Complexity and Change: Frameworks for defining future challenges for Countering Violent Extremism

EUROPEAN STRATEGIC COMMUNICCATIONS NETWORK

Brussels, 5 September 2019

Paul Ekblom

Dawes Centre for Future Crime
Department of Security and Crime Science
University College London

p.ekblom@ucl.ac.uk
https://www.ucl.ac.uk/jill-dando-institute/research/dawes-centre-future-crime
http://5Isframework.wordpress.com

Coming up

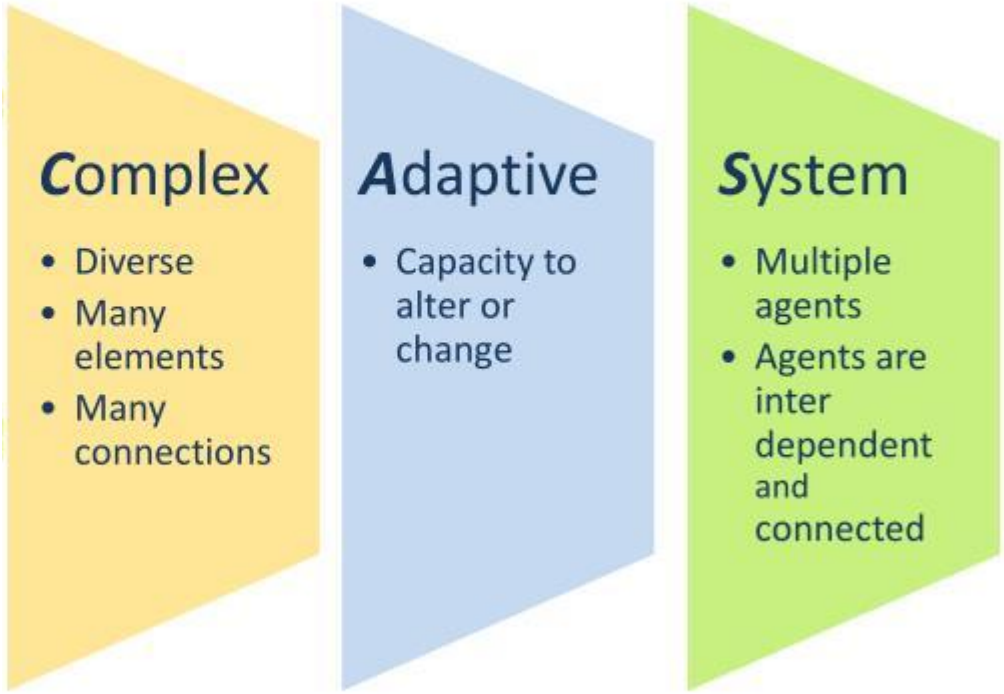
- Crime, terrorism, extremism throw up problems which are **complex, wicked, networked and changing ever faster**
- **Communications** are a key dimension to consider
  - Content – narrative challenge
  - Technology, structures and processes
- Understanding 1) nature of **complexity**, and 2) how things **change**, helps us to gear up to address the problems
  - Faster, better-prepared **reaction**
  - **Anticipation** e.g. through horizon-scanning
  - **Well-designed responses** – out-innovating adaptive offenders against a background of technological and social change
  - Various **frameworks** help to understand problems and design responses

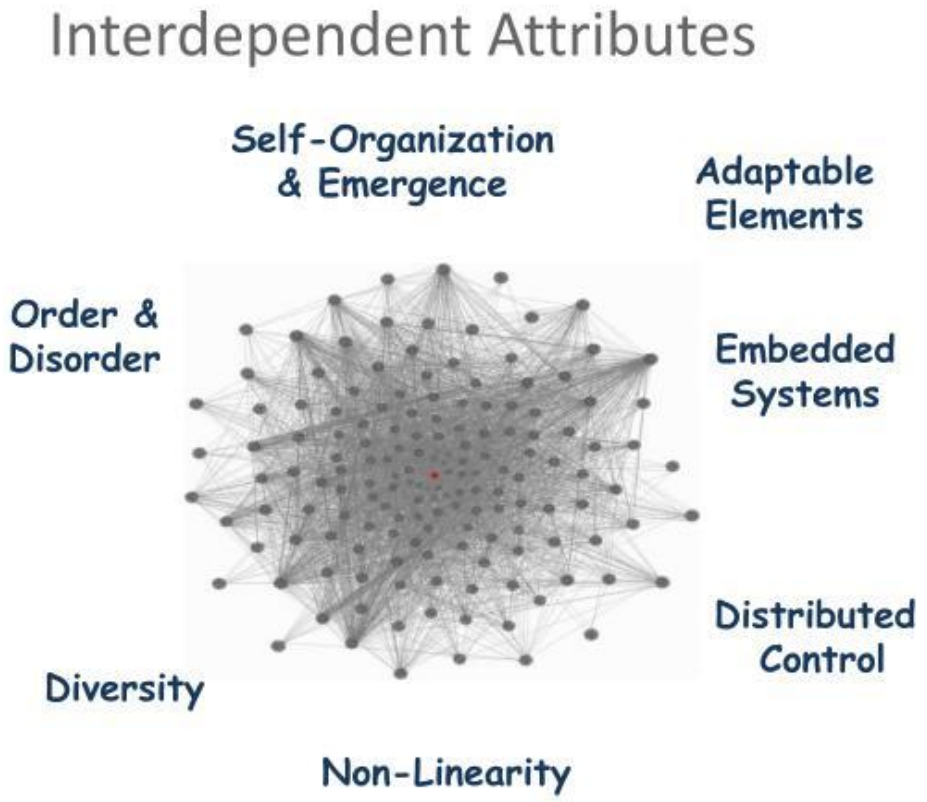
Complexity

- Human problem-solving capabilities and practice emerged to tackle problems that are simple, obvious, tangible, clearcut, linear
- We increasingly face problems which are
  - **Complicated** – many components, albeit quite tightly coupled
  - **Complex** – highly interactive, loosely coupled components, non-linear
  - and even **Chaotic** – cause and effect are unclear, no knowledge-based response available
  - **Wicked** – hard to solve because of incomplete, contradictory and changing requirements

Key Concept: Complex Adaptive Systems

- Diverse **agents** (individuals, organisations, intelligent software) acting, reacting and anticipating each others' moves against a changing social and technological background that favours first one side, then the other, often with lags





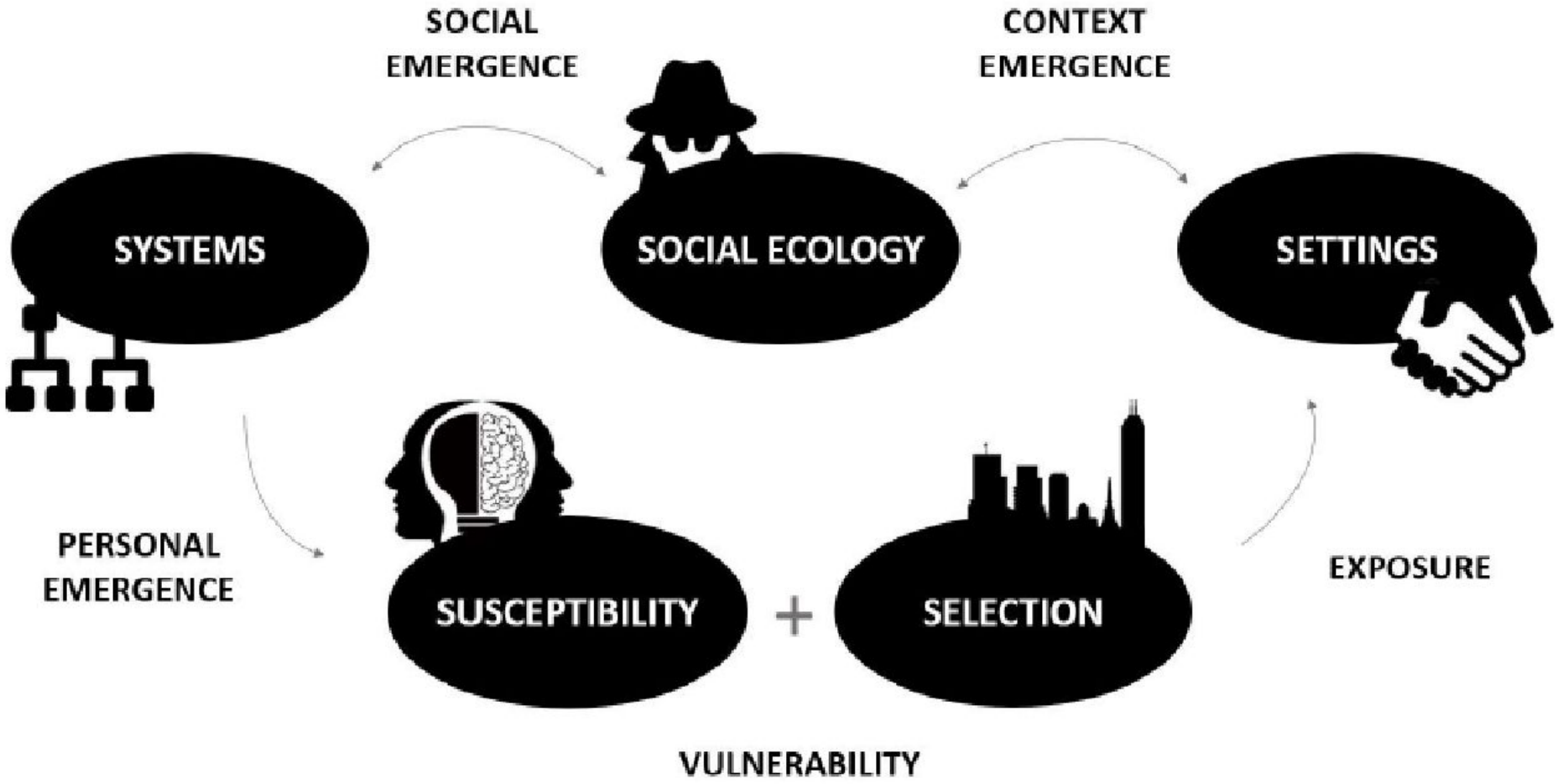
- **System failure** occurs when interventions targeted to perturb one component of a CAS have unpredicted/undesired effects on other components or system as a whole

https://www.slideserve.com/charlize-vaughn/flirting-with-uncertainty-and-surprise-thriving-on-change-in-complex-systems-powerpoint-ppt-presentation

https://www.demos.co.uk/files/systemfailure2.pdf

Complexity and Extremism: The S5 framework

- A recent framework by Noémie Bouhana at UCL attempts to capture the complexity of extremism in a conceptually rigorous way, identifying five distinct categories of determinants that interact to generate or suppress the risk of **extremist propensity development** and **extremist action**



Noémie Bouhana (2019). The Moral Ecology of Extremism. A Systemic Perspective. London: Department of Security and Crime Science, University College London. https://www.gov.uk/government/publications/the-moral-ecology-of-extremism-a-systemic-perspective

Complexity and Ecosystems - Roles

- Offender
- Preventer (reduces risk of terrorist behaviour by lowering likelihood and preparing to respond to minimise harmful consequences)
- Promoter (increases risk of terrorist behaviour without directly doing it)
- Target vector (immediate victim/asset) sends message to…
- Target Audience (the ones they wish to influence)
- Responder (acts during/immediately after event to limit/mitigate harm)

Conjunction of Terrorist Opportunity

https://5isframework.files.wordpress.com/2013/12/cto-security-journal-july05.pdf

Change – Evolution

- There are many kinds of change, but change in a consistent direction, over a prolonged period and with multiple iterations is best conceived in terms of **evolution**
- Evolutionary theory enables us to identify and focus on **constants** of processes rather than the diversity and day-to-day changes as evolution plays out
- Most people are familiar with biological evolution, with its key processes of **variation**, **selection** and **replication** in a population of organisms; and **repurposing** of existing traits for new purposes
- But the '**evolutionary algorithm**' applies to a wider phenomena, from functioning of the immune system to generation of thoughts in the brain – 'Universal Darwinism'
- At the level of organisms/populations, it operates in **4 dimensions**
  - **Genetic** (DNA), **epigenetic** (DNA markers), **behavioural** (social learning/imitation), **symbolic** (verbal/written/ICT)

https://mitpress.mit.edu/books/evolution-four-dimensions

Change – Cultural/Technological Evolution

- Behavioural/symbolic dimensions support **cultural**, **technological**, evolution
- This takes us **beyond individuals** (though evo psychology is also important)
- The most developed (albeit controversial) idea in cultural evolution is Dawkins' concept of the **meme** – cultural equivalent to the **gene**
  - Memes cover content (including narrative) – **ideas and actions** ranging from catchy tunes to fashions to whole religions
  - Memes compete and conflict for attention and **embedding** in human minds, and for **replication** through social learning, symbolic communication, and teaching
  - Questions of interest with relevance to communications:
    - What memes are **generated** by whom?
    - How are memes **selected** by, or appeal to, **susceptible** minds?
    - How are memes **replicated**?
    - How does this play out in contexts of **settings, social ecology, systems**?
    - How does **polarisation** influence meme process?
    - How does the **technological** dimension fit in?

https://www.routledge.com/Evolutionary-Psychology-and-Terrorism/Taylor-Roach-Pease/p/book/9781138774582

https://www.susanblackmore.uk/the-meme-machine/

Evolutionary Game-Changers

- Sometimes in biological evolution, complete gamechangers emerge
  - E.g. evolution of eyesight 500 mya arguably led to predator/prey and rapid speciation under predation pressure
- Cultural evolution – ‘cultural phyletic changes’
  - E.g. Neolithic revolution > farming > cities, creates many new niches
  - ICT is one of these game-changers

Accelerants of Evolution

- Evolution can be accelerated
  - Major accelerant is **ICT** including writing, printing, the telephone and now the **Internet** – which is exceptionally pervasive and fast:
    - Partly due to **scale, speed and agility** of code-based processes compared to material ones
    - Also due to specific **enablers** such as encryption, exploit kits (e.g. WordPress, virus generators…) and Crime-As-A-Service (e.g. helpdesks for those who buy exploit kits) – scale is unconstrained by supply of expert operators
  - Complex Adaptive Systems give rise to **co-evolution**
    - **Arms races** as in warfare, predators v prey, viruses v immune system, antibiotics v bacteria, and between perpetrators and security
    - **Technological and social changes** in the background, or purposefully developed by offenders or security, favour first one side then the other
    - The **capacity to out-innovate adaptive offenders**, and **deploy those innovations**, is vital – no point winning individual battles if the whole campaign is lost

IRA example: Ekblom & Gill https://www.taylorfrancis.com/books/9780203431405/chapters/10.4324/9780203431405-19

General: https://www.researchgate.net/publication/317358133_Terrorism_-_lessons_from_natural_and_human_co-evolutionary_arm

Artificial Acceleration of Evolution

- Artificial accelerants based on **ICT** & especially **AI/Machine Learning**
  - **Simulation** of complex systems (e.g. through Agent-Based Modeling) helps (good side and bad side alike) anticipate actions and reactions
  - **Evolution** – genetic algorithms used to solve complex problems without having to understand how they work
  - **Co-evolution** – **Generative Adversarial Networks**
    - Can produce highly **convincing fake news**, **impersonation** of influential individuals (both seen as major threats in recent UCL sandpit on AI/crime)
    - Work by setting one AI system against another
      - The **Generator** produces draft news items
      - The **Discriminator** seeks to spot the fake products from among real items
      - Feedback from D to G helps G to improve ability to fool the D
      - Feedback from G to D helps D to improve spotting the fakes…

https://twitter.com/AllanXia/status/1168049059413643265

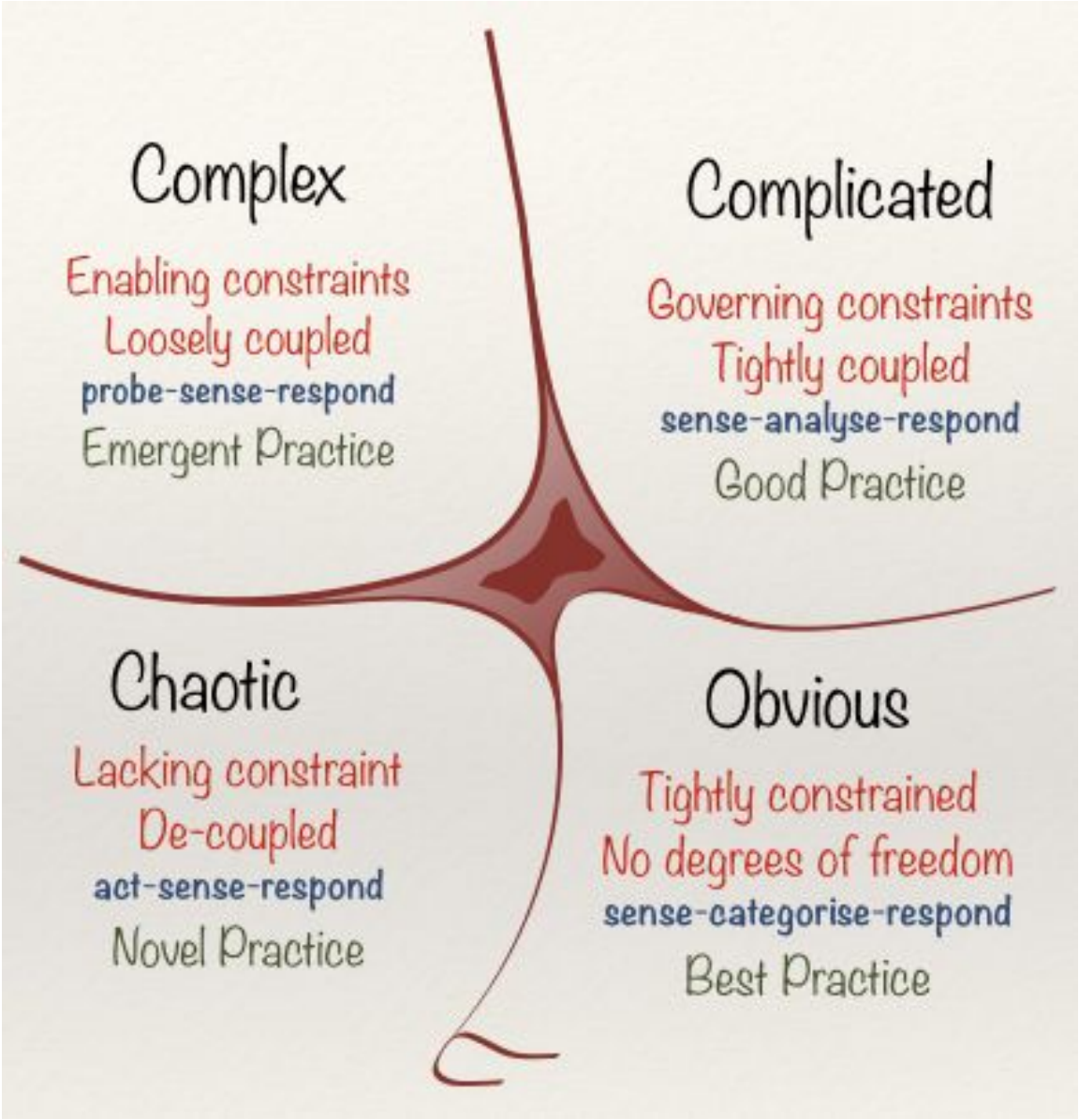
https://www.bbc.co.uk/news/technology-49446729

More Complexity x Evolution

- Cultural evolution works via **learning, teaching**, search engines, **recommender** systems
- Cultural evolution is not a one-way relationship with agents adapting to a fixed environment
- Agents and environment can have **reciprocal causation** (like a river and its banks)
  - **Niche construction** and **ecosystem engineering** – agents can alter the environment they live in, for their own benefit and that of their successors, and with impact on people/organisations playing other roles
  - Biological example
    - Grazing animals convert forests into grasslands, to which they are better-adapted
  - Cultural/criminal examples
    - **Corruption** and ?grooming
    - **Normalisation** of extremism and violence
    - Adoption of **extremist vocabulary?**
    - Creating a **receptive/ supportive/ permissive cultural climate** for extremism and violence
    - **Echo-chambers**?
    - How do **person-to-person networks** fit in?

Handling Complexity

- Use **systems thinking**… e.g. S5 framework
- **Attune interventions to context** at S2-5 levels
- **Differentiate** between subsets of agents, settings etc (one size does not fit all)
- Use the **Law of Requisite Variety** (Ashby)
  - Oversimplified approaches may be easier to understand and communicate but fail to tackle the problem
  - Our models of the real world must be sufficiently complex in themselves, to handle the vastly greater complexity out there
- Use **Cynefin** – put complexity in its place by characterising the nature of the problem/s and responding appropriately



https://en.wikipedia.org/wiki/Cynefin_framework

Handling Change

- Prepare to **detect & respond to changing patterns** of Violent Extremism and changing reactions to interventions

- Undertake **horizon-scanning** to **anticipate** change in the problem and in your operating environment (political, economic, social, technological, environmental, legal, organisational, media, infrastructure), based on understanding of **system** as a whole and its various levels

- Study **offenders' ICT resources** to aid anticipation of what we are up against now, and will be in future – how can new ICT products/services be mistreated, misused, mishandled? How will they interact in combination (technology roadmapping)?

https://www.researchgate.net/publication/307144442_Technology_Opportunity_Crime_and_Crime_Prevention_Current_and_Evolutionary_Perspectives

Handling Change

- Seek solutions that are **effective**, **resilient & adaptable** and not rigid and at risk of becoming outdated
- Create '**pipelines**' of new security arrangements to deploy as soon as current ones fail (as with satellite TV revenue-protection encoders, which have the rare advantage of immediate, 'broadcastable' transmission of security upgrades to all users
- Strategically, **boost our innovative capacity** and disrupt that of offenders without harming legitimate enterprise
  - Encourage **variety** of security actions (so offenders can't 'crack one, crack all')
  - Generate '***plausible* variety**' by combination of tested theoretical principles, research into what works at the level of detailed practical methods, 'think offender' imagination
- Draw on communications **design** in generating, testing and improving interventions
  - Define and address what we want **more of** as well as **less of**
  - Differentiate between **target vector** and **target audience**
  - Address the **messy and complex nature** of the **trade-offs, constraints and conflicting requirements** in CVE (security + privacy + inclusivity + …) in creative ways
  - Design for resistance to '**implementation failure**' in rolling out programmes (don't 'fire and forget')
  - **Reframe** the problem Dorst, C 2015, *Frame Innovation: Create New Thinking by Design*, 1, The MIT Press, Cambridge, Massachusetts; London, England.View/Download from: UTS OPUS