

# Towards closure on closure

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**Abstract** Tracking theories of knowledge are widely known to have the consequence that knowledge is not closed. Recent arguments by Vogel and Hawthorne claim both that there are no legitimate examples of knowledge without closure and that the costs of theories that deny closure are too great. This paper considers the tracking theories of Dretske and Nozick and the arguments by Vogel and Hawthorne. We reject the arguments of Vogel and Hawthorne and evaluate the costs of closure denial for tracking theories of knowledge.

**Keywords** Contrastive statements · Closure · Equivalence · Distribution · Dretske · Nozick · Hawthorne · Vogel

## 1 Introduction

Not long ago, Heller (1999) opened a paper on knowledge this way: ‘A war has been raging in epistemology over the last few decades, and the good guys are losing.’ The ‘good guys’ are the closure deniers (mainly Dretske and Nozick)—who deny that if one knows that  $p$  is true and knows that  $p$  implies  $q$ , then one knows that  $q$  is true.<sup>1</sup>

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<sup>1</sup> Peter Baumann reminds us that Dretske (1970, 2005a,b) rejects closure for ‘heavyweight’ implications. Neither Dretske nor Nozick would deny all cases of closure. In some cases one’s evidence or reasons that allow one to know that  $p$  will ‘track’ the truth of  $q$  and allow one to know that  $q$ . If  $S$  sees a car in the driveway, knows it is a car, knows that since it is car it is not a motorcycle, of course  $S$  knows it is not a motorcycle... and so on for ‘lightweight’ cases of closure. This will come out more clearly in Sect. 4.

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The suggestion that ‘the good guys are losing’ stems in part from the presumed defeat of Nozick’s tracking theory at hands of Kripke (forthcoming) and in part from the unintuitive consequence that both Dretske (1970, 1971, 1981, 2005a,b) and Nozick (1981) deny that knowledge is closed. Feldman (2001, p. 95) represents matters this way: ‘to my mind, the idea that no version of the closure principle is true, that we can fail to know things that we knowingly deduce from other facts we know, is among the least plausible ideas to gain currency in epistemology in recent years.’<sup>2</sup>

We will not attempt to demonstrate that knowledge is never closed.<sup>3</sup> We will examine the claim that closure never fails and that tracking theories should be rejected because the costs of denying closure are too great. Elsewhere, one of us (Adams 2004, 2005; Adams and Clarke 2005) has dealt with Kripke’s objections to Nozick, as well as other objections to tracking theories generally. So, here we will focus our attention exclusively on objections to the tracking theories of Dretske and Nozick and their denial of closure. Since neither Nozick’s account nor Dretske’s includes justification as a necessary condition for knowledge, we will not consider objections that mainly focus upon justification and closure.<sup>4</sup>

Vogel (1990) and Hawthorne (2005) give strong reasons to embrace closure and reject purported counterexamples to closure. Neither Dretske nor Nozick responded to Vogel’s arguments, so we do that here. Dretske (2005b, p. 43) does respond to Hawthorne, but says that Hawthorne ‘does an admirable job of describing the “costs” connected with my rejection of closure. These costs are, I admit, significant ....’ Actually, we think he should have said something far less concessive to Hawthorne.

## 2 Why deny closure?

A typical skeptical scenario is that presented by Descartes. He seems to hear the crackling, see the flames, and smell the smoke from the fire. Prior to the demon hypothesis, he seems to know he is seated by the fire. Yet, could not a very powerful demon cause these experiences in his mind, even if there were no fire? The skeptical conclusion that Descartes draws—that does not know he is seated by the fire—seems to depend upon the closure principle. If he knows he is seated by the fire, and knows that if he is seated by the fire, then he is not having his experiences caused solely by a demon,

<sup>2</sup> We won’t try to catalog all of the negative reactions to closure denial, but some of them include: BonJour (1987) charge that such views suffice for ‘reductio of the view’, DeRose (1995) pointing out possible ‘abominable conjunctions’, and Fumerton (1987) assessing closure denial as a ‘devastating objection’.

<sup>3</sup> In fact, in other papers (Barker and Adams 2010, forthcoming), we explore avenues for closure. Here we press hard on attacks upon the standard examples of closure failure and are sympathetic to the arguments of the closure deniers.

<sup>4</sup> Closure supporters may believe that if they defeat Nozick’s or Dretske’s tracking theories, they will thereby rescue closure. We disagree. Most closure supporters argue for closure based upon the intuitive oddity of its denial, but they need a positive argument for knowledge being closed. They need a reason why knowledge entails closure by its very nature. Here, we look at those who argue from the other direction ... from the direction that tracking theories must be wrong *because* they deny closure. It is that line of reasoning that we are here denying.

then he should know that he is not having his experiences caused solely by a demon.<sup>5</sup> Since he suggests that he does not know his experiences are not being caused solely by a demon, early in the *Meditations*, he concludes that he does not know he is seated by the fire.

Nozick (1981) believes that all skeptical scenarios have this pattern. He looks to neutralize the skeptic's argument by showing that the closure premise is false. Since the tracking conditions of his otherwise plausible account of knowledge are not closed, Nozick argues that knowledge itself is not closed.

Nozick's account has four conditions. S knows that p when (and only when):

1. p is true,
2. S believes that p,
3. if p were not true, S would not believe that p,
4. if p were true, S would believe that p.

(Nozick subsequently includes specifications regarding tracking methods.) One need only look at condition (3) to see why closure fails on Nozick's account. In Descartes' example, the conditions are satisfied for p (I'm seated by the fire), since (1) and (2) are true, and (3) and (4) are also true because in all nearby possible worlds in which the antecedents of (3) and (4) are true, the consequents are also true (in those worlds there are no demons, no tricks, etc.). Hence, Descartes tracks the truth of p, thereby knowing p.

If we substitute q for p condition (3) will fail. That is, while (1) and (2) are true (Descartes is not being deceived by a demon and doesn't believe that he is),<sup>6</sup> if q were false (he were being deceived by a demon), it is not guaranteed that Descartes would not believe q (that he is not being deceived). A demon might make him believe anything, including q. Therefore, knowledge isn't closed.<sup>7</sup>

Nozick would reject the skeptics intended conclusion (that Descartes does not know he is seated by the fire) for it might be possible both that Descartes knows he is seated by the fire *and* he does not know that he is not being deceived by a powerful demon. This is the result that Nozick (1981, p. 202) himself finds 'startling, shocking', and that DeRose (1995) finds 'abominable'.<sup>8</sup>

<sup>5</sup> We are sensitive to worries about wording and causal over-determination. We could use the formulation that if he knows he is seated by the fire and he knows that, if seated by the fire, he is not merely a disembodied mind, then he knows he is not merely a disembodied mind. If necessary, substitute this wording.

<sup>6</sup> Actually, in the early *Meditations* Descartes does try to convince himself that he may be being deceived by a demon (his 'hyperbolic' or 'metaphysical' doubt), but we shall set this aside here.

<sup>7</sup> Warfield (2004) correctly points out that just because one necessary condition for knowledge is not closed, it does not follow that knowledge itself is not closed. To think so would commit the fallacy of composition. Just because one part of something lacks a property, it doesn't mean the whole of that thing doesn't have the property. But in this case, there are only four conditions. Nozick explains why neither 'tracking condition' is closed. That leaves only truth and belief to make up the difference, and we don't see how *they* could make knowledge closed.

<sup>8</sup> We think much of this is due to pragmatics and not semantics of 'know' when used in the first person. That is, a lot of the 'abominability' comes from putting things in the first person. If we say, 'I know that I have hands and I also don't know I'm not a handless brain in a vat,' this sounds pragmatically strained ... to say the least. As a Gricean matter, say, one probably ought not to assert that p when one knows it implies q and one knows one does not know q. Or, or at least, one ought not without a lot of explaining about why

Dretske's (1970; 1971; 1981; 2005a; 2005b) reasons for rejecting closure are similar to Nozick's, though he denies being led to this *in order to* defeat skepticism.<sup>9</sup> (Dretske, 2005a, p. 16) acknowledges that when one knows *p* and knows that *p* implies *q*, there may be independent routes to knowledge that *q* (other than by knowing that *p*), but he denies that one *must* know that *q*, via one of these independent routes, in order to know that *p*.

For Dretske, to know that an empirical proposition is true, one must have means for detecting its truth, a *conclusive reason* *R*. (From here on we shall use 'R' to designate a 'conclusive reason'.) For example, to know the temperature of a certain metal bar is increasing (*p*), one needs a thermometer to detect bar's temperature changes. Suppose that one believes *p* on the basis of a certain thermometer's registering an increasing temperature (*R*); and suppose that *R* wouldn't be the case, were *p* not true. Then, on his view, one knows that *p* on the basis of *R*. *R* functions as a *p*-detector, as a means for detecting the truth of *p*. Let *q* = the bar is expanding. Since it is a law of nature that metal expands, when heated, *R* can also function as a *q*-detector. Suppose, knowing that *p* is true on the basis of *R* and knowing that *p* implies *q*, one infers that *q* is true. Given that *R* wouldn't be the case, were *q* not true, Dretske's view permits inferential knowledge that *q* is true, for one believes *q* on the basis of a conclusive reason, namely, *R*. Thus, Dretske's view is compatible with a highly plausible principle of *restrictive closure*: if one knows that *p* is true on the basis of *R*, and one knows that *p* implies *q*, then if one infers that *q*, and *R* is a conclusive reason for believing *q*, one knows that *q* is true. Weaker than full closure, this principle enjoys even more claim to truth, and may succeed in accommodating every case in which a subject incontrovertibly acquires inferential knowledge.<sup>10</sup>

Let *P* and *Q* be two distinct properties that may or may not be nomically connected. For Dretske, to know that *P* is present requires a *P*-detector and to know that *P* is absent requires a not-*P*-detector. Similarly, to know that *Q* is present requires a *Q*-detector and to know that *Q* is absent requires a non-*Q*-detector. Let *P* = the property of being an acid, and let *Q* = the property of being a non-acid that turns blue litmus paper pink. (Let us say that the property *Q* is never actually instantiated.) Something's having the property *P* entails its lacking the property *Q*. Let us say that litmus paper's turning pink when dipped into a liquid, indicates that the liquid is an acid. Accordingly, it may seem at first glance that litmus paper's turning pink when immersed in a certain liquid can not only function as a *P*-detector, telling one that the liquid has property

Footnote 8 continued

the implicatures are to be cancelled. However, if we put things in the third person and say, 'Tom knows he has hands, but Tom does not know he is not brain in a vat (handless or otherwise),' it sounds a bit less 'abominable', at least to us. And, as Dretske reminds us, some abominable-sounding things are even true, such as Moore's Paradox sentences (personal communication).

<sup>9</sup> Dretske (2005b, p. 43) says: 'As a historical footnote, I wasn't led to deny closure because it represented a way around skepticism. I was led to it because it was a result of what I took to be plausible conditions on evidence (justification, reasons) required for knowledge.'

<sup>10</sup> To accommodate Nozick's view as well as Dretske's, restrictive closure can be formulated as: if one knows that *p* is true on the basis of *R*, and one knows that *p* implies *q*, then if one infers that *q* and *R* tracks the truth of *q*, one knows that *q* is true (as long as *R* meets Nozick's conditions on being a knowledge-generating method). We discuss restricted closure in much more detail in (Barker and Adams 2010), but do not elaborate further in this paper.

P, but also as a not-Q-detector, telling one that the liquid lacks property Q. Only in environments free of instantiations of property Q, however, can litmus paper tell one that something is an acid by turning pink. Furthermore, the job of a P-detector is to tell one about the presence of property P; it is not its job to tell one whether or not it is reliable as a P-detector. It can tell one about the presence of property P only if it is reliable in the environment in which it is employed.

The following case shows why Dretske rejects closure. In his chemistry laboratory, Chris uses litmus paper to indicate whether a liquid is an acid. Chris knows that the liquid in the beaker is an acid (knows it has property P) on the basis of the litmus paper's turning pink—the paper's turning pink functions as a P-detector. Chris also knows that if the liquid is an acid, then it is not a non-acid that turns litmus paper pink (knows that if it has property P then it does not have property Q). But does Chris know that the liquid is not a non-acid that turns litmus paper pink (know it is not Q)? If he does, it is surely not from the litmus paper's turning pink alone. The litmus paper's turning pink cannot function as a not-Q-detector for it might turn pink if the liquid were a non-acid that turns litmus paper pink. In a nutshell, we believe that *this* (the connecting of knowledge with property-detectors or other sources of specific information) is the main motivation driving Dretske's denial of closure.<sup>11</sup>

### 3 Why reject tracking theories?

Answer: closure denial—which goes back as far as the views of Stine (1976). We focus upon Vogel and Hawthorne because their views are representative of criticisms of tracking theories that attack them on their own terms (not because they don't have accounts of epistemic justification beyond tracking itself).<sup>12</sup>

Vogel (1990) maintains that there are no counterexamples to closure,<sup>13</sup> because if you know that p and know that p implies q, then *you will know that q* because you will be armed with appropriate *background knowledge*. If not so armed, you will not actually know that p. Either way, closure doesn't fail.

Vogel musters this line of defense against Dretske's zebra case. You take your child to the zoo. You see animals in the cage marked 'zebra'. You know there is a zebra in the cage, but do you also know it is not a cleverly disguised mule—disguised to look indistinguishably like a zebra? It would be odd if it were a disguised mule. Still, a mule cleverly enough disguised would look exactly like a zebra. Dretske concludes that you do not know (without further inspection) that it is not a cleverly disguised mule, but that you do know it is a zebra.

Vogel (*ibid.*, p. 14), finding the 'situation implausible', maintains that the reason you know it is a zebra (if you do), is that your belief is backed by 'good evidence' that includes background information about the nature and function of zoos. Zoos exhibit

<sup>11</sup> So far as we know, Dretske never actually puts things this way ... in terms of property-detectors. Yet, we believe this nicely captures his view. See also (Adams 1986, 2003).

<sup>12</sup> We also focus on these because they are relatively recent and influential.

<sup>13</sup> There are many different ways to formulate closure principles, even restricting attention to knowledge alone. For our purposes here, we will look only at the version we've been using throughout. For versions that turn on whether one believes the relevant entailments, see Audi (1995) and Brueckner (1985, 2004).

‘genuine specimens’. Not to do so would be ‘most unlikely and bizarre’.<sup>14</sup> There is ‘no reason whatsoever to think any such circumstances obtain’. Further, if you had reason to be suspicious, you would then have reason to doubt, and would no longer know it is a zebra in the cage. Hence, Vogel claims that one’s background knowledge is sufficient to promote known logical consequences to the level of knowledge.

Does your background knowledge give you ‘justification for denying that the animal is a mule’? Indeed, it does, but the question is whether it gives you knowledge. There are justified false beliefs and justified true beliefs that are not knowledge. So justification alone cannot be the thing that promotes one’s belief to knowledge. What we need from Vogel are persuasive reasons that *this* justified belief constitutes knowledge.

Curiously, after saying that one’s background knowledge provides justification *for* and knowledge *that* the animal is not a mule, Vogel points out that the usual adequate evidence for the claim that the animal is a zebra is ‘visual evidence’, and thereby different from the background evidence that supports the claim ‘It is not a cleverly disguised mule.’ Vogel (*ibid.*, pp. 14–15) then says: ‘If so, you could conceivably be in a position where you had the visual evidence and knew there was a zebra, but lacked the background knowledge, and hence didn’t know there wasn’t a disguised mule. In such circumstances, the Closure Principle would face a counterexample.’ Based upon his own line of reasoning, we think he should have said in this case you *don’t know it is a zebra*. Otherwise, he would be admitting that there are counterexamples to closure.

Nevertheless, we think that Vogel intends that the visual evidence that it is a zebra and the background knowledge about zoos and zookeepers cannot come apart and one still know that it is a zebra in the cage. This way he can consistently deny that the zebra example is a counterexample to closure. He gives two examples where knowledge would fail, if background knowledge were not present. In the first example, someone traveling in the Western United States sees something that looks like a zebra, but is not in a zoo. The West is famous for made-up animals, such as jack-a-lobes and other mysterious creatures. So this is a case where the visual evidence would support the belief that it is a zebra, but the background knowledge would be lacking. In this case, Vogel says one would *not know* it is a zebra *because* the background knowledge comes apart from the visual evidence (sustaining mystery of his above claim about a possible ‘counterexample’).

He adds (*ibid.*, p. 15) that one might challenge his example by asking whether he has ‘unrealistically high demands’ on evidence? Though he says the child could not know that it was a zebra without the background knowledge about zoos and zookeepers, again we find him saying something curious. He challenges not the child’s background knowledge, but the child’s very concept of a zebra. He says that it would be hard to know whether the child believed something *was a zebra* rather than believed *it looked like a zebra*. This is a question, not about background knowledge of zoos and zookeepers, but about the very concept the child has. Vogel seems to buy into an unrealistic form of *belief holism* that requires one who believes something is a zebra to have a whole host of other beliefs, not only about zebras, but about real animals,

<sup>14</sup> Curiously, now one can even find photos of painted mules and donkeys on the internet. Still, as far as we know, they are not being made to look like zebras unannounced in zoos.

looks, zoos and zookeepers. It is one thing to maintain that to believe something is a zebra, you have to believe that it is an animal. It is quite another thing to say that to believe (and hence know) something is zebra, one must have beliefs about zoos and zookeepers. That seems clearly to be false. African children living before zoos or zookeepers had no trouble at all believing things about zebras. So if Vogel is supporting his epistemology with some unrealistic or just plain false form of belief holism, then his support clearly fails.

Vogel maintains that if there are no significant epistemic guarantees that the animal is not a cleverly disguised mule, then one is not in a position to know that it is a zebra. However, this is just the point in dispute between Vogel and the tracking theorists. For Vogel, one has a significant epistemic guarantee only if one has adequate justification for believing; for the tracking theorists, however, one has such a guarantee only if one's belief tracks the truth. The tracking theorists maintain that (in Dretske's example) one, as a matter of fact, can be in a context where one's beliefs are tracking the truth that there is a zebra in the cage. One's evidence, in that circumstance, and one's belief-forming methods, *do track the truth* about zebras. However, to track the truth about the presence or absence of a cleverly disguised mule, takes more than one presently has available. Of course, in principle, one could utilize a DNA test or scrape for paint or some such, but in the set-up of Dretske's original example, these are not available to the knower. One knows there is a zebra as long as the zookeeper is not in fact a trickster, and there are no cleverly disguised mules anywhere nearby. This allows the fact that something looks like a zebra to carry information that it is a zebra and allows one to track the presence of a zebra. However, on tracking accounts, while all of this needs to be true, it may be in the background in the sense that *one need not know it to be true, even though one's knowledge depends upon its being true*. Where Vogel wants to make what is in the background *required background knowledge*, the tracking theorist is content to have it remain 'in the background'. What Vogel needs *to settle the matter* is a further reason why it is not possible to know that something is a zebra without being in a position to know that it is not a cleverly disguised mule. To our mind, he has not given this further reason nor demonstrated this. Instead, he has merely staked out one side in the dispute.

After rejecting Dretske's zebra case as a counterexample to closure, Vogel (*ibid.*) suggests that 'properly understood' the zebra case can be seen as a type of cases that 'cannot be treated so straightforwardly' and similar to what he calls 'car theft' cases.<sup>15</sup> You park your car in a large metropolitan area and leave it for a few hours. Every day hundreds of cars are stolen in major cities. Do you know your car has not been stolen? Vogel thinks one might try to turn this into a case of closure denial. You know your car is currently parked on Avenue A. You know that, if your car is parked on Avenue A, then it has not been stolen, but you do not know that it has not been stolen.

First, we deny that this is a 'proper' comparison to Dretske's zebra case. In 'car theft' cases, it is fairly obvious that one *does not know* that one's car is still where one parked it. No tracking theorist would maintain that *you know* where your car is. Your evidence for thinking that it is still on Avenue A does not 'track' the truth, nor is

<sup>15</sup> Vogel goes on to compare 'car theft' cases with 'lottery' cases. We won't here give all the comparisons, but agree that they have the same structure.



it a ‘conclusive reason’, nor does it ‘carry the information’ that your car is still there (Dretske 1981). When living in areas where cars (of your type) are regularly stolen, merely knowing where you left it will not ‘track the truth’ about where it still is. So car theft (or lottery) cases are not cases that tracking theorists would offer as cases of closure denial. One fails to know that one’s car has not been stolen, but one also fails to know where one’s car is.

Vogel himself points out the relevant differences between the zebra case and car theft cases. To make them similar, the zebra case would require that there are disguised mules about and they are going to show up in some zoo or other sooner or later. Indeed, Vogel acknowledges that it is hard to see the zebra case as like a car theft case (or lottery case). Just as you would not know where your car is in an area of high auto theft, you *would not know* it is a zebra in the cage, under the circumstances where fake zebras are bound to show up in your area sooner or later. Therefore, comparing zebra cases to car theft (or lottery) cases is a non-starter.<sup>16</sup> In the end, Vogel fails to demonstrate that there are no counterexamples to closure. Dretske’s zebra example still looks to be a legitimate contender.

We are a bit more concerned by objections raised by John Hawthorne. Hawthorne (2005, p. 32) aims to show ‘not ... a decisive refutation of Dretske’s position’, but another ‘significant cost’ of denying closure. The cost is giving up either the ‘Equivalence Principle’, that if you know  $p$  and you know  $p$  is logically equivalent to  $p \& q$ , you will know  $p \& q$ , or ‘Distribution’, that if you know  $p \& q$ , you will know  $p$  and know  $q$ . Hawthorne does not really press the point about giving up the Equivalence Principle, for he thinks that Dretske’s reasons for denying closure have no force against this highly plausible principle. He challenges Dretske with being forced to deny Distribution. We will explain why it is for good reasons that Dretske is committed to giving up the Equivalence Principle, and to denying that one must know  $p \& q$  if one knows  $p$  and knows  $q$  is logically equivalent to  $p \& q$ . But we will argue that Dretske is not committed to denying Distribution.

This is not news to tracking theorists. Nozick (1981, p. 22) himself claims that one must ‘adjust’ to this very ‘fact’. He claims to know that he is in Emerson Hall, and to know that, if he is in Emerson Hall, he is not floating in a tank on Alpha Centauri. Still Nozick claims he does not know he is not floating in a tank on Alpha Centauri, despite knowing that being in Emerson Hall is equivalent to being in Emerson Hall and not floating in a tank on Alpha Centauri. Now we don’t think one *is* tracking the conjunction because we don’t think one is tracking the second conjunct. By Nozick’s own lights, one tracks relative to a method  $M$ . As far as we know, there are no methods of knowing whether one is now floating in a tank on Alpha Centauri. If there were, the skeptic would not be able to use the example in the first place. So, we depart from Nozick.<sup>17</sup> We note this mainly to point out that the problem of what to do about this

<sup>16</sup> Vogel also raises another type of example that he calls ‘semi-skepticism’. In the end, he denies that the issue of semi-skepticism depends on the denial of closure. We will not go into the matter here because we agree with Vogel that the issues are independent. As with ‘car theft’ cases, we think this leads to a dead-end on the issue of closure-denial and the rejection or defense of tracking theories.

<sup>17</sup> We maintain that one cannot track  $p \& q$ , if one cannot track  $q$ , and Nozick himself maintains that one cannot track  $q$  in his Emerson Hall example. So, we think he should have denied that one can track  $p \& q$ .



is not new. Nozick was aware of it and went one way on the issue. We go another.<sup>18</sup> In fact, we think that Hawthorne's objection would have been better aimed at Nozick (not Dretske). Nozick, it seems (*ibid.*), did give up distribution.

The second thing to be said is that Hawthorne is using a logical importation principle to generate a different formulation of the denial of closure—another (clever) way of stating the denial of closure. If one knows that  $p$ , and one knows that  $p$  implies  $q$ , then one knows that  $p$  is equivalent to  $p \& q$ . To avoid Hawthorne's trap, anyone denying closure has to deny that one will automatically know  $p \& q$ , when one knows  $p$  and knows that  $p$  implies  $q$ .<sup>19</sup>

Nonetheless, we admit that it seems (in the abstract) preposterous to deny that one might know a proposition  $p$ , and not know a proposition  $p \& q$ , believed and known to be logically equivalent to it. But denial of closure itself seems (in the abstract) *equally* preposterous. Still, to our minds, there seem to be countless mundane<sup>20</sup> examples of apparent actual failure of closure. Take our earlier one. Suppose the world is such that, in fact, only acid turns litmus paper pink. Then Chris knows the liquid in the beaker is an acid, by the paper's turning pink. Chris also knows that if the liquid is an acid, it is not a non-acid that turns litmus paper pink. So Chris should know that the liquid is not a non-acid capable of turning litmus paper pink. But does Chris really know the latter?

Chris does know that the *acid* in the beaker is not a non-acid of some kind. Yes, of course, *acids* cannot be non-acids of any kind. But does Chris know that the *liquid* is not a non-acid-capable-of-turning-litmus-paper-pink? Or at least, does he know this by the litmus test alone? We maintain (with Nozick and Dretske) that Chris does not know that the liquid is not a non-acid capable of turning litmus paper pink.<sup>21</sup> So, one may ask, why does Chris believe that the liquid is an acid? Because he never even questions that only acid's turn litmus paper pink. But the fact that he never questions this remains in the background and need not presently cross Chris's mind.

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Footnote 17 continued

We explained above why we think one cannot track the conjunction. Nozick does know that he is in Emerson Hall. He knows he is in Emerson hall and not not in Emerson Hall. But he doesn't know he is in Emerson hall and not floating in a tank on Alpha Centauri that makes it appear exactly as it would if he were in Emerson Hall. *That* is the conjunction he should have denied knowing.

<sup>18</sup> In conversation, Dretske goes our way too. For instance, one lacks a 'conclusive' reason for  $q$ , so one does not know it or the conjunction on Dretske's 'conclusive reasons' account of knowledge. And one does not have the information that  $q$ , so one does not know that  $p \& q$  on Dretske's informational account of knowledge. We did not have the opportunity to discuss it with Nozick.

<sup>19</sup> Further, as Skip Larkin reminded us, Hawthorne here begs the very question at issue because Hawthorne must *use closure* to generate the conjunction that is supposed to be known and generate significant 'costs' by requiring Dretske and Nozick to give up 'distribution'.

<sup>20</sup> Examples from everyday life may be more compelling than those that involve evil demons or fake zebras. For more examples see (Adams 1986, 2003).

<sup>21</sup> Now in some cases, the reaction to Dretske and Nozick is that there must be some other route via which one will know  $q$ , if one knows  $p$  and knows  $p$  implies  $q$ . It may not be the same route via which one knows  $p$ . But that is another formulation of a closure principle that may be defended. For instance, it may be one that Vogel would defend. However, when Nozick and Dretske reject closure, they reject that this formulation, as well. We too, in our 'acid' example, see no reason why there must be 'another route' via which Chris knows the liquid is not a non-acid capable of turning litmus paper pink. He simply knows it is an acid by the litmus paper's turning pink (if this is indeed a reliable indicator of acids, which Chris believes, with good reason, to be the case). See Klein (2004).

Why do we think this? Because something that gives one the information that  $p$  cannot simultaneously give the information that it is a reliable source of information that  $p$  (Dretske 2006). To know the latter requires new information or information from another source. The litmus paper (when reliable) can tell us something is an acid. But the litmus paper cannot simultaneously tell us both that something is an acid *and* that it is a reliable acid detector in the current circumstances. To think otherwise is like trying to solve an equation with too many unknowns.

Where does Hawthorne go wrong? Hawthorne begins by proffering an initially plausible thesis he calls the *Equivalence Principle*: ‘If one knows *a priori* (with certainty) that  $p$  is equivalent to  $q$  and knows  $p$ , and competently deduces  $q$  from  $p$  (retaining one’s knowledge of  $p$ ), one knows  $q$ ’ (2005, p. 31). He then argues that Dretske’s reasons for denying closure have no force against this principle: ‘Following recent usage, let us say that  $R$  is ‘sensitive’ to  $p$  just in case were  $p$  not the case,  $R$  would not be the case. Suppose one believes  $p$  on the basis of  $R$ , and that  $p$  entails  $q$ .  $R$  may be sensitive to  $p$  and still not to  $q$ . But notice that where  $p$  and  $q$  are equivalent, there can be no such basis for claiming that while  $R$  can underwrite knowledge that  $p$ , it cannot underwrite knowledge that  $q$ . We may thus safely assume that Dretske will accept the Equivalence Principle’ (*ibid.*).

Hawthorne goes on to argue that in order to deny closure, Dretske must deny another initially plausible thesis he calls *Distribution* (*ibid.*): ‘If one knows the conjunction of  $p$  and  $q$ , then as long as one is able to deduce  $p$ , one is in a position to know that  $p$  (and as long as one is able to deduce  $q$ , one is in a position to know that  $q$ ).’ Hawthorne uses a case like the following one to argue that Dretske is committed to denying Distribution. Let  $p =$  a certain glass  $x$  is full of wine. Let  $q = x$  is not full of non-wine that is colored like wine. And let  $R = x$ ’s appearing to be full of wine. Suppose: (i)  $R$  is sensitive to  $p$ , that is, if it were not the case that  $x$  is full of wine,  $x$  would not appear to be full of wine; (ii)  $S$  knows  $p$  on the basis of  $R$ ; (iii)  $S$  knows *a priori* that  $p$  if and only if  $p \& q$ , and (iv)  $S$  competently deduces  $p \& q$  from  $p$ . (Hawthorne would formulate (iii) as:  $S$  knows that  $p$  is *a priori* equivalent to  $p \& q$ ; for convenience, we will formulate it as:  $S$  knows that  $p$  is logically equivalent to  $p \& q$ .) The Equivalence Principle implies that  $S$  knows  $p \& q$ . According to Hawthorne, Dretske is committed to accepting this, for  $R$  cannot be sensitive to  $p$  without being sensitive to  $p \& q$ . And since Distribution implies that  $S$  is in a position to know that  $q$ , Dretske must deny Distribution in order to deny closure.

Of course, this has roughly the same structure as Dretske’s original zebra example. Accordingly, Dretske would no doubt reject the Equivalence Principle, and the following case shows that his reasons for denying closure do have ‘force’ against this principle. Let  $p =$  a certain animal  $x$  is a zebra. Let  $q = x$  is not a painted mule. And let  $R = X$  appears to be a zebra. Suppose: (i)  $R$  is sensitive to  $p$ , that is, if it were not the case that  $x$  is a zebra,  $x$  would not appear to be a zebra; (ii)  $S$  knows  $p$  on the basis of  $R$ ; (iii)  $S$  knows *a priori* that  $p$  if and only if  $p \& q$ ; (iv)  $S$  competently deduces  $p \& q$  from  $p$ ; and (v) if  $x$  were a painted mule,  $x$  would appear to be a zebra. Although the Equivalence Principle implies that  $S$  knows  $p \& q$ , the following considerations show that Dretske’s analysis of knowledge implies that  $S$  doesn’t know  $p \& q$  because  $R$  is insensitive to  $p \& q$ . In virtue of (i) and (v), it follows that if it were not the case that  $x$  is a zebra, then  $x$  would not be a painted mule (for otherwise  $x$  would appear to be a

zebra). But if it were not the case that  $x$  is both a zebra and not a painted mule, i.e., if it were the case that  $x$  is either a non-zebra or a painted mule, then  $x$  might be a painted mule, in which case  $x$  would appear to be a zebra. Consequently,  $R$  is insensitive to  $p \& q$ . That is, if it were not the case that  $x$  is a zebra and not a painted mule,  $x$  might appear to be a zebra. Thus, even though the Equivalence Principle implies that  $S$  knows that  $p \& q$ , contrary to Hawthorne's contention, Dretske's reasons for denying closure *do have force* against the Equivalence Principle.

In discussing the Equivalence Principle elsewhere, Hawthorne concedes that 'we do have some tendency to evaluate *a priori* equivalent claims differently when they are embedded in counterfactual settings. "There is a diamond in front of me" is *a priori* equivalent to "There is a real diamond in front of me." But "If there were not a diamond in front of me, then  $p$ " has intuitively different truth conditions than "If there were not a *real* diamond in front of me, then  $p$ " on account of the fact that in the latter but not in the former case one looks to worlds where there is a fake diamond in front of the speaker' (2004, p. 40, n. 98). Since 'There is a real diamond in front of me' is equivalent to 'There is a real diamond in front of me and it is not a fake diamond,' Hawthorne is committed to holding that 'If it were not the case that  $x$  is full of wine, then  $p$ ' has intuitively different truth conditions than 'If it were not the case that  $x$  is full of wine and not full of wine colored water, then  $p$ .' Hawthorne attempts to salvage the Equivalence Principle by saying: 'Nevertheless, the Equivalence Principle is intuitively very powerful; so much the worse for counterfactual tests, so construed' (*ibid.*, p. 40). This only begs the question against Dretske.<sup>22</sup>

#### 4 Contrastive knowledge attributions<sup>23</sup>

We have given reasons to support possible closure denial. Our reasons are based on the view that conclusive reasons  $R$ , Nozickian tracking methods  $M$ , and information (as Dretske construes it) are not closed in their tracking. If not, and knowledge is dependent upon them, this helps explain why knowledge too is not closed. However, we know that there are those who insist that tracking methods  $M$ , conclusive reasons  $R$ , and information must be closed. Indeed, Hawthorne (2005, p. 35ff) argues just this. Still there are strong reasons that support Dretske and Nozick.

It has long been known that contrastive statements emphasize different aspects of a situation.<sup>24</sup> *Tom* married Bertha (rather than Bill) says one thing. *Tom married* Bertha

<sup>22</sup> Hawthorne states that 'If there were not a diamond in front of me, then  $p$ ,' has intuitively different truth conditions than 'If there were not a *real* diamond in front of me then  $p$ ,' on account of the fact that in the latter but not the former case one looks to worlds where there is a fake diamond in front of the speaker' (2004, p. 40). Instead of constituting a satisfactory explanation of the fact that the two claims have intuitively different truth conditions, we think this statement represents an admission that standard 'possible worlds' construals of the truth conditions of counterfactuals are unsatisfactory. In a planned sequel to this paper, we will challenge such construals for being incapable of accommodating many other important aspects of such conditionals.

<sup>23</sup> We take much of this discussion from a longer paper where we put this distinction to greater use (Barker and Adams 2010).

<sup>24</sup> See Dretske (1972).

(rather than divorced) says another. And Tom married *Bertha* (rather than Betty) says yet another.

Knowledge attributions too can be contrastive and thereby set different requirements for knowing because different claims are made. We maintain that it is this type of attribution that Dretske and Nozick had in mind, when denying closure. So when Dretske maintains that S knows that a zebra is in the cage, but not a painted mule, we would express this with the contrastive form ‘S knows p (but not/rather than) q.’ Or when Nozick says he knows he is in Emerson Hall, but not that he is not floating in a tank on Alpha Centauri he is expressing a contrastive knowledge attribution.

One might wonder about attributions such as ‘Gary knows Bush is president.’ We will maintain that these can be thought of as *degenerately contrastive* knowledge attributions. Depending upon emphasis, this may say that Gary knows that Bush is president rather than someone else or that Bush is president rather than not president (Governor of Texas).

In normal contexts when one makes a knowledge attribution of the form ‘S knows that p’ then one is committed by that attribution to S’s having a means of knowing (a conclusive reason R or method M) that is sensitive to the truth of the proposition p. However, it does not commit one to S’s having a reason or method of discriminating the truth of p from all logically possible alternatives that might compete with p’s being true on all the logically possible sorts of evidence one might have (Rs or Ms) for knowing p. It does commit one to S’s having a reason or method that eliminates the relevant alternatives, given S’s environmental circumstances or niche. As Nozick would say, it only commits one to S’s having at least one method M that tells him that p, meeting Nozick’s tracking conditions. Or as Dretske would say, it only commits S to having at least one conclusive reason R that tracks the truth of p and S’s supporting his/her belief with R. The means by which S knows that p must be sensitive to p’s truth, in S’s circumstances (Dretske) or in close possible worlds (Nozick). Were p false, R would not be there in the actual circumstances C in which S finds himself (Dretske). Were p false and S to use method M, in close possible worlds S would not believe that p via method M (Nozick).

When Dretske knows there is a zebra in the cage via R (its look), R must be sensitive to the presence of the zebra (it would not look like a zebra, were it not a zebra), given actual circumstances C. When Nozick knows he is in Emerson Hall via M (say, believing one is where it seems one is, given one’s background knowledge and cognitive abilities), Nozick’s belief (via M) is sensitive to the truth of p. In close worlds he would not believe, via M, that he is in Emerson Hall if he were not.

Now consider contrastive knowledge claims. Dretske knows it is a zebra in the cage rather than a painted mule. Or Nozick knows he is in Emerson Hall rather than floating in a tank on Alpha Centauri. These contrastive attributions *require more* than a reason that detects the presence of a zebra or a method that detects the presence of Emerson Hall. These contrastive attributions also imply detectors of the absence of painted mules or absence of floating in tanks on Alpha Centauri. For they suggest the knower has a means of discriminating the difference between these types of situation. However, if one’s reason or method is not sensitive to fake zebras or mad scientist-induced hallucinations of being in Emerson Hall, then the reason (look of a zebra) or method (seeming to be in Emerson Hall), is insensitive to these

possibilities (even though they are non-actual). That is, one's reasons or methods alone are insufficient to declare these alternative possibilities (painted mule/floating in a tank on Alpha Centauri) non-actual. For in the situations imagined, Dretske does not have a not-painted-mule detector. Nozick does not have a detector for suffering hallucinations as of being in Emerson Hall while floating in a tank on Alpha Centauri. Since contrastive knowledge attributions require for their truth these more robust reasons or methods, knowledge of these entailed propositions (not a painted mule/not floating in a tank on Alpha Centauri) is blocked where reasons or methods are lacking.

But if Dretske knows something is a zebra, doesn't Dretske thereby know that that thing is not a non-zebra? Yes. Knowing something is a zebra is enough to give knowledge of the degenerately contrastive claim that it is not a non-zebra. And if something is a painted mule then it is a non-zebra. So will not one who knows something is not a non-zebra thereby know that it is not a painted mule (one way of being a non-zebra)? No. Why not? Because the contrastive knowledge claim that one knows it is a zebra rather than a painted mule requires a reason sensitive not only to whether it is a zebra, but also to whether it is not a painted mule.<sup>25</sup> The reason (R) or method (M) that yields knowledge of a zebra, does so only against a backdrop free of things which look like zebras but are non-zebras. That is, in an environment free of zebra look-alikes the fact that something looks like a zebra tells one it is a zebra, and not a non-zebra. But if asked whether one has contrastive knowledge that something is a zebra rather than a painted mule by its look (alone), the answer has to be no. Because were it a painted mule (contrary to fact), it would look exactly the same as it does now (when it is a zebra). The contrastive knowledge attribution requires that one have, in addition to a zebra detector, a not-painted-mule detector and requires that the former is sensitive to zebras and the latter is sensitive to not-painted-mules. Lacking such, the person who knows it is a zebra via the first reason alone, would still lack contrastive knowledge that it is a zebra rather than a painted mule.

But (asks the sceptic) if one lacks knowledge that it is not a painted mule, how can one have knowledge that it is a zebra? Because if in fact there are no fake zebras (painted mules, etc) in one's relevant environmental niche, one does not need a detector of their absence—the possibility of their presence is too remote to be relevant. However, to *knowingly claim* such possibilities are too remote to be relevant (or actual) requires a reliable detector of their absence—a detector one has not got in the case at hand. To see this, suppose that what one sees—call it *x*—is in fact a zebra, and that one knows *x* is a zebra by means of a detector *D* (*x*'s looking like a zebra). Suppose in addition that *D* is sensitive to *x*'s being a zebra, but not to *x*'s not being a fake zebra (painted mule, etc.). How can *D* possibly enable one to know that *x* is a zebra? If in fact there are no fake zebras in one's relevant environmental niche, *x*'s being a fake zebra is an *irrelevant alternative* to *x*'s being a zebra. An alternative is a *relevant alternative* with respect to knowing that *x* is a zebra if and only if the alternative might

<sup>25</sup> We discuss and defend this implication for contrastive knowledge attributions in much more detail in (Barker and Adams 2010). Some versions of contrastivism seem not to include this implication (Morton and Karjalainen 2003). Others are so complex, it is hard to tell (Schaffer 2005).

obtain were  $x$  not a zebra. If there were fake zebras *nearby*, and if  $x$  might be such a fake, were  $x$  not a zebra, then  $x$ 's being a fake zebra would be a relevant alternative. In such a case, one's believing that  $x$  is a zebra on the basis of  $x$ 's looking like one would not qualify as knowledge, for one's visual experiences would not function as a zebra detector — were  $x$  not a zebra,  $x$  might be a fake zebra, and therefore might look like a zebra. Assuming that the setting is a normal zoo environment devoid of such fakes, however,  $x$ 's being a fake zebra is not a relevant alternative, since  $x$  would not be such a fake were  $x$  not a zebra. Instead  $x$  would be something that presents a significantly different visual experience. In one's actual environment,  $x$ 's looking like a zebra *is* sensitive to  $x$ 's being one, and functions as a *zebra detector* that enables one's belief to qualify as knowledge. Nevertheless, with respect to knowing *that  $x$  is a zebra but not/rather than a fake zebra*,  $x$ 's being such a fake qualifies as a relevant alternative, for regardless of environmental conditions—were it not the case that  $x$  is a zebra rather than a fake zebra,  $x$  might be a fake zebra rather than a zebra. Consequently, in order to know that  $x$  is a zebra rather than a fake zebra, one would need a detector (e.g. passing a zebra-DNA test) that would be sensitive both to  $x$ 's being a zebra and to  $x$ 's not being a fake zebra. (A similar story can be told for Nozick's knowledge of his being in Emerson Hall via his method  $M$  and his failure to know the contrastive knowledge attribution that he is in Emerson Hall and not/rather than floating in a tank on Alpha Centauri because he lacks a detector for not floating in tanks on Alpha Centauri.)

Let's return to Hawthorne's challenge. It is initially plausible that if one knows something is a zebra, and one knows that its being a zebra is *a priori* (or logically) equivalent to its being a zebra and not a painted mule, then if one competently so infers, one knows it is a zebra and not a painted mule. Closure deniers assert that one may lack knowledge that it is not a painted mule. It is initially plausible that any conclusive reason  $R$  or method  $M$  that tracks  $p$ , must track  $p \& q$ , since  $p$  is *a priori* (or logically) equivalent to  $p \& q$  (it is knowable *a priori* that something is a zebra if and only if it is a zebra and not a painted mule). Suppose, contrary to what we argued in the previous section, that any signal that carries the information that something is a zebra also carries the information that it is a zebra and not a painted mule. Suppose that any reason  $R$  and any method  $M$  that tells one that something is a zebra has the potential of telling one that it is a zebra and not a painted mule—that any such reason or method that is sensitive to something's being a zebra is also sensitive to its being a zebra and not a painted mule. How could one know something is a zebra by means of  $R$  or  $M$  and not be in a position to know that it is a zebra and not a painted mule by means of  $R$  or  $M$ ? And if one knows that it is a zebra and not a painted mule, how could one not be in a position to know that it is not a painted mule?

Even if it is true that any signal that carries the information that  $p$  carries the information that  $p \& q$  for any  $q$  nomically nested in that signal (nomically co-extensive), it is nonetheless true that the signal's containing that information and a subject's extracting that information are two different things. And this is what Hawthorne may have overlooked. We will now argue that extracting the information that  $p \& q$  from the signal is required for knowledge that  $p \& q$ , even if it is not required for mere transmission of the information.



Consider the contrastive character of knowledge emphasized by Dretske and Nozick.<sup>26</sup> In a normal situation, S may know that something is a zebra and not a mule if and only if S is in a position to know that it is a zebra *rather than* a mule. Even if (given that in S's actual environmental niche there are no zebra look-alikes), the animal wouldn't look like a zebra unless it was a zebra and not a painted mule, its looking like a zebra might not enable S to extract the information that it is a zebra and not a painted mule, and thereby put S in a position to know that it is a zebra rather than a painted mule. To extract that information, S must extract both the information that it is a zebra and the information that it is not a painted mule. The animal's looking like a zebra must be capable of functioning as a differentiator enabling S to distinguish between its being a zebra and its being a painted mule. And by the reasoning above, S cannot extract the information that it is not a painted mule without a not-painted-mule-detector. So to extract the information  $p \& q$ , S needs both a p-detector (zebra-detector) and a q-detector (not-painted-mule-detector), and S lacks the latter though S has the former. Why is the look of the zebra (R) sensitive to something's being a zebra and not to something's not being a painted mule? We explained above that in the environment free of zebra look-alikes, something would not look like a zebra were it not one. And it would not look like a zebra were it a mule. But it is still true, even in such an environment that it might look like a zebra were it a *painted mule*. R (the look of the zebra) is sensitive to its being a zebra, and R is sensitive to its not being a mule, but R is not sensitive to its not being a painted mule. Consequently, R alone cannot be used to extract the information that q. Hence even if R tracks  $p \& q$ , it cannot be used to extract the information that  $p \& q$  and therefore cannot be used to acquire knowledge that  $p \& q$ . (A similar story can be told about why Nozick can know via method M that he is in Emerson Hall, but not that he is in Emerson Hall and not floating in a tank on Alpha Centauri.)

Thus, in view of the contrastive character of knowledge, it appears that S can know that the animal is a zebra and not a painted mule only if S is in a position to know that it is a zebra rather than a painted mule.<sup>27</sup> And since S cannot, on the basis of R (the look of the zebra), know that something is a zebra rather than a painted mule, S cannot, on the basis of R alone, know that it is a zebra and not a painted mule. This won't be possible unless S is equipped with a P-detector (zebra) and a Q-detector (not painted mule).<sup>28</sup>

<sup>26</sup> We spend much more time elaborating upon the contrastive character of knowledge claims in (Barker and Adams 2010). We defend our view and distinguish it from other views of the contrastive character of knowledge claims by others, such as (Morton and Karjalainen 2003) and Schaffer (2005).

<sup>27</sup> We are not suggesting that statements of the form 'S knows that x is A and not B' are always or even usually equivalent to statements of the form 'S knows that x is A rather than B.' Sometimes they are equivalent to statements of the form 'S knows that x is A and (that) x is not B.' But given suitable context and obviously contrastive content (say, A = wolf and B = dog), the contrastive interpretation is practically mandated—'S knows that x is a wolf and not a dog' would almost invariably be taken to be equivalent to 'S knows that x is a wolf rather than a dog.'

<sup>28</sup> Of course, in principle, one could know  $p \& q$  without having separate detectors of p and of q, if someone else told him/her that  $p \& q$ . But that just postpones the question of how the person doing the telling knew. For more on the logical relations between contrastive and non-contrastive knowledge claims, various logical forms of closure principles, see Barker and Adams (2010).



Now of course, a single detector can play both roles in many cases. The animal's appearing to S to be a zebra can function not only as a zebra-detector, but also as a not-elephant-detector, as a not-gazelle-detector, as a not-mule detector, etc. Indeed, as the following considerations show, in some cases it can even function as a not-painted-mule-detector. Suppose that S is familiar with the visible anatomical differences between zebras and painted mules, and would not be fooled if the animal in question were a painted mule. S can acquire knowledge that the animal is a zebra rather than a painted mule on the basis of its appearing to S to be a zebra, since S's having this experience can function as a differentiator that enables S to distinguish between its being a zebra and its being a painted mule. Thus, S's having the experience can play the role of a zebra-detector and a not-painted-mule-detector, enabling S to extract the information that the animal is a zebra and the information that it is not a painted mule.

This case can be instructively compared to Kripke's famous red barn case.<sup>29</sup> To know something is a red barn, one needs to extract both the red-object information and the barn-object information from the signal. Suppose it were not necessary to have a distinct red-object-detector and a distinct barn-object-detector. Perhaps one has a template that fires only to the conjoined shape and color, but not separately to red objects or barn objects. Then to extract the information that the object is a red barn, one's red-object-detector need not be distinct from one's barn-object-detector, but one's red-barn-detector must be differentially sensitive to the property of being a red object and to the property of being a barn object. So, the detector must not fire when shown a non-red barn object, and it must not fire when shown a red non-barn object. Thus, the case involving red barns turns out to be similar in structure to the case involving a subject who is familiar with the visible anatomical differences between zebras and painted mules.

## 5 Conclusion

We have examined the reasons Dretske's and Nozick's versions of tracking theories deny closure. We found arguments to fail for rejecting tracking theories because they deny closure. Vogel's arguments are both curious and inconclusive. Hawthorne is wrong that tracking theories must deny distribution. We acknowledged that it seems counterintuitive that one may know that p and to know that p is logically equivalent to q without being in a position to know that q. However, we give a principled reason for this, viz. for contrastive knowledge attributions the same item that generates information sufficient to know (track) that p alone cannot generate information *that it is information* (or reliable), and thus enable one to track q. To know the relevant propositions known to be implicated (or logically equivalent ones), takes more information than that required to know the original propositions. It takes the ability to extract information in a very fine-grained way—via differentially sensitive detector mechanisms.

<sup>29</sup> See Adams (2005) for discussion of why this example does not refute tracking theories.

Therefore, with regard to the opening quote by Heller, we think the ‘good guys’ may not be losing, after all.<sup>30</sup>

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