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Implementing, Embedding, and Integrating Practices: An Outline of Normalization Process Theory

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ABSTRACT

Understanding the processes by which practices become routinely embedded in everyday life is a long-standing concern of sociology and the other social sciences. It has important applied relevance in understanding and evaluating the implementation of material practices across a range of settings. This article sets out a theory of normalization processes that proposes a working model of implementation, embedding and integration in conditions marked by complexity and emergence. The theory focuses on the *work* of embedding and of sustaining practices within interaction chains, and helps in understanding why some processes seem to lead to a practice becoming normalized while others do not.

KEYWORDS

diffusion of innovation / embedding / implementation / material practice / normalization process theory / routinization

Introduction

This is an article about how and why things become, or don't become, routine and normal components of everyday work. This is an important question not only for sociologists interested in the construction of the life-world, but for those interested in understanding how particular material practices are rendered as

doable in specific institutional settings. As we shall see, this is a relevant general problem in sociological research that focuses on social construction and organization. There is also a practical use for explanations of such phenomena in applied social research, in understanding how complex practices – for example, business processes or healthcare interventions – are made workable and integrated in context-dependent ways. A theoretical model that helps us to understand such processes would also be a valuable tool in planning and evaluating the implementation of policy and practice. Our aim is therefore to sketch out the dimensions of a middle range theory of Normalization Processes that provides an explanatory framework for investigating the routine embedding of material practices in their social contexts.

The article takes the following form. First, we discuss some existing ways of theorizing the implementation, integration, and institutionalization of material practices. Then we introduce Normalization Process Theory (henceforth NPT), which helps us to understand how practices are embedded and integrated into their social contexts. We then explore the question of the use of the theory to investigate and anticipate the outcome of processes of implementation and integration.

Institutionalization and Normalization

Institutionalization – the routinization of practices of different kinds in everyday social life – was big news in sociology during the 1950s and 1960s. It is to be found in functionalist (Merton, 1957; Parsons, 1951), interactionist (Blumer, 1969; Goffman, 1974), and broadly phenomenological (Berger and Luckmann, 1966) sociologies. After the 1970s, and in the face of the assault on functionalism and the rise of post-structuralist and post-modern social theory, very concrete analytic concepts like institutionalization declined in theoretical significance and were overtaken by notions of the constructedness of social life and relativist notions of ‘reality’ itself (Rosenau, 1992).

While its analytic importance in general sociology has faded, the notion of institutionalization runs through ‘social influence’ theories of organizational innovation and change. In Rogers’ Diffusion of Innovations theory (Rogers, 1995; Wejnert, 2002) it represents the final stage in a process of diffusion and adoption, and research in this field has focused on the process of adopting and championing innovations. In particular, it focuses on the ‘early adopters’ and ‘product champions’ who act entrepreneurially to engage with the ‘new’ (Strang and Meyer, 1993). It has taken the form not simply of a theory that explains technological change – mainly in retrospect, since prospective studies are few and far between, a fact regretfully noted by Everett Rogers (2004) towards the end of his life – but also as a normative perspective that defines what needs to be done to engender organizational change, and which informs the perspectives of policy-makers (Greenhalgh et al., 2004).

At the same time, a concept analogous to institutionalization runs through the very broad and more recent literature informed by 'social shaping' theories. Once again, studies from these perspectives are almost never prospective. Whether we are concerned with the positions and practices formed around thought collectives (Fleck, 1979[1935]), the production of subjects and the constitution of objects evinced in the writings of Michel Foucault (Gutting, 1989), or, most recently, with Actor-Network Theory and the field of Science and Technology Studies (STS) (Latour, 2005) and the social history of technology (Fox, 1996), the notion that things become constructed and are stabilized is crucial. Researchers in the STS tradition have offered both innumerable case studies and, in Donald MacKenzie's *Inventing Accuracy* (1993) and *Mechanizing Proof* (2001), two of the most impressive theoretically informed empirical studies in any sociological tradition.

Institutionalization and stabilization are homomorphs, but in practice they each mean something rather different. Institutionalization – at least for Parsons – refers to the point where some practice has become generally habitualized, as the product of socialization processes. Stabilization, on the other hand, seems to refer to a moment of equilibrium in the relationships that flow through an Actor-Network. Both raise a problem for students of 'implementation' processes – *how are they brought about?* This matters very much in the analysis and evaluation of implementation processes in research on policy, organizations, and professional knowledge and practice. For example, in structured evaluations of new technologies in health care, the problem of implementation refers not only to embedding a new treatment modality or other technology into service delivery, but also to embedding the techniques and technologies required for its evaluation (Finch et al., 2003). The notion of 'implementation' is politically loaded, and Henriette Langstrup (2008) has observed that it is often employed in ways that assume the 'organizational setting and its actors as pre-givens, thus making the critical task the creation of a "fit" between technology and organization' (p. 118). Across the wider literature, such problems are often understood in terms of the management of behaviours:

Implementation involves all activities that occur between making an adoption commitment and the time that an innovation either becomes part of the organizational routine, ceases to be new, or is abandoned (...) [and the] behavior of organizational members over time evolves from avoidance or non-use, through unenthusiastic or compliant use, to skilled or consistent use. (Linton, 2002: 65)

As Linton sets the problem out, implementation is about innovation, especially technological innovation. It need not be. Implementation may be conservative and focus on standardization and regulation of practices according to specific criteria of adequacy, focusing on holding them in place; for example, the problem of implementing 'evidence-based' best practice so important in recent professional change in medicine and health care. In the sense that it is used in the management literature, 'implementation' is a highly purposive and directed set of activities, but how practices become routinely embedded and integrated into their social contexts – how they become *normalized*, or not – needs to be understood as a matter of more than external direction.

Individual Action

Focusing on collective action is not unproblematic. After all, a number of strong arguments have been advanced for believing that individuals' intentions and purposes should form the basic unit of analysis in sociology and that sociological analysis should rest on methodological individualism. These arguments draw on two different traditions, one which shifts sociology towards a psychological perspective on volition (Homans, 1951; Simon, 1957), and one that draws on behavioural economics (Becker, 1976) and sociological rational choice theory (Coleman, 1990; Goldthorpe, 1998). These theoretical perspectives have tended to focus on theoretical ideal-typical actors rather than real ones (Hechter and Kanazawa, 1997), and population level phenomena (Hedström and Swedberg, 1996) rather than on context-dependent social processes.

In contrast, psychological theories of intention, and, in particular, the Theory of Planned Behaviour (Ajzen, 1991; Ajzen and Fishbein, 1980), are intended to explain the relation between intention and action in particular contexts and in relation to specific practices. Meta-analyses have suggested that these theories can explain up to 25 per cent of variance in outcomes, in prospective studies of behaviour change (Gollwitzer and Sheeran, 2006; Webb and Sheeran, 2006). However, these theories have been criticized by some psychologists for relying on analyses of correlation, rather than causes (Noar and Zimmerman, 2005; Weinstein, 2007), and for assuming too much about the instrumental relation between attitude and intention (Ogden, 2003).

Although it is undoubtedly the case that actors do have preferences and intentions that they seek to express, there are always social factors that promote or constrain particular expressions of agency. These do not automatically rest on individual cognition and volition and include extant vocabularies and repertoires of interaction, normative frameworks and belief systems, symbolic and material resources, power relations and legitimating authority – the key properties of collective action in social networks. Individual intention and preferences are thus necessary, but not sufficient, explanations for collective action.

We argue that sociological problems of accounting for 'institutionalization' and 'stabilization' and the policy problem of accounting for 'implementation' all revolve around the ways in which these involve participants in *work* that has contingent outcomes. NPT helps us to explore the social production and organization of this work, to understand these contingencies, and to consider their effects. It begins with the question, *what is the work?*

Normalization Process Theory

Normalization Process Theory is concerned with the social organization of the *work* (implementation), of making practices routine elements of everyday life (embedding), and of sustaining embedded practices in their social contexts (integration).

Focusing on factors that promote or inhibit routine embedding, the first iteration of the Normalization Process Model (May, 2006b; May et al., 2007) sought to explain the operationalization of complex interventions in health care settings. It was derived from secondary analyses of multiple qualitative studies in health care settings, and both these studies and the method by which it was formulated have been described in detail elsewhere (May, 2006b; May et al., 2007). Empirical application of the model to experimental (Wilkes, 2007), qualitative (Gask et al., 2008; Mair et al., 2008), and review (Elwyn et al., 2008) data showed that the model had utility in explaining factors that promoted and inhibited collective action in operationalizing practices.

In its first iteration, the model was limited in scope and did not explain how complex interventions were formed in ways that held together, how actors were enrolled into them, or how they were appraised. In this article, we seek to fill this gap, and extend the explanatory model to a middle range theory. This means that we are no longer specifically concerned with complex interventions in health care, but now focus on general processes by which material practices come to be embedded in their social contexts. In what follows, we therefore outline the key components of the theory by exploring new domains of coherence, cognitive participation, and reflexive monitoring. The relationship between these core concepts is mapped out in Figure 1, (with reference to the conditions that pertain to collective action); all of the theory's components are summarized in Table 1; and their application is sketched out in Table 2. As we do this, we use as exemplars ethnographic and other studies of the development, implementation, and evaluation of a teledermatology service that sought to replace in-person diagnoses of skin conditions with remote diagnosis using digital images. We describe in detail elsewhere the methods by which the theory was built (May and Finch, forthcoming).

Definitions

There is a good deal of debate in the social sciences about what 'theory' is, and what it might be good for (Hechter and Horne, 2003; Manicas, 1988). Our starting point is that a theory is a coherent conceptual arrangement that, when it is operationalized, makes possible a rational description and taxonomy of phenomena and constructs by which their systematic explanation is possible. From these stem a set of knowledge claims that, in turn, offer the potential for hypotheses or propositions that might be open to further investigation. As we discuss later, these lead to questions about the prediction of outcomes or results of social processes.

The theory rests on apprehending the work that people do, and by work we mean purposive social action that involves the investment of personal and group resources to achieve goals. When we refer to a 'practice', we are specifically concerned with material practices: that is, the things that people do to perform certain acts and meet specific goals. Further, we are concerned with material practices that are produced, reproduced, and transformed, in relatively

formal settings – within an institutional or organizational framework – which are consciously composed and purposively directed. Following others in this field, we refer to such purposive direction as implementation although we recognize that this is a politically loaded term. This work takes place in what we call interaction chains, socially patterned points in time and space which are connected by the flow of social processes.

By normalization, we mean the work that actors do as they engage with some ensemble of activities (that may include new or changed ways of thinking, acting, and organizing) and by which means it becomes routinely embedded in the matrices of already existing, socially patterned, knowledge and practices. For these reasons, the scope of the theory includes only the products of deliberate social action in formal organizational settings, and excludes the products of ‘evolutionary’ or ‘traditional’ historical processes of habituation or of the informal practices that produce cultural forms and fashions (Camic, 1986). Within the frame of the theory, human action is not assumed to be reducible to individual factors or to the emergent patterns of corporate direction, and it is further assumed that the contribution of both individuals and groups to the processes that lead to implementation, embedding, and integration are interdependent.

Summary Statement of the Theory

NPT provides a set of sociological tools to understand and explain the social processes that frame the implementation of material practices. The theory proposes that:

- a) Material practices become routinely embedded in social contexts as the result of people working, individually and collectively, to implement them.

Implementation processes are therefore organized and organizing expressions of human agency that involve patterns of dynamic and contingent interactions within a specific context, over time. A general and symbolic map of this process is given at Figure 1. So, to understand the embedding of a practice we must look at what people actually *do* and how they *work*. In this context, the theory proposes that:

- b) The work of implementation is operationalized through four generative mechanisms (*coherence; cognitive participation; collective action; reflexive monitoring*).

These are affected by factors that promote or inhibit the routine embedding, or normalization, of a practice in its social contexts – the immediate and organizing components outlined in Table 1. The embedding of a practice is thus dependent on organized and organizing agency, and the theory therefore proposes that:

- c) The production and reproduction of a material practice requires continuous investment by agents in ensembles of action that carry forward in time and space.

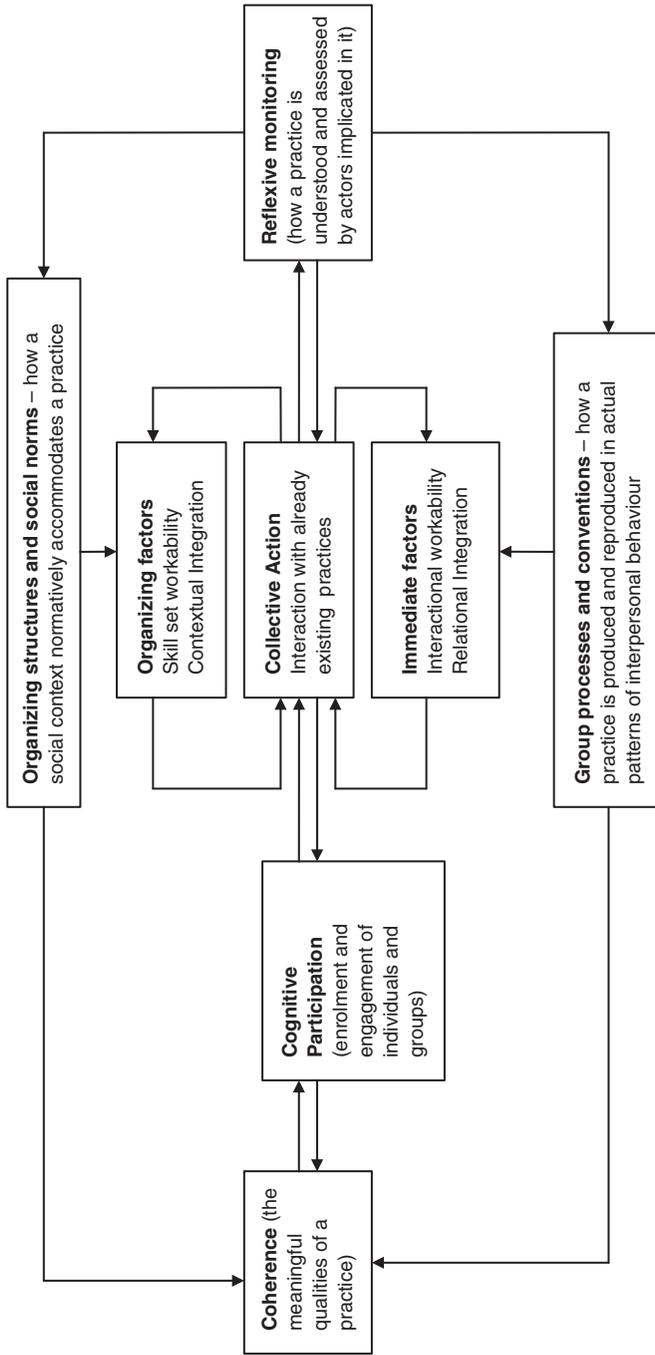


Figure 1 Model of the components of normalization process theory

This continued investment sustains the integration of a practice in its social contexts, outlined in Table 2. Through all of this, actors' investments and the work that flows from these are themselves affected by the play of power and by changing social contexts (Clegg, 2002). These processes are dynamic and contingent, activities in all four domains may occur concurrently, and their production and reproduction over time is emergent. Figure 1 is therefore a map of the relations between the core concepts of the theory rather than an empirical map of normalization processes, and relations between these core concepts are not linear. Even so, they focus our attention down on *how the work gets done* – the everyday business of getting on with the job in hand.

Components of the Theory

Coherence

The starting point for our account of NPT is the notion of coherence. This draws into view work that defines and organizes the objects of a material practice. We begin with the proposition that:

Embedding is dependent on work that defines and organizes a practice as a cognitive and behavioural ensemble. (1.1)

Coherence means that a practice – an ensemble of beliefs, behaviours, and acts that manipulate or organize objects and others – is made possible by a set of ideas about its meaning, uses, and utility; and by socially defined and organized competencies. These meanings and competencies hold the practice together, and make it possible to share and enact it. This leads to a second proposition that:

Embedding work is shaped by factors that promote or inhibit actors' apprehension of a practice as meaningful. (1.2)

It stands to reason that a practice is defined by its differences from other practices, but the nature of this differentiation is often in doubt. One of us (Finch, 2008) has explored the coherence of attempts to replace the in-person diagnosis of skin disease in clinics with remote diagnosis using digital images. In this case *differentiation* was conceived of by practitioners as that of the image. Conceptualization of the image was the result of a process of *communal specification* in which the practice of remote diagnosis was rendered in terms that were understandable to, and shared by, the people who work with it in relation to its distinctive features and perceived suitability for the task in hand. They attributed an identity to the practice (teledermatology), as a thing that held together well enough that it could be operationalized. In this sense, users established its coherence by defining the components of a practice, and its differences from other – already established – practices. But as they explored their contributions to remote diagnosis they found that these were not consistent with those previously communally specified. In fact, they found that they lost knowledge of the patient

gained through other diagnostic practices of face-to-face interaction. This lack of fit between the work of communal and *individual specification* revealed the ways that remote diagnosis failed to cohere with other clinical work. The practices of diagnosis are more than a set of acts that are externally defined and normatively constrained. They have a *meaning* that is learned, shared, and experienced by actors in specific social contexts, as they work the practice through. This meaning is *internalized* and contributes to embedding by anchoring the practice in the lived experiences of individuals. This leads to a further proposition that:

The production and reproduction of coherence in a practice requires that actors collectively invest meaning in it. (1.3)

Cognitive participation

Within the purposive interaction chains that make up an implementation process, a practice is framed through cognitive participation, the symbolic and real enrolments and engagements of human actors that position them for the interactional and material work of collective action. From this stems the proposition that:

Embedding is dependent on work that defines and organizes the actors implicated in a practice. (2.1)

Here, work that defines and organizes human engagement with a material practice runs through long interaction chains. Such chains can involve highly focused work (in enacting a routine laboratory experiment, for example), or more diffuse patterns of activity (in operationalizing a policy decision in a large organization). Such chains are organized through socially patterned cognitive participation, and this leads to the proposition that:

Embedding work is shaped by factors that promote or inhibit actors' participation. (2.2)

Staying with teledermatology as an example, we can see that actors initiate a practice. That is, they possessed powers of invention and agency and were both able and prepared to exercise them. *Initiation* involves work that brings a practice forth. It requires that actors are enrolled across social and socio-technical networks. Having defined a mode of teledermatology that seemed to suit their circumstances, its clinical proponents then sought to enrol others into the new system of practice (May et al., 2004). *Enrolment* involves actors working together and organizing themselves to participate in a new practice. In this case, enrolment was sometimes mandatory (since not all participants – especially nurses – possessed powers of negotiation or resistance) but sometimes highly negotiable, as high status and autonomous consultant dermatologists worked through the possible implications of remote diagnosis for their clinical practice.

Enrolment involves work that brings about and organizes a community of practice. *Legitimation*, on the other hand, requires the work of interpreting and 'buying in' to that practice in relation to institutionally shared beliefs about the

propriety and value of knowledge and other existing practices. In this case, legitimation was secured by proponents of the teledermatology service by appeals to the technological ambitions of some participants (who wanted to be 'first' to demonstrate the utility of the system), and to the moral ambitions of others (who wanted better and more rapid access to specialist services for patients). Legitimation is essential for a practice to be generally activated in contexts where actors work together to decide the procedures by which it is to be enacted, and how engagement with it is defined. This decision-making work leads to the *activation* of a practice, bringing forth the materials and means by which – in this case, teledermatology – could be effectively operationalized in a clinical setting.

The question of cognitive participation is therefore closely bound to the norms (Therborn, 2003) and conventions (Biggart and Beamish, 2003) that circulate within the social matrices in which actors find themselves working out a material practice. This leads to a further proposition, that:

The production and reproduction of a practice requires that actors collectively invest commitment in it. (2.3)

Collective action

The chains of interactions in which we can trace the cognitive participation of actors are, in NPT, understood to be the site of mental and material *work* that is about organizing and enacting a practice. From this stems the proposition that:

Embedding is dependent on work that defines and operationalizes a practice. (3.1)

This work may be to reshape behaviours or actions, to employ objects or artefacts, or it may be to reorganize relationships and contexts – but it involves collective purposive action aimed at some goal. Goal-orientation, in this context, may include resistance, subversion or reinvention, as well as affirmation and compliance, but it always involves some investment of effort around the practice in play. This leads to a further proposition.

Embedding work is shaped by factors that promote or inhibit actors' enacting it. (3.2)

The work of enacting a practice is located in the operant conditions of encounters between actors, and the conditions that organize these. In these immediate conditions, two important qualities of a practice can be observed to come into play. First, the *interactional workability* of a practice refers to how actors operationalize it. In the teledermatology service we use as an exemplar how the focus of professional–patient interaction shifted from the lesion to the digital image and the computer-driven protocol that governed its use (Mort et al., 2003). A material practice will affect cooperative interactions over work, and the normal pattern of outcomes of this work.

Second, relational integration refers to the way that a practice is mediated and understood within the networks of people around it. A material practice will also affect not only the knowledge required by its users, but also the ways that they understand the actions of people around them. Trust relations

between dermatologists, nurses, and patients using the teledermatology service were maintained, yet doctors' confidence in the practice of remote diagnosis declined as they struggled to make sense of the digital images that were transmitted to them. This loss of confidence increased over time, as they took a progressively more evidential approach to diagnostic decisions (Mort et al., 2003).

In organizing conditions, two further qualities are important. First, *skill-set workability* describes the distribution and conduct of work that distributes a practice in a division of labour. A material practice will affect the ways that work is allocated, and the ways skills are defined. Teledermatology was appropriate to the skills of nurses administering it, and they felt it enhanced these. It led to specialist nurses operationalizing high level clinical knowledge that overlapped with, but was accepted by, medical specialists (May et al., 2004), even though this threatened the strict demarcation of diagnostic boundaries between medicine and nursing. Second, *contextual integration* refers to the incorporation of a practice within a social context. A material practice will also affect the mechanisms that link work to existing structures and procedures, and for realizing material and symbolic resources for them. Here the teledermatology service added complexity and workload to specialist services, it never achieved real integration with the existing set of practices that ran through the clinical encounter with patients with skin diseases, and it added complexity to the funding and organization of the clinics in which these practices were activated. The operation of the factors that frame collective action lead us to the proposition that:

The production and reproduction of a practice requires that actors collectively invest effort in it. (3.3)

Reflexive monitoring

Patterns of collective action and their outcomes are continuously evaluated, both formally and informally, by participants in implementation processes, and the formality and intensity of this monitoring work reflects the nature of their cognitive participation and collective action. From this stems the proposition that:

Embedding is dependent on work that defines and organizes the everyday understanding of a practice. (4.1)

Formal patterns of monitoring focus attention on normative elements of implementation. These frame how things *ought* to be, rather than the conventions that frame how things are worked out in practice. The shift from explicit to tacit appraisal by participants is an important signal of the routine embedding of a practice (Finch et al., 2007). This leads to a further proposition:

Embedding work is shaped by factors that promote or inhibit appraisal. (4.2)

Reflexive monitoring may involve judgements about the utility and effectiveness of a new practice, and these are made with reference to socially patterned and institutionally shared beliefs. *Systematization* is central to this process, and it refers to the methodological formality of these judgements and the

rationalities that underpin them. Keeping tele dermatology in mind, we can see that relatively informal modes of evaluation – characterized by participants as clinical experience – seem to be associated with embedding services (Finch et al., 2007), while highly formal and strictly defined modes of evaluation – such as randomized controlled trials – seem to be associated with real problems in integrating experiential knowledge and abstract information (May, 2006a).

Regular and organized procedures for monitoring and ongoing assessment of the process and impact of the new practice within an organizational context may involve highly structured and formal mechanisms of institutional knowledge production and interpretation – patterns of *communal appraisal*. Of course, communal appraisal co-exists with *individual appraisal* that relies on experiential and unsystematic practices of judging the value and outcomes of a practice, and from which stem individual commitments to its conduct and performance. More immediately, both communal and individual appraisal may lead to attempts at *reconfiguration* in which ideas about the use and utility of a practice are subverted, modified, or reconstructed. These play an important part in feeding back into notions of the coherence and meaningfulness of a practice. This leads us to a final proposition:

The production and reproduction of a practice requires that actors collectively invest in its understanding. (4.3)

The Status of Propositions in Normalization Process Theory

NPT is structured around a propositional scheme. Such schemes play an important part in the development of theory (Turner, 1987), and are especially important in considering the problem of mechanisms. In this context, a theory must do more than propose a link between a process and its effects (Hechter and Horne, 2003), but must also propose a mechanism by which these effects are produced (Hedström, 2005). We follow Bunge (2004) in understanding a mechanism to be a process that ‘brings about or prevents some change in a concrete system’ (2004: 193). In NPT, three kinds of proposition specify elements of a mechanism.

- 1 Propositions (e.g. 1.1 above) that define a mechanism (i.e. embedding is dependent on socially patterned implementation work).
- 2 Propositions (e.g. 3.2) that define components of the mechanism (i.e. factors that shape socially patterned implementation work).
- 3 Propositions (e.g. 4.3) that define actors’ investments in a mechanism (i.e. how the mechanism is energized).

Propositions beg empirical verification, but it is important to be clear that the purpose of those outlined here is also to give structure to theory and to provide analytical leverage. This scheme allows us to conceptualize the general

Table 1 Mechanisms, components and investments

| Components | Mechanisms | | | |
|--|--------------------------|--------------------------------|---------------------------|-----------------------------|
| | <i>Coherence</i> | <i>Cognitive Participation</i> | <i>Collective Action</i> | <i>Reflexive Monitoring</i> |
| Components (1) <i>Immediate work</i> | Differentiation | Initiation | Interactional Workability | Systematization |
| Components (2) <i>Organizing work</i> | Individual Specification | Legitimation | Relational Integration | Individual Appraisal |
| | Communal Specification | Enrolment | Contextual Integration | Communal Appraisal |
| Investments | Internalization | Activation | Skill Set Workability | Reconfiguration |
| | <i>Meaning</i> | <i>Commitment</i> | <i>Effort</i> | <i>Comprehension</i> |

structure of an implementation process, and it thus sensitizes us to a set of activities, mechanisms, and investments that are crucial to its outcomes. In Table 1 we set these mechanisms, components, and investments out in tabular form, but there is a caveat to this. Setting out the components of a theory in propositional and tabular form implies a degree of rigidity that is completely alien to the phenomena with which NPT is concerned. We emphasize that ‘implementation’ is a dynamic and fluid process. Moreover, the operation and importance of particular mechanisms and components will vary within and between particular empirical contexts. This raises the question of the application of Normalization Process Theory to understanding and forecasting the trajectory and outcomes of implementation processes. It is to these problems that we turn to next.

Prediction and Potential

Normalization processes are found everywhere that people work to implement specific practices and to integrate them in their social worlds. They are important sources of contextual change in organizational settings; for example, as ‘business processes’ in firms, or ‘complex interventions’ in health care organizations. These are also two areas where ‘implementation’ is seen to be highly important. The question is, can the outcomes of such processes be predicted?

Almost all social theories provide a point of departure for retrospective explanation of some social relationship or process. The goal of many theories, however, is to move beyond post-hoc explanations to predict outcomes. This really is a significant methodological and theoretical challenge, and one that many theories in the social sciences have been poor at meeting (Gorski, 2004). It is worth asking why this is so. One reason is the problem of accounting for causation, in the context of complex relations between elements of a social process

(Kern, 2004). All social processes are complex and emergent (Sawyer, 2005). They can be transformed by the proximity of, or interaction with, some other process or event. Implementation processes are no different. In real-world studies, predictions about outcomes are complicated by multiple confounders that include the sheer number of actors in a process, the weight of numbers and effects of confounding variables, and the intervention of chance as an *actor* in a social system under observation rather than a statistical problem that needs to be solved by an external observer. Crucially, these processes are also the foci of contests, and mechanisms of the theory map out sites of resistance and conflict. This means that predictions of the outcome of a complex and emergent process are a problem. After all, social processes transform as they are produced and reproduced.

Although implementation processes are complex and emergent, they are rarely arbitrary. In practice, emergence is often characterized by a relatively narrow range of possibilities that are held in place by normative frameworks (which include shared beliefs about action, rules about appropriate forms of behaviour, and so forth) and structural constraints (which include the permissive actions of others, the availability of social spaces for action, and material and symbolic resources). Normative and structural constraints thus have a powerful effect on implementation processes at work, and reflect actors' propensities to work within already normalized frames of knowledge and practice. So, although we make no claim of absolute predictive power for the theory, we do argue below that the trajectory of a practice can be anticipated within certain limits. Probabilistic assessments of the potential of a practice to embed and of the readiness of actors to accept it in a specific context ought to be possible. To assess potential, we need to consider the structure of NPT and the variables that it suggests. In doing so we must bear in mind that variable driven theoretical models in social science possess certain problems. In this context, we need to avoid the situation remarked by Hedström where:

Theoretical statements have become synonymous with hypotheses about the relationships between variables, and variables have replaced actors as the active subjects with causal powers. (2005: 105)

Drawing on the work of Coleman (1986), Hedström goes on to reject a model of theory building that relies on studies, 'where behaviour is explained by reference to whatever individual or environmental variables can be measured' (2005: 105). We also take this view. In this context, we emphasize that NPT expresses an empirically observable set of social processes that can be modelled. Even though such a forecast is subject to a range of unknowable contingencies, and emergence and complexity are significant constraints on predicting the outcomes of social processes, the theory's constructs may be used to construct a statistical model of a process and forecast its outcome in probabilistic terms. To assess the normalization *potential* of a practice, for example, requires that values can be reliably assigned to variables derived from the theory.

Whether we choose to use NPT as the foundation for hypothesis testing investigations that use quasi-experimental or other quantitative methods, or for analytic

Table 2 Framework for operationalizing normalization process theory

| | <i>Coherence</i> <i>What is the work?</i> | <i>Cognitive</i> <i>Participation</i> <i>Who does the work?</i> | <i>Collective</i> <i>Action</i> <i>How does the work get done?</i> | <i>Reflexive</i> <i>Monitoring</i> <i>How is the work understood?</i> |
|--|---|--|---|---|
| Systematic explanation of mechanisms and components at work | Factors that promote or inhibit the mobilization of a practice | Factors that promote or inhibit participation in a practice | Factors that promote or inhibit enacting a practice | Factors that promote or inhibit the appraisal of a practice |
| Knowledge about the sources and operation of investments at work | Beliefs and behaviours that define and organize objects | Beliefs and behaviours that define and organize actors | Beliefs and behaviours that define and organize work | Beliefs and behaviours that define and organize understanding |
| Investigation of core questions that could include... | <i>How is a practice conceptualized by participants?</i> <i>How does it hold together in action?</i> | <i>How do participants come to engage with a practice? How do they decide on engagement and the purposes that it serves?</i> | <i>How do participants enact a practice?</i> <i>How are their activities structured and constrained?</i> | <i>How do participants appraise a practice? What are its effects of appraisal? How are they mediated?</i> |

investigations using ethnographic or other qualitative methods, operationalizing the theory requires that its abstract core constructs (set out in Figure 1 and Table 1) are translated into a working model with real-world correlates. These form a basis for the conceptual work of describing, explaining, making, and testing claims about observed phenomena. In Table 2 we set these elements out in a simple summary table, always beginning with the question, *what is the work?*

Conclusion

Normalization Process Theory provides a robust and replicable ecological framework for analysing the dynamic collective work and relationships involved in the implementation and social shaping of practices. It is a theory for empirical application rather than abstract critique. It focuses attention on organized and organizing agency in the production and reproduction of the implementation, embedding (or not), and continuing integration of material practices.

There is a hierarchy of scope in sociological theory, and throughout this article we have been clear that NPT is an example of what Merton (1957) called a 'middle range' theory, which addresses a discrete sociological question – how

are material practices implemented and routinely embedded in everyday life – through analysis and explanation of a specific set of concrete behaviours and relations. Boudon (1991) has argued that such theories are not simply powerful in their own right, but that they are also ‘efficient’ because they can ‘federate’ and consolidate empirical and theoretical observations across disciplines.

If there is a hierarchy of scope in sociological theories, there is also the problem of the role of theories themselves. NPT is intended to explicate the conditions of social action in a specific, and limited, arena. It holds out the hope of prospectively assessing the potential of practices to normalize by reference to a set of constructs that define *the work* that actors do in such circumstances, and thus also provides a sociological framework for comparative implementation studies. The theory is formal, in that it proposes a set of generative statements that may be expressed as an abstract model, and that lead to hypotheses about specific relationships between its elements. The theory is verifiable because these hypotheses are amenable to experimental investigation and concurrent qualitative inquiry. Beyond this, the theory provides a sociological basis for explanatory and comparative studies of the *work* of social construction, by reference to a set of mechanisms that permit the dynamic, creative, and complex *work* evident in the ‘normalization’ of what often seem to be very simple things.

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