible, then whether Sally rejected Bet A affects what is permissible for her in Bet B. I'll call this feature *path-dependence*:

Path-Dependence. ϕ_2 is path-dependent for an agent S if and only there is act ϕ_1 such that (i) whether or not S does ϕ_1 doesn't affect the narrow payoff table for ϕ_2; (ii) if S does ϕ_1, then ϕ_2 is impermissible for S; and (iii) if S does not ϕ_1, then ϕ_2 is permissible for S.

[7] Sud (2014), p. 126.

I refer to the 'narrow' payoff table of an action; this is simply the normal payoff table. We'll meet its broad counterpart later.

Path-dependence isn't the standard phenomenon where an earlier act affects the permissibility of some later act by *causally* changing the the later act's payoff table. I can make throwing a bag in the river impermissible by filling it with your family photos, but that's not what's going on here. (Construing acts as functions from states to consequences, to change the payoff table of an act is to make a new act. But I'll talk in the more natural way.)

Path-dependence is more radical, because ϕ_1 affects neither your beliefs nor your preferences about the consequences of ϕ_2 (except your beliefs about whether doing ϕ_2 will complete a foolish sequence), but still bears on the permissibility of ϕ_2. We cannot determine the permissibility of ϕ_2 purely from its payoff table—that permissibility also depends on whether ϕ_1 and ϕ_2 form a foolish sequence.

Such path-dependence can be vindicated by abandoning standard decision theory. Ruth Chang, for example, writes that parity (her theory of incommensurability) deals with value pumps by allowing that the impermissibility of some choice on a par 'depends on understanding the rationality of choice against a background of other choices'.[8] She fleshes this out in her later *Hierarchical Voluntarism* which says that in moving from Academic to Banking, Hopper endorses or creates reasons to prefer the financial jobs, which thereby means that moving from Banking to Academic- is straightforwardly impermissible.[9]

I critically discuss Hierarchical Voluntarism in (Elson 2021), but like Tenenbaum's view it's in a different and more broadly Kantian tradition. My aim is to dispell the air of paradox *within* standard decision theory, and so to avoid identification with sharpenings or normative powers, and so on. Not because Chang's (or Tenenbaum's) ingenious views are necessarily implausible, but because I am trying to push things as far as possible without such supplementation.

That's what I'll do now. To avoid a naming clash with Elga, I'll talk about 'compound actions' rather than sequences of action. ϕ_1 and ϕ_2 are *atomic* actions and $[\phi_1 \& \phi_2]$ is a diachronic compound action composed thereof.

Consider again Job Hopper. Standard decision theory with Liberal tells Hopper not to simultaneously send two letters, one first-class, quitting Academic for Banking and one second-class, quitting Banking for Academic-. We saw that these verdicts are not always obvious—remember Two Workshop Sodas (one order) from Chapter 3—but are nevertheless defensible. Path-dependence simply adds that if he has *already* sent the first letter, then it's impermissible to send the second.

Here's the rule I'll defend:

Compound. Do not complete impermissible compound actions. If $\phi_1 \& \phi_2$ is impermissible, then it's impermissible to $[\phi_1 \ \& \ \phi_2]$.

[8] Chang (2005), p. 347.
[9] Chang (2009).

Whether a compound action (sequence of actions) is impermissible depends on the status of the sequence *as a whole*, compared to other available sequences.

Compound is a conservative extension of our synchronic decision rule for unsharpness: it extends the synchronic verdicts of, for example, Hierarchical Liberal, but doesn't interfere with them, except to make some actions that would have been permissible, impermissible. So strictly speaking, Compound says nothing without synchronic verdicts to extend. Throughout I'll assume Hierarchical Liberal is correct, so for Sally reject Bet A & reject Bet B is the only inadmissible thus impermissible compound action. Compound says that [reject Bet A & reject Bet B] is impermissible. Hopper may not quit Academic for Banking then quit Banking for Academic-. *Pace* Moss, these compound actions are impermissible, and *pace* Sud the problem lies in completing them, not starting them.

Compound has wide scope: it says that if $\phi_1 \& \phi_2$ is impermissible, then the diachronic *combination* of actions [ϕ_1 and ϕ_2] is impermissible. This might give us a detachment problem. 'And' (or '&' or 'then') is in the scope of the 'impermissible' operator. Wide-scope norms forbid certain combinations of attitudes and actions or intentions. But we want something stronger, a narrow-scope norm which captures path-dependence by saying that if someone has rejected A, then it is *impermissible* to reject Bet B—where only rejecting Bet B is in the scope of 'impermissible'.

But in the cases we care about, the narrow-scope norm emerges. Assume Sally rejected Bet A. Then without backwards causation and given an uncooperative bookmaker, the only way she can comply with the wide-scope norm is to accept Bet B, and detachment is not a problem. I just appealed to a rule John Broome calls Necessary Detachment.[10] Compare a wide-scope norm of promising: it's forbidden to promise ϕ then fail to ϕ. There are two ways to comply with this norm: don't promise, or promise and then keep your promise. If we have promised to ϕ, and cannot retract that promise, then the only way to comply with the norm is to ϕ. The analogy here is not perfect: promising to ϕ changes the payoff table of ϕ by creating expectations in the promisee and so on, so it is more like the causal case.

I am arguing for a distinctive *non*-causal application of Necessary Detachment under unsharpness. In fact whether we call it causal or not is somewhat arbitrary, as we'll see below when I defend the consequentialism of the rule under vagueness.

The assumption that you can't change the past (or withdraw your bet, or unpromise) is crucial because in slogan form, without necessity there's no Necessary Detachment. If Sally is able to retrospectively accept Bet A, then she may rationally do that and reject Bet B. I am here focusing on the application of Compound to the most troubling cases for unsharpness: a foolish sequence with full foreknowledge and no backwards causation or similar. These are troubling because they are the cases where it seems clearest of all that Bet B should not be rejected after A has been, for example. If decision theory can't render that ver-

[10] Broome (2013), pp. 123ff. Coincidentally, Broome also uses the example of promising.

dict then there really is a problem for the unsharp agent. Elga chose his case well.

But, I'm arguing, in such cases Necessary Detachment allows us to detach the wide-scope Compound norm. If Sally has rejected Bet A, then rejecting Bet B is impermissible; if Hopper has already moved from Academic to Banking, then moving from Banking to Academic- is impermissible. Here is the combined rule:

Compound with Necessary Detachment. Do not complete impermissible compound actions. If (i) for some ψ_2, $\phi_1 \& \psi_2$ is permissible, but (ii) $\phi_1 \& \phi_2$ is impermissible, and (iii) you have done ϕ_1, then ϕ_2 is impermissible.

Disagreeing with the cliche 'dad' advice about fights, this rule says that you may start a foolish sequence, but you should never finish one. Clause (i) rules out dilemmatic cases where ϕ_1 is determinately impermissible in a way that infects all possible compound actions starting with ϕ_1. Without clause (i), Compound would wrongly say that *any* future actions are impermissible.[11]

This rule captures some distinctive features of unsharpness. Anna Mahtani argues that any decision theory for unsharpness should predict and explain *unstable* betting behaviour: if your representor is unsharp with respect to a certain bet, then there should be 'close possible worlds where you have your actual evidence and preferences where you accept the bet, and close possible worlds where [...] you reject the bet'; 'betting behaviour (even the betting behaviour of rational agents) exhibits a similar same sort of instability across time as it does across possible worlds'.[12]

I explained the cross-world instability in Chapter 2. Supersharp says that there are nearby possible worlds where I bet and where I do not bet—that's just what it is to be unsharp regarding the bet. Supersharp says that the Savage (or other) axions are supetrue but it's indeterminate (or unknowable) 'how' they are true. Compound explains why such instability is *permissible*: if there are multiple permissible ways to act, then we may—all else equal—act in more than one of those ways. If Sally accepts at least one bet she makes it indeterminate (or unknowable) whether she conforms to the axioms; if she rejects both bets then she knowably, determinately fails to conform to them.

As we'll see below, however, Compound may have more trouble with instability across time.

Compound only comes into play under unsharpness, because it's only under unsharpness that $[\phi_1 \& \phi_2]$ can be impermissible *without* either of the atomic actions being synchronically impermissible. For a sharp agent, if $[\phi_1 \& \phi_2]$ is impermissible, then either (i) ϕ_1 is impermissible, or (ii) ϕ_2 is antecedently impermissible, or (iii) ϕ_2 is made impermissible because its payoff table was causally altered by ϕ_1. So Compound isn't needed to forbid $[\phi_1 \& \phi_2]$ under sharpness, which is why foolish sequences are a distinctive problem for the unsharp.

Compound copes nicely with the distinctive dual-aspect phenomenology of fool-

[11] I'm grateful to John Broome for discussion of this point. See Broome (2021), especially the first example on p. 47.

[12] Mahtani (2018), pp. 77 & 81. Compare Williams (2014), p. 5, on 'Inconstancy'.

ish sequences. When thinking about returning from Banking to Academic-, we are torn between two facts: the return would on its own be permissible according to Hierarchical Liberal, but it is not permissible according to Compound because of acts already done (ie, the previous move from Academic to Banking). We should expect a sense of hesitancy and paradox, which is precisely what we experience in such situations.

Given Necessary Detachment, we could either talk about Compound as a distinct diachronic norm or as a *modification* of Hierarchical Liberal to cope with foolish sequences, as in the following:

Hierarchical Liberal no Fool. Choose T-admissible options over merely E-admissible options over inadmissible options. E-admissible options that complete inadmissible compound actions are impermissible.

But not only is this rule a little ugly, it obscures some of the underlying structure of what is going on such as—as we'll see—the possibility of extending Compound's basic idea to other decision rules beyond Hierarchical Liberal and to other views of unsharpness.

There's no doubt that path-dependence—making the completion of foolish sequences impermissible—makes life more complicated. In particular, if you are in Sally's position you might be uncertain whether you rejected Bet A, and thus uncertain whether it would be impermissible to reject Bet B.[13] Could your credence that you rejected Bet A be, dare I say it, unsharp?

Compound *does* introduce potentially-overlapping layers of complexity in this manner, but this price is justified. Many—even opponents of unsharpness—find it extremely plausible that unsharpness introduces restrictions at the level of the sequence or compound action. Elga's argument, for example, is that no defensible decision rule captures these restrictions. To comply with them restrictions we do unfortunately need to keep track of what sequences we are engaged in (unless we're very lucky).

But by way of locating companions in guilt, the same can be said of competing views—such as those of Andreou and Tenenbaum, as we'll soon see in more detail—where distinct permissibility verdicts arise at the level of the sequence of action. Orthodoxy does need some modification, and the modification does add some complexity.

4 Elga's Challenge

Why has nobody else adopted a rule like Compound? In fact, Weirich comes close:

> One should apply [Good's rule] to multiple decisions in a way that is context sensitive. When making new bets, one should keep track of bets already made. Bets already made influence the possible net gains or losses from betting if one makes additional bets. One

[13] I owe this ingenious objection to an anonymous reviewer.

> should evaluate new bets with respect to consequences for net wealth. (Weirich 2001, 440.)

I think that this is correct, but it looks too much like sunk-cost reasoning. How can the path taken be non-fallaciously part of what matters to the choice? Compound's answer is that the earlier action ϕ_1 changes the following feature of ϕ_2, upon which its rationality can depend: *whether ϕ_2 is the completion of an impermissible sequence of actions*. This is not a property which makes it into ϕ_2's payoff table, narrowly construed, but it is a feature of that choice.

(Elga 2010, 9) rejects 'Sequence', which has it that each action (rejecting Bet A and rejecting Bet B) was rationally permissible, but 'performing the sequence of actions "reject-Bet-A-then-reject-Bet-B" was rationally impermissible'.

Despite his official statement saying that rejecting Bet B was rationally permissible, Elga's argument against Sequence relies on the claim that "Sally's rejecting Bet B is consistent with her perfect rationality [if she was never offered Bet A], but not [if she rejected Bet A]"[14]. (Sequence shares some of the ambiguity just discussed, about whether Compound should be seen as genuinely diachronic rule or as a modification of the synchronic rule.)

So Sequence is path-dependent, which Elga rejects:

> In the two situations [ie, having rejected Bet A and not], Sally faces choices that are exactly the same in every respect she cares about. That is because the monetary consequences of accepting or refusing Bet B are the same in each situation, and Sally only cares about money. So it must be that rationality imposes the same constraints on her in the two situations.[15]
>
> Bottom line: Sequence entails that rationality imposes different requirements on Sally in the two situations. But Sally can see that her choices in the two situations are alike in every respect that she cares about. So it must be that rationality imposes on her the same constraints in the two situations. So Sequence is incorrect.[16]

For Elga, the very fact that 'rationality imposes different requirements on Sally in the two situations' is the decisive strike against Sequence, so path-dependence is *per se* unacceptable. This seems to be an appeal to *consequentialism* about rational choice: the permissibility of an action depends only on the consequences of that action. In particular, its consequences for the (expected) satisfaction of one's desires. Susanna Rinard mounts a similar criticism against a version of Moderate that would forbid rejecting Bet B after rejecting Bet A.[17]

To take stock, we appear to have an inconsistent triad:

(1) Consequentialism: the permissibility of rejecting Bet B depends only on the expected consequences of rejecting Bet B;

[14] Elga (2010), p. 10. Of course, one might deny that *not consistent with perfect rationality* implies *rationally impermissible*.

[15] Elga (2010), p. 9. I have elided a paragraph break.

[16] Elga (2010), p. 10.

[17] Rinard (2015), p. 14.

(2) No Consequential Change: rejecting Bet A changes nothing about the expected consequences of rejecting Bet B;

(3) Path-Dependence: rejecting Bet B is impermissible *iff* Bet A was rejected.

As we've seen, Elga rejects the rationality of unsharpness because it gets us into this inconsistent mess, whereas Rinard accepts the rationality of unsharpness but rejects Path-Dependence. I will reject (2): we can have both Path-Dependence and Consequentialism.

If I can't sustain a denial of (2) then it's poker metaphor time and I must lay my cards on the table. If the chips are down, I reject Consequentialism. This is because like many—but not all!—parties to the debate I think it manifestly obvious that Sally and Hopper will *not* reject both bets or change jobs more than once if they are rational.

Consequentialism is an exceptionally plausible principle, but if it clashes with a manifestly obvious verdict then it has to go. Moreover, the verdict stands even if (with Elga) we reject unsharpness. I also find manifestly plausible the conditional verdict that even if unsharpness is irrational and so an agent with unsharp credences is irrational, she would be *even more* irrational if she rejects both bets. This is exactly the kind of verdict that decision theory should formalise insofar as it provides guidance to non-ideal agents—in that case an agent who falls short of the ideal by being unsharp.

But with apologies to *Yes Minister*, I'm going to make sure the chips stay up. (2) is false and the consequences Sally cares about of rejecting Bet B are *not* alike in the two cases. Here is the central difference, put as ecumenically as possible:

- if she accepted Bet A, then there are two E-admissible compound actions available to complete—[accept Bet A & accept Bet B] and [accept Bet A & reject Bet B];
- if she rejected Bet A, then she can either complete the E-admissible [reject Bet A & accept Bet B] or the inadmissible [reject Bet A & reject Bet B].

This asymmetry is why Forward Looking tells her to accept Bet A, but we'll make different use of it.

Granted, the narrow payoff table for Bet B is the same in each situation, but rejecting Bet B makes 'Sally has acted in an E-admissible way' false *iff* she rejected Bet A. And for her, E-admissibility is determined by money. This is all a bit hazy, but that's because we've not yet made use of the machinery of indeterminacy.

5 The Consequentialism of Compound

I'll now be less ecumenical and work within the Supersharp framework. According to Hierarchical Liberal reject Bet A & reject Bet B is impermissible because not admissible. Both of its atoms are E-admissible, but there's no sharpening where *both* are E-admissible.

It's indeterminate whether rejecting Bet A is sanctioned, and indeterminate whether rejecting Bet B is sanctioned, but determinately false that *both* rejections are sanctioned. That this can happen is a central feature of unsharpness as indeterminacy. The other three compound actions—[reject Bet A & accept Bet B], [accept Bet A & accept Bet B], and [accept Bet A & reject Bet B]—are permissible because merely E-admissible: the sharpenings disagree about which of these three compound actions is permissible, and there are no T-admissible compound actions.

When Sally accepts or rejects Bet B, she completes a compound action, and what she did in the first bet *constitutively* determines the compound actions open to her:

- If she accepted Bet A, then whatever she does in Bet B it'll be indeterminate whether she's acted admissibly.
- If she rejected Bet A, then she can accept Bet B (and it'll be indeterminate whether she's acted admissibly) or she can reject Bet B (in which case she's acted determinately inadmissibly).

If she is to avoid determinately-inadmissible compound actions, then whether Sally can reject Bet B depends on whether she rejected Bet A. This is the fundamental consequential difference between rejecting Bet B in the two situations: in one—but not the other—rejecting Bet B has the consequence that she determinately fails to maximise expected financial gain.

If we want this property to make rejecting Bet B impermissible without violating consequentialism, it must be a property of Bet B. Moreover it must be a *relevant* property of Bet B, the sort of consequence that orthodox decision theory can take into account.

5.1 Indeterminacy-Breaking Properties

Under indeterminacy, being the completion of a determinately impermissible sequence of actions can be a property of an action. To see this more generally, suppose that $\Phi = \phi_1\&...\&\phi_n$ is an (ordered) sequence of n actions such that determinately, just one $\phi_i \in \Phi$ has some property F, but it is indeterminate which. Nothing outside Φ is F. The sequence contains one F action. This is not a determinate fact about any member of the sequence. Nevertheless the first and last actions in the sequence have special properties. When ϕ_1 is done, the proposition that F is instantiated changes from false to indeterminate. And when ϕ_n is done after all the others, that proposition changes from indeterminate to true.

I'll say that ϕ_1 and ϕ_n have *indeterminacy-breaking* properties: when they are done, some proposition (in this case, that F is instantiated) changes from false to indeterminate, or from indeterminate to true. Once ϕ_1 is done none of the intermediate actions ϕ_2 to ϕ_{n-1} in the sequence has any indeterminacy-breaking property that we care about. When they are done, the proposition in question remains indeterminate.

Crucially, whether ϕ_n has the indeterminacy-breaking property of making F determinately instantiated depends on whether the earlier acts in the sequence were done, a fact not reflected in the narrow payoff table of ϕ_n. If one or more earlier ϕ_1 to ϕ_{n-1} had been omitted, then ϕ_n wouldn't have the indeterminacy-breaking property either: were ϕ_n done or not, it would have remained indeterminate whether F is instantiated.

If our decision rule tells us that it's impermissible to make F determinately instantiated, then permissibility of ϕ_n depends on whether those earlier acts were done, even though they don't affect the narrow payoff table of ϕ_n. (Similarly, if it is forbidden to take 'F is instantiated' from determinately false to indeterminate, then ϕ_2 is permissible if and only if ϕ_1 was skipped.)

In Sally's Bets, the second action in [reject Bet A & reject Bet B] has the indeterminacy-breaking property of making 'Sally maximises expected utility' determinately false (rather than indeterminate). But the second action in [accept Bet A & reject Bet B] doesn't have that property, because whether she accepts or rejects Bet B it's indeterminate whether she acts admissibly.

I've repeatedly referred to the 'narrow' payoff table of an action. We can now present its broader cousin. Previous actions change the broader payoff table of the action, in this case giving Reject Bet B an indeterminacy-breaking property, as shown in Tables 2 and 3.

Table 2: Broad Payoff Table for Bet B after **accepting** Bet A

	H true	H false	Atomic expected payoff	Maximises compound expected payoff?
Accept Bet B	-10	15	$15 - 25c(H)$	Indeterminate
Reject Bet B	0	0	0	Indeterminate

Table 3: Broad Payoff Table for Bet B after **rejecting** Bet A

	H true	H false	Atomic expected payoff	Maximises compound expected payoff?
Accept Bet B	-10	15	$15 - 25c(H)$	Indeterminate
Reject Bet B	0	0	0	False

So I don't think we can deny that rejecting Bet B has an indeterminacy-breaking property. My opponent can object that these are not consequentially-*relevant* properties of rejecting Bet B.

5.2 Humean Relevance

Does Compound violate the Humean belief-desire model of rationality, according to which (1) the permissibility of my actions depends only on my desires and my beliefs about the consequences of that action for the satisfaction of those desires, and (2) my basic or intrinsic desires are not themselves assessable for permissibility? Elga is clear that Sally cares only about money. Thus to vindicate Path-Dependence without violating the Humean model, Compound must forbid her from instantiating the indeterminacy-breaking property with *only* that preference. In particular, even if she doesn't care *de dicto* about indeterminacy.

If I don't meet this challenge, then Compound is a departure from the orthodox Humean picture—still perhaps correct, but without the satisfaction of ruling out foolish sequences for *all* agents, without resorting to unHumean moves.[18]

I'll argue that Compound meets this challenge. Though it does broaden the relevant payoff table to include facts about determinate inadmissibility, those are ultimately facts about the satisfaction of her desires. Sally need not care *de dicto* about the indeterminacy-breaking property in question. She cares about money and it's an indeterminacy-breaking property *about money*: that she has determinately failed to maximise expected financial gain.

We can push two companions in guilt here. The first is that Compound is no more of a departure from consequentialism than is our synchronic decision theory in Chapter 3. Liberal bases permissibility on whether an action is E-admissible: on the indeterminacy interpretation, on whether it is indeterminate whether that action maximises expected value. So 'meta-level' facts about determinacy are already part of the synchronic decision theory. I'd argue that this is no departure from consequentialism at all, but at the very least there's no *further* diachronic departure. Moreover, the indeterminacy interpretation provides a consequentialist rationale for distinctive diachronic upshots: some relevant consequences emerge only at the sequence level. If we accept a rule such as Liberal, there is no further non-consequentialist aspect to accepting Compound.

To be fair, Rinard's Moderate—which rejects Liberal and other meta-level facts even synchronically, instead simply saying that an action is permissible if and only if that action maximises expected utility, and so under indeterminacy many acts are borderline-permissible—has more standing to criticise Compound (and Liberal) for non-consequentialism. But for the very same reason, Moderate has implausible upshots in synchronic cases too, or so I argued.

You could be a hardliner and insist that consequentialism means the *only* relevant properties of an action are those in its narrow payoff table. Then indeed for you Compound is not consequentialist, but drawing the line here is somewhat unmotivated. Why not taken an even harder line?

Thus the second companion in guilt. As (Sud 2014, 131–33) insightfully argues, finding the most precise and plausible version of conseqentialism is not simple. Standard decision theory doesn't assess actions based solely on their actual consequences. It also takes account the agent's beliefs. To cope with uncertainty we move from utility maximisation to *expected* utility maximisation. Most of us don't care *de dicto* about maximising expected utility, but on the standard picture any sharp rational agent who cares only about money (with the usual conditions) will maximise expected payoff—and the 'expected' brings in properties of the agent. My argument is that they will also maximise *determinacy* in their

[18] I'm grateful to an anonymous reviewer for pushing this objection especially hard.

payoffs, and this is both a synchronic and diachronic matter (and a feature of the agent). Liberal and Compound are consequentialist insofar as they forbid avoid determinate failures to maximise expected utility.

The consequentialist credentials of Compound can be bolstered by considering an epistemicist version of Supersharp: if and only if Sally has rejected Bet A then rejecting Bet B is the completion of a *knowably* inadmissible sequence of actions. If (as is plausible given the structure of the case) this is impermissible as a matter of expectation-maximising, it is unprincipled to draw the line here and not permit similar reasoning about *determinately* inadmissible sequences of action.

In considering not only uncertainty but indeterminacy it seems fair to take that into account too, and stay in the consequentialist tent. But even if you reject this reasoning as wishful thinking, then you should at least accept that I'm pushing a very minor departure from consequentialism.

5.3 The predicate-vagueness analogy

Indeterminacy engenders path-dependence in other contexts, which offer more companions in guilt. Consider the following case:

> **John and James.** John and James are both borderline-tall but John is 2cm taller than James.

(Notice the one-sided height increment akin to a small-improvement argument.) It's indeterminate whether James is tall and indeterminate whether John is tall, but the material conditional 'if James is tall, then John is tall' is determinately true, because true on all sharpenings.

If you first say 'John is not tall', then you say something indeterminate. If you then say 'James is tall', again you say something indeterminate. But together, these assertions amount to the determinately false assertion that John is not tall & James is tall. If you want to avoid making determinately false claims, you face path-dependence: whether you can say that James is tall depends on whether you've already said that John is not tall. (Brian Hedden makes a similar argument, where he considers applying synchronic norms to temporally-extended agents.[19])

More generally, if some proposition P is indeterminate, then whether you've already asserted something that implies not-P determines whether an assertion of P has the indeterminacy-breaking property of making it determinate that you speak falsely. But your previous assertions don't change the narrow 'payoff table' of your assertion that P, which remains indeterminate, as we can see from table 4.

[19] Hedden (2015), p. 140. In note 18, he also considers vagueness, but with two borderline-bald rather than borderline-tall men.

Table 4: assertions about James

	Truth-value
"John's tall"	Indeterminate
"John's not tall"	Indeterminate

But suppose you've already said something about John, and your claims about James form a compound assertion with it. Then Tables 5 and 6 show the broader payoff tables for your (later) James-claims.

Table 5: broad payoff table for assertions about James, having said John is tall

	Atomic truth value	Compound truth value
"James is tall"	Indeterminate	Indeterminate
"James isn't tall"	Indeterminate	Indeterminate

Table 6: broad payoff table for assertions about James, having said John is not tall

	Atomic truth value	Compound truth value
"James is tall"	Indeterminate	False
"James isn't tall"	Indeterminate	Indeterminate

Being asked about John and James in sequence is a very short sorites forced march. In a longer march you are walked from the very tall to the very short, and the conjunction of your verdicts about each man forms a compound verdict on the tallness of the men. Your compound verdict is indeterminately-accurate *iff*:

(i) your verdict changes from 'tall' to 'not-tall',
(ii) your verdict changes only once, and
(iii) your verdict changes in the penumbra of 'tall'.

Any compound verdict meeting these constraints is true on least one sharpening. If you violate any of these constraints, then your compound verdict is determinately inaccurate. At the compound level, there are only two possibilities: you can make an indeterminately-accurate verdict, or a determinately-inaccurate one.

Here we can again see path-dependence, if you've complied with (i)-(iii) so far and now reach the borderline-tall Xavier. The verdicts 'Xavier is tall' and 'Xavier is not tall' are (in isolation) not impermissible, because both are indeterminately accurate. But:

- if you've said that all previous men are tall, then you may either say that Xavier is tall or that he isn't without violating any of the constraints;
- if you've said that some previous man is not-tall, then you *must* say that Xavier is not-tall, or you will violate condition (ii).

Your calling a previous man not-tall is analogous to Sally rejecting Bet A. The predicate 'is tall' lacks sufficient content to sanction a change of verdict at a *particular* point in the forced march. But it has enough content to impose the structural constraints (i), (ii), and (iii) on your choices. These constraints allow a number of non-forbidden pathways or compound actions as you progress through the sequence. But if through your actions, you close off all but one non-forbidden pathway, by acting in a way that is inconsistent with the other pathways and that you can't retract, then this—together with Necessary Detachment—engenders path-dependence: you are required to complete the only remaining non-forbidden pathway. This can be so even if in isolation, the action which completes that pathway is not required.

5.4 Other Decision Rules

The framework of indeterminacy-breaking properties allows us to explain Compound under indeterminacy, but similar reasoning can work under other construals of unsharpness. Each synchronic decision-rule has a rationale for compliance with its verdicts, and whatever the justification for compliance with Minimax or Liberal or whatever, Compound extends it diachronically. And if there's no rationale beyond "it's intuitive" or especially "it renders plausible verdicts"? That'll be Compound's rationale too.

Without a particular decision rule and account of unsharpness in hand, it's hard to say much more than this: there will be a difference between an action that completes a foolish sequence, and one that does not.

Almost all interpretations of unsharpness replace credence and utility functions, or whatever determines the permissibility of an action, with a *set* of such things (the representor). Permissibility-facts can then arise at the level of some compound action, because there's a difference between compound actions where all functions in the representor forbid at least one of the atoms, and compound actions sanctioned in their entirety by at least one member of the representor. This difference can be captured without vagueness: 'every atom is admissible according to all members of the set', 'some but not all members of the set sanction all the atoms', and 'no member of the set sanctions all the atoms'.

The vagueness view interprets these statuses in terms of sharpenings and supertruth, but other interpretations are available. However, the vagueness interpretation and in particular Supersharp are especially well-placed to explain path-dependence in a consequentialist way, via indeterminacy-breaking properties.

6 Individuating Compound Actions and a Concessive View

I've argued that Compound forbids the completion of impermissible compound actions, and that this doesn't mean departure from the consequentialist Humean model. But when do some ϕ_1 and ϕ_2 count as a compound action? My view is a thin one: Compound applies if the actions are done by the same agent (on whatever is the correct view of personal identity), and if that agent has a sufficiently stable joint representor during the intervening period.

We might wonder if the 'same agent' restriction can be justified. If Compound extends our synchronic rule diachronically, then why not interpersonally? Why not say that if Sally has rejected Bet A, then her friend Sarah—who has a relevantly similar representor—must not reject Bet B? My answer passes the buck to the synchronic rule: we have been working with synchronic rules that treat interpersonal distinctions as important. Are *your* actions E-admissible? But given a synchronic rule that aggregates between persons—forbidding Sally and Sarah from simultaneously rejecting both bets—Compound may well extend this stricture diachronically.

'Sufficiently stable' means at least that any credal or preferential changes in the intervening period don't affect the rationality of $\phi_1 \& \phi_2$. So, for example, if after quitting Banking+ for Academic, Hopper comes to dislike the slower pace of academia and misses the City, then Compound doesn't forbid him from switching to Banking. Either his preferences have genuinely changed in light of experience or he has come to see that he always strictly preferred Banking to Academic. In each case Banking $\succ$ Academic at the time of the second action, there is no unsharpness, and Compound doesn't apply.

This is why Compound's advice to Sally ('accept Bet B because you rejected Bet A') doesn't commit the sunk-cost fallacy. In sunk-cost reasoning, we take an impermissible option because of 'the sacrifices already made'. Compound only kicks in under unsharpness, when more than one action—for example accepting and rejecting Bet B—is E-admissible in isolation. Sunk cost fallacies lead us to do an impermissible action (I'd prefer not to eat this apple but I spent so much effort washing it...), whereas Compound *limits* the set of permissible actions.

This line of response—that the representor is not sufficiently stable—also defeats one of John Broome's putative counterexamples to Compound. (Broome 2021, 46–47) suggests that Sartre's student *regrets* his earlier choice, and that in that case it may remain permissible to join the later convoy. I read 'regret' either as an update in preferences or as realising that the first choice was impermissible, and Compound doesn't apply in either of these cases. (I should note that Broome is working in a somewhat different context, concerned with incommensurability in value rather than incompleteness in preferences. His synchronic rule is also different to Liberal, appealing to a graded conception of indeterminacy where it can obtain that 'neither [act] is definitely impermissible, but one may be less permissible than the other'.)

6.1 Intuitive Counterexamples to Path-Dependence

I've defended path-dependence on intuitive grounds—thinking it obvious that rejecting both bets is impermissible, for example—but we don't always seem to judge our later acts constrained by earlier ones in the very demanding way Compound suggests. Even if foolish sequences are not *always* permissible, they don't always seem impermissible either.

Sometimes we can bite a bullet. Consider a temporally-extended version of Sally's Bets, for example. If Sally rejects Bet A now and her representor remains sufficiently stable for 40 years—unlikely in some cases, but we'll stipulate it—does Compound imply that she must not reject Bet B in the 2060s? Yes. There's nothing inherently implausible about such long-term demands, which we also see elsewhere. For example, standard decision theory's rationale for probabilistically-consistent credences is that they'll save us from Dutch Books. This can be so even if the Dutch Book in question ensnares us only over several decades. The long wait doesn't all by itself make the rationale excessively demanding, and so I can live with this.

More troubling is a variant of a case that detained us in Chapter 3:

> **Two Workshop Sodas (two orders).** I'm at a two-day workshop, and I'm entitled to one free drink *per day*. As before, my preferences are incomplete between the blackberry and the orange soda (which I strictly prefer to all the other options). I must place my order for both sodas on the first day. I choose my daily soda each morning.

In the last chapter I bit the bullet that if I must place my order for both days together then Liberal requires me to choose the same soda for both. But the present case seems even more demanding: could the fact I chose blackberry yesterday really forbid me from choosing orange today? Even without regret, that seems excessively demanding.

Mahtani does seem correct that as well as inter-world variation, there may be variation across time in how we respond to unsharpness. As in the last chapter, I can appeal to other desires, such as for novelty and spontaneity. We can accept the (admittedly surprising) claim that there is an injunction from Compound to choose the same drink every time, but mitigate the surprise by noting that the injunction will often be defeated by those other desires. This might seem like an epicycle—perhaps it is.

Here's another case with similar features, and it involves a long day.[20] You are on a train to a horse race and intend to take a specific High-Stakes Bet. Your credence in the proposition H that Bebe will win is imprecise. You have two members in your credal set, on one of which cr(H)=0.25 and on one cr(H)=0.75. As usual you have utilities linear in pounds, and three events occur in sequence.

(1) On the train, you sit next to the Mad Sharpener, who offers you a bet. You can choose any number x between 0 and 100, and the Mad Sharpener will pay you x^2 pennies if Bebe wins and $(1-x)^2$ pennies if Bebe loses.

[20] I owe Giacomo Molinari for suggesting this case.

You should definitely take some variant of the bet because you can't lose—that's why she is mad—but which? Your expected payoff is maximised if you pick an x that corresponds to your cr(H), and so choosing x=25 and x=75 are each E-admissible for you. So you choose the bet at x=75, and settle back in your seat.

(2) Smug from this free money, you start chatting to the man on the other side of you. He tells you his heartwrenching story of how gambling addiction made him destitute many years ago.

(3) You arrive at the races, where the High-Stakes Bet is be offered. It pays £4,000 if Bebe wins and costs £10,000 if she loses. This is the bet your originally intended to take.

The High-Stakes Bet is merely E-admissible for you because it is sanctioned by the second sharpening in your credal set, according to which the expected payoff of the bet is 4000 * 0.75 - 10000 * 0.25 = £500. Hierarchical Liberal permits you to take the High-Stakes Bet, which you intend to do.

Suppose that after hearing the tale in (2) and despite your earlier intention, you decide not to take the High-Stakes Bet after all. This seems wholly defensible and rational—after all, rejecting the bet is E-admissible.

The problem is that Compound seemingly *requires* you to take the High-Stakes Bet, because rejecting it would complete a foolish sequence after you took the Mad Sharpener's bet at x=75. No sharpening sanctions rejecting the High-Stakes Bet after doing that, so Compound seems to make the earlier 'freebie' small-stakes bet constrain your later actions with higher stakes. This seems very implausible, not least because the tail wags the dog in financial terms, but also because it extends the ban on mixing-and-matching into purely monetary bets.

I think Compound has a response here: your representor is no longer sufficiently stable. The stranger's tale has made you more risk-averse, and risk poses well-known problems for standard decision theory, problems largely orthogonal to the issue at hand. The problem is that the standard theory requires you to maximise expected utility no matter how large the stakes, and I don't think Compound adds any *additional* implausibility here. To see that risk is doing the work here, let's drop the unsharpness and imagine an agent with determinate (precise) credence that Bebe will win. Whether or not she takes the freebie bet at x=75, maximisation requires her to accept the High-Stakes Bet. But again it seems plausible that the stranger's tale could make her rationally averse to such risky bets, by changing her attitude to risk. (To make this more plausible, we might increase the numbers.)

However the standard view is modified to cope with risk—perhaps perhaps along the lines of Lara Buchak's risk-weighted expected utility theory, or simply biting the bullet that rejecting the bet *would* be irrational—the modification will help in the imprecise case too.[21] The issue is orthogonal to Compound.

[21] Buchak (2013).

6.2 A more concessive Humeanism

I've considered two main objections to Compound: that it doesn't comply with the Humean belief-desire model in a consequentialist way and that it is excessively demanding in cases where intuitively, we can act differently in different 'rounds' (such as your soda order).

A more concessive view could deal with both objections together. To motivate it, consider again the predicate vagueness case again. I said that Compound can forbid me making a determinately false conjunctive assertion that John (who is 2cm taller) is short and James is not. But if we are doing some kind of repeated forced march, isn't it permissible for me to say this time that John is short and next time that he isn't? The intuitive reason it is is that my assertions across two forced marches don't form a combined assertion, because I don't intend them to. But if I *did* desire to remain consistent across time, rationality would forbid me changing my verdict about John.

My concessive fall-back is that *whether two acts form a compound action depends on the desires of the agent*—in particular, whether they desire their actions across time to be E-admissible. Without such a desire, we may regard two soda orders as separate actions and have no desire to avoid making it determinately false that our orders maximise preference-satisfaction. As such, we are under no requirement to co-ordinate our actions in this way.

The fall-back tracks many of our intuitive judgements. Plausibly we do have *de dicto* desires not to be value-pumped across bets and career changes, and most of us want to maximise our expected long-run career and financial outcomes, or at least not determinately fail to maximise them. On the other hand, we likely lack a diachronic consistency desire about the sodas.

This concessive view is a little unexciting. To switch jargons, we are simply positing an additional desire, turning an apparently categorical imperative into a hypothetical one. This is a bit of a cheat when it comes to fitting things into the orthodox belief-desire picture. But it's nice to know that the concessive picture is available, and offers an orthodox way for unsharp agents to avoid being value-pumped... if they care about that sort of thing.

But I endorse the stronger ('categorical') view. I find it plausible that even if Sally has no *de dicto* desire to be E-admissible across her sequence of bets, rationality requires her not to accept both bets. And it requires that as an unpshot of her caring about money: under indeterminacy, the demands of that desire stretch diachronically. I think the stronger view gets (mostly) extremely plausible verdicts, and that it has a strong claim to consequentialism.

7 Conclusion

In these two chapters, I've defended a combination of Hierarchical Liberal and Compound. Rational agents may take any E-admissible option, *unless* there's a T-admissible option (in which case they should do that), and *unless* that E-admissible option would complete an impermissible compound action. If they follow this pair of rules, then they'll avoid the most obvious traps for the unsharp. And there are neither decisive first-principles arguments nor clear counterexamples against those rules.

We can now situate Supersharp against opposing views. *Pace* Elga and others, I've argued that unsharpness is rationally permissible and defended a decision rule for it. I am in the same camp as Sud and others who've proposed broadly orthodox accounts to cope with unsharpness.

On the other hand, to my eyes the most distinctive feature of many *unorthodox* models of rational choice is that a pattern of choices can be irrational even if no single choice therein is. Sergio Tenenbaum endorses the *non*-supervience claim that 'the rationality of an agent through a time interval t_1 to t_n does not supervene on the rationality of the agent at each moment between t_1 and t_n'.[22] And Chrisoula Andreou writes that there are

> cases in which the agent qualifies as giving in to temptation even though she acts in accordance with her rational preferences at each choice point. [...] she qualifies as giving into temptation, even though, at each choice point [...] the relevant instances of giving in to temptation, *considered individually*, are not, other things equal, instances of irrationality... (Andreou 2023, 174–75)

Compound rejects such heresies. Under indeterminacy a pattern or sequence of choices can be irrational ('foolish'), and in virtue of that completing the *final* choice in that pattern is impermissible. The irrationality of the sequence is loaded onto the final member, because the final member makes it determinately true that the agent has acted inadmissibly.

For both Andreou and Tenenbaum, heresy is largely motivated by vague projects, such as Warren Quinn's notorious 'Puzzle of the Self-Torturer'. So I'll now turn to them.

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