4 Conclusion

4 Conclusion

Learning difficulties are developmental. A developmental framework is therefore essential for understanding how learning difficulties impact on future mental capital and wellbeing. A learning difficulty affects learning *trajectories* throughout the lifespan. As an example, Farrington[152] points out that the anti-social child has the potential to become the anti-social teenager, who is at risk of becoming the anti-social adult who is at risk of producing another anti-social child. Across learning difficulties, more research into underlying mechanisms is needed, so that developmental trajectories are better understood and consequently more effective interventions can be developed. For example, recent research in cognitive neuroscience is revealing how differences in subtle aspects of very basic sensory processes such as seeing and hearing affect the cognitive trajectories important for high-level processes such as reading and mathematics.

Developmental trajectories are easier to intercept than to reverse. Initial differences between children may be small. Yet even a small initial difference in basic sensory processing can end up having large cognitive consequences. For example, a small difference in how the brain processes auditory information may lead eventually to a specific reading difficulty. This may then have a serious impact on the development of mental capital, because reading is the key to accessing the entire educational curriculum and to later participation in the knowledge economy. As children get older, their cognitive difficulties affect their self-concept and their emotional development, with erosive effects on wellbeing and increased risk for social exclusion and unemployment. As the learning difficulty is biological in origin, it may be passed to the next generation. However, biology simply confers a risk or a vulnerability to having a particular learning difficulty. It is the environment that determines the impact of carrying certain genes and the eventual developmental trajectory.

As many learning difficulties are genetically-driven, prevalence rates are unlikely to change markedly in the future. Therefore, environmental strategies are required to reduce the impact of an inherited vulnerability to a learning difficulty. Interventions that address underlying causes early in the developmental trajectory are most likely to be effective. The earlier that learning difficulties are detected, and the earlier that interventions are put into place, the better the child's eventual mental capital and wellbeing and the more valuable their contribution to society. The principle of early detection and early intervention is therefore a starting point for consideration of possible strategies for intervention. The outcome of that analysis will be presented in the final report of the Project, to be published in October 2008.

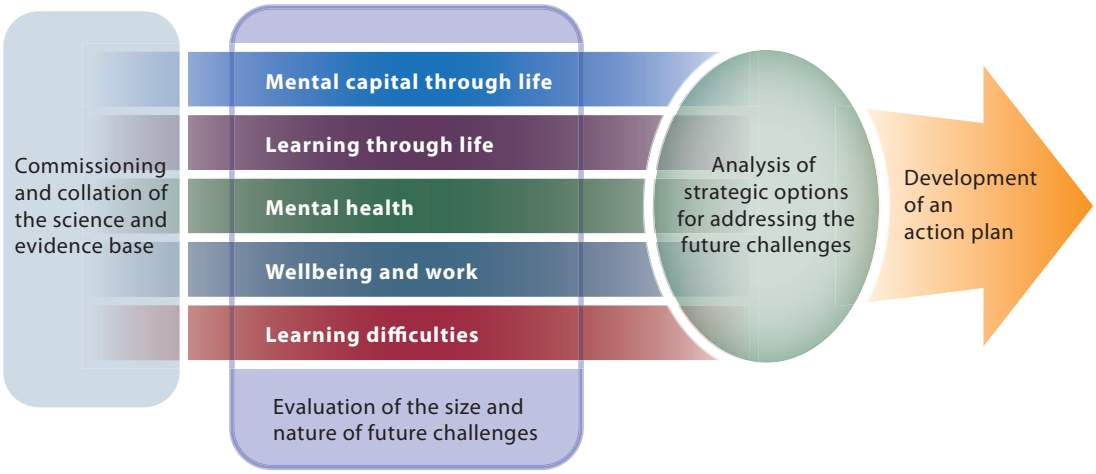
152 Farrington (2006)

Appendix A: Overview of the work of the Foresight Project on Mental Capital and Wellbeing

The aim of the Project is to advise the Government on how to achieve the best possible mental development and mental wellbeing for everyone in the UK.

The principal parts of the Project are set out in Figure A.1 and are described below. Further information may be found on the Project website (www.foresight.gov.uk). All the Project papers and reports will also be made freely available through this website in October 2008 – either electronically or in hard copy.

Figure A.1: The principal parts of the Project



Analysis of future challenges

The starting point was to generate a vision for the size and nature of future challenges associated with mental capital and wellbeing, and to assess how the situation may change over the next 20 years. This analysis was predicated on the assumption that existing policies and expenditure remain unchanged. To make the analysis tractable, the work was divided into five broad areas, as indicated in Figure A.1. The present report documents the findings from one of these – Learning difficulties. Details of the reports of the five areas are listed in Table A.1.

Table A.1: The challenges ahead – reports of the findings		
Designation	**Title**	**Authors**
CR-E	Mental capital through life: Future challenges	T. Kirkwood J. Bond C. May I. McKeith M. Teh
CR-A	Learning through life: Future challenges	L. Feinstein J. Vorhaus R. Sabates
CR-B	Mental health: Future challenges	R. Jenkins H. Meltzer P. B. Jones T. Brugha P. Bebbington M. Farrell D. Crepaz-Keay M. Knapp
CR-C	Wellbeing and work: Future challenges	P. Dewe M. Kompier
CR-D	Learning difficulties: Future challenges	U. Goswami

The five areas were chosen to closely map onto the interests of important Government Departments, although it was recognised from the outset that the areas were interrelated. Therefore, consideration across the five has also been undertaken – the results of that will be reported in the final Project report.

Supporting evidence and analysis

The above analysis was informed by:

- Consideration of the underpinning science associated with each of the five areas. This was informed by approximately 80 commissioned reviews – these set out the current state-of-the-art of science in diverse fields, and also scientific developments of particular interest (Appendix B provides a full list).
- Reviews of certain socio-economic factors. These were performed when the existing literature was deemed insufficient for the purposes of the Project. In particular, these reviews addressed the relationship of the physical environment to wellbeing, and the evolving use of information and communication technologies (see Appendix B).
- Economic analysis. This has taken a broad view of the direct and indirect impacts of important issues – such as specific learning difficulties and mental health problems.
- Systems analysis relating to each of the five areas (e.g. see Figures 1.2, 3.1, 3.2 and 3.3) An account of the Project systems work is being prepared in a separate report (see Appendix B; S1: Systems maps).

- The development of hypothetical future scenarios. These have been used to explore future uncertainty in the five areas (listed in Figure A.1), and to test the robustness of possible interventions. An account of the scenarios and their use within the Project will also appear in a separate report (available through www.foresight.gov.uk).

In addition to the above, the work also drew extensively upon the existing literature as well as several workshops and meetings with relevant organisations.

Analysis of strategic options

Having identified important challenges for the future, the Project identified and analysed possible interventions and strategic options for addressing them. Here the analysis of possible costs and benefits took a lifecourse approach, recognising that interventions affecting today's children might affect them for the rest of their lives.

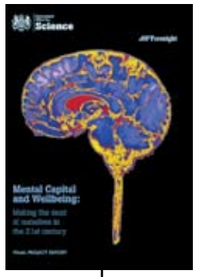
Consideration has also been given to the social and ethical context within which the proposed interventions would be offered. Issues concerning ethics, governance, and public attitudes have been addressed. The results from this part of the Project are presented in the final Project report.

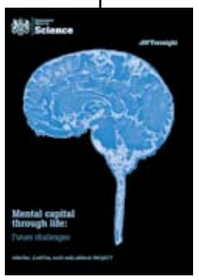
Stakeholder engagement

From the outset, the Project has involved a wide range of leading organisations from both the public and private sectors. The intention has been to work closely with them to develop a comprehensive plan to take forward the findings of the Project. That plan will be announced at the launch of the final Project report in October 2008.

Appendix B: Structure of the Project reports and supporting papers

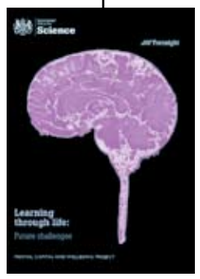
Mental Capital and Wellbeing: Making the most of ourselves in the 21st century
Final Project Report





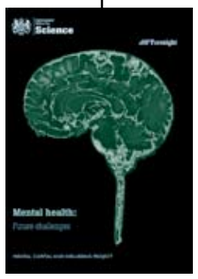
Mental capital through life: Future challenges

- **SR-E1:** *Neuroscience of education*
- **SR-E2:** *Human reward*
- **SR-E3:** *Neuroeconomics*
- **SR-E4:** *Cognitive reserve*
- **SR-E5:** *The adolescent brain*
- **SR-E6:** *Behavioural economics*
- **SR-E7:** *Resilience*
- **SR-E8:** *Adolescent drug users*
- **SR-E9:** *Pharmacological cognitive enhancement*
- **SR-E10:** *Stem cells in neural regeneration and neurogenesis*
- **SR-E11:** *Early detection of mild cognitive impairment and Alzheimer's disease: An example using the CANTAB PAL*
- **SR-E12:** *Anxiety disorders*
- **SR-E13:** *Neurocognition and social cognition in adult drug users*
- **SR-E14:** *Normal cognitive ageing*
- **SR-E15:** *Social cognition in teenagers – inclusion*
- **SR-E16:** *HPA axis, stress, and sleep and mood disturbance*
- **SR-E17:** *Nutrition, cognitive wellbeing and socioeconomic status*
- **SR-E18:** *Nutrition and cognitive health*
- **SR-E20:** *Effect of chronic stress on cognitive function through life*
- **SR-E21:** *Depression and its toll on mental capital*
- **SR-E22:** *Fitness and cognitive training*
- **SR-E24:** *Effects of exercise on cognitive function and mental capital*
- **SR-E25:** *Technology solutions to prevent waste of mental capital*
- **SR-E27:** *Housing as a determinant of mental capital*
- **SR-E29:** *Cognitive neural prosthetics*
- **SR-E31:** *Cellular and molecular logic of neural circuit assembly*



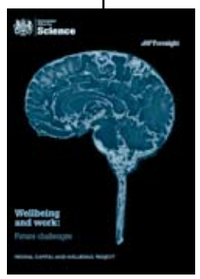
Learning through life: Future challenges

- **SR-A2:** *Learning at work*
- **SR-A3:** *Skills*
- **SR-A4:** *Participation in learning*
- **SR-A5:** *Evidence-informed principles from the Teaching and Learning Research Programme*
- **SR-A7:** *Estimating the effects of learning*
- **SR-A9:** *Self-regulation and executive function*
- **SR-A10:** *Lifelong learning across the world*
- **SR-A11:** *Non-cognitive skills*
- **SR-A12:** *Future technology for learning*



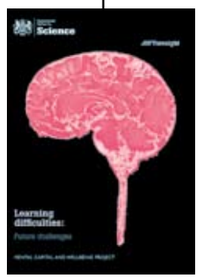
Mental health: Future challenges

- **SR-B1:** *Genetics and social factors*
- **SR-B2:** *Mental health of older people*
- **SR-B3:** *Positive mental health*
- **SR-B4:** *Mental disorders in the young*
- **SR-B5:** *Prisoners*
- **SR-B6:** *The homeless*
- **SR-B7:** *Children in local authority care*
- **SR-B8:** *The costs of mental disorders*
- **SR-B9:** *Serious and enduring mental illness*
- **SR-B10:** *Personality disorders*
- **SR-B11:** *Violence*
- **SR-B12:** *Ageing*
- **SR-B13:** *Migrants*
- **SR-B14:** *Substance abuse*
- **SR-B15:** *Depression*



Wellbeing and work: Future challenges

- **SR-C1:** *Workplace stress*
- **SR-C2:** *Mental wellbeing at work and productivity*
- **SR-C3:** *Management style and mental wellbeing at work*
- **SR-C4:** *Flexible working arrangements and wellbeing*
- **SR-C5:** *New technology and wellbeing at work*
- **SR-C6:** *Stress management and wellbeing*
- **SR-C7:** *Working longer*
- **SR-C8:** *Leisure: the next 25 years*
- **SR-C9:** *Training in the workplace*
- **SR-C10:** *Careers*
- **SR-C11:** *Violence at work*



Learning difficulties: Future challenges

- **SR-D1:** *Specific language impairment*
- **SR-D2:** *Dyslexia*
- **SR-D3:** *Adult learning disabilities*
- **SR-D4:** *Dyscalculia*
- **SR-D5:** *Deafness*
- **SR-D7:** *Genetics and diagnosis of learning difficulty*
- **SR-D8:** *Conduct disorder and anti-social behaviour*
- **SR-D9:** *Social cognition and school exclusion*
- **SR-D10:** *Autism and autism spectrum disorders*
- **SR-D11:** *Attention Deficit Hyperactivity Disorder*
- **SR-D12:** *New technologies and interventions*
- **SR-D13:** *Trajectories of development and learning difficulties*
- **SR-D14:** *Early neural markers of learning difficulty*
- **SR-D15:** *Childhood depression*
- **SR-D16:** *Eating disorders*

Cross-Project papers

- **SR-X2:** *Science of wellbeing*
- **SR-X3:** *Neurobiology of wellbeing*
- **SR-X5:** *Neural circuit assembly*
- **DR-1:** *ICT as a driver of change*
- **DR-2:** *Physical environment and wellbeing*
- **ER-1:** *Ethics*

S1: Systems maps

Note 1: Some reference numbers were assigned to topics; however, the reports/papers were not subsequently commissioned.

Note 2: The Project commissioned some additional "discussion papers" as referred to in the text of the final report.

These will be made available through www.foresight.gov.uk in due course.

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