Distributed Agency in the Novel

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WHO ARE THE MAIN CHARACTERS OF Arthur Hailey's pulpy best-seller, *Airport?*[1] Initially, the answer seems simple: there is Mel Bakersfeld, the airport general manager, and his wife, Cindy. They aren't on good terms. "You should have married an airport," she says to her husband bitterly at some point.[2] Tanya Livingston is Mel's other "special friend" who works at the counter for Trans America Airlines as a passenger relations agent. Joe Patroni leads the Trans World Airlines maintenance team: ingenious, reliable, happily married. Captain Vernon Demerest pilots a Mercedes along with a Boeing 707–320B dubbed the Golden Argosy. Gwen Meighen, a senior stewardess for Trans America Airlines, will become the reluctant hero on a flight to Rome. Her efforts save the lives of many passengers of Flight Two, where D.O. Guerrero will attempt to detonate a bomb, midair, for an insurance payout. And Inez, his helpless partner, will spend many anguishing hours anticipating disaster, lost at the airport.

Aside from this cast of nominally human actors, a perceptive reader may also recognize vital composite forces that exceed the bounds of individual agency: "the people" of the Meadowood community suing Lincoln International for noise violations; maintenance and snowplow crews, the Airport Board and the City Council; the airline and the police; insurance companies and insurance policies; Aéreo-Mexico, Trans America, Trans World; and even the impending snow storm—all part of another, shadowy cast—collective, diffuse, transhuman, but no less fateful for the plot of the novel.

The emergence of such distributed actors illustrates the conceit central to all of Hailey's many bestselling novels, which include also *Hotel*, set in a hotel; *The Final Diagnosis*, which really should have been called *Hospital*; and *Wheels* and *Overload*, both "business novels" concerning the automotive and electrical industries, respectively.[3] Similar to Mel Bakersfield of *Airport*, characters in these works struggle to maintain their senses of private identity as part of, while also representing, the whole—a synecdoche—of an organization. Like Mel, they are often forced to act "on behalf of" in ways that may contradict their personal ideals or aspirations. Airports, hospitals, hotels, and corporations emerge

as powerful characters in their own right: motivated by their manifold constituents, languages, architectures, and logics.

And yet, conventional summaries of *Airport*—the kind found on its *Wikipedia* page or on the *IMDB* page for the 1970 film adaptation (starring Burt Lancaster and Dean Martin)—list the human characters only. A similar oversight affects academic reception, to the small extent that this genre received any attention. State-of-the-art methods for detecting literary characters often rely on prior assumptions and "obvious" features, such as named entities (i.e. Heathcliff), gender attributes, or evidence of direct speech or sentience.[4] Agency, by convention (and especially in the freedom-loving US) belongs to the realm of self-made, self-propelled individuals.

However, not all actors who act speak with a single voice, name, or body. Not even all airplanes are piloted locally. As Edwin Hutchins reminded us in "How a Cockpit Remembers its Speeds," it takes an airport.[5] Incorporated conglomerates span collective goals, capabilities, outcomes. The house in *Bleak House* by Charles Dickens, the Railroad Commission in *The Octopus* by Frank Norris, and the airport in *Airport* all evidence "agencies" in another, composite sense.[6] The whole history of political thought—from *Republic*, to *Leviathan*, *Capital*, and *How Institutions Think*—undermines the unduly individualistic perspective bounded by singular bodies or minds. And though it's tempting to speak about agency in subjective terms—I know what it feels like to want, do, and achieve—the results elude an easy narrative connecting causes to their effects.

Any linear account unravels under scrutiny. I struggle to find autonomy even in mundane tasks, such as getting lunch, much less big ones, such as choosing a career. The same difficulty, at scale, poses a constant challenge to modern political realities, typified by corporate rights and limited-liability concerns. All sorts of diffuse leviathans exert their wills onto the world—markets, governments, Siri, karma, Bill Gates—putting our own small accomplishments into question. Any attempt to model agency in the novel seems doomed to dissolve into this vast theoretical morass.

Lucky for us, language always betrays theory. In this study, I propose to side-step the philosophical complexity surrounding free will, agency, or volition in favor of their linguistic proxy, syntax. However tangled our beliefs about willful actors, the English language demands linear propositions, where subject verbs object (SVO). As such, nouns in the subject position become, semantically, the causes of action, and objects their passive effects: pilots fly planes, maintenance crews clean snow, terrorists detonate bombs. Similarly, though we don't have to agree on exactly how, countries also "decide" to invade other countries, commit-

tees "deliberate" mergers, and, in the world of Lincoln International, a shipment of turkey hatchlings (alive, finicky) gives the airport "anxiety."

Such complex personifications don't need to be mapped out perfectly before observing that actors are those entities that act, and that action manifests itself through verbs. Assuming little more than that, one can ask: What sorts of nouns get to "do stuff"? Who are the most common syntactical actants? And who or what do they act upon? With this bit of shorthand we can discuss characterization not in terms of contested philosophical categories, such as name or being, but in relation to specific grammatical features. The syntactic points to the philosophical subject.

I proceed, then, by developing a computational method for extracting a set of main characters from a novel (or any other collection of sentences in which agency might be implicated). Hailey's *Airport* bears the brunt of my analysis, while a few other, more familiar novels will supply comparison for an experiment in formal literary method.

The syntax-based approach leads to a minimally viable algorithm capable of automatically identifying all linguistically willful agents, both major and minor, with a high degree of recall (though not, for interesting reasons to be discussed later, precision). In this task, it performs similarly to or better than existing methods while being easier to replicate and making fewer assumptions. Moreover, the syntax-based approach captures those agents that fall out of traditional character theory, giving us a powerful tool for discovering new and hitherto undertheorized characters, such as the Lincoln International Airport or TransAm Flight Two and "the people of Meadowood."

The proposed method occasions several formal, exploratory experiments that tell us something about real-world dynamics of volition in the novel. While reductive at first, these case studies move us closer to a more complete theory of agency, one grounded in observation and based on several proposed metrics: "volitional share" given to each character's portion of the total action, and "volitional debt," which captures a sense of narrative dominance between agents, signifying major and minor characters. A notion of distributed agency develops in discussion, describing the kind of structurally composite "scene-agents," defined by their prominence in the subject, object, and context factorials of action. A formal definition helps visualize the diffuse complexity of organizational actors such as hospitals and airports, who act, are acted upon, and where action happens. This tripartite syntactic structure marks distributed forces uniquely, differentiating them from singular personas and personalities.

Finally and briefly, the presence of formally distributed characters signals a major genre—the organizational novel—seldom discussed in

North American criticism despite its global popularity, a genre comprising elements of French and Soviet realisms, the American occupational novel, and the business novels of India and Japan. Despite being ignored, perhaps due to its "middle-brow" status, the genre deserves further study, particularly because it broaches the pragmatics of distributed action in its most vivid form, providing compelling experimental grounds for theoretical speculation.

I. Preliminary Theoretical Remarks

To get started, let's revisit the problem of characterization more generally, as it affects the practices of contemporary literary and computational analysis alike.

On the side of the literary, I have long followed a fascinating conversation in character studies made popular by monographs such as *A Grammar of Motives* by Kenneth Burke; *The Economy of Character* by Deidre Lynch; Alex Woloch's *The One vs. The Many*; John Frow's *Character and Person*; *Flat Protagonists* by Marta Figlerowicz; and *Character: Three Inquiries in Literary Studies* by Amanda Anderson, Rita Felski, and Toril Moi.[7] In one way or another, these works concern the illusion of literary character: words on a page create a facsimile of "real world" persons with whom the reader can, should, or shouldn't identify in various ways.

Fall for the illusion or not, most scholars in character studies usually assume literary characters to imply human persons: the magic happens somewhere in the connection between "clusters of words" and "figures of speech" on the one hand and, on the other, "actual human[s]" and "person-like entities."[8] The emphasis on human form entails human characteristics (such as voice, speech, name, face, mind, thought, or body), leaving transhuman forces out of the discussion. Frow does briefly gesture toward what he calls the "dividual person," which extends in time and space, "undermining the boundedness of individual subject."[9] But the dividual still functions by personification, hence arriving at his preferred term of art in his "person-like entities."

What are we to do with airport-like entities?

Consider Dickens or Norris in that regard. "This is Bleak House. This day I give this house its little mistress," John says to Esther as the narrative gaze soars to observe the scene in its totality, describing, in a single majestic sweep of a sentence and paragraph, the surrounding orchards and streams, the nearby town, the household rooms, colonnades, walls, and furniture— "the arrangement of all the pretty little objects . . . my odd ways everywhere" (*BH* 793). "Ah, yes, the Wheat," the narrator of

The Octopus concludes:

As if human agency could affect this colossal power! What were these heated, tiny squabbles, this feverish, small bustle of mankind, this minute swarming of the human insect, to the great, majestic, silent ocean of the Wheat itself! Indifferent, gigantic, resistless, it moved in its appointed grooves. Men, Liliputians, gnats in the sunshine, buzzed impudently in their tiny battles, were born, lived through their little day, died, and were forgotten; while the Wheat, wrapped in Nirvanic calm, grew steadily under the night, alone with the stars and with God. (*O* 161)

That the description of such forces comes from fiction is beside the point. Dickens and Norris tell us something vital about actual houses and wheat fields, just perhaps not specific houses or fields. I'm with Moi in finding easy living among literary devices.[10]

Organizational fiction poses a more interesting problem, however, because its outward personifications contain inner multitudes. They are fictions within fiction. Houses and fields exceed human agency in ways difficult to articulate, which is kind of, thematically, the philosophical impact of these novels. The organizational plot describes an emergence of vast octopodal assemblages—railroads, cities, airports—as actors on the stage of human history. Reading Hailey and others therefore requires a character theory beyond the singular human, a theory encompassing small and large bustles: Johns, Cindys, Mels, and Esthers, gnats and oceans of wheat, giants and Lilliputians, houses and their mistresses, airports and their managerial grooms.

The omission of distributed agents persists across disciplines, in literary analysis as well as in computer science. Among dozens of studies surveyed in "Extraction and Analysis of Fictional Character Networks" by Vincent Labatut and Xavier Bost in 2019, all but a few make similar assumptions about character composition: the most common evidencing named entities, honorifics, direct speech, personhood, possession, and the presence of action or "intention verbs."[11]

For a paradigmatic example, let's take the influential study by David Elson, Nicholas Dames, and Kathleen McKeown, titled "Extracting Social Networks from Literary Fiction."[12] Here, the authors present a novel method for extracting social relations from literature, which they then use to test several literary-theoretical hypotheses regarding the nature of those interactions. They succeed brilliantly—at the common cost of advancing the human assumption. To draw a social network, their method identifies entities counted as "characters" using the Stanford Named Entity Recognition tagger.[13] Further, and skipping much innovative computational detail, the method assembles a network based on dialog edges drawn between recognized named entities. This works well

for novels in which protagonists have names and speak, though not at all for literary works in the organizational genre, where characters might not have names nor speak directly.

As we'll see in the following sections, semantic assumptions aren't necessary for volitional analysis. I offer instead a minimal definition of subjecthood based on syntax, where willful subjects emerge through repeated assignment of the predicate.[14] The list of most common sentence subjects ultimately guarantees the capture of all common story subjects.

Like Leo Tolstoy's unhappy families, distributed characters we are about to encounter are distributed in their own ways. Real-life airports differ compositionally from households, railroads, or forests—as do their depictions. They sometimes appear in the guise of bureaucratic organizations, sometimes groups, sometimes cyborgs or assemblages of organic and inorganic matter. Despite their differences, distributed characters exhibit several common structural characteristics.

Where with conventional human actors agency can be said to emanate from a nominally localized body, distributed characters are constituted and reconstituted in numerous complementary configurations: an airport manager acts sometimes on the behalf of the organization and at other times as a neighbor or a husband, part of other bounded units: family and neighborhood. The methods I develop in this paper help us perceive the fluid dynamics of distributed agency across such boundaries. Although initially it will be useful to make a distinction between species of constitution—human bodies and airplane fuselages, for example—I am ultimately interested in their morphological similarities. All agents, even conventionally constituted ones, are composite from the distributed perspective. Airports and their managers serve at once as actors, benefactors, and contexts of their actions. Some such characters are more tightly wound around a single volitional core than others and some more loosely. As a singular hero, the aggrieved Achilles offers a dense target for Hector's spear, whereas an airport or a house draws a mere suggestion of a nucleus, perceived from a distance within the buzzing aggregate of its satellites.

When we begin with the hypothesis of distributed cognition, we arrive at a theory of literary character adjacent and complementary to the approaches that depart from singular brains and their ensuing personalities.[15] By contrast to natural persons, who reason about other persons and mental states, distributed actors cannot be said to have a unified theory of mind. Consequently, though distributed agents enter the social sphere with powers to act willfully, they struggle to act morally, or even to articulate morals, because they lack a coherent, centralized view of the consequences of their actions. Colloquially, one says the system is

"a beast with many heads," or "its left hand doesn't know what its right hand is doing." The institution appears cold or blind—it doesn't care, nor is it capable of caring. Individual bureaucrats may take note of Josef K's plight, but the bureaucracy in Franz Kafka's *The Trial* can supply only the formal outward requisites of care in regurgitating court briefs and summons.[16] Diffusion of agency lies at the center of this conundrum, empowering and frustrating our human protagonists throughout.

The modern corporation and the limited liability company were in fact explicitly created to maximize the capacity for collective action while minimizing the liability of its individual members, who, as organs in the name of the organism, abjure personal responsibility. In the English legal tradition, the corporation came into being in an effort to preserve land ownership past the death of its member associates.[17] States, churches, guilds, and universities were some of the earliest examples of *personae fictae*, capable of entering into contracts with natural persons, paying remittances, or transferring property rights. Unlike natural persons, whose volition is inextricably connected to bodily integrity, pain, and death, fictional persons neither die nor feel pain.[18] Incorporated symbolically, an organization thinks or suffers in the metaphorical sense only, by an imperfect analogy with human bodies.

Distributed characters act and are acted upon but lack the conventional markers or mental activity key to our ordinary understanding of characterization.[19] Airports and bleak houses instead confront us with bound environments—"scene-agents," in Burkean terms—from which agency emerges in the accumulate of social interactions.[20] "*Railroads build themselves,*" Mr. Shelgrim explains in *The Octopus*:

Where there is a demand sooner or later there will be a supply. Mr. Derrick, does he grow his wheat? The Wheat grows itself. What does he count for? Does he supply the force? What do I count for? Do I build the Railroad? You are dealing with forces, young man, when you speak of Wheat and the Railroads, not with men. There is the Wheat, the supply. It must be carried to feed the People. There is the demand. The Wheat is one force, the Railroad, another, and there is the law that governs them—supply and demand. Men have only little to do in the whole business. Complications may arise, conditions that bear hard on the individual—crush him maybe—but the wheat will be carried to feed the people as inevitably as it will grow. If you want to fasten the blame of the affair at Los Muertos on any one person, you will make a mistake. Blame conditions, not men. (*O* 576)

Distributed characters such as airports and railroads differ from, for example, talking trees or pensive rocks, in that their agency is defined

not only thematically or metaphorically—talking or thinking—but also structurally. A distributed agent contains within itself other agents who cede their powers of volition to the agglomerate, in a nesting doll-like formation. Our puzzle will be in the capture of such odd forms by the hook of available linguistic features.

II. Method

II.a Model

My methods build on (in that they simplify) the approach taken to unsupervised participant extraction based on semantic roles by David Bamman, Ted Underwood, and Noah A. Smith.[21]

To begin, note that whatever high-order models of agency we might imagine they must translate in discourse into formal low-level linguistic features. In seeking a formal model of agency based on grammatical features, such as sentence subjects and objects, we approach a conception of character that—by the way of David Alworth referencing Bruno Latour quoting Algirdas Julien Greimas via Lucien Tesniere—"precedes any semantic/or ideological investment."[22] In other words, we need to observe the functions of agency (how it does it) before committing to its shape (what it is). The definition emerges through usage, not the other way around.

The above can be achieved by describing agency in its grammatical sense, at a level that precedes representational content—the meaning—of its carriers. At the very least, such low- level linguistic features will point to (signify indexically) agency in its semantic sense, which in turn may involve other, more complex, nongrammatical attributes worthy of further study. A stronger version of the thesis would hold that the physical microtransactions between grammatical subjects and objects, in accumulation, produce (and not merely signal) a reader's intuitions about volition in its macrosemantic, metaphysical sense. Ordinary speakers need not theorize coherently about agency prior to description—they simply place agents in linguistic contexts as they see fit. It is for us to discover the regularities of that placement.

A few minimal assumptions are therefore sufficient to construct a viable grammatical model of agency in use. For example, we intuit a novel's major characters to play a more active role in the diegetic world than its minor characters. It follows that semantic subjects of action must often be found in the grammatical subject position. Minor characters, who rarely act but are acted upon, are likely to occupy the grammatical

object position along with proper semantic objects, such as furniture, instruments, clothing, and the like. An ordinary object such as a spoon, a mere instrument of action, will fail to attain semantic agency by the virtue of rarely being in the grammatical subject position. Overall, we expect major characters to be frequent *actors* and *benefactors* within the narrative space of a novel, whereas minor characters will appear infrequently in one or both positions. Noncharacters will never occupy the subject position but will sometimes figure in the object. Though not all stories may work that way, most do. The innate swell of an SVO language will generally overwhelm any attempt to swim against its grammatical tides.

To identify actors and benefactors, I will be using a natural language processing technique called Semantic Role Labeling (SRL), a method of breaking sentences down into their subjects and predicates. A few degrees more complex than simple sentence parsing, SRL is a good way to find and describe commonalities between sentences such as "Brutus killed Caesar" and "Dennis ate a sandwich." Killing usually involves an actor doing the killing and a "patient" being killed. Eating similarly involves an actor doing the eating and the thing being eaten. The commonality between killing and eating, both specific, "deep" themes of action, may be expressed in the shallow thematic commonality between volitional agents. Whereas verbs connect nouns generally, SRL classifies the available connections under several common types or roles. Common semantic roles may include *experience*, *force*, *theme*, *result*, *content*, *beneficiary*, *goal*, and *source*.[23] In addition, SRL is sensitive to grammatical subtleties such as the passive voice in the phrase "Caesar was killed by Brutus." In both cases, Brutus is properly identified as the actor and Caesar as the benefactor (or patient, in SRL lingo) of action.

The technique of classifying semantic roles computationally is based on an annotated corpus of tagged predicates, or "case frames." For example, in the sentences "Doris gave the book to Cary" and "Doris gave Cary the book," the verb *to give* frames the relationships among *Dory*, actor; *Cary*, patient; and *book*, the theme of the action.[24] To teach a machine to differentiate between thematic frames, a group of researchers annotated, by hand, a large number of articles from the *Wall Street Journal*.[25] A machine was then trained using hand-annotated labels along with other features—syntax position, part of speech, passive and active voice—to assign labels automatically.[26]

SRL further uses something called the Proposition Bank (PropBank) labeling taxonomy to classify roles into unique semantic categories. In that taxonomy, ARG0 is reserved for arguments that signify the agents (or actors) of action and ARG1 for those that signify their patients (or benefactors). No generalized inference can be made about ARG2–5,

though we know that these at least attach to the clauses of ARG0.[27] Verbs take optional adjuncts, thirteen in all, ranging from AM-LOC, indicating location, to AM-TMP for temporality and AM-PNC for purpose.[28] For example, in the sentence "On Monday, Doris made lunch at home,"— "on Monday" and "at home" modify the context of action. The resulting roles are still shallow in the sense of encapsulating diverse syntax cases that resolve into similar semantic groupings.

Since the various frame annotation schemas differ slightly in the labeling of roles, for the purposes of this paper, I will keep my labeling terms within the same metaphorical paradigm. Let us designate *actors* as the volitional agents of the predicate, corresponding to ARG0 in the PropBank labeling schema. Further, let us designate *benefactors* as proto-typical patients or themes of the predicate, corresponding to semantic roles labeled ARG1–5. The three boundary-defining optional adjuncts— location (AM-LOC), extent (AM-EXT), time (AM-TMP), and direction (AM-DIR)—will refer to the *context* of the action in our discussion. I pick these specific contextual markers (while discarding others) for the sake of convenience only and not to suggest that contexts are to be limited to time and space. More work can be done in classifying such contexts. However, I also suspect that time and place will sufficiently demarcate the context for our purposes and, further, that more complex contexts will hold diminishing returns for analysis.

The above, simplified taxonomy coheres into a schema made up of actors, benefactors, and contexts. Accordingly, the sentence "On Monday, Doris made lunch for Carol at home." will first be parsed as "On Mon-day [AM-TMP], Doris [ARG0] made lunch [ARG1] for Carol [ARG2] at home [AM-LOC]." In the second pass, we will label "Doris" the actor, "lunch" and "Carol" the benefactors of Carol's work, and "home" and "Monday" its spatio-temporal context, incidental to the volitional event.

The schema helps refine our initial theoretical observations about char-acter agency into a more specified, formal model. First of all, whatever is meant by "major character" I expect to correspond to frequent volitional actors under the schema. The list of benefactors will likely include both major and minor characters, as well as the various important objects of action, though only the characters will sometimes also feature in the actor list. (A teacup seldom figures in the subject position.)

Last, and most pertinent to the problem of distributed agency, I expect major distributed characters to feature prominently in all three categories—actor, benefactor, and context—by virtue of their being both frequent subjects, frequent objects, and frequent contexts of their ac-tions—the distributed agent being that entity capable of self-referential,

boundary-defining action. To put it another way: where some actors (usually human) will be bounded by singular subjects, others (like airports) will also encompass a multiplicity of actorial events: the airport does things and is a thing where things happen.

Not all statements are self-referential in that way. For example, "I, Dennis Yi Tenen [actor], ate a taco [benefactor], at Riverside Park [context]." This ordinary sentence spans at least three nominally distinct entities (me, taco, park). Compare the above with the mission statement of Columbia University, found online and edited for clarity: "Columbia University [provides] . . . a distinctive and distinguished learning environment for undergraduates and graduate students in many scholarly and professional fields. . . . It expects all areas of the University to advance knowledge and learning at the highest level and to convey the products of its efforts to the world."[29]

By our definitions, "Columbia University" constitutes an actor [ARG0] of the sentence, "distinctive learning environment" and "students" become its benefactors [ARG1], while the "scholarly and professional fields" indicate the context [AM-LOC]. Circuitously, "distinctive learning environments," "students," and "fields" also constitute Columbia the University. The mission statement really concerns one composite entity, not, as before, three distinct ones. Thus, the (nominal) University provides the University (a distinguished environment) for the University (students) in the University (scholarly fields).

In addition to its ability to take concerted action without on the part of the collective ("to convey its efforts to the world"), the institution is defined by action directed within, toward itself. An organism thus acts simultaneously on the world and on its organs. Such self-directed activity is operationally necessary for systemic survival. Absent recursive, self-referential action, complex systems dissolve into their constituencies. The folding of agency onto itself—reaching out to reach back in—delineates the outer edges of a distributed organism.[30]

A formal, grammatical model of action can ultimately help differentiate between centralized and distributed dynamics of agency: a novel's major characters will manifest through its frequent actors and benefactors. Minor characters will become its infrequent actors and sometimes benefactors. The set intersection among actors, benefactors, and contexts will capture actors distributed within their environment.

II.b Exploratory vs. Confirmatory Modeling

Since we are wading into the methodological weeds here, I want to take a moment to discuss the principles underlying exploratory data analysis (EDA), a mode of statistical thinking particularly appropriate for the kinds of difficult historical, cultural, interpretive, "fuzzy" questions usually posed in humanities research. EDA was popularized in the 1970s by John Tukey. Many problems in contemporary statistics take the shape of confirmation, he wrote in his now classic introduction of *Exploratory Data Analysis.*[31]

For example, doctors have long posited a link between smoking and cancer. A confirmatory study would look for correlations or even causal relationships between these variables, "assessing the strengths of the evidence" (*EDA* 21). However, to have an intuition, much less a testable hypothesis about health at all, researchers must first engage in a bit of "numerical detective work" (*EDA* 1). How did we even come to the idea that smoking and cancer are related? There is nothing for confirmatory analysis to consider without systematic exploration of a domain (*EDA* 3).

An exploratory approach seeks to shape the intuitions guiding later confirmatory analysis. At this initial stage we are not interested in proving anything, only in getting a feel for the data in speculating, in looking for unexpected trends or outliers. A high degree of accuracy is not required for the task. EDA techniques favor rough calculations, schematic summaries, sketches, and visual analysis. To see a trend, we may, for example, fit a curve by hand or by using simplified metrics so as to go back and confirm with greater precision at a later date.

EDA is a good fit for the humanities because much of our work is fundamentally resistant to exact methods. A text or a historical event lies at the nexus of potentialities—it cannot be resolved to a single universal meaning. Consequently, we ask not what a cultural construct means, but how it means and in what contexts. Our tools are not any less empirical than those of the so-called hard sciences. Our methods—archival research, close reading, historiography, hermeneutics, philology—are immersed in the observed particulates. Rarely am I interested in the exactitude of my findings, however: it matters to me that Lincoln International Airport is a character in the novel, not that it is more or less of character than Mel Bakersfeld or Gwen Meighen to several decimal points of measurement. I experiment with quantitative methods and draw graphs to refine my qualitative, theoretical intuitions about distributed agency. Literary modeling and visualization are therefore not just a way of reading at scale—they force us to confront the inner dynamics, poetics in Susan Sontag's or Boris Eichenbaum's sense, of complex cultural phenomena.[32]

II.c Exploratory Analysis

Let these musings rest while we commence the exploratory phase of the experiment, in three stages.

We begin by resolving pronouns using neural network and deep reinforcement learning methods developed by Kevin Clark and Christopher Manning and implemented in the Python programming language by the *neuralcoref* library.[33] Coreference resolution disambiguates pronouns so that sequential sentences such as "Doris ate a sandwich; She was hungry." can be understood to refer to the same entity: "Doris ate" and "Doris was hungry." The resolution is not perfect, operating at roughly .74 accuracy (F1 score), with the best score being 1.[34] Since we will be using frequency metrics over long stretches of text—*Airport* contains 36,500 words and *Bleak House* 356,465—the error can be treated as a correction on the reported confidence intervals.

Once pronouns are resolved, I tokenize the text by sentence and use the technique developed by Ronan Collobert and his team to label semantic roles according to the labeling schema described above.[35,36]

So derived, semantic roles facilitate the exploration of volitional dynamics in aggregate, indicating not just the source but also the direction agency flows across diegetic space. Here, a measure of "volition share" can be used to quantify the "majorness" and the "minorness" of characters by the proportional share of action they take within the story. Intuitively, we expect major characters to take the majority of action. Impoverished story worlds will fail to spread the action among minor characters, who will appear to readers as "flat" or "underwritten." Further, the imbalance or "debt" in pairwise action between any two protagonists can indicate semantic disparity, manifesting from implicit gender or racial bias, for example.

To produce a measure of *volitional share,* I have divided the frequency of actors (according to their semantic roles) by the total number of pairwise actions between actors and benefactors. All of the "major characters" listed on the *Wikipedia* entry for *Airport* were recovered in the top quartile of most frequent actors in the novel, giving this approach reliable recall, which I expect would likewise hold true for minor characters, lower down the list (Table 1).

The top quartile also contains several transhuman, distributed actors, which I suggest should be included in our understanding of the novel by virtue of being grammatically active. Airport, Airline, and Plane rank above Perry Yount, for example, the air traffic controller tasked with helping Mel Bakersfeld's suicidal brother, Keith, and above Ned Ordway, the chief of airport police, notable for apprehending the elderly stowaway, Ada Quonset.

Table 1. Character volitional share in Arthur Hailey's *Airport*, expressed as a percentage of total character actions.

ACTOR	VOLITIONAL SHARE %
Mel Bakersfeld	12.5
Vernon Demerest	7.3
Keith Bakersfield	6.3
Tanya Livingstone	4.9
D.O. Guerrero	4.7
Gwen Meighen	2.8
Elliott Freemantle	2.7
Inez Guerrero	2.3
Joe Patroni	2.3
People	2.2
Ada Quonsett	1.9
Anson Harris	1.7
Cindy Bakersfeld	1.4
Lincoln International Airport	1.4
Driver	0.7
Agent	0.7
Plane	0.7
Peter Coakley	0.7
Policeman	0.6
Wayne Tevis	0.6
Airline	0.6
Ned Ordway	0.6
Danny Farrow	0.6
Natalie Bakersfeld	0.6
Passenger	0.6
Baby	0.6
Dr. Milton Compagno	0.5
Libby Bakersfield	0.5
Flight	0.5
Perry Yount	0.5

Should we count these among the false positives? No, because they nevertheless answer the minimal definition of characters encoded into the model. The appearance of Airport and Plane among named human characters on the list instead highlights the deficiency of conventional, single-person-based theories of characterization. Given a minimal "preceding investment" into a formal model of agency, we find that airports and planes nevertheless exhibit at least the shallow semantic properties of agency, usually afforded to humans only.

The second metric I propose to explore is the *volitional debt ratio* (VDR), representing a ratio of total action share to total benefit share in the novel. In pseudo-code:

```
            total share of action
vdr =      ───────────────────────        - 1
            total share of benefits
```

A debt ratio of zero would mean that a character acts and benefits from action in equal measure. A positive debt ratio indicates volitional excess, meaning that a character acts in greater proportion to the derived benefit from the total action of the plot. A negative debt ratio indicates debt, in which case the entity benefits in greater share than its action.

Debt metrics exhibit several surprising features, apparent by consulting Table 2. For one, judging by lower debt ratios, being a major character does not always entail being a willful subject. While Mel Bakersfeld takes the lion's share of the novel's action, other, more minor characters, such as Ada Quonset are able to project their will more reliably: they are subjects in greater proportion than they are objects of action. Ada actively seeks to evade the consequences of her mischief. Her talents lie in gaming the system. Agents of the airport would love catch her, placing her in the grammatical object position, but they cannot. She gets to act, in other words, but is not acted upon. The most active character by this measure is not Mel, the protagonist, but Vernon Demerest, the macho star pilot who guides his damaged plane to safety and who is in debt to none.

If we ignore for a moment the share of action and examine volitional shares alone, minor "assistant" characters, such as Perry Yount and Cy Jordan, along with general social forces, such as Police, Society, and Company, operate at the greatest *volitional excess.* Their share of action is paradoxically small, but decisive. Passive entities, such as Eye, Thing, Car, Noise, Insurance, Face, or Meal, operate at a greatest *debt*: they are acted upon but do not themselves act at all. In that, they don't clear the bar of becoming characters.

Table 2: Volitional debt metrics in Arthur Hailey's Airport, expressed in the ratio between a character's total action and total benefit.

BENEFACTOR	BENEFIT SHARE %	TOTAL VOLITIONAL DEBT RATIO
Mel Bakersfeld	6.2	1.0
Keith Bakersfeld	3.2	1.0
Tanya Livingstone	3.1	0.6
Vernon Demerest	2.8	1.6
People	2.7	-0.2
Gwen Meighen	2.5	0.2
Airport	2.0	-0.3
D.O. Guerrero	1.8	1.6
Plane	1.8	-0.6
Flight	1.5	-0.7
Inez Guerrero	1.5	0.6
Elliott Freemantle	1.3	1.1
Cindy Bakersfeld	1.1	0.3
Passenger	1.0	-0.5
Joe Patroni	1.0	1.4
Anson Harris	0.9	0.9
Ada Quonsett	0.8	1.6
Insurance	0.7	-0.8
Runway	0.6	-0.4

Volitional debt ratios also help differentiate statistically between human and distributed characters. Note, initially, that most human characters on average operate at the VDR of 1. People, Airport, Plane, and Flight operate at a general debt because they benefit from action disproportionately to playing the actant. We expect all non-willful objects in the novel—vehicles, body parts, and things—to operate at a debt. Distributed actors are both willful and indebted. The set intersection between frequent actors and frequent benefactors can thus be used to filter out mere objects of action from distributed subjects. For example, Insurance is often the beneficiary of action rather than its originator. Flight Two operates at a debt as well, while also holding a significant portion of the novel's action. Semantically, Flight Two begins to act like a character when its passengers band together to respond to a terrorist threat. Insurance companies, by contrast, do not figure actively in the novel (they "don't do things"), remaining passive factorials of action in the object position.

A similar pattern holds true for *The Octopus*. The octopus itself—the railroad—holds the twelfth most active agent spot in the novel, taking slightly more than 1% of the action. But where human characters operate at general excess, averaging about 1.2 on the total volitional debt ratio scale—Anixter and Presley, both men of action, are at 1.6 and 1.8, respectively; and Hilma Tree, the love interest, and S. Behrman, a Railway agent, both are at 1.5. Railroad operates at balance with a score of 0.1. Wheat, not a very active entity in the novel, operates at a debt ratio of -0.6. These results are consistent enough to support our initial intuitions about distributed agents who exhibit active but nevertheless diffuse loci of volition.

Where the above debt metrics were averaged among all actions, the following charts help visualize pairwise actor-benefactor connections, that is, the volitional dynamic between individual characters. To draw them, I arranged a list of most frequent actors along the *x*-axis and most frequent benefactors along the *y*. For each cell I calculated the imbalance of action between character A and B, expressed as a share of total number of actions (times a hundred for convenience). In pseudocode:

```
                        AB actions - BA actions
pairwise-vdebt = ─────────────────────────────   x 100
                            sum (all action)
```

A negative number once again represents debt, expressed in blue, and a positive number excess, expressed in red shades on the graph (Fig. 1).

From this chart (starting with an actor and moving to a benefactor), we can see, for example the imbalance of action between Mel Bakersfeld and both Cindy his wife and Tanya Livingston, a developing love interest who works at the airport as a customer-relations manager for Trans America. Conversely, where Tanya stands in a passive relation to Mel, she takes a more active role in relation to other characters. We observe also that Joe Patroni, the head of maintenance operation for Trans World Airlines, although an active character, is weakly connected to the rest of the group. His action and benefit are primarily restricted to Airport, Plane, and the two Bakersfeld brothers. Cindy is likewise not well connected: not an employee, she does not participate in disaster proceedings that advance the plot forward. Elliott Freemantle, an attorney who organized the uprising against the airport at the local neighborhood meeting, has effect on People but is upstaged, literally and figuratively, by Mel Bakersfield. In their singular encounter, Mel responds to the attorney's accusations in front of a crowd with empathy and considerable legal knowledge. Freemantle is subsequently exposed for the confidence man that he is. We observe also the relatively "cool" nature of distributed agents such as Airport, People, and Plane.
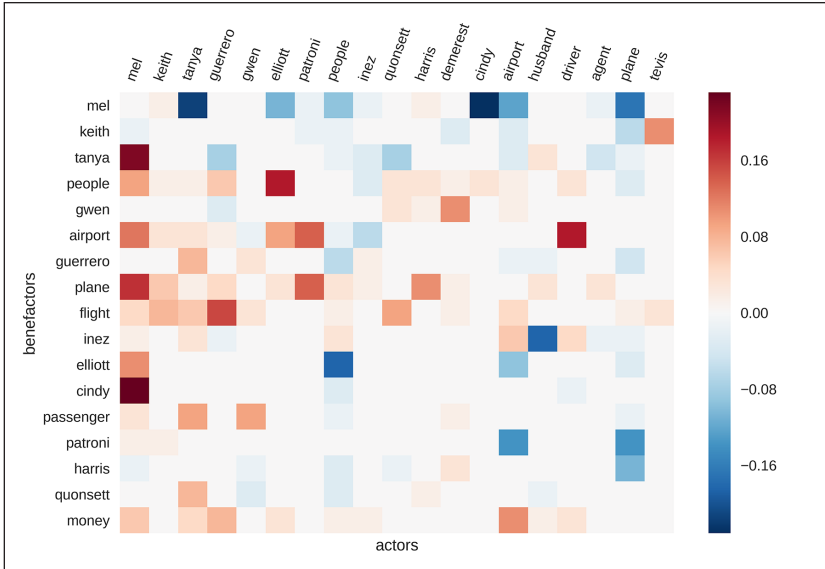
Fig. 1. Pairwise comparison between actors and benefactors in Arthur Hailey's *Airport* (1968).

It is instructive to compare the volitional topography of *Airport* with that of other novels. *Bleak House* differs from *Airport* not only in the number of characters (*Bleak House* contains many more) but also in those characters' relative levels of activity. No character in *Bleak House* dominates the action as much as Mel does in *Airport*. Lady Dedlock, William Guppy, and Mr. George occupy between 3 and 4% of the novel's action in contrast to Mel Bakersfeld's 12.6%. Harry Harrison's fantastical *Deathworld* is even more unbalanced in that sense, with Jason dinAlt taking more than 40% of the action (Fig. 2).[37] Such high scores would indicate a certain "flatness" of character development, as signaled by actors who rarely interact with each other, operating at a huge debt as compared to the protagonist.[38]

To check the efficacy and the limits of volitional debt metrics, I chose Gertrude Stein's *Tender Buttons*, a highly experimental novel lacking conventional characterization as such.[39] The resulting graph is sparse as we would expect (Fig. 3). Stein's world contains mostly objects, which rarely act on one another. Soldier, Sight, Cake, and Cup each takes between 2 and 4% of the grammatical action. In a novel that resembles a still life, mobilizing few verbs, Cup operates at a total volitional excess ratio of 11.83, as compared to Jason dinAlt's .92 and Mel Bakersfeld's .97: "A white cup means a wedding. A wet cup means a vacation. A strong cup means an especial regulation. A single cup means a capital arrangement

Fig. 2. Pairwise comparison between actors and benefactors in Harry Harrison's *Deathworld* (1960) showing the volitional prevalence of the protagonist.

Fig. 3. Pairwise comparison between actors and benefactors in Gertrude Stein's *Tender Buttons* (1914). Note the general sparsity of connections.

between the drawer and the place that is open."[40] The most prominent single pairwise imbalance is between sight and thing, which is perhaps fitting for a world composed of weakly transitive, disembodied verbs, such as "to mean," "to be," and "to show." Stein's things emanate meaning into the environment in a mist, containing a mere suggestion of the subject.

By contrast to dishware, distributed social agents are complicated by their diffuse localization. Characters might "wear different hats," belonging simultaneously to multiple overlapping or nonoverlapping contexts. For example, Mel Bakersfield's brother, Keith, is both family and colleague, whereas his wife, Cindy, is a member of the family only (as far as we encounter her in the novel). By contrast, biological organs are unique in that they remain in place. My liver is always mine—it does not leave to become a member of some other organism during business hours (as we read in Corinthians 12:21, "And the eye cannot say unto the hand, I have no need of thee: nor again the head to the feet, I have no need of you").

A truly distributed agent is even less cohesive. Its organs threaten continually to dissolve into a myriad of individual, atomic actor constituents. Incorporation thus emerges as a major theme of the organizational novel in addition to being its defining grammatical feature. When Mel and Tanya Livingston interact in their professional capacities, they do so on the behalf of the airport as part of its internal, self-directed dynamics. Their love-life belongs to a different domain. However, our simple pairwise actor-benefactor models from Figure 2 do not account for context and therefore cannot discriminate between actions taken under differing aegises.

The pairwise model can therefore be refined by considering the context-defining properties of distributed agency already suggested (though not carried out) by Burke in the discussion of his scene-agents (*GM* 7–9). If we are to understand characters as "fields of activity"—rather than as singular things or persons—we must look for actors not only in the grammatical subject position, but also in the context of action! Note that characters frequently characterize their action in terms of other characters, including those to which they formally belong as members of the set. Mel's sphere of influence, for example, is bounded spatially by the airport, and he is organizationally a member of the airport community. From that vantage point, the actions of an airport manager are properly internal and self-directed but are external and directed toward others from the point of view of Mel, the family man.

Characters can subsequently be modeled as a collection of contexts—the various hats they wear—where a context is represented by a collec-

tion of characters active within its boundaries. The sum total of actors, benefactors, and contexts approximates Burkean "ways of placement" (*GM* 13). In contrast to unitary, brain-bound models, in which wills emanate from uniformly sentient nodes—humans and their anthropomorphisms—scene-agents can now be visualized as diffuse volitional fields, emerging slowly through the aggregation of boundary-defining contexts.

Visualizing characters in sets made up of constituent actors accounts for the multiplicity of belonging. With sets, we are able to differentiate actions taken by a pilot on behalf of the flight from those taken on behalf of his professional organization or his family.

The most common contexts in *Airport*—as evidenced by the semantic adjuncts related to location (AM-LOC), extent (AM-EXT), time (AM-TMP), and direction (AM-DIR)—that are also actors and benefactors are (in order of prominence): Vernon Demerest, Airport, Mel Bakersfield, Plane, and Keith Bakersfield. Somewhat less prominent are Gwen, Meadowood, Guerrero, Home, Joe Patroni, Runway, and Flight. I discarded contexts such as Time, Day, Moment, and Office because, though they constitute scenes, they rarely function as agents. These do not otherwise hold any volitional share in the novel and therefore do not figure in our previous metrics capturing actors and benefactors. The scene-agent can be defined effectively by the set intersection among actors, benefactors, and contexts. This information becomes useful for better identifying distributed characters, which we can now understand as contexts who are also frequent actors and benefactors of the novel.

To my surprise, whereas we began by expanding our ideas about character to include bound scenes—airports and neighborhood associations—we now find that conventional people-agents also exhibit the properties characteristic of distributed agency. Similar to other emergent contexts, human characters also emanate volition diffusely, through compound action. The seeming unity of action congeals around their member constituent organs. When a character such as Vernon acts—on Mel, for example—he acts not in the singular capacity but as a collective entity better conceptualized as a member set Vernon: {A, B, C} Mel {C, D, F}. A more nuanced network-based model of power dynamics in the novel would take the diffusion of agency into account. We can prepare the grounds for that work by extracting common scene-agents programmatically. For each of *Airport*'s contexts that appear on our actor and benefactor lists, I have therefore extracted a set of constituent actors and benefactors. In pseudocode:

```
for each SCENE-AGENT return common ACTORS and
BENEFACTORS
```

The above heuristic results in the list of scene-agents represented in Table 3. We have here the nodes of a network diagram, but one that no longer takes the unity of volition for granted. Our binary pairwise comparisons can now be expanded into a relationship between collectives or member sets, even in cases where such collectives converge on the locus of an individual.

The reported results summarize the composition of prominent scene-agents, that is, those characters in the novel that appear also as contexts of action (and I list only those members of action that also appear frequently in the actor and benefactor counts).

What is an airport? We expect an airport to represent a collective through which its member constituents act on other collectives and individuals. Who is Mel Bakersfield? More than a localized body, he also represents a composite scene that frames the action of other characters. Cindy, Elliott, Plane, Airline, Tanya, Committee, and Joe often frame their action in the context of Mel. Actors belong to their assemblages by virtue of reaching across the spatial and temporal boundaries of the organization.

The member composition of scene-agents shows stark differences in the structural characteristics of distributed volition. Localized, single-body agents such as Mel, Vernon, and Keith contain few members, with much of the action directed explicitly toward the unified self. Distributed characters such as Airport, Plane, Meadowood, and People contain more members on average. Consequently, a much smaller proportion of distributed action is directed toward the unified self. Where Mel often contextualizes his own actions, Airport acts on self diffusely, through the assemblage of its members.

Another way to understand these descriptive statistics would be to note that all characters are distributed to an extent, but institutional characters are more diffuse and less explicitly self-referential. For example, Keith Bakersfield, one of the most withdrawn characters of the novel, whom we encounter in contemplation of suicide, defines the contexts of his own action in 78% of all context-bound events. And despite being a concern for others, Keith contextualizes the actions of only two other characters: Perry Yount, his workplace assistant, and Natalie, his wife. Lost in the airport and in her own worries (about her terrorist husband), Inez Guerrero is similarly self-bounded, isolated, and self-absorbed.

The novel's major characters Mel Bakersfield and his love interest Gwen Meighen contextualize their own actions more rarely because they are often seen to act in multiple capacities, both private and official. Fully distributed characters such as Airport and Plane contain the most diverse sets of member constituents, meaning that they not only

Table 3. Scene-agents expressed as sets of member scene-agents, listed parenthetically by the share of action. Set membership signifies activity of actors and benefactors bounded by actors and benefactors that are also contexts of action.

Scene-agent	SetMembership, %action
InezGuerrero	{Self 79%, Cindy 7%, Plane 7%, Sadness 7%}
KeithBakersfield	{Self 78%, PerryYount 13%, NatalieBakersfield 9%}
TanyaLivingstone	{Self 68%, Mel 18%, Agent 4%, PeterCoakley 4%, Ada 4%}
VernonDemerest	{Self 62%, Gwen 12%; Harris 10%, People 6%, Guerrero 4%, Airport 2%, Mel 2%, Plane 2%}
ElliottFreemantle	{Self 60%, Mel 30%, Police 10%}
MelBakersfeld	{Self 58%, ElliottFreemantle 16%, Plane 6%, Cindy 4%, Tanya 4%, JoePatroni 2%, Airline 2%, Committee 2%, NedOrdway 2%, Agent 2%, Inez 2%}
D.O.Guerrero	{Self 64%, People 15%, Inez1 5%, Plane 7%}
JoePatroni	{Self 43%, Policeman 36%, Plane 14%, Tanya 7%}
GwenMeighen	{Self 39%, Vernon 17%, Quonsett 17%, Captain Demerest 12%, Harris 5%, Compagno 5%, Passenger 5%}
Plane	{Self 18%, Patroni 18%, Harris 13%, Gwen 9%, Mel 9%, Gwen 5%, Tanya 5%, Quonsett 5%, Elliott 5%, Vernon 5%, Guerrero 4%, Patroni 4%}
People	{Keith 29%, Girl 14%, Lawyer 14%, Self 14%, Mel 14%, Captain 14%}
Airport	{Cindy 14%, Patroni1 4%, Insurance 10%, Meadowood 7%, People 7%, Vernon 7%, Flight 7%, Mel 7%, Plane 7%, Keith 7%, Gwen 3%, Harris 3%, Self 3%, Guerrero 3%}
Meadowood	{People 63%, Plane 12%, Mel 12%, House 12%}

often act and benefit from the action of the novel, but that they also often contextualize action and that action often happens on their behalf through personification. Like all planes, the plane at the center of the novel's terrorist plot personifies life-forms, having a head (cockpit), body (fuselage), and wings. This arrangement of organs contains volitional dynamics similar to those of other body-bound characters. The Plane contextualizes its own actions in 17% of the cases and the Airport, a truly amorphous entity, in only 3%.

In localizing agency by the share of contextual action, we can better map the varied topographies of the will in the novel. Scene-agent summaries show all actors to be distributed to the extent that they delimit a swarm of collective activity. Their inner volitional dynamics differ structurally however, in that Airports and Planes, Managers and their love interests, draw upon overlapping yet also distinctive member sets, some more tightly and others more loosely wound around the contextual nucleus.

II.d On Validation

Theories of distributed agency lead us to a genre of literary works sharing similar thematic and structural concerns, revealing a gap in the theory of characterization. To account for airport-like, organizational entities, we need an expanded model of character agency capable of capturing the distributed as well as human-centric agents. State-of-the-art formal methods for automated character extraction measure their success (accuracy) in relation to a list of characters as understood by human classifiers who, at the outset, exclude distributed agency by definition. The alternative has to perform as well as or better than when it comes to traditional characters, in addition to capturing the diffuse, emergent actors at play in novels such as *Bleak House*, *Airport*, and *Octopus.*

The toy models above do not exhaust the possibilities of agency—rather, like planetary mobiles, they show us something about the inner workings of a fictional universe. To construct such models, we created hardwired linkages among actors, benefactors, and their contexts.

Wires should not, however, be mistaken for gravity. All models, even implicitly held ones, will be reductive to an extent. Models ultimately present us with a tautology: a view of character agency based on the theory of mind will produce mindful characters; orthodox, class-based Marxist systems will produce class actors; deconstructivist Lacanian theories will produce unconscious fields of pure nonsubjective differentiation. Models assume the very units they set out to discover—an insight that Latour

once leveled against sociology as a whole.[41] Crucially, formal models can also reveal gaps between theories and their applications. The extent to which a planetary mobile fails to account for irregularities in celestial motion opens the possibility for general relativity. A reified, exploratory model does not simply confirm its assumptions—it also makes the hermeneutical trip back to inform theory.

But how can we trust these new findings? Researchers in more quantitative disciplines frequently try to get out of this circular epistemological bind by testing their findings against externally validated data. The computational studies of literary character I cite above check the efficacy of their algorithms against *CliffNotes* or *Wikipedia*, precisely because these offer the most generic "ground truth" values pertaining to fictional characterization. Such externally validated results are reported as some combination of *precision*—along with validated characters, did we also dredge up a number of noncharacters?—and *recall*: did we miss anyone? (These are also known as Type I and Type II errors: false positives and false negatives.)

Recall makes sense when applied to my proposed actor-benefactor-context model, but precision does not. While I know my models identify most conventional characters, I also expect those that do not normally appear in authoritative sources such as *CliffNotes* or *Wikipedia*. My explicit aim is to change the perception of actors that otherwise would be considered in the false positive category. Many of my Type I errors are therefore not errors at all—rather, they point to the limitations in the orthodox theory.

But before we get into that: why didn't previous studies take a simpler tack? Predicate grammars and frame semantics have been around at least since the 1960s, described in well-known works by Noam Chomsky, Charles J. Fillmore, Collin F. Baker, and John B. Lowe.[42] Their use today is often encapsulated by higher-order logics, which obscure the underlying linguistic representation.

Two answers suggest themselves in passing, both systemically problematic for our field.

For some, simpler methods are not interesting programmatically. "Solved" problems in computer science become a matter of applied science and therefore lose publication momentum. The push toward complexity advances the boundaries of computation but not necessarily in the applied domain. Problems in the human sciences often require the reduction of complexity, where simpler models with fewer assumptions should hold more weight. Paradoxically, the more technically interesting the problem, the more complex the solution and the less a home field is able to reason transparently about its methods. Thus, in

collaboration between disciplines, a researcher may be compelled to sacrifice explanatory power for computational interest.

The related and more thorny problem lies in the recent popularity of machine learning (ML), usually of the supervised variety. For the uninitiated: the general experiment design in socio-cultural applications of ML involves establishing a sense of "ground truth" created by either expert or nonexpert annotators. For example, to teach a machine the difference between emails categorized as "spam" and "important," a researcher might begin by collecting a large archive of messages (C). A small sample of that corpus (C_A) would then be used for annotation and the larger portion (C_B) set aside. Human annotators will now be asked to follow instructions, labeling the messages in C_A according to a predetermined taxonomy: in our case, with tags "spam" or "important." This labeled portion of the corpus becomes ground truth, further split into training and verification portions (C_{At} and C_{Av}). Researchers will use the training data (C_{At}) to teach the machine and the verification portion (C_{Av}) to estimate how well machine guesses perform in comparison to human-derived ground truth. Once confidence is established, the machine can extend its guesses to the remainder of the corpus (C_B). In short: we label, train, evaluate, and extend.

Learning, in this sense, signifies the statistical correlation between observed features (e.g. spelling, punctuation, length of sentence, capitalization, message source, or the frequency of certain words or parts of speech) and the supplied category labels ("spam" or "important"). The number of such features can potentially reach millions. The correlational, feature-discovery aspect of ML applications distinguishes them from formal methods.

For an analogy of such learning, think of two teachers, Show and Tell. The latter will tell us the difference between, say, "birds" and "airplanes" explicitly by identifying several distinctive features particular to each: for example, size, shape, or the presence of feathers or aluminum fasteners. Here, we may learn about wing lift and the evolution of feathers from the top (theory) down (to observation). By contrast, the former, bottom-up teacher will show many examples without explanation. We are left to derive theoretical intuitions on our own and implicitly.

Both strategies of learning have their strengths and weaknesses. The growth of computational power has proven bottom-up approaches to be surprisingly, unreasonably even, effective in all sorts of classification tasks. As it turns out, many questions in social science and the humanities can be reduced to a problem in classification, particularly when the categories are uncontested. For example, in labeling images, few humans would disagree on whether something looks like a "bird" versus

"airplane." In such cases, researchers need not concern their recruits with lectures on ornithology or aeronautics. Label it as you see it; the machine will learn by example. Theory is unnecessary because the machine will theorize for us by creating a model of implicit correlations between the object and its category.

The bottom-up technique becomes more problematic in cases where ground truth is contested. Consider the task of classifying "abusive" language, a topic of special interest to the Association for Computational Linguistics since 2017.[43] What are birds? What is abuse? The two questions are not epistemologically equivalent. In the first instance, I was comfortable to establish the ground truth by consensus. Anyone older than toddler will do for the task. I also don't mind coming to the question of bird recognition with a blank slate, that is, without priors or critical reflection. The bottom-up study design reveals what people think, implicitly, in each category.

The example of abusive language demands pause, by contrast. We cannot in good faith pretend to approach whatever is meant by "abuse" in a state of implicit ignorance, without priors. Nor can we trust latent opinion. Location, time, and demographics, among other factors, influence the establishment of ground truth. Who does the training and where? Context matters. Implicitly held ideas about abuse in the general population may themselves be objectionable, racist, sexist, or reprehensible. A whole field of scholarship exists to rectify, to challenge latent beliefs, and to change our minds. Showing without telling—without thinking, theorizing, modeling—won't do in such cases.

All readers are biased readers in that they hold prior philosophical commitments. A successful experiment must "make the trip back" to the underlying theoretical model, changing it in the process. The trip back to theory leads us to the tricky problem of verification. Formal methods will always return some results, however arbitrary. How can we trust new findings absent the ground truth? By what standards would they be valid or not? In confirmatory studies, algorithm performance can be ascertained internally, by accuracy as compared to latent belief. Exploratory studies answer to higher, though less exacting, standards.

First, any findings must accord to prior observation external to the study: a new method for discovering planets should, at the very least, discover those we already know about. Agency mapping in the way I have proposed it here recalls 100% of the "major characters" listed in each of the novel's *Wikipedia* page and its *CliffNotes*, with similar results (adjusted for differences in the plot) for the film adaptations listed on *IMDB*.

Second, any new speculative discovery must also become available by other routes. Thus, I not only postulate speculatively that distributed

agents exist and that we can find them experimentally: I also wager that they are discoverable by means—computational or not—other than those tested. Measures of precision, the number of false positives (Type I error), are necessarily insufficient for this task. We will, by design, encounter new planets—characters hitherto overlooked in previous study. Whether you are convinced by these findings or not depends on their fit within the larger epistemic landscape—for example, features observed by close reading. The import of such exploratory work lies in the journey back to theory, reconfigured by experiment.

I grow more confident in my results also because they lead me to the discovery of a genre hiding in plain sight—the organizational novel.

III. Corollaries in Genre History

The grammars of distributed agency define the organizational novel as a literary genre, which, once identified, is difficult to overlook. Its central features comprise neither networks, nor realism of description, nor the professional settings where they take place.[44] Rather, in each case, the genre can be understood structurally, by the prominence of boundary-defining scene-agents—firms, airports, markets, and factories—alongside their entailing thematics.

This genre's harbingers include the novels of Pierre Hamp (Henri Bourrillon) such as *Vin de champagne*, *Le Rail*, and *Le Lin*.[45] The early Soviets revered Hamp, penning "occupational" fiction in search of collective protagonists: Feodor Gladkov's *Cement*, Andrei Platonov's *The Foundation Pit*, Marietta Shaginian's *Hydroplant*, and Yuri Krymov's *Tanker 'Derbent'*. The genre's second and third waves include works such as *Parking Garage* and *Supermarket* by Ilya Shtemler, *The Freedom Factory* by Ksenia Buksha, and *Laments of Northern Territories* by Irinal Glebova. Soviet scholars saw Hailey as a natural heir to that tradition in the West, alongside *The Green Berets* by Robin Moore, *MASH* by Richard Hooker, J. G. Ballard's *High-Rise*, Satoshi Azuchi's *Supermarket*, and Tom Clancy's *Red Storm Rising*.[46] To these we may add "business novels" such as Saburo Shiroyama's *Export* and *Made in Japan*, John Grisham's *The Firm*, *Microserfs* by Douglas Coupland, *Company* by Max Barry, and Ravi Subramanian's *Bankrupt* .[47]

Schools, hospitals, police departments, law firms, and prisons embody the common thematics of the org plot: self-contained infrastructure, barriers to entry, competing organ-factions, technical jargon, the diminution of human actors, and the befuddling emergence of distributed agency. Here, we will often find themes related to feelings of powerless-

ness or abulia, the loss of willpower, and the corresponding emergence of transhuman agency, which cloud-like permeates its extended host.[48] Sometimes, as is the case in Kafka's *The Trial*, distributed characters will lie beyond human understanding, acquiring sublime, awe-full, or even divine connotations.

In *Bleak House*, for example, Mr. Jarndyce speaks about being unjustly treated by the "monstrous" British legal system. "There again!" Mr. Gridley, another man airing his grievances against the courts, responds:

The system! I am told, on all hands, it's the system. I mustn't look to individuals. It's the system. I mustn't go into Court, and say, 'My Lord, I beg to know this from you—is this right or wrong? Have you the face to tell me I have received justice, and therefore am dismissed?' My Lord knows nothing of it. He sits there, to administer the system. I mustn't go to Mr. Tulkinghorn, the solicitor in Lincoln's Inn Fields, and say to him when he makes me furious, by being so cool and satisfied—as they all do; for I know they gain by it while I lose, don't I?—I mustn't say to him, I will have something out of some one for my ruin, by fair means or foul!' HE is not responsible. It's the system. But, if I do no violence to any of them, here—I may! I don't know what may happen if I am carried beyond myself at last! —I will accuse the individual workers of that system against me, face to face, before the great eternal bar! (*BH* 153)

A number of other systemic entities emerge in *Bleak House*: schooling, "the system which had addressed him [Richard] in exactly the same manner as it had addressed hundreds of other boys"; the Chancery, which "imparted to his nature something of the careless spirit of a gamester who felt that he was part of a great gaming system"; and society, responsible for "the general arrangement of the whole system of spoons" but which nevertheless has failed to feed a starving child (*BH* 161, 305). In writing a letter to an old woman's enlisted son, Esther, a frequent narrator of the novel, worries she "got all the credit that ought to have been given to the Post-office" (*BH* 355). She feels unduly "invested with the merit of the whole system"—a peculiar sense of anxiety about one's infinitesimal powers of volition in the shadow of the organization (*BH* 355).

At other times, as is the case with Hailey's *Airport*, organizations are presented in a positive light, as institutions worthy of our care, ultimately comprehensible and even necessary for human existence. Scenes of incorporation witness institutional birth. A major subplot in *Airport* involves the forming of a neighborhood organization in the suburb of Meadowood. Readers observe neighbors who hardly know each other holding emergency meetings, deliberating as a body, and taking concerted action against the airport. "What do the airports and airlines do?," one of the neighbors shouts. "They pretend; pretend to listen . . .

They make promises which they have no intention of fulfilling. [They] are cheats and liars!"[49] From the perspective of distributed intelligence, *Airport* presents a story about the tensions between and among Airport Committee, Airline Snow Committee, Ground Control, the neighborhood association, insurance companies, and airlines—in parallel to the personal drama of Mel, Joe, Gwen, Inez, and Ada.

In *Octopus* by Norris, ranchers similarly unite to form a league of farmers. "ORGANISATION," a rancher shouts, "That must be our watch-word. The curse of the ranchers is that they fritter away their strength. Now, we must stand together, now, *now.* Here's the crisis, here's the moment. Shall we meet it? *I call for the league.* Not next week, not to-morrow, not in the morning, but now, now, now, this very moment, before we go out of that door. Every one of us here to join it, to form the beginnings of a vast organisation, banded together to death, if needs be, for the protection of our rights and homes" (*O* 275).

Such negotiation of individual boundaries—legal, physical, or linguistic—will often become a prominent plot element in the org novel. The case at the center of *Bleak House* is, in a sense, not just a case about property ownership, but also about belonging to the body of an estate. In *Octopus*, "these eternal fierce bickerings between the farmers of the San Joaquin and the Pacific and Southwestern Railroad" manifest in the physical struggle to settle spatial boundaries (*O* 12). "They did not belong," one of the narrators muses, because they ruin the undifferentiated expanses of the boundless West: "By now he was not quite half way across the northern and narrowest corner of Los Muertos, at this point some eight miles wide. He was still on the Home ranch. A few miles to the south he could just make out the line of wire fence that separated it from the third division; and to the north, seen faint and blue through the haze and shimmer of the noon sun, a long file of telegraph poles showed the line of the railroad and marked Derrick's northeast boundary" (*O* 13).

The nesting division of newly sentient, emergent assemblages leads to a multiplicity of perspectives characteristic of the genre. Instead of a unified worldview, we are presented with a range of sometimes complimentary and sometimes conflicting perspectives: the sale of insurance at the departure gate, for example, provides a source of revenue for the airport and a source of concern for the pilots (due to the potential for fraud or subterfuge); the transportation needs of a county must be balanced against a neighborhood's desire for peace and quiet.

The field-defining property of distributed agency translates into semantic and temporal commonalities. The articulation of institutional argots, also particular to the so-called "occupational" novel, becomes paramount

in describing collectives that police membership through language. In *Airport*, pilots, air traffic controllers, snow crews, and stewardesses not only occupy their distinct physical domains—airplane cockpits, air traffic control towers, airplane fuselages, and convoys of snow plows—but also share distinct technical vocabularies. The speech of snowplow operators is a dialect of airportese. The texture of an org novel evinces technical minutia, signifying a sense of simultaneous belonging to distinct groups whose interests do not always align. Mel Bakersfeld, the airport's general manager, must sometimes act in the interest of the airlines, at others in the interest of the passengers, the City Council, or the airport itself.[50] He switches codes often—speaks differently—to signal a change in roles.

As a genre, the org novel parallels the rise and proliferation of institutions in the modern world. Institutions embody infrastructures, human collectives, and symbolic systems of order. They are incorporated in at least these ways: spatially as architecture or infrastructure: socially as a collective of bodies in space; and legally as entities defined by their articles, charters, and mission statements. Modern institutions differ from their predecessors in that they derive their legitimacy not from a divine force but from a people, each of whom contribute to them a mote, and sometimes much more, of vital energy, which in aggregate animates the corporation. But since each contributes only in part, none can be said to be responsible for the whole. The emergent organization foreshortens the horizon of individual possibilities in some regards while extending it in others.

Finally, the org novel animates the promise and the failure of modern Enlightenment institutions. Humans are born free, yet everywhere they are in chains, Jean-Jacques Rousseau wrote in the opening lines of his *Social Contract*, describing the modern condition as a "total alienation of each associate for the sake of the community."[51] In giving ourselves to all, he concluded, we give ourselves to none. Without gods, we exist at the mercy of past collective commitments, which, like deities, shape individual destiny with an invisible hand: at once a goal-giving reason for existence and incomprehensible as reason. When nations declare war, they drag along with them their unwitting organ constituents. When corporations inject capital into politics, they are said to defend their interests. We speak of such decisions—declare, condemn, condone—in familiar personified terms. But what sort of metaphors are they? And how do they structure our collective experience?

Volitional metrics offer a powerful methodology for exploration and can be used further as building blocks for iteratively refining our theoretical models of discursive agency. For now, my experiments successfully formalize the presence of transhuman assemblages that routinely

originate a measure of grammatical action. The advantage of shallow models such as these lies in the paucity of assumption. We were thus able not only to isolate all of the single-locus human characters programmatically, but also to describe novel diffuse forces acting in a distributed capacity. People and crowds, railroads and airports, houses and planes, flight crews, firms, committees, and corporations do not always exhibit conventional markers of sentience: they might not think or speak or have names in the way humans or smart animals do. But they do hold volitional weight; they are not only acted upon as objects, they also influence narrative as subjects and contexts of action. Authors routinely place them into an active grammatical role. Readers therefore recognize them as characters because they behave—think, decide, punish, or take blame—in a recognizably willful way.

In addition to offering a methodological toolkit, I have suggested a minimally viable theory of character capacious enough to contain an account of distributed agency. An experiment in sentence parsing has lead us to a popular literary genre that is nevertheless underrepresented in the critical literature. Toy models based on simple volitional dynamics can further help us visualize the structure of such complex narrative systems. They reveal distributed actors formally, actors captured in the struggle to articulate a shared sense of purpose and by the means to put that purpose into action. Such organizational origin stories are performative as well as descriptive. Through them, the modern subject emerges at once a free agent and an object of corporate bondage in service to a greater composite good.

<div align="right">Columbia University</div>

<div align="center">NOTES</div>

1   Arthur Hailey, *Airport* (New York: Bantam, 1968).

2   Hailey, *Airport*, 83.

3   Hailey, *Hotel* (Garden City, NY: Doubleday, 1965); Hailey, *The Final Diagnosis* (Garden City, NY: Doubleday,1959); Hailey, *Wheels* (Garden City, NY: Doubleday, 1971); Hailey, *Overload* (Garden City, NY: Doubleday, 1979).

4   Hua He, Denilson Barbosa, and Grzegorz Kondrak, "Identification of Speakers in Novels," *Proceedings of the 51st Annual Meeting of the Association for Computational Linguistics* (2013), 1312–20; Mariona Coll Ardanuy and Caroline Sporleder, "Structure-Based Clustering of Novels," *Proceedings of the 3rd Workshop on Computational Linguistics for Literature* (2014), 31–39; Hardik Vala, David Jurgens, Andrew Piper, and Derek Ruths, "Mr. Bennet, His Coachman, and the Archbishop Walk into a Bar but Only One of Them Gets Recognized: On The Difficulty of Detecting Characters in Literary Texts," *Proceedings of the 2015 Conference on Empirical Methods in Natural Language Processing* (2015), 769–74; Mohit Iyyer, Anupam Guha, Snigdha Chaturvedi, Jordan Boyd-Graber, and Hal Daumé III, "Feuding Families and Former Friends: Unsupervised Learning for Dynamic Fictional Relation-

ships," *Proceedings of the 2016 Conference of the North American Chapter of the Association for Computational Linguistics: Human Language Technologies* (2016), 1534–44.

5   Edwin Hutchins, "How a Cockpit Remembers Its Speeds," *Cognitive Science* 19, no. 3 (1995): 265–88.

6   Charles Dickens, *Bleak House* (London: Bradbury & Evans, 1853) (hereafter cited as *BH*); Frank Norris, *The Octopus: A Story of California* (Garden City, NY: Doubleday, 1901) (hereafter cited as *O*).

7   Kenneth Burke, *A Grammar of Motives* (New York: Prentice-Hall, 1945) (hereafter cited as *GM*); Deidre Shauna Lynch, *The Economy of Character: Novels, Market Culture, and the Business of Inner Meaning* (Chicago: Univ. of Chicago Press, 1998); Alex Woloch, *The One Vs. The Many: Minor Characters and the Space of the Protagonist in the Novel* (Princeton, NJ: Princeton Univ. Press, 2003); John Frow, *Character and Person* (Oxford: Oxford Univ. Press, 2014); Marta Figlerowicz, *Flat Protagonists: A Theory of Novel Character* (New York: Oxford Univ. Press, 2017); Amanda Anderson, et. al, *Character: Three Inquiries in Literary Studies* (Chicago: Univ. of Chicago Press, 2019).

8   Frow, *Character and Person*, 25; Woloch, *The One Vs. The Many*, 13.

9   Frow, *Character and Person*, 83.

10   Toril Moi, "Rethinking Character," in *Character: Three Inquiries in Literary Studies* (Chicago:
Univ. of Chicago Press, 2019), 27–76.

11   Vincent Labatut and Xavier Bost, "Extraction and Analysis of Fictional Character Networks: A Survey," *ACM Computing Surveys* 52, no. 5 (2019): 89.1–40.

12   David Elson, Nicholas Dames, and Kathleen McKeown, "Extracting Social Networks from Literary Fiction," *Proceedings of the 48th Annual Meeting of the Association for Computational Linguistics* (2010), 138–147.

13   Elson, Dames, and McKeown, "Extracting Social Networks from Literary Fiction," 5.

14   In Burke, for example, we find the related "As for 'act,' any verb, no matter how specific or how general, that has connotations of conciousness or purpose falls under this category . . . 'Dramatistically,' the basic unit of action would be defined as 'the human body in conscious or purposive motion'" (*GM* 14).

15   Lisa Zunshine, "Theory of Mind and Experimental Representations of Fictional Consciousness," *Narrative* 11, no. 3 (2003): 270–91; Susan C. Johnson, "Detecting Agents," *Philosophical Transactions: Biological Sciences* 358, no. 1431 (2003): 549–59; Alan Palmer, *Fictional Minds* (Lincoln: Univ. of Nebraska Press, 2004); and Zunshine, "Theory of Mind and Fictions of Embodied Transparency," *Narrative* 16, no. 1 (2008): 65–92.

16   Franz Kafka, *The Trial*, trans. Willa and Edwin Muir (New York: Knopf, 1992).

17   See Ernst Freund, *The Legal Nature of Corporations* (Chicago: Univ. of Chicago Press, 1897); Edmund Bayly Seymour, Jr., "The Historical Development of the Common-Law Conception of a Corporation," *The American Law Register* 51, no. 9 (1903): 529–51; and Frederic William Maitland, "Moral Personality and Legal Personality," *The Collected Papers of Frederic William Maitland*, vol. 3, ed. H. A. L. Fisher (London: Cambridge Univ. Press, 1911), 304–20.

18   Frederic Maitland recalls the practical conundrum confronted by Charles II after he condemned all of London's citizens to prison for "presuming to act as a corporation." Maitland, "Moral Personality and Legal Personality," 311.

19   Uri Margolin, "Chapter 5: Character," *The Cambridge Companion to Narrative*, ed. David Herman (Cambridge: Cambridge Univ. Press, 2007), 72.

20   See, for example, Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (New York: Oxford Univ. Press, 2005), 33: "Every group formation will be accompanied by the digging out of a wide array of features, mobilized to make the group boundary hold against the contradictory pressures of all the competing anti-groups that threaten to dissolve it." See also *GM* 13.

21 David Bamman, Ted Underwood, and Noah A. Smith, "A Bayesian Mixed Effects Model of Literary Character," *Proceedings of the 52nd Annual Meeting of the Association for Computational Linguistics* (2014), 370–79.

22 Lucien Tesnière, *Éléments de Syntaxe Structurale* (Paris: C. Klincksieck, 1959), 10524; Algirdas Julien Greimas and Joseph Courtés, *Semiotics and Language: An Analytical Dictionary* (Bloomington: Indiana Univ. Press, 1982), 5; Latour, *Reassembling the Social*, 43–62; and David J. Alworth, "Supermarket Sociology," *New Literary History* 41, no. 2 (2010): 304.

23 David Jurafsky and James H. Martin, "Semantic Role Labeling," 3.

24 Jurafsky and Martin, "Semantic Role Labeling," 4.

25 Martha Palmer, Daniel Gildea, and Paul Kingsbury, "The Proposition Bank: An Annotated Corpus of Semantic Roles," *Computational Linguistics* 31, no. 1 (2005): 71–106.

26 Ronan Collobert, Jason Weston, Léon Bottou, Michael Karlen, Koray Kavukcuoglu, and Pavel Kuksa, "Natural Language Processing (Almost) from Scratch," *Journal of Machine Learning Research* 12, no. (2011): 2493–2537.

27 Xavier Carreras and Lluís Màrquez, "Introduction to the CoNLL-2005 Shared Task: Semantic Role Labeling," *Proceedings of the Ninth Conference on Computational Natural Language Learning* (2005), 153; and David Dowty, "Thematic Proto-Roles and Argument Selection," *Language* 67, no. 3 (1991): 547–619.

28 Carreras and Màrquez, "Introduction to the CoNLL-2005 Shared Task," 155; Palmer, Gildea, and Kingsbury, "The Proposition Bank," 6.

29 "University Mission Statement," *Columbia University*, https://www.columbia.edu/content/about-columbia.

30 Sara Ahmed, *Willful Subjects* (Durham, NC: Duke Univ. Press, 2014), 27. See also Tom R. Burns and Erik Engdahl, "The Social Construction of Consciousness: Collective Consciousness and Its Socio-Cultural Foundations," *Journal of Consciousness Studies* 5, no. 1 (1998): 67–85: "Human groups (as well as individuals) have the capacity to acquire types of self-description, and self-knowledge, and to reflect on and to regulate themselves. An agent-subject becomes the object not only of her own awareness but the awareness itself may become for her an object of higher order of reflection . . . Reflectivity, as a type (in our view the major defining type) of conciousness, is based on a shared code, a particular language, collective representations, and capabilities and skills of representing and talking about the 'self' and its various activities, including its inner states and processes, and changes in these" (69–70).

31 John W. Tukey, *Exploratory Data Analysis* (Reading, MA: Addison-Wesley, 1977) (hereafter cited as *EDA*).

32 Susan Sontag, "Against Interpretation," in *Against Interpretation and Other Essays* (New York: Farrar, Straus and Giroux, 1966), 3–14; Boris Eichenbaum, "The Structure of Gogol's 'The Overcoat,'" *The Russian Review* 22, no. 4 (1963): 377–99.

33 Kevin Clark and Christopher D. Manning, "Deep Reinforcement Learning for Mention-Ranking Coreference Models," *Proceedings of the 2016 Conference on Empirical Methods in Natural Language Processing* (2016), 2256–2262.

34 Clark and Manning, "Deep Reinforcement Learning for Mention-Ranking Coreference Models," 4.

35 Collobert et al., "Natural Language Processing (Almost) from Scratch"; Ronan Collobert, "Deep Learning for Efficient Discriminative Parsing," *Proceedings of the Fourteenth International Conference on Artificial Intelligence and Statistics, PMLR* 15 (2011), 224–32.

36 SRL further involves multiple levels of abstraction—through neural networks and word vectorization—that produce an accuracy score of about .78. Confidence erodes with each operation, underscoring the importance of simplicity in modeling.

37 Harry Harrison, *Deathworld* (New York: Bantam, 1960).

38   See Marta Figlerowicz, *Flat Protagonists: A Theory of Novel Character* (New York: Oxford Univ. Press, 2016).

39   Gertrude Stein, *Tender Buttons* (New York: Claire Marie, 1914).

40   Stein, *Tender Buttons*, 42.

41   Latour, *Reassembling the Social*, 1–20.

42   Collin F. Baker, Charles J. Fillmore, and John B. Lowe, "The Berkeley FrameNet Project," *36th Annual Meeting of the Association for Computational Linguistics and 17th International Conference on Computational Linguistics* (1998), 86–90.

43   Zeerak Waseem, Wendy Hui Kyong Chung, Dirk Hovy, and Joel Tetreault, eds., *Proceedings of the First Workshop on Abusive Language Online* (Association for Computation and Linguistics, 2017).

44   For institutional novels, see Rudiger Campe, "Kafkas Institutionenroman," in *Gesetz. Ironie: Festschrift Für Manfred Schneider* (Heidelberg: Synchron, 2004), 197–208; Arne Höcker and Oliver Simons, eds., *Kafkas Institutionen* (Berlin: Verlag, 2015); and Rüdiger Campe, "James Joyces *A Portrait of the Artist as a Young Man* Und Die Zwei Seiten Des Romans: Bildung Und Institution," *Internationales Archiv Für Sozialgeschichte Der Deutschen Literatur* 41, no. 2 (2016): 356–75. On the occupational novel, see Natalia Moskovskaia and Marina Matsaeva, "K Voprosu o Zhanrovoi Spetsifike Proizvodsvennogo Romana [On the Question of Genre Specificity in the Occupational Novel]," *Annals of Cheliabinsk State Pedagogical University*, no. 3 (2013): 282–91; and Nina Barkovskaia, "Proizvodstvennii Roman 2010x: Transformatsiia Zhanra [The Occupational Novel of the 2010s: A Tranformation of a Genre]," *Annals of Ural Philology*, no. 2 (2015): 127–41. On business novel in Japan see Tamae K. Prindle, *Made in Japan and Other Japanese "Business Novels"* (Armonk, NY: M. R. Sharpe, 1990).

45   Pierre Hamp, *Vin de champagne* (Paris: Union pour la verité, 1908); Hamp, *Le rail* (Paris: Rivière, 1912); Hamp, *Le lin* (Paris: Nouvelle revue française, 1924).

46   Robin Moore, *The Green Berets* (New York: Crown, 1965); Richard Hooker, *MASH* (New York: Morrow, 1968); J. G. Ballard, *High-Rise* (London: Jonathan Cape, 1975); Satoshi Azuchi, *Supermarket* (New York: Thomas Dunne, 2009); Tom Clancy, *Red Storm Rising* (New York: Putnam, 1986).

47   John Grisham, *The Firm* (New York: Doubleday, 1991); Douglas Coupland, *Microserfs* (New York: ReganBooks, 1995); Max Barry, *Company* (New York: Knopf, 2006); Ravi Subramanian, *Bankerupt* (New Delhi: Penguin, 2013).

48   Caroline Levine suggests we examine *Bleak House* alongside other modern narratives in the "form of the network," such as the film *Traffic* or *The Wire* television series. See Levine, "Narrative Networks: Bleak House and the Affordances of Form," *Novel* 42, no. 3 (2009): 517; and Levine, *Forms: Whole, Rhythm, Hierarchy, Network* (Princeton, NJ: Princeton Univ. Press, 2015), 112–31.

49   Hailey, *Airport*, 26.

50   Levine writes of characters who "act as nodes in two or more different distributed networks." Levine, "Narrative Networks," 518.

51   Jean Jacques-Rousseau, *On the Social Contract* (Indianapolis: Hackett Publishing, 2019), 12.