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Holdings about holdings: modeling contradictions in judicial precedent

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Abstract This paper attempts to formalize the differences between two methods of analysis used by judicial opinions in common law jurisdictions to contradict holdings posited by earlier opinions: "disagreeing" with the holdings of the earlier opinions and "attributing" holdings to the prior opinions. The paper will demonstrate that it is necessary to model both methods of analysis differently to generate an accurate picture of the state of legal authority in hypothetical examples, as well as in an example based on Barry Friedman's analysis of the "stealth overruling" of *Miranda v. Arizona* through subsequent judicial interpretations. Because the question of whether "disagreement" and "attribution" need to be modeled separately relates to contradictions rather than to subtler interactions between holdings such as "distinguishing," it can be answered using the simple technique of modeling holdings as propositional variables and evaluating the holdings using truth tables.

Keywords Legal authority · Holdings · Precedent · Stare decisis

1 Introduction

Two methods that judicial opinions use to contradict the analysis of earlier opinions are "disagreeing" with the holdings of the earlier opinion and "attributing" holdings to the prior opinion. This paper will explore the question of whether a formal description of the creation of common law precedent through judicial holdings requires these two methods of analysis to be modeled as separate phenomena. Section 2 discusses related work in AI and Law. Section 3 introduces three concepts from jurisprudence: holdings, disagreement, and attribution, and explains the role they will play in a hypothetical model of a judicial system. Section 4 introduces the

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model itself, which is designed to highlight contradictions between judicial holdings. Section 5 plots the authority commitments created by three hypothetical sets of opinions into tables, demonstrating that the failure to account for "attribution" holdings would cause systematic errors in determining which courts are bound by which holdings. Section 6 uses the same model of a judicial system to show the significance of "attribution" holdings in an actual legal analysis of *Miranda v. Arizona* and its progeny. Section 7 briefly discusses whether conclusions based on the simplified model are likely to be applicable to real judicial systems. Section 8 discusses problems with the model and potential subjects for future research.

2 Related work

A critical step toward the goal of formally describing the creation of precedent is to find a general solution to the problem of determining when one holding implies or contradicts another holding. Works addressing this problem have appeared in the field of AI and Law since at least the late 1980s.

(Ashley and Rissland 1987) analyzes cases as a whole rather than as individual holdings, using an approach based on dimensions and claim lattices. However, its idea of generating candidates for "Contra" and "But See" citations comes close to the idea of detecting contradictions between holdings. (Berman and Hafner 1991) contains an index for determining in which procedural scenarios one case may generate precedent for or against a given outcome in another case addressing the same subject matter. Although this index is directed toward case-based reasoning, it may be adaptable to reasoning with holdings. Branting (1991 and 1994) proposed to model abstract holdings as rules and concrete holdings as exemplars in a reduction-graph model, which would mean that holdings that describe individual steps on the graph could be combined to create implied knowledge, even if the holdings came from different cases. Berman and Hafner (1995) proposed to model one or more holdings per case as outcomes with sufficient granularity to detect contradictions, while using dimensions to provide additional description of each case. (Berman and Hafner 1995 at 49) also suggests a "red flag algorithm" to detect contradictions between holdings. McCarty's proposal to describe legal rules in terms of their effect on the state of the world is applied to the holding of the United States Supreme Court opinion *Eisner v. Macomber* in (McCarty 1995). (Wyner and Bench-Capon 2007) and (Carey 2011) both propose to model holdings in terms of factors sorted into hierarchies where general factors are the parents of more specific factors. (Wyner and Bench-Capon 2007) then proposes to determine prior holdings' relations to current cases using argument schemes, while (Carey 2011) proposes to treat holdings as rules and identify contradictions between them by comparing their factors. (Horty 2011) proposes to model the ratio decidendi of a case as a triple containing the entire set of factors present in the case, a rule, and an outcome. Because Horty proceeds from the assumptions that each case always contains a single rule and that the reasoning under consideration involves only a single step (Horty 2011 at 5), the paper addresses only situations where the ratio decidendi of a case consists of exactly one holding. Horty proposes to accept that such a prior

holding implies a new holding with the same outcome when the later holding does not contain any new set of factors that could be deemed a reason for a different outcome. (Horty and Bench-Capon 2012 at 31–32) adopts the same view and argues further that opinions that offer new reasons for declining to follow a binding rule may be deemed only to have distinguished the binding rule rather than overruling it.

This paper will not attempt to argue for or against any of the proposals above. Instead, it will assume that a working theory of implication and contradiction between holdings can be put in place, and will examine the question of whether it will then be necessary to distinguish between opinions that posit holdings on their own behalf and opinions that attribute holdings to other opinions.

Describing the creation of precedent also requires modeling a hierarchy of courts, including the rules of precedent in that hierarchy, to show how a single holding may create different authority commitments in different courts. Some work has been done in this area, but it could be developed further. (Wyner and Bench-Capon 2009) offers such a model as part of an effort to create argument frameworks that take precedent into consideration, but does not explicitly discuss holdings or the attribution of holdings to prior opinions. (Berman and Hafner 1995 at 47) offers the beginnings of a model of a judicial system by modeling the date when opinions are issued in an effort to detect when older cases have been weakened by more recent precedent. However, Berman and Hafner did not propose to track which court issued which opinion or to distinguish between the differing sets of authority commitments in different courts. (Horty and Bench-Capon 2012 at 26) does not incorporate a model of a hierarchy of courts, but it does state that its account of precedential constraint could be viewed as an obligation for courts to maintain local consistency even in a case base which is not globally consistent. It may be worth investigating whether a model of a hierarchy of courts could be used to define such a locally consistent set of holdings by determining the set of holdings which are controlling authority in a particular court.

3 Legal terminology

3.1 Holdings

For purposes of this paper, a "holding" is a statement of law, posited by a judicial opinion, about how courts should resolve litigation. This paper also assumes that holdings can imply or contradict other holdings. That assumption may mean that only rules can be holdings because, as Alexander (2012) argues persuasively, "the rule model is the only model of precedent that can constrain a later court to decide a case in a way that it believes is incorrect at the time it decides it."

(Berman and Hafner 1995 at 46) defines the ratio decidendi of a case as the set of all holdings which are necessary to the results of the case. Any holdings that are not part of the ratio decidendi are known as dicta. In most common law judicial systems, holdings which are dicta are assigned a lesser level of authority than other holdings of the same opinion. However, (Stinson 2010) notes that some courts regard the "considered" dicta of courts of last resort as binding authority. Also,

courts frequently disagree about whether a particular holding of a prior opinion was dicta. (Twining and Miers 2010 at 304).

The definitions of "holding" and "ratio decidendi" above would be controversial to many legal scholars. Many commentators, like Leval (2006), prefer to define "holding" as a synonym for "ratio decidendi." For those commentators, there is no general, neutral term for statements of law posited by judicial opinions. Even some commentators who define "holding" and "dicta" as mutually exclusive categories concede that courts often blur the distinction between the two and that dicta is commonly "elevated to holding." (Stinson 2010) Because the question of whether a rule posited by a particular opinion is dicta is at least debatable and arguably entirely subjective, insisting that "holding" and "dicta" are mutually exclusive would cause any speaker who referred to a particular rule by either term to appear to be taking a controversial stance on the merits of future legal disputes. Thus, it is preferable to avoid the usage of Leval and Stinson, and instead follow the usage of Berman and Hafner by defining "ratio decidendi" and "dicta" as mutually exclusive subcategories of the larger category of "holdings."

3.2 Disagreement

Under the "disagreement" method of analysis, a new opinion posits a holding interpreting an underlying source of law such as a statute, and the new opinion's holding contradicts a holding posited by an earlier opinion. The rules of precedent generally limit lower courts' power to disagree with higher courts. (Twining and Miers 2010 at 281) However, lower courts may sometimes avoid this limitation by labeling the higher courts' holdings as dicta.

Contradiction by disagreement may go by names such as "overruling," (Raz 2009 at 189) "abrogating," (see *Holytz v. Milwaukee* (1962) 17 Wis.2d 26, 39 "The doctrine of governmental immunity having been engrafted upon the law of this state by judicial provision, we deem that it may be changed or abrogated by judicial provision") "disapproving," (see *People v. Lopez* (2009) 177 Cal.App.4th 202, 206 "It therefore appears that *Geier* has been disapproved by the United States Supreme Court's interpretation of the confrontation clause") "modifying," (see *Calloway v. White* (2009) 649 F.Supp.2d 1048, 1051 "Although the Supreme Court modified the holding of *Roberts* in *Crawford v. Washington*…it has also held that *Crawford* is not to be applied retroactively") or "limiting." (Todd 2007) The term "overruling" by itself carries the connotations that the new opinion specifically considered and rejected the analysis of the earlier opinion, and that the hierarchy of courts will require the court that issued the overruled opinion to follow the overruling holding in the future. "Overruling sub silentio," by contrast, indicates that a holding has been abrogated without explicitly being mentioned. (Friedman 2010 at 14) "Abrogating" connotes that the abrogating court may not have specifically analyzed the abrogated opinion, but that the court that issued the abrogated opinion will nonetheless be required to follow the abrogating holding. "Limiting" and "modifying" generally mean that the new opinion's holding is similar but not identical to the earlier opinion's holding; these terms are ambiguous as to whether

the new holding literally contradicts the earlier holding at all. This paper will generally use "disagreeing" instead of the other terms, because "disagreeing" is broad enough to encompass each of the other terms to the extent that they involve contradiction. "Disagreeing" connotes only that the disagreeing court is not required to follow the court that issued the earlier opinion, not necessarily that the court that issued the earlier opinion is required to follow the disagreeing court. Terms that refer to disagreement are often modified with the word "partially" (e.g. "partially overruling," "partially disagreeing") when one holding contradicts another holding only in part. Partially contradicting a holding by disagreement is also commonly called "carving out an exception" from the holding.

3.3 Attributing

Under the "attribution" method of analysis, the new opinion restates a holding (or set of holdings) posited by the earlier opinion, but does not necessarily agree that the holdings as restated are a correct interpretation of the underlying source of law. Instead, the new opinion merely posits that the earlier opinion should be read as if the earlier opinion posited the restated holdings. This paper will refer to this form of analysis as "attributing" holdings to an earlier opinion. The holdings thus attributed to the earlier opinion may be broader or narrower than, or even identical to, the holdings actually stated in the text of the earlier opinion. In other words, while "disagreement" means making a statement in the abstract that contradicts a prior opinion's holding, "attribution" involves making a statement about what the prior opinion's holdings were.

When courts attribute holdings to earlier opinions, they often illuminate the best interpretation of what the original author actually meant, sometimes drawing on knowledge of the historical context to extract meaning that would not be obvious to the ordinary reader. Higher courts may also attribute holdings to lower appellate courts as an exercise of the power of judicial administration rather than as a matter of interpretation, for example, to remedy procedural errors committed by the lower appellate court. However, courts sometimes also engage in what the literary critic Harold Bloom might call "creative misreading" or "poetic misprision," a practice in which an author consciously or unconsciously misstates the intended meaning of the significant works that precede him or her, but in doing so makes them a better prelude to the author's own work. (Bloom 2003 at 3–4) In the legal context, this practice has been labeled "stealth overruling," which Friedman criticizes as a "disingenuous treatment of precedents in a manner that obscures fundamental change in the law." (Friedman 2010 at 5) But it is not safe to assume that judicial misreadings of prior opinions should be disregarded as mistakes or aberrations. Dworkin (1986 at 230) takes a more favorable view of the practice, likening the work of writing a judicial opinion to that of a "chain novelist" whose interpretation of previous chapters "is not disqualified simply because he claims that some lines or tropes are accidental, or even that some events of plot are mistakes because they work against the literary ambitions the interpretation states." Bloom argues that misreading of earlier poetry is the hallmark of a highly influential "strong poet."

(Bloom 2003 at 69) It seems at least arguable that influential jurists may also use misreading as a powerful tool to create new law.

Lower courts generally are not expected to exercise the same latitude in attributing holdings to sources of higher authority that higher courts may exercise in attributing holdings to lower courts. Typically, a lower court would be expected to explain not just why the controlling opinion "should be deemed" to have posited the holding attributed to it, but also why the holding attributed to the higher court reflects what the higher court actually intended to say or why it is clearly implied by the higher court's opinion. While there may be no bright line to define exactly what interpretations of controlling authority are permissible, lower courts are aware that higher courts will likely reverse or overrule any opinions which appear hostile to the higher courts' view of the law.

3.4 Other negative treatment

There are at least two other well-known methods of negative treatment of judicial opinions that will be outside the scope of this paper because they do not involve contradiction: "recognizing legislative abrogation" and "distinguishing."

When an opinion merely recognizes the legislative abrogation of an earlier opinion, it does not contradict the analysis of the earlier opinion. Instead, it merely notes that the statutes and other enactments relevant to the earlier opinion's holding have changed since the earlier opinion was issued, and notes that this change in the state of affairs has rendered the earlier opinion's holding irrelevant. When a holding is legislatively abrogated but not contradicted, there is always a possibility that the holding could come back into effect if the legislative changes are rolled back. See *City of Mesquite v. Aladdin's Castle, Inc.* (1982) 455 U.S. 283, 289 (holding that repeal of challenged ordinance did not render the issue of its interpretation moot because of the possibility that the ordinance could be reenacted).

Similarly, "distinguishing" occurs only when a court observes that its holding does not literally contradict the holding of an earlier opinion. (Raz 2009 at 185) calls this definition "the tame view" of distinguishing. Raz himself advocates a broader definition which he calls the "strong" view of distinguishing, which also includes modifying the rule of a prior case to narrow it. Raz's definition is problematic to a study of contradiction in judicial opinions because it makes the term "distinguishing" ambiguous as to whether the prior case's holding has been contradicted. Alexander (2012) argues, contrary to Raz, that when a court contradicts a holding of an earlier opinion in purporting to distinguish the earlier holding, the court's claim to have distinguished the case is "illusory." The best approach to this problem is to use the term "distinguishing" to mean only "tame distinguishing," which does not involve contradiction, while replacing the term "strong distinguishing" with "modifying" to avoid confusion. In other words, when a new holding purports to "carve out an exception" to the unqualified holding of a prior case, it should be viewed as "disagreeing with" the prior holding at least in part, rather than "distinguishing" the holding or even "attributing" a different holding to the prior opinion. Unlike "strong

distinguishing," "tame distinguishing" also has the advantage of corresponding to a definition of the word "distinguishing" in common usage outside the legal domain.

4 A model of contradicting authority

This paper will use a running example of a hypothetical simple judicial system. The hypothetical judicial system has five courts: two trial courts, two intermediate appellate courts, and one supreme court. Each intermediate court accepts appeals from one of the two trial courts, and the supreme court accepts appeals from either of the two intermediate courts (Fig. 1).

In this judicial system, the following rules of precedential authority apply:

1 Whenever a court issues an opinion, every court assigns that opinion's holdings one of these five levels of authority, which are ordered from strongest to weakest: "Controlling," "Decided in current court," "Horizontal stare decisis," "Persuasive only," and "Ignored."
2. An opinion issued by a trial court is "Ignored" in every court
3. Where court A accepts appeals from court B, the opinions of court A are "Controlling" in court B
4. Where court A is an appellate court, the opinions of court A are "Decided in current court" in court A
5. Where court A accepts appeals from courts B and C, and courts B and C are appellate courts, the opinions of court B are "Horizontal stare decisis" in court C and vice versa
6. Where court A accepts appeals from court B, and rules 2–5 do not decide the level of authority an opinion has in court B, the opinion has the same level of authority for B that it has for A
7. If rules 2–6 do not decide the level of authority an opinion has in some court, the opinion is "Persuasive only" in that court

Once each court assigns a level of authority to each opinion using the rules above, these additional rules apply to determine which holdings the courts may choose to follow or contradict:

8. If more than one opinion is at the same level of authority in court A, then court A ranks those opinions from strongest to weakest based on the time they were issued, under the doctrine of lex posterior, with the latest opinions rated as strongest

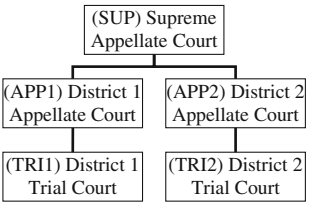

Fig. 1 A hypothetical hierarchy of courts

9. There are three possible truth values for a holding: True, False, and Undecided. "False" and "Undecided" contradict "True." "True" and "Undecided" contradict "False." Nothing contradicts "Undecided."[1]
10. In the absence of any authoritative opinions on a particular holding, the default value for that holding is "Undecided."
11. No court may posit a holding *h* if *h* contradicts a prior holding that is "Controlling" authority in that court, unless *h* is implied by another prior holding that is even stronger Controlling authority
12. "Controlling," "Decided in current court," and "Horizontal stare decisis," are the three "Stare decisis" levels of authority. If court A is a trial court, then court A may not posit a holding *h* if *h* contradicts a prior holding that is "Stare decisis" authority in court A, unless *h* is implied by another prior holding that is even stronger Stare decisis authority
13. Any court may posit any holding that is not prohibited by rules 11 or 12

The running example also includes five holdings. Because this paper addresses only ways that holdings can literally contradict one another, it will be sufficient to think of the holdings as propositional statements represented by letters, without attempting to describe or formalize their meaning. Thus, the five holdings are represented by the lowercase letters *a*–*e*, where *a* and *b* each imply *c*, and *c* implies both *d* and *e*, with the understanding that both modus ponens and modus tollens apply (Fig. 2).

Readers might find it useful to have an example of a situation where five holdings could actually have the implication relationships assigned to holdings *a* through *e* in the running example. One such example might be where the holdings fit into the following pattern:

a: In all cases where factor P applies, the trial court must accept outcome R
b: In all cases where factor Q applies, the trial court must accept outcome R
c: In all cases where factors P and Q apply, the trial court must accept outcome R
d: In some cases where factors P and Q apply, the trial court must accept outcome R
e: In all cases where factors P and Q apply, the trial court may accept outcome R

These example holdings illustrate that while holdings may describe defeasible implications, the implication relationships between the holdings themselves need not be defeasible. For a discussion of the benefits of stating holdings as procedural rules rather than as institutional facts, see (Hage et al. 1994).

If a model like the one described above was used to record all the opinions and holdings in the hypothetical jurisdiction, then a researcher could use it to calculate the answer to such queries as the complete set of holdings that were binding law in any particular court. A potentially useful feature is that changes to legal doctrine would be modeled only accretively, so that a correct representation of an opinion or its holdings would never need to be modified or deleted even if the opinion was later

[1] In effect, because no truth value is deemed to contradict "Undecided," lower courts in this model are not barred from deciding issues that have been left expressly undecided by higher courts.

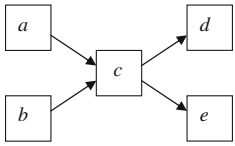

Fig. 2 Implication relations of five hypothetical holdings

overruled. This feature might make the updating process more manageable. Also, this approach would make it easier for historical researchers to perform queries from the point of view of a particular date in the past, to learn about the state of legal authority on that date.

The model described in this paper does not follow the proposal of (Branting 1994 at 33) that contradictions between holdings should be modeled by removing the earlier holding that has been contradicted from the knowledge base. Deleting contradicted holdings would cause the loss of valuable historical knowledge about the state of authority commitments in the past. As will be shown in the next section, it would also fail to account for the fact that in many cases the rules of precedent will obligate some courts to accept certain holdings as binding even after those holdings have been contradicted by other courts.

5 Tracking hypothetical authority commitments

Each of the three hypothetical examples in this section will describe a scenario in which courts issue a series of opinions making various assertions about holdings *a* through *e*. After each courts issues its opinion, a "truth table" of authority commitments will show what position each court is compelled to take as to each holding. The tables will show only the single strongest authority commitment for each holding in each court. An authority commitment is represented by a capital letter abbreviation for the truth value (T for True, F for False, or U for Undecided) followed by a hyphen and then a capital letter abbreviation for the level of authority (C for Controlling, D for Decided in current court, H for Horizontal stare decisis, or P for Persuasive only).[2] When a holding is "Undecided" by default, there is no level of authority. Note that in more complex examples the decision to include only the single strongest authority commitment in the table may obscure relevant information, as there can be cases where conflicting commitments are nearly in equipoise and a court is free to follow either of them, yet only the marginally stronger one appears in the table.

A detailed model of judicial authority would represent opinions as distinct from holdings. Courts can only posit holdings by issuing opinions, and it can be useful to track not just when a court posited a holding, but which opinion that holding appeared in. For the sake of simplicity, in each of the examples below there is exactly one opinion issued at time 1 and that opinion is designated Opinion 1, the one opinion issued at time 2 is designated Opinion 2, and so on. The examples will

[2] As a mnemonic device, note that the abbreviations are ordered alphabetically from the strongest level of authority to the weakest.

also assume that holdings begin to have authoritative effect instantaneously at the time they are posited so, for instance, the new authority commitments created by Opinion 2 will be reflected in the truth table for time 2.

5.1 Example 1: disagreeing

Time 1: TRI1 issues Opinion 1, which posits c
Time 2: APP1 issues Opinion 2, which posits c
Time 3: SUP issues Opinion 3, which posits $\neg d$

This simple example will illustrate the concept of "disagreeing" without yet introducing the concept of "attribution." At time 1, the District 1 Trial Court (TRI1) posits holding c. At time 2, the District 1 Appellate Court (APP1) agrees with the District 1 Trial Court by positing c. At time 3, the Supreme Court (SUP) disagrees with both of the District 1 courts by positing $\neg d$. The authority commitments created by these holdings are shown by the truth tables below (Table 1).

At time 1, the trial court's holding is assigned the "Ignored" level of authority by every court. Since the holding is ignored, it does not create new authority commitments, and every holding remains at the default value of "Undecided" in every court (Table 2).

At time 2, the District 1 Appellate Court's holding c becomes Controlling authority in the District 1 Trial Court, it takes "Horizontal stare decisis" effect in both District 2 courts, and it becomes "Persuasive only" authority in the Supreme Court. Because c implies d and e, d and e have the same level of authority as c in every court (Table 3).

At time 3, the Supreme Court's holding $\neg d$ becomes Controlling in every court other than the Supreme Court itself, thus also establishing Controlling authority against holdings a, b, and c. However, $\neg d$ does not imply $\neg e$, so the authority commitments that existed as to holding e at time 2 remain exactly the same at time 3.

In Example 1, even though the holding that the District 1 Appellate Court posited at time 2 has been overruled by the Supreme Court, that holding still lives on as "Stare decisis" authority in support of holding e in both trial courts. This outcome may be undesirable to the Supreme Court if it thoroughly dislikes the Appellate Court's analysis. But at the same time, the Supreme Court may be unwilling to commit itself to a position on holding e, or the Supreme Court may feel that canons

Table 1 Authority commitments at time 1 in Example 1

	SUP	APP1	TRI1	APP2	TRI2
a	U	U	U	U	U
b	U	U	U	U	U
c	U	U	U	U	U
d	U	U	U	U	U
e	U	U	U	U	U

Table 2 Authority commitments at time 2 in Example 1

	SUP	APP1	TRI1	APP2	TRI2
a	U	U	U	U	U
b	U	U	U	U	U
c	T-P	T-D	T-C	T-H	T-H
d	T-P	T-D	T-C	T-H	T-H
e	T-P	T-D	T-C	T-H	T-H

Table 3 Authority commitments at time 3 in Example 1

	SUP	APP1	TRI1	APP2	TRI2
a	F-D	F-C	F-C	F-C	F-C
b	F-D	F-C	F-C	F-C	F-C
c	F-D	F-C	F-C	F-C	F-C
d	F-D	F-C	F-C	F-C	F-C
e	T-P	T-D	T-C	T-H	T-H

of judicial restraint prevent it from doing so because holding *e* is not necessary to decide the case that is before the Supreme Court at time 3. This situation is a good illustration of why upper appellate courts often choose to "attribute" to intermediate courts that the intermediate courts should not be considered to have decided issues related to issues decided by the upper court. For example, in California, when the state Supreme Court grants review on any issue decided by a state Court of Appeal, the Supreme Court routinely "supersedes" the entire Court of Appeal opinion, eliminating its authority as precedent, even if the Court of Appeal opinion addressed issues entirely irrelevant to the Supreme Court's grant of review. (California Rules of Court, rule 8.1105(e)(1).) Once a California Court of Appeal opinion has been superseded in this way, other California courts are prohibited even from citing to the superseded opinion. (California Rules of Court, rule 8.1115.)

5.2 Example 2: limiting lower court's holding

Time 1: APP1 issues Opinion 1, which posits *c*
Time 2: APP2 issues Opinion 2, which posits $\neg d$
Time 3: SUP issues Opinion 3, which posits *e* and "Opinion 1 posits only *d*"

This new example will introduce an "attribution" holding. In this example, at time 1, the District 1 Appellate Court posits *c*. At time 2, the District 2 Appellate Court posits $\neg d$, thus disagreeing with District 1. At time 3, the Supreme Court posits *e*, and also posits the "attribution" holding that the District 1 Appellate Court's opinion is deemed to have posited only *d*, not *c*, at time 1. The courts can be subject to authority commitments as to this attribution holding just as they can for the holdings represented by propositional variables *a*-*e*, so the attribution holding will

be included on the truth table as a sixth holding. Doing so raises a puzzling question, however. Given that Opinion 1 posits *c*, should Opinion 1 be deemed to commit the District 1 Appellate Court to the position that the holding "Opinion 1 posits only *d*" is false? Or, to state the question more generally, when some opinion O posits some holding *h*, should opinion O also be deemed to posit that "O posits *h*"?

Although there may be room for disagreement on this point, the better answer seems to be no. It seems problematic to determine exactly where the holding "O posits *h*" could come from. Clearly *h* does not by itself imply "O posits *h*." It seems unsatisfactory to say that *h* implies "O posits *h*" only under some circumstances and not others, depending on which opinion has posited *h*. One of the attractions of a theory of implication and contradiction between holdings is the possibility that these relations between holdings can be determined in the abstract, without regard to which opinions have posited which holdings. That possibility would be eliminated if the set of holdings implied by holding *h* depended on which opinions posited *h*. An alternate possibility, which also seems unsatisfactory, would be to conclude that although *h* does not imply "O posits *h*," whenever some opinion O posits some holding *h*, O should be deemed separately to have posited "O posits *h*." The obvious problem here is that "O posits *h*" is also a holding, such that O would also be deemed to have posited "O posits 'O posits *h*'" and so on into infinity. There also may be a justification in terms of isomorphism (see Bench-Capon and Coenen 1992) for concluding that opinions should not be assumed to posit that they posit their holdings. There is no unanimous consensus about exactly what constitutes a holding, and many commentators believe that courts may posit holdings without understanding that they have done so. For instance, the model of (Horty 2011) suggests that even when a court fails to consider the significance of certain factors in a case, those factors become part of the holding of the case. Therefore, it seems at least conceivable that someone will propose a model of judicial holdings in which the act of positing a holding is deemed to be separate and distinct from the act of positing that one is positing the holding. For these reasons, Opinion 1 is not deemed to create an authority commitment as to the holding "Opinion 1 posits only *d*" (Tables 4 and 5).

Table 4 Authority commitments at time 1 in Example 2

	SUP	APP1	TRI1	APP2	TRI2
a	U	U	U	U	U
b	U	U	U	U	U
c	T-P	T-D	T-C	T-H	T-H
d	T-P	T-D	T-C	T-H	T-H
e	T-P	T-D	T-C	T-H	T-H
Opinion 1 (APP1)[a] posits only *d*	U	U	U	U	U

[a] Technically, "Opinion 1 posits only *d*" would be a sufficiently unambiguous description of this holding. The parenthetical reference to the court that issued Opinion 1 is included only to improve readability

Table 5 Authority commitments at time 2 in Example 2

	SUP	APP1	TRI1	APP2	TRI2
a	F-P	F-H	F-H	F-D	F-C
b	F-P	F-H	F-H	F-D	F-C
c	F-P	T-D	T-C	F-D	F-C
d	F-P	T-D	T-C	F-D	F-C
e	T-P	T-D	T-C	T-H	T-H
Opinion 1 (APP1) posits only *d*	U	U	U	U	U

At time 3, the following question arises: if Opinion 1 does not create any authority commitments as to the holding "Opinion 1 posits only *d*," what authority commitments does the holding "Opinion 1 posits only *d*" create as to Opinion 1? Because that holding contradicts Opinion 1 by attributing to it an inconsistent set of holdings, every court is required to weigh the relative precedential strength of Opinions 1 and 3 to decide whether Opinion 1 posits *c* or only *d*. Because Opinion 3 was issued later than Opinion 1 and by a higher court, the interpretation that "Opinion 1 posits only *d*" is Controlling authority in every court except the Supreme Court (Table 6).

In this example, the Supreme Court used its attribution holding to narrow the scope of the disagreement between District 1 and District 2. At time 2 the two districts disagreed about both holdings *c* and *d*, while at time 3 the disagreement covered only holding *d*. While the District 1 Appellate Court could in theory posit holding *c* again, the District 1 Trial Court cannot do so on its own initiative because it is required to accept the District 2 Appellate Court's implication that *c* is false as "Stare decisis" authority. One reason why the Supreme Court might choose to limit the intermediate court's holding in a situation like this is to emphasize that although the Supreme Court could have relied on the appellate court's analysis at time 1 as persuasive authority in favor of holding *e*, the Supreme Court actually relied on different reasons for positing holding *e*.

Is it possible to create an accurate model of the authority commitments in Example 2 without invoking the concept of an "attribution holding"? One approach would be, instead of modeling "Opinion 1 posits only *d*," simply to change the event that occurred at time 1 from "Opinion 1 posits *c*" to "Opinion 1 posits *d*," to

Table 6 Authority commitments at time 3 in Example 2

	SUP	APP1	TRI1	APP2	TRI2
a	F-P	F-H	F-H	F-D	F-C
b	F–P	F-H	F-H	F-D	F-C
c	F-P	F-H	F-H	F-D	F-C
d	F-P	T-D	T-C	F-D	F-C
e	T-D	T-C	T-C	T-C	T-C
Opinion 1 (APP1) posits only *d*	T-D	T-C	T-C	T-C	T-C

correspond with the Supreme Court's instructions about how the opinion should be read. Under that approach, the set of authority commitments for holdings *a*-*e* at time 3 would be exactly the same as in the table above. However, there would be four drawbacks. First, the set of authority commitments shown in the truth tables for times 1 and 2 would be very different, which would create a problem for researchers who wanted to learn the state of authority commitments at earlier times. Second, researchers who attempted to verify the information in the model would find nothing to alert them to the fact that the textual support for the conclusion that "Opinion 1 posits only *d*" appeared in a Supreme Court opinion issued at time 3, and the researchers might conclude that the information in the model was based on the model's creator's own misreading of the District 1 Appellate Court opinion issued at time 1. Third, there would be nothing in the model to alert researchers to the fact that lower courts would be violating the rules of precedent if they contradicted the holding "Opinion 1 posits only *d*," for instance, if the District 2 Appellate Court was to hold at time 4 that "Opinion 1 posits only *e*." Fourth, there would be nothing in the model to indicate that any negative treatment of the holding "Opinion 1 posits only *d*" could impact the meaning of the District 1 Appellate Court opinion at time 1. For instance, the model would fail to reflect that if the Supreme Court withdrew Opinion 3 for reconsideration or rejected it in its entirety, then other courts would once again be free to posit that the District 1 Appellate Court posited holding *c* at time 1. For these four reasons, Opinion 3's holding about Opinion 1's holding cannot be modeled simply as a change to the holding of Opinion 1.

Other approaches that avoid the concept of an attribution holding are even worse. If the model stated that the Supreme Court posited at time 3 that holding *c* was false, that would be inaccurate because it would indicate that the District 1 Appellate Court was barred from positing *a*, *b*, or *c*. If the model stated that the Supreme Court posited at time 3 that holding *c* was to be considered undecided, that would incorrectly indicate that the Supreme Court contradicted the District 2 Appellate Court's holding that *d* was false. If the model stated that the Supreme Court opinion caused the District 1 Appellate Court to be deemed to posit *d* at time 3 instead of *c* at time 1, it would lead to the incorrect conclusion that the District 1 Trial Court was prohibited from contradicting $\neg d$ at time 2. Nor would it be accurate to say that the Supreme Court opinion had the effect of causing the District 1 Appellate Court to posit at time 3 that *c* was false or undecided. Based on the above, it appears that the most obvious alternative models that omit the concept of an "attribution" holding result in systematic errors when used to determine which holdings are binding in which courts.

5.3 Example 3: attributing holdings to higher court

Time 1: SUP issues Opinion 1, which posits *c*
Time 2: APP1 issues Opinion 2, which posits "Opinion 1 posits *a*"
Time 3: APP2 issues Opinion 3, which posits "Opinion 1 posits only *d*" (Tables 7, 8)

Table 7 Authority commitments at time 1 in Example 3

	SUP	APP1	TRI1	APP2	TRI2
a	U	U	U	U	U
b	U	U	U	U	U
c	T-D	T-C	T-C	T-C	T-C
d	T-D	T-C	T-C	T-C	T-C
e	T-D	T-C	T-C	T-C	T-C
Opinion 1 (SUP) posits *a*	U	U	U	U	U
Opinion 1 (SUP) posits only *d*	U	U	U	U	U

Table 8 Authority commitments at time 2 in Example 3

	SUP	APP1	TRI1	APP2	TRI2
a	T-P	T-D	T-C	T-H	T-H
b	U	U	U	U	U
c	T-D	T-C	T-C	T-C	T-C
d	T-D	T-C	T-C	T-C	T-C
e	T-D	T-C	T-C	T-C	T-C
Opinion 1 (SUP) posits *a*	T-P	T-D	T-C	T-H	T-H
Opinion 1 (SUP) posits only *d*	F-P	F-D	F-C	F-H	F-H

After Opinion 2, the District 1 Appellate Court's holding "Opinion 1 posits *a*" creates an authority commitment in favor of *a* in every court, with the lesser of the strength that those courts would assign either the District 1 Appellate Court's holding or the Supreme Court's imputed holding. The District 1 Trial Court assigns Controlling strength to holding *a* because the holdings of both the District 1 Appellate Court and the Supreme Court are Controlling to the District 1 Trial Court. Even though the attribution holding "Opinion 1 posits only *d*" has not yet been discussed in any opinion, there are already authority commitments against it because it is contradicted by "Opinion 1 posits *a*" (Table 9).

Table 9 Authority commitments at time 3 in Example 3

	SUP	APP1	TRI1	APP2	TRI2
a	T-P	T-D	T-C	T-H	U
b	U	U	U	U	U
c	T-D	T-C	T-C	T-C	U
d	T-D	T-C	T-C	T-C	T-C
e	T-D	T-C	T-C	T-C	U
Opinion 1 (SUP) posits *a*	F-P	T-D	T-C	F-D	F-C
Opinion 1 (SUP) posits only *d*	T-P	F-D	F-C	T-D	T-C

The District 2 Appellate Court's holding at time 3 actually violates the rules of precedent by contradicting the Supreme Court with its misinterpretation of the Supreme Court's holding. Such violations happen in real life, and it is important for a model of judicial precedent to be able to handle them.

Recall that these truth tables show the one strongest authority commitment for each holding in each court, not every authority commitment. The District 2 Appellate Court's holding "Opinion 1 posits only *d*" does not assert either that holding *a* is false or that it should be considered undecided. Thus, the strongest (and only) authority on the issue of holding *a* for both the Supreme Court and the District 2 Appellate Court is still the Supreme Court's imputed holding *a* described in the holding "Opinion 1 posits *a*." Both the Supreme Court and the District 2 Appellate Court are free to rely upon the holding "Opinion 1 posits only *d*" to reject the holding "Opinion 1 posits *a*," but neither of them is required to do so, because the holding "Opinion 1 posits only *d*" is not Controlling authority for either of them. The situation is different in the District 2 Trial Court, where "Opinion 1 posits only *d*" is Controlling authority. The District 2 Trial Court must accept that the Supreme Court never posited holding *a*, and thus that holding *a* is completely undecided. The District 2 Trial Court also must accept that Opinion 1 never posited holding *c* or implied holding *e*. Although those holdings were recently Controlling authority for the District 2 Trial Court, the District 2 Trial Court is required to follow the more recent Controlling authority in case of a conflict. The District 2 Appellate Court, on the other hand, cannot assign its holding "Opinion 1 posits only *d*" a level of authority any higher than "Decided in current court," so in the future the rules of precedent will continue to demand that the District 2 Appellate Court reject its own decision and follow the Controlling holding of the Supreme Court.

Recall that in Example 2, it was not necessary to separately model the "attribution" holding to create an accurate table of authority commitments at Time 3 after all the opinions had been issued. The same table could be generated by updating the record of the earlier opinion's holding to correspond to the later opinion's instructions about how the earlier opinion should be read. But in Example 3, updating the record of the earlier opinion's holding does not generate the same table of authority commitments at Time 3. Any update to Opinion 1's holding at Time 2 would have to be deleted if Opinion 3 required another update to the same holding at Time 3, which would mean that data relating to Opinion 2 would be completely lost from the model. Also, updating the Supreme Court's holding would give undue deference to the intermediate appellate courts' holdings, because neither intermediate appellate court has absolute power to dictate the meaning of the Supreme Court's holdings to every other court. The following tables show an attempt to model the District Appellate Courts' holdings by updating the record of the Supreme Court's holding (Table 10).

While the deviation is obviously extreme at time 3 between the correct table (Table 9) and the table that relies on updates to the Supreme Court's holding (Table 11), a significant error regarding the level of authority supporting holding *a* has already appeared at time 2, caused by a failure to model only one attribution holding. Once again, these tables show that modeling attribution holdings as updates

Table 10 Authority commitments at time 2 in Example 3, incorrectly modeling attribution holding as update to original opinion

	SUP	APP1	TRI1	APP2	TRI2
a	T-D	T-C	T-C	T-C	T-C
b	U	U	U	U	U
c	T-D	T-C	T-C	T-C	T-C
d	T-D	T-C	T-C	T-C	T-C
e	T-D	T-C	T-C	T-C	T-C

to the original opinion would cause systematic errors in the analysis of which holdings are binding in which courts.

6 Modeling "stealth overruling" of *Miranda*

Based on Friedman's (2010) analysis of what he calls the "stealth overruling" of *Miranda v. Arizona* (1966) 384 U.S. 436, by subsequent United States Supreme Court opinions, it appears that certain holdings that have affected the continued vitality of *Miranda* can only be modeled as "attribution" holdings and not as "disagreement" holdings. (This paper will not attempt to review the extensive available scholarship about *Miranda* to determine whether Friedman is correct. Instead, it will simply attempt to describe the requirements for a model of part of Friedman's analysis.)

Friedman views the 1966 *Miranda* opinion as articulating a constitutional rule interpreting the Fifth Amendment to mean "that a prosecutor 'may not use' statements 'stemming from custodial interrogation' in the absence of 'procedural safeguards effective to secure the privilege against self-incrimination,'" and that the required "safeguards" are "the now-ubiquitous *Miranda* warnings." (Friedman 2010 at 16) However, according to Friedman, the Supreme Court contradicted *Miranda* under the guise of interpretation in its 1984 opinion in *New York v. Quarles*, 467 U.S. 649, 654–55, which held that "[t]he prophylactic *Miranda* warnings… are 'not themselves rights protected by the Constitution.'" (Friedman 2010 at 19) Assuming that a model of a judicial holding contains information about whether the holding purports to interpret a constitutional provision, Friedman

Table 11 Authority commitments at time 2 in Example 3, incorrectly modeling attribution holdings as updates to original opinion

	SUP	APP1	TRI1	APP2	TRI2
a	U	U	U	U	U
b	U	U	U	U	U
c	U	U	U	U	U
d	T-D	T-C	T-C	T-C	T-C
e	U	U	U	U	U

apparently would conclude that *Quarles* attributes a different, and much weaker, holding to *Miranda* than the holding that *Miranda* actually posited. Later, the Supreme Court's 2000 opinion in *Dickerson v. United States*, 530 U.S. 428, 432, "seemingly recant[ed]" *Quarles*'s interpretation of *Miranda* by describing *Miranda* "as a 'constitutional decision' holding that because of the 'coercion inherent in custodial interrogation,' 'certain warnings must be given before a suspect's statement made during custodial interrogation could be admitted into evidence.'" (Friedman 2010 at 20) Thus, it appears that *Dickerson* disagreed with the attribution holding in *Quarles* by attributing a holding to *Miranda* much closer to the holding posited by *Miranda* itself. But even if *Dickerson* accurately acknowledged the meaning of *Miranda*'s 1966 holding, it would be wrong to model *Dickerson* as reaffirming *Miranda*'s holding in the year 2000. In fact, the *Dickerson* opinion has been described as a strategic decision by Chief Justice Rehnquist, who authored the lead opinions in both *Dickerson* and *Quarles*, to preserve the Supreme Court's post-1966 exceptions to the *Miranda* rule despite the other justices' unwillingness to hold that *Miranda* could be superseded by a statute. (Katz 2006 at 328, 339) While *Dickerson* explicitly declines to overrule *Miranda* (*Dickerson* at 432), *Dickerson* also states that "no constitutional rule is immutable" and acknowledges that the *Miranda* rule had been subject to "modifications" including the "public safety" exception created by *Quarles* (*Dickerson* at 441) Subsequent cases showed that *Dickerson* did not restore *Miranda* to the same vitality it had in 1966, as later opinions like *United States v. Patane* (2004) 542 U.S. 630 and *Berguhis v. Thompkins* (2010) 130 S. Ct. 2250 continued to cut back on the scope of *Miranda*'s exclusionary rule. (Friedman 2010 at 21–23).

Friedman's narrative seems to verify that actual judicial opinions sometimes contradict earlier opinions by attributing holdings to them. But it should be possible to test that conclusion by building a simple model of the court's authority commitments, similar to the model created for the hypothetical holdings above in Sect. 5. Friedman's interpretation of *Miranda* and its progeny indicates that, at one time or another, the Supreme Court discussed all four of the following holdings interpreting *Miranda*'s exclusionary rule (which are stated here in only enough detail to highlight where they imply one another):

a: A constitutional exclusionary rule always applies to statements elicited from a suspect without procedural safeguards for the privilege against self-incrimination

b: An exclusionary rule always applies to statements elicited from a suspect without procedural safeguards for the privilege against self-incrimination

c: A constitutional exclusionary rule sometimes applies to statements elicited from a suspect with neither procedural safeguards for the privilege against self-incrimination nor a public safety justification

d: An exclusionary rule sometimes applies to statements elicited from a suspect with neither procedural safeguards for the privilege against self-incrimination nor a public safety justification

Specifically, according to Friedman, *Miranda* posited holding *a* and *Dickerson* later correctly attributed holding *a* to *Miranda*. Holding *b* was never posited by any

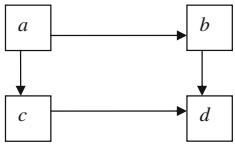

Fig. 3 Implication relations of four holdings from *Miranda, Quarles*, and *Dickerson*

opinion, but it is the holding that *Quarles* attributed to *Miranda*. Holding *c* was posited by *Dickerson*, and holding *d* was posited by *Quarles* in disagreeing with *Miranda*. Like the holdings in the hypothetical example, these holdings can be described by their implication relations. Holding *a* implies both holding *b* and holding *c*, while holdings *b* and *c* each imply holding *d* (Fig. 3).

Because the opinions in *Miranda*, *Quarles*, and *Dickerson* were all issued by the United States Supreme Court, and the Supreme Court's holdings are controlling authority in all US courts other than the Supreme Court itself, this extremely simple model of the judicial system will be adequate (Fig. 4):

For purposes of this example, the three opinions can be summarized as follows:

1966: SUP issues *Miranda*, which posits *a*
1984: SUP issues *Quarles*, which posits *d*, ¬*b*, ¬*c*, and "*Miranda* posits only *b*"
2000: SUP issues *Dickerson*, which posits *c* and "*Miranda* posits *a*"

Assuming that *Miranda*, *Quarles*, and *Dickerson* are the only three relevant opinions, the resulting tables of authority commitments look like this (Tables 12, 13):

Again, the practical effect of an "attribution" holding such as "*Miranda* posits *a*" is that when an opinion O1 posits that some opinion O2 posited a holding *h*, each court C is required to assign the imputed holding *h* the lesser of the level of authority that court C would assign to a holding of opinion O1 or of opinion O2. Here, even after *Dickerson* posits its broad reading of *Miranda*, *Miranda* is still not the source of the strongest authority commitment as to any of the holdings *a*–*d* in any court (Table 14).

These tables help to explain why *Dickerson*, although it was a pro-*Miranda* decision, did not restore *Miranda* to its former significance in establishing pro-defendant rules of criminal procedure. In 1966, *Miranda* was controlling authority in favor of holdings *a* and *b*, but in 2000 lower courts were still committed to reject holdings *a* and *b* due to the lingering effect of *Quarles*, which was only partially abrogated by *Dickerson*.

Admittedly, in the *Miranda* example, the presence of attribution holdings does not change the authority commitments in any court as to any of the holdings *a*–*d*. Regardless of whether *Miranda* posited *a* or *b*, the holdings of *Quarles* contradict both *a* and *b*, and the holdings of *Quarles* supplant the holdings of *Miranda* as controlling authority. Nonetheless, judicial authority about what the law was in the

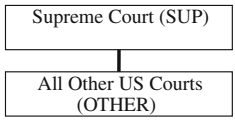

Fig. 4 A simple hierarchical relationship between the Supreme Court and other courts

Table 12 Authority commitments in 1966 after *Miranda*

	SUP	OTHER
a	T-D	T-C
b	T-D	T-C
c	T-D	T-C
d	T-D	T-C
Miranda posits only *b*	U	U
Miranda posits *a*	U	U

Table 13 Authority commitments in 1984 after *Quarles*

	SUP	OTHER
a	F-D	F-C
b	F-D	F-C
c	F-D	F-C
d	T-D	T-C
Miranda posits only *b*	T-D	T-C
Miranda posits *a*	F-D	F-C

Table 14 Authority commitments in 2000 after *Dickerson*

	SUP	OTHER
a	F-D	F-C
b	F-D	F-C
c	T-D	T-C
d	T-D	T-C
Miranda posits only *b*	F-D	F-C
Miranda posits *a*	T-D	T-C

past (or what it is deemed to have been in the past) can have several uses for researchers. For instance, under the "qualified immunity" doctrine of *Harlow v. Fitzgerald* (1982) 457 U.S. 800, in a lawsuit for a constitutional tort the plaintiff generally has the burden to prove not just that a government official violated a constitutional right but also that the right was "clearly established" at the time of the violation. A plaintiff alleging a *Miranda* violation in a constitutional tort lawsuit thus might need to make arguments not only about whether the *Miranda* doctrine was currently understood to have a constitutional basis, but also about whether the *Miranda* doctrine was deemed to have had a constitutional basis in the era between *Miranda* and *Quarles*. Another group that could benefit from a model incorporating attribution holdings might be researchers interested in performing studies of lower court compliance with Supreme Court precedent along the lines of the studies found in (Benesh and Reddick 2002) and (McClurg and Comparato 2003). For instance,

researchers might want to compare the rate of compliance with *Miranda's* original holding to the rate of compliance with a holding later attributed to *Miranda*. Researchers also might want to study whether lower court noncompliance with a Supreme Court opinion can influence the Supreme Court to attribute a narrower meaning to that opinion. Either of these questions would be much more difficult to research without an explicit model of incidents where one opinion has attributed a holding to another opinion.

7 Discussion

It probably goes without saying that the rules of precedent in this hypothetical judicial system do not correspond with the rules in every real-world common law jurisdiction, and may not exactly correspond with the rules in any of them. For instance, in some jurisdictions certain courts may lack the power to overrule their own precedents, effectively eliminating the distinction between "Controlling" and "Decided in current court" authority for those courts. That was the case in the British House of Lords prior to 1966, as discussed in (Leach 1967). In other jurisdictions, certain courts may issue opinions either as a panel or en banc, and may only overrule their own panel opinions by issuing en banc opinions, as discussed in (Kannan 1993). Although there are many variations in the rules of precedent in different jurisdictions, such variations are likely to result in even greater complexity than in the hypothetical judicial system, so it is unlikely that such variations would make it possible to simplify the model by eliminating the concept of attribution holdings.

It would be possible to complicate the model further by assuming that appellate courts have the power to posit that certain holdings that are to be assigned at most "Persuasive only" authority in future cases, because the holdings are considered dicta or are disfavored for some other reason. This added layer of complexity may or may not be a necessary feature of a complete model of judicial authority in a common law system, but if so, it establishes an additional reason why such a model needs to distinguish between "disagreement" and "attribution" holdings.

7.1 Uncontradicted consequences of contradicted holdings

It might appear at first that the model of precedent in this paper needs an additional rule to detect when one holding has contradicted another holding, and then to treat all of the consequences of the contradicted holding as if they too had been contradicted (either by assigning them the opposite of their current truth value or by assigning them the truth value "Undecided"), on the assumption that those holdings have been undercut and now have no justification. For an example of this phenomenon, refer back to Example 1 in Sect. 5.1 above. At time 2 in Example 1, the District 1 Appellate Court's opinion posits c, and at time 2, the Supreme Court's opinion posits $\neg d$, which contradicts c and commits the District 1 Appellate Court to accept the position $\neg c$. So it seems tempting to conclude that the District 1 Appellate Court's opinion can no longer be considered a source of authority for c's

logical consequence *e*. However, this conclusion cannot be justified by the abstract logical relationship between ¬*d* and *e*, because it is not a valid rule of inference that statements can be deemed to contradict every logical consequence of every statement that they contradict.[3] To explain why the holding ¬*d* contradicts the holding *e*, it would be necessary for the Supreme Court's holding in Opinion 3 to say something *about* the District 1 Appellate Court's holding in Opinion 2. However, nowhere in Example 1 does it say that Opinion 3 cites Opinion 2 or even mentions holding *c*. It would have been possible within the model for Opinion 3 to have posited an attribution holding stating that Opinion 2 should no longer be deemed to have held *c*. But Opinion 3 did not make any such assertion about Opinion 2, and it appears counterproductive for the model to incorporate a rule that implicitly deems Opinion 3 to have done what it could have done explicitly.

Another useful question to ask is whether real judicial opinions are actually likely to contradict a prior opinion's holding without positing that the prior holding should be disregarded, or whether these two methods of contradiction are so likely to occur together that there is no need to model them separately. In fact, it appears that contradicting a prior opinion's holding without positing that the prior holding should be disregarded is a good description of what opinions do when they "partially overrule" or "carve out an exception" from a prior opinion's holding. As an illustration, imagine that holdings *a* through *e* in Example 1 were the following holdings loosely based on Waldron's (1994 at 537) "ambulance" variation on Hart's (1958) famous "vehicles in the park" hypothetical (keeping in mind that *a* and *b* each imply *c*, and *c* implies both *d* and *e*, as illustrated in Fig. 2 above):

a: Driving a vehicle in the park is always a felony
b: Driving a vehicle in the park is always a misdemeanor
c: Driving a vehicle in the park is always a crime
d: Driving an ambulance in the park is always a crime
e: Driving a motorcycle in the park is sometimes a crime

In Opinion 2 in Example 1, an intermediate appellate court posits *c*, which in this illustration we take to mean "Driving a vehicle in the park is always a crime." Thus, as illustrated in Table 2 above, both trial courts are committed to accept not only holding *c* but also the two holdings implied by holding *c*, which are "Driving an ambulance in the park is always a crime" and "Driving a motorcycle in the park is sometimes a crime." As Waldron points out, the holding that driving an ambulance in the park is always a crime is likely to cause injustice because someone might use an ambulance to respond to a medical emergency in the park. It is certainly understandable why the Supreme Court would choose to posit in Opinion 3 that driving an ambulance in the park is not always a crime (in other words, to posit the negation of *d*). What is less obvious is whether the ambulance counterexample would motivate the Supreme Court to completely eliminate Opinion 2 as a source of precedential authority. Although the negation of *d* flatly contradicts the holding that driving a vehicle in the park is always a crime (as well as the more specific holdings

[3] That is to say, "$(x \rightarrow y) \rightarrow ((z \rightarrow \neg x) \rightarrow (z \rightarrow \neg y))$" is not valid because it is falsifiable where x is false but y and z are true.

that it is always a felony or misdemeanor), it does not contradict the narrower holding that driving a motorcycle in the park is sometimes a crime. It seems plausible, in this illustration, that the Supreme Court would allow the trial courts to continue enforcing holding *e* to keep undesirable vehicles out of the park. As Waldron notes, a court's decision to posit that driving an ambulance in the park is not always a crime would not be based on whether an ambulance comes within the definition or the "penumbra" of the word "vehicle" as used in rule *c*, because an ambulance is a paradigm case of a vehicle rather than a borderline case of a vehicle. The better explanation for why a court would posit $\neg d$ is that, for policy reasons, the court is carving out an exception to rule *c*, that is, partially disagreeing with it.

7.2 Positing and positivism

Another possible objection to the type of model proposed in this paper might come from those who believe that statements of law posited by a judicial opinion are not really holdings of the opinion. For instance, some people might believe that it would be an illegitimate usurpation of the legislative power (even in a common law jurisdiction) for judges to formulate an abstract legal rule and to impose that rule on other courts by publishing the rule in a judicial opinion. They might believe that any abstract rules which are "holdings" of a case are generated only as a side effect of the judges' resolution of the specific dispute in the case, which could mean that the judges could generate holdings without "positing" them in any meaningful sense. Or, they might believe that the holdings of an opinion do not take the form of rules at all, consisting instead of some combination of other features of the case. This paper has attempted to accommodate the broadest possible range of understandings of what a "holding" might be. However, the usefulness of a model of contradictions between holdings probably depends at least on the assumptions that holdings are things that can imply or contradict one another, and that those implication or contradiction relationships are discoverable by legal analysts. The term "posit" seems to be a useful way to signal those assumptions, although the term's use is obviously suggested by legal positivism. Non-positivists still might query whether this commitment to positivism goes beyond terminology, or whether the distinction between "disagreeing" and "attributing" is equally important to a model that describes opinions as "generating" or "announcing" holdings rather than "positing" them.

8 Problems and future work

This paper has attempted to prove that attribution holdings are a necessary feature of a model of judicial precedent, but it has done so without providing either a computable model of judicial precedent or a full formal specification of the logical foundations of such a model. At this stage, any conclusions about how such models would work are necessarily tentative. One question that appears significant is how to limit the number of possible holdings represented within the model. A potential solution would be only to track authority commitments as to holdings that have

actually been posited or attributed by some opinion, but it might also be desirable to track authority commitments as to hypothetical holdings that can be inferred from the union of two known holdings (see Branting 1991). Depending on how holdings are defined, the number of hypothetical holdings could be infinite. It also appears that in cases where an earlier opinion posits some holding h and a later opinion overrules the earlier opinion by positing $\neg h$, it may be possible to formulate a large number of hypothetical holdings that are implied by h (and may be extremely similar to h), but that are not contradicted by $\neg h$ and thus are not deemed to have been overruled. In the examples in this paper the attribution holdings helped to limit the lingering precedential effect of such partially overruled holdings, but it is not clear that attribution holdings provide a complete explanation of how courts handle this problem in practice. These may be worthy subjects for future work to examine.

Finally, this paper has asserted the implication relations between the holdings without proving them formally, even in the example based on real cases. To the extent that significant inferences can be drawn from these relations, it appears that substantial benefits would flow from an efficient procedure or algorithm to determine when one judicial holding implies or contradicts another. The creation of such a procedure is another important subject for future work.

9 Conclusion

Although in basic cases it may be unimportant to understand whether an opinion "disagreed with" a holding of an earlier opinion or "attributed" a holding to the earlier opinion, in more complex cases the difference between these two methods of contradiction proves very significant to the resulting authority commitments. Thus, it appears that a model of contradictions in judicial authority does need to distinguish between these two methods of contradiction.

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