

<b>Institution:</b> Abertay University		
<b>Unit of Assessment:</b> 4 – Psychology, Psychiatry and Neuroscience		
<b>Title of case study:</b> Changing teachers' training and practice to incorporate self-referencing techniques that enhance children's learning		
<b>Period when the underpinning research was undertaken:</b> 2013-2020		
<b>Details of staff conducting the underpinning research from the submitting unit:</b>		
<b>Name:</b> Sheila Cunningham	<b>Role (e.g. job title):</b> Professor	<b>Period employed by submitting HEI:</b> 2011-present
<b>Period when the claimed impact occurred:</b> 2015-2020		
<b>Is this case study continued from a case study submitted in 2014?</b> No		
<b>1. Summary of the impact</b>		
<p>According to the Department of Education, underachievement in numeracy and literacy in UK schools undermines children's future opportunities. To address this, teachers need to develop skills that allow them to maximise children's learning.</p> <p>Professor Cunningham's work meets this need, enhancing teacher skills by establishing and disseminating the use of 'self-referencing' (linking materials with the self) in education. Her research shows that using self-referencing enhances engagement and learning in classroom activities.</p> <p>Her work has: a) established the evidence-base showing the benefits of self-referencing in education; b) influenced teachers' practice through Continuing Professional Development workshops; c) changed teacher training activities; and d) improved public awareness and understanding.</p>		
<b>2. Underpinning research</b>		
<p>The self-reference effect on memory is the tendency for stimuli (e.g., a trait like <i>modest</i>) to be remembered better when they are encoded with reference to the self (e.g., '<i>are you modest?</i>') than with reference to someone else ('<i>is Brad Pitt modest?</i>'), or at a semantic level (e.g., '<i>is modest a positive word?</i>').</p> <p>Professor Cunningham's research into the effects of self-referencing on memory began with work showing that the self-reference effect extends beyond character trait encoding paradigms and can be elicited by a minimal link with self such as 'ownership' of stimuli, which engage attention and boost memory. In ownership paradigms, participants sort stimuli into 'self-owned' and 'other-owned' categories based on a colour cue, and subsequently show a reliable memory advantage for those items 'owned' by self. Professor Cunningham's research established that the ownership effect is robust in children [3.1] and demonstrated that children show stable self-reference effects across development. Data collection for some of this developmental work began while Professor Cunningham was a Research Fellow at the University of Aberdeen (2005-2011). After moving to Abertay University in 2011, she analysed the data, undertook the intellectual interpretation, and published the research [3.2]. She then conducted new research at Abertay on the development of the self-reference effect [3.3] with the support of a £99,730 research grant from the Leverhulme trust [3.a]. The importance of this new theoretical research</p>		

is that it established for the first time that children show reliable memory advantages for self-referenced stimuli, an important precedent for the application of this tool in education.

Having shown that self-referencing engages attention and enhances memory in children, Professor Cunningham and colleagues proposed that it should be applied in learning, a line of research now supported by funding of £484,383 awarded by ESRC [3.b]. Confirming the effectiveness of this proposal, their first education study [3.4] showed that self-referencing supports children's learning of spelling words. Children practised spelling to-be-learned non-words (Exp. 1) or real words (Exp. 2) by generating sentences about themselves or another character. Those in the self-focused sentence group wrote significantly more and improved their spelling performance by an average of 20% across the two experiments.

Extending the application of self-referencing to learning more generally, a second study explored the efficacy of using ownership games in the classroom [3.5]. Children were asked to sort flash cards depicting novel shapes into self-owned, other-owned, and un-owned categories, based on either choice (Exp. 1) or colour-matching (Exp. 2). Subsequent free recall showed significantly better learning of self-owned than other-owned and un-owned shapes.

Together, these studies represent the first published demonstrations that self-referencing can be directly applied to support children's task engagement and learning in the classroom, underpinning the current impact case study.

### 3. References to the research

#### **Peer-reviewed research outputs:**

- 3.1 **Cunningham, S. J.**, Vergunst, F., Macrae, C. N., & Turk, D. J. (2013). Exploring early self-referential memory effects through ownership. *British Journal of Developmental Psychology*, 31(3), 289-301. doi: <https://doi.org/10.1111/bjdp.12005>
- 3.2 **Cunningham, S. J.**, Brebner, J. L., Quinn, F., & Turk, D. J. (2014). The self-reference effect on memory in early childhood. *Child Development*, 85(2), 808-823. doi: <https://doi.org/10.1111/cdev.12144>
- 3.3 Ross, J., Hutchison, J. & **Cunningham, S. J.** (2020). The me in memory: The role of the self in autobiographical memory development. *Child Development*, 91, e299-e314. doi: <https://doi.org/10.1111/cdev.13211>
- 3.4 Turk, D. J., Gillespie-Smith, K., Krigolson, O. E., Havard, C., Conway, M. A., & **Cunningham, S. J.** (2015). Selfish learning: The impact of self-referential encoding on children's literacy attainment. *Learning and Instruction*, 40, 54-60. doi: <https://doi.org/10.1016/j.learninstruc.2015.08.001>
- 3.5 **Cunningham, S. J.**, Scott, L., Hutchison, J., Ross, J., & Martin, D. (2018). Applying self processing biases in education: Improving learning through ownership. *Journal of Applied Research in Memory and Cognition*, 7(3), 342-351. doi: <https://doi.org/10.1016/j.jarmac.2018.04.004>

#### **External research grants:**

- 3.a Leverhulme Trust Research Project Grant (RPG-2014-310). *The 'me' in memory: Exploring the developing self and its influence on cognition*. Awarded to **S J. Cunningham (PI)** and J Ross (£99,730; 01/04/2015 - 30/03/2018).
- 3.b ESRC Research Grant (ES/T000465/1), *Self-referencing in the classroom: The influence of self-cues on children's information processing and retention*. Awarded to **S J. Cunningham (PI)**, J McLean and J Ross (£484,383; 1/6/2020 - 31/5/2023)

**4. Details of the impact**

Professor Cunningham’s research led to the development of educational resources which she has disseminated to influence teacher practice. Her impact activities have included:

- (i) delivering Continuing Professional Development (CPD) training techniques to change teachers’ practice
- (ii) changing teacher training delivered externally
- (iii) raising public awareness and improving public understanding

The activities are based directly on her applied educational research papers [3.4; 3.5].

**i) Teachers’ practice**

School teachers are the key beneficiary of the research.

To date, Professor Cunningham has delivered CPD training to approximately 80 teachers responsible for the education of over 1,500 children, in schools across three different local authorities in Scotland (Oct 2016-March 2020). Subsequent planned events had to be cancelled due to COVID-19 restrictions.

The CPD workshops explain self-referencing research and demonstrate ways in which the technique can be used to support children’s learning and classroom task engagement. Teacher Support leaflets are also distributed to maximise impact after the workshop (see examples in Fig. 1; also available online at [www.selflab.co.uk](http://www.selflab.co.uk)).



Fig 1: Example teacher leaflets

In three large schools, feedback on the usefulness of the CPD training and its impact on their practice was collected both immediately after training and after a term of practice. Responses showed that 100% of CPD attendees changed their practice to include self-referencing in class.

One Depute Head Teacher noted that:

*“The feedback from Dr Cunningham’s training was excellent and her tools are now being used by our teachers in the classroom, with all teachers surveyed here reporting that they have changed their practice to include self-referencing materials” [5.1].*

Specific examples of behaviour change include a teacher applying self-referencing in multiple tasks she was setting for children during the COVID-19 lockdown:

*“Expressive arts - I will carry out the task and upload my attempt referring to myself and what materials I used. Numeracy... Money word problems - using myself and giving examples of how I would need change to make it more realistic for learners. Health and wellbeing - Uploading different wildlife within my own garden and local area to better encourage my learners to do the same” [5.2].*

Importantly, teacher surveys and testimonials evidence that the change in teacher practice is directly linked to the CPD workshops delivered by Professor Cunningham, with Head Teacher reports noting that:

*“The staff were unaware of the technique [of self-referencing] before the CPD, so it has added to their professional knowledge and has been put to good use in the classroom” [5.3].*

### **ii) Teachers’ training**

Extending the reach of personally delivered CPD workshops, Professor Cunningham has effected a change in the training and guidelines delivered to practicing teachers at a national level through workshops delivered by an external Scottish education company (SSERC), and an external higher education institution (University of Dundee).

The Scottish Schools Education Research Centre (SSERC), a national organisation set up for the benefit of Scottish education, has modified its training to include self-referencing workshops. SSERC is funded by all 32 local authorities and provides professional learning courses and resources for teachers across Scotland. A self-referencing workshop designed by Professor Cunningham now forms part of the training workshops delivered by SSERC. According to the company’s Head of Early Years and Primary:

*“We adapted our materials as a direct result of Dr Cunningham’s research because her work has the benefit of combining tested psychology theory with practical tasks that have a real, measurable impact on children’s learning” [5.4].*

Professor Cunningham’s training resources began being delivered by SSERC in January 2020, to teachers on a ‘Primary Cluster Programme’ who are required to train other teachers in their own school cluster after receiving the training themselves. Through the collaboration with SSERC, Professor Cunningham’s research is now impacting on the practice of teachers in multiple schools and local authorities, who are responsible for the teaching of many hundreds of children.

Feedback from SSERC on the self-referencing training showed very positive impact:

*“There were 85 mentors in attendance all of whom were provided with the SSERC TV YouTube link to [Professor Cunningham’s] pre-recorded material. All 85 mentors across 6 Local Authorities accessed the link with a further 40 views of this material by other teachers. All of the mentors commented positively on the content with those in ASN [Additional Support Needs] schools or having ASN children in their classes remarking on how this will support them with their teaching and subsequent learning in their settings along with a change in their pedagogy” [5.4].*

As well as influencing practicing teachers’ professional development, Professor Cunningham’s self-referencing research has been incorporated into undergraduate teacher training programmes, influencing professional standards, guidelines, and training. Students completing the Education MA at the University of Dundee (N=120) have received training on Professor Cunningham’s self-referencing techniques during the 2020/21 session.

As a lecturer on the programme states:

*“We have modified the materials included in our MA (Hons) Education course to include instruction on using self-referencing in the classroom, as well as educating our trainee teachers on the psychology underpinning its influence. [Prof] Cunningham is contributing directly to this training. The technique of self-referencing has not previously been taught to student teachers, so including this training constitutes a change in the guidelines we provide.” [5.5].*

### **iii) Public understanding**

Self-referencing can benefit educators, learners, and parents outside of the school environment, creating a need to enhance cultural understanding of the technique. Professor Cunningham has impacted on public understanding by publishing non-academic articles and videos that have received more than 1000 views since 2019. These include a blog in *The Learning Scientists*

(2019) [5.6], an article in *Teach Early Years* (2020) [5.7] and an instructional video on the University of Dundee's Teaching Innovation and Learning Enhancement site (2018) [5.8]. She also delivered the *Leverhulme Annual Public Lecture* at Aberdeen's May Festival on self-referencing applications (2019; >100 attendees), hosted workshops on self-referencing for >150 children as part of Dundee Schools Science Week (2019), and for >400 school children and teachers who visited Abertay to take part in psychology workshops as part of a collaboration with Leisure and Culture Dundee (2016-2018).

These activities have raised public awareness and understanding of the benefits of self-referencing, with parental communications evidencing new understanding (e.g., "*Just read your piece on the "self-referencing" study... This makes so much sense and I can certainly relate it to the difficulties that [my son] has with Maths*") [5.9]. Through a combination of direct participation in Professor Cunningham's workshops and public lectures, and engagement with her online articles and videos, knowledge of the educational applications of self-referencing has now reached over 1,500 parents and children.

## 5. Sources to corroborate the impact

**5.1** Testimonial from Mrs Paula Nicoll, Depute Head Teacher, Our Lady's RC Primary School, Dundee

**5.2** Example quotations from Teacher Survey responses. Access to all paper-based survey responses available on request.

**5.3** Testimonial from Mr Mark Evans, Head Teacher, Cornhill Primary School, Aberdeen

**5.4** Testimonial from Mr Euan Mitchell, Head of Early Years and Primary, Scottish Schools Education Research Centre (SSERC)

**5.5** Testimonial from Dr Alexia Barrable, Lecturer in MA (Hons) Education programme, University of Dundee

**5.6** Self-Referencing as a Tool to Improve Learning. The Learning Scientists, Guest Blog. <http://www.learningscientists.org/blog/2019/4/11-1>

**5.7** Educational psychology – how the word 'you' can improve children's working memory. TeachPrimary article: <https://www.teachwire.net/news/educational-psychology-how-the-word-you-can-improve-childrens-working-memory>

**5.8** Can thinking about themselves ('self-referencing') help children learn? TILE EduSnaps video: <https://learningspaces.dundee.ac.uk/tile/tile-edusnaps/>

**5.9** Example parental communication received on social media following publication in non-academic outlets