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ARTICLE

Normative Diagrams as a Tool for Representing Legal Systems

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Abstract
The paper at hand introduces and discusses a diagrammatic method to represent legal norms first developed by the second author. It is shown how this method can be used to represent not only norms and argument forms originating from classic legal methodology (legal subsumption, analogy, appeal to the contrary), but also more complex legal-theoretical phenomena, especially legal antinomies. Beyond its didactic virtues, the diagram is a useful theoretical tool for investigating how norms interact with each other and how singular actions can be considered as satisfying or violating a given norm.

Keywords Normative diagrams · Formal representation of norms · Legal antinomies · Legal methodology

1 Introduction

The paper at hand introduces and discusses a diagrammatic method for representing (legal) norms and related legal-theoretical phenomena, such as normative conflicts (antinomies). These *normative diagrams* are based on elements of Legal Theory (especially Legal Positivism—the ideas presented here are based particularly on Bobbio's works, cf. particularly [5]) and were first developed with didactic purposes by the second author, who has been successfully employing them in his lecture notes for several years. Section 2 outlines the construction of the diagrams, as well as some of their legal-theoretical motivations; Sect. 3 discusses the representation of

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Table 1 Analysis of a norm's validity dimensions and deontic value

It is forbidden	for lawyers	to smoke	in the courtroom	during a trial
Deontic value	Subject	Object	Space	Time

subsumptive reasoning and analogy arguments, and appeals to the contrary within the diagrams; Sect. 4. shows how the diagrams can be used to represent legal antinomies and more complex normative situations; Sect. 5 discusses how the diagrams can be employed to better visualise the so-called *partial–partial* conflicts between norms, thus enabling the proposal of new solution approaches to these conflicts. Finally, Sect. 6 concludes and refers to future work.

2 Basic Structure and Theoretical Motivation

In general terms, a norm can be defined as being a deontic valuation ranging over a validity domain. With respect to the deontic valuation, one can distinguish between three deontic values: (1) *prohibition*, (2) *obligation*, and (3) *permission*. Here, these values shall be considered as being disjoint. A norm's validity domain can be seen as stretching throughout four dimensions, which, respectively, refer to (1) time, (2) space, (3) subject, and (4) object of the norm's validity domain (cf. [5, p. 214], [10, p. 116-119], [13, p. 85]). The basic idea is that an action (objective dimension) is performed by some agent—or by a group thereof—(subjective dimension) in a specific place during a specific time period (spatial and temporal dimensions). This action can then be classified as being forbidden, obligatory, or permitted (deontic value). This way of analysing norms is exemplified in Table 1.

In its 'complete' form, the normative diagram would consist of a four-dimensional coordinate system—each coordinate corresponding to one of the four dimensions of a norm's validity domain. For example, if it is assumed that the action of smoking is delimited by the values o_1 and o_2; the set of all lawyers by the values s_1 and s_2; the courtroom by the values r_1 and r_2; and the time during which a trial is being held by t_1 and t_2, then the validity domain of the norm represented in Table 1 (let this norm be called ϕ) can be defined as being the set

$$U_\phi = \{ < o_a, s_b, r_c, t_d > \mid o_a \in [o_1, o_2] \wedge s_b \in [s_1, s_2] \wedge r_c \in [r_1, r_2] \wedge t_d \in [t_1, t_2] \}. \tag{1}$$

U_ϕ is in other words the set of all points (ordered quadruples) in the four-dimensional metric space corresponding to the norm ϕ's validity domain.

Albeit this is not a relevant problem for computer programs, a four-dimensional metric space is, for humans, unintuitive and difficult to visualise. Luckily, general norms' regulation spectrum usually encompasses actions committed by any subject at any given place or time. Hence, it is possible to simplify the diagram by omitting the dimensions fully contained in the norm's validity domain. Indeed, most normative phenomena can be adequately represented in a diagram containing only one (usually the objective dimension) or at most two dimensions

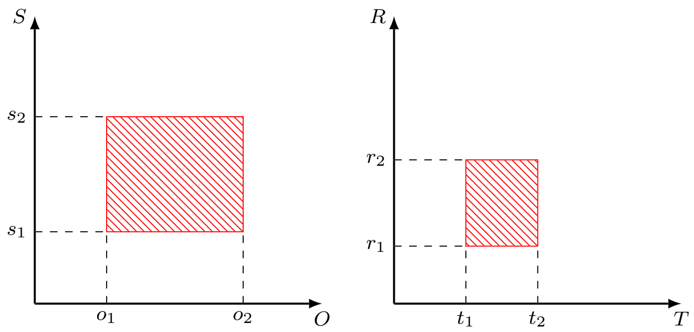

Fig. 1 Normative diagrams for ϕ

(e.g., the objective and the temporal or the objective and the subjective dimensions). Even if all four dimensions have to be analysed, it is still possible to simplify the representation, e.g., by constructing several diagrams encompassing one or two dimensions. In addition, when available, different colours can be used to represent different deontic values. Here, the colour red is used to indicate the value *prohibition*. Similarly, the colours blue and yellow shall be employed to represent, respectively, the values *obligation* and *permission*.

Figure 1 shows how the norm ϕ can be represented using two diagrams. The diagram on the left shows the extension of the norm's validity domain (U_ϕ) over the subjective (S) and the objective (O) dimensions; the diagram on the right shows this extension over the spatial (R) and temporal (T) dimensions.

3 Representing Legal Arguments within the Diagram

For the purposes of the discussions below, the following definitions are assumed:

Definition 1 (Legal Argument) A legal argument is a method for inferring a legal decision for a given concrete case from one or more general norms. The fact that a legal decision $\mathfrak{D}(\mathfrak{C})$ for a given concrete case $\mathfrak{C}$ is inferred from a general norm ϕ by some argument form (or method) M shall be written as $\phi \stackrel{\Delta \mathrm{M}}{=} \mathfrak{D}(\mathfrak{C})$.

Definition 2 (Concrete Case) A concrete case $\mathfrak{C}$ is a point on the normative diagram, i.e., a quadruple $< o_a, s_b, r_c, t_d >$.

In other words, a concrete case is a precise description of some specific action o_a, carried on by some subject s_b at place r_c and time t_d.

Table 2 Legal syllogism and classic *modus barbara*

Legal Syllogism	Classic *modus barbara*
(1) It is obligatory for P to keep all of his promises	(1) P keeps all of his promises
(2) *A* is a promise of P	(2) *A* is a promise of P
(3) Therefore: It is obligatory for P to keep *A*	(3) Therefore: P keeps *A*

Definition 3 (Legal Decision) A legal decision $\mathfrak{D}(\mathfrak{C})$ for some case $\mathfrak{C}$ is a norm whose validity domain $U_{\mathfrak{D}(\mathfrak{C})}$ contains only the concrete case $\mathfrak{C}$. In other words, $U_{\mathfrak{D}(\mathfrak{C})} = \{\mathfrak{C}\}$. A decision $\mathfrak{D}(\mathfrak{C})$ shall also be called a "(possible) solution" to $\mathfrak{C}$.

Due to the extension of their validity domains, legal decisions can also be called *atomic* or *punctual norms*.

3.1 Legal Subsumption

Legal subsumptive reasoning (*legal syllogism*) is often seen as the most simple form of law application. Its structure is usually defined as being analogous to classic subsumptive reasoning, e.g., in the form of the so-called *modus barbara* of Aristotelian Syllogistic (cf. [17, p. 4], [2, p. 364], [3, p. 19-29]). The structural similarity between these argument forms is illustrated in Table 2. It is important to notice that this view implies a major simplification of what a legal syllogism truly is (cf. [4]).

From a logical point of view, solving a concrete case by means of legal subsumption can be reduced to the task of verifying whether this concrete case falls under the validity domain of a given general norm. If so, the solution to the case will result from applying the general norm's deontic value to the respective concrete case. For example, let $\mathfrak{C}_1$ be the case "lawyer *Phoenix* smokes in the courtroom during trial T" and $\mathfrak{C}_2$ the case "prosecutor *Miles* smokes in the courtroom during trial T". Evidently, $\mathfrak{C}_1 \in U_\phi$ and $\mathfrak{C}_2 \notin U_\phi$. Thus, a solution for $\mathfrak{C}_1$ can be derived by legal subsumption; it will consist of the atomic norm $\mathfrak{D}(\mathfrak{C}_1)$, which prescribes the prohibition of the action described in $\mathfrak{C}_1$, i.e., $\mathfrak{D}(\mathfrak{C}_1)$ prescribes "it is forbidden for lawyer *Phoenix* to smoke in the courtroom during trial T". Notice that $U_{\mathfrak{D}(\mathfrak{C}_1)} = \{\mathfrak{C}_1\}$. Following *Definition 1*, above, the fact that $\mathfrak{D}(\mathfrak{C}_1)$ can be derived from ϕ by legal subsumption can be stated by the formula

$$\phi \overset{\Delta \mathrm{LS}}{=\!=} \mathfrak{D}(\mathfrak{C}_1). \tag{2}$$

On the other hand, although $\mathfrak{C}_1$ and $\mathfrak{C}_2$ only differ with respect to the subjective dimension, legal subsumption offers no solution for $\mathfrak{C}_2$ on the basis of ϕ alone, for $\mathfrak{C}_2$ is outside of ϕ's validity domain. Figure 2 illustrates how this scenario can be represented by using normative diagrams.

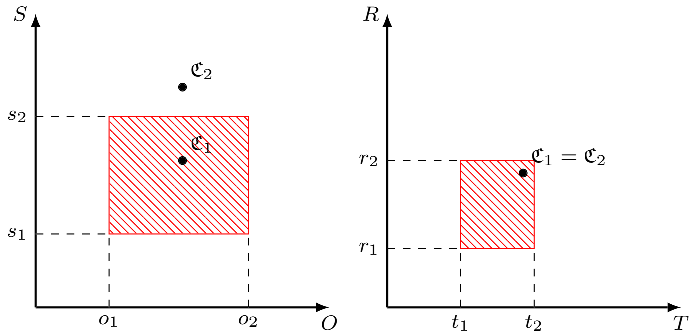

Fig. 2 Legal subsumption for $\mathfrak{C}_1$ and $\mathfrak{C}_2$

3.2 Analogy

Roughly speaking, analogy arguments (*argumenta a simile*) are based on the idea that similar cases should be treated similarly. An analogy argument enables the inference of a solution to a case $\mathfrak{C}$ from some general norm x even if $\mathfrak{C} \notin U_x$, i.e., even if the case $\mathfrak{C}$ is not encompassed by the norm x's validity domain (for otherwise a simple solution by subsumption would be possible and analogy would not be needed)—for details, see [11, p. 105], [17, p. 150]. This, however, is only possible if there is some case $\mathfrak{C}'$ fulfilling the following conditions:

1. $x \stackrel{\Delta \mathrm{M}}{=} \mathfrak{D}(\mathfrak{C}')$ (in most cases, the method M in question is legal subsumption).
2. $\mathfrak{C}$ and $\mathfrak{C}'$ are *(sufficiently) similar*, i.e., for some previously defined similarity relation S, $\mathrm{S}(\mathfrak{C}, \mathfrak{C}')$ holds.

For example, in the situation described above in Fig. 2, one could, based on the similarity between lawyers and prosecutors, argue that cases $\mathfrak{C}_1$ and $\mathfrak{C}_2$ are sufficiently similar. Hence, since $\phi \stackrel{\Delta \mathrm{LS}}{=} \mathfrak{D}(\mathfrak{C}_1)$ holds, one would be entitled to infer a (possible) decision $\mathfrak{D}(\mathfrak{C}_2)$ to case $\mathfrak{C}_2$ by means of analogy. This can be stated by the formula

$$\phi \stackrel{\Delta \mathrm{A}}{=} \mathfrak{D}(\mathfrak{C}_2). \tag{3}$$

Decision $\mathfrak{D}(\mathfrak{C}_2)$ prescribes "it is forbidden for prosecutor *Miles* to smoke in the courtroom during trial T".

From a practical point of view, analogy arguments lead to an extension of a norm's validity domain so as to also include cases that, while outside of its explicit scope, are nonetheless sufficiently similar to cases inside it.

Figure 3 illustrates this extension of ϕ's validity domain. The interval $[s_2, s_n]$ represents the range over which ϕ's validity domain can be extended over the subjective dimension by means of analogy. Intuitively, this range represents the set of all subjects *sufficiently similar* (with respect to the regulatory context) to elements included in ϕ's

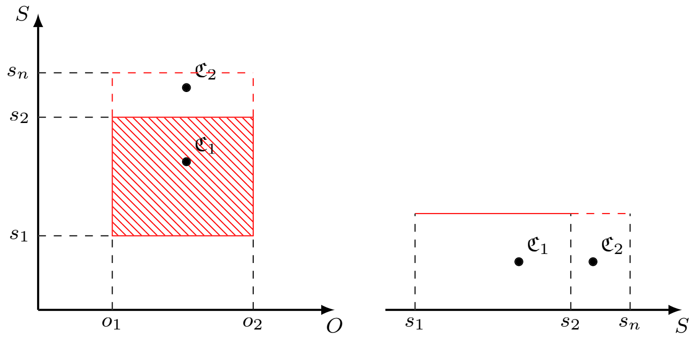

Fig. 3 Extension of U_ϕ by the use of analogy

subjective dimension, i.e., to lawyers. The diagram on the right side of Fig. 3 is a one-dimensional diagram: it only shows the subjective dimension. When using such diagrams, it is convenient to represent concrete cases as points beneath the lines representing the norms regulating them.

3.3 Appeal to the Contrary

Appeals to the contrary (*argumenta e contrario*) are based on the idea that the legislator, when setting a norm, exhaustively enumerated the cases to be regulated accordingly. Thus, all cases falling outside of its validity domain are to be decided in a *contrary manner*. This usually means that cases outside the scope of a prohibition or an obligation are to be seen as permitted and cases outside a permission are to be seen as prohibited (for details, cf. [5, p. 251–257], [15, p. 325]; cf. also the critique in [11, p. 129–132]). Following this idea, since $\mathfrak{C}_2 \notin U_\phi$, one could infer a decision $\mathfrak{D}(\mathfrak{C}_2)'$ for $\mathfrak{C}_2$ by appeal to the contrary. This would be represented by

$$\phi \overset{\Delta C}{=\!=} \mathfrak{D}(\mathfrak{C}_2)'. \tag{4}$$

Decision $\mathfrak{D}(\mathfrak{C}_2)'$ prescribes "it is permitted for prosecutor *Miles* to smoke in the courtroom during trial T".

Figure 4 shows how normative diagrams can be used to show the way appeals to the contrary work.

The dashed yellow arrows represent the *exclusion* of all cases outside of U_ϕ from ϕ's deontic valuation (the colour yellow is used to represent permissions). Case $\mathfrak{C}_3$ differs from $\mathfrak{C}_2$ in the objective dimension, i.e., it is a case in which the same subject of $\mathfrak{C}_2$ does a different action. Let it be, e.g., the case "prosecutor *Miles* drinks beer in the courtroom during trial T". If $\phi \overset{\Delta C}{=\!=} \mathfrak{D}(\mathfrak{C}_3)$ is successful, then the solution to this case (i.e., $\mathfrak{D}(\mathfrak{C}_3)$) would prescribe: "it is permitted for prosecutor *Miles* to drink beer in the courtroom during trial T".

It is important to notice that, overall, appeals to the contrary are relatively weak, highly context-dependent arguments. In particular, the success of an appeal to the contrary with respect to some case $\mathfrak{C}$ usually presupposes that there are no norms

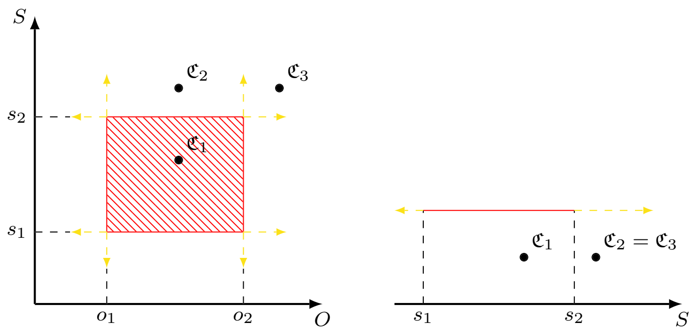

Fig. 4 Exclusion of U_ϕ by the use of appeal to the contrary

which explicitly regulate this case, i.e., no norms x such that $\mathfrak{C} \in U_x$. In this sense, appeals to the contrary could be considered equivalent to subsumptions under what Bobbio calls the *general exclusive norm* (*norma generale esclusiva*) [5, p. 251-256], i.e., the principle "what is not prohibited (or obligatory) is allowed". In this case, however, a legal decision would not be inferred by appeal to the contrary from a single norm, but from the whole legal order. Thus, if a legal order is represented by $\mathfrak{O}$, one would write $\mathfrak{O} \overset{\Delta C}{=\!=} \mathfrak{D}(\mathfrak{C})$ for some case $\mathfrak{C}$.

4 Legal Antinomies and More Complex Normative Situations

4.1 Legal Antinomies

Definition 4 (Legal Antinomy (Classic View)) A legal antinomy (normative conflict) is a relation between two norms x and y which is satisfied if and only if

(1) $U_x \cap U_y \neq \emptyset$;
(2) x and y have different deontic values.

This definition is based on [7, p. 160] and especially [5, p. 209-216]. Normative diagrams offer a very elegant way of representing antinomies, especially if different colours can be used for representing different deontic values. For example, the normative conflict between the norms ρ ("it is forbidden to sell or smoke cigarettes inside public buildings") and σ ("it is allowed to smoke in the grounds of Saarland University") can be represented as in Fig. 5.

The objective dimension of the action of selling cigarettes is defined by the interval $[o_1, o_2]$; values in $[o_2, o_3]$ correspond to smoking cigarettes, and those in $[o_3, o_4]$ to smoking things other than cigarettes (e.g., pipes, cigars, etc.). Similarly, the interval $[r_1, r_3]$ represents all areas inside public buildings; $[r_2, r_3]$ refers to areas inside public buildings which also belong to the grounds of Saarland University. The

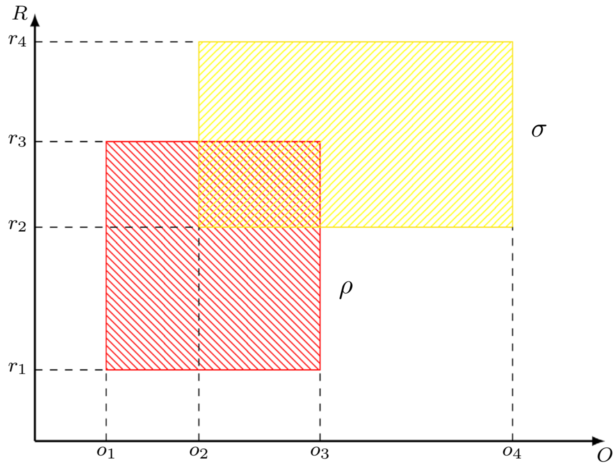

Fig. 5 Representation of a legal antinomy

conflict between the norms ρ and σ occurs in the intersection between these norms' validity domains (i.e., between the rectangles on the diagram). This intersection represents the cases in which lawyers smoke cigarettes inside public buildings that belong to the grounds of Saarland University.

It is common to distinguish between *apparent* and *real* antinomies.

Definition 5 (Apparent and Real Antinomies) An antinomy is called apparent (pseudo-antinomy) if at most one solution to it can be inferred from one of the established criteria for solving antinomies (cf. Definition 6). It is called real if it is not apparent [5, p. 218].

Definition 6 (Criteria for Solving Antinomies) Legal Methodology offers three established criteria for solving antinomies [5, p. 218–222]:

(1) Temporal criterion (*lex posterior derogat legi priori*)—a more recent norm overrides older norms.
(2) Speciality criterion (*lex specialis derogat legi generali*)—a more specific norm overrides more general norms.
(3) Hierarchical criterion (*lex superior derogat legi inferiori*)—a hierarchically superior norm overrides lesser norms.

To apply these criteria, it is necessary to consider three properties of norms: (1) generality, (2) hierarchy, and (3) the time of its introduction to the legal order. All of these properties can be easily represented on the diagrams. Evidently, a norm's generality directly corresponds to the extension of the representation of its validity domain on a diagram. Generally, hierarchy and time can be represented by the use of indexes. However, when using one-dimensional diagrams, it is convenient to

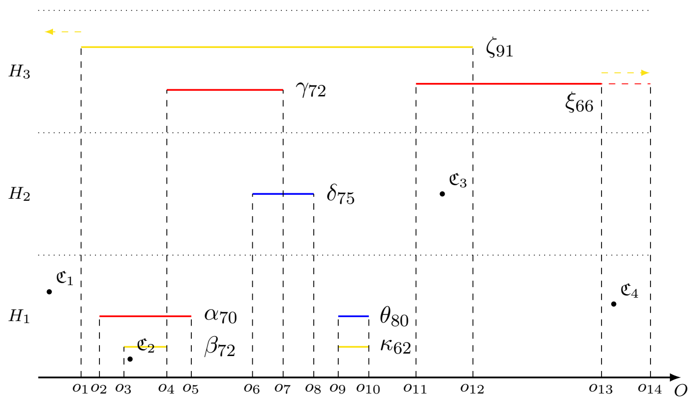

Fig. 6 Representation of a complex normative situation

represent a norm's hierarchy by its vertical position on the diagram. This is exemplified in Fig. 6.

4.2 Complex Normative Situations

Normative diagrams can also be used to represent more complex normative situations, e.g., ones encompassing several norms and various of the normative phenomena briefly discussed above. Figure 6 shows a one-dimensional diagram containing eight norms, which are represented by small greek letters. For all of these norms, one can assume that their respective validity domains encompass all possible time-periods, places, and legal subjects. The objective dimension represented on the diagram is therefore the only relevant one. The numbers indexed to the norms represent the time the norm joined the legal order. Here, one can assume that a higher number means a more recent norm. The areas on the diagram delimited by the dotted lines represent three different hierarchical levels, which are labeled (from the lowest to the highest level) H_1, H_2, and H_3. The diagrams also include four legal cases ($\mathfrak{C}_1$ –$\mathfrak{C}_4$). Their vertical placement on the diagram is chosen by convenience and has no particular meaning.

Several antinomies are represented in Fig. 6. The antinomy $\alpha \times \beta$ is an apparent antinomy which is solvable by both the temporal and the speciality criteria, both of which lead to β overruling α. Such a conflict can be called *total-partial*, for U_α is completely contained in U_β, but not the other way around (cf. [5, p. 215–216], [10, p. 99–103]). Since β prevails over α, case $\mathfrak{C}_2$ can be solved by legal subsumption under β. The antinomy $\delta \times \gamma$ is a real *partial-partial* antinomy: it is solved by the hierarchical criterion in favour of γ; but it is also solved by the temporal criterion in favour of δ. In such cases, the hierarchical criterion usually prevails over the temporal one [5, p. 228–232]. The antinomy $\theta \times \kappa$ is an apparent *total-total* antinomy which is solved by the temporal criterion in favour of θ.

It is important to notice that the criteria for solving legal antinomies presented here are not absolute. Following the definitions above, the antinomy $\zeta \times \xi$ is to be classified as an apparent *partial–partial* antinomy, which is solvable by the temporal criterion in favour of ζ. However, due to their high hierarchical level and their wide validity domain, ζ and ξ are likely general principles of law (e.g., basic rights). Following the established Legal Methodology, conflicts between such general principles are usually solved by methods of weighing and balancing, which also depend on a thoroughly consideration of the respective concrete case (cf. [12, p. 223–232]). Thus, case $\mathfrak{C}_3$ would likely not be really solvable by the criteria presented above. Similarly, the antinomy $\delta \times \zeta$ is a *total–partial* conflict solvable by all three criteria: hierarchy and time speak in favour of ζ; speciality in favour of δ. Although two criteria point to a solution in favour of ζ, one cannot guarantee that this will necessarily be the case. If ζ is a general legal principle, it would not be uncommon for it to have several exceptions. In fact, the norm γ, which also enjoys the highest hierarchical level, seems to be a clear exception to ζ. Thus, depending on the concrete case, the more special norm δ could eventually prevail over ζ, in spite of ζ having a higher hierarchical level (cf. [5, p. 231]).

Finally, cases $\mathfrak{C}_1$ and $\mathfrak{C}_4$ are outside of the validity domain of all the norms represented in the diagram. $\mathfrak{C}_1$ would likely be solvable by an appeal to the contrary based on the whole legal order (i.e., by the principle "what is not prohibited, is allowed"). As it was the case above, the extension in which such arguments could be used in the situation described on the diagram is represented by the dashed yellow arrows. Case $\mathfrak{C}_4$, in its turn, while also solvable by appeal to the contrary, is sufficiently similar to cases regulated by ξ (this is represented by the dashed red line extending ξ's validity domain). Thus, $\mathfrak{C}_4$ could also be solvable by analogy. Such conflicts between appeal to the contrary and analogy correspond roughly to Bobbio's definition of *legal gap* (cf. [5, p. 256]; this definition is somewhat odd, for it seems to mix the concepts of legal antinomies and legal gaps).

5 Visualising and Solving Partial–Partial Antinomies with Normative Diagrams

The advantages offered by normative diagrams in visualising and even finding potential new solutions for problems of legal theory come to the fore when dealing with difficult normative situations, i.e., ones for which classic methods do not seem to be able to provide a clear solution. In the following, one such *difficult situation* shall be discussed, namely the case of partial–partial antinomies, which cannot—at least in principle—be solved by means of the application of the speciality criterion (cf. Def. 6 above), even when the norms involved evidently possess different degrees of generality.

Following established legal scholarship, whenever there is a partial–partial antinomy between two norms, the speciality criterion is *not* applicable. The reason for that is very simple: a collision between a general and a special norm is always, as argued by Bobbio, a total–partial antinomy [5, p. 221]. This makes sense, for the relation between a general norm and a special norm should be a gender–species

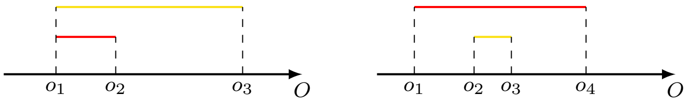

Fig. 7 Normative diagrams showing total–partial antinomies

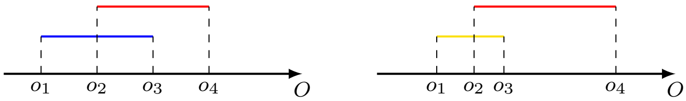

Fig. 8 Normative diagrams showing partial–partial antinomies in which the norms involved have either the same (left) or clearly different (right) degrees of generality

relation. Thus, for example, the relation between a norm that allows smoking in a courtroom and the norm that prohibits smoking cigars in a courtroom is a relation between a general and a special norm, because the action *smoking cigars* can be regarded as a species of the gender-action *smoking*. If *smoking* is general and *smoking cigars* is special, every action of the second kind (i.e., *smoking cigars*) is also an action of the first kind (*smoking*); however, the contrary does not hold: not every action of the first kind is an action of the second kind (e.g., *smoking cigarettes* is an action of the first kind, but not of the second).[1] Normative diagrams can be employed to represent total–partial conflicts between general and special norms, as shown in Fig. 7.

Remember that the generality of a norm is represented in a one-dimensional normative diagram by the length of the line segment corresponding to it: this means that the length of the line segments is proportional to the generality of the norms, respectively, represented by them. In the case of a partial–partial conflict between two norms, the colliding norms being represented can have either the same or different degrees of generality. Hence, their representation as line segments on a one-dimensional diagram can either have the same length or different lengths. This is shown in Fig. 8 (cf. also Fig. 5, above).

The diagrams shown in Fig. 8 help visualising that, irrespective of whether the line segments representing the colliding norms have the same or different lengths, the conflict between them remains a partial–partial one. This is so because, by

[1] The example just mentioned in the text (*smoking* and *smoking cigars*) is based on generality regarding the material or objective dimension of the norm's validity domain. Notwithstanding, in principle, the speciality criterion can be applied with respect to each and every one of the four dimensions of a norm's validity domain: the relation between a norm that allows legal professionals to smoke in a courtroom and a norm that prohibits lawyers to smoke in a courtroom is a relation of generality-speciality regarding the subjective dimension of the validity domain; the relation between a norm that prohibits legal professionals to smoke in a courtroom all day long and a norm that allows them to smoke in a courtroom during the evening is a relation of generality-speciality regarding the temporal dimension of the validity domain; last but not least, the relation between a norm that allows legal professionals to smoke in a public building and a norm that prohibits legal professionals to smoke in a courtroom is a relation of generality-speciality regarding the territorial dimension of the validity domain.

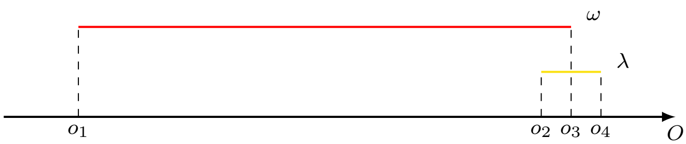

Fig. 9 Partial–partial conflict between the norms ω and λ

definition, a partial–partial conflict occurs when only a part of a norm collides with only a part of another norm.

Now, imagine, e.g., a partial–partial conflict in which the difference between the degrees of generality of the two colliding norms is evidently large. For instance, the conflict between a norm that prohibits all drivers from driving in an unsafe way (let this norm be called ω) and a norm that allows ambulance drivers to drive through red lights when they are responding to an emergency call (λ). This conflict could be represented, as shown in Fig. 9. It is a partial–partial conflict, because, while driving through red lights is usually an unsafe way to drive, it is, nonetheless, *possible* to drive through red lights in a safe way, e.g., if one has clear visibility and can unambiguously see that there are no other vehicles approaching the road-crossing, not even from a distance.

In this conflict, the difference between the degrees of generality of the colliding norms is not only evident: it is also *evidently large*. But since the degree of generality of the colliding norms is irrelevant for the characterization of an antinomy as partial–partial, the conflict represented above remains as a partial–partial antinomy. As already mentioned above, following established legal scholarship, such antinomies cannot be solved by the speciality criterion. However, this seems to be unjustified. The basic idea behind the speciality criterion is that the legislator, by enforcing a norm that regulates a more especial case, considered the particularities of this case in more detail. Thus, such norms should prevail over more general norms. It seems reasonable to apply this same argument to partial–partial conflicts in which the difference between the degrees of generality of the involved norms is evidently large. Using normative diagrams, one can show that such antinomies are much more similar to a total–partial antinomy than to a partial–partial antinomy between norms that share roughly the same degree of generality. This is illustrated in Fig. 10.

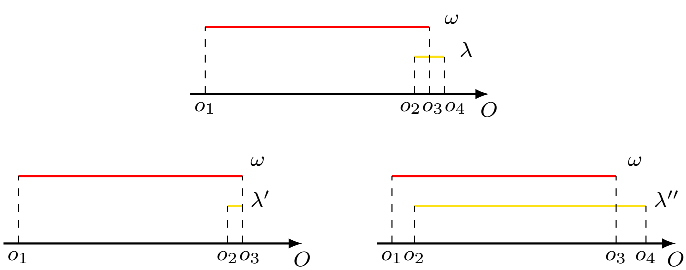

Fig. 10 The partial–partial antinomy between ω and λ (above) is clearly more similar to the total–partial conflict between ω and λ' (left) than to the partial–partial conflict between ω and λ'' (right)

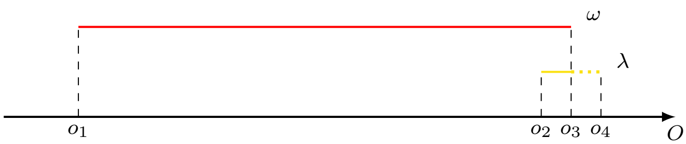

Fig. 11 To treat the Partial–Partial conflict between the ω and λ as a total–total conflict, a part of the norm with lesser generality degree (i.e., λ) is disconsidered

Hence, one could argue that it would be more reasonable to treat the antinomy between ω and λ (Fig. 9) in a similar way as how one treats the conflict between ω and λ', rather than treating it like the conflict between ω and λ''. In other words, it seems reasonable to treat the antinomy $\omega \times \lambda$ as if it were a total–partial antinomy. By doing so, the speciality criterion could be applied and λ would prevail over ω. This would mean disconsidering a part of the norm with lesser generality degree (i.e., disconsidering a part of λ), namely, the part that does not collide with ω. This is illustrated by Fig. 11.

This way of dealing with the antinomy would be justified not because λ is a species of the gender to which ω belongs, but rather because λ is so specific in comparison to ω that the basic idea within the speciality criterion would be applicable: the idea that, when choosing between a more general and a more special norm, it is better to apply the more special one, for what is special is more appropriate to a case than what is general (Bobbio even connects speciality with justice: the more special a norm is the more just it is [5, p. 221]). Thus, it seems reasonable that, in some particular cases, the speciality criterion might be applicable for solving a partial–partial antinomy; and while one could certainly find many good arguments against applying the speciality criterion for solving partial-partial antinomies—again, depending on the case—it is also undeniable that normative diagrams could provide a better visualisation and thus facilitate the identification of cases in which the criterion is applicable, as well as of cases in which it is not.

6 Conclusion and Future Work

Normative diagrams are a powerful tool for visualising several legal-theoretical phenomena. The main advantage of this representation method is its plasticity: while the examples presented above do imply major simplifications of the represented legal phenomena, new elements could be easily introduced to the diagrams to grasp more nuanced aspects of normativity, thus improving the quality of the representation. For instance, the diagram's objective dimension could be refined by adding elements of a *general theory of actions* (cf. [18, 19]). This would enable a more precise metric representation of the degree of similarity between different actions. Other refinements could enable the representation of interactions between legal and moral systems, including, e.g., so-called *ideological legal gaps* (cf. [7, p. 142], [5, p. 257–261]), as well as *Radbruch's Formula* [9].

Another topic for future work is the relationship between the diagrams and other formal methods for representing norms, e.g., (deontic) logic (cf. [8]), normative systems (cf. [1]), input/output logic (cf. [14]), and so-called *Rulebooks* (cf. [6]). For example, deontic logic usually introduces (deontic) *modalities* corresponding to obligation, prohibition, and permission. From a structural perspective, these differ from the deontic *values* introduced here insofar, as modalities operate on linguistic expressions, while the values introduced here act as predicates for abstract objects. In this sense, normative diagrams are closer to the predicate logic-based approach pursued in [16]. An immediate consequence is that the classic inter-definition schemes between the modalities cannot be reproduced: the idea that "it is prohibited to kill" is equivalent to "it is obligatory *not* to kill" loses its meaning if the action of killing is treated as an abstract object, since objects, differently from linguistic expressions, cannot be negated. Thus, another interesting research question concerns the representation of omissions in the diagrams.

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