DISORGANIZATION THEORY AND DISORGANIZATIONAL BEHAVIOR: TOWARDS AN ETIOLOGY OF MESSES

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ABSTRACT

This article develops a theory of messes, defined as disorderly accumulations of varied entities. More specifically, it examines disorder caused by individual, or collective human agents, in hierarchically-ordered and complex systems – systems composed of sub-systems that, in turn, have their own subsystems, and so on. Such hierarchical-complex systems include filing systems (filing cabinet, drawers, and folders), formal organizational systems (Presidents, Senior Vice Presidents, and Vice Presidents), as well as cognitive categorization systems (the category bird, big and small birds, big blue birds and so on). The article distinguishes different types of messes, their genesis, and their efficiency and effectiveness consequences, both negative and positive. Messes in offices are used at the individual level of analysis to illustrate the theory and the propositions derived from it, whereas messes in formal organizations are used to illustrate them at the collective level. The conclusion to the article raises the possibility that the theory and the propositions it suggests might be applicable to messes in cognitive systems and to the evolution of cognitive brain functions.

Even before the Scientific Management of Frederick Taylor (1911), students of organization and management have tended to assume that order is generally good, something to strive for, and that deviations from order, or disorder, are generally bad, and to be avoided (Shenhav, 1995; Shenhav, 1999). Perhaps as a result of this pro-order bias, with few exceptions, students of organizations and organizational behavior have focused on order rather than on its opposite, disorder. We have a field of Organizational Behavior and Organizational Theory, for instance, but no field of Disorganizational Theory and Disorganizational Behavior.

This article examines disorder in hierarchical-ordered, complex, human systems. Following Simon (1962) – hierarchically-ordered complex systems are "systems composed of sub-systems that, in turn, have their own subsystems, and so on". Many formal organizations, for example, are hierarchically-ordered, complex, human systems – the corporation subsumes businesses, which subsume departments, which in turn subsume teams, which finally subsume individuals. As an other example, individual office filing systems also constitute hierarchically-ordered complex human systems – the office contains filing cabinets, which contain drawers, which contain folders, which contain documents. Finally, individual cognition also forms a hierarchically-ordered complex human system – general categories like "bird" subsume sub-categories and "small bird" and "big bird", and so on (Rosch, 1978).

I use the term "mess" to distinguish disorder occurring in hierarchically-ordered, complex, human systems, from disorder occurring in all other types of systems. The article advances a theory of messes so defined. It focuses on the etiology of messes for three reasons.

First, in the rare instances when they are mentioned in the organizational sciences, messes are placed into to one undifferentiated category (Bateson, 1972). This theory suggests instead that many different types of messes can be usefully distinguished; messes distinguishable by their locations, their causations, and their dimensions. The first contribution of this theory to the organizational sciences, therefore, is to examine whether different types of messes have common properties, regardless of their locations, causations, or dimensions? For instance, might the same characteristics of messy organizations, messy offices, and messy mental categories make them more or less difficult to reorganize? Alternatively, we could ask the question, are there causal relations between certain types of messes across different levels of analysis? For instance, do entrepreneurs who see the world through messy mental categorization schemes tend not only to create certain types of office messes, but also to imprint these same types of messes on their organizations?

Second, organizational scientists understand many of the performance and survival consequences of being organized in specific ways, but they understand far fewer consequences of being messy in equally varied and different ways. Just as order is not necessarily good, messes are not necessarily bad. Certain types of messes may be adaptive, in the sense of being survival or profit enhancing for organizations, their subunits, or their executives and employees, as may certain levels of messiness or certain pairing of types of messes coupled with particular environmental contingencies. Likewise certain types of messy offices may enhance efficiency or effectiveness, as may certain messy thought processes. This theory of messes seeks to highlight both the negative and positive efficiency and effectiveness consequences of different types of messes. It attempts to provide a framework that would make it possible to begin answering questions such as: can a certain level of office or organizational messiness be efficient? Or, do certain types of cognitive, office, or organizational messes enhance creativity?

Third, organizational scientists know a lot about how to organize something, but far less about how to avoid messes or to clean them up, and even less about how to actively mess up something: how to disrupt illegal drug-cartels, terrorist organizations, or overly rule-constrained bureaucracies, for example. Not all messes form in the same way and with the same timing. It follows that prescriptions for mess avoidance or mess creation may depend on how a mess emerges. Understanding the genesis of messes may also help create organizations, departments, or offices that are more or less messy, and harder or easier to mess up. Knowing the etiology of messes may also indicate how to go about cleaning up or messing up organizations, offices, or mental maps if necessary. This mess theory attempts to provide a framework to address questions such as: How do I allow a productive mess to form in my thinking, office, or organization? Or, when does it pay to just destroy a mess in my office or organization, rather than trying to reorganize it?

The article has **five parts**. The first unpacks my definition of a mess as – a disorderly accumulation of varied entities. The second reviews and positions this work on messes in the extant Organizational Behavior and Organizational Theory literatures, in order to highlight the questions it raises and the avenues of research it opens up. The third section distinguishes different messes according to their locations, causations, and dimensions. The fourth presents a general model of mess formation. The **fifth and sixth sections** use this general model to develop propositions about causes of different types of messes, as well as their consequences.

WHAT IS A MESS?

I advance a tripartite definition of a mess as a:

(1) disorderly;
(2) accumulation of
(3) varied entities.

In doing so, I define a mess by its essence, rather than by its consequences. I reject, therefore, two alternatives definitions of messes. A mess defined by either the inability to place or retrieve entities in it, or, relatedly, a mess as a set of entities that make it difficult or impossible to accomplish a task. I reject these alternative definitions in order to avoid propositions of the type: messes (defined as disorder that harms task completion) will harm task completion. That is, tautologous propositions wherein certain consequences of messes both define messes and purportedly result from messes so defined.

Disorderly
In the context of this theory, one or more agents who fail in an attempt to create hierarchical order create what I call "disorder". Or, more succinctly, disorder is a deviation from hierarchical order. The deviation can be either intentional or unintentional, and the resulting mess either functional or dysfunctional to goal attainment in the system where the mess accumulates.

Accumulation
The definition of a mess as the result of accumulation also suggests that messes have a temporal dimension. Messes can result from distinct processes, evolve at different speeds, and persist for varying durations. Messes, for example, can accumulate relatively slowly, as a result of sloppiness. Alternatively, messes can occur relatively suddenly, when an exogenous shock destroys hierarchical order. I messed up, for instance, when piles of papers swirled around my office because I opened its windows on a very windy day. A mess can also emerge suddenly when, for example, two organizations, with very different organizational structures, are merged.

Varied Entities
An accumulation of identical, or perceptually-identical entities, cannot be disorderly, by definition. This is because these entities fall into the same organizing category. For a mess to occur, entities have to vary, or be perceived to vary along certain dimensions – employees with different qualifications in the organizational example, documents on different topics in the office

example, or different stimuli in the cognitive example. Although the entities must vary for there to be a mess, they must also have something alike or in common, which gives them a joint entity-status. This allows us to speak of messy organizations, offices, or individual categorizations, for instance, by which we usually mean that certain entities are in a state of disorder within the organizations' boundaries, the offices' perimeter, or the individuals' mind.

REVIEW AND POSITIONING

The rare article that pertains to a theory of messes is usually lost somewhere in a gigantic mess of articles that are hierarchically ordered by disciplines, literatures in these disciplines, and sub-areas in these literatures. The disciplines range from basic disciplines like physics, economics, sociology and psychology, to more applied disciplines like organizational theory, Organizational behavior, operations management, information theory, and Information design, and their sub-areas. As a result, even an extensive search of this scholarly mess reveals very few pertinent articles. I searched until the point of what might be called "conceptual saturation" – the point at which each new article or book I found in the scholarly mess provided little additional insight about messes.

Some work is particularly enlightening. Bateson (1972) provides some very general insights about messes, or what he calls muddles (Chapter 2, in particular). Ackoff pioneered the study of messy problems – which he defined as "dynamic systems of problems" (1981, p. 22). His work on messy problems, although it draws attention to the complex, disorderly, and chaotic dimensions of organizational life, bears little relation to the organizational messes discussed in this article.

Some work in Organizational Theory, though not explicitly about messes, also bears on theorizing about the consequences of messes. Organic organizations (Burns & Stalker, 1961), though they are designed to be orderly, resemble in certain respects messy organizations. Complexity Theory is also a source of inspiration for insights about messes, because it examines entropy and the emergence of order out of disorder (Byrne, 1998). Complexity Theory, however, does not focus on open systems – that is bounded systems, such as organizations, offices, or brains, which import resources from their environment in order to counter entropy and maintain order within their boundaries (Katz & Kahn, 1966). Complexity Theory, therefore, has little to say about order, disorder, and messes in open systems.

Likewise, work on garbage can models (Cohen, March & Olsen, 1972), emergent strategies (Mintzberg & Waters, 1985), creativity (Amabile, 1983),

and improvisation (Weick, 1998) provides insight on some of the consequences and benefits of certain types of messes. These works suggest the many ways in which the existence of disorder – and by extension messes – is imperative for the emergence of new types of order. More succinctly, disorder and messes are the raw material from which new forms of order can spring forth.

This section, however, is not a review of the literature pertinent to messes. Rather, this section indicates how a focus on messes reveals important unanswered questions and lines of research that are either explicit or implicit in extant Organizational Theory and Organizational Behavior disciplines.

Economic Perspective

Simon (1962) defined hierarchy as a "complex system being composed of subsystems that, in turn, have their own subsystems, and so on". He begins his article, The *Architecture of Complexity*, by pointing to the ubiquity of hierarchically-organized complex systems, whether social, biological, physical, or symbolic.

Without going into too much detail, Simon theorizes why, when simple systems evolve towards more complex systems, the complex systems that survive tend to be hierarchically ordered. He argues that hierarchies thrive and survive because they have certain survival-enhancing properties. Simon illustrates these properties using the parable of two watchmakers – Hora and Tempus. Tempus' watch-making business thrives and survives because Tempus builds his watches as hierarchically-structured system of parts – mechanical subsystems or modules, at superior hierarchical levels, are made up of subsystems or sub-modules at the next level below, and so on. When something interrupts Tempus' watch production, he only has to rebuild one sub-module. For Hora, to the contrary, interruptions cause him to have to rebuild the entire watch. This is because he designed his watches as one, single, non-hierarchical system, composed of thousands of parts. Simon demonstrates mathematically that, in the evolutionary competition for the soundest watch design and production system, Tempus' hierarchically-designed watches cause his business to survive, whereas Hora's does not. More generally, according to Simon (1962), in the evolutionary competition to design increasingly complex systems – whether natural, social, or symbolic – organizing agents that employ hierarchy survive, whereas those who do not disappear.

In short, Simon (1962) notes the ubiquity of hierarchies. "Hierarchy . . . is one of the central structural schemes that the architect of complexity uses". Simon's focus on the ubiquity of hierarchical order draws attention to its dialectical opposite: the equally ubiquitous deviations from hierarchical order,

which I call "messes". Likewise, his focus on the evolution from simple to complex hierarchical structures also draws attention to the evolution of messes.

Shifting the focus from hierarchical order, to its dialectic antithesis, raises important, interesting, and unanswered questions. Do all messes in complex hierarchical systems have common causes? What might these causes be, and do they produce different types of messes with different consequences? Are messes in hierarchically-ordered complex systems always threats to system survival, or can they enhance survival? In certain hierarchically-structured problem-solving systems, for instance, specialized superiors transmit their expert solutions down the hierarchy to unspecialized subordinates. Are such systems always superior to what Cohen, March, and Olsen (1972) called "garbage can" problem-solving systems, wherein solutions, problem-solvers and problems meet quasi randomly? Alternatively, do the costs to Tempus of creating his hierarchical design always exceed its returns? Are certain types of messy organizations or markets, for instance, superior to either well-ordered markets or hierarchies (Williamson, 1975)?

Political Perspective

Explanations stressing power and authority also account for hierarchies, and by extension messes. In the literature about power, the stress is not on hierarchical systems in general, but rather on hierarchically-ordered formal organizations specifically. That is, the focus is on order in complex organizational systems in which fewer superiors exercise formal authority over more numerous groups, and sub-groups of subordinates carrying out specialized tasks. Michel (1962) was among the first to theorize that the ubiquity of hierarchy in formal organizations stems from its advantages in promoting successful, large-scale collective action. According to Michel, the mobilization of large groups is impossible without a leader, because very large numbers of individuals cannot self-organize. The tasks necessary to sustain such larger groups, in turn, become more complex, mandating the use of differentiated specialized units in which more specialized members of these units have formal authority over less specialized members.

Interestingly, focusing on the technical advantages of hierarchy for collective action raises interesting questions about collective action in cleaning up messes (Olson, 1971). Indeed, under certain circumstances, even messes that harm entire collectivities will proliferate, because no single collectivity member finds it in their interest to clean up the collective mess. In short, certain messes may persist and proliferate as a failure of collective action.

Other scholars challenge explanations stressing the purported technical advantages of hierarchy for collective action. They stress, instead, hierarchies' technical advantages in helping domination by the few over the many, regardless of whether domination favors or impedes collective action. Edwards (1979), for instance, views different forms of organizational hierarchy as so many tools for more powerful capitalists to divide, conquer, and control weaker workers.

The focus on hierarchy as a tool of domination raises interesting questions about the role of messes in resisting domination. A resource – information for instance – gives Agent A power over Agent B, when B greatly needs this resource, cannot find it anywhere else, and when A has discretion to give or withhold the resource from B (Pfeffer, 1981). Messes empower mess-creators by leaving it to their discretion whether they will or will not find vital resources lost to all but themselves in the mess they created. Messes might also blunt the political control that hierarchy offers by making it harder to detect, attribute, and punish non-sanctioned behavior? Certain government bureaucracies are hard to bring to accountability, for instance, because it is impossible to trace where in the hierarchy rests responsibility.

Socio-cultural Perspective

Other explanations for hierarchy – and messes – point to cultural and social determinants of their emergence and persistence. For instance, hierarchical structures, inherited from religious and military institutions, provide visible instantiations of more general myths of rationality (Weber, 1947). Hierarchy provides a rational-legal base of authority and legitimacy in organizations, replacing traditional or charismatic bases. In some accounts, conformity to hierarchical norms is assumed to be behavioral – real hierarchies are created and made to function as designed (DiMaggio & Powell, 1983). In others, conformity is more symbolic and ceremonial (Meyer & Rowan, 1977). That is, hierarchical structures serve as legitimizing façades symbolizing order and rationality. These façades hide the internal, technically-driven activities of the firm – whether they are rational or irrational, legal or illegal, and orderly or messy.

This institutional perspective, by focusing on the social and cultural bases of hierarchy, also suggests social and cultural causes and consequences of messes. With respect to causes, for example, if notions about hierarchical order are culturally specific, then so will notions about messes as deviations from order. Messes would occur or be perceived to occur when individuals following non-hierarchical forms of order, deviate or are perceived to deviate from these

forms. With respect to the consequences of messes, hierarchical order as a façade may symbolize rationality; Indeed, messes also have their symbolic value (Gosling, Ko, Mannarelli & Moris, 2002). In the U.S., for instance, they sometime symbolize extreme activity or even creativity.

Psychological Perspective

A final explanation for the prevalence of hierarchically-structured complex systems is more cognitive in nature. Simon (1962) raises the possibility that hierarchically-structured systems only *appear* to be ubiquitous. This because the human cognitive apparatus is itself a hierarchical-ordered categorization scheme (Rosch, 1978). Such hierarchical categorization schemes allow us to parse out, encode, reason with, and remember hierarchical-ordered information, causing us to perceive hierarchies as ubiquitous in natural, social, and symbolic systems. These schemes might also obscure alternate, non-hierarchical forms of order, revealing them as the deviations from order, which I call messes.

The cognitive perspective raises three types of interesting questions. First, do we tend to overlook non-hierarchically ordered aspects of human categorization, reasoning, and memory – messy thinking so to speak? Second, if hierarchically-ordered categorization schemes are hardwired in the human mind, then why so? Are their survival-enhancing characteristics of such categorization schemes, at least over other forms of mental order? Did these characteristics favor the survival of species using hierarchical categorization? By extension, if messy thought processes exist, can they have only survival-inhibiting properties? Or, must certain types of messy thought processes also have survival-enhancing properties?

Third, are hierarchically ordered human systems so prevalent because people enact these hierarchical categorization schemes in the world? Filing cabinets may be not so much an analogy for human categorization, memory, and retrieval, as they are a result of such processes enacted in the physical world of office filing systems. Indeed, in Simon's (1962) Architecture of Complexity, he theorizes that hierarchy not only prevails because of its resilience in the face of interruptions. Hierarchy also prevails because it facilitates the storing and retrieval of information necessary to develop and reproduce large complex systems. To follow through with Simon's watch-production example, Tempus can keep watch parts in a hierarchically structured set of cabinets, drawers, partitions, and bags, and retrieve them easily when building each watch module. Hora has to search through thousands of drawers to find each part, or worse, through one disorderly accumulation of thousands of varied parts.

TYPES OF MESSES

The prior section's literature review suggests that that there exist many different dimensions along which messes can be usefully distinguished. More specifically, messes can be distinguished by their location, their causation, and their dimension. This section examines each in turn.

Location – Where Do Messes Occur?

The location of messes differs according to the level of analysis at which they are conceptualized, the type of system in which they occur, and their function within that system.

Levels of Analyses

Messes can be located at different levels of analysis. Messes created by individual agents can be distinguished from those created by collective agents – a top management team, for instance. Moreover collective messes can occur across different levels of formally organized, hierarchical systems – at the level of the economy or the polity, the sector, the industry, the organization, the division, the team or the individual. More specifically, messes can occur at the national level as in the case of messy governments – deviations from hierarchical state structures, for instance. Messes can occur at an inter-industry level, such a messy structure of hierarchical relationships between third-, second-, first-tier suppliers, for example. Finally, messes are created in and by organizations, divisions, departments and teams.

Types of Systems

Messes, whether individual or collective, occur in at least three distinct types of human systems. First, messes can occur in cognitive systems. Messes can occur in an individual's categorization schemes, for instance. Sacks (1985), for instance, tells of the case of the patient, in the psychologist's office, who mistook his wife for a hat and tried to put her on his head. Mental illness caused the "wife" visual stimulus to be categorized in the "hat" category. In the case of shared cognitions, messes can also occur in a cultures' shared categorization scheme.

Second, messes occur in classification systems external to individuals. Messes, for instance, can occur in an individual's system of filing cabinets, drawers, and folders. Messes can also occur in collective classification systems, such as in the case of job titles in a formal organization, for example, or in the case of the ordering of books in a library.

Third, messes can occur in formally organized systems. That is, both in the vertical relations of authority in a hierarchy, as when one subordinate reports to two bosses, and in the horizontal division of labor, as when two departments share a common responsibility. The mess in these systems pertains not only to what goes where, but also to who is authorized to ask whom to do what.

Locations in the System

As Fig. 1 indicates, the first choice, when an organizing agent is presented with an entity, is whether to retain it or to place it in a location in the ordering system from which it will be removed – a garbage can in the office example, a list of employees to be terminated in the organizational one, or an item of information placed in short-term memory. A first distinction, therefore, can be drawn between messes among entities that organizing agents retain and among those that will be removed from the system.

I use the term "to-discard mess" as shorthand for a mess that occurs among entities that are to be removed from the ordering system. An example, in the office context, would be the mess constituted by the non-recyclables in my office recycling bin and the recyclables in my non-recyclable bin. An example, in the organizational context, would be a mix up of employees with terminal contracts and employees notified that they will be terminated if their performance does not improve.
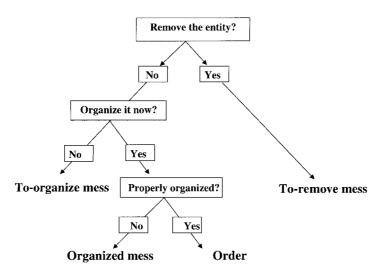

Fig. 1. Three Types of Messes.

The cognitive analogue of a to-discard mess is less clear. In this context, removing might be taken to mean forgetting. A to-discard cognitive mess, then, might be thought to occur when a mix of information – some of which has useful long-term utility, and some of which does not – is placed in short-term memory. Sacks (1985) points to the case of a patient who stored all information in short-term memory, thus reliving repeatedly the same situations.

It is also important to note that most organizing systems place entities to remove in a location from which they are not immediately discarded, and may even be retrieved, if they were placed there by mistake. Vital documents are sometimes retrieved from the trash, terminal contracts are sometimes reversed, and information is sometimes transferred from short- to long-term memory. It is also important to note that locations containing entities to remove often have an organized structure. This structure can be violated – as when an agent places a non-recyclable in his or her offices' recycling bin, when an employee is fired outright when he or she should have been placed on terminal contract, or in the case of long-term information being stored in short-term memory.

Figure 1 indicates that the retention of an entity sets up a second forking-point concerning whether or not this entity is put directly into its place defined by the ordering scheme. In the affirmative, the agent puts it directly in its place. In the negative, the agent places it into what I call a "to-organize location" – a location for entities that are going to be organized, such as a desk surface, or a pool of newly hired employees. These to-organize locations can be orderly, as when newly hired employees are segregated by function and hierarchical level, prior to being assigned to a position, when incoming mail is placed in different inboxes, or when a pile of papers is assembled neatly on a desk for subsequent use. Of course, these to-organize locations can become extremely messy, as when books, papers, folders and other junk are strewn across an office, in no particular order, with the vague intent of refiling them at some point in time. Such messes I denote with the shorthand "to-organize mess", as when an organization that is not even certain of whom it hired.

Again, extending such a framework to cognitive processes is less straightforward. The to-organize location, might be thought of analytically as the location where active thinking takes place. For example, a conscious thought-process about whether this article should be categorized as innovative or weird, is a transitory step between purposefully committing some of its arguments to long-term memory, or making a commitment to promptly file it in one's mental garbage can. By extension, a mental mess in the to-organize location would denote all forms of disjointed thinking processes.

In contrast to to-organize and to-discard messes, there exist messes among entities that have been organized – papers in files, employees in jobs,

information in long-term memory – in a faulty manner. Certain entities are in the proper location in the order, whereas others are not, and constitute what I call the "organized mess".

Causation – How do Messes Differ by Their Origins?

Messes, across different locations, can result from similar or different causes. Therefore, messes can be distinguished according to their causation.

Sloppy and Structural Messes

In the context of this theory, disorder is failed order. The old adage "a place for everything and everything in its place" helps distinguish two different causative mechanisms for messes.

What I call "structural messes" exist when an organizing agent did not create a proper hierarchical order. This is the "a place for everything" part of the adage. The structure of the organizing schema deviates in some way from the hierarchical ideal. An organization, for instance, is more structurally disorderly if it has a Senior Vice President position in one division that is hierarchically inferior to a Vice President position in another. Or, an office is more structurally disorderly if a file folder designed to receive paychecks stubs is located in a drawer designed to receive research related documents, which is itself located in a filing cabinet for class materials. Likewise, an individual's cognitive categorization scheme may have non-hierarchical features, with the category "wife" being a sub-category of both the "hat" and "people" categories.

What I call "sloppy messes" exist when everything is not in its proper place because the organizing agent or agents did not follow the organizing routines. This is the "everything in its place" part of the adage. A human resource management professional, for instance, places an employee trained in finance in a position that requires someone trained in marketing. Alternatively, I may associate a memory with the wrong category. Or, I place a paper by John Hancock in my file folder for authors whose surnames begin with a K.

Messes sloppy or structural also differ with respect to whether they are caused by forces exogenous or endogenous to the hierarchically ordered complex system.

Exogenous Messes

At least two types of exogenous messes can be distinguished. First, as discussed in greater detail below, messes can occur because the number or characteristics of exogenous inputs to the system overwhelm the system's order creating-capacity. The amount of mail or email I receive may outpace the time

I have to sort through it. Or, there may be too many cognitive stimuli, for instance. Alternatively, messes can result from exogenous shocks that devastate hierarchical order or order-creating capacity. Disease can destroy certain brain functions necessary for categorization, for instance. Alternatively, the joining of two different hierarchically ordered systems can result in a mess, as when two firms are merged.

Endogenous Messes

Endogenous messes – messes created by forces internal to the system – also fall into two categories. First, there is what I call "attribute messes", messes caused by psychological or socio-cultural attributes of the ordering agent or agents. Such messes can be further differentiated into those which cause agents to create messes and those which cause them to tolerate messes so created.

Second, there are endogenous messes that might be called "strategic messes", those caused by the strategic calculations of agents. Here too, it may be useful to distinguish strategies that make it advantageous to create messes, from strategies that make it advantageous to tolerate them. With respect to mess-creation strategies, the creation of a mess may have either of three types of advantages:

(1) efficiency advantages, such a returns to scale in ordering;
(2) effectiveness advantages, such as enhancing creativity; and
(3) political advantages, such as making oneself indispensable in finding vital elements lost in the mess.

With respect to mess-toleration strategies, one key calculation revolves around what I call the "order creation – order exploitation tradeoff" – that is, would time be better spent cleaning up a mess or continuing to use those entities that remain in order? If I want to finish this article faster, for instance, should I keep pulling out articles necessary to continue writing, or should I first file the mess of articles that have already accumulated on my desk before resuming writing? As another example, should all efforts in a business be focused on production, or should some be diverted to reorganizing the business? In certain instances, the opportunity cost of creating order may be lower than that of exploiting it, making it reasonable to allow a mess to proliferate. Alternatively, the time saving from refilling or reorganization now may more than compensate for the lost work time spent ordering. As yet another example, getting things straight in my mind – is this my wife or is it a hat – might be either more or less valuable than spending more time thinking about what to do.

It is one of the ironies of collective action that mess toleration may be an irrational collective strategy, but a rational individual strategy. In political

conflicts around order, for instance, it may be more advantageous to tolerate a mess than to see an opponent's conception of order prevail. Likewise, it may be cost-efficient for the collectivity to clean up the mess, but not so for any member to take the initiative, clean up, and watch others take a free ride.

Dimensions – What are the Dimensions of Messes?

Messes also vary according to how they deviate from a model of order. In the West, this is generally the hierarchical ideal type handed down from early forms of organizations in the military and the church (Weber, 1970).

As Table 1 illustrates for both office and organizational examples, messes vary along particular dimensions of their hierarchical structure: the mess's breadth (its span), depth (the number of hierarchical levels it encompasses), volume (the number of entities out of order), intensity (the ratio of improperly to properly ordered entities), and duration. With respect to the latter, one of my colleagues allows messy piles of papers to form on her desk for no more than five minutes, before they are impeccably refiled, whereas another lets a mess of books and articles accumulate in and on his desk, shelves, and cabinets for months, if not years.

I examine mess breadth and depth first, as they both pertain to structural disorder – failures to adhere to a hierarchical organizing schema on a horizontal (breadth) or vertical dimension (depth) respectively. I turn next to mess volume and intensity, as they both pertain to sloppy disorder – failure to follow organizing routines, causing the number of misfiled entities (volume) and the ratio of improperly to properly filed entities (intensity) to grow. Other dimensions of mess which I only touch upon are spatially-dispersed or "splattered messes" as opposed to spatially-concentrated or "concentrated messes", and "homogeneous messes" vs. "heterogeneous messes" – that is messes wherein the degree of disorderliness varies greatly in different parts of the mess.

Breadth

The breadth of a mess pertains to the nature of categories, and their horizontal relations, at one level of a hierarchical organizing scheme. The horizontal rule, for a hierarchical organizing scheme, dictates that a set of related categories, at one level of generality, should be ordered sequentially across that horizontal level. For example, the twenty-six cabinets in an office should be lined up spatially and sequentially from A to Z. At the next hierarchical level of the scheme, the drawers in each cabinet should be ordered from higher to lower in descending numerical order.

Table 1. Dimensionality of Office and Organizational Messes.

		Offices	Organizations
Breadth	Narrower	One filing cabinet is out of order	One division is out of order
	Broader	Most filing cabinets are out of order	Most divisions are out of order
Depth	Shallower	Only the relation between filing cabinets and the drawers they contain is confusing	Only vertical relations between employees and their direct supervisors is confusing
	Deeper	The relationship between cabinets, the drawers they contain, the folders in these drawers, and the subfolders in these folders is confusing	The relationship across every hierarchical level of the organization tends to be confusing
Volume	Smaller	A small number of documents were placed in folders designed to contain another type of documents	A small number of employees were placed in jobs requiring different types of skills
	Bigger	A large number of documents were placed in folders designed to contain another type of documents	A large number of employees were placed in jobs requiring different types of skills
Intensity	Less intense	The ratio of improperly filed to properly filed document is small	The ratio of improperly assigned to properly assigned employees is small
	More intense	The ratio of improperly filed to properly filed document is large	The ratio of improperly assigned to properly assigned employees is large
Duration	Shorter term	The office has been disorderly for a short time	The organization has been disorderly for a short time
	Longer term	The office has been disorderly for a long time	The organization has been disorderly for a long time

Table 2. Classes of Horizontal Deviations from the Hierarchical Organizational Ideal.

Horizontal Ideal		
	A limited set of related categories, at one level of generality, should be ordered across that horizontal level	A, B, C, D, E
Deviations From Horizontal Ideal		
Class 1:	Missing categories	A, B, C, E
Class 2:	Extra categories	A, B, C, C1, D, E
Class 3:	Out-of order categories	A, B, D, C, E
Class 4:	Unrelated category	A, B, C, D, E, 6
Horizontal-Messiness Quotient		
	The number of Class 1s, 2s, 3s and 4s	

As summarized in Table 2, the horizontal rule suggests at least four deviations from the ideal hierarchical organizing scheme: extra categories (class one), missing categories (class two), out-of-order categories (class three) and unrelated categories (class four). A class one deviation occurs, for example, when there exists two job categories denoting the same job, whereas a class two deviations occurs when no job category exists to classify a job. A class three deviation occurs, for instance, when filing cabinets are organized in sequence from A to Z, except for one cabinet Q, which is out of order because it was placed before, rather than after cabinet P. Finally, an example of a class four deviation is when two file folders belonging to different categories in the organizing schema are placed in the same drawer. The horizontal messiness quotient for a filed mess is a function of the number of class one through four deviations.

Depth

The depth of a mess pertains to the existence and relation between categories across levels of a hierarchical organizing scheme. The vertical rule for a hierarchical organizational scheme dictates that fewer, more general, categories need to be divided into more numerous, related, and specific categories.

As summarized in Table 3, such a rule suggests four deviations from this vertical ideal that I label as classes five through eight. First, in class five deviations, there are more hierarchically superior categories than there are hierarchically inferior ones, as when one subordinate reports to two bosses. Second, in class six deviations, one category may be linked to one or more unrelated sub categories. A drawer full of financial information, for example, may be placed in a filing cabinet of personnel information, for instance. Third, in a class seven deviation, a subcategory may be missing from one level, so that a category, rather than being linked to a sub-category, is linked directly to a sub-category of that sub-category. One of the drawers in my filing cabinet has no files, so roughly eighty articles are piled in the drawer. Fourth, in class eight deviations, a hierarchically superior category is subsumed under a hierarchically inferior category, as when a Senior Vice President from one division reports to the Vice President of another. The vertical messiness quotient for a

Table 3.   Classes of Vertical Deviations from the Hierarchical Organizational Ideal.

Vertical Ideal

Fewer, more general categories, subdivided into more, specific sub-categories	

Deviations From Vertical Ideal

Class 5: More general categories linked to fewer specific categories	
Class 6: General categories relating to one or more specific sub-categories, which are not specifications of the general principle defining the general category	
Class 7: General category relating directly to a sub-subcategory (skipping a level)	
Class 8: Sub-category hierarchically superior to a category	

Vertical Messiness Quotient

The number of Class 5s, 6s, 7s, and 8s	

filed mess is a function of the number of class-five through class-eight deviations.

Volume and Intensity

Mess depth and breadth pertain to entities that are in structural disorder – there is not a proper place for everything, as the adage goes. Mess volume and intensity, by contrast, pertain to entities that are in sloppy disorder – not everything was put in the proper place – because organizing routines were violated. More specifically, mess volume is the weighted number of misfiled entities, with higher-weight entities contributing more to mess volume than lower-weight entities. By contrast, mess intensity is the ratio of misfiled to properly-filed entities.

Mess Duration

Some level of messiness is always present, which I call "frictional messiness". So called "frictional unemployment" occurs because, even under perfect economic conditions, individuals released from one job cannot instantaneously find another. Likewise, "frictional messiness" occurs because new, used, or discarded entities cannot be instantaneously acted upon. Mess duration denotes shorter or longer-term messiness in excess of frictional messiness.

A THEORY OF MESSES

Before turning to my theory of messes, I introduce some important construct and assumptions that constitutes the building blocks of the theory.

This theory of messes is based on the assumption that *organizing agents* use *organizing routines* to place *entities* belonging to *organizing categories* into specific locations in order, from which they can be retrieved. For instance, the organizing routine – place documents belonging to the "paycheck" organizing category, in the "paycheck folder" – allows an agent to organize documents that fit the paycheck description into a location from which they can be retrieved. Or place this set of stimuli in the category "my wife" and this other set in the category "my hat" allows individuals to organize their thinking, reasoning, decisions and behaviors.

The theory contains, therefore, three types of constructs illustrated in Fig. 2. First, it contains "organizing categories". It is beyond the scope of this article to review the extensive literature on categorizations processes, especially since a number of authors, such as Fisk and Taylor (1991), already provide a helpful review. For purposes of this article, I use the term category to denote a cognitive construct that defines a set of cues, which gives an entity membership
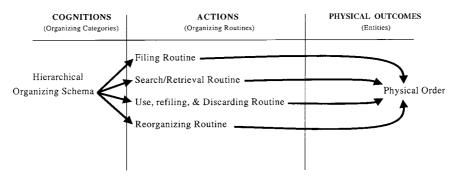
| COGNITIONS | ACTIONS | PHYSICAL OUTCOMES |
| (Organizing Categories) | (Organizing Routines) | (Entities) |

Hierarchical
Organizing Schema

Filing Routine

Search/Retrieval Routine

Use, refiling, & Discarding Routine

Reorganizing Routine

Physical Order

Fig. 2. Static Model.

in a group of like entities. A job category, for instance, is an organizing
category that specifies knowledge, skills, and maybe demeanor required of an
employee or executive that could be placed in that job. A filing category, as
another example, would specify a set of criteria that a document would have to
meet to be placed in that category. In the case of cognition, the organizing
categories are the mental categories themselves.

I assume, for purposes of simplicity that the boundaries of categories are
clearly demarcated – the entity must have all the attributes for membership to
the category to be ascribed to it. The category's boundaries are not fuzzy sets,
such that the entity must have only some of the attributes to be classified as
belonging to the category (Fisk & Taylor, 1991). I make this simplifying
assumption, even though the notion of "fuzzy sets" might greatly enrich
theorizing about messes, and might lead us to think about the properties of
"sharp messes" as opposed to "fuzzy messes" – the later being complex
systems that deviate from a hierarchical order only because their categories are
fuzzy rather than clearly delineated.

The organizing categories considered in this article are related to what I call
"hierarchical organizing schema" – systems of organizing categories wherein a
smaller number of hierarchically superior categories are subdivided into a
greater number of more hierarchically inferior categories[1] (Simon, 1962). The
work organizing-category, for instance, has administrative, teaching, and
research, sub-categories, which can be sub-divided, in turn, into still more
numerous sub-categories.

A second key construct, in this theory, is what I call an "entity", something
that an agent or agents attempt to organize – stimuli in the cognitive example,
articles in the office example, or employees in the organizational one. A third
construct is "organizing routines", that is rules for placing, retrieving, using,

replacing, organizing, or reorganizing entities, belonging to particular organiz-
ing categories (March & Simon, 1958).

These conceptual building blocks make it possible to describe the agent or
agents, whether individual or collective, which are assumed throughout this
theory of messes. This agent – whether a brain organizing stimuli, an individual
organizing documents in his or her office, or a top-management team
organizing employees in their organization – has an explicit hierarchical
organizing categorization schema, as well as organizing routines for classifying
entities, belonging to each category in the schema, so that these entities can be
retrieved from these locations, used in specific ways, and possibly replaced
there for reuse.

In summary, in this theory of messes assumes a brain, individual, or
collective purposive agent seeking to create hierarchical order. To do so, agents
follow organizing routines in order to place entities, ascribed to hierarchically-
ordered organizing categories, from which these entities can be retrieved.
Agents create a mess by either failing to follow their organizing routines
(sloppy disorder), or following an organizing schema that deviates from the
hierarchical model (structural disorder).

Propositions

The frameworks reviewed so far can be used to develop general propositions
that might be useful and testable across different types of messes. In this part
of the paper, I instantiate and illustrate these general propositions with
examples from office filing systems and formal organizational systems only. I
do not use examples from cognitive psychology or brain anatomy, as this
literature is well beyond my area of expertise. In the conclusion to the article,
however, I raise the possibility that these propositions might also apply to
cognitive functions, the adaptive economy of thinking, and, therefore, to brain
evolution.

My approach to messes as failed hierchical order makes it possible to explain
not only the distinction between perceived and real messes, but also why one
might be confused for the other. I enter one messy colleague's office, for
example, and perceive it to be strewn with disorganized piles of papers. My
perception of a horrendous mess is blind to the fact that my colleague has
careful organizing routines dictating which type of entity he placed in what
pile. I perceive a mess where there is order because the categorization scheme
I use to perceive the papers on his desk differs from the organizing scheme he
used to arrange papers on this desk. Likewise, an external consultant might
perceive an organizational mess, because she does not understand the

organizing scheme along which the organization was designed. More generally,

P1: An orderly system of entities will be perceived as increasingly messy the more the categorization scheme through which it is perceived differs from the organizing scheme according to which it was ordered.

My approach to messes also makes it possible to explain why a real mess might be perceived as orderly. A real mess can be said to occur when an organizing scheme is flawed (structural disorder) or not followed (sloppy disorder). In those instances, not only does another agent's office or organization look like a mess, it also is one, in the sense that the agent did not have organizing routines, had flawed routines, or did not follow proper routines. Yet, it is possible that I will perceive order, where there is none, as I would in a Rorschach in-block test. More specifically,

P2: Real messes will be perceived as orderly when the categorization scheme through which the mess is perceived highlights characteristics of the entities along which they can be ordered.

The distinction between perceived and real messes also indicates that agents can create a real mess by simply changing their organizing scheme or organizing routines. If, for example, I decide that I will now file my academic articles alphabetically, rather than by topic, I have generated a real mess. This is because the articles in each topical folder are now out of alphabetic order. Likewise, a decision to reorganize an organization along a new organizing schema, until the reorganization is complete, leaves employees with the wrong skills within particular department, teams, or job categories. More generally, in every order lurks a wide variety messes. Within each of my topical folders, for example, there is a disorder of articles not only by alphabetical order, but also by journal, country of origin, or publication date. Messiness becomes visible when we alter the categorization schema that hid it.

A MODEL OF MESS FORMATION

This article's theory rests on a simplified model of mess formation that will serve to theorize why messes of different widths, breadths, volumes, intensities and durations might form in different functional locations, and how they might evolve over time. The model is an open system model – inputs pass system boundaries, are transformed, and exit the system as outputs (Katz & Kahn, 1966). Task-related inputs (tasks and entities) enter the system's throughput process. In this process, entities are filed, searched, retrieved, used to complete

tasks, and refiled. The throughput process may also involve the reorganizing of this system. The throughput process generates particular outputs – task outputs and entities purged from the to-discard mess.

Even this article's simplified model of mess formation is fairly complex, and it is depicted gradually in Figs 3–6, with the full model laid out in Fig. 7. It is clear that the formation of organizational or office messes can be much more complex than what is depicted in Fig. 7, but this model can serve as a useful starting point, which could then be rendered more complex or messy, if necessary.[2]

The model's first part, in Fig. 3, pertains to the organizing of incoming entities.

Varied entities, a new employee or piece of office mail for instance, appear (path 1). If they are not rejected outright (path 2b), an agent may use an organizing routine to place them in the existing order. The model assumes that these new entities cannot or will not always be organized instantaneously because it is not always efficient or effective to do so. Rather, they go into the to-organize mess (path 2a), for however short a period. From there, they enter either the organized mess (path 3) or the to-discard mess (path 4), from which they are either purged, or returned to the to-organize mess, if they went to the to-discard mess by mistake.

Figure 4 depicts tasks entering the system (path 5) and being undertaken (path 6). Tasks are projects for an organization an individual, writing this article
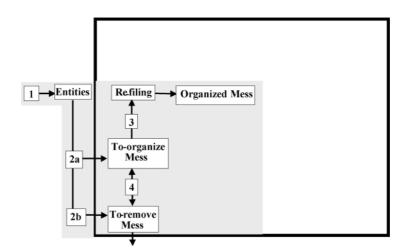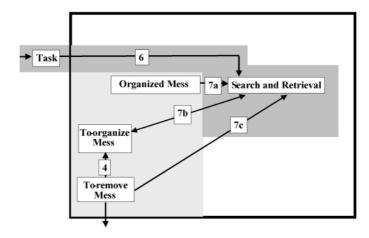

Fig. 3. Filing of Entities.

Fig. 4. Search and Retrieval of Entities.

for instance, that will cause them to use entities such as employees in specific positions or documents in specific files.

The task triggers a search and retrieval organizing routine of the entities necessary to complete the task. Initial search occurs usually in the organized mess (7a). However, because entities used in the task are returned to the to-organize mess before being replaced in the organized mess, search may also occur in the to-organize mess (Path 7b).[3] Finally, the failure to find an entity in either the to-organize or organized mess can prompt a search through the to-discard mess (path 7c). We have all, at one time or another, scurried madly through the trash to retrieve some lost document needed urgently to finish a task. Likewise, organizations sometimes reverse a terminal contract, or bring back employees that are laid off because of a seasonal business cycle.

Figure 5 depicts what happens to entities after they have been used.

The entity is returned to the to-organize mess (path 8a), either by being actively placed in a location outside the order, or just left where it was last used. From there, the entity may be placed back in the organized mess (path 3). Alternatively, the entity can be discarded, either directly (path 8b), or indirectly (path 4). In some instances, moreover, agents take multiple entities belonging to the to-organize mess, and throw them, in one block, into the organized mess, thereby greatly increasing its breadth and depth.

Finally, Fig. 6 depicts what happens when one part of the system fails.

First, it may not be possible to place a new entity into the order using the existing organizing scheme and routines (path 9). Until the organizing scheme
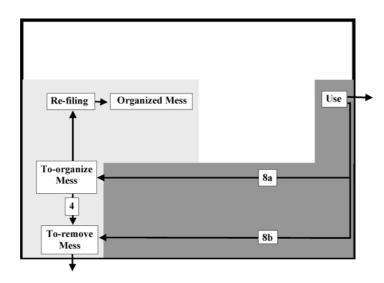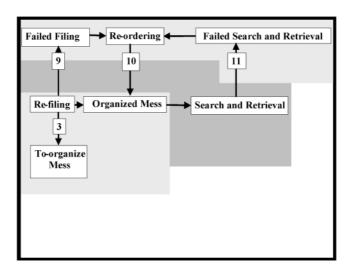
Fig. 5. Use, Refiling, and Discarding of Entities.
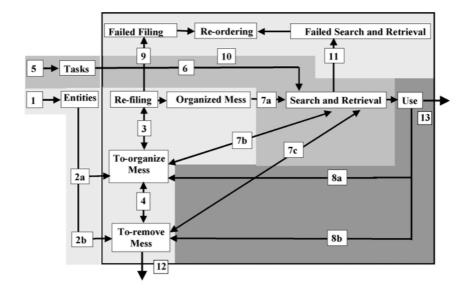

Fig. 6. Reordering of Entities.

Fig. 7. Full Model.

and routines are either created or re-ordered (path 10), the unorganizable entity has to be returned to the to-organize mess (path 3) or be placed in the wrong location in the order. The creation of some new organizing category, categorization scheme, and routine, or even the recreation of the entire organizing scheme, and associated organizing routines, may have to occur for the entity to be organized. Second (path 11), search and retrieval organizing routines may also fail. Such failures can also prompt a reorganization of organizing categories, schemes, and routines (path 10).

Figure 7 integrates the different components of the model, revealing a number of its characteristics.

Two types of inputs enter the system: new entities (path 1) and new tasks (path 5). Likewise, two types of outputs exit it, entities purged from the to-discard mess (path 12) and outputs from completed tasks (path 13). It should be noted that this model omits two other systems of ordered entities, which like this one, can be messy or messed up: messes in the system to order incoming tasks (box 6) – my to-do list or the order book of a company, for instance – or in the system to order task outputs (box 12) – the shipping department of a company, for instance. Both these systems could be modeled along the lines of Fig. 7, however.

The next two sections use the model, depicted in Fig. 7, to examine state and strategic causes of messes of different breadth, depth, volume, intensity and durations in the to-order, order, and to-discard mess.

STRATEGIC CAUSES OF MESSES

In the first part of this section, I assume that entities and task inputs enter the ordering system at a rate that exceeds its capacity to maintain order, so that messiness is increasing. Yet, the level of accumulated messiness does not usually grow to a point at which it either brings work to a halt, or triggers reorganization. This assumption allows me to examine factors influencing the dimensions of to-discard messes, to-organize messes, and organized messes in a steady state of the system. In the second part of this section, I examine what level of messiness, among other factors, might trigger reorganization.

To-Discard Messes

As Fig. 7 indicates, both new entities and used entities are either placed in the to-organize mess (Path 2a, 4, and 8a) or in the to-discard mess (paths 2b, 4, and 8b). Why would agents decide to place entities into the to-discard, rather than the to-organize mess, and to then to actually discard them from the to-discard mess? A task ends, for example, and an agent has to decide whether or not to throw out documents, or to let go employees who were useful in completing the task. They do so first, and rather obviously, because they perceive no future utility for these entities. Second, they may place entities in the to-discard mess because they perceive a low joint probability that an entity – even if it is potentially useful – will be needed again and that it can be found and retrieved in that eventuality. Third, they may also place useful entities in the to-discard mess and purge them because they perceive that the cost of searching and retrieving the entity may be greater than cost of recreating, reacquiring, or rehiring it. Thus,

P3: The decisions both to place an entity into the to-discard mess, and to purge it from that mess, are directly related to cost of finding the entity if it were filed, and inversely related to the probability of reusing the entity, its utility, and its replacement cost.

This type of proposition might apply equally well to the decision to throw out documents used in a completed office task and to decisions by managers to both retrain and redeploy workers employed in a division that has been closed down, or to lay them off, or even to the decision to memorize a piece of information.

To-organize Mess

The volume of a to-organize mess is the result of three factors: first, the rate of entry of entities in to that mess, rather then the to-discard mess (paths 2A, 4, 8A), second, the rate of exit from that mess of entities used in tasks (path 7B) and third, the rate of exit of entities that are organized. Factor 2 is a given and factor 1 was analyzed above. Therefore, I focus on the third factor. I address the question, why would the rate of organizing be lower than that necessary to maintain frictional messiness in the to-discard mess, causing it to grow? I examine three possible answers to this question: efficiency and effectiveness benefits of to-organize messes, and bottlenecks in organizing.

Efficiency Benefits
There are a number of reasons why it is efficiency-enhancing to let to-organize messes form and proliferate – to let a pile of papers form on your desk, for instance, or to form a temporary cross-functional team of employees to address a particular task.

A first benefit of to-organize messes is that they vitiate the need for repeated interruptions in order to refile each entity immediately after it enters the system or is used. Work does not have to be interrupted every time a new piece of mail or employee appears. Thus, to-organize messes speed up task completion because they allow for periods of uninterrupted work.

Second, if there is a non-zero probability that an entity used in a task will be reused in short order, then it may be efficient to leave it in the to-organize mess, in order to avoid the loss of time from reorganizing and re-retrieving the entity shortly thereafter. I can repeatedly reuse the paper on my desk or the employees in the cross-functional team, rather then having to repeatedly return them and bring them back from their files or jobs.

Third, there are increasing returns to scale in re-organizing. For example, letting to-organize messes accumulate within an office makes it possible to make only one trip to refile multiple like papers, rather than multiple trips to file each of these papers separately. Alternatively, letting a pool of new hires accumulate makes it possible to train and socialize them all at once, rather than one at a time. Moreover, there is the question: how do I know how these entities should be organized until I see what types of entities I will have to organize? Indeed, there are instances in which the optimal organizing scheme for a set of new entities can only become apparent when a sufficiently large sample of these entities has accumulated and it becomes clear how they should be organized. Filing before that point makes it likely that the wrong ordering schema will be adopted, because new uncategorizable types of entities will

enter the system after that point. Were such uncategorizable entities to enter the ordering system, it would have to be modified or even replaced, and all the entities would have to be laboriously unfilled and then refiled. These reordering and refilling costs may exceed the cost of letting the mess pile up until a sufficient sample of entities is present to indicate what the best ordering scheme is.

Fourth, entities that are being used can easily be found in a to-organize mess of moderate size, whereas they may be hard to find, or even lost, if they are organized. More importantly, these entities, by their sheer presence, can remind the ordering agent that they should be reused. An article left on one's desk, for instance, can trigger its reuse, whereas it will be promptly forgotten if stored in electronic format somewhere in the bowels of one's computer – an argument often used by those fighting against the "paperless office" (Selen & Harper, 2001).

Fifth, certain to-organize messes have a spontaneous ordering – a chronological ordering in piles of papers on an office desk, for instance, with older papers towards the bottom of piles and newer ones towards the top, or a spatial ordering, as when a mess of computer manuals tends to form next to my computer. Likewise, in the absence of filters, that classify emails by subject or sender, emails accumulate in one's mail box in chronological order, and the ones I have not read appear in bold.

Six, heterogeneous messes allow for what might be called flexible ordering. Most filing systems require a standard level of orderliness throughout the system. Messes, however, can accommodate different degrees of orderliness in different parts of the mess. One pile of papers in the corner might have absolutely no order, whereas the ones near me on the floor may have some sort of rough order, whereas I know pretty much what each pile on my desk contains. This heterogeneity and flexibility in the degree of organization of a mess may help different parts of a mess serve different types of benefits – some parts of the mess containing entities that will be reused in short order, others containing entities that will benefit from returns to scale in ordering, still others containing entities that are useful because their sheer presence will prompt their re-usage, and still others containing spontaneously ordered entities. Para-doxically, flexibly ordered messes might be thought of as an alternate form of non-hierarchical organization.

Finally, seventh, I reviewed above the manifold political benefits of too organize-messes. They range from individual advantages in creating messes – such as becoming indispensable to find things within them – to advantages in tolerating them – such as waiting until someone else bears the cost of clean up.

The efficiency benefits of to-organize messes may, however, have diminishing returns to scale. In particular, as a to-organize mess becomes very large, it may become increasingly difficult to find entities within it, making it difficult to reuse these entities. Whether and when such search and reuse costs overwhelms both the benefits of uninterrupted work, returns to scale in ordering, and spontaneous ordering, is a matter for empirical analysis. I can propose, however, that,

P4: The magnitude of the to-organize mess will grow as a function of efficiency benefits stemming from returns to uninterrupted work, lower search and reuse costs, returns to scale in ordering, and spontaneous ordering benefits.

Effectiveness Benefits

The effectiveness benefits of to-organize messes occur primarily because they enhance creativity (Amabile, 1983). Messes enhance creativity for a number of reasons. First, they make it possible to retain radically new entities that do not fit into the existing ordering scheme, or can not yet be perceived to, or made to, fit in that scheme. I can retain a new type of article or employee outside existing order, for instance. Ordering such entities could cause them to be rejected, misfiled, or filed in a way that masks their uniqueness, thus removing their innovative contribution to a creative task. For example, I sometimes come across papers, which, like this one, do not fit neatly in a well-established category within my Organizational Behavior and Theory files. Leaving such papers in the to-file mess on my desk both reminds me of their existence and gives me easy access to them.

Second, to-organize messes, by their very existence, juxtapose entities belonging to different categories, bringing to mind new combinations of entities that would have been hidden, had these entities been segregated in distant parts of order. For example, organizations that randomly mix up the office locations of functional specialists, rather than segregating them on different floors, enhance the likelihood of original cross-functional solutions to certain types of tasks. Similarly, the chance juxtaposition of two articles in the mess on my desk can bring to mind a combination of ideas from both papers that I would never have considered, had they been kept apart by my ordering scheme. Thus, by juxtaposing very different types of entities in a to-organize mess, one increases the likelihood of combining mismatched entities into new and creative outputs (Abrahamson, 2000). With respect to efficiency, however, creativity might decline as the scale of a to-file mess grows. Thus,

P5: The magnitude of the to-organize mess will grow as a function of its effectiveness benefits stemming from greater creativity in task completion.

Preliminary evidence supports this proposition. Malone (1983) found that non-routine tasks, which presumably required more creativity in their completion, were associated with more messy offices. Likewise, organizations that face non-routine tasks might use more temporary teams whose members can be returned to their regular position when the tasks are completed (Burns & Stalker, 1961).

Organizing Bottlenecks

As noted above, the volume of a to-organize mess is a function of the rate of entry of entities into that mess (path 4), their rate of exit from the mess for task purposes (path 7b), and the rate at which entities can be organized (path 3). The organizing rate, however, does not depend only on how long agents decide to keep entities in the to-organize mess for efficiency or effectiveness reasons. It also depends on how quickly they can organize entities, if they decide to do so. If the maximal rate at which agents can organize is low, organizing can cause a bottleneck, resulting in a pile up of entities in the to-organize mess, and growth in its volume. This might occur in an office receiving a sudden surge of mail or in an organization that has to hire many employees in order to grow very rapidly. At the extreme, as the downward arrow in path 3 of Fig. 7 depicts, entities that cannot be organized at all will flow back into the to-organize mess, further increasing its volume. It follows that,

P6: The magnitude of the to-organize mess will grow faster, the more the organizing rate necessary to maintain frictional messiness exceeds the maximal rate at which entities can be organized.

What determines the maximal rate at which entities can be filed? My answer is the organized-messes' total magnitude – a function of its breadth, depth, volume and intensity (see Appendix 1). The broader, deeper, bigger and more intense the organized mess, the harder it will be to organize entities within it, and the slower the maximal organizing rate. I turn next to forces that influence the total magnitude of organized messes.

Non-standard Inputs

Figure 7 distinguishes two kinds of inputs to the organizing system: entities (path 1) and tasks (path 5). Each of these inputs, if they do not fit the existing organizing scheme and routines, will contribute to the breadth or depth of the filed mess.

Consider first entities that have characteristics that differ from those used to classify entities in an existing organizing scheme – an employee with skills that do not match those used in an organization's job descriptions, or an article that does not fit the dimension of organizing categories used in an office organizing scheme. For such entities to be properly organized according to this scheme, a new organizing category that does not fit the existing scheme has to be added to it, causing an increase in mess breadth and depth (class four and six violations of the rules of hierarchical ordering). Thus,

P7: New types of entities, which have characteristics that are not used to classify existing entities in an organized system of entities, will tend to cause broader and deeper organized messes.

Non-standard entities do not necessarily enter ordering systems one at a time. Already-ordered systems of multiple entities also enter when they have to be added or merged to that system. This is the case when two sets of files or two organizations have to be merged, for instance. No mess results when the ordering scheme of both entities is the same – two libraries using the Library of Congress classification code, for example. When two systems of entities organized according to different categorization schemes have to be integrated, however, as in the case of the post-merger integration of differently organized firms, a wide and broad mess can result. Thus,

P8: Combining systems of ordered entities based on differing ordering schema tends to cause combined systems of entities whose mess breadth and depth is equal or greater than the breadth and depth of either of the systems that were combined.

Second, a new task may present itself that requires using dimensions of entities that were not used in the existing organizing schema and routines in order to retrieve, use, and refile these entities. As a result, new organizing categories have to be added to the organizing scheme in order to locate and file these entities. These new organizing categories will, by definition, be incongruous with the existing organizing scheme, thereby increasing mess breadth and depth. For example, I organize my Organizational Theory articles by perspectives – institutional theory, population ecology, etc . . . To work on this article about messes, however, I have to create a category and sub-categories within my Organizational Theory file, in order to file organizational theory papers bearing on messes. These categories do not fit the perspective-based horizontal and vertical ordering dimensions that guide how I organize my papers, thereby adding to the breadth and depth of my filed mess (Class 4 and 6 deviations). It follows that,

P9: New types of tasks, which require using characteristics of entities that are not used to classify existing entities in an organized system of entities, will tend to cause broader and deeper organized messes.

New types of inputs, whether they are new entities, system of entities, or tasks, affect structural order generally, and mess breadth and depth particularly. I examine next determinants of sloppy disorder and resulting mess volume and intensity.

It seems reasonable to assume that if there does not exist a place for everything, then it is likely that everything will not be in its place. That is, structurally disorderly organizing schema and routines will tend to result in more sloppy disorder. More specifically, greater mess breadth and depth will tend to cause greater mess volume and intensity. It is difficult, however, to predict precisely how mess volume and intensity are affected. Mess breadth and depth does slow down retrieval, thereby causing fewer entities to exit the to-organize mess, thereby encouraging its growth. Breadth and depth, however, also slows down organizing, thereby causing fewer entities to enter the organized mess, and thereby limiting its growth. How these countervailing forces, affecting mess volume, balance out is a matter for empirical investigation. What is less ambiguous, however, is that mess-breadth and depth, whether it occurs in to-organize, organized or to-discard messes, because it confuses organizers, would cause the rate of sloppy organizing to increase. It follows that,

P10: The greater the breadth and depth of a mess, the greater its subsequent volume and intensity.

This proposition could be tested both in the context of offices, wherein one would expect a relation between mess breadth and depth among filing cabinets, drawers, folders and subfolders and the ratio of properly to improperly filed documents. It could also be tested in an organizational context wherein one would expect a relation between the mess breadth and depth of the organizations' formal structure and the ratio of improperly to properly assigned employees to their jobs.

Reorganization

Messiness, in excess of frictional messiness, can persist over the longer-run; I call such longer-term messiness "structural messiness". The existence of structural messes raises the question, why do they occur? Why do not organizers always restructure organizing schema and routines so as to bring messiness down to a frictional level?

There are two key reasons why, under certain circumstances, it may be more efficient or effective to be messy. One key reason, which I explored above (propositions 6 and 7), is that certain types of messes enhance efficiency or effectiveness. Such mess benefits could result in structural messiness. A second key reason is that, even when a cost-benefit analysis of the consequences of messiness on a task suggests that reorganizing would increase that task's efficiency or effectiveness, there exists what I call an "order-creation, order-exploitation tradeoff". That is, because time spent reorganizing to create order cannot be spent exploiting this order, the benefits of creating greater order may not justify lost work time, which could be used to exploit existing order. So, even if more order speeds up task completion, the time necessary to create that higher level of order might exceed the time saved.

The Cusp of Messiness

The order creation-exploitation tradeoff suggests an optimal level of messiness. I call it the cusp of messiness – the level of messiness at which any more or less time spent creating order would reduce task efficiency or effectiveness. This suggests that if agents optimize,

P11: Mess magnitude will fluctuate around the cusp of messiness.

Below the cusp, more time will be devoted to reorganizing, whereas more time will be devoted to reorganizing above the cusp.

STATE CAUSES OF MESSES

This section examines psychological and socio-cultural explanations for the dimensions of to-recycle, to-organize and organized messes respectively (Gosling, Ko, Mannarelli & Moris, 2002). The goal in this section, as in the previous one, is a mid-range theory, which could be used for both individual and collective agents in a variety of hierarchically ordered organizing system, exemplified by offices and organizations. Therefore, the discussion points to relatively broad classes of individual or collective states as determinants of messes, rather than to either specific psychological traits of individual office organizers, or to characteristics of collectives, such as an organizational top-management team.

To-discard Messes

It seems that certain individuals, pack rats in particular, retain entities when it would be more economically-efficient and effective to discard and purge them,

whereas others have a strong bias towards discarding rather than organizing. Likewise, it seems that certain organizations routinely downsize, whereas other retrain and redeploy employees rather than removing them. In the context of this theory, the economic returns of retaining vs. removing entities is a function of the probability of reusing entities, their utility, their replacement cost, and their retrieval cost. It follows, therefore, that

P12: Organizing agents, whether individual or collective, who have a bias towards, overestimating (underestimating) the probability of using entities, their utility, their replacement cost, or underestimating their retrieval cost, will tend to retain (discard) more entities than is economically efficient, in to-organize or organized locations.

A next step would be to examine particular psychological variables, in the case of individual agents, or socio-cultural variables, in the case of collective organizing agents that would cause such under and overestimations.

To-organize Messes

As with to-discard messes, the challenge is to find state factors that cause organizing agents to under or over-estimate the efficiency and effectiveness of to-organize messes.

With respect to psychological factors, it may be useful to distinguish genetic or psychological mess-creation tendencies, which prompt an organizing agent to create messes, from psychological mess-tolerance tendencies, that encourage agents to clean them up once they have emerged. Mess creation tendencies might reflect, for instance, high-need for achievement and the resulting propensity to take on hard to achieve tasks, leaving little time to create order. Mess-tolerance tendencies, likewise, might result from psychological factors, such as a low need for closure or a high tolerance for ambiguity.

It seems that mess-creation and mess-tolerance tendencies, in conjunction, would predict an organizing agent's tendency to produce messes. Indeed, if mess-tolerance tendencies are present, messes will not form unless mess-creation tendencies first produce the mess to be tolerated. Likewise, if mess-creation tendencies are present, but strong mess tolerance tendencies are absent, messes will be cleaned up as they emerge. It follows, that:

P13: The greater the weighted product of agents' psychological tendencies towards creating messes and tolerating such messes, the greater the breadth, depth, volume, intensity and duration of the messes they produce.

There may also exist socio-cultural factors influencing messiness. Such factors may also moderate the effects of psychological factors on messiness. In direct parallel to psychological factors, it may be useful to distinguish socio-cultural mess-creation tendencies, which prompt organizing agents in a culture to create messes, from mess-tolerance tendencies, which encourage them to tolerate mess formation, once they have formed. For instance, national cultures may have tendencies, like need for achievement (McCleland, 1961), that encourage greater messiness, as well as other tendencies, like tolerance for ambiguity (Hofstede, 1991) that cause greater tolerance for messes. What messiness symbolizes in a culture may also affect mess-tolerance. In the U.S., for example, messiness can symbolize that a person is very busy and should not be disturbed. Consequently, messes might be more tolerated in the U.S. than in other countries, like Germany, that have strong norms against disorder. Thus,

P14: The greater the weighted product of a culture's tendencies towards creating messes and its tendencies towards tolerating such messes, the greater the magnitude of messes within that culture.

Organized-messes

The psychological and cultural factors just described might also explain the breadth, depth, volume, intensity, and duration of filed messes. However, there are at least two other state causes, which pertain only to the formation of broader or deeper filed messes. First, an organizer may be guided by a categorization and organizing schema which violates vertical or horizontal rules of hierarchical organization. It would follow that,

P15: The more non-hierarchical an organizing agent's organizing scheme, the broader and deeper the mess it will create.

Organizational founders who have no respect for organization, for instance, might imprint their messy organizational schema on their organization's structure (Kets de Vries & Miller, 1984).

Second, creating order is often a collective process. So, even if every member of an organizing team is guided by a hierarchical categorization and organizational schema, the team can still produce a broad or deep mess. Consider, for example, two division heads organizing their own department without agreeing on the number of reporting levels. The flat (few levels) structure created by one, when combined with the steep (many levels) structure created by the other, will result in an overall organizational mess with both breadth and depth. More generally,

P16: The greater the number of organizers, the greater the division of organizational labor, and the lesser the agreement over the overall organizing scheme guiding organizing labor, the broader and deeper will be the resulting organizational mess.

CONCLUSION

This article pertains to only one type of disorder, which occurs in hierarchical ordering systems. A fuller theory of failed organization will have to examine other types of messes, like those that emerge in non-hierarchically ordered organizing systems. Nonetheless, this article's precise focus on messes in hierarchically ordered organizing systems suggests a number of areas for research and a number of approaches to carrying out such research. I turn to them next.

Future Research

Areas of Research

There are a number of broad questions about messes that need to be investigated. Among the most important are, what is the relative contribution of state and strategic causes of messes? What are more powerful causes of messes – economic, political, socio-cultural or psychological, and how do these causes interact. Equally important is the testing of what I might call a contingency theory of messes. That is, how the impact on task performance of a particular type of mess, with given dimensions, is moderated by various contingencies.

From a more pragmatic point of view, researchers could explore what mess avoidance, creation, or clean up techniques work best with different types of messes. An important first step in such messiness research is the measurement of the messiness construct. Appendix 1, for instance, suggests a measure of overall mess magnitude. Equations 1 through 3 suggest variables that need to be measured (mess breadth or depth, for example). They do not specify, however, what weight should be given to these different variables in calculating overall measures of mess magnitude.

Measurement

The mess measure in Appendix 1 makes it possible to generate and test a number of hypotheses. Greater overall mess magnitude causes slower search and retrieval. It follows that, the greater the overall magnitude of the mess, the less efficient the completion of tasks affected by that mess. How could such a hypothesis be tested? One approach would be to measure the breadth, depth,

volume, intensity of various messes and their resulting task efficiency. It would then be possible, by induction, to weight the individual effect of each of these dimensions on task efficiency. This would also make it possible to estimate how the overall magnitude of other messes might affect the efficiency of tasks carried out in the midst of such messes.

Research Modalities

Given the current level of understanding of messes, case studies of messes might be very useful in beginning to understand their formation, nature and consequences. Malone's (1983) multi-case study of five messy and five orderly offices provides a good example of this type of research and the insights it can yield. Another promising approach is to simulate, on a computer, the evolution of a mess. This article suggests that mess formation is a complicated, multifaceted process, which unfolds dynamically over time. Such complex dynamic processes are best investigated with a series of simulations that highlight the effects of shifts in parameters on the evolution of the process. A third approach might be to study messes through quantitative field studies. Certain messes, such as those in offices or on computer hard drives for instance, by virtue of their scale and accessibility, might provide the easiest way to start studying messes. Such small-scale studies would set the stage for studies of much larger and complex messes, such as organizational and inter-organizational messes.

CONCLUSION

This article focused on disorganization generally, and messes specifically for a number of reasons: first, because they have received little explicit attention. Second, because what we learn about messes could be scale invariant and, therefore, applicable to entities ranging from the brain to other phenomena at individual, teams, organizational, interorganizational, and inter-industrial levels of analysis. Third, because messes can have major consequences, both positive and negative. Finally, because messes might be becoming more prevalent because of the ever growing ease with which we can acquire the information, ideas, and products that form the raw material of messes. I believe, therefore, that after decades of studying organization and order, the time has come to turn our attention to the study of disorganization, disorder, and messes – in an orderly fashion, of course.

This article did not explore in any depth two important areas for future research on messes. The first is cognitive messes and, by extension, the development of cognitive processes in the evolution of humans and other

primates. The second pertains to the dynamics of messes – the pattern or filing, refiling, organizing and reorganizations that unfolds over time.

The dynamics of messes may yield many interesting future research questions. It seems clear that even if messes benefit organizing agents, they do so with diminishing returns. An important question, therefore, is what triggers the cleaning up of messes. Why and when do organizing agents take misplaced entities and replace them in their correct location in the organizing system? When do they consider that such refiling is insufficient, and that the entire structure of the organizing system needs to be reorganized? Does time availability, new organizing agents, new tasks, new inputs, or failure trigger refiling and reorganization? Alternatively, do messes reach a particular threshold that triggers the refilling and reorganization process? What determines that threshold? Moreover, if order tends to increase work efficiency, and more effective work tends to generate more of a mess that slows down efficiency, what will be the timing of clean-up episodes?

If messes create inefficiencies and efficiencies in systems like formal organizations and offices, it is possible that they may have similar consequences for cognitive functions. Were this to be the case, a theory of messes would have at least two broad types of consequences. First, harmful properties of certain types of messes might help explain types of encoding, reasoning, decision making or remembering pathologies. Thus, the study of cognitive messes might provide new explanations for flaws in human capabilities. And, from a more pragmatic point of view, it might also help in developing training techniques capable of enhancing peoples' cognitive capacities. Second, more positive aspects of messes might explain when cognitive messes have particular benefits, such as a greater ease at linking disparate categories of entities and an enhanced capacity to be creative.

In contemplating the benefits of messy thinking, one has to ask: why were messy human thinkers not selected out a long time ago in the course of human evolution? Do functions, such as the survival benefits of creative thinking, explain why there remain messy thinkers among us? Put differently, is there an adaptive economy of messy thinking? These are just some of the interesting questions raised by the examination of the form and function of cognitive messes.

SOME FINAL THOUGHTS IN NO PARTICULAR ORDER

There is a paradox in writing an article about messes in such an orderly fashion. I end this paper with a number of ideas and question about messes that did not

fit neatly in this paper's organizing scheme. Ideas and questions that must, therefore, be presented in no particular order.

Why, for instance, is the term mess associated with dirt and uncleanliness, so that we have to "clean up" messes? Does it make sense to think as messes among non-human animals or in the physical world? Are their orderly and messy ant nests, for instance? What is the relation between entropy and human messiness? One might think, for instance, that there exists a natural tendency towards messiness in human affairs. Human entropy would emerge because there exists many more disorderly states of a cognitive, organizational, or social system than there are hierarchically orderly states of that system. So, by the laws of probability, human messes would tend to prevail. However, if messes are so prevalent, why have so few people written about them? Physical entropy dissipates in an orderly fashion, does social entropy as well? Why am I so messy in every aspect of my life, except in how I think? More generally, why are some people messy in certain contexts and not in others, whereas others are always messy? Possibly, contextual factors explain localized messiness, whereas psychological factors generalized messiness? Why are machines said to be "out of order" when they break? Do some languages have only words for non-order, but no word for mess? Do certain cultures have relatively more words for messes than others? What would this mean about the culture? Why do so many words for messes belong to slang? What is the relation between Attention Deficit Syndrome and messiness? What would a psychoanalyst say about messes? If order is the thesis and disorder the antithesis, what is the synthesis? Is God messy?

NOTES

1. Not all categorization schema need be hierarchical. Just as hierarchical schema allow us to conceptualize messes in hierarchical organizing systems, other types of schema will make it possible to conceptualize disorder in other types of organizing systems.

2. For purposes of simplicity, this model focuses on messes in the entities used to complete tasks, and ignores messes that form among these tasks and the outputs they generate.

3. Entities may also be pre-assembled in anticipation of starting the task. Such entities, the books I will need at work tomorrow for instance, are placed temporarily in the to-organize mess (7b left arrow) to be retrieved subsequently.

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REFERENCES

Abrahamson, E. (2000). Change Without Pain. *Harvard Business Review*, *78*(4), 75–79.

Amabile, T. (1983). *The Social Psychology of Creativity*. New York: Springer-Verlag.

Ackoff, R. L. (1981). The art and science of mess management. *Interfaces*, *11*(1), 20–26.

Bateson, G. (1972). *Steps to an Ecology of Mind*. Chicago: The University of Chicago Press.

Burns, T., & Stalker, G. M. (1961). *The management of innovation*. London: Tavistock.

Byrne, D. (1998). *Complexity Theory and the Social Sciences*. Routledge.

Cohen, M. D., March, J. G., & Olsen, J. P. (1972). A garbage can model of organizational choice. *Administrative Science Quarterly*, *17*, 1–25.

DiMaggio, P., & Powell, W. W. (1983/1991). The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields. In: W. W. Powell and P. J. DiMaggio (Eds), *The New Institutionalism in Organizational Analysis*. The University of Chicago Press. (Originally in *American Sociological Review*, *48*, 147–160.)

Edwards, R. (1979). *Contested Terrain: The Transformation of the Workplace in the Twentieth Century*. New York: Basic Books.

Fisk, S. T., & Taylor, S. E. (1991). *Social Cognition*. New York: McGraw Hill.

Gosling, S., Ko, **?**., Mannarelli, T., & Moris, **?**. (2002). A Room with a Cue: Personality Judgments Based on Offices and Bedrooms. *Journal of Personality and Social Psychology*, *82*(3), 379–398.

Hofstede, G. (1991). *Cultures and Organizations: Software of the Mind*. London: McGraw-Hill.

Katz, D. K., & Kahn, R. L. (1966). *The Social Psychology of Organizations*. New York: John Wiley & Sons, Inc.

Kets de Vries, M. F. R. M., & Miller, D. (1984). Neurotic Style and Organizational Pathology. *Strategic Management Journal*, *5*, 35–55.

Malone, T. (1983). How Do people Organize Their Desks? Implications for the Design of Office Information Systems. *ACM Transactions on Office Information Systems*, *1*(1), 99–112.

March, J. G., & Simon, H. A. (1958) *Organizations*. New York: John Wiley and Sons.

McCleland, D. (1961). *The Achieving Society*. Princeton, NJ: Van Nostrand.

Meyer, J. W., & Rowan, B. (1977). Institutionalized organizations: Formal structure as myth and ceremony. *American Journal of Sociology*, *83*(2), 340–363.

Michels, R. (1962). *Political Parties*. New York, MacMillan.

Mintzberg, H., & Waters, J. (1985). Of Strategies, Deliberate and Emergent. *Strategic Management Journal*, *6*(3), 257–172.

Olson, M. (1971). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, Mass.: Harvard University Press.

Pfeffer, J. (1993). Barriers to the advance of organizational science: Paradigm development as a dependent variable. *Academy of Management Review*, *18*, 599–620.

Pfeffer, J. (1981). *Power in Organizations*. Pitman.

Pfeffer, J., & Salancik, G. (1978). *The External Control of Organizations*. Harper & Row.

Rosch, E. (1978). Principles of Categorization. In: E. Rosch & B. B. Loyds (Eds), *Cognition and Categorization*. Hillsdale, N.J.: Erlbaum.

Sacks, O. (1985). *The man Who Mistook his Wife for a Hat and Other Clinical Tales*. Summit Books.

Sellen, A., & Harper, R. (2001). *The Myth of the Paperless Office*. MIT Press: Harper.

Shenhav, Y. (1995). From Chaos to Systems: The Engineering Foundations of Organizational Theory. *Administrative Science Quarterly*, *40*, 557–585.

Shenhav, Y. (1999). *Manufacturing Rationality: The Engineering Foundations of the Managerial Revolution*. Oxford: Oxford University Press.

Simon, H. A. (1962). The Architecture of Complexity. Proceedings of American Philosophical Association.

Taylor, F. W. (1911). *The Principles of Management*. New York: W. W. Norton Company.

Weber, M. (1947). *The Theory of Social and Economic Organization*. New York, MacMillan.

Weick, K. E. (1998). Improvisation as a Mindset for Organizational Analysis. *Organization Science*, *9*(5), 543–555.

Williamson, O. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. New York: The Free Press.

APPENDIX 1

An Overall Measure of Messiness

This article specifies dimensions of messes, and makes it possible, therefore, to move towards operationalizing mess magnitude as a weighted function of a mess measured on these dimensions. The magnitude of a mess (M), for instance, can be expressed as a function of its breadth (b), depth (d) and volume (v), and intensity (i) such that:

$$M = \beta 1 * b + \beta 2 * d + \beta 3 * v + \beta 4 * i \qquad (1)$$

Moreover, if most messes occur in tripartite, to-organize, organized, and to-discard location, a messes' total magnitude (TM) would be a function of the mess-magnitude for the to-organize mess (TOM), the volume of the organized mess (OM), and the to-discard messes (TRM), such that:

$$TM = \alpha 1 * TOM + \alpha 2 * OM + \alpha 3 * TRM \qquad (2)$$

Finally, if the magnitude of a mess varies over time, then we might think of the average total messiness (ATM) of an ordered system over some time periods (n) as,

$$ATM = \frac{\sum_{1}^{n} TM_n}{n} \qquad (3)$$