

Impact case study (REF3)

Institution: Brunel University London		
Unit of Assessment: 4 – Psychology, Psychiatry and Neuroscience		
Title of case study: Supporting Children with Learning Disability or Dyslexia to Continue Their Education in Japan		
Period when the underpinning research was undertaken: 2009-2019		
Details of staff conducting the underpinning research from the submitting unit:		
Name(s): Professor Taeko Wydell	Role(s) (e.g. job title): Professor of Cognitive Neuroscience	Period(s) employed by submitting HEI: 08/1995-present
Period when the claimed impact occurred: 2017 – Dec 2020		
Is this case study continued from a case study submitted in 2014? No		

1. Summary of the impact (indicative maximum 100 words)

Prof Wydell has developed the first and only testing system (STRAW-R) that allows the identification of learning disability (LD) and dyslexia in the 6,381,506 children aged 13-18 in Japan.

STRAW-R was published in 2017, and by November 2020, 7,211 Japanese institutions were known to be using it, of which approximately 75% are in the education sector. It offers a quick, practical and reliable solution for schools to design and implement tailored intervention programmes. Teachers, with some training, can conduct the tests and review annually the effectiveness of their intervention programmes for each child.

As the only test identifying dyslexia, which is often unrecognised unless accompanied by behavioural disorders, it has informed the public, the educational sector and health professionals of the existence of dyslexia in children who were otherwise labelled as too 'lazy' or 'stupid' to continue education, and consequently became 'drop-outs'. Undiagnosed, their condition not only affects their educational progress, but can also lead them to develop other types of developmental and/or behavioural disorders that would have required extensive professional support and care from the medical sector.

The results from STRAW-R provide scientific evidence about the incidence of dyslexia and have served as a basis for decision-making by the Municipal Boards of Education and Support in Japan. For the first time, it has provided a standardised way for the nation to speak of the level of LD conditions and design and implement support provisions. As the result of implementing STRAW-R, Japan now has official statistics on children with LD at junior high schools (aged 13-15): in 2020, 83,802 children at junior high schools were known to require special education needs for LD and dyslexia.

2. Underpinning research (indicative maximum 500 words)

Prof Wydell at Brunel University has been conducting research on the universality and specificity of language/reading processes in alphabetic and non-alphabetic languages. In the English-speaking world, between 10-12% of individuals are reported to be suffering from dyslexia. For Japan, Prof Wydell reported for the first time in 2009 that less than 1.4% of the Japanese primary school children had reading problems with syllabic Kana, and 6.9% of them had reading problems with logographic Kanji. This was based on an objective study where every participating child was assessed individually on their cognitive abilities such as visuo-spatial processing/

Impact case study (REF3)

phonological & visual short-term memory processing skills as well as maths, reading and writing skills (Ref 1).

While there is a wide consensus that developmental dyslexia is a neurobiological disorder with a genetic origin, Prof Wydell's research demonstrated that among non-alphabetic language users such as Chinese and Japanese, children's reading and writing impairments were attributed more to visuo-spatial as well as orthographic processing problems rather than phonological processing deficits, which are more prevalent in alphabetic languages (*for Japanese*: Ref-2; Ref-3; *for Chinese*: Ref-4; Ref-5). Prof Wydell thus argues that the difference in the prevalence of dyslexia across different languages/writing systems might be due to the inherent characteristics of each language/writing system. (Ref-2; Ref-6)

Building on Prof Wydell's first development of STRAW-I which identified reading/writing problems but also areas of cognitive deficit (e.g., visuo-spatial processing deficits, visual short-term memory deficits, etc.) for children aged 8-12, Prof Wydell has further developed STRAW-R that offers more comprehensive testing capacity, (e.g., testing "fluency" - processing speed) for children aged up to 18 in Japan.

Prof Wydell reported case studies of Japanese post-graduate students studying at a post-graduate art college in the UK, who were identified as dyslexic in English. While they were in Japan, they did not experience any difficulties at school/university. Using STRAW-R Prof Wydell revealed that these Japanese post-graduate students were impaired at fluency retaining accuracy in reading/writing in Japanese. No other test in Japan could have identified their difficulty in Japanese.

3. References to the research (indicative maximum of six references)

- Ref 1 Uno, A., **Wydell, T.N.**, Haruhara, N., Kaneko, M., & Shinya, N. (2009). Relationship between reading/writing skills and cognitive abilities among Japanese primary-school children: normal readers versus poor readers (dyslexics). *Interdisciplinary Journal of Reading & Writing*, 22, 755–789. <https://doi.org/10.1007/s11145-008-9128-8>
- Ref 2 **Wydell, T.N.** (2019). *Developmental Dyslexia in Japanese*. In Ludo Verhoeven, Charles Perfetti & Ken Pugh (Eds) *E-Book, Developmental Dyslexia across Languages and Writing*. Part-1. Cambridge: Cambridge University Press. ISBN: 9781108686402 <https://www.cambridge.org/core/books/developmental-dyslexia-across-languages-and-writing-systems/DACDFD35D7C85DFF2692BA699AA1C8BC>
- Ref 3 **Wydell, T.N.** & Kondo, T. (2015). Behavioural and neuroimaging Research of Reading: A case of Japanese. *Current Developmental Disorders Reports*, 2, 4, 339-345. <https://doi.org/10.1007/s40474-015-0066-2>
- Ref 4 Meng, Z-L, **Wydell TN** & Bi H-Y (2019) Visual-motor integration and reading in Chinese children with/without dyslexia. *Reading & Writing*, 32, 493–510. <https://doi.org/10.1007/s11145-018-9876-z>
- Ref 5 Wei, T-Q, Bi, H-Y, Chen, B-G, Liu, Y., Weng, X-C, **Wydell, T.N.** (2014). *Developmental Changes in the Role of Different Metalinguistic awareness skills in Chinese Reading Acquisition from Preschool to Third Grade*. *PLoS ONE*, 9 (5), e96264. <https://doi.org/10.1371/journal.pone.0096240>
- Ref 6 **Wydell, T.N.** (2017) Reading difficulties in English and Japanese. *Japanese Journal of Learning Disabilities*, 26 (2), 143-153. <https://bura.brunel.ac.uk/handle/2438/15757>

4. Details of the impact (indicative maximum 750 words)

STRAW-R is developed solely based on Prof Wydell's research and it is the first and only test in Japan that offers a comprehensive testing capacity for identifying children with learning disability (LD) and dyslexia aged up to 18. The categories of learning disability include: intellectual disability, physical disability, physical health impairments, visual Impairment, hearing impairment, language impairment, Autism Spectrum Disorder (ASD) and emotional disability/disturbance.

STRAW-R has brought significant changes to the society and culture in Japan, most importantly, by helping children with LD and dyslexia to continue their study. Using the results from STRAW-

Impact case study (REF3)

R, junior-high schools (children aged 13-15) and high schools (children aged 16-18) have been able to identify the types of special needs required for children with LD and dyslexia in a timely manner and put in place appropriate intervention programmes. It has greatly improved the public's understanding of children with dyslexia, who were otherwise considered 'lazy' and/or 'stupid', and has empowered teachers and clinicians to share resources and discuss children's conditions with parents in an objective way. Due to its systematic and scientific approach, STRAW-R has been widely promoted by the Ministry of Education and Science in Japan.

Impact on Education and Intervention Programmes in Japan

Japan is known for its strong commitment to education. The 2019 national statistics showed that the numbers of 3-year junior-high school students (aged 13-15) and 3-year high school students (aged 16-18) are 3,218,115 and 3,168,262 respectively. Japan's compulsory education lasts 9 years up to junior high schools and yet 98% of junior-high school graduates entered high schools and 54.7% of high school graduates entered universities. A national university entrance exam takes place every year, which is critical as many corporations in Japan set a university degree as a minimum requirement for recruitment. (Source 1)

Before STRAW-R, children had no means of understanding their learning difficulties and school teachers would have to rely on their 'experience', not 'scientific evidence'.

A supervisor of school education (source 2) confirms that teachers who noticed those children with dyslexia were 'too concerned that their relationship with parents might break down and hence did not inform the parents'. Instead, they said 'let's observe them a little longer'. This only exacerbated the children's conditions and often led to them developing other types of developmental and/or behavioural disorders such as ADD, ADHD and dyspraxia.

STRAW-R has provided a solution to this; it offers a standardised test for identifying children with reading and writing difficulties and this could be easily conducted by teachers and professionals with some training:

As a Special Education Needs (SEN) teacher it has become easier for me to give instructions to class teachers on how to give support as for example, I can inform them of the level of reading attainment of an individual child with possible LD. (SEN Teacher, Source 2)

This is significant because children at risk are identified at an early stage and can easily be provided with support and intervention programmes tailored to their needs at costs affordable to schools.

'By using the STRAW-R, it has become possible to objectively evaluate children's degree of reading and writing attainment. By showing a clear basis, the class teachers also find it easier to convey the actual situation of the child with confidence to his/her parents/guardian, and it has become possible to respond quickly to the child who needs support individually.' (Supervisor of School Education, Source 2)

The Municipal Boards of Education and Support across Japan, who provide different levels of support for children with LD and dyslexia, now base their decisions on the result of STRAW-R:

The Municipal Boards of Education and Support used to make their decision for providing special need support to children with reading/writing difficulties based on class teachers' impression. Recently these decisions have been made more objectively by the results of the STRAW-R. The Municipal Boards of Education/Support nowadays combine the results from IQ and the STRAW-R to make these decisions holistically. (Japan Developmental Psychological Society Ibaraki-Pref Representative, Source 2)

As a result of implementing STRAW-R, for the first time Japan has official statistics on LD children at junior high schools: in 2020, 83,802 children at junior high schools are now known to require special education needs for LD and dyslexia. (Source 4)

Impact case study (REF3)

The Director of Learning Difficulties and Dyslexia Centre corroborates the significant impact of STRAW-R on the education system in Japan:

Since STRAW-R can measure the reading fluency (reading speed) of Primary, Junior-High and High School children, it is possible to give longer examination times for those with developmental dyslexia at the entrance examinations for High-Schools and Universities as part of “reasonable accommodation”. Test results can be considered as scientific evidence. This also applies to children taking internal examinations at schools. (Source 2)

STRAW-R has enabled the nation to speak of the level of LD and dyslexia conditions and support needed in a standardised way. As a SEN teacher says, ‘all the class teachers and SEN teachers share the same language, i.e., same terminology to discuss the difficulties that LD [and dyslexia] children may have’ and design and provide optimal care for and accommodate the needs of LD and dyslexia children. (SEN teacher, Source 2)

An education journalist, who published a book ‘I am not Lazy – Dyslexia: LD children with reading and writing difficulties’ in 2003, says:

I visit many schools/ education centres all over Japan, and I can confidently say that most of the SEN classes/ education centres that I have visited use the STRAW-R...

STRAW-R has been used to give extended exam times for entrance exams for high schools and universities as part of reasonable accommodation. Also when assessors such as doctors/ educational psychologist/ clinicians write reports they can identify levels of reading/writing difficulties, i.e., mildly affected to severely affected. (Source 3)

Cultural Impact on Japanese Perception on ‘Lazy’ Children

STRAW-R has informed the public, the educational sector and health professionals of the existence of dyslexia among children who were otherwise labelled as ‘lazy’ or ‘having some other difficulties at the time’, and consequently left with no support or became ‘drop-outs’. Dyslexia is often unrecognised unless it is ‘discovered by chance’ when children are diagnosed with behavioural disorders.

Therefore, it is not a surprise that there had been many children who had given up their education because they felt that they were not capable of continuing their learning. A Professor provided a testimony of a man whose STRAW-R test result suggested that he could be a developmental dyslexic said that he was ‘very grateful’ as ‘it shed light on why he was struggling at school, and in the end, he abandoned the idea of going to senior-high school education, believing that he was stupid.’ (Japan Developmental Psychological Society Ibaraki-Pref Representative, Source 2)

The importance of identifying dyslexia has been increasingly understood by the Ministry of Education and Science in Japan: in September 2018, they invited Prof Wydell to give a public lecture in Tokyo on how important it is to make an appropriate diagnosis of dyslexia and provide tailor-made intervention programmes. In order to do this, a standardised screening test such as STRAW-R is essential.

This is reiterated by the testimony from the Education Journalist:

I believe that the STRAW-R has contributed to the awareness change/cultural shift on dyslexia not only of the teachers or educationalists but also of the general public. Hence the STRAW-R has made it possible for dyslexic children/pupils get appropriate educational support as well as interventions. (Source 3)

STRAW-R was published in 2017, and by November 2020, 7,211 Japanese institutions were known to be using it, of which approximately 75% are in the education sector. STRAW-R have been sold to educational authorities, primary schools, schools for special needs education, local children’s welfare centres, hospitals, clinics, and universities across Japan. (Source 5)

Impact case study (REF3)**5. Sources to corroborate the impact** (indicative maximum of 10 references)

Source 1: New Record Low for Japan's Elementary and Junior High School Students (30 August 2019) *Nippon.com*

<https://www.nippon.com/en/japan-data/h00529/new-record-low-for-japan%E2%80%99s-elementary-and-junior-high-school-students.html#:~:text=A%20survey%20conducted%20by%20Japan%27s,total%2019%2C738%20and%2010%2C222%2C%20respectively>

Source 2: Corroborating letter including a collection of testimonials from the Founder of Learning Disability and Dyslexia Centre

Source 3: Corroborating letter from an Education Journalist, Japan

Source 4: Corroborator: Professor from Ochanomizu University

Source 5: Corroborator from the STRAW-R publisher, Interuna Publishing Co Ltd.