

Lorraine Kennedy



**ASSIGN  
BUSTER**

Are systematic synthetic phonics the most effective method to teach a child to read within the early year's foundation stage.

According to Nick Gibb (2017, p. 1) "Teaching children to read is the key to unlocking human potential. It is the cornerstone of education." Jim Rose (2006), has stated reading fluency is the ability to identify written words quickly, accurately and effortlessly. Additionally, children who have a love of reading, will gain essential skills that leads to them accessing necessary information through to adulthood.

The more children read, the easier it becomes to decode words phonetically, which in turns contributes to them mastering reading through automatic recognition (Rose, 2006). As part of synthetic systematic phonics, children are taught a range of skills to help them recognise a word or letter then verbally repeat it (gov. uk, 1997-2011). However, there appears to be some varying analogies from theorists regarding the way a child reads.

Kathleen Rustle (2015) has emphasised effective reading skills can only be achieved through contentious intervention, instruction and practice.

Whereas, Kenn Apel, Elizabeth Wilson-Fowler, Danielle Brimo and Nancy Perrin, (2012) have included orthographic awareness which is an essential skill and contributes to word reading proficiency. Additionally, Apel et al (2012) believe that the spelling of words comes from the knowledge of associating different letters with sounds contributes to a child learning a word. Furthermore, Robbins and Ehri (1994) believe there are four ways in which a child learns to read; sight reading, phonological recoding, analysing sight words and contextual guessing (cited in Jeffrey Walczyk, 2007).

Whereas, Jay Samuels and Richard Flor (1997) and Charles Perfetti (1999)

have suggested that a person's reading ability derives from both automaticity and verbal efficiency. This is often referred to as whole-word reading which requires reading a range of words on sight (Marilyn Adams, 1998). Although some analogies, the combined theories seemingly link to phonic instruction within reading.

Within the early years foundation stage (EYFS), children are often taught to read using systematic synthetic phonics via a range of suggested programmes such as; Read, Write, Inc<sup>1</sup> See <https://www.ruthmiskin.com/en/> for additional information regarding this phonics programme. ; Letters and Sounds<sup>2</sup> See <https://www.letters-and-sounds.com/> for additional information regarding this phonics programme. and Jolly Phonics<sup>3</sup> See <https://www.jollylearning.co.uk/> for additional information regarding this phonics programme. (gov. uk, 2018). Rose (2006) recommends children should be introduced to systematic synthetic phonics at the age of four which is when they move from nursery into reception. However, he has acknowledged that for some children this may be too young due to accompanying issues such as; speech and language issues; children who have English as an additional language and other special educational needs and disabilities (SEND). Therefore, practitioners are instructed to use their professional judgement and introduce children to phonics when they will benefit the individual child.

Although phonics were not always widely favoured as a prime skill, Henrietta Dombey (2006), has argued the implementation of several components, such as phonics can contribute to a child becoming a fluent and confident reader. Furthermore, the implementation of phonemes and graphemes,

which are part of phonics also support a child's reading ability (literacy trust. org, 2016). Moreover, early research conducted by Jeanne Chall (1996), concluded that the implementation of phonics is more effective than whole-word methods when teaching a child to read due to variation in the deliverance (cited in Isabel Beck and Mark Beck, 2013). Chall (1996) discovered that whole-word methods were successful in early years, however, once they begin to move into key stage one (age 5 - 7), they begin to fall behind due to the inability to sound and blend words.

There has been some scepticism regarding phonics mainly due to the use of ' nonsense words,' ' grotty graphemes' and pseudo-words (Patrick Goff, 2003). However, Goff (2003) states that although pseudo-words are not real words, they are spelt in predictable ways and therefore should not pose any real problems. Furthermore, Chall (1996) argues that the correct teaching of systematic synthetic phonics, allows children to fully deconstruct pseudo-words from correct words and is a skill children need to have. Additionally, Keith Stanovich (2000), Roland Good and Ruth Kaminski (2002), and Dombey (2006) also believe that children who have the ability to decode pseudo-words become proficient readers and is an important part of learning to read. On the contrary, John Hodgson et al (2013) and Andrew Davies (2014) have suggested phonics has attracted criticism due to the inclusion of pseudo-words which have no referential meaning and often confuse children, especially their spellings. In 2012, a study conducted by UK Literacy Association (UKLA) reported that introducing children to words that do not make sense contributes to the confusion and often the misspelling of words. In the same year, the government at the time introduced a phonics

screening test with a range of pseudo-words. Therefore, implying they believe children need to have the ability to decipher the difference between nonsense words and real words.

Part of the phonics screening test requires children to be able to read a mixture of pseudo-words and real words (gov. uk, 2018). However, Carole Torgesson (2000), Stephanie Otaiba and Douglas Fuchs (2006), have reported that there are between 30-50 per cent of children who fail to respond to traditional intervention of phonics, specifically children who have dyslexia. According to the NHS (2018), someone with dyslexia may confuse the ordering of words, place letters around the wrong way and find it hard to carry out a sequence of directions. However, within the phonics test there are allowances for children who have additional needs. Arguably, children with dyslexia are not always diagnosed at an early age as there are several processes that need to be completed first (NHS, 2018). Furthermore, it is only when a child has formally had a diagnosis that allowances will be made by the testing authority (gov. uk, 2018). Additionally a formal education health care plan (EHCP) will need to be in place as evidence (NHS, 2018). Although Goff (2003) and Chall (1998) have implied that pseudo-words are written in a predictable way and make for proficient readers.

Evidence provided by the NHS (2018), Davies (2014), Hodgson et al (2013) and the UKLA (2012), all imply that both real words and pseudo-words are commonly difficult for children with dyslexia. Thus, the screening test may be placing children with dyslexia at a disadvantage, which may also contribute to them not becoming fluent readers.

Despite Chall's (1996) findings being robust, it took several years before her

theory regarding the use of phonics was implemented fully. Interestingly, she did not recommend the use of nonsense words and nor did the government at the time. To support Chall's (1996) research, an independent report conducted by the national reading panel (NRP, 2000) defined phonics as an instruction strategy that teaches letters and sound associations which is then transferred through a child's spelling and reading of words. Likewise, the Clackmannanshire<sup>4</sup> Data produced within this 7 year longitudinal study can be located online at: <https://www2.gov.scot/Resource/Doc/36496/0023582.pdf>. report which was conducted by Rhona Johnston and Joyce Watson (2004) and the Rose<sup>5</sup> Further information regarding the Rose report can be located online at: <https://www2.gov.scot/Resource/Doc/36496/0023582.pdf> (2006) report considered the conceptual coherence of the use of systematic synthetic phonics stating, " it teaches children directly what they need to know" (Rose, 2006, Para. 47). Furthermore, Rose's (2006) meta-analysis showed that children learn to read through the manipulation of sounds not by whole-word reading, although it can aid in their ability to read (ibid). Thus, the research from NRP (2000), Johnston and Watson (2004) and Rose (2006) adds substance to Chall's (1996) early findings of how phonics impact positively on a child's reading.

For the past decade, I have been involved in the observation of Read, Write, Inc, Jolly Phonics and participating in the deliverance of Letters and Sounds in a range of primary schools within the North East of England. Now, as a trainee teacher, the teaching of systematic synthetic phonics will be something I encounter throughout my career. Although I have some experience of phonics my knowledge as to why there were introduced was

limited. Due to my own experience of learning in the eighties through whole-word reading, I was unsure of how the implementation of systematic synthetic phonics contributes to reading in children. Adams (1998) has implied that almost all public schools were using the whole word, look say and meaning first approach, with phonics used less frequently. Therefore, to be able to provide the children with the best start with their reading, I need to have a clear mindset on why using systematic synthetic phonics is the preferred way of teaching children to read fluently.

In order to examine systematic synthetic phonics further this study will explore some of the historical events which led to systematic synthetic phonics being introduced. Additionally, I will include key references from other parts of the world to add clarity to my findings. Further consideration of reading assessments will be discussed and why they are important and how the data produced may be used in the teaching phonics to children. There will be a focus on the independent report by Jim Rose (2006) and the Clackmannanshire report by Johnston and Watson (2004). Thus, the main enquiries of this study are: Does instruction in phonemic awareness improve reading achievement? Are assessments for learning in reading necessary? Do some phonics programmes work better than another? Are collaborative relationships between teachers and parents important?

In 1997 the national literacy strategy was launched, then introduced in September 1998. The strategy was devised due to very little impact being made on raising standards within literacy compared to other countries (gov. uk, 1997-2011). Prior to 1998, the teaching of reading in many classrooms consisted of children being read to by the teacher or independent reading. This type of reading was present in schools in the eighties and nineties and

was often referred to as whole-word reading (Adams, 1998). Phonics were being used as part of the national curriculum (NC), but there were no written requirements or specific guidelines on how they needed to be taught and reading results were often below age-related expectations (gov. uk, 1998). Although phonics were part of the NC they were frowned upon by many schools as there was no real evidence to suggest they secured a child's reading (gov. uk 1997-2011). Moreover, there were no written requirements or specific guidelines on how they needed to be taught and reading results were often below age related expectations (gov. uk, 1997-2011). Furthermore, Adams (1998) stated the teaching of phonics were being used minimally as there was no real evidence to suggest it would benefit or contribute to a child's reading ability.

As a result of teachers within primary not promoting or using phonics effectively, the government sought a way of making changes to help raise the standards (Rose, 2006). The Clackmannanshire 7-year longitudinal study by Johnston and Watson (2004), paved the way for Rose (2006) to conduct his own year long study. Rose (2006) drew upon the evidence produced as a way of gaining clarity on why phonics are key to children reading and how they should be best used. Within the report, recommendations from Rose (2006) stated that phonics were an integral part of a child's reading and specifically systematic synthetic phonics. Previous recommendations within the NC advised schools to use analytic phonics, however the teaching and learning was slow and drawn out, which led to poor reading results. Data collected at the time indicated prior to 1997 the use of analytic phonics amounted to only 65 per cent of children achieved in reading. However, by



2005, nearly 80 per cent were achieving as a result of effective systematic synthetic phonic programs being used. Although there was a 15 per cent increase in reading outcomes, the government at the time, advised that there was still some work to be done in the raising of standards in reading across all ages (gov. uk. 2005).

Assessment of reading in in the late eighties and mid nineties in key stage 1 and 2 was monitored by a child's book choice and the progression onto a different series such as the Biff, Chip and Kipper series (oxfordowl. co. uk, 2018), and the Peter and Jane reading books (penguin. co. uk, 2018). For a child to progress in any are of their learning, assessment for learning (AFL) needs to take place (gov. uk, 1997-2011). The national strategy (1997), addressed issues surrounding assessment being limited, stating formative assessment concerns the actions we take to change the way we work with a child. Therefore, the use of formative assessment contributes to a child's motivation and progress as they understood what they need to do to improve upon within their learning (gov. uk, 1997-2011, p: 10).

Early recommendations made by Dylan Wiliam and Paul Black (1998) and more recently by Bosanquet et al (2016), have all implied that learning is interactive and the teacher needs to adapt the learning environment to meet the needs of the children. Likewise, Lev Vygotsky (1978: p86 cited in Bosanquet et al, 2016) suggests that support and interaction can help children quickly learn and progress at a rapid speed. As part of the recommendations within Johnston and Watson's (2004) Clackmannanshire report and Rose's report (2006), it was a recommendation that children should be assessed to gain a starting point of where they were at in terms of

<https://assignbuster.com/lorraine-kennedy/>

phonetic knowledge and reading ability. From the assessment results, Rose (2006) suggested children's learning would be enhanced as programmes would be differentiated to meet their individual needs. Similarly, children within Finland and Denmark are assessed on their abilities to help with their individual learning then groupings are identified (OFSTED, 2003). Therefore, in order for children to gain secure subject knowledge the implicit use of differentiation is paramount as they will be given the unique support required to help them become fluent readers.

The explicit teaching of phonics was not part of my primary teaching. However, from an early age I was encouraged to blend words I found difficult from both teachers and parents. Dominic Wyse and Morag Styles (2007) reported, that the way in which I was taught to read was known solely as whole-word reading. This involved an element of reading words through analysis, arguably similar to blending in phonics. What is interesting about all these books is they all use analytic phonics to help teach children to read, each one having common words that were repeated and grown throughout each sub-level. However, as Adams (1998) has suggested, if schools at the time were not convinced phonics were effective, Adams (1998) informs us that by engaging schools, they may begin to rethink their role and the value of phonics within their engagement of reading. Within schools, unless phonics is implemented correctly, the reading ability may not be as good as those schools who follow programmes such as Letters and Sounds, Read, Write Inc or Jolly Phonics. Recent reports have stated that teachers are overwhelmingly positive about phonics and their contribution to early reading development from an early age (Walker et al, 2013). Furthermore,

data collected in a report by Walker et al (2013), found 89 per cent of respondents felt that systematic synthetic phonics played a valuable part within a learning environment. However, they do not believe that following one phonic programme is enough, but a combination of different methods are required for a child's development in phonics and reading (ibid). OFSTED (2010) supports the variety within the teaching of phonics and have acknowledged the importance of using complementary strategies to help children become fluent readers. Additionally, Rose (2006) and Foorman et al (2015) reinforces the use of a combination of methods and recommends the implementation from other programs can help to develop a child's reading fluency. Thus, teachers should have open access to a range of programmes to secure a child's reading.

As a parent myself I often question the importance of having phonetic awareness. In early 2000 when my child entered primary school, I had no prior knowledge of phonics and I often felt a little confused as to how I should be teaching my child to read. Wendy Jolliff et al (2015) have suggested parents still see the phonic processes as alien and do not support their children in their home because they have no prior education in this way of learning to read. Sui-Chu and Willms, (1996) have implied that parental involvement is an essential part of enhancing a child's education, as they can see the links between home, school and the processes that are in place. Furthermore, adding integral reading at home supports the children's development and understanding within their reading. Additionally, Paula Bosanquet, et al, (2016), have also advised that children who read at home and are introduced to text from an early age find reading easier. In turn they can read fluently at an earlier age in comparison to those children who do

not read at home. To help eradicate the fears many parents have regarding systematic synthetic phonics, all schools should offer a range of support mechanisms to help alleviate their concerns (Gater and Yates, 2011).

Furthermore, if the support is given to support parents with learning and understanding phonics, they may feel confident and encourage more reading at home from their children. To concur, Sui-Chu, Willms (1996) and Gater and Yates (2011) have advised that without parental involvement with the teaching of phonics, then a child will not make significant progress.

Therefore, offering and encouraging parents to attend training in systematic synthetic phonics, may contribute to all children reading fluently.

The recommendation of reading is only upon children having the ability to blend words using their phonetic ability (gov. uk, 2013). The development of Letters and Sounds by the department for education and skills (DfES, 2007) aimed to help prepare children for learning to read by developing their phonetic knowledge (Rose, 2006). Although, the DfE (2007) provided a comprehensive planning document with resources, the only formal training provided was by the local authority or self-generated training which led to schools delivering systematic synthetic phonics their own way. Diane McGuinness (1997) has supported the need for training, suggesting that for a teacher to be confident in delivering a new national curriculum, then there needs to be enough support put in place so that they feel comfortable in the delivery and confident in the approach used. Furthermore, there needs to be money available to support schools with the implementation of a range of programs McGuinness (1997). Therefore, if teachers are given the support

and funding required to teach phonics effectively there may be an increase in the reading abilities of their children.

To help reduce the attainment gap the DfE (2018) have committed to improving reading and phonics attainment by increasing government funding to help schools invest in a phonics programme up until 2020.

However, this has been allocated to only 108 priority schools to raise life chances for every child (Ruth Miskin, 2018). Data collected in 2013 cited that the most popular commercial provider was Read, Write, Ink. The commercially produced program Read, Write, Ink requires you to follow a set sequence which helps children to develop their phonetic knowledge (Ruth Miskin, 2018). Although the DfE (2018) do not endorse any one phonics scheme, they have identified 12 opportunity areas which have a legacy challenge where there is an educational challenge (gov. uk. 2016). Both Letters and Sounds and Read, Write, Inc encourage the use of their resources for both whole and individual participation. Letters and Sounds provide a range of free resources, whereas Read, Write, Inc requires you to pay a subscription fee. Thus, if you belong to a school within one of the identified opportunity areas, the subscription fee will not be a problem as funding will be provided.

According to key findings published in 2013, 90 per cent of schools use Letters and Sounds as their key programme to teach phonics in key stage one and two. The programme encourages the teaching of a 'first and fast' approach in line with the NC (gov. uk, 2013). Walker et al (2013) reported that the most commonly used phonics programme was Letters and Sounds closely followed by Jolly Phonics (ukla. org, 2018). The Letters and Sounds

programme is broken into six phases which include the teaching of alphabetic principles. Furthermore, children are taught to give names to capital letters and lower case letters are the sounds. Once children understand the basics, they are taught to blend, segment and decode words which contributes to them becoming fluent readers. Jolly Phonics uses a multi-sensory method which encompasses reading of words from left to write at a fast pace. To support the effectiveness of Jolly Phonics, Morag Stuarts (1999) and Marylynne Grants (1998) studies prove phonics are highly effective when teaching children with English as a second language and significantly improves boys and girls reading ages. Each study was conducted over a period of one year and the evidence collected indicate high success rates. Furthermore, the developers of Jolly phonics were teachers in the school where Johnston and Watson (2004) conducted their Clackmannanshire report. Moreover, their report was referred to by Rose (2006) during his independent study supporting the benefits of using phonics. Thus, from the evidence herein, Jolly Phonics appears to be the more successful programme when comparing it to Letters and Sounds.

In 2004, a report conducted in Clackmannanshire by Johnston and Watson, made significant recommendations that systematic synthetic phonics improved reading from an early age. Their conclusion was that reading synthetic phonics was more effective than only knowing the 26 letters of the alphabet. Instead by learning the 41 phonemes, children would have the ability to link letters to their individual sounds. When it comes to effective reading abilities, the blending and segmenting of a variety of words, demonstrates a child's phoneme knowledge as they can break down a word

or build a word correctly (NRP, 2000). As a result of changing and favouring synthetic phonics, boys reading became significantly better than girls in primary's reception year, additionally there was an increase in spelling ability overall (Johnston and Watson, 2005).

Some significant limitations within the Clackmannanshire report by Johnston and Watson (2004) were the people who were implementing the phonic programmes were not controlled and varied; the children's prior attainment and development lacked vigour and there was little information given about the schools involved ((Wyse and Styles, 2007). Furthermore, Johnston and Watson (2004) used Clackmannanshire's council school deprivation index which does not assess the families of the children's circumstances. However, a report by Barbara Foorman, David Francis, Jack Fletcher, Christopher Schatschneider and Paris Mehta (1997) chose children who had reading disabilities in one particular area with a view to implementing phonics to help develop their reading. The measures Foorman et al (1997) had in place, were to ensure the individual administration of achievement test scores, intelligence test scores, Woodcock-Johnson psycho-educational battery-revises and the Wechsler intelligence scale for children. Moreover, Foorman et al (1997) assessed the programmes' compliance through weekly visits, monitoring checklists and reviewing the teacher journals for each child. Foorman et al (1997) were reflective and cautious about their findings highlighting some of their outcomes and possible differences such as demographics (Dominc Wyse and Morag Styles, 2007, p. 39). However, the report conducted by Johnston and Watson (2004) had no information about how compliant they were, or how effective the teachers were. Yet, they were

certain about their findings and concluded synthetic phonics superseded analytic phonics.

Drawing upon the conclusion made by Johnston and Watson (2004), Rose (2006, p. 49) has suggested that there is currently no strong evidence to suggest that any one systematic phonics is better than another, however he does imply it can contribute to a child's reading accuracy. Furthermore, Anne Castles et al (2018) have concluded that there is insufficient evidence to determine the use of systematic synthetic phonics is superior to analytic phonics. Arguably, both Foorman et al (1997) and Johnston and Watson's (2004) results, although seemingly robust, offer contrasting evidence. Thus, after analysis by both Rose (2006) and Castles et al (2018), it may be advisable that further studies need to be completed before any form of phonic programmes are put into practice.

In light of the Clackmannanshire report by Johnston and Watson (2004), the government announced in 2005 that Rose (2006) would lead a review of early teaching. As part of Rose's (2006) report, the recommendation was for systematic synthetic phonics to be included as part of early reading in primary schools (Dominic Wyse and Morag Styles, 2007). The deliverance of phonics needed to be done so in a systematic way to ensure each and every child would go on to become fluent readers (Rose, 2006). Similarly, in conjunction with the National Literacy Strategy (1997-2011), the USA's No Child Left Behind Act which was introduced in 2001 aimed to remedy the problems in failing low achieving schools with a focus on reading. Whereas, Australia's teaching reading report (2005) recommended children also need to be part of a language enriching curriculum as well as having phonic



awareness. Within the USA, the children's test scores were not statistically significant and all funding was removed. However, here within the United Kingdom (UK), reading outcomes improved 15 per cent over an eight year period as a result of the introduction of systematic synthetic phonics (gov. uk. 2005). Therefore, the USA's one year approach may have been a little premature and if additional time was given, there may have seen some improvement. This may suggest that by providing children with a curriculum which enhances their reading, language and combining these with phonics; this will in time, support and build the foundations for all children to be fluent readers.

Rose (2006) made it clear that for systematic synthetic phonics to be successful they must be taught using a discrete system, with all children being taught by age 5. However, he also expressed that the latter was down to professional judgement as he was aware of different factors which build up a classroom environment such as; children who are multi-lingual; learning disabilities; ASD; speech and language and demographics. Furthermore, Rose (2006) implied that reading words alone does not enhance a child's reading ability but further instruction is needed; such as the implementation of phonic programmes to run along side to aid in the progression of a child reading fluently. In agreement with Rose (2006), Chall (1998) agreed that the early phonic intervention supersedes whole word teaching especially as they age. Thus, word recognition derives from a combination of approaches, such as using various phonic programmes, teacher interaction and professional judgement.

In a report by OFSTED (2010) they declared that through the explicit teaching of phonics virtually every child will be able read. More recently, Clegg (2018), stated that 163, 000, 6-year-old children are on track to become fluent readers since the implementation of the phonics screening test in 2012, which supports the Clackmannanshire report by Johnston and Watson(2004), Rose (2006) and OFSTED's (2010) findings. However, Davies (2014) argues that literature and policy blurs the difference between synthesising letter sounds into a result that may not match how we say a real word properly. Additionally, he suggests that local accents can also have a significant impact on a child's understanding due to pronunciation. In agreement with Davies, I taught the Letters and Sounds programme to children who were at different levels in terms of their reading abilities. I felt that some of the sounds pronounced reflected my local dialect. For instance, when teaching the /oo/ sound and then implementing it into words like /look/ my pronunciation would often sound like the word /luck/. To rectify this problem, I would often be required to change the way I spoke to ensure the children could reciprocate the correct sound, which in turn would support them when they were assessed. The coalition government (2018) have identified the implications of accents when it comes to the phonics screening results and children's test outcomes according to Davies (2014). To help eradicate the impact on results due to accent, Davies (2014) has implied that children should be marked on their ability to blend letter sounds without placing an emphasis on pronunciation, as this may be detrimental to their achievement. Taken into consideration both Rose (2006) and OFSTED's (2010) data analysis it is becoming strikingly evident that systematic synthetic phonics are producing amazing results in terms of the reading

ability of children. However, it may be argued that Davies (2014) also has a valid point as in terms of local dialect, we could be crossing the line of equality for all by not allowing for the difference in pronunciation to be taken into account. What this also leaves questionable is the robustness of the phonic screening test results.

Phonics have been part of the education system for many years and although not explicitly used by schools, the results from reports conducted in Clackmannanshire by Johnston and Watson (2004) and Rose (2006) have raised the phonics profile. However, within my research, I have discovered Davies (2014), Hodgson et al, (2013 and the UKLA (2012) are all against the introduction of pseudo-words as part of the phonics screening test. One criticism is time constraints regarding children receiving a SEND diagnosis. Although a child may show signs of a learning disability such as dyslexia, without an official diagnosis and EHCP, a child may be placed at a disadvantage (Davies, 2014; Hodgson et al 2013; UKLA, 2012). Therefore, it may be suggested for these children, testing does not take place until a formal diagnosis has been made.

The report devised by Rose (2006) confirmed anomalies within the Clackmannanshire by Johnston and Watson (2004) but chose to still implement a phonics programme based upon their findings. However, what Rose (2006) did do, was acknowledge areas that lacked substance and focussed only on evidence which was relevant to the task he had been placed with. Furthermore, additional research from Chall (1998) and Forman et al (1997) supports the positive impact phonics has on teaching children to read fluently. Since the introduction of systematic synthetic phonics, there

has been a 15 per cent increase in the reading ability of children (gov. uk, 2015). Thus, indicating the use of phonics when teaching children to read is beneficial.

To enhance the use of phonics within the classroom, I found ongoing training should be given to ensure that everyone. Reports from Sui-Chu, Willms (1996) and Gater and Yates (2011)