Institution: University of Birmingham

Unit of Assessment: Psychology, Neuroscience and Psychiatry

a. Context

The School of Psychology has broad expertise in the discipline, and many links across disciplinary boundaries, into medicine, neuroscience, engineering, computer science, robotics and education. Our research is relevant to diverse users in the NHS, prison and education services, related charities, patient groups, NGOs and government departments. We have long-standing and productive relationships with many such groups, and we are working to extend this successful practice to new topics and new users.

***NHS*.** We have direct impact on practice in assessment, intervention and rehabilitation (psychosis, traumatic brain injury and stroke, epilepsy, alcohol and drug addiction, neurodevelopmental disorders including autism). We are advancing understanding of medically and socially significant problems (obesity, childhood feeding difficulties, maternal medication during pregnancy, and chronic pain), informing policy and practice on survival and recovery from cancer, dealing with bereavement, and improvement of patient experience within NHS services.
Prison, police and the law. As one of only two centres in the UK with a doctoral programme in forensic psychology the School is a major trainer of front-line workers in forensic services. Policy and practice is informed by work on the detection, evaluation and treatment of sex offenders, offender profiling and criminal case linkage, child abuse and neglect, understanding family and gang violence, and studying the cognitive and neural bases of conduct disorder and psychopathy.
Education. Work on challenging behaviours in individuals with intellectual disability informs policy and practice in appropriate classroom and institutional care. Research on early indicators of autism is leading to the development of School-based assessments. We conduct primary research on reading, dyslexia and stammering, and developments in self control, social understanding and reasoning, which gains impact through collaboration with the School of Education.
Industry. Our research on cognitive and computational neuroscience is informing commercial collaborations in human-computer/robot interaction, and rehabilitation and cognitive prosthetics following stroke and traumatic injury.
Governmental and non-governmental policy. Our work informs government policy on important social issues both nationally (gambling law, age limits on abortion) and internationally (child protection and institutional care).
Charity. Many of the above activities also involve charities that take a direct interest in the end-users affected by changes in policy and practice. We inform charity policy through consultation and board membership.
***Public Engagement*.** Because of its relevance to policy, practice, and everyday human behaviour, our research is of considerable interest to science educators and the general public reached through a variety of popular media, through events in science museums, festivals, and outreach events at the University.

b. Approach to impact

The School's success in translating research into impact on policy, practice, and public engagement has been established through a range of methods and approaches.

Collaborative and commissioned research with stakeholders enables the generation and direct dissemination of new knowledge with immediate impact *(eg Stakeholder;* Staff*).* The Birmingham Cognitive Screen – a screening instrument for cognitive deficits following stroke (see case study 4) – grows from a collaboration between academics in the School and hospital neuropsychologists and neurologists. The School collaborates with NHS practitioners in stroke rehabilitation (Wing, Rotshtein, Miall), including three multi-centre grants and two Birmingham-led grants on limb and gait retraining, funded by NIHR, MRC, Stroke association and EU-FP7. The School has been a World Health Organisation international Collaborating Centre for Child Care and Protection from 2006-2010, playing a leading role in the transformation of institutional care for young children across Europe (see case study 1). Expertise in qualitative and survey methods has driven collaboration to improve NHS services (Royal Orthopaedic Hospital & Coventry and Warwickshire NHS trusts; Larkin, Newton, Rose, Kroese). Other work has been **directly commissioned**: investigating methods for introducing novel foods to young children (*Danone*;

Blissett, Harris, Higgs); evaluating effectiveness of victim support interventions (*Victim Support*; Beech); evaluating community-based sex offender treatment programme in Northumbria (*Ministry of Justice*; Beech).

Direct practice allows rapid integration between research and application. We have 7 staff whose contracts are split between University and external services, or who have moved to the University from NHS or forensic services. These staff bring expertise in translation, maintain active collaborations with end users of research, and frequently collaborate on the development and evaluation of new interventions, treatments or policies. Research on early intervention in psychosis (Impact case study 2) and on CBT treatments for psychosis is closely integrated with Birchwood's work as clinical director to the YouthSpace youth mental health service and Director of research and Innovation for Birmingham and Solihull Mental Health Foundation Trust. Other such relationships have led to new methods for risk assessment and treatment of sex offenders (case study 5), to establishment of a health visitor programme in Essex that identifies children at risk for abuse/neglect (Hamilton-Giachritsis), and to development and evaluation programmes for anger management and sex offender treatment for people with intellectual disabilities (Rose, Kroese). Recently the School became the organising hub for the C-Link collaborative network between researchers and police organisations in 7 countries, to share data for development of advanced methods of crime linkage (Woodhams, funded by Leverhulme Trust).

Active dissemination enables us to reach new stakeholders. We organise workshops that enable practitioners, policy-makers, patients and other interested parties to learn about our work and provide feedback that shapes further research. Events organised by us include workshops on: psychosocial issues for young people with coeliac disease (*GPs, gastroenterologists, health professionals*; Howard, Law); multiple perpetrator rape (*HM Prison Service, police, victim support charities*; Woodhams), preventing child abuse and neglect in institutional care (*UN/UNICEF, government advisors*; Hamilton-Giachritsis), brain injury and rehabilitation (*patients, practitioners and service-providers*; Bickerton, Miall, Wing, Rotshtein) and dementia care (*Strategic Health Authority, GPs, service-users*; Oyebode). The University's Centre for Obesity Research trains "obesity ambassadors"; enthusiastic volunteers who both learn about obesity research through the centre and act as links to schools and other community groups.
We also prepare **educational materials** for charities, patients and the public at large, including: Information booklets and DVDs to help parents/carers deal with challenging behaviour of individuals with severe intellectual disability (Oliver); a commercially available DVD for children with Coeliac disease (Howard, Law); a briefing document on crime linkage for the National Policing Improvement Agency (Woodhams); practitioner-directed fact sheets about toddler feeding (Harris).

Knowledge-transfer has been further enabled by two K-T grants from the ESRC, supporting information provision to carers and charities for people with rare genetic disorders, and to patients with Coeliac Disease. ***A BPS-funded Seminar Series*** brought together practitioners and researchers investigating Multiple Perpetrator Rape. ***Training and knowledge transfer has also been enabled by collaborative studentships with the public and private sector.*** We have fully-funded studentships supported by charities (e.g., *Autistica, Acquarius, CEREBRA, Hillary Green Foundation*). Through CASE and other schemes we have been able to attract matching funding for 18 studentships from private and third-sector organisations, including the Ministry of Justice, NHS, Bromford Housing Association, Aston Reinvestment Trust, the motion capture company Qualisys, and the experimental medicine company p1vital.

Collaborations with industry have been assisted by a BBSRC pathfinder grant, and a University Business Fellowship (funded by the London Technology Network). These have helped secure industrial contributions to our centre for Computational Neuroscience and Cognitive Robotics, including £1.1M committed from QinetiQ, a company developing bomb-disposal and fire fighting equipment. They have helped UoB co-ordinate three major EU-funded projects with industrial partners in the UK and Spain. Cogwatch (industrial partners BMT, Headwise and RGB Medical Devices, SA) assists daily activities of stroke patients with cognitive impairment of action. Coglaboration (industrial partners RURobotics, Treelogic and Technalia) targets fluent human-robot interaction, with applications to industrial maintenance and assembly. Nanobiotouch (industrial partner, Unilever) is developing biomimetic tactile sensing. Our EU-Initial Training Network grants have involved international industrial partners: AlphaOmega (Israel); Chronos-Vision GmbH (Germany); Noldus Information Technologies (Netherlands); Industrial Development

Bangor (Wales); Brain Innovation B.V. (Netherlands) and Volvo (Sweden). These links enable the generation of students trained in these networks to develop the impact of their academic work.

We are actively involved in public engagement, across a wide range of media. Our staff have featured on BBC radio and TV news and current affairs, ITV, Channel 4, and the National Geographic channel (Blissett; Welchman; Braithwaite; McCleery & Apperly; Derbyshire; Harris; Orford; Wing). Our work has featured prominently in **international popular science journalism**, with features in New Scientist highlighting the work of Apperly, Braithwaite and Higgs, and a feature and podcast in Nature highlighting the work of Miall and colleagues. Three members of the School are **STEM ambassadors**, and are involved in highlighting scientific psychology and neuroscience to school children in the Birmingham area. We have a long-standing relationship with Cadbury College, a local sixth form college with a highly diverse intake reflecting the social and ethnic mix of urban Birmingham. During a week-long event pupils from the College come onto campus and attend talks and demonstrations on psychology, and take part in research. We regularly accept sixth former Nuffield Research Placement bursary holders.
Our staff participate in many **public science festivals**, including Brain Awareness Week, the British Science Festival, Cheltenham Science and Big Bang festivals, and the Battle of Ideas. We have also collaborated with artists in a range of music and drama events. These include a Wellcome trust Arts Project called "Supersizeme Science" with Jestaminute Theatre Company in 2008 (children were involved in devising a play on issues around obesity); Aldeburgh music festival (workshop on timing and rhythm); Brum Dine With Me (EU-funded engagement event on science of eating); Brain awareness week event on "Art and the brain", and a documentary "Capturing Life" screened at the Metropolitan Museum of Art, New York, and October Gallery, London.

Our expertise is often sought in the role of consultants for key stakeholders. Examples include *(Stakeholder; Staff)*: serving on national clinical guideline committees (NICE; Birchwood, Copello); expert advisors on intimate partner violence (Scottish Parliament; Dixon) and crime linkage (e.g., Scottish Crown Office, Metropolitan Police, South African Police force; Woodhams); evidence given to Parliamentary Select Committees on foetal pain, and gambling (UK Parliament; Derbyshire, Orford); an advisory paper on mental ill-health in people with learning difficulties (Department of Health; Rose, Kroese); hypnotic methods for pain control (MoD; Derbyshire).

Charity board membership enables members of the School to advise on clinical, scientific and policy developments to support carers and professionals in service delivery. Oliver is chair/co-chair of national and international scientific and clinical advisory committees for the Cornelia de Lange Syndrome Foundation, and the Smith-Magenis Foundation, and is a member of the Prader-Willi Syndrome Association Scientific Advisory Committee and the Cri du Chat Syndrome Support Group Clinical Advisory Committee. Dixon chairs the West Midlands branch of the British Association for the Study and Prevention of Child Abuse and Neglect; Rose sits on the management board of Dudley Advocacy (service for people with intellectual disability); Howard sits on the Coeliac UK Health Advisory Board; S. Wood is a board member of the International Early psychosis Association; A. Wood is a member of the executive committee of the Australian Pregnancy Register for Women with Epilepsy and Allied Disorders; Bickerton is a Management Board member of the NIHR West Midlands Stroke Research Network.

c. Strategy and plans

Strategy development. In response to the growing importance of impact, and the potential benefits to be gained from a more co-ordinated approach, the School established a committee for Research and Knowledge Transfer in 2010. An early outcome was recognition that, in addition to current programmes of impactful work, there are areas of strength in primary research that present further opportunities for substantial impact. We also recognised that while most impact is best achieved "bottom-up" from the activity of individual research groups, there is a valuable role for institutional support in enabling the development of new impact. One role of this committee has therefore been the development of an impact strategy, with three key components.

Tactical support for existing and new impact. Pump-priming funds have supported impact activities, including workshops for practitioners working on neuropsychological rehabilitation, and Coeliac disease, and development of web resources for disseminating research to families and charities concerned with neurodevelopmental disorders. In the latter case, the preliminary work

funded by the School supported a successful ESRC knowledge transfer grant application supporting development of a full-scale site.

Strategic support to bridge between "pure basic" and applied research. The objective of increasing our impact has guided the recent appointment of staff who can bridge between traditional areas of "pure-basic" research strength in the School, and areas that have established records of generating impact. For example, A. Wood and S. Wood, de Brito and McCleery, bridge between behavioural neuroscience and work in maternal/neonatal health, psychosis, psychopathy and neurodevelopmental disorders, respectively. A Marie Curie outgoing fellowship (Woodcock) bridges between primary work on attention (Humphreys, Mevorach) and applied work on neurodevelopmental disorders (Oliver), and forges links with Peking University. A University Research Fellowship supports translation of work in neuropsychology into a cognitive screen used by neurologists and clinical neuropsychologists in the UK and overseas (Bickerton). A new Chair bridges between work on visual attention into application in consumer psychology (Raymond). Finally, as described above, we have been able to use School and College resources, as well as ESRC and BBSRC CASE schemes to attract matching funding for 18 studentships from private and third-sector organisations. This investment builds links with non-academic institutions to increase the impact of our work.

Building a research culture with greater awareness of impact and how to achieve it. Our annual personal development reviews for staff have been amended to ensure that plans for achieving and extending impact are discussed, and our process of internal grant pre-submission review now specifically advises on impact. The School has initiated a programme of research workshops on impact, including advice from staff currently leading high-impact activities on how to plan and fund impact. Recipients of pump-priming funds for impact produce short "how-to" guides to assist others, and examples of successful impact plans for grant proposals are provided for new grant applicants. We are establishing long-term commitments to public engagement by staff, and by new generations of researchers. In 2012 the School committed to quarterly "Meet the psychologist" events at Birmingham Thinktank (science museum), where staff and PhD students present displays and demonstrations on a research topic to a large audience of the general public. Grant applicants can sign up to this scheme as part of their impact activities. Training of postgraduates in public engagement is now supported by an annual workshop on popular science writing, led by Thinktank's director of science education. The best examples of the short guides produced are made available to the public in the museum.

Institutional support. Development of impact is also supported by the College of Life and Environmental Sciences, and the University. The College organises an annual impact conference to share ideas and innovations for impact between its constituent Schools, and with invited speakers from key stakeholders in charities, industry and outreach. The University's Research and Commercial Services unit helps mediate between academics and businesses for collaboration (e.g., finding appropriate industrial partners for EU FP-7 and related applications), and commercialisation (e.g., the unit assisted with commercialisation of the Birmingham Cognitive Screen (case study 4) the proceeds from which fund staff to train new adopters of the screen).

d. Relationship to case studies

The case studies represent our most mature and substantial examples of impact. The origins of most pre-date our new strategies in support of impact, and have been critical in informing impact strategy development. For example case study 4 illustrates the value of strategic institutional support for a researcher devoted to managing the transition between the creation of a product (a neuropsychological assessment) and the point at which the income it generates makes the impact self-sustaining (by funding expert training in its use). Notably although the individual case studies are presented in isolation, they are in many cases closely integrated with other work going on in the School. It is clear that developments of such work will continue to be a key driver for new impact over the coming period. We also anticipate that entirely new impact of this scale and significance is more likely to come from integration between our "pure-basic" and "applied" research than from either one individually. The strategy of motivating and nurturing the collaborations necessary for such future case studies is a critical feature of our approach to impact and the research culture of the School.