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## ESSAY

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### CONTRACT LOGIC

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*Conditional statements are central to both contracts and logic, but until now, no scholarship—legal or philosophical—has addressed their intersection. This Essay is the first academic publication to analyze contract language through the lens of logic.*

*Surprisingly, the fundamental principles of classical logic, which many American lawyers learn as undergraduates or when preparing for the Law School Admissions Test, do not operate the same way in contract provisions as they do in the declarative sentences on which this subject traditionally focuses. Indeed, in these two types of statements, the basic concepts of sufficiency and necessity operate in a diametrically opposite manner. Relatedly, a conditional statement's contrapositive does not necessarily follow from that statement in a contract as it does in other settings. Rather than consider each sentence individually per convention, a logic of contracts must incorporate other relevant terms in the same contract, additional terms implied by applicable laws, and canons of interpretation.*

*This Essay makes novel contributions to both legal scholarship and philosophical discourse. In addition to identifying the unique logical characteristics of contract terms, it recasts dispersed default rules as necessary conditions to a provision's enforceability, permitting logical analysis of those rules. With these conceptual advances, lawyers, judges, and legal educators can use the familiar but rigorous system of logic to draft, interpret, and explain contracts more clearly and methodically than ever before.*

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INTRODUCTION .....	2
I. CONDITIONS IN LOGIC .....	5
II. CONDITIONS IN CONTRACTS .....	8
III. THE LOGIC OF CONTRACT CONDITIONS .....	13
CONCLUSION .....	18

## INTRODUCTION

Conditional statements are a fundamental feature of both contracts and logic. Since antiquity, philosophers have explored and debated these sentences' operations and implications in seemingly comprehensive detail.<sup>1</sup> But even with all this time and attention, the resulting literature has not considered how these statements function in contracts, despite their ubiquity, importance, and distinct purposes in this consequential context. Moreover, these theoretically and practically significant issues are completely absent from legal scholarship, which has scrutinized contracts from almost every other angle but not from the perspective of logical analysis.

Filling this void, this Essay is the first academic publication in either discipline to explain the unique logical operations of conditional statements in contracts. In one sense, the absence so far of any such explanation may not be surprising. Logic has traditionally focused on evaluating arguments and the declarative statements that compose them.<sup>2</sup> According to the prevailing classical theory, these statements are either true or false depending on their correspondence to facts in the real world.<sup>3</sup> In contrast, most contract provisions are not intended to accurately describe reality in this manner. Instead, they are used to create legally enforceable rights and obligations that otherwise would not exist.<sup>4</sup> At first glance, these distinct purposes may make logical analysis seem inapplicable to contracts.

But that impression would be mistaken. One of classical logic's fundamental contributions is to precisely explain when and how a compound sentence's

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<sup>1</sup> See Paul Égré & Hans Rott, *The Logic of Conditionals*, STAN. ENCYC. PHIL. (Jul. 3, 2021), <https://plato.stanford.edu/entries/logic-conditionals> [<https://perma.cc/VS6G-GLAL>] (tracing discord among philosophers over the logic of conditionals “back to debates between Megarian and Stoic logicians”).

<sup>2</sup> See PATRICK J. HURLEY & LORI WATSON, *A CONCISE INTRODUCTION TO LOGIC* 1-2 (13th ed. 2018) (stating that the purpose of logic is to evaluate arguments).

<sup>3</sup> See Marian David, *The Correspondence Theory of Truth*, in *THE OXFORD HANDBOOK OF TRUTH* 242-45 (Michael Glanzberg ed., 2018) (discussing a definition of truth based on correspondence to facts).

<sup>4</sup> See RESTATEMENT (SECOND) OF CONTRACTS § 1 (AM. L. INST. 1981) (“A contract is a promise or a set of promises for the breach of which the law gives a remedy, or the performance of which the law in some way recognizes as a duty.”).

truth or falsity depends on the relationships among its components (e.g., the *if* and *then* clauses of a conditional statement).<sup>5</sup> This framework enables thinkers to form and assess complex arguments more systematically and reliably.<sup>6</sup> Analogously, as this Essay demonstrates, a logical analysis of contracts could precisely explain how a provision's applicability and enforceability depend not only on the relationships among its components, but also on its connections with other terms in the same contract and with applicable legal rules and canons of interpretation. This framework could enable lawyers and judges to draft and interpret complex agreements more methodically and reliably, while explaining their decisions more clearly and persuasively.

However, the system of classical logic, which American lawyers usually learn as undergraduates or when studying for the Law School Admissions Test (LSAT), applies only to declarative statements in everyday language, not to contract provisions. Indeed, in these two settings, the basic concepts of sufficiency and necessity in conditional statements operate in a diametrically opposite manner.<sup>7</sup> Moreover, although inferences based on these sentences' contrapositives are important on the LSAT, they turn out to be invalid in contracts. Therefore, a true understanding of conditional statements' logical functions in contracts requires a dedicated analysis.

Through that analysis, this Essay proposes an innovation to a central component of legal education. Currently, required contract law courses teach legal doctrines and conventions used to interpret contracts, and, where available, elective contract drafting courses teach the language and techniques used to create contracts.<sup>8</sup> But none of these courses provides a systematic approach to analyzing each provision's applicability and enforceability. Instead, law students encounter a wide assortment of default rules and judicial

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<sup>5</sup> See HURLEY & WATSON, *supra* note 2, at 341-51 (exploring the "truth functions" of various logical operators).

<sup>6</sup> See *id.* at xxii-xxiv (explaining formal logic's practical value in making inferences and identifying mistakes of reasoning).

<sup>7</sup> See *infra* text accompanying note 73.

<sup>8</sup> See THOMAS R. HAGGARD, CONTRACT LAW FROM A DRAFTING PERSPECTIVE: AN INTRODUCTION TO CONTRACT DRAFTING FOR LAW STUDENTS, at vii (2003) ("First year contracts courses generally cover only the legal requirements of contract formation, enforcement of contracts, questions of interpretation, avoidance of contract duties, contract conditions, breach, third party beneficiaries, assignment and delegation, and remedies. . . . But students often come out of their contracts course with little if any knowledge or experience in the creation of contract documents."); AM. BAR ASS'N, SECTION OF LEGAL EDUCATION & ADMISSIONS TO THE BAR, A SURVEY OF LAW SCHOOL CURRICULA: 2002-2010 78 (Catherine L. Carpenter ed., 2012) (reporting that, in a 2010 survey, 122 of 162 law schools—approximately seventy-five percent—stated that they offered at least one contract drafting course to upper-level students); TINA L. STARK, DRAFTING CONTRACTS: HOW AND WHY LAWYERS DO WHAT THEY DO 5 (2d ed. 2014) (intending to "teach you how to write a contract and how to think about writing a contract.").

conventions with little apparent connection to one another. Although these lessons are essential, too often students emerge from law school unable to synthesize them consistently when drafting and interpreting contracts.<sup>9</sup>

Unifying these dispersed, abstract concepts, this Essay recasts applicable legal doctrines and rules as implied, necessary conditions to each contractual right and obligation, operating together with any conditions that appear expressly in the agreement. Within this novel but straightforward framework, basic logical analysis provides a familiar, accessible, and rigorous method to determine when a given contract provision applies and is enforceable.

If contracts curricula are supplemented with this new approach, law students who will draft and interpret agreements in their future careers will be more likely to consider all relevant provisions and rules and less likely to commit logical fallacies. For instance, someone trained in classical logic may understand the word *if* to introduce a sufficient condition, but as shown in Part 0, in contracts it usually introduces a necessary condition instead. As a result, that person may overlook other conditions that apply to the same provision. Throughout my career, as both a contract drafting professor and a transactional lawyer, I have seen countless law students and attorneys make these mistakes, which this Essay's proposed framework would prevent. The same types of logical fallacies often befall people articulating or analyzing arguments without a proper grounding in logical analysis.<sup>10</sup> Just as classical logic is essential education for philosophers,<sup>11</sup> contract logic should be so for lawyers.

As a foundation for this project, Part I of this Essay provides an overview of the treatment of conditional statements in classical logic. The standard theory, enshrined in introductory logic texts and LSAT preparation materials, views these statements as truth-functional, with antecedents (*if* clauses) containing sufficient conditions and consequents (*then* clauses) containing necessary conditions.

Part II explains how conditions arise and function in contracts, as opposed to the arguments (i.e., sets of declarative premises and conclusions) on which classical logic focuses. Like many documents, contracts are full of expressly stated conditions introduced by clear signals like *if*, but in this context, canons

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<sup>9</sup> See MITU GULATI & ROBERT E. SCOTT, THE THREE AND A HALF MINUTE TRANSACTION: BOILERPLATE AND THE LIMITS OF CONTRACT DESIGN 164 (2013) (“[T]he link between contract design and litigation seems underappreciated in practice, other than in a handful of specialized fields.”).

<sup>10</sup> See HURLEY & WATSON, *supra* note 2, at 125-26 (describing common “informal fallacies” that logical analysis can prevent).

<sup>11</sup> See, e.g., Program of Study (CAS Bulletin): Philosophy (2022–2024), N.Y.U. COLL. ARTS & SCI., <https://cas.nyu.edu/academic-programs/bulletin/departments-and-programs/department-of-philosophy/program-of-study-cas-bulletin.html> [<https://perma.cc/JEB2-NF2J>] (listing Logic as a required course for a major in philosophy).

of construction can significantly impact their interpretation. In addition, default rules of contract law and other legal requirements can create implied, unwritten conditions. Some of these implied terms are characterized as conditions by courts. Others are not traditionally described as such but are functionally equivalent to conditions, as this Essay demonstrates. A logical analysis of contract language must account for all these legal nuances, which govern that language's ultimately adjudicated meaning and impact.

Part III synthesizes the lessons from Parts I and II by examining the logical operation of conditional statements in contracts. It finds that the standard theory of classical logic does not apply directly in this setting, because in contracts rather than arguments, sufficiency and necessity operate very differently—indeed, in a completely opposite manner—and reasoning by contrapositive is simply invalid. Unlike conventional logic, analysis of contract language requires attention not just to individual sentences but also to context, both written and unwritten. Part III then explains and demonstrates how these lessons can enhance legal education and help lawyers and judges to draft and interpret contracts in practice.

## I. CONDITIONS IN LOGIC

In philosophy, logic is commonly viewed as the science of evaluating arguments.<sup>12</sup> An argument is a group of declarative statements, one of which (the conclusion) is claimed to be supported by the others (the premises).<sup>13</sup> In classical logic,<sup>14</sup> each statement taken individually—whether in an argument or not—is either true or false.<sup>15</sup> According to the dominant view of sentences' truth and falsity, known as the "correspondence theory of truth," a sentence is true if and only if it "corresponds with some fact" or, stated differently, "with some state of affairs."<sup>16</sup>

A fundamental distinction in logic is between simple and compound statements. A simple statement contains no other statements or logical operators as components.<sup>17</sup> In contrast, a compound statement consists of one

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<sup>12</sup> HURLEY & WATSON, *supra* note 2, at 1 ("Logic may be defined as the organized body of knowledge, or science, that evaluates arguments.").

<sup>13</sup> *Id.* at 2.

<sup>14</sup> Regarding the distinction between classical logic and alternative forms, see generally GRAHAM PRIEST, AN INTRODUCTION TO NON-CLASSICAL LOGIC: FROM IF TO IS (2008).

<sup>15</sup> HURLEY & WATSON, *supra* note 2, at 2 ("A statement is a sentence that is either true or false . . .").

<sup>16</sup> David, *supra* note 3, at 239, 242-45.

<sup>17</sup> HURLEY & WATSON, *supra* note 2, at 328 ("A simple statement is one that does not contain any other statement as a component.").

or more simple statements and one or more logical operators.<sup>18</sup> These operators perform the functions of negation (*not*), conjunction (*and*), disjunction (*or*), implication (*if/then*), and equivalence (*if and only if*).<sup>19</sup> This Essay focuses on the last two of these operators, which express conditional and biconditional statements, respectively.

The “standard theory” in classical logic treats conditional statements as truth-functional,<sup>20</sup> meaning that a conditional statement’s truth value (i.e., its truth or falsity) is a function of the truth values of its antecedent (commonly denoted by *P*) and consequent (*Q*).<sup>21</sup> In other words, the truth value of the sentence, *If P, then Q*, is determined entirely by the truth values of *P* and *Q*. According to the standard theory, the relationship between these components is “material implication,” in which the entire conditional statement is false only when *P* is true and *Q* is false.<sup>22</sup> Given this relationship, this theory holds that the truth of *P* is sufficient for the truth of *Q*, and the truth of *Q* is necessary for the truth of *P*.<sup>23</sup>

To illustrate these properties, consider this true sentence: “If a shape is a square, then it has four sides.” First, and most obviously, if one encounters a square, then one can conclude that it has four sides; this demonstrates the antecedent’s sufficiency. Next is the contrapositive (also called *modus tollens*)<sup>24</sup>: if a shape does not have four sides, then it is not a square. This establishes the consequent’s necessity. But one cannot conclude that any shape with four sides is a square, as it could be another quadrilateral like a trapezoid instead; this shows that the consequent is not sufficient for the antecedent. Similarly, if a shape is not a square, we cannot conclude that it does not have four sides, for again, it could be another quadrilateral; thus, the antecedent is not necessary for the consequent.

This truth-functional understanding of conditional statements is fundamental to the LSAT, as demonstrated by its prominence in test preparation materials,<sup>25</sup> and to undergraduate logic courses, as exemplified by

<sup>18</sup> *Id.* (“A compound statement is one that contains at least one simple statement as a component.”)

<sup>19</sup> *Id.*

<sup>20</sup> Andrew Brennan, *Necessary and Sufficient Conditions*, STAN. ENCYC. PHIL. (Aug. 15, 2003), <https://plato.stanford.edu/entries/necessary-sufficient> [<https://perma.cc/9LC5-MGAX>] (“[A]ny truth-functional conditional sentence states both a sufficient and a necessary condition as well.”).

<sup>21</sup> Égré & Rott, *supra* note 1.

<sup>22</sup> David H. Sanford, *If P, then Q: Conditionals and the Foundations of Reasoning* 47-48, 52 (2d. ed. 2003).

<sup>23</sup> Brennan, *supra* note 20.

<sup>24</sup> DANIEL J. VELLEMAN, *HOW TO PROVE IT: A STRUCTURED APPROACH* 103 (2d ed. 2006) (“[*Modus tollens* . . . says that if you know that  $P \rightarrow Q$  is true and *Q* is false, you can conclude that *P* must also be false.”).

<sup>25</sup> *E.g.*, *LSAT Formal Logic: Necessary vs. Sufficient*, KAPLAN, <https://www.kaptest.com/study/lSAT/lSAT-formal-logic-necessary-vs-sufficient> [<https://perma.cc/Y54P-4FRW>] (“The sufficient term is the part

its integration in leading textbooks.<sup>26</sup> Therefore, at least in the United States, it is the conception that incoming law students have most likely learned and that lawyers most likely retain when they enter practice.

Despite the standard theory's prevalence in these relatively popular pursuits, philosophers have questioned it for decades. A common objection arises from the theory's tenet that a conditional sentence is false only when its antecedent is true and its consequent is false. Curiously, this means that any conditional sentence with a false antecedent is true, regardless of any connection with the consequent. Therefore, any conditional statement that expresses a hypothetical situation (sometimes called "subjunctive" or "counterfactual"<sup>27</sup>) is true simply in virtue of having a false antecedent,<sup>28</sup> leading to absurd conclusions. For example, despite any factual relationship between its two parts, the sentence, "If the United States flag had only three sides, then pigs could fly," is true under the standard theory simply because it is not the case that the antecedent is true and the consequent is false. In response, some proponents of the standard theory contend that subjunctive conditional statements like this are not truth-functional in the way that "indicative" statements are.<sup>29</sup> But this response is not quite satisfactory. At least intuitively, a counterfactual statement like, "If the United States flag had only three sides, then it would be a triangle," does seem true, unlike the previous example about pigs flying, even though each sentence's antecedent and consequent are false. As these examples show, the standard theory's truth-functional treatment of conditional statements ignores any connection between their components, contrary to most people's intuitions about these statements' meanings.

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that immediately follows 'if' . . . . The necessary term is the part that immediately follows the 'then.'"); *Conditional Reasoning: Multiple Sufficient and Necessary Conditions*, POWERSCORE, <https://www.powerscore.com/lsat/help/multiple.cfm> [<https://perma.cc/VQ73-RTC3>] ("Many questions on the LSAT rely on the use of sufficient and necessary conditions, and a solid knowledge of this form of reasoning is essential to a strong test performance."); *If X, then Y | Sufficiency and Necessity*, KHAN ACADEMY, <https://www.khanacademy.org/test-prep/lsat/lsat-lessons/logic-toolbox-new/a/logic-toolbox-article-if-x-then-y-sufficiency-and-necessity> [<https://perma.cc/9RR8-5NWC>] (listing "if" as a "sufficient condition signal word[]" and "only if" as "necessary condition signal words").

<sup>26</sup> *E.g.*, HURLEY & WATSON, *supra* note 2, at 22-23 (stating that, in a conditional sentence, the antecedent is sufficient for the consequent and the consequent is necessary for the antecedent); BROOKE NOEL MOORE & RICHARD PARKER, *CRITICAL THINKING* 314 (13th ed. 2021) ("The word 'if,' by itself, introduces a sufficient condition; the phrase 'only if' introduces a necessary condition.").

<sup>27</sup> JONATHAN BENNETT, *A PHILOSOPHICAL GUIDE TO CONDITIONALS* 11-12 (2003).

<sup>28</sup> Brennan, *supra* note 20 ("[A]ccording to the standard theory . . . any falsehood will be a sufficient condition for the truth of any statement we care to consider.").

<sup>29</sup> *See, e.g.*, HURLEY & WATSON, *supra* note 2, at 348-54; *see also* JOHN P. BURGESS, *PHILOSOPHICAL LOGIC* 63 (2009) ("There is no classical theory of counterfactual conditionals to consider. Classical logic neglects them [because] . . . they play no serious role in mathematics.").

Opponents of the standard theory have also offered other counterexamples in which the components of conditional statements appear to have relationships besides just sufficiency and necessity, contrary to the standard theory's reduction of conditions to these qualities. These counterexamples include sentences with explanatory, temporal, and causal elements.<sup>30</sup> For instance, based on the sentence, "If you play with fire, you may be burned," it may seem odd to characterize the risk of a burn as "necessary" for playing with fire, even if it may be accurate in a narrow, truth-functional sense. Instead, this conditional statement's intended and generally understood meaning is one of cause and effect, not sufficiency and necessity.

In many such cases, the standard theory's simplicity, while elegant and sometimes intuitive, may not adequately describe the relationships among a sentence's parts. In general, these counterexamples tend to show that conditional statements in natural language cannot always be distilled and analyzed in terms of sufficient and necessary conditions as simply as the standard theory suggests. Nonetheless, this theory has remained predominant in the types of education that American lawyers are most likely to encounter.

Despite its long history and wide variety, the scholarly discourse on conditional statements has not yet extended to contracts. In this context, language not only tends to be much more economically consequential than in the arguments on which analytic philosophy focuses, but also serves distinct purposes that require different analyses from those proposed to date. Accordingly, toward a logic of contract language, the next Part proceeds to explain in detail the nature of conditions in contracts.

## II. CONDITIONS IN CONTRACTS

By itself, a contract condition does not create a right or obligation. Instead, it expresses an uncertain event that must occur before another provision applies.<sup>31</sup> The provision qualified by the condition could state an obligation to perform, discretionary authority to act, or a declaration of a policy that governs

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<sup>30</sup> Brennan, *supra* note 20.

<sup>31</sup> RESTATEMENT (SECOND) OF CONTRACTS § 224 (AM. L. INST. 1981) ("A condition is an event, not certain to occur, which must occur, unless its non-occurrence is excused, before performance under a contract becomes due.").

the parties' relationship.<sup>32</sup> A condition can be either expressly stated in the contract or implied by applicable law.<sup>33</sup>

Express conditions can be stated in various ways, most clearly and advisably with an *if*-clause in the sentence containing the provision to which the condition applies, though many contracts instead use ambiguous language like *provided* and *must*.<sup>34</sup> In addition, several conditions may be stated together in their own section or article, separate from the provisions that they qualify. This approach is standard for closing conditions in acquisition and financing agreements, which typically dedicate discrete articles to list separate events that must occur or not occur before each party is obligated to complete the transaction.<sup>35</sup> For example, under most large mergers and acquisitions contracts, the buyer is not obligated to complete the transaction if a "material adverse event or change" affecting the target company occurs between the signing date and the expected closing date.<sup>36</sup> This condition appears not in an *if/then* sentence in the same provision as the buyer's obligation to complete the transaction, but in a completely separate article alongside other closing conditions. Less overtly, but still expressly, commercial contracts often take a similar approach through force majeure clauses, which relieve a party of some or all of its obligations under the contract upon any of an enumerated list of unforeseen and unavoidable events that prevent performance, like natural disasters and government orders.<sup>37</sup> Effectively, the nonoccurrence of each of these events is a condition to the obligations to which the provision applies.

In contrast, implied or "constructive" conditions are not stated in the contract but supplied by the court that is interpreting it.<sup>38</sup> In one common situation, if a party cannot perform a duty without some cooperative act by the other party, then a court may make that act a condition to the duty, even though no such condition is written in the agreement.<sup>39</sup> For example, if a

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<sup>32</sup> STARK, *supra* note 8, at 9-10 ("A condition to an obligation is a state of facts that must exist before a party is obligated to perform . . . Sometimes the exercise of discretionary authority is subject to the satisfaction of a condition . . . Sometimes a declaration is subject to the satisfaction of a condition."). In contrast, representations, warranties, and acknowledgements, through which parties convey or accept statements of facts, are typically unconditional and thus outside this Essay's scope.

<sup>33</sup> RESTATEMENT (SECOND) OF CONTRACTS § 226 (AM. L. INST. 1981) ("An event may be made a condition either by the agreement of the parties or by a term supplied by the court.").

<sup>34</sup> *Id.* at § 226 cmt. a.; STARK, *supra* note 8, at 164-65, 316-18.

<sup>35</sup> *Id.* at 167.

<sup>36</sup> Albert Choi & George Triantis, *Strategic Vagueness in Contract Design: The Case of Corporate Acquisitions*, 119 YALE L.J. 848, 865 (2010).

<sup>37</sup> *Harriscom Svenska, AB v. Harris Corp.*, 3 F.3d 576, 580 (2d Cir. 1993); *see generally* Nancy F. Persechino, *Force Majeure*, in NEGOTIATING AND DRAFTING CONTRACT BOILERPLATE 327-40 (Tina L. Stark et al. eds., 2003).

<sup>38</sup> RESTATEMENT (SECOND) OF CONTRACTS § 226 cmt. c (AM. L. INST. 1981).

<sup>39</sup> *Id.*

tenant is contractually obligated to perform certain repairs on a leased property before vacating but first needs the landlord to approve the proposed work, then the landlord's approval is an implied condition to the tenant's obligation.<sup>40</sup> If the landlord withholds approval, then the tenant is no longer obligated to perform the specified repairs before vacating. Courts sometimes create similar conditions through the "duty of good faith and fair dealing," which "[e]very contract imposes upon each party . . . in its performance and its enforcement."<sup>41</sup> Each party's material performance of that duty is an implied condition to the other party's own duty to perform the contract.<sup>42</sup>

Another default condition to "each party's remaining duties to render performances to be exchanged under [a contract is] that there be no uncured material failure by the other party to render any such performance due at an earlier time."<sup>43</sup> Under this rule, each party's "substantial performance" of its covenants is a condition to the other party's obligations to perform its own covenants,<sup>44</sup> even when the contract does not expressly present those covenants as conditions. For instance, if a builder breaches a construction contract by failing to complete a house properly, then the homeowner may suspend payment of the contract price, because "a constructive condition of the owner's duty to pay the balance[] has not been satisfied."<sup>45</sup>

Separately, a court may relieve a party of a duty if, without that party's fault, "the occurrence of an event the non-occurrence of which was a basic assumption on which the contract was made" either makes that party's performance "impracticable" or "substantially frustrate[s]" that party's "principal purpose" in entering the contract.<sup>46</sup> Although these doctrines are

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40 *Chem. Bank v. Stahl*, 712 N.Y.S.2d 452, 462 (N.Y. App. Div. 2000) ("The need for the landlord's cooperation in [approving certain proposed exit work] can also be viewed as a constructive condition to the tenant's own duty to perform [that] exit work.").

41 RESTATEMENT (SECOND) OF CONTRACTS § 205 (AM. L. INST. 1981); *accord* 511 W. 232nd Owners v. Jennifer Realty Co., 773 N.E.2d 496, 500 (N.Y. 2002) (enumerating cases under New York law that impose a covenant of good faith and fair dealing in contract performance).

42 RESTATEMENT (SECOND) OF CONTRACTS § 226 cmt. c (AM. L. INST. 1981). *See, e.g.*, *German v. Ford*, 300 S.W.3d 692, 707 (Tenn. Ct. App. 2009) (finding that "the duty of good faith and fair dealing" required an investment firm to provide an individual investor with the basic information necessary for the investor to fulfill his express contractual obligation to post a letter of credit, and that the firm's breach of this implied duty excused the investor's failure to post the letter).

43 RESTATEMENT (SECOND) OF CONTRACTS § 237 (AM. L. INST. 1981).

44 *Id.* at § 237 cmt. d.

45 *Argentinis v. Gould*, 592 A.2d 378, 380 (Conn. 1991).

46 RESTATEMENT (SECOND) OF CONTRACTS §§ 261, 265, 266; *accord* U.C.C. § 2-615 (AM. L. INST. & UNIF. L. COMM'N 2018) ("Delay in delivery or non-delivery in whole or in part by a seller . . . is not a breach . . . if performance as agreed has been made impracticable by the occurrence of a contingency the non-occurrence of which was a basic assumption on which the contract was made . . ."). Before excusing a party's performance due to impossibility, New York courts require that the impossibility must be "produced by an unanticipated event that could not

not traditionally described in connection with conditions, each of them effectively makes the absence of impracticability or frustration of purpose an implied condition to each related duty in the contract. Though rarely applied, the doctrine of impracticability, also called “impossibility,” has recently been a subject of renewed interest during the COVID-19 pandemic.<sup>47</sup> Because government restrictions on business operations and the health risks of personal interaction have made the performance of many contracts genuinely impracticable, courts may excuse that performance under this doctrine.<sup>48</sup> Accordingly, every obligation in a contract is subject to an implied condition that no pandemic or other unanticipated event prevents that obligation’s performance.

Implied conditions also emerge from laws and regulations beyond general contract law. For example, the default rule in the United States, except in Montana, is that employment arrangements are “at will,” meaning that either party may terminate the relationship at any time for any reason or no reason.<sup>49</sup> The accompanying contracts usually contain a purportedly unconditional termination right for each party.<sup>50</sup> Though rarely mentioned in these documents, various federal and state laws restrict an employer’s ability to terminate an employment relationship. For example, the Americans with Disabilities Act of 1990 (ADA) and its implementing regulations prohibit a covered employer from firing an employee with disabilities unless (a) the termination is unrelated to the disability, (b) the employee does not meet the job’s legitimate requirements, with or without a reasonable accommodation, or (c) because of the disability, the employee directly threatens health or safety in the workplace.<sup>51</sup> In effect, these legal requirements imply these three

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have been foreseen or guarded against in the contract.” *Kel Kim Corp. v. Central Mkts.*, 519 N.E.2d 295, 296 (N.Y. 1987).

<sup>47</sup> See Kelly J. Bundy, *Impossibility, Impracticability and Frustration of Purpose in the Age of COVID-19*, AM. BAR. ASSOC. (Aug. 3, 2020), [https://www.americanbar.org/groups/construction\\_industry/publications/under\\_construction/2020/summer2020/impossibility-impracticability-frustration-of-purpose-in-the-age-of-covid19](https://www.americanbar.org/groups/construction_industry/publications/under_construction/2020/summer2020/impossibility-impracticability-frustration-of-purpose-in-the-age-of-covid19) [<https://perma.cc/ZK5D-47DQ>] (stating that impossibility and impracticability are “variations on the same theme” and are “often treated interchangeably by courts”).

<sup>48</sup> See Andrew A. Schwartz, *Contracts and COVID-19*, 73 STAN. L. REV. ONLINE 48, 51-54 (2020) (stating that, because the COVID-19 pandemic made contract performance “so much more difficult and dangerous than expected,” the law can excuse nonperformance through the doctrine of impossibility).

<sup>49</sup> RESTATEMENT EMP. L. § 2.01 cmt. b (AM. L. INST. 2015) (noting that Montana requires “good cause” for an employer’s termination of a non-probationary employee).

<sup>50</sup> See, e.g., *Offer Letter/Short-Form Employment Agreement for a Non-Executive*, THOMSON REUTERS PRAC. L. (2023), <https://us.practicallaw.thomsonreuters.com/0-501-1654> [<https://perma.cc/8FDQ-2WFT>] (providing a sample employment agreement stating, “[y]our employment will be at-will, meaning that you or [EMPLOYER NAME] may terminate the employment relationship at any time, with or without cause, and with or without notice”) (emphasis added).

<sup>51</sup> *Employers and the ADA: Myths and Facts*, U.S. DEP’T OF LAB., <https://www.dol.gov/agencies/odep/publications/fact-sheets/americans-with-disabilities-act> [<https://perma.cc/TJB4-B6EQ>];

conditions for every covered employer's contractual termination rights; that is, the employer may fire the worker only if at least one of these conditions is satisfied. Likewise, many other laws, notably those against discrimination and harassment, subject these termination rights to additional implied conditions of legal compliance.<sup>52</sup> Outside the employment context, many rights and obligations in other highly regulated agreements, like residential leases, depend similarly on default conditions that may not be stated.<sup>53</sup>

In addition to creating implied or constructive conditions beyond the parties' written agreement, courts apply various canons of interpretation when reading expressly stated conditions. Of greatest relevance is the maxim of *expressio unius est exclusio alterius*, which holds that "the expression in the contract of one or more things of a class implies exclusion of all that is not expressed."<sup>54</sup> This convention, well established as an interpretative "guide" not only for contracts but also for statutes,<sup>55</sup> suggests "that all omissions should be understood as exclusions, and the specification of particular items impliedly excludes other items relating to the same general matter."<sup>56</sup>

As applied to conditions in contracts, this maxim means that when an agreement includes one or more express conditions to a provision, no other conditions apply to that provision. If the parties had intended to qualify that provision with other conditions, then a court would expect them to have written those conditions expressly.<sup>57</sup> For example, fixed-term employment contracts, unlike at-will arrangements, often permit the employer to freely terminate the contract only for "cause," which those contracts typically define as a list of

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42 U.S.C. § 12112 (2020) (prohibiting discrimination "on the basis of disability in regard to" the "discharge of employees").

<sup>52</sup> See, e.g., 42 U.S.C. § 2000e-2(a) (2020) (prohibiting an employer from discharging an individual "because of such individual's race, color, religion, sex, or national origin").

<sup>53</sup> For example, in New York State, a landlord may retain a tenant's security deposit only under certain circumstances and by following statutory requirements, including an obligation to provide "an itemized statement indicating the basis for the amount of the deposit retained" within fourteen days after the tenant vacates. N.Y. GEN. OBLIG. L. § 7-108(e) (McKinney 2021). A contractual right to retain that deposit, even if not expressly conditioned within the agreement, is subject to the legally implied condition that the landlord complies with these laws.

<sup>54</sup> Robert E. Scott & George G. Triantis, *Anticipating Litigation in Contract Design*, 115 YALE L.J. 814, 849 (2006); accord *Expressio unius est exclusio alterius*, BLACK'S LAW DICTIONARY (11th ed. 2019) (defining this term as "[a] canon of construction holding that to express or include one thing implies the exclusion of the other, or of the alternative").

<sup>55</sup> See, e.g., *United States v. Vonn*, 535 U.S. 55, 65 (2002) (examining this canon's application to Rule 11 of the Federal Rules of Criminal Procedure).

<sup>56</sup> Scott & Triantis, *supra* note 54, at 849.

<sup>57</sup> See 28 GLEN BANKS, NEW YORK CONTRACT LAW § 10:16 (2d ed. 2021) ("The decision to include some items in a clause but not include others of the same class strongly suggests an intent not to include the others either because they were deemed unimportant or because they were not mutually agreed upon.").

various forms of misconduct by the employee.<sup>58</sup> Essentially, each of these enumerated causes for termination is an express condition to the employer's termination right; if the employee engages in the listed conduct, then the employer may terminate the contract. When a list includes some specific activities—like romantic relationships with colleagues—the maxim of *expressio unius* prevents the employer from terminating due to other activities—like romantic relationships with customers.

While excluding unstated conditions that would normally need to be expressly stated, the maxim does not override more general default rules that create implied conditions such as good faith and fair dealing, the lack of impracticability or frustration of purpose, and compliance with applicable laws and regulations.<sup>59</sup> Therefore, without contradiction, a court can simultaneously exclude omitted conditions based on this maxim and add constructive conditions based on those default rules. To continue the previous examples of termination rights in employment agreements, the *expressio unius* canon would exclude an omitted condition about romantic relationships with customers but not the ADA's legally implied conditions regarding disabilities.

This Part has explained how canons of construction can shape the meaning of express conditions in contracts and how various default rules and legal requirements can create implied conditions. Given these findings, the next Part proceeds to explain the logical relationships between all those conditions and the provisions that they qualify.

### III. THE LOGIC OF CONTRACT CONDITIONS

To logically analyze contract language, one must first distinguish between the purpose of contract provisions and that of the arguments on which classical logic focuses.<sup>60</sup> In general, each statement in an argument is claimed to be true, either independently if it is a premise, or based on the other statements' support if it is a conclusion.<sup>61</sup> Either way, according to the correspondence theory of truth, a declarative statement is true if it corresponds with some fact or state of affairs.<sup>62</sup> Because arguments are ultimately intended to establish that their conclusions are true, it makes sense that classical logic focuses on the truth-functional relationships among statements and their components.

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<sup>58</sup> RESTATEMENT OF EMP. L. § 2.04(b) (AM. L. INST. 2015).

<sup>59</sup> See *supra* text accompanying notes 38–52.

<sup>60</sup> See *supra* text accompanying notes 12–15.

<sup>61</sup> HURLEY & WATSON, *supra* note 2, at 14.

<sup>62</sup> See *supra* text accompanying note 16.

However, most contract provisions do not function in this manner.<sup>63</sup> Instead, their purpose is to create legally enforceable rights and obligations that otherwise would not exist, not to accurately describe the world like a declarative premise or conclusion in an argument. For example, outside a contract, the truth of the sentence, “The employer may terminate the contract without cause,”<sup>64</sup> depends on whether it corresponds to facts about the employment contract and the law; the sentence is false if the contract permits termination only for cause. Inside a contract, however, the same sentence is “true” simply because its presence in the contract makes it true; it does not have to correspond to any other fact or state of affairs. Therefore, in this context, the correspondence theory of truth is tautological and uninformative.

Because declarative sentences in arguments and provisions in contracts have such different purposes, classical logic’s conventional truth-functional analysis is inapposite to contracts. Instead of considering whether a sentence is true or false, a logical analysis of contract language should consider when a provision is applicable and enforceable. Unlike truth values, these legal properties do not depend on a sentence’s correspondence to facts. Instead, a provision is enforceable if and only if the parties agree that it should be so (i.e., by stating it in the contract) and the law permits its enforcement under the circumstances.

Like a declarative sentence’s truth value, a contract provision’s enforceability may also change over time. Outside a contract, the sentence, “The President of the United States is from Hawaii,” was true in 2013 but not in 2023. Inside a contract, a typical covenant like, “The client shall pay the fees to the contractor,” may be enforceable only after the contractor has provided the corresponding services, because the provision of those services is either an express condition to the payment covenant or an implied one under the default rule of contract law that relieves a party of its obligations if the other commits a material breach.<sup>65</sup> A logical analysis of contract language must determine when that covenant is enforceable given its relationships to these express or implied conditions.

These conditional relationships can be very different in contracts than in the declarative statements of classical logic, and the distinction is clearest when reduced to sufficiency and necessity. For example, outside a contract, in the

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<sup>63</sup> Exceptions to this generalization are representations, warranties, and acknowledgements, which indeed are true or false depending on whether they correspond to facts. *See generally* RESTATEMENT (SECOND) OF CONTRACTS § 159 (AM. L. INST. 1981) (defining misrepresentation as a false assertion of fact); STARK, *supra* note 8, at 11-16 (explaining that representations are statements of present or future facts and warranties are promises that the statements are true). However, these concepts are outside this Essay’s scope because they are not normally subject to conditions. *See supra* note 32.

<sup>64</sup> *See* THOMSON REUTERS PRAC. L., *supra* note 50.

<sup>65</sup> *See supra* text accompanying notes 43-45.

everyday sentence, “If you pay for dinner then I will buy the tickets,” the standard theory would construe paying for dinner as sufficient but not necessary for buying the tickets. This makes sense; based on that sentence alone, we do not know whether the speaker will buy tickets anyway even if the other person does not pay for dinner. Perhaps the speaker will decide to do so altruistically, in exchange for some other favor, or even under duress. These are all possibilities that the sentence does not logically foreclose, because the antecedent is sufficient but not necessary. In this quotidian sentence, the standard theory seems correct.

In a contract, however, a similar sentence could not be interpreted in the same way. For example, take a contractual provision that states, “If the client pays the fee, then the contractor shall provide the services.” In a covenant like this, *shall* means “has a duty to.”<sup>66</sup> This translation clarifies the sentence’s logical structure, because the modal auxiliary verb *shall* is difficult to negate clearly.<sup>67</sup> The translated sentence is, “If the client pays the fee, then the contractor has a duty to provide the services.”

Under the standard theory, the *if*-clause introduces a sufficient condition, such that the client’s payment of the fee is sufficient but not necessary for the contractor’s duty. When this sentence appears in a contract, however, if the client does not pay the fee, then the contractor is not obligated to provide the services.<sup>68</sup> Under the standard theory, this deduction based on that sentence would normally be a logical fallacy, mistaking a sufficient condition for a necessary one. The main reason for the surprisingly different result in a contract is the maxim of *expressio unius est exclusio alterius*.<sup>69</sup> If the contract states only one condition to the obligation to provide the services, then according to this maxim, this obligation is not subject to any other conditions. Therefore, in this sentence taken alone, the antecedent (i.e., payment) is both sufficient and necessary for the consequent (i.e., the duty), contrary to the standard theory, which would consider the antecedent merely sufficient but not necessary.

However, the situation is even more complex than this example suggests because a contractual provision cannot be taken alone. Instead, it must be interpreted against the background of the contract’s other provisions and various legal default rules, all of which could impose additional conditions on a given provision.

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<sup>66</sup> KENNETH A. ADAMS, A MANUAL OF STYLE FOR CONTRACT DRAFTING 57–58 (4th ed. 2017).

<sup>67</sup> See *id.* at 58; STARK, *supra* note 8, at 154 (“To obligate a party not to do something, use *shall not* . . . . To negate a duty to perform, use *is not obligated to*.”).

<sup>68</sup> Of course, the contractor could choose to provide the services anyway even without a contractual obligation, but this possibility does not affect that *obligation*’s presence or absence, which is the point of the contract provision.

<sup>69</sup> See *supra* notes 54–57.

In our example of a contractor's performance obligation, contract terms outside that covenant, such as a force majeure clause, may relieve the contractor of that obligation even when the client pays the fee if, for example, a natural disaster prevents the contractor from providing the services.<sup>70</sup> Even without such a clause, such an event could lead to the same result under the doctrine of impracticability, which creates an implied condition that performance is practicable.<sup>71</sup> In either case, whether by clause or by doctrine, the lack of a natural disaster is a necessary condition for the performance obligation, and payment alone is not sufficient for that obligation. Other legal default rules create additional implied conditions. For instance, the rule that allows a party to suspend performance if the other party materially breaches the contract could relieve the contractor from its performance obligation even if the client pays the fee but fails to comply with some other important provision (e.g., an obligation to provide materials necessary for the services). Thus, if elsewhere in the contract the client makes any covenants besides paying the fee, the client's substantial performance of those covenants provides another necessary condition for the contractor's own performance obligation. The client's good faith and fair dealing constitute yet another such condition, and sector-specific laws and regulations could provide even more.<sup>72</sup>

In summary, although the client's payment of the fees is the only condition expressly stated in our hypothetical contract provision, that payment is not the only condition to the contractor's performance obligation. Generally, when one provision is subject to multiple conditions, each condition is necessary but not sufficient for that provision, and all conditions together are both necessary and sufficient for it. Accordingly, in an express *if/then* sentence in a contract, the antecedent, as only one condition out of several, is necessary but not sufficient for the consequent. This is exactly the opposite of the standard theory's construal of sufficiency and necessity in individual conditional statements.<sup>73</sup>

As an equally surprising consequence, the fundamental principle in classical logic of *modus tollens*—i.e., that the truth of a conditional sentence implies the truth of its contrapositive<sup>74</sup>—does not apply in contract language. In other contexts, this principle would permit a valid inference from our example—*If the client pays the fee, then the contractor has a duty to provide the services*—to its contrapositive (i.e., that if the contractor does *not* have this duty, then the client has *not* paid the fee). In a contract, however, that deduction would be invalid,

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<sup>70</sup> See *supra* text accompanying note 37.

<sup>71</sup> See *supra* text accompanying notes 46–48.

<sup>72</sup> See *supra* text accompanying notes 41–42, 49–52.

<sup>73</sup> See *supra* text accompanying note 23.

<sup>74</sup> See *supra* text accompanying note 24.

because the client may have paid the fee but committed some material breach that relieves the contractor of its duty.

Therefore, the standard theory of classical logic, so thoroughly ensconced in American lawyers' educations, is inapposite to contract language. Logical analysis in this context cannot depend on signaling words like *if* and *only if* per the standard theory, nor can it apply to individual sentences taken alone. Reasoning by contrapositive, an essential skill tested on the LSAT,<sup>75</sup> may lead to logical fallacies. Instead, to determine whether and when a provision's rights or obligations apply, a logic of contracts must consider that provision's relationships not only to the conditions stated adjacently, but also to express conditions stated elsewhere in the contract and implied conditions arising from legal default rules.

These are the same considerations that dutiful lawyers and judges should always contemplate when drafting and interpreting contracts. Until now, however, these professionals have not had a systematic method for performing these tasks or training others to do so. A logical approach to contract analysis could fill this need.

Essentially, to determine whether a contract provision is enforceable in a particular situation, one should carefully enumerate all the express and implied conditions that apply to that provision. In the previous example of a service provider's duty, these conditions would include the expressly stated event—"the client pays the fee"—as well as the absence of any specified *force majeure* event, the practicability of the service provider's performance, the client's substantial performance of its covenants, and the client's good faith and fair dealing. In addition, legal research should ascertain whether governing laws impose further implied conditions under the circumstances. Individually, each of these conditions would be necessary for the conditioned provision's enforceability, and together, all of them would be sufficient for it. Based on the facts at hand, one should then determine whether each condition is satisfied. Only if all conditions are met can one conclude that the conditioned provision is enforceable.

Compared with prevailing legal practice, in which experienced attorneys rely on their experience and inexperienced ones often lack clear direction,<sup>76</sup> this

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<sup>75</sup> See *Conditional Reasoning and Logical Equivalence*, KHAN ACADEMY, <https://www.khanacademy.org/test-prep/lSAT-lessons/logic-toolbox-new/a/logic-toolbox—article—conditional-reasoning-logical-equivalence> [<https://perma.cc/3KBE-68HX>] (“Why is the contrapositive important on the LSAT? On the LSAT, you’ll often be asked to infer a result. And many times, the trigger you’re given won’t be the trigger that’s explicitly stated in the text, but rather the trigger of the (implicit) contrapositive.”).

<sup>76</sup> See Claire A. Hill, *Why Contracts Are Written in “Legalese”*, 77 CHI. KENT L. REV. 59, 62-66 (2001) (explaining that junior attorneys are generally expected to “learn from experience” with insufficient guidance, often leading to unthinking reliance on precedent documents).

logical approach to contracts provides several benefits. First, it constitutes a form of “decision hygiene,” a verification system for contract drafting choices and analysis.<sup>77</sup> As a mechanical technique, it “represent[s] significant improvements on human judgment,” helping even expert lawyers to avoid errors.<sup>78</sup>

Moreover, the language of logic—notably, the familiar concepts of sufficiency and necessity—could help attorneys and judges explain these decisions more clearly and thoroughly, toward more persuasive negotiations, pleadings, and opinions. In these settings, the legal analysis would primarily involve identifying all express and implied conditions to enforceability and interpreting all vague standards that they contain, and the factual application would entail determining each necessary condition’s satisfaction. This structured approach would not only reduce errors but also help to convince others of a decision’s correctness.

Finally, by employing skills that students are already expected to possess when entering law school (given the LSAT’s emphasis on logical analysis), this system also provides an accessible educational tool for aspiring lawyers to learn how to work with contracts properly. First, it corrects misapprehensions of contract language that they often bring from their prior exposure to classical logic. Second, it unifies into a coherent process the dispersed legal rules and interpretive conventions conveyed in first-year contracts courses,<sup>79</sup> permitting law students and junior attorneys to apply them accurately and consistently in practice.

## CONCLUSION

The connection between logic and contracts has been overlooked for far too long. Attention to this underexplored intersection yields surprising and useful results, as conditions operate in a diametrically opposite manner in contracts than in other contexts, contrary to basic principles of classical logic. These findings provide not only a novel contribution to legal scholarship and philosophical discourse, but also valuable tools for lawyers, judges, and legal educators.

Beyond this Essay’s focus on conditionality, this precedent may open a new line of academic inquiry to systematically analyze other connections among contract provisions, their components, and applicable laws. By further clarifying and classifying these relationships, these efforts could bring new theoretical insights with additional practical benefits.

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<sup>77</sup> See DANIEL KAHNEMAN, OLIVIER SIBONY & CASS R. SUNSTEIN, *NOISE: A FLAW IN HUMAN JUDGMENT* 286 (2021) (describing and promoting various systematic approaches to reducing errors in complex decisions).

<sup>78</sup> *Id.* at 127.

<sup>79</sup> See *supra* note 8 and accompanying text.