

## Confessing to a Superfluous Premise

“An account of premises containing superfluous information is essential to understanding verification, confirmation, and explanation by subsumption under general law, . . . (Sanford 1988, 32). Hopes for this account have been frustrated by deductions that obscure idle components (Lutz 2017). If only arguments were more forthcoming about the presence of expendable premises!

### The Confession Conundrum

On second thought, could this candor be correct?

(A) (A) has a superfluous premise.

∴ (A) has a superfluous premise.

The conclusion of (A) is a false confession. An argument has a premise superfluous to its soundness if and only if deletion of a premise would preserve the fact that the argument is valid and has true premises.<sup>1</sup>

Since (A) is valid one might expect that the addition of an irrelevant premise would guarantee an accurate acknowledgment:

(B) (B) has a superfluous premise.

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<sup>1</sup> An argument without superfluous *premises* might harbor subtler redundancies such as needless conjuncts. David Sanford (1981) demonstrates how to re-pack the content of

The redundant individual has been a stock character in Russian literature since Ivan Turgenev's 1850 novella The Diary of a Superfluous Man.

∴ (B) has a superfluous premise.

However, erasing the second premise yields an argument that has the same unsound character as (A).

Suppose we recruit another extraneous proposition: 'To ensure genuine fulfillment of Karl Marx's prediction of full employment, Soviet anti-parasite laws forbade over-manning'. The resulting three-premise argument is even more redolent of redundancy. Nevertheless erasing the third premise would return us to an argument with the same nature as (B) – already exposed as a false confessor.

Irrelevance is not the sole path to superfluity. The more respectable route is to install relevant premises that make the argument redundantly valid.

(B') (B') has a superfluous premise.

Either (B') has a superfluous premise or the chief of the Soviet secret police from 1936-1938, Nikolai Yezhov, invented relevance logic.

Yezhov did not invent relevance logic.

∴ (B') has a superfluous premise.

Despite being doubly valid, each possible deletion fails to leave a *sound* argument. When the first premise is erased, the conclusion of the rump argument falsely alleges that one of its surviving premises is superfluous. When the second or third premise is removed, the

resulting argument has the same structure as (B), whose false advertising has already been noted.

Grafting on further redundant validities is just as futile as adding further irrelevant premises. The extra premises just create more nesting in a Russian doll sequence.

#### Elevating Reference over Self-Reference

Perhaps our investigation would be more successful if an outsider corroborates (B)'s confession.

(C) (B) has a superfluous premise.

∴ (B) has a superfluous premise.

(C) denounces (B) by repeating all but one of (B)'s claims. Given (C) is sound, the deletion test can be satisfied by (C) rather than a self-referential relative of (B), such as (B').

On this diagnosis of the confession conundrum, the self-referential kin of (B) are irrelevant to the deletion test. They vainly switch the topic to themselves instead of preserving reference to (B). By ignoring these red herrings, we redeem the initial appearance of (B) having a superfluous premise.

Little Ivan: "Is there freedom of speech in the Soviet Union, as in America?"

Aunt Yelena: "Yes comrade! In America, you can stand in front of the White House and chant, *DOWN WITH AMERICA!* You will not be punished. Equally, you can stand in Red Square in Moscow and chant, *DOWN WITH AMERICA!* You will not be punished."

The lesson intimated by the joke is that tests of freedom of speech need to be applied at a level of abstraction that tracks offense to *oneself*.

Similarly, tests of superfluity need to be applied at a level of abstraction that preserves the original argument. The goal is to strip the argument down to its essential components, not to cannibalize its parts to assemble a smaller, distinct argument. When the conclusion of that argument has an essential indexical, reference must be sacrificed to salvage self-reference.

Admittedly, authors of logic textbooks write as if there is never a need to preserve self-reference when testing for superfluity. They say an argument has a premise superfluous to its soundness if and only if there is a sound argument whose premise set is a proper subset of the original argument's and which has the same conclusion. Their criteria for identifying "the same conclusion" never mention self-reference.

But this omission is an artifact of simplification. Suppose two of these logicians are lost. They trust their map but debate their location. The logicians need indexical terms, such as 'here' to express their difference of opinion (Perry 1979, 35).

If the logicians were pressed about the first person reasoning in Rene Descartes' Meditations, they would concede that self-reference is sometimes more important than reference. After all, Rene Descartes tells readers to put themselves in the place of the narrator. To show a superfluous premise in 'I think. I walk. Therefore, I exist.' the instructor will streamline to 'I think. Therefore, I exist', rather than 'Descartes thinks. Therefore, Descartes exists'. 'I think' is more certainly verified than 'Descartes thinks'.

The father of empiricism concurs. John Locke erects his foundations on sense data judgments of the form 'It seems to me now that p' rather than 'It seems to John

Locke at noon January 1, 1700 that p'. Locke's agreement with Descartes on the superior verifiability of indexicalized judgments was upheld through subsequent generations of empiricists. According to the logical positivists, scientists rely on private experience, specifically protocol sentences such as 'Here now red'. When A. J. Ayer (1946, 13) tries to filter superfluous information from indirectly verifiable statements, his algorithm tacitly relies on indexicals such as 'here' and 'now'.

Explanations of actions are also sensitive to modes of presentation and perhaps a distinctive kind of belief about oneself, belief *de se*. Consider a practical syllogism that explains why Descartes fled Paris in 1648: 'Descartes will be detained unless he flees. I will be detained unless I flee. I desire not to be detained. Therefore, I flee'. The opening two premises have the same content but only the first premise is superfluous.

Predictions in the social sciences frequently attribute practical syllogisms. An adequate account of superfluous information will therefore avoid a simple transfer model of content (Torre 2016, 13). The speaker's belief is affected by his available actions. When Descartes persuades his host 'I will be detained unless I flee Paris', the two men act differently. Descartes flees while his host apologizes for encouraging the Paris visit.

Translators commonly surrender reference to retain self-reference:

- (D)            This argument is expressed in English.  
                  ∴ Some argument is expressed in English.

A German translation of (D) can preserve any two of reference, self-reference, and soundness – but not all three. A charitable translator sacrifices reference: *Dieses*

*Argument ist in deutscher Sprache verfasst. Deshalb ist ein Argument in deutscher Sprache verfasst.*

Tyler Burge (1978, 139) notes that logicians preserve self-reference rather than reference when translating informal presentations of Godel's incompleteness result. 'Das ist kein Theorem' becomes 'This is not a theorem'. They can preserve reference if they add meta-linguistic premises about the particular German sentence token. But this supplementary infrastructure would drag in reference to another language: "Preservation of non-demonstrative self-reference is sometimes the only way to preserve the soundness of an argument under translation without adding additional premises." (Burge 1978, 140)

Logicians also rank self-reference over reference when translating Alfred Tarski's articles on truth. His discussion of a particular sentence token of 'Schnee ist weiß' becomes a discussion of a particular sentence token of 'Snow is white' (Burge 1978, footnotes 9 and 11).

What goes for translation goes for quotation. Consider Richard Cartwright's obscenity puzzle:

(E1) The last word of (E1) is obscene.

(E2) The last word of (E1) is obscene.

At first blush, (E1) looks like it can be tinkered into a truth by adding quotation marks around the last word (just as (B) seems like it can be made sound by adding any proposition as an extra premise). After all, (E2) is a token of the same sentence type and has the same reference as (E1). Despite this encouraging resemblance, (E1) is not

salvageable. We are chagrined: How can (E1) and (E2) differ so stubbornly in truth-value given their near identity? Consistently answering the riddle requires meticulous attention to demonstratives and indexicals (Kaplan 1973).

Tyler Burge (1978, 145-147) argues that all quotation involves a tacit self-referential clause about the language used to report what was said. For instance, 'Tarski said, "Snow is white"' would be paraphrased: 'Tarski said, "Snow is white", taken as a sentence of the language of this very sentence'. Occasionally, this tacit clause is made explicit to disambiguate a sentence. When an English speaker says 'Empedocles leapt' his speech sounds are the same as those made by a German saying 'Empedokles liebt' (Empedocles loves). So the English speaker may cautiously add "'Empedocles leapt' as a sentence of the language of this very sentence, is true".

Theorists differ on the extent of hidden self-reference. The most expansive is reduction of all belief to belief de se (Lewis 1979, Feit 2008). All inquiry is self-locating: which possible world am I in and where and when am I within that world?

Truth is disquotational. So the connection between quotation and translation predicts an asymmetry paralleling the sentences used in the obscenity puzzle:

(F1) (F1) is not true.

(F2) (F1) is not true.

(F1) is an instance of the liar paradox. The supposition that it has a truth-value leads to contradiction. So (F2) is the correct conclusion. Consequently, only (F2) is true despite the fact that (F1) and (F2) are tokens of the same sentence type.

The liar paradox can be expressed with a conditional 'If this conditional is true, then Kremlin doctors plotted to kill Secretary General Stalin'. Proof by *reductio ad absurdum*: Suppose the conditional is false. The antecedent is then true and the consequent is false. But this implies a contradiction. So the conditional is true. Therefore, the existence of the conspiracy follows by modus ponens.

What can be done with conditionals can be done with the consequence relation, as in 'This argument is valid, therefore, this argument is invalid' (Read 1979). More relevantly,

(G)            (G) is not sound.  
                  ∴ (G) is not sound.

Is (G) a sound argument? If sound, then it is unsound. So it must be unsound. But wait, if (G) is unsound, then it has a true premise and true conclusion. A valid argument with a true premise is sound. (G) is sound if unsound and unsound if sound! (Jacquette 2003)

The correct conclusion is that (G) is ill-formed. This diagnosis is compatible with the soundness of the following argument:

(H)            (G) is not sound.  
                  ∴ (G) is not sound.

Nevertheless, we endorsers of (H) do not want it to be used to ground judgments of superfluity. For consider this sophistry:



(I) (I) is not sound.

Carl Hempel believed Craig's theorem sharpened the redundancy horn of the Theoretician's Dilemma.

∴ (I) is not sound.

Is (I) a sound argument? If sound, then it is unsound. So it must be unsound. But wait, if (I) is unsound, then it has true premises and a true conclusion. A valid argument with entirely true premises is sound. (I) is sound if unsound and unsound if sound!

There is a sound, reference preserving argument that deletes a premise:

(J) (I) is not sound.

∴ (I) is not sound.

But we do not want to let the soundness of argument (J) establish the soundness of (I).

Similarly, we should not regard the soundness of (C) as vindicating the soundness of (B). Since this exhausts all the comparison arguments that could satisfy the deletion requirement for a superfluous premise, we should stick with the paradoxical verdict that (B) does not have a premise superfluous to its soundness.

### Navigating between Extremes of Self-Reference

The most repressive explanation of why (B) does not have a superfluous premise is that it is as pathological as the soundness paradox. Pseudo-Scotus (John of Cornwall) banned

arguments that deny their own validity. One might propose a similar ban on self-attributions of superfluous premises. On this analysis, (B) is meaningless.

An opposite strategy is to proliferate self-reference. Instead of forbidding self-commentary, require every argument is compelled to speak up:

(K) This argument is sound and deleting any of the subsequent premises would render it unsound.

All men are mortal,

Caius is a man.

∴ Caius is mortal.

This self-endorsement of efficiency would render inconsistent any argument that concludes it has a superfluous premise. On this analysis, (B) is meaningful but unsound – just as maintained by the paradoxical reasoning.

Proliferation of self-reference inflicts collateral damage. No argument with superfluous premises would be sound because the unstated premise would be false.

Advantages of the proliferationist's proposal can be salvaged by demoting the presumption of efficiency to the status of a maxim of argumentation. H. P. Grice derives his maxims from the cooperative principle. Participants in a conversation are to make their "conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange." (1975, 45) Speakers should say

what is true (maxim of quality), relevant (maxim of relation), in exactly as much detail as needed (maxim of quantity), and with clarity (maxim of manner).<sup>2</sup>

So the speaker ought to argue efficiently, appealing only to those premises that support his conclusion. Irrelevant premises violate the maxim of relation. Redundant premises violate the maxim of quantity (specifically the downward submaxim of saying only as much as needed).

Violation of the presumption against superfluous premises paralyzes many ordinary reasoners.

(L) If Karl Marx has a manifesto to write then he studies late in the British Library.

If the library stays open then Marx studies late in the British Library.

Marx has a manifesto to write.

∴ Marx studies late in the British Library.

Only about a third of college students accept arguments such as (L) (Byrne 1989). Nearly all accept the argument if the second premise is deleted.<sup>3</sup>

An implicature is not part of what is said. Instead of being encoded as premise, the implicature is an inference from the fact that speaker uttered the sentence. When Bertrand Russell says, “Some atheists are communists” he implicates some atheists are not communists. For if he believed all atheists are communists, he would have made the

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<sup>2</sup> One of the sub-maxims of Grice’s maxim of manner is “Be brief (avoid prolixity)”. The common illustrations feature synonymous sentences that vary in length. Merely verbal excess poses no philosophical problems.

<sup>3</sup> Experiments on inference suppression generally exclude students who report taking a logic class. The student might recall that deduction is monotonic – adding a premise to a valid argument can never invalidate it.

stronger, universal claim (by virtue of his adherence to maxim of quantity, say as much as one can). Asserting the logically equivalent converse 'Some communists are atheists' does not carry this implicature.

The same point holds for larger units of discourse. By including both P and Q, as premises you implicate that both are necessary for your conclusion. By asserting them as separate premises, you implicate distinct sources of evidence are needed. P, Q, therefore R differs pragmatically from P & Q, therefore, R (Jackson 1987).

Since the efficiency of any remark is conveyed, as a general implicature, by the maxim of quantity (Say exactly as much as needed), an assurance of efficiency with a premise would be redundant. Normally, it is a waste of time to tell people you are not wasting their time.

The pragmatic basis for the presumption of efficiency only confers as much confidence as afforded by inference to the best explanation (of why the speaker couched his argument the way he actually did rather than in an alternative way). To attain the level of confidence needed for adjudication, judges buttress ordinary norms of conversation with canons of legal interpretation. Law students are told that no clause of a contract ought to be read as redundant. Ditto for patent claims. The United States Supreme Court avers that it is "a cardinal principle of statutory construction that a statute ought, upon the whole, to be so construed that, if it can be prevented, no clause, sentence, or word shall be superfluous, void, or insignificant." (TRW Inc. v. Andres, 534 U.S. 19, 31 (2001)).

The canons of interpretation are semantic whistling through the pragmatic graveyard. Even the judges concede that the presumption of efficiency can be overridden.

They grudgingly concede that redundancy can be useful for emphasis. Legal claims moored to multiple bases are more difficult to dislodge than those with a single anchor.

In any case, the arguer's implicature that there are no superfluous premises is not as strong as him *asserting* there are no superfluous premises. After Cicero propounds an argument, he can consistently continue with a confession that his argument has a superfluous premise. His confession does not *contradict* anything previously asserted.

Moreover, cancellation of the implicature is a common prelude to streamlining. An argument that is inefficient for scholarly purposes can be pedagogically efficient; students understand faster and in greater numbers.

Even the addition of tautologies is tolerated when the validity of the original argument is difficult to discern. Indeed, adding a second superfluous premise can sometimes expose a superfluous premise of the original argument. The earliest example of "consequentia mirabilis" (miraculous consequence) is in a fragment of Aristotle's Protrepticus: "If we ought to philosophise, then we ought to philosophise; and if we ought not to philosophise, then we ought to philosophise (i.e. in order to justify this view); in any case, therefore, we ought to philosophise." To stimulate recognition of its validity, William Kneale (1957) temporarily supplements the premise set with the dummy disjunction 'Either we ought to philosophise or not'. This bloated argument is obviously valid by the inference rule of constructive dilemma: P or not P, If P then P, If not P then P, therefore, either P or P. Since the disjunctive premise is a tautology, it can be deleted from the argument without affecting validity. Having subtracted one tautology, the reader is primed to subtract the tautological conditional "If we ought to philosophise, then we ought to philosophise". Kneale fattens up the original argument to slim down to the

austere immediate inference: 'If we ought not to philosophise, we ought to philosophise, therefore, we ought to philosophise'. Had the argument been propounded without the tautological propaedeutic, the reader would have suspected that argument is too brief to be valid.

Information theorists made an early peace with redundancy. In addition to allocating bits to carry information, they allocated a checksum parity bit to test for a transmission error. Since the discovery of error required a time consuming re-transmission, Richard Hamming devised a code that, with just a few more bits, enables the receiver to reconstruct the original message. Error correcting codes inspired biochemists to conjecture that deoxyribonucleic acid is a self-correcting molecule. Their slogan: "DNA checks itself before it wrecks itself".

Competing criteria of dialectical success guarantee the aptness of Voltaire's catchphrase, "The superfluous, a very necessary thing." (line 22 of his 1736 poem "Man of the World"). Since we cannot satisfy all the criteria simultaneously, we start with a rough but accessible first pass and later adapt the argument in stages in light of developing interests and new information.

At least psychologically, an argument is an artifact with parts that are open to qualification, substitution, and outright elimination.<sup>4</sup> When historians chronicle progress on the cosmological argument, they treat it akin to a cart that can be repaired and improved. Theologians replaced the universal premise 'Everything is in motion' with the

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<sup>4</sup> Rather than a fragile set whose members are essential – as presupposed in logical theory. With equal fragility, mereological essentialists maintain that each part of an object is essential to it. In contrast with set theorists, most mereologists permit an object to survive a gradual change.

leaner 'Something is in motion'.<sup>5</sup> John Duns Scotus improved on this craftsmanship when he further diluted the premise to 'Possibly something is in motion'. In economics, where expectations suffice for consumer choice, students learn subjective streamlining. For instance, they would formerly argue that course evaluations cause grade inflation with the objective premise that teachers *know* that raising grades raises course evaluations. After learning expected utility theory, the student gets by with the subjectivized premise that teachers *believe* that raising grades raises course evaluations.

Arguments can be refined *pragmatically* by adopting a weaker propositional attitude toward the assumptions rather than changing the assumptions themselves. Frederick Nietzsche initially presented his eternal return argument by *asserting* that everything endlessly repeats (as a lemma from that the finitude of atoms and the infinitude of time). After consulting physics books that raised doubt about the eternal repetition, Frederick Nietzsche contended his conclusion followed from the mere *supposition* that everything repeats endlessly ("the thought of thoughts"). Social contract theorists originally maintained that there was a past agreement about how society was to be organized. Later, they retracted this assertion in favor of the *supposition* of a founding agreement. In the crucible of debate, direct arguments with asserted premises become indirect conditional proofs and *reductio ad absurdum*s.

In sum, acknowledgements of superfluity are a natural side-effect of working in stages. After I introduce an argument, I confess that the argument has a premise that is

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<sup>5</sup> Diluting a premise reduces internal friction with other components of the argument. 'Everything moves' contradicts the conclusion of the cosmological argument 'There is an unmoved mover'.

expendable - relative to a newly appropriate standard. Scaffolding that was earlier essential becomes obsolete clutter.

### A Mirror Image of Lewis Carroll's Infinite Regress

So why not confess to superfluity in the body of the argument? Recall the Tortoise makes a parallel proposal when Achilles presents a geometrical proof (Carroll 1895). Achilles' use of 'therefore' triggers a conventional implicature that the premises entail the conclusion (Grice 1989, 25-26). Why not explicitly add this logical assurance as a premise?

To promote this policy of transparency, the Tortoise permits Achilles to add any premise he wishes. In exchange, Achilles must merely include, as an explicit premise, the normally tacit assurance that the conclusion follows from the premises. Achilles agrees – thereby stepping on a hidden treadmill. When he takes the step of adding a guarantee that the previously stated premises entail the conclusion, he expands the premise set. To guarantee the conjunction of the premises in this superset entails the conclusion, Achilles must take the further step of adding another guarantee. But this is just to run in place. The second premise creates a fresh premise set (a proper superset of the previous premise set). So to keep his bargain with the Tortoise, Achilles must add a third premise to guarantee that the conclusion follows from the enlarged premise set. Achilles cannot reach the conclusion because he is caught in an infinite loop of premise addition.

The confession conundrum reverses Lewis Carroll's puzzle. Whereas the Tortoise's requirement of explicitness creates a cycle of premise addition, the deletion test for superfluity creates a cycle of premise subtraction. Since single premise arguments



such as (A) cannot soundly confess to superfluous premises, we are tempted to compensate for the shortage of superfluous premises by adding an irrelevant premise. But our obligation to vindicate the confession with the deletion test forces us to subtract what we added. To compensate for the anticipated cancellation, we add *two* irrelevant premises. But this merely adds a link in a chain that must be eventually decoupled.

The role of self-reference is reversed in the confession conundrum. Achilles could have avoided the infinite regress if permitted the self-referential premise: 'The conclusion follows from all of the premises including this one'. In contrast, avoidance of self-reference would pre-empt the confession conundrum - as in the appeal to (C).

In a final reversal, the problematic statement in Achilles' argument occurs as a premise. The conclusion is the troubling agent in the confession conundrum.

My position is that the paradoxical reasoning in the confession conundrum is cogent. 'Argument (B) does not have a premise superfluous to its soundness' is a surprising truth to be embraced rather than an absurdity to be escaped. Instead of vindicating this verdict by classifying (B) as a pseudo-argument, I regard (B) as meaningful. (B) is an unsound argument that gives the illusion of being repairable (making it resemble (E1) in the obscenity puzzle). (B') is equally unredeemable. Consequently, argument (C) is meaningful and unsound. (C) flunks the deletion test. It fails to replicate the original conclusion's self-reference. This elevation of self-reference over reference minimizes the attribution of meaninglessness while enriching our conception of superfluous information.

Resignation to Redundancy

A meaning preserving solution becomes especially desirable if we become resigned to superfluity. In a hurried letter to beleaguered brethren, Blaise Pascal (1658) inaugurated a tradition of apologizing for a lapse of concision: “I have made this longer than usual because I have not had time to make it shorter.” Pascal’s apology was emulated with the same enthusiasm as philosophers now emulate the apology introduced by D. C. Mackinson’s “The Preface Paradox”.<sup>6</sup>

Could Pascal’s confession of superfluity be sound? Pascal thinks his letter could be soundly abridged; the shortened letter would be true and have the exact same content. In contrast to the Preface Paradox, where the author apologizes for false assertions, Pascal apologizes for an excess of true assertions. He believes at least one of his assertions could be deleted in a fashion that leaves all of its consequences entailed by the remaining assertions. This confession is plausible even if we count the apology as part of the letter (as we should since this is the most famous part of the letter). Yet there is an *a priori* refutation. Any conservative abridgement must preserve the implication that there is a superfluous assertion. This means any abridged version can itself be abridged. Since the letter is finite, we must eventually run out of conservative abridgements. Any predecessor of an unabridgeable abridgement is itself an unabridgeable. So by a backward recursion, the original letter cannot be conservatively abridged.

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<sup>6</sup> Earliest is John Locke’s 1690 “Epistle to the Reader” introducing An Essay on Understanding: “I will not deny, but possibly it might be reduced to a narrower Compass than it is; and that some Parts of it might be contracted: The way it has been writ in, by Catches, and many long Intervals of Interruption, being apt to cause some Repetitions. But to confess the Truth, I am now too lazy, or too busy to make it shorter. (1714, vii) The best known emulations are by Benjamin Franklin, Henry David Thoreau, and Woodrow Wilson.

## The Infinite Case

The recursive refutation presupposes that the letter is only finitely long. If supplemented with infinitely many assertions, then Pascal's confession could be true. For instance, we could add a short appendix containing Peano's Postulates along with a long appendix containing an infinite sequence of consequences: 1 is a number, 2 is a number, 3 is a number, and so on. This infinitely long letter has infinitely many sound abridgments (in which the numeric consequences are deleted one by one).

Classical logic has compactness requirement that all valid arguments must be compressible into an argument with finitely many premises. This means classical logic fails to validate some intuitively valid arguments. Some are trivial. Eliminating infinitely many alternatives could reveal the identity of the German numeral 'drei': Drei is not one, Drei is not two, Drei is not four, Drei is not five, . . . . Therefore, Drei is three. Others are interesting (Parsons 1996, 172, n9):

- (M) 1 can be paired with 2.
- 2 can be paired with 4.
- 3 can be paired with 6.
- .
- .
- .

Hence, the natural numbers can be put into a one-to-one correspondence with the even numbers.

To validate this infinite argument, we need an omega rule.<sup>7</sup> This would vindicate the judgment that the argument is efficient. Deleting any premise would render the argument unsound. Thus the argument would be unsound if we add to the conclusion the conjunct: 'This argument contains a superfluous premise'. As in the case of (A), we are tempted to make the argument sound by adding an irrelevant premise, say, 'Lenin is mummified'. But this fails the deletion test. Adding two irrelevant premises just puts off the evil day. So the confession conundrum can be extended to some infinite arguments.

### How to Acknowledge Superfluity

Once we decide to acknowledge superfluity, there is a restriction on how to break the news. If we organize our beliefs into an axiomatic system, then our confession will emerge as a theorem: 'This system has superfluous information'. We have already seen, in miniature, why this cannot be a sound confession.

The confession conundrum also affects those who defiantly advertise redundancy as a virtue. Indeed, the conundrum is more frustrating because we are more inclined to advertise our virtues than confess our vices. Furthermore, we feel entitled to speak up for virtues that are misperceived as vices.

Alas, we must find an indirect outlet for news of virtuous redundancy (for the same reasons we must find another outlet for confessions of superfluity). One option is to compartmentalize. A more integrated approach to acknowledge textual superfluity in a

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<sup>7</sup> Superfluity is relative to the strength of a logical system. In syllogistic argument, the universal quantifier has existential import. So the first premise of the following argument would be superfluous to its validity: *There are spies. All spies are liars. No serf is a spy. Therefore, some liar is not a serf.* The premise is not superfluous with respect to first order predicate logic.

meta-text. Any superfluity at the meta-textual level could be reported in the meta-meta-text. And so on.

Still, we have a drive, admired by the romantics, to represent all of our beliefs in a comprehensive system. Immanuel Kant, in his discussion of the antinomies, portrays this drive as doomed to tragic failure. The basis for Kant's pessimism is not altogether clear and univocal. But Kurt Godel has a stable, precise reason. He showed that any system strong enough to express arithmetic would imply a true sentence that cannot be proved within that system. The theorem could be proved by another system. But that system implies its own unprovable truth. So we cannot get a expressively complete system that is consistent.

Suspensions that our theorizing is inevitably incomplete penetrate into contemporary theories of quantification (Rayo 2013). Worry about inevitable superfluity is unprecedented. But descendants of the logical positivists are inadvertently filling the historical gap.

### The Inductive Basis for Resignation

The inductive basis for suspecting inevitable superfluity is our persistent failure to eliminate superfluous information – or even to identify what it is. Confession: I was tempted to begin this essay with a review of failed attempts to formulate a verification criterion of meaning. But I fretted that readers would infer that this was a prelude to another heroic attempt to solve the problem. Most readers would have stopped reading. The long record of failure discourages them. Some have quietly concluded that the problem is impossible to solve.

Now that the reader realizes that I am no hero, I am confident enough to conduct an abbreviated review. My retrospective paragraphs are merely intended to consolidate a basis for resignation.

To explain different rates of intellectual progress, the logical positivists proposed that a statement is meaningful if and only if it is verifiable by observation or experiment (or is analytic). After the logical positivists realized that verification commonly requires background assumptions, they granted meaning to indirectly verifiable statements. These appear as premises of a directly verifiable conclusion. But what is to prevent 'God exists' from being added as a premise? The positivist answers that the premise must be essential to the justification of the conclusion. 'God exists' cannot be tacked on as an After-thought (as in the final paragraph of the third edition of Charles Darwin's The Origin of Species).

Past scientists wielded 'God exists' as a premise supporting a verifiable conclusion. For instance, divine design biologists predicted that every body part has a function. Natural selection, in contrast, predicts much inefficiency. The human body is an encyclopedia of vestigial organs (appendix), obsolete behavior (goose bumps), supernumerary parts (wisdom teeth), atavisms (tails), spandrels (chin), and functionless homologies (male nipples - arising from the genders being variants upon the same ground plan, differentiated late in embryological development). Human reasoning echoes the assorted superfluities of the human body. Analytic philosophers read Peter Strawson's The Bounds of Sense with relief because Strawson trims Kant's ponderous, overbuilt deductions to obtain sleek, penetrating inferences.

Any consistent hypothesis can be protected from refutation by adjusting background assumptions. The religious significance of the divine design hypothesis ensures that it will be aggressively protected. But this does not make divine design an *intrinsically* untestable hypothesis.

The positivists were not historians of science. They focused on dogmatic theists who isolated 'God exists' from all testing. Historical theists are not that extreme. For instance, Rene Descartes believed he derived laws of refraction from God's efficiency.

Fidelity to actual history was not important to the positivists. If the conclusion *could* have been inferred without 'God exist', then the actual reliance on the premise is immaterial. If there is a leaner hypothesis that could have generated the same prediction, then only the members of the reduced premise are confirmed or disconfirmed. The logical positivists did their history by rational reconstruction.

Unfortunately, this sets off a runaway process in which the theory is pared down to a long conjunction of observation statements. In a tidy flourish, William Craig (1953) devised an algorithm that allows us to derive a recursively axiomatized atheoretic formal system from a theoretical one. The theory, if true, is superfluous. And if the theory is false, then it should be rejected. So either way, theory is dispensable (Hempel 1958).

Reflections on superfluous information also suggest that deduction is dispensable. The patently circular  $P \therefore P$  is no improvement over the bare assertion of  $P$ . Since a contradiction carries no useful information, no progress is made by adding a contradictory disjunct:  $P \text{ or } (Q \text{ and not } Q) \therefore P$ . Dividing the useless contradiction between premises makes no difference:  $P \text{ or } Q, \text{ Not } Q, \therefore P$ . Changing the logical form of the first premise can only generate appearance of service:  $P \text{ or } Q, \text{ Not } Q \therefore P$ . So

disjunctive syllogisms are as useless as  $P \therefore P$ . Further massaging of the logical form again shows that *modus ponens* is useless: If not Q then P, Not Q  $\therefore$  P. Inserting superfluous contingent premises just slows recognition of the validity: If not Q then P, R if and if S, T or U, Not Q  $\therefore$  P. Similar injections of superfluous information reveal that each valid argument form is a puffed up obfuscation of the obviously circular  $P \therefore P$ .

This sophistry aligns with Sextus Empiricus' insinuation that all deduction is fallacious. All invalid arguments are formally invalid while all valid arguments beg the question.

Even apart from the theoretician's dilemma, positivists encountered technical problems in stating an accurate verification criterion. Each putative algorithm has been either too permissive or too restrictive. The search has survived the extinction of the positivists. For the same sort of filter is desirable for many doctrines (collected together under Michael Dummett's umbrella category "semantic anti-realism") and for concepts related to verification: confirmation, explanation, indispensability, etc. Despite this diversification, proposed filters continue to be refuted by deductions that obscure their idle components.

Proposals continue. But seven decades of failure lead most philosophers to treat the increasingly complicated definitions as symptoms of a degenerating research programme. Another patch, another puncture. Another patch, another puncture.<sup>8</sup> Maybe we should pause and await assistance from a future advance.

One rationale for a moratorium is that our conception of superfluity needs refinement by experts. Economists have made some progress in understanding efficiency.

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<sup>8</sup> Yes, the pleonastic couplet illustrates a useful rhetorical redundancy. I should have realized you realized that. My apology for this superfluous footnote.



The fitful nature of this progress is instructive. Economics starts with the suspicion that intermediaries are wasteful. Medieval philosophers understood how farmers produced wealth. But middlemen who bought food for re-sale were regarded as parasites. Even more suspicious were the money-lenders who funded these merchants. Coins also seemed dispensable. Even more suspicious was the paper money that became an intermediate for that intermediate. When theorists accept coins, they based its value on the precious metal from which the coins were minted. Accordingly, the mercantilists condemned exports of precious metals as a loss of national wealth. International trade is a zero-sum game; importers of precious metals gain precisely what exporters lose. Physiocrats disagreed – but only because they believed products of nature were the real basis of value. They condemned manufacturing because it merely reshaped this natural wealth. Once the value of labor was accepted, it became fetishized in the Marxist’s labor theory of value. Karl Marx denied any contribution by those who merely owned the means of production.

The economists’ troubles in identifying economic superfluity portend trouble identifying superfluity in biology, psychology, and reasoning. There are echoes of economic controversies. In biology, claims of superfluity trigger functionalist rebuttals. What appears to be supernumerary or vestigial or junk is often later discovered to serve a subtle purpose.

When economists make sufficient progress in identifying inefficiency, we can re-open the inquiry into superfluous information. But for now, philosophers should think twice about what is redundant.

Failure to identify inefficiency may be permanent if we are not suited to cognitive efficiency. A precedent is the human immune system. It operates under the assumption

that parasites have already breached the skin. These freeloaders cannot be entirely eliminated. And there are diminishing returns in persecuting them. Under the hygiene hypothesis, the immune system's capitulation is so profound that it malfunctions when the parasite load dips to an unnaturally low level. The under-occupied defenders over-react to insignificant environmental insults and even turn on indigenous tissue. We wind up with allergies and auto-immune diseases. If the mind is built on a similar presumption of superfluity, parasitical beliefs may be equally necessary for mental well-being. If psychological investigation confirmed this mental hygiene hypothesis, we would need to represent the discovery. The psychologist might find evidence that we have an innate meta-belief to the effect that our belief system has superfluous elements. This built-in modesty about our cognitive efficiency would spare us the inefficiency of pursuing levels of efficiency unavailable to human beings.

If there are conflicting criteria for what is necessary, then superfluity is not a quirk of human psychology. Most attempts to resolve the Theoretician's Dilemma distinguish between what is logically superfluous and what is epistemically superfluous. Perhaps theory is indispensable for discovering the relationships that lay the groundwork for the observations. But this heuristic service does not alter the logical superfluity of theory.

Perhaps hopes for perfect efficiency are doomed by irresolvable conflict between regulative ideals. On the one hand, we have non-overridden obligation to eliminate superfluous information. On the other hand, we have a non-overridden obligation to entrench theories that historically generate confirmed hypotheses. It is impossible to meet

both obligations. But this impossibility does not override the normative pull of either imperative.

Whatever the depth of the explanation, intellectual honesty compels confession that our belief system has superfluous elements. But there is a problem about voicing the confession *within* the system. We have seen the difficulty in miniature, as simple as (A), (B), (C). And the challenge scales up.

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