Can we measure health care implementation processes using Normalization Process Theory (NPT)?

Development of the NoMAD survey tool

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University of Nottingham April 20th 2016

CHILL: Centre for Health Innovation, Leadership & Learning

Grant: RES-062-23-3274
Welcome & Introduction

**Tracy Finch** – Senior Lecturer in Psychology of Healthcare

**NoMAD team:** Melissa Girling, Tim Rapley

**NPT co-developers:** Carl May (lead) – Professor of Healthcare Innovation, University of Southampton

Tim Rapley, Frances Mair, Elizabeth Murray, Shaun Treweek, Luciana Ballini, Anne MacFarlane, Kate O’Donnell, Pauline Ong, Cathy Pope, Anne Rogers, and many more......
Acknowledgements

The NoMAD team:
Tracy Finch, Tim Rapley, Melissa Girling, Carl May, Frances Mair, Elizabeth Murray, Shaun Treweek, Elaine McColl, Nick Steen, Claire Dickinson

Collaborators for site participation:
Nicola Mackintosh, Claire Scally, Jane Banks, Gaery Barbery, Samridh Sharma, Christopher Vernazza, Jimmy Steele, Aileen Macvinish, Hilary Hall & Janice McNichol

Cognitive interview participants
Expert review team

Funders: The UK Economic and Social Research Council has funded both the NoMAD study ‘Improving the normalization of complex interventions’ (RES-062-23-3274) and the original NPT Toolkit and website development 'Normalizing New Health Technologies: Building a Web-Enabled Toolkit for Implementation Practitioners' (RES-189-25-0003).
Implementation research is the **scientific study of methods** to promote the systematic **uptake of proven clinical treatments, practices, organisational, and management interventions into routine practice**, and hence to improve health. In this context, it includes the study of influences on **patient, healthcare professional, and organisational behaviour** in either healthcare or population settings.

(**BMC Implementation Science website ‘Aims & Scope’**)
Why is implementation so difficult?

Complex interventions: “Conventionally defined as interventions with several interacting components, they present a number of special problems for evaluators, in addition to the practical and methodological difficulties that any successful evaluation must overcome. Many of the extra problems relate to the difficulty of standardising the design and delivery of the interventions, their sensitivity to features of the local context, the organisational and logistical difficulty of applying experimental methods to service or policy change, and the length and complexity of the causal chains linking intervention with outcome.”

From www.mrc.ac.uk/complexinterventionsguidance
Why is understanding implementation important?

• Getting evidence of new therapies/interventions into wider practice is necessary for patient outcomes and health system improvement – but this is still problematic

• Clinical and applied health research can tell us if a new intervention is safe, beneficial, or more effective than a comparator – but not whether it can be implemented in a routine practice setting

• When results of clinical studies (eg RCTs) are inconclusive – are negative effects because of the treatment intervention being ineffective (not ‘efficacious’) or because it was too difficult to implement?

• Implementation science has seen the proliferation of theories, frameworks and tools to help with these problems, although not always easy to understand or to use for own purposes.
Normalization Process Theory: NPT

BMC Health Services Research

A rational model for assessing and evaluating complex interventions in health care
Carl May*

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

Carl May
Newcastle University

Tracy Finch
Newcastle University
How does NPT sit within Implementation Science (v1)?

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process models</td>
<td>Specify steps (stages, phases) in the process of translating research into practice, including the implementation and use of research. The aim of process models is to describe and/or guide the process of translating research into practice. An action model is a type of process model that provides practical guidance in the planning and execution of implementation endeavours and/or implementation strategies to facilitate implementation. Note that the terms “model” and “framework” are both used, but the former appears to be the most common.</td>
<td>Model by Huberman [40], model by Landry et al. [41], model by Davies et al. [43], model by Majdadeh et al. [44], the CIHR Model of Knowledge Translation [42], the K2A Framework [15], the Stetler Model [47], the ACE Star Model of Knowledge Transformation [48], the Knowledge-to-Action Model [13], the Iowa Model [49,50], the Ottawa Model [51,52], model by Grol and Wensing [53], model by Pronovost et al. [54], the Quality Implementation Framework [27]</td>
</tr>
<tr>
<td>Determinant frameworks</td>
<td>Specify types (also known as classes or domains) of determinants and individual determinants, which act as barriers and enablers (independent variables) that influence implementation outcomes (dependent variables). Some frameworks also specify relationships between some types of determinants. The overarching aim is to understand and/or explain influences on implementation outcomes, e.g. predicting outcomes or interpreting outcomes retrospectively.</td>
<td>PARIHS [5,64], Active Implementation Frameworks [63,68], Understanding-User-Context Framework [62], Conceptual Model [17], framework by Grol et al. [22], framework by Cochrane et al. [59], framework by Nutley et al. [21], Ecological Framework by Durlak and DuPre [57], CFIR [60], framework by Gurses et al. [58], framework by Ferlie and Shortell [61], Theoretical Domains Framework [66]</td>
</tr>
<tr>
<td>Classic theories</td>
<td>Theories that originate from fields external to implementation science, e.g. psychology, sociology and organizational theory, which can be applied to provide understanding and/or explanation of aspects of implementation</td>
<td>Theory of Diffusion [107], social cognitive theories, theories concerning cognitive processes and decision making, social networks theories, social capital theories, communities of practice, professional theories, organizational theories</td>
</tr>
<tr>
<td>Implementation theories</td>
<td>Theories that have been developed by implementation researchers (from scratch or by adapting existing theories and concepts) to provide understanding and/or explanation of aspects of implementation.</td>
<td>Implementation Climate [116], Absorptive Capacity [117], Organizational Readiness [118], COM-B [119], Normalization Process Theory [120]</td>
</tr>
<tr>
<td>Evaluation frameworks</td>
<td>Specify aspects of implementation that could be evaluated to determine implementation success.</td>
<td>RE-AIM [124], PRECEDE-PROCEED [125]; framework by Proctor et al. [126]</td>
</tr>
</tbody>
</table>
What is NPT?

Theory of how new technologies and practices become ‘normalised’

Focuses on how implementing a new intervention or practice involves people working together

Considers:

• **Practices** and **perceptions** of different groups of people involved in implementing a new intervention

• The **context** where it is being implemented

• The **intervention/practice** itself

What is NPT?
A way of thinking about implementation problems that focuses on:

- How interventions can become part of everyday practice
- How different groups of people need to work together to achieve it

How do I use it?
Thinking of your intervention, use the four sets of questions on the right to identify possible barriers to successful implementation, and suggest solutions to improve the process.

<table>
<thead>
<tr>
<th>Coherence</th>
<th>Cognitive Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do people make sense of the intervention as something 'new'? (eg. what it involves, why?)</td>
<td>How do people get involved and stay committed? Can they see how they contribute?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Collective Action</th>
<th>Reflexive Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>How do people make it work in practice?</td>
<td>How do people assess whether it is worth the effort? Can improvements be made?</td>
</tr>
<tr>
<td>What do they need to make it happen?</td>
<td></td>
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<tr>
<td></td>
<td>Specialist Derm. Nurses</td>
</tr>
<tr>
<td>---------------------</td>
<td>-------------------------</td>
</tr>
<tr>
<td><strong>Coherence</strong></td>
<td>‘Yes’ as skill development; ‘No’ as autonomy limited</td>
</tr>
<tr>
<td></td>
<td>‘No’ as didn’t seem to save patients travelling</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cognitive</strong></td>
<td>Engaged. Close partnership with consultant.</td>
</tr>
<tr>
<td><strong>Participation</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Collective</strong></td>
<td>Logistical problems re primary care placements</td>
</tr>
<tr>
<td><strong>Action</strong></td>
<td>Constrained by electronic proforma</td>
</tr>
<tr>
<td></td>
<td>Data transfer did not happen</td>
</tr>
<tr>
<td><strong>Reflexive</strong></td>
<td>Some access to data, but felt lack of worth effort</td>
</tr>
<tr>
<td><strong>Monitoring</strong></td>
<td></td>
</tr>
</tbody>
</table>

Or more simply…

‘It’s all about the ‘work’’:

What is it? (Coherence)
Who does it? (Cognitive Participation)
How does it get done? (Collective Action)
Why did it happen like that? (Reflexive Monitoring)

Model of the components of normalization process theory

- **Coherence (the meaningful qualities of a practice)**
- **Cognitive Participation** (enrolment and engagement of individuals and groups)
- **Organizing structures and social norms** – how a social context normatively accommodates a practice
  - Organizing factors
    - Skill set workability
    - Contextual Integration
  - Collective Action
    - Interaction with already existing practices
    - Immediate factors
      - Interactional workability
      - Relational Integration
- **Reflexive monitoring** (how a practice is understood and assessed by actors implicated in it)

**Figure 1** Model of the components of normalization process theory
How does NPT sit within Implementation Science (v2)?

Figure 1: How higher level and middle-range theories are assembled to support the proposed General Theory.

May C: Towards a general theory of implementation. Implement Sci 2013, 8:18.
What is NPT useful for?

- A conceptual tool to think through issues of implementation while designing a complex intervention and its evaluation.
- Growing body of studies that have used NPT in diverse contexts – e.g., McEvoy et al: Qualitative review of 29 studies that used NPT, between 2006 & 2012; Review in progress includes 70+ papers up until Dec 2015.
NPT: Key points

• NPT is *not* about individual’s intentions and perceptions, it is focused on collective, distributed, patterns of work

• NPT will encourage you to focus on the *range of people, situations, times and places* that are involved in implementation

• The context is all important, and NPT needs to be adapted/translated to the context of use
Applying NPT

Two ways of thinking about this:

1. What is the **objective** you want to achieve?
   - Designing an intervention?
   - Planning Implementation?
   - Evaluating an intervention?

2. If evaluation, what **methodological approach** is most useful?
   - *i.e.* qualitative; survey; trials; systematic reviews...
Current work applying NPT

Planning/ Developing Interventions
- STRIDE – CBT for Fear of Falling (Finch et al 2014 BMC HSR)
- 16 item toolkit on NPT website

Evaluating implementation factors
- Normalization Measure Development (NoMAD) for Complex Interventions
- Diagnosis & Management of Lewy-body Dementia (Diamond-Lewy, John O’Brien)
- Robotic rehabilitation for upper limb in stroke (RATULS) (Helen Rodgers et al)
- Electronic alerts for Acute Kidney Injury – Suren Kanagasundaram et al
- STRIDE – CBT for Fear of Falling (HTA report in press, Parry, S. et al)

Implementation strategy
- Diagnosis & Management of Lewy-body Dementia (Diamond-Lewy) – Claire Bamford/ John O’Brien PI
- New proposals in progress
Normalisation process theory: a framework for developing, evaluating and implementing complex interventions

Elizabeth Murray¹, Shaun Treweek², Catherine Pope³, Anne MacFarlane⁴, Luciana Ballini⁵, Christopher Dowrick⁶, Tracy Finch⁷, Anne Kennedy⁸, Frances Mair⁹, Catherine O’Donnell¹⁰, Bie Nio Ong¹⁰, Tim Rapley⁷, Anne Rogers⁸, Carl May¹¹

Abstract: The past decade has seen considerable interest in the development and evaluation of complex interventions to improve health. Such interventions can only have a significant impact on health and health care if they are shown to be effective when tested, are capable of being widely implemented and can be normalised into routine practice. To date, there is still a problematic gap between research and implementation. The Normalisation Process Theory (NPT) addresses the factors needed for successful implementation and integration of interventions into routine work (normalisation).

Discussion: In this paper, we suggest that the NPT can act as a sensitising tool, enabling researchers to think through issues of implementation while designing a complex intervention and its evaluation. The need to ensure trial procedures that are feasible and compatible with clinical practice is not limited to trials of complex
AIM: To operationalize the constructs of the NPT and create a simple generic instrument that can be used to enhance the implementation of complex interventions.

- To extend the NPT toolkit work to develop a set of NPT based measures (instrument).
- To explore the utility of the instrument in different contexts.
- To assess the psychometric properties of NPT instrument.
- To provide guidance on using the instrument in www.normalizationprocess.org.
Improving the normalization of complex interventions: measure development based on normalization process theory (NoMAD): study protocol

Tracy L Finch1*, Tim Rapley1, Melissa Girling1, Frances S Mair2, Elizabeth Murray3, Shaun Treweek4, Elaine McColl1, Ian Nicholas Steen1 and Carl R May5

Abstract

Background: Understanding implementation processes is key to ensuring that complex interventions in healthcare are taken up in practice and thus maximize intended benefits for service provision and (ultimately) care to patients. Normalization Process Theory (NPT) provides a framework for understanding how a new intervention becomes part of normal practice. This study aims to develop and validate simple generic tools derived from NPT, to be used to improve the implementation of complex healthcare interventions.
Measuring ‘implementation’

- Consensus about how to define ‘implementation success’ is lacking

- Overview of ‘instrumentation issues’ in Implementation Science (Martinez et al, 2014). **Need for:**
  - Increased use of frameworks, theories and models
  - Determination of psychometric properties
  - Careful development of ‘home grown’ instruments
  - Appropriate choice of methods
  - Keeping instruments practical to use
  - Decision-making tools to guide instrument choice

What should we measure?

Implementation Climate, not ‘organisational readiness’:

“...the construct of implementation climate is perhaps the most useful for studying complex interventions in health and human service delivery. By complex, we mean innovations that require collective, coordinated behavior change by many organizational members in order to successfully implement them and realize some or all of the anticipated benefits of innovation use.” (p9)

NPT Tool Development Projects

**TARS: Technology Adoption Readiness Scale**  
NIHR SDO (2006-9)

**Focus:** Ehealth implementation tool  
**Users:** Evaluators  
**Methods:** workshops, expert survey, NHS staff surveys (2 sites, n=46; n=231)  
**Items:** 30

**NPT Web-enabled toolkit**  
ESRC (2006-10)

**Focus:** Simple NPT tool to think through implementation  
**Users:** Research, clinical, managerial  
**Methods:** workshops, expert appraisal (qualitative), web design  
**Items:** 16

**NoMAD**  
ESRC (2012-15)

**Focus:** Validated assessment tool for implementation  
**Users:** Research, clinical, managerial  
**Methods:** workshops, item appraisal, cognitive interviews, expert critique, NHS staff surveys  
**Items:** 23
NoMAD Study Methods

- Literature review
- Protocol development
- Ethical approval
- Conceptual framework development
- Item mapping
- Initial item development
- Full team feedback
- Item appraisal
- Co-applicant workshop

**Instrument Version 1**

- R1 Cognitive Interviews (n=18)
- Instrument Version 2
- **Item revisions**
- Instrument Version 3
- Co-applicant workshop
- **R2 & R3 Cognitive Interviews (n=9; n=3)**
- Online Expert survey (n=23)
- **Co-applicant workshop**
- Tested in 6 implementation sites (n = 831)
## Item development: example

Original items broadened to include different elements of ‘understanding’ ...

<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Construct (Original)</th>
<th>Version 1 items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coherence is the sense-making work that people do individually and collectively when they are faced with the problem of operationalizing some sets of practices.</td>
<td>Differentiation</td>
<td>V1</td>
</tr>
<tr>
<td>[Participants] can tell the difference between the [intervention] and other [work/interventions]</td>
<td>(1) I can distinguish the [intervention] from current ways of working&lt;br&gt;(2) I can appreciate how the [intervention] differs from current ways of working&lt;br&gt;(3) The [intervention] is easy to describe</td>
<td></td>
</tr>
</tbody>
</table>
Challenges of item translation

**Wording/ Ambiguity**
The participant queries wording within the item, e.g. unsure of meaning

**Timing relevance**
The participant does not consider the item ‘relevant’ to the timing of the intervention

**Multiple Interpretations**
The participant offers a response from their own perspective as well as that of others involved in the intervention, in a single response

**Who?**
The participant has trouble with ‘who’ the item is relating to e.g. themself, or others (and who the ‘others’ may be)

**Role relevance**
The participant does not consider the item ‘relevant’ to their role in the intervention
Q. I carry out the tasks that are expected of me

“Well that’s too vague, don’t know what it’s talking about erm [pause] as the developer and evaluator I carry out the tasks that are required of me to get this thing ready for implementation and to facilitate it’s implementation but that’s too vague that question so I can’t even rate it”

“Probably tapping into what they are thinking of their colleagues, probably a positive bias in that one, unless you got somebody super disgruntled that notices it’s anonymous…”

“Yeah, I do the job”
‘Problem of relevance’

Q. I carry out the tasks that are expected of me

“Well as a researcher it doesn’t require anything of me, erm, so yeah, so again I’m not sure what to answer on that one, it’s probably not applicable”

“Yes well I’m very clear about what my role as an evaluator is so, so if that’s what the intervention requires of me but ultimately the intervention doesn’t require anything of me I guess, it’s just the evaluation requires something of me rather than the intervention”

“The intervention as in the programme doesn’t really require anything of me, I just show up once or twice a year to collect data. I understand…. I am going to go in the middle of that”
Understanding the issue of ‘role’ is central

• **Problem**: Conceptual problem of ‘making sense’ of items in terms of role

• **Roles**:
  - *Evaluator*
  - ‘Observer’
  - ‘Doer’

• *The focus would become on those who are ‘working on the ground’*
Retaining theoretical integrity

• **Problem:** Multi-dimensional constructs difficult to capture in single questions/statements

• Expert critique: Online survey of NPT users (23/30) to rate items against theoretical constructs:
  
  • *Reflection* of main construct
  
  • *Alignment* with ‘sub-constructs’
  
  • Free-text *feedback*
Expert critique: Results & Analysis

Theory validation of items: online survey of (23/30) NPT users

Strength of Coherence Items

For ‘Coherence’, team decided to:

Remove Item 3 – ‘The [intervention] is easy to describe’
Remove Item 10 – ‘I will benefit personally from being involved in the [intervention]’
Rewrite Item 9 – ‘I can see the worth of the [intervention]’
<table>
<thead>
<tr>
<th>Construct</th>
<th>Sub-Construct (Original)</th>
<th>Version 1 items</th>
<th>Sub-construct (revised)</th>
<th>Version 2 items</th>
<th>Online expert survey items</th>
<th>Re-writes &amp; exclusions</th>
<th>Version 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enrolment</td>
<td>[Participants] are willing to contribute to the [intervention]</td>
<td>(7) I am able to contribute to delivering the [intervention]</td>
<td>Whether people can organise themselves to contribute to the intervention</td>
<td>(7) I am able to contribute to delivering the [intervention]</td>
<td>(8) I am willing to contribute to delivering the [intervention]</td>
<td>(8) I am able to contribute to delivering the [intervention]</td>
<td>(8) I am able to contribute to delivering the [intervention]</td>
</tr>
<tr>
<td></td>
<td>(8) I am willing to contribute to delivering the [intervention]</td>
<td>(9) I can work with colleagues to deliver this [intervention]</td>
<td>(8) I am willing to contribute to delivering the [intervention]</td>
<td>(9) I am willing to contribute to delivering the [intervention]</td>
<td>(10) I can work with colleagues to deliver this [intervention]</td>
<td>(9) I am willing to work with colleagues in new ways to deliver the [intervention]</td>
<td></td>
</tr>
</tbody>
</table>

**Version 3 Revision comments:**

Drawing on (i) website definitions and (ii) sociology paper we agreed that:
Some confounding across sub-constructs because ‘willingness’ is key to CP generally’ Enrolment’ is about rethinking group and individual relationships; people working together; establishing new ways of working together; willingness as well as capacity and ability
Part C: Detailed questions about the intervention

For each statement please select an answer that best suits your experience using Option A. If the statement is not relevant to you please select an answer from Option B.

<table>
<thead>
<tr>
<th>Section 1</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
<th>Option B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can see how [the intervention] differs from usual ways of working</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>2. Staff in this organisation have a shared understanding of the purpose of [the intervention]</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>3. I understand how [the intervention] affects the nature of my own work</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
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<tr>
<td>4. I can see the potential value of [the intervention] for my work</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Do you feel [the intervention] is currently a normal part of your work?

<table>
<thead>
<tr>
<th>Scale</th>
<th>Not at all</th>
<th>Somewhat</th>
<th>Completely</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
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</tr>
<tr>
<td>1</td>
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<tr>
<td>10</td>
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</tbody>
</table>

Available at: [www.normalizationprocess.org](http://www.normalizationprocess.org)
How to define ‘normalisation’?

• **Problem**: Outcome measurements tend to be focused on intervention-related outcomes rather than progress of the implementation

• Through discussion and directed team level feedback, developed a set of 3 *potential* ‘normalisation indicators’ rated 0-10:

  • When you use [the intervention] how **familiar** does it feel?

  • Do you feel [the intervention] is **currently** a normal part of your work?

  • Do you feel [the intervention] **will become** a normal part of your work?
Phase 2 Survey testing: Site selection

Target: 6 implementation projects, & pooled dataset of approx. 300 surveys

Data collection time-points: multiple

Diversity of interventions:
- Technology vs process
- Research v implementation/delivery
- Sectors (e.g., health/social/education)
- Stage of implementation variable

Inclusion criteria for individual sites:
- Access (via site contact) to staff by email/paper survey
- Collaboration agreement to adapt survey to site participants & facilitate administration
- Willingness to support reminders
- Min. 20 staff using the intervention
## Full survey dataset

<table>
<thead>
<tr>
<th>Site</th>
<th>Intervention details</th>
<th>Staff involved</th>
<th>N</th>
<th>R (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Digital health record rollout</td>
<td>Health visitors</td>
<td>67</td>
<td>29%</td>
</tr>
<tr>
<td>2</td>
<td>Multi-component intervention for smoking cessation in pregnancy</td>
<td>Midwives; health visitors</td>
<td>21</td>
<td>21%</td>
</tr>
<tr>
<td>3</td>
<td>Implementation of electronic tool designed to support patient self-management</td>
<td>Allied Health Professionals; Consultant and Trainees; GP’s; Nurses and Pharmacists</td>
<td>91</td>
<td>23%</td>
</tr>
<tr>
<td>4</td>
<td>Oral health risk assessment tool/pathway in Dental Hospital</td>
<td>Dentists and Dental students</td>
<td>229</td>
<td>77%</td>
</tr>
<tr>
<td>5</td>
<td>Trust-wide technology implementation involving different occupational groups</td>
<td>Consultants &amp; trainees; Nurse; Admin clerical; Managers; Allied Health professional &amp; Technical services</td>
<td>87</td>
<td>22%</td>
</tr>
<tr>
<td>6</td>
<td>Implementation of sports injury interventions in the AFL</td>
<td>Football coaches &amp; managers</td>
<td>336</td>
<td>??</td>
</tr>
</tbody>
</table>

*Note: 413 total completed all 43 NPT items*
Item retention process

**INTER-ITEM CORRELATIONS**
- Within sub-construct
- Within construct
- Across constructs
- Construct items with 3 global items

**EASE OF RESPONSE?**
Option ‘B’

‘Not relevant because….

**INDIVIDUAL SELECTIONS**
- 16 sub-construct item sets
- Item data summary tables
- Choose which to drop/keep & why
- Difficulty of decision (1-5)

**ITEM RETENTION MEETING**
- 7 team members
- Collated selections & comments
- Face validity considerations (e.g. CI findings)
- Consensus for each of the 16 sets

**20 CONSTRUCT ITEMS RETAINED**
<table>
<thead>
<tr>
<th>NoMAD Items</th>
<th>Option B (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ability to respond: Option ‘A’ and Option ‘B’</td>
<td></td>
</tr>
<tr>
<td><strong>Coh</strong></td>
<td></td>
</tr>
<tr>
<td>I can see how [the intervention] from usual ways of working</td>
<td>8.1</td>
</tr>
<tr>
<td>Staff in this organisation have a shared understanding of the purpose of</td>
<td>4.2</td>
</tr>
<tr>
<td>[the intervention]</td>
<td></td>
</tr>
<tr>
<td>I understand how [the intervention] affects the nature of my own work</td>
<td>3.1</td>
</tr>
<tr>
<td>I can see the potential value of [the intervention] for my work</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>CP</strong></td>
<td></td>
</tr>
<tr>
<td>There are key people who drive [the intervention] forward and get others</td>
<td>4.8</td>
</tr>
<tr>
<td>involved</td>
<td></td>
</tr>
<tr>
<td>I believe that participating in [the intervention] is a legitimate part of</td>
<td>2.2</td>
</tr>
<tr>
<td>my role</td>
<td></td>
</tr>
<tr>
<td>I’m open to working with colleagues in new ways to use [the intervention]</td>
<td>3.2</td>
</tr>
<tr>
<td>I will continue to support [the intervention]</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>CA</strong></td>
<td></td>
</tr>
<tr>
<td>I can easily integrate [the intervention] into my existing work</td>
<td>8.7</td>
</tr>
<tr>
<td>The [intervention] disrupts working relationships</td>
<td>5.6</td>
</tr>
<tr>
<td>I have confidence in other people’s ability to use [the intervention]</td>
<td>4.2</td>
</tr>
<tr>
<td>Work is assigned to those with skills appropriate to [the intervention]</td>
<td>11.2</td>
</tr>
<tr>
<td>Sufficient training is provided to enable staff to implement [the</td>
<td>9.4</td>
</tr>
<tr>
<td>intervention]</td>
<td></td>
</tr>
<tr>
<td>Sufficient resources are available to support [the intervention]</td>
<td>8.0</td>
</tr>
<tr>
<td>Management adequately supports [the intervention]</td>
<td>10.5</td>
</tr>
<tr>
<td><strong>RM</strong></td>
<td></td>
</tr>
<tr>
<td>I am aware of reports about the effects of [the intervention]</td>
<td>12.1</td>
</tr>
<tr>
<td>The staff agree that [the intervention] is worthwhile</td>
<td>13.0</td>
</tr>
<tr>
<td>I value the effects [the intervention] has had on my work</td>
<td>10.8</td>
</tr>
<tr>
<td>Feedback about [the intervention] can be used to improve it in the future</td>
<td>6.5</td>
</tr>
<tr>
<td>I can modify how I work with [the intervention]</td>
<td>12.4</td>
</tr>
</tbody>
</table>
Chair: Excellent. So our decision then is to keep two. [P3: Yep.] Good. So let’s move on to legitimization and here again, there looks as though there’s a consensus that we should keep 1.

P1: No! [laughter]

Chair: The second part of the sentence that I was about to announce was ‘but this may not be true in P1’s case [laughter]. So what, what’s your view P1 here?

P1: I can’t bear the word legitimate. It just makes it sound awful. It’s like ‘surveillance’. It’s really appalling. You can’t possibly have something that’s illegitimate! I mean, you know, what’s an illegitimate [half-timer]? Are we talking about my ancestry or my legality?

P2: What if we drop the word legitimate, so it would be ‘I believe that participating in the RAG scoring system is a part of my role’

Chair: Or should be a part of my role?

P3: But I don’t think we should change the wording at this stage.

P4: I think we shouldn’t too.

P6: I think the other thing is, despite the fact you dislike ‘legitimate’ as a word, it had a very low level of non-response.

P4: Yeah, the third item seemed tricky for people.

P3: Trickier, slightly.

P4: Trickier.

P5: In the cognitive interviews, people really liked that question.


P6: Because that is what the construct’s about, is it not? [Chair and P3 agree]

P1: I’ll buy into everybody’s greater wisdom on this one, but I personally would have a small freak-out and think that I was being observed by CCTV and the thought police.

P3: Well, I mean we all are, P1.
Final NoMAD Instrument

Survey Instructions

This survey is designed to help get a better understanding of how to apply and integrate new technologies and complex interventions in health care.


This survey asks questions about the implementation of [the intervention]. We understand that people involved with [the intervention] have different roles, and that people may have more than one role.

From the statements below please choose an option that best describes your main role in relation to [the intervention]:

- I am involved in managing or overseeing [the intervention]
- I am involved in delivering [the intervention]

[THIS LIST MAY NOT BE NEEDED]

For this survey, please answer all the statements from the perspective of your main role. Depending on your role or responsibilities in [the intervention], some statements may be more relevant than others.

The survey is in [NUMBER] parts. Part A asks some brief questions about [the intervention] [ADDITIONAL QUESTIONS CAN BE ADDED]. Part C has questions about the intervention [ADDITIONAL QUESTIONS THAT ARE NOT IN THE SURVEY CAN BE ADDED].

Please take the time to decide which answer best suits your response.

Part C: Detailed questions about the intervention [WE ADVISE MINOR ADAPTATION ONLY AS REQUIRED TO MAKE SENSE]

For each statement please select an answer that best suits your experience using Option A. If the statement is not relevant to you please select an answer from Option B.

<table>
<thead>
<tr>
<th>Section C1</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neither agree nor disagree</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can see how [the intervention] differs from usual ways of working</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Staff in this organisation have a shared understanding of the purpose of [the intervention]</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do you feel [the intervention] is currently a normal part of your work?

Not at all  Somewhat  Completely
## Internal consistency

### COHERENCE (4 items)
Cronbach’s alpha = **0.71**

1. I can see how the [intervention] differs from usual ways of working
2. Staff in this organisation have a shared understanding of the purpose of this [intervention]
3. I understand how the [intervention] affects the nature of my own work
4. I can see the potential value of the [intervention] for my work

### COGNITIVE PARTICIPATION (4 items)
Cronbach’s alpha = **0.81**

1. There are key people who drive the [intervention] forward and get others involved
2. I believe that participating in the [intervention] is a legitimate part of my role
3. I’m open to working with colleagues in new ways to use the [intervention]
4. I will continue to support the [intervention]

### COLLECTIVE ACTION (7 items)
Cronbach’s alpha = **0.78**

1. I can easily integrate the [intervention] into my existing work
2. The [intervention] disrupts working relationships
3. I have confidence in other people’s ability to use the [intervention]
4. Work is assigned to those with skills appropriate to the [intervention]
5. Sufficient training is provided to enable staff to use the [intervention]
6. Sufficient resources are available to support the [intervention]
7. Management adequately support the [intervention]

### REFLEXIVE MONITORING (5 items)
Cronbach’s alpha = **0.65**

1. I am aware of reports about the effects of the [intervention]
2. The staff agree that the [intervention] is worthwhile
3. I value the effects the [intervention] has had on my work
4. Feedback about the [intervention] can be used to improve it in the future
5. I can modify how I work with the [intervention]
How do the NPT constructs relate to each other?

<table>
<thead>
<tr>
<th></th>
<th>Coherence</th>
<th>Cognitive Participation</th>
<th>Collective action</th>
<th>Reflexive monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coherence</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cognitive Participation</td>
<td>.682 (n=512)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective Action</td>
<td>.550 (n=454)</td>
<td>.540 (n=456)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Reflexive Monitoring</td>
<td>.599 (n=427)</td>
<td>.593 (n=428)</td>
<td>.489 (n=423)</td>
<td>1</td>
</tr>
</tbody>
</table>

Pearson Correlation, all sig. (2 tailed) <.000
How do the NPT constructs relate to the ‘normalization’ questions?

<table>
<thead>
<tr>
<th></th>
<th>How familiar? (n)</th>
<th>Normal part of your work? (n)</th>
<th>Will it become normal? (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coherence</td>
<td>.354 (448)</td>
<td>.432 (447)</td>
<td>.536 (443)</td>
</tr>
<tr>
<td>Cognitive Participation</td>
<td>.249 (431)</td>
<td>.298 (430)</td>
<td>.472 (426)</td>
</tr>
<tr>
<td>Collective Action</td>
<td>.411 (409)</td>
<td>.479 (408)</td>
<td>.450 (404)</td>
</tr>
<tr>
<td>Reflexive Monitoring</td>
<td>.256 (388)</td>
<td>.281 (387)</td>
<td>.397 (383)</td>
</tr>
<tr>
<td>Normalisation score</td>
<td>.411 (417)</td>
<td>.479 (416)</td>
<td>.575 (412)</td>
</tr>
</tbody>
</table>

Pearson Correlation, all sig. (2 tailed) < .000
### NoMAD instrument properties (so far)

<table>
<thead>
<tr>
<th>Property</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face validity</td>
<td><strong>High.</strong> Appropriate adaptation locally is key to retain this.</td>
</tr>
<tr>
<td>Construct validity</td>
<td><strong>Good.</strong> Relationships between items within and across constructs mostly as proposed by NPT. Further exploration to undertake with Factor Analytic procedures.</td>
</tr>
<tr>
<td>Internal consistency</td>
<td><strong>Mostly Good.</strong> Chronbach’s alpha ranges from 0.65-0.81 across the four NPT constructs.</td>
</tr>
<tr>
<td>Test-retest reliability</td>
<td><strong>In progress!</strong></td>
</tr>
<tr>
<td>Predictive validity</td>
<td>Capacity to predict implementation outcomes over time - still to be tested – collaboration welcome!</td>
</tr>
</tbody>
</table>
Guidance on using NoMAD

The NoMAD instrument can be accessed from www.normalizationprocess.org and downloaded, with guidance on how to adapt it for use.

Please cite as:

How to use NoMAD?

The NoMAD instrument may be used in different ways to suit your needs, but it needs to be adapted to ‘make sense’ for your participants. Here we provide guidance on how to do this.

What are you using it for?

We hope that the NoMAD instrument will be used for a wide range of purposes and across different settings. It could be used simply to describe participants’ views about how an intervention impacts on their work, and their expectations about whether it could become a routine part of the work. It could be used at different time points, to see if perceptions have changed after a period time. It also could be used as a way of improving implementation by identifying areas needing further work to progress an implementation project. For example, the responses may indicate th...
http://normalizationprocess.org: How to use NoMAD?

1. **Determine who should complete the survey.** You may be interested in the perceptions of a single group of professionals, or multiple groups. In deciding who should complete it, a key consideration is how involved they are with the implementation. It is likely that some groups will be more familiar with engaging with the target intervention than are others, but this is okay if all groups are familiar enough to be able to answer most questions. The item response options allow for people to indicate if and why they cannot rate a particular item.

2. **Deciding how to conduct the survey.** It is possible to create your survey electronically (e.g., using online survey software) or on paper. This will depend on how you can best access respondents. In our study we used both approaches.

3. **Customising the instructions.** In the instrument accessible on this website, we provide an example of how to introduce the survey. This just needs to be adapted to fit your own purpose.

4. **Determine your role questions.** We have provided examples of these, but just as a guide. These questions should reflect your participant groups, and any other information you might want to collect for your purposes. For example, if you are assessing staff from different departments, you will want to know if they use the intervention in their work.
Furthering our understanding of implementation process

“In order to better understand implementation, success measures must be standardized, the relative importance of various roles, the role of the network, and the interaction between technology and an organization must be better understood.” (Linton 2002, pg 76)
NoMAD: Further directions

• **400+ NoMAD survey downloads** since Kings Fund launch event Nov 2015

• Much **local and international interest** in collaboration and/or using NoMAD in studies being planned (eg. Netherlands/EU, USA, Canada, Melbourne, UK). Discussion & applications in progress.

• Interest relates to wide ranging implementation projects including:
  
  • e-mental health
  • person-centred care in nursing homes
  • telehealth for nutrition monitoring & management
  • enhanced recovery after surgery
NPT: Website & toolkit

Available at: www.normalizationprocess.org
Evaluating complex interventions and health technologies using normalization process theory: development of a simplified approach and web-enabled toolkit

Carl R May¹, Tracy Finch², Luciana Ballini³, Anne MacFarlane⁴, Frances Mair⁵, Elizabeth Murray⁶, Shaun Treweek⁷ and Tim Rapley²*

Abstract
Background: Normalization Process Theory (NPT) can be used to explain implementation processes in health care relating to new technologies and complex interventions. This paper describes the processes by which we developed a simplified version of NPT for use by clinicians, managers, and policy makers, and which could be
This is the interactive NPT toolkit.

It contains 16 questions for thinking through an implementation problem.

To understand how to use it, click here, for an explanation and a powerpoint presentation that you can download and use collaboratively.

1. Participants distinguish the intervention from current ways of working.

   Not at all  
   [Ruler]  
   Completely

Whether the intervention is easy to describe to participants and whether they can appreciate how it differs or is clearly distinct from current ways of working.

2. Participants collectively agree about the purpose of the intervention.

   Not at all  
   [Ruler]  
   Completely

Whether participants have or are able to build a shared understanding of the aims, objectives, and expected outcomes of the proposed intervention.
**Sense-making**
1. Participants distinguish the intervention from current ways of working.
2. Participants collectively agree about the purpose of the intervention.
3. Participants individually understand what the intervention requires of them.
4. Participants construct potential value of the intervention for their work.

**Participation**
5. Key individuals drive the intervention forward.
6. Participants agree that the intervention should be part of their work.
7. Participants buy in to the intervention.
Implementing and evaluating complex interventions

New technologies, and business processes in healthcare are complex and demanding.

This website offers a users’ guide to Normalization Process Theory (or NPT). Implementing and evaluating complex interventions, new technologies, and business processes in healthcare is complex and demanding. NPT can be used to support the work of implementation and evaluation of complex interventions.

This website offers a set of conceptual tools and explanatory models (Normalization Process Theory, or NPT) intended to support the work of implementation and evaluation. If you are a researcher, clinician, manager, or someone else who has to practically implement and integrate some form of innovation, this website could help you think through the processes involved. It offers tools for identifying potential barriers to implementation, developing intervention strategies, evaluating implementation success, and identifying ways to further improve the processes involved.

Available at: [www.normalizationprocess.org](http://www.normalizationprocess.org)