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Independent examination boards and the start of a national assessment system

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Examinations in the Age of Reform

The 1850s was the decade in which public examinations were run for the first time for secondary age students in England. To describe what came into being at first as 'a system' would be to misrepresent the ad hoc and small-scale nature of the operation. But the methods of running public examinations chosen in those early days has remained with us for 150 years. The effort to get something started was made by committed individuals and, with minimal government help, they enlisted the support of independent institutions. Indeed, at the beginning of that century the country did not expect the government to take responsibility for the education of its citizens, let alone for a system of public examinations. However, reform was in the air.

The introduction of examinations to the universities at the beginning of the century was seen as having been successful in raising standards at the universities. Students were now being required to demonstrate that they deserved their degrees and university posts were offered on the basis of merit and not of patronage. Thus people who had been through the universities began to argue that exams would be a tool for improvement on a wider scale (Montgomery, 1965). Under the influence of thinkers like Jeremy Bentham and John Stuart Mill, the idea took root that it was the responsibility of government to stimulate society to improve itself. The aim was, according to Mill's familiar phrase about Bentham's 'utilitarian' doctrine, the greatest happiness of the greatest number, and the engine which would drive this movement would be 'self-interest', or to use a less pejorative phrase, 'self-help'. As part of his plan for a modern society, Bentham (1827) worked out an elaborate examination system for applicants to the Civil Service and Mill (1859) later proposed a system of compulsory education based on an examination system.

Teacher accreditation schemes

As well as in the universities, public examinations were established in other areas before they were established for school students. In 1846 a scheme was set up by the government under which pupil-teachers were apprenticed to schoolmasters and mistresses. They started at the age of 13 and were examined at end of the fifth year of their apprenticeship by Her Majesty's Inspectorate (HMI), which had been set up in 1839. Prizes and scholarships were awarded to successful candidates. In addition to this scheme, grants were also made to students at training colleges. Both of these processes were managed through annual exams administered by HMI. For the colleges, inspectors at first paid individual, annual visits but from 1846 common exams were set simultaneously for all. As Roach (1971) has pointed out, the examination system for teachers was the first common test in England set on a general syllabus and taken in a number of separate places.

In addition to this government-run scheme, examinations for teachers were set by The College of Preceptors, which was set up in 1846. This independent organisation was given a royal charter in 1849 with the stated aims of improving teachers' knowledge and of granting certificates of fitness for office to teachers. College of Preceptors members were those working in private schools run for 'middle class' pupils. (For 'middle class' schools, see below.) Very few teachers came forward to take these exams, but in 1850 the College started examining pupils and these exams were fully operational in 1854. Again Roach (1971) points out that these were the first external examinations held for students in middle class schools in the country. However, the College of Preceptors was a small organisation and it lacked prestige, particularly as the public were suspicious of exams that were run by teachers (Montgomery, 1965).

Society of Arts[1]: Trade exams

From the 1820s onwards, those who had reached their teens with or without elementary schooling, could attend a growing number of private educational institutes, called 'Mechanics Institutes'. One of these was started in Wandsworth in 1853 by James Booth, whose important role in setting up the Society of Arts exams is described by Frank Foden (1989). At Wandsworth the Institute catered for 'the instruction of the children of artisans and small tradesmen in the knowledge of common things, that may be turned to practical usefulness in after life'. For a charge of one shilling or 1/6d a week children were taught 'a little of mechanics, chemistry, use of the steam engine, and geography, history and arithmetic and their bearing in relation to trade' (Foden, 1989).

In 1853 the Society of Arts (SA) proposed 'a scheme for examining and granting certificates to the class students of Institutes in union with the society [of arts]'. The first exam was offered in 1855 but only one candidate applied. (He was a chimney sweep called William Medcraft, and he studied at the Belmont Mutual Improvement Society.) Exams were offered again by the SA in 1856, and this time 42 candidates presented themselves. (This time William Medcraft managed to obtain pass certificates in arithmetic, algebra and geometry.) Foden credits James Booth with much of the work on rescuing the SA examinations, for he became chairman of the SA Board of Examiners after the debacle of 1855, and it was his revised scheme that can be called the blueprint for all future schools examinations. (See Foden, 1989, chapter 8 for the background to this and the next section.)

The Society of Arts fairly quickly, in 1859, handed over its examining activity in the Sciences to a government body, the Department of Science and Art. This department, one of whose aims was to encourage schools to take on the teaching of Science, distributed money to schools

1 The Society of Arts (which became the Royal Society of Arts in 1907), had been founded in 1754 with the aim of promoting art, industry, commerce and invention by awarding prizes and grants. It promoted the Great Exhibition of 1851 and at that time Prince Albert was its President.

on the basis of their pupils' performance in exams. Later (in 1879) the SA handed its exams in technology to the City and Guilds of the London Institute, thus keeping only its commercial exams, which RSA Examinations retains to today. The Society of Arts exams made, and have continued to make, a very significant contribution to the development of adult and work-orientated education in the country.

A blueprint for an exam system

As well as their impact on adult education, the SA's exams had a significant effect on the development of school exam administration, for they had demonstrated what could be made to work in practice. The following were features of the SA system, set up by the committee chaired by James Booth, and these features were taken on by other agencies, thus becoming part of the examination system with which we are still familiar.

Exams were to be held annually (in March) and exam timetables were published in advance.[2] Society of Arts rules allowed single subject entry and it was assumed students would take up to three subjects. (The university Locals later required students to attempt a full range of subjects.[3]) Sample question papers were sent to institutions and candidates were encouraged not to spend time on subjects that would not come up in the papers (Foden, 1989). Soon this led to the production of examination syllabi, which came to dominate the teaching syllabus (as indeed was hoped by the reformers). Question papers were set by the examiners and quickly they required only written answers. Initially, the invigilation was conducted by the examiners themselves, which enabled oral examinations to be conducted at the discretion of the examiner, usually to confirm the award of an 'excellent' grade. This was the model that James Booth knew from his days at Trinity College, Dublin and it presupposes a personal link between the examiner and the candidate which was quickly lost. The format of timed, essay-type questions was not old: it was the product of the constraints and conditions under which public examining began, and was an inevitable product of the increasing number of candidates.

The examiners who marked the papers were regarded as the 'best authority' and were chosen for their eminence in their field. It was not until much later in the century that teachers began to be involved in external examining. (The SA's 43 examiners in 1856 included: 14 Fellows of the Royal Society, 13 professors – 8 from King's College, London, The Astronomer Royal, Two Reverend Principals of Teacher Training Colleges, 2 HMI, including Frederick Temple, a future Archbishop of Canterbury.) Students' performances were divided into class 1 (excellence), 2 (proficiency), 3 (competence). Those who didn't make the grade were 'refused' or more colloquially, 'plucked'. No credit was given for a smattering of knowledge, poor spelling, or illegibility. The 1st class was very cautiously awarded.

It was felt from the start that feedback to centres should be given after the exams. This was of particular significance because a central purpose was to encourage improvements in schools and institutes. The examiners therefore took on an authoritative tone in their reports and saw it as their business to point out the deficiencies not only of the candidates but of the teaching programmes which had produced them.

'Middle class' schools

One familiar aspect of the Victorian era is their openly accepted division of English society into classes. The rapidly expanding middle class was seen to include a range of people from newly-successful industrialists to clerks and book-keepers, farmers, shop keepers and tradesmen. The issue of the need for examinations was discussed in class terms, as the need to improve 'middle class' secondary schools was seen as a major issue. Middle class schools did not attract government support, they were privately run and parents paid fees. Some of the schools were long-established grammar schools which had been allowed to deteriorate, some had historic endowments to provide education for certain groups of children and some were institutions started in people's private property and run by them and their families. Some of these private schools were good, but in many cases they were not. Charles Dickens' portrayal of schools in *Nicholas Nickleby*, *David Copperfield* and *Our Mutual Friend* gives a campaigning novelist's view of early Victorian middle class education and teachers.

Many Victorian reformers focussed their attention on this class of pupils and their schools, none more thoroughly than Nathaniel Woodard. He described the range of middle class people by dividing them into two grades: 1- gentlemen of small incomes, solicitors, surgeons, unbeneficed clergy, army and navy officers; 2- trades people, retail shop owners, publicans, 'respectable tradesmen dealing with the higher classes' (Woodard, 1848). Woodard was concerned that the church should lead the way in providing schooling for the children of such groups and he set about raising funds and then founding private schools, which are still known as 'Woodard Schools' (Woodard, 1851). He responded to the needs of the middle classes by founding schools: others envisaged public examinations as the way to improve middle class education.

The Oxford Local Exams

The start of the Society of Arts exams was significant not only for its own sake, but also because that experience played a part in the establishment of examining at Oxford and Cambridge. Two people who were involved in both the SA's and Oxford's exams were Viscount Ebrington and Frederick Temple. Ebrington was a land owner in Devon, and an MP, and he became Chairman of the Society of Arts' Council in 1854. This was the year in which the first proposal to set up an exam system was put to the SA. His particular concern was for the education of farmers, labourers and country tradesmen – a country equivalent of a wider concern for the poor standards of education for 'middle class' children. Ebrington's plan was for setting up a system of 'county degrees, awarded on the basis of county examinations'. Finding SA reluctant[4] he and another local landowner set up their own exam in Exeter in Easter, 1856 with support of the Bath and West Society. Ebrington offered a prize of £20 for the best performance of any young man between 18 and 23 who was the son or relative of a Devon farmer.

2 It is interesting to note that advances in technology, such as steam printing and the introduction of a postal service, made such an enterprise possible. Also, when local exams were planned, the examiners were able to reach local centres by railway.

3 The Locals and later the School Cert., in 1918, fostered the system of requiring students to sit for groupings of subjects, but in 1951 the 'O' level system went back to single subject entry.

4 Ebrington also thought that SA had insufficiently strong influence on public opinion to hold examinations. It was also the case that the SA planned its exams for adult workers not school students.

The Exeter committee asked the Department of Education for help in setting up their local exam and they were given the help of Frederick Temple[5]. It was Temple who became the primary link with Oxford University and in February 1857 Temple wrote to Robert Scott, Master of Balliol College proposing that the university should run local examinations. He drew up a clear and detailed scheme showing how it would work (Sandford, 1906, quoted in Roach, 1971). Roach concludes that it was Temple who was responsible for setting out a practical scheme of examining which convinced Oxford University that they could run such a system.

In 1857 a committee set up by the Oxford University Senate worked on Temple's idea. The scheme received a warm welcome. The *English Journal of Education* (1857) wrote that Temple 'had struck the key to a thousand hearts'. In June 1857 the University of Oxford Delegacy of Local Examinations (UODLE) was established by statute. Its aim was to conduct examinations of non-members of the university. This was widely seen as part of the movement to reform universities and make them become more democratic and socially involved. At a celebratory meeting in Exeter, Temple stated: 'The universities should be made to feel that they have an interest in the education of all England' (Sandford, 1906). The first Oxford Local Examinations were conducted in the summer of 1858 in 11 centres.

The Cambridge Local Exams

In Spring 1857, Cambridge University received a deputation from Birmingham and memorials from schools in Cheltenham, Leeds and Liverpool requesting that the issue of offering local exams be considered. The Council of Senate recommended that a syndicate be set up. This was done on 4th June and the syndicate reported on 19th November. It proposed:

- Examinations for pupils under 15 (16 was eventually agreed) and 18.
- The subjects to be examined were English Language and Literature, History, Geography, French, German, Latin, Arithmetic, Mathematics, Natural Philosophy, Religious Knowledge (unless parents objected).
- An award of 'Associate of Arts' to successful senior candidates. This proposal, accepted at Oxford, was dropped at Cambridge after intense debate.

The University of Cambridge Local Examinations Syndicate (UCLES) was eventually set up in February 1858, and the first examinations were held in December 1858. The papers were set and marked by members of the university's teaching staff, and administered by them in each locality with the support of 'local committees'.[6] It was hoped that eventually Oxford and Cambridge would work together, possibly by running exams in alternate years,[7] but this did not come about.

5 Frederick Temple was brought up in Devon, went to Oxford, and became a fellow of Balliol. Then to Education Department. Served as Principal of Kneller Hall, the training college for workhouse school masters. Then in 1855 became inspector (HMI) of men's training colleges. In November 1857 became Head of Rugby School and later was Archbishop of Canterbury. Temple was involved in SA exams as Examiner in English and was an influential member of SA's Board.

6 This link accounts for the word 'local' in UCLES' and UODLE's names. The SA exams were at first administered only in London. Candidates had to travel to SA headquarters to take the exams, a considerable disincentive. So there was quickly a demand for 'local' examinations in candidates' home towns. In the second year of its exams the SA ran a 'local' centre in Huddersfield. Even so, the expense continued to be a problem for most students at the time.

7 At first Oxford ran its exams in June and Cambridge in December. In 1860 the suggestion was revived that they should share the running of the exams by having them in alternate years. Agreement on this could not be reached and they continued on their separate ways.

Examinations and girls' education

An area in which the hopes of the reformers were fulfilled, though they had not made this area a main focus of their plans, was the effect on girls' education of the introduction of public examinations. Emily Davies, eventual founder of Girton College, agitated for girls to be able to enter the Cambridge Locals (Stephen, 1927, quoted in Roach, 1971). She wanted girls to be judged on the same standards and curriculum as boys and definitely turned down any idea that girls should follow separate syllabuses or tackle different exams (which was all that was offered by Oxford initially). At first the Cambridge Syndicate only agreed that girls could 'unofficially' sit the exams to be taken in December, 1863. This gave the girls only 6 weeks to prepare, but the campaigners were determined to make the best of the opportunity. 83 girls took the exams in London. Miss Buss, Head of North London Collegiate School for Ladies, who was strongly in favour of exams for girls, entered 25 candidates for the UCLES' experiment in 1863.

The next step was a memorial in 1864 to the Cambridge Vice Chancellor that girls should be able to enter the Cambridge Locals officially. It contained nearly a thousand signatures. A positive report was published in February 1865 and, by a narrow majority in the Senate, entry for girls on the same basis as boys was agreed for a three year period.[8] In 1865, 126 girls took exams in London, Cambridge, Brighton, Manchester, Bristol, Sheffield. In 1867 entry to Cambridge Locals was made permanent for girls.

Miss Buss spoke at her school prize giving in 1871 of the Locals' good effect, saying, 'There can be little doubt as to the good effect of these examinations on girls' education.' In 1891 she told the governors of her school: 'Our practice has been to use the public examinations of the Cambridge and London Universities for the purpose of school external examination … Since our scheme was passed, nothing less than a revolution in the education of girls and women has taken place' (Headmistress's Reports to Governors, 1971). Roach (1971) concludes that the Locals were 'one of the most important levers in raising the whole level of women's education throughout the country.'

Criticisms of examinations

There was satisfaction within the examination boards that their efforts were indeed helping to raise the standards of secondary education generally. At the same time, however, criticisms of examinations were forcefully aired and the points made are those with which a modern reader will be familiar. One criticism commonly reported in the reports of HMI was the domination of schools' curricula by examinations, which led schools to provide too narrow a range of study, with any idea of a broader education being discouraged.

A German observer of the English education system (Weise, 1877) commented on the irony that schools were so keen for examinations over which they had so little control. Such criticisms were aimed specifically at the Locals, which appointed university men as examiners and in which teachers claimed the standards were set too high and the examiners were out of touch with schools.

8 The discussion of girls' involvement in exams revealed some deeply held views about what girls could and could not do. One Headmistress in a school in Malvern was reported as saying that 'no girl ought to go through anything that was public.' (Transactions of the Social Science Association, 1872)

Cramming and too much competition were claimed to be causing pupils to become over-strained. The argument was put forward that examinations were damaging the students' health[9], an argument that was particularly advanced when the examining of girls was under discussion. At a meeting in November 1871 the chairman of the Social Science Association, Lyon Playfair, recommended that there should be a system in England like the Prussian leaving certificate and that the exam should be 'taken with a quiet mind and without painful effort' (Sessional Proceedings of the National Association from the Promotion of Social Science, 1871–72).

A book written in 1877 by a Cambridge don, Henry Latham of Trinity Hall, *On the action of examinations considered as a means of selection*, provided the following critique of the value of what was being assessed in exams. He looked at the Civil Service exams and claimed that a high class in the exam did not mean necessarily that here was a candidate of high quality. There were two ways in which this came about. He claimed that the exams penalised important qualities such as originality and independence, and that all an exam could do was test knowledge, not mental powers or sound judgement. Secondly, Latham questioned the judgements of the examiners and claimed that their subjectivity affected the results. In reviewing the use of exams in universities, Latham argued that what was being assessed was becoming less important than the struggle of students to attain distinction and the examiners to pick out the best students. The content of the exams was thus becoming a secondary matter, yet they were dominating the teaching curriculum of the university (Montgomery, 1965).

A further strand of criticism emerged after the Bryce Commission (see below) and in some respects in response to the outcomes of that commission. In a Symposium published in 1889, entitled 'The Sacrifice of Education to Examination', the editor, Auberon Herbert, who was an advanced radical and a Liberal MP, attacked exams '... as a tool of centralisation. They increased the power of those who are in control of them' (quoted in Roach, 1971). The instrument, which initially was to have been an agent for creating change in society, had become a tool of the establishment: 'No remedy for existing evils is to be expected by substituting some of these forms of centralisation for others, but only by allowing the utmost freedom for new wants and new forms of thought to express themselves in new systems to compete with the old.' Herbert, as a free-trade economist, was suspicious of all government control and he broadened his argument for decentralisation into opposition to the setting up of an Education Department.

The Bryce Commission

In 1894 a Royal Commission was set up, under the chairmanship of James Bryce, to enquire into the whole subject of secondary education. One of the topics the commission dealt with was the proliferation of exams, and with schools' continued demand for more standardisation. The Cambridge Syndicate's view was presented to the Commission in a memorandum in June 1894. It referred to the original aim of the Local Examinations to improve the state of education in secondary schools and claimed, 'The high character of the work sent in by the pupils at many of the schools which regularly prepare candidates, and the gradual rise which has on the whole taken place in the difficulty of the examinations, afford a satisfactory evidence of progress. The Syndicate believe that this progress may fairly be attributed in a considerable degree to the local examinations themselves.' (Royal Commission, 1895).

The commission reported in 1895 and accepted the important role that examinations played in the system. It recommended the setting up of a central government board and in 1899 the Board of Education was created. Later, in 1902, The Balfour Education Act provided for the establishment of a system of state secondary schools through Local Education Authorities. However, concerning examinations, Bryce took on what was by then the traditionalist point of view, (Montgomery, 1965), that it was preferable to leave examination boards as they were, and to preserve the links with the universities.

The contribution of independent organisations to examining

The introduction of national examinations in this country owes much to an attitude that lay deep within the Victorian view of society: that people should be free to develop themselves. This led to a *laissez-faire* attitude to government intervention in education, but it also left space for the energetic work and enthusiasm of individual educationalists, and of educational institutions. The consensus at the end of the century was that, rather than concentrate power over education in a single government department, such power should be diffused into strong, but accountable, institutions.

How far this was a reason that the work of the mid-nineteenth century pioneers endured needs to be thought through. The focus of that discussion should not be merely on procedural and administrative matters (i.e. who could run the system most efficiently?), but on the educational value of the work that has been done. Exam boards with their roots in universities or other educational institutions, and later with full teacher participation, could represent to people the underlying purpose and meaning of education. Their certificates could express the candidate's relationship to the educational enterprise. This gave them more than utilitarian value. Candidates were linked to the value-base of the academic disciplines and to the communities of those who adhered to those disciplines. In the case of vocational exams, the board (e.g. RSA Examinations) gained its credibility by fostering close relationships with the world of industry and commerce, and by linking students with this world. In a similar way to the academic enterprise mentioned above, its assessments gained their meaning and value from the human activity (commerce) which was their focus.

Independence for exam boards was not the same as licence. They could not act only on their own account, and it was because they were independent that they had to build relationships with their centres and candidates. This sense of relationship extended to that between the examiner and the examinee, in which the examiners tried to do a fair job for each individual student. If the transaction between the examiner and examinee had become purely bureaucratic and impersonal, the system would have been in danger of losing its sense of fairness for the candidate. With the huge increase in examination taking which we now see, this is one of the strong arguments for including a role for teacher assessment in the process, as well as for the need to maintain trust in 'the examiner'.

9 Henry Latham, in his comprehensive book, *On the action of examinations considered as a means of selection*, 1877, deals with this point. He claims that he had found that students who had undergone too many exams 'were, usually, for long time, incapable of giving their minds steadily to any subject requiring close attention', p.48.

The Locals began in the 1850s partly because they were seen to be a fair way to identify and reward ability. Twenty years later the boards were working out their responses to accusations of not being fair. It is how far the present examination system is seen as being fair to individuals which will make the difference between it being perceived as a liberalising or a reactionary one. Independent examining boards are well-placed to respond to this challenge and they continue to play an important part in maintaining the credibility of that system.

References

Bentham, J. (written and printed 1827, published 1830). *Constitutional code: Vol. 1.* London: R.Heward.

English Journal of Education (1857). **XI**, 226.

Foden, F. (1989). *The Examiner, James Booth and the Origins of Common Examinations*. Leeds: School of Continuing Education, University of Leeds.

Headmistress's Reports to Governors (1871). **II**, 256–256.

Herbert, A. (ed.) (1889). *The sacrifice of education to examination*. London: Williams & Norgate.

Latham, H. (1877). *On the action of examinations considered as a means of selection*. Cambridge: Deighton, Bell.

Mill, J.S. (1859). *On Liberty*. London: John W. Parker & Son.

Montgomery, R.J. (1965). *Examinations: An account of their evolution as administrative devices in England*. London: Longmans.

Roach, J. (1971). *Public Examinations in England: 1850 – 1900*. Cambridge: Cambridge University Press.

Royal Commission on Secondary Education 1894. (1895). **V**., 268. London: HMSO.

Sandford, E.G. (ed.) (1906). *Memoirs of Archbishop Temple by 'Seven Friends'*. **II**, 541, 68–69; 549. London: Macmillan & Co. Ltd. Quoted in Roach (1971).

Sessional Proceedings of the National Association for the Promotion of Social Science, 1871–72. 29.

Stephen, B. (1927). *Emily Davies and Girton College*. 83–4. London: Constable. Quoted in Roach (1971).

The Transactions of the Social Science Association (1872). 271–9

Weise, L. (trans. L. Schmitz, 1877). *German Letters on English Education: Written during an Educational Tour in England in 1876*. London: Collins.

Woodard, N. (1848). *A Plea for the Middle Classes*. (pamphlet).

Woodard, N. (1851). *Public Schools for the Middle Classes*. (pamphlet).

PSYCHOLOGY OF ASSESSMENT

Investigating the judgemental marking process: an overview of our recent research

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Prior to Cambridge Assessment's recent interest in the area, the process of marking GCSE and A-level examination questions had received surprisingly little attention among psychologists and social scientists. Whilst there has been some research into marking processes in other contexts (e.g. English essay marking: Barritt, Stock and Clark, 1986, Pula and Huot, 1993; English as a second language: Cumming, 1990, Vaughan, 1991, Milanovic, Saville and Shuhong, 1996, Lumley, 2002) to our knowledge, only Sanderson (2001) has explored the process in depth, producing a socio-cognitive model of A-level essay marking. To address this dearth in knowledge, members of the Core Research team have conducted several linked projects, considering the marking process from different angles. Key aims have been to provide insights into how examiner training and marking accuracy could be improved, as well as reasoned justifications for how item types might be assigned to different examiner groups in the future.

As with any major research question, the issue of how examiners mark items needs to be explored from many different angles to gain as full and cohesive an answer as possible. In biological research, for example, the nature and effects of an illness are explored at multiple levels: molecular, intra-cellular, cellular, physiological, whole organismal, and even epidemiological and demographic. Similarly, some physics researchers conduct fine-grained analyses of minute particles, while others monitor massive structures in space, both in their attempts to establish how the universe began. Linking together these jigsaw pieces in order to see the bigger picture and gain a real overview of a process or phenomenon can be a difficult but necessary challenge. As with biology and physics, this is an important task for researchers in educational assessment.

To recognise the different approaches to research and analysis that the marking process engenders, it is worth considering the very broad research field in which it primarily lies – that of human judgement and decision-making. There exist a number of well-established approaches to investigation, adopted by researchers working within diverse paradigms, and as with the natural sciences, questions are explored on a number of levels. For example, a key approach has been to ask *what information* people attend to and utilise when making decisions. On perhaps the most 'fine-grained' level of research, cognitive psychologists have identified and scrutinised shifts in visual attention among small pieces of information, such as letters, numbers and words on a page of writing. At another level, other psychological researchers have focused on cognitive heuristics and biases in information processing. At yet another level, the influences and roles of behavioural and social information have been explored by researchers interested in such dynamics, and at yet another level still, the effects of physical information in the environment have been studied. Studies at all of these levels have provided important contributions to our understanding in the research field, although there is the potential for them to be integrated much more.

Another popular approach to understanding judgement and decision-making has been to explore the sequences of mental operations by which people arrive at their choices. This approach has proven particularly popular in clinical and legal settings, and again, it has been adopted at a number of levels. In the Core Research team's work on the marking process, we have combined this approach with the one outlined above: