The effects of ability grouping on the learning of children from low income homes: a systematic review

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Abstract

This paper explores the relationship between socio-economic status, ability grouping and children's educational outcomes. The study takes the form of a systematic review to examine available evidence-based articles which are selected by following a specific set of inclusion criteria. Articles are then analysed in terms of the research questions which look to examine the relationship between children's socio-economic background and ability group placement, and the impact of ability grouping on the learning (cognitive and behavioural) of children from low socio-economic households. The review suggests that children from lower socio-economic status backgrounds are more likely to be placed in lower ability groups, sets or streams. This placing is proven to have an overall negative impact on behaviour, as well as failing to close the achievement gap as children in lower groups make slower cognitive progress than children in other groups. Furthermore the general consensus arising from the literature is that ability grouping does not have the positive evidence base to support its use in primary classrooms. Especially when concerning the learning of children from lower socio-economic status backgrounds.

Introduction

The Glasgow Centre for Population and Health (2014) shows that one third of children in Glasgow are living in poverty. In Scotland overall, one fifth of children are in poverty. The Scottish Government (2014; 2015) in its Child Poverty Strategy and Raising Attainment priorities, promise educational, support to bring more families out of low income.

Education is arguably the most valuable tool in ending the poverty cycle. Jensen (2009) and Hirsch (2007) argue that the success of our population depends on education. Despite there being much research into how poverty damages children's education, the number of studies which demonstrate practical and effective strategies teachers can adopt to mitigate the problem are few and far between (Sosu & Ellis, 2014). Ability grouping is a commonly used organisational strategy in the primary classroom intended to meet the needs of all pupils (Ireson & Hallam, 2001). However, the evidence for this is unclear. There is relatively little literature which looks at ability grouping and poverty together. I hope this paper will provide key findings to help in this area.

Context

Cognitive differences between children from lower and higher socio-economic status Homes
Poor, less affluent, lower income homes, lower socio-economic status (SES) and deprived are terms which will be used interchangeably during this investigation to describe children who find themselves in poverty. This means that their household does not take in sufficient income (less than 60% of the national median) to cater for essential needs like nutrition, clothing and housing (Brooks-Gunn & Duncan, 1997; The Child Poverty Action Group, 2014). Evidence suggests that a learning gap between children with a less and more affluent background starts in early childhood (Cheng Lee & Otaiba, 2015; Feinstein, 2003; Kiernan & Mensah, 2009). Goodman and Gregg (2010) acknowledge the gap between the poorer and richer widening from age 3 to starting school. By the age of five, children from higher income homes can have up to a 13 month lead in their knowledge of vocabulary compared to children

Citation

from lower income homes (Bradshaw, 2011). This is noteworthy as early ability in a child from a poorer home can be a predictor of their future qualifications (Feinstein, 2003). Instead of this learning difference being rectified as children progress through their primary education, the gap prevails and often further widens (David, 2010; Richards, 2008). The widening gap in Scottish education specifically is illustrated in figure 1 which shows numeracy attainment comparisons between children from more and less affluent backgrounds (Scottish Government, 2013). However, it is important not to generalise as some children may experience poverty at different points in their early childhood and therefore can affect their cognitive learning more or less severely (Kiernan & Mensah, 2009).
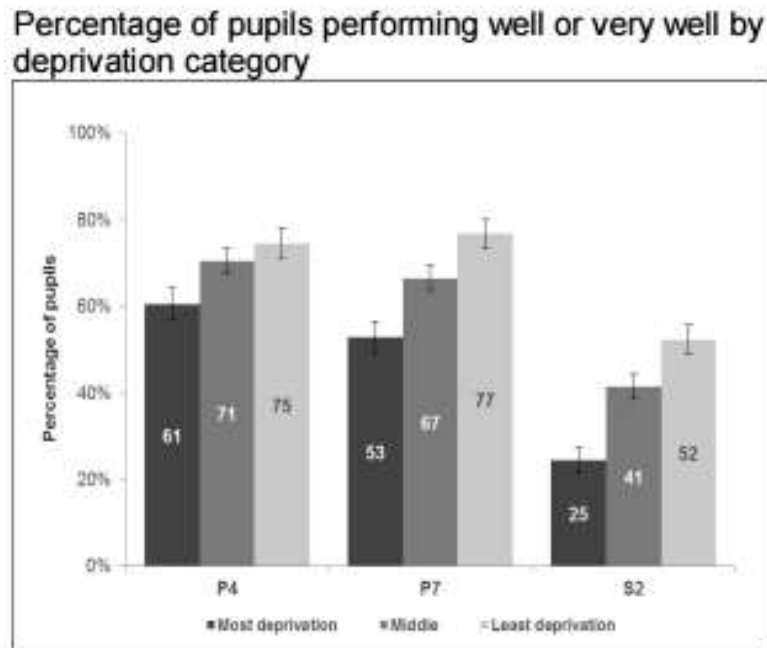

Figure 1. The difference in numeracy attainment from P4-S2. (Scottish Survey of Literacy and Numeracy 2013, Scottish Government, 2013, p2)

The picture does not improve through secondary education, with pupils attaining lower marks (Grades 4 – 7) or no Standard Grades largely originating from more disadvantaged backgrounds. These pupils often have been lower achievers all through their schooling years (Howeison & Ianelli, 2008). In later education, children with a lower socio-economic status are also half as likely to go University than their more affluent counterparts (Carter-Wall & Whitfield, 2012) and 42% of children from the poorest fifth will grow up to be in the poorest fifth themselves (Goodman & Gregg, 2010). Sinclair, McKendrick and Scott's (2010) study showed that often young people from deprived backgrounds did have aspirations following on from school, but they may be influenced by their parents' occupations.

Reasons Why the Cognitive Gap Arises
A number of researchers have explored the potential reasons for the cognitive gap arising (Bradshaw, 2011; Sammons *et al*., 2007). Slower developing children from more affluent backgrounds are much more likely to close this gap before school (Feinstein, 2003), and this is largely through pre-school and home learning environment interaction (Sammons *et al*., 2007). An example being 42% of poorer children are read to everyday in comparison to 79% of richer peers (Goodman & Gregg, 2010). This is important as Kiernan and Huerta (2008) argue that the strongest connection to cognitive development stemmed from the parents' reading behaviours. Lower birth weight is also significantly associated with lower cognitive capabilities and a lower birth weight is strongly connected to a lower SES (Sammons *et al*., 2007). As well as these factors, parental expectations, aspirations, conflicts at home, school choice, access to technology, lack of home routines and family stress are all contributors to the gap which

prevails (Bradshaw, 2011). Poorer children may also experience less cognitively stimulating communications with their parents and have access to fewer educational resources in their homes (OECD, 2010). Having a lower income can also make it more difficult to visit places of interest like museums which can narrow a child's link to learning about wider society (Gershoff, Aber, Raver & Lennon, 2007; Welsh, Nix, Blair, Bierman & Nelson, 2010). If the class are reading or hearing words which these children are unfamiliar with, it can discourage concentration or develop a negative attitude towards the work because they do not understand what is being said or asked (Jensen, 2013).

The connection with parental qualification and children's cognitive capacity also is highly apparent (Adelman, Middleton & Ashworth, 2003; Bradshaw, 2011). Goodman and Gregg (2010) argue that parental education, age and family size have a higher influence on cognitive ability than home learning environment. One third of poorer mothers have no formal qualifications in comparison to 6% of middle income and 1% of higher income mothers. It can be argued that the likelihood of children being in poverty is heightened when parents themselves do not have educational qualifications (Adelman, *et al*., 2003) and Hirsch (2007) extends this by stating that this attainment gap in education is the main reason the poverty cycle continues. However, Sammons *et al*. (2007) understand that some parents who lack qualifications do provide an effective home learning environment for their children and it is the lack of quality pre-school attendance which can also contribute to the child's delay in cognitive development (Bradshaw, Lewis & Hughes, 2014).

The Behavioural Gap Which Prevails Between Lower and Higher SES Children
The effect of poverty on children's learning is not only limited to cognitive disparities but also extends to behavioural difficulties. Living in a consistently poor home can heighten levels of behavioural problems and from the age of three, 18% of children from poorer backgrounds show high behavioural problems in comparison to 4% of children from more affluent backgrounds (Kiernan & Mensah, 2009). This pattern is then likely to continue through the years as Goodman and Gregg (2010) show that children at the age of 14 from lower socio-economic homes are more likely to take part in risky behaviours such as truancy and smoking and tend to have a more negative attitude towards education. According to Munn and Lloyd's study (2005), pupils who were recognised as being in poverty made up 50% of the total number of students excluded from school.

Reasons for the Behavioural Gap
Challenging behaviour from poorer children can be explained through many ways. Living in poverty can encourage mothers and primary caregivers to experience greater levels of stress (Welsh *et al*., 2010). Gershoff *et al*. (2007) argue that the higher the levels of stress are with the parent, the less the positive behaviour passed on to the children. This can result in tougher discipline and greater behavioural stress and problems from the child (Kiernan & Huerta, 2008; Smith, 2004). In addition to parental stress, children from lower income homes are more likely to have a lower birth weight and Kelly, Nazroo, McMunn, Boreham and Marmot (2001) found that there is a strong connection between lower birth weight and higher levels of behavioural issues like hyperactivity and attention difficulties. However, boys were more at risk at displaying negative behaviours than girls (Kelly, *et al*., 2001).

Poorer children are also more likely to display negative behaviours in the classroom (Jensen, 2013). Pritchett, Nowek, Neill and Minns' (2014) study showed teachers naming hyperactivity in poorer children as a common issue. Goodman and Gregg (2010) argue that these behaviours could also be explained by their own feelings about schools; many children know they are poor and are less likely to attain than their more affluent counterparts. This can cause children to see school as pointless and boring causing them to disengage because they cannot see the relevance of learning to their own lives (Sutton, Smith, Dearden & Middleton, 2007).

The Government's Response to the Learning Gap
The Scottish Government (2015) have made addressing the achievement gap a priority and rolled out the "Raising Standards for All" initiative to attempt to bridge the gap between the most deprived and most affluent learners. The Child Poverty Strategy (Scottish Government 2014) further recognises the value of education in escaping the mitigating effects of poverty. However, researchers have argued that current policy is not fully addressing the issue which prevails, and with such large shortfalls in attainment for a long period of time, changes will be a lengthy process which will involve altering the current educational system and the practices adopted (Sosu & Ellis, 2014). An important change to policy made by the Scottish Government in 2009 was to formally recognise children in poverty as group who may experience barriers to learning due to their cognitive delays and behavioural issues within the amended Education (Additional Support for Learning) (Scotland) Act 2009. In accordance with the act, teachers are encouraged to improve outcomes by differentiating for the children in their class and recognise that each child is individual. However, the OECD (2012) stress that equal opportunities and learning experiences are required for all children to reduce the risk of educational failure for groups in need.

Mixed Ability Grouping as a way to Raise Attainment
One of the organisational and pedagogical strategies employed to advance learning in the classroom is grouping. It is argued that children organised in mixed ability groups for collaborative working tasks, or by specific ability in order to tailor the curriculum to the differing abilities in the classroom, can influence attainment.

Georges (2009) stated that for raising poorer children's attainment, mixed ability grouping is effective. Other researchers have evidenced the value of mixed ability grouping for raising attainment (Kutnick, Blatchford and Baines, 2002). HMIE (2007) furthers this by stating that children should be working co-operatively in the classroom to solve problems. These groups can be organised in different ways with gender and friendships often influencing allocations to create a group of differing abilities (Bearne & Kennedy, 2014; Ireson & Hallam, 2001). Ensuring groups are the optimum size for effective collaboration, which is commonly 3-5 members, is also necessary for creating a good group working environment (Abrami *et al*, 2000, Kerr & Tindale, 2004; Kutnick *et al*, 2002; Laughlin *et al*, 2006; Prais, 1998; Wheelan, 2009; Wilkinson and Fung, 2002). These groups do not foster effective learning opportunities alone; they require teachers to teach communication skills, problem solving and decision making skills in order to complete tasks which are designed to facilitate effective group working (Baines, Blatchford & Kutnick, 2009; Kutnick, *et al*., 2002; Wing-Yi Cheng, Shui-Fong and Chun-Yan Chang, 2008). The importance of grouping for learning relies on the concept of Zone of Proximal Development (ZPD) (Vygotsky, 1978) which recognises the power of guidance from a knowledgeable person to bridge the gap in knowledge and further develop learning. Lui (2012) understands that in the classroom, this knowledgeable other could be the teacher or another peer who collaborates and communicates with the learner. Mixed ability collaborative working groups is thus encouraged by this theory. Despite researchers advocating the effectiveness of this type of grouping, it is less commonly found in the primary school in comparison to ability grouping. This may be because educational policy may not specifically refer to mixed ability, collaborative group work as a means of raising standards and so teachers do not see its relevance (Kutnick *et al*., 2002).

Ability Grouping as a way to Raise Attainment
Ability grouping is simply the allocation of children to groups based on their academic ability. For teaching these groups of children, the teacher will change their pedagogy in order to meet the needs of the pupils in the group (Boaler, William & Brown, 2000). However there are differing forms of this type of placing. 'Within class ability grouping' involves children being divided into sub groups (usually low, middle and top) based on their level of ability or achievement in different subjects and usually mainly lends itself to maths and English learning organisation (Alpert & Bechar, 2008; Hallam, Ireson, Lister,

Chaudhury & Davies, 2003). Streaming is a highly structured way of grouping children by ability for teaching which involves children being allocated to a classroom in correlation with measures of their attainment and remain in that class all of the year (Hallam & Parsons, 2013). Setting is different, with children being allocated another classroom based on ability only for the teaching and learning of certain subjects (Hamilton & O'Hara, 2011). Although it is termed as "grouping", one may find issue with this as it often does not facilitate collaborative or cooperative working; it is largely viewed as an organisational structure (Ireson & Hallam, 2001). Researchers have also questioned the use of the term *ability,* as it is often recognised as unchanging potential with which a child is born (Florian & Black-Hawkins, 2011). Making assumptions or predictions on one's ability can encourage teachers to change their expectations as well as the way they interact and teach the child (Hart, Drummond & McIntyre, 2007).

Although the Scottish Government do not specifically request ability grouping to be used in schools; HMIE (2007) encourages the use of varying activities and resources to meet the needs of all children in the classroom and altering the pace and delivery of lessons to suit different groups of children. This could easily be, and is widely interpreted as tailoring class work to groups of children divided by their abilities in different subjects, or ability grouping. It is usually the classroom teacher, head teacher or council who determines the way the classrooms are organised for learning and if they will adopt ability grouping structures (Hornby & Witte, 2014). Hamilton and O'Hara (2011) recognise the increasing use of setting in Scottish primary schools and Whetton and Twist (2003) indicate that Scottish primary schools are more likely to use ability grouping more than any other type of grouping in its classrooms. This is interesting because ability grouping of any form can be labelled as an organisational structure which promotes inequity and segregation of pupils (Ireson & Hallam, 2001) and Scotland is arguably renowned for its stance on equal education for all in its state run schools through a Curriculum for Excellence (Scottish Government, 2007).

Ability grouping is largely implemented because professionals believe it raises attainment as the classwork is tailored to suit the needs of the child's ability (Ireson & Hallam 1999). Furthermore, Allebone (2006) suggests that many teachers do not see any other option in the teaching of mathematics and literacy in particular, as it is a structure which should tailor work to the inevitably varying needs in the class. Researchers have acknowledged the perceived advantages of grouping by ability and some are: meeting the needs of all learners; creating a more manageable classroom for the teacher; raising attainment across the board due to more tailored teaching; additional support for lower groups and higher groups are more likely to be challenged and extended (Dunne, *et al*., 2007; Hornby & Witte, 2014; McSherry & Ollerton, 2002; Whitburn, 2001). However, Boaler *et al*. (2000) found that children in higher groups could become dissatisfied with their set placing because work was too difficult, higher paced and too much pressure weighed upon them to do well. Whereas, in the same account, children from lower sets found work too easy and children were very aware of the lack of challenge and expectations from their teacher.

Those who choose to adopt other strategies often rebut the use of this organisational strategy as some research finds it does not address the educational inequality gap it is intended to (Whitburn, 2001). Key researchers in this area have stated that ability grouping largely does not improve attainment (Hallam & Parsons, 2013; Ireson & Hallam, 2005). Although research concerning ability grouping is rather ambiguous, higher placed pupils' learning seems to be unaffected by grouping structures whereas lower ability children learn better in mixed ability groups (Hallam & Parsons, 2013). Ireson and Hallam (2005) and Burris and Welner (2005) found that children in lower ability groups develop a more negative attitude to school and that streaming could be socially segregating or stigmatising due to certain groups being overrepresented in lower streams. This stigma relates to the psychological theory of intergroup and out-group bias which could be encouraged by ability grouping. Bigler, Brown and Markel (2001) and Hewstone, Rubin and Willis (2002) explain that in-group bias means one would favour their own group much more than any other group and its members and the use of the word *bias* implies that this

judgement is largely unfair and unjust. Particularly in the use of ability grouping with children in lower ability groups being stigmatised by the label of "low ability" and stereotyped by their peers as being less clever and able (McSherry & Ollerton, 2002).

Furthermore, teachers of higher ability sets or streams can be more qualified or experienced than those teaching lower classes which may cause further disadvantage and expectations of children may then be distorted (Hallam & Parsons, 2013). Kutnick *et al* (2006) asserted that children in lower groups were less likely to have access to group or paired working, limiting collaborative activity opportunities. Findings also showed that teachers may also base allocations on behaviour in the class, peer relationships and perceived ability, limiting the child's chance to access a challenging and extending curriculum as it is often the lower groups children are placed into (Allebone, 2006; Ireson & Hallam, 1999). It is also evident that places in ability groups on the whole have limited permeability (Allebone, 2006; Blatchford, Hallam, Ireson, Kutnick, & Creech, 2008; Hallam & Parsons, 2013; MacIntyre & Ireson, 2002; Whitburn, 2001) and so children are more unlikely to change groups as time progresses (McSherry & Ollerton, 2002).

Whetton and Twist (2003) found a correlation between how teachers organise their class for reading and their reading achievement. The classrooms which adopted a variety of organisational structures in their classroom seemed to result in higher reading achievement. In this study, Scotland was the country which most adopted the structure of ability grouping and scored lower reading achievement than all but two of the countries displayed in Figure 2 (France and Singapore).
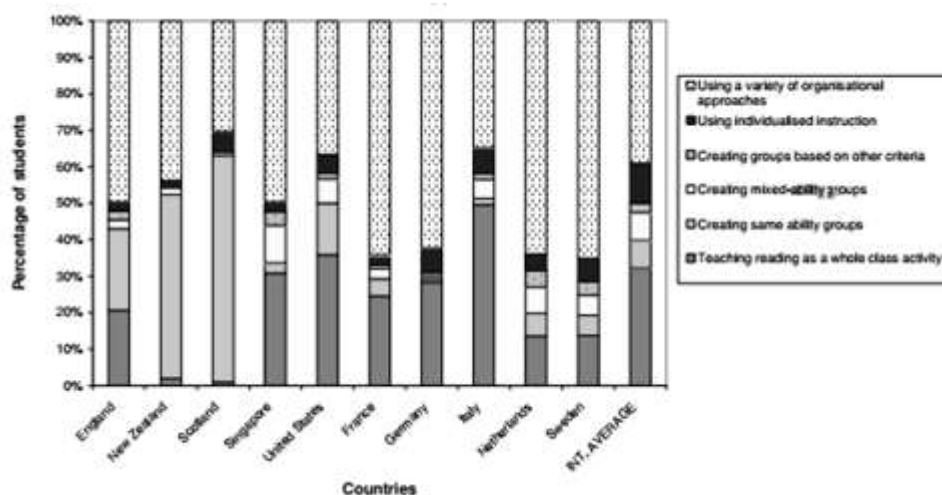

Figure 2. The range of classroom organisational approaches adopted in different countries. (*What determines the range of reading attainment in a country*) Whetton &Twist, 2003, p12.

There also is a suspicion that ability grouping is not beneficial for all groups of children in the classroom. Evidence suggests that boys, ethnic minorities, Summer born children (Campbell, 2013) and children from lower socio-economic backgrounds (Burris & Welner, 2005; Dunne, et al., 2007; William & Bartholomew, 2004) can be disadvantaged from this particular grouping strategy. However, much of the research on ability grouping available is based on secondary school findings due to its prevalence, and not specifically focussed to a particular group of children who may not fully benefit from such a structure in the primary sector. Therefore, for the purpose of this review, research will be limited to finding out the effect ability grouping may have on the learning of primary school children from lower income backgrounds.

Methodology

Systematic Review

The design of this research study follows the literature based method of a systematic review. This method is recognised primarily in education and health disciplines as a valuable way of reviewing and summarizing previous research to analyse and combine evidence to produce answers to already established research questions (Bronson, 2011; Littell, Corcoran & Pillai, 2008; Torgerson, 2003). A systematic review follows a clear set of procedures which are: the defining of specific research question(s); deciding on inclusion criteria to search for literature; using electronic databases to find suitable literature based on title and abstract; screening literature to find suitable studies based on pre-set criteria; assessing the quality of the studies which are suitable based on criteria; extracting the data from these studies before analysing and synthesising the data that has been retrieved to answer the research questions (Dickson, Cherry & Boland, 2014; Petticrew & Roberts, 2006; Torgerson, 2003). Reviews should be specifically carried out in accordance with these procedures and recorded efficiently so that another researcher could replicate the same study (Bronson, 2011; Littell, Corcoran & Pillai, 2008; Petticrew & Roberts, 2006; Torgerson, 2003). This can minimise bias as all studies which fit the criteria are included in the review regardless of outcome and researchers are not able to only select the studies which adhere to their proposed conclusion (Bronson, 2011).

Inclusion Criteria

The systematic review involved gathering available evidence which is specific to pre-assigned criteria. The inclusion criteria were decided upon before carrying out any literature searches and specify the exact elements the study must have if it is to be included in the review (Cherry & Dickson, 2014; Gough, Oliver & Thomas, 2012; Torgerson, 2003). For this study, the inclusion criteria were:

- Date range- (2000-2015)
- Written in English
- An Empirical Study Design
- Study Design Includes
- Participants (Primary school children)
- Participant analysis (socio-economic status)
- Use of grouping children by ability
- Measuring of participant learning in these ability decided groups

In order to ensure the literature search was focussed and relevant, studies were only included from 2000 – present. This ensured that the review would more closely reflect the education picture of today, thus increasing its impact, as studies would display how grouping by ability as a practice fares on the learning of lower SES children in the 21st century. Studies from any country were viable, as long as they were written in English and the class stages referred to equated to primary aged children in the UK. All studies included needed to involve an empirical study design. Participants had to be in primary school and data relating to the socio-economic status of the children had to be identified. Lastly, the study had to include ability grouping of some form – within-class ability grouping, setting or streaming – and show a measurement of participant learning (cognitive, behavioural or socio-emotional) whilst arranged in these ability groups.

Search Keywords and Searching

Search keywords were selected by identifying the main words from the research questions before sifting through the initial literature review to find relevant, reoccurring keywords which also related closely to the research questions. More closely related terms were found by using a thesaurus and synonyms. Taking time to ensure the chosen keywords were as all encompassing as possible was important in providing the best chance at finding the most related literature to the study aims. Different terms that could be used for the same meaning like low income, poverty, disadvantaged, low socioeconomic status

and poor were also taken into account (Bell, 2010). However, a typical limitation to this type of review is that even the most all encompassing keywords may not derive all possible applicable literature. It is very difficult to ensure that the searches carried out are completely comprehensive. Thus searching techniques were also employed to ensure literature was not missed because of the tense or variance of the keyword. The main technique used was truncation, which involved putting an asterisks at the end of a word like "group*" so that literature which uses the terms "groups", "grouping", "groupings" and "grouped" would also appear in the search (Dundar & Fleeman, 2014; Lefebrve, Manheimer & Glanville, 2008).

The keywords identified and used in different combinations were: primary, children, poor, attainment, group*, effect, school, Scotland, poverty, ability, achievement, low, income, UK, Britain, Europe, American, elementary, track*, setting, stream*, classroom, sets, classes, social class, socio-economic status.

After establishing the criteria which would shape the search for literature and the selected keywords, two electronic databases and a search engine were identified to use to look for the relevant studies: Education Resources Information Centre (ERIC), Google Scholar and Mendeley. From these searches, the bibliographies of relevant studies would also be examined to further identify more related pieces of literature which would form part of the systematic search for literature in this review. This is called the snowball technique (Greenhalgh & Peacock, 2005). By doing this, it ensured that the chance of missing important studies which would fit my inclusion criterion that may not be found through database searching alone were narrowed (Dundar & Fleeman, 2014; Greenhalgh & Peacock, 2005). Searches were organised into a table of specific headings which were in line with the inclusion criteria and the numbers of papers identified were recorded at every stage of the searching process. Keeping a record of all searches was valuable for the transparency of the study as technically by following the methods and data search sheets, another reviewer could then replicate this review which makes the overall review more reliable and valid (Bronson, 2011; Dundar & Fleeman, 2014; Littell, Corcoran & Pillai, 2008). Due to each search turning out a high number of results and the time limit of the study, only the first 250 results of each search were looked at with each search being ordered by relevance.

Screening
After searching which studies were applicable to the project based on title and abstract, full papers were obtained and screened for applicability based on the inclusion criteria. As the criteria were highly specific, it was not surprising that only three papers were identified as relevant to the study after searching and screening. This is a common finding of the systematic review method (Torgerson, 2003). It could also suggest that there is a lack of research-based study into commonly used practices in education. The three identified papers were then further analysed for study design quality thus increasing the reliability and validity of the systematic review. Examining variables like study size and number of participants ensured the review's findings were not over or under represented due to the quality of the papers examined (Torgerson, 2003). Data was then extracted from the included three papers and organised into a table with specific headings to provide the researcher and reader with a brief overview of each of the studies which would be referred to during the review (Littell, Corcoran & Pillai, 2008). This is important as it compares the size of each of the study and their results making it easier to come to more balanced conclusions about the data overall (Petticrew & Roberts, 2006).

Narrative Synthesis/Analysis
Due to only three suitable articles being identified in the systematic review after the initial searching and screening process, a narrative analysis was then undertaken as there were not enough studies to compare and contrast as a vote count (Popay *et al* 2006). After extracting the data from the studies and inputting this data into data sheets, the three articles were taken separately and briefly summarized in terms of size, design, characteristics and potential bias as a quality assessment. This was to make clear

to the reader any study bias or unreliability which should be taken into account when deriving any conclusions from the data. Then followed the narrative analysis which aimed to synthesise the data and results of the studies together in order to address and come to conclusions based on the initial research questions (Littell, Corcoran & Pillai, 2008; Petticrew & Roberts, 2006;). The studies were organised by common findings in relation to the research questions into a table initially before analysing the data in the discussion section.

Results
The three studies which form this systematic review were included on the basis of the inclusion criteria. The literature search yielded a total of 652 citations which were suitable based on title alone. From there, results were excluded in relation to inclusion criteria after abstract screening, then full text screening and also if papers exactly the same data as others already included. The most common reasons for exclusion were the use of secondary school participants and because the study did not refer to the SES of the participants.

Two of the three studies included were available in the UK and used differing data which originated from the 4th survey of the Millennium Cohort Study (MCS). Campbell (2014) used solely English primary participants from the MCS whilst Hallam and Parsons (2012) used a combination of English, Welsh, Scottish and Northern Irish primary participants. Tach and Farkas' (2006) is an American study which used data from the Early Childhood Longitudinal Study, Kindergarten Class (ECLS-K). This gives the overall review weight as the study sizes for all three included are relatively large (minimum: 851 maximum: 11, 769) and because the participants are part of much larger funded studies, which comprise of nationally representative participants , the general level of bias and unreliability are lowered.

Each of the studies focussed on different forms of ability grouping. Hallam and Parsons (2012) focussed on the organisation of setting by ability. The study found that 28.8% of children within their sample were set for literacy and 34% were set for maths. However, overall 63% of the children were not set for either. Scottish children were the least likely to be set for literacy or maths (23.6%, 27.5%).

The study found that amongst the children who were set for literacy and maths, there was a range of family characteristics which correlated strongly with the individual set placement. The bottom set had almost twice the number of children who had experienced poverty at ages five and seven than the top set (32.3%-16.3% literacy, 29.2% -15.14% maths). Children identified in the bottom set were also more likely to live in rented accommodation; live in lone parent households; live in a non-working household and to have a mother with less or no formal qualifications than the top set. The cognitive testing (reading, vocabulary and pattern) average scores for each ability set over the two years are displayed in figure 3. Figure 3 shows that the top set made an improvement of 21.3 whilst the bottom set improved by 1.1 from initial testing at age 5.
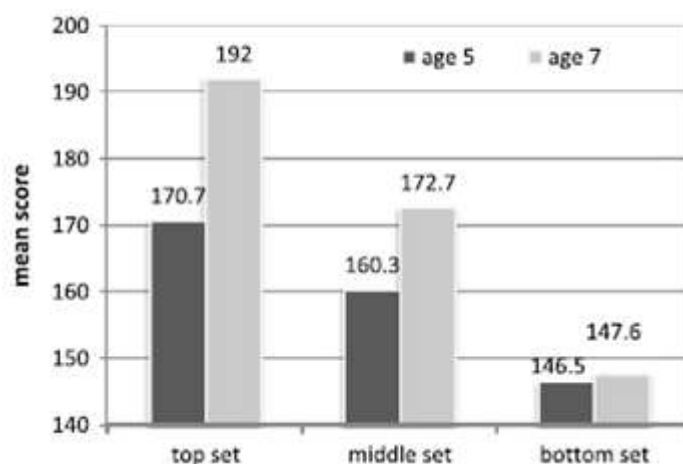
Figure 3. The difference between sets in terms of cognitive outcomes age 5 and age 7 (Hallam & S. Parsons 2012)

Figure 4 shows that children in the bottom set were also much more likely to be identified with varying behaviour difficulties. However, teachers were more likely to rate children in the bottom set with a higher degree of these difficulties than their respective parents.
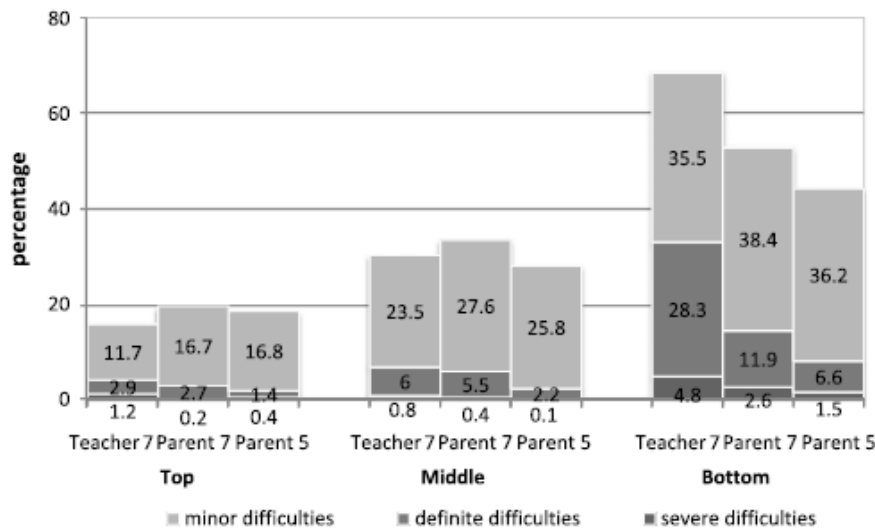

Figure 4. The percentage of children rated with difficulties on the summary strengths and difficulties question by teacher and parent by literacy set. (Hallam & S. Parsons 2012)

Tach and Farkas (2006) studied the determinants and consequences of within class reading ability group placement in Kindergarten and first grade (primary one and two). The study focussed on classrooms which were and were not grouped. The research found that 42% of Kindergarten classrooms used ability grouping for reading and this heightened to 72% in the first grade. Teachers compared children to other children in deciding which group to place them into, as well as considering their learning related behaviours (attentiveness, task persistence, eagerness to learn, learning independence, flexibility and organisation). Prior reading and maths abilities were strong predictors of ability group placements as were teachers' judgements of these student learning behaviours and achievement. Whilst the study proves that there is little bias in assigning children to groups and it is largely based on their prior attainment, children who begin Kindergarten disadvantaged and with lower ability seem to stay there as they are placed in low groups which do not appear to progress in the same way as higher ability groups.

The study found that children from higher SES homes are typically higher placed in ability groups as SES had a positive effect on ability group placement. Behaviour also had a positive effect on ability group placement with poorer behaviour associated with lower grouping. The results showed that placement into a higher group increases reading ability scores, but ability grouping seems to have a negative impact on the learning of lower placed children contributing to an overall negative effect of ability grouping as it widens the achievement gap.

The final study included was Campbell's (2014) research which examined what factors influenced streaming placements in the primary school. Family characteristics were again found to be disproportionally represented in different streams. Children from low income homes were split 42% in the bottom stream, 33% in the middle stream and 25% in the top stream. Children with a higher SES were represented with 48% in the top, 31% in the middle and 21% in the lower stream respectively. Campbell (2014) utilised the same MCS cognitive ability testing data as Hallam & Parsons (2012), but for their smaller participant number. Figures 5, 6 & 7: represent the distribution of maths (5), word reading

(6) and PCT (7) test scores between the streams (Campbell 2014). The results presented in figure 6 showed that children in the lower streams performed less well than the other streams in word reading ability tests. Although, as figures 5 and 7 illustrate, there were some children in the lower stream who achieved the same as the middle stream for maths and general cognitive aptitude tests.
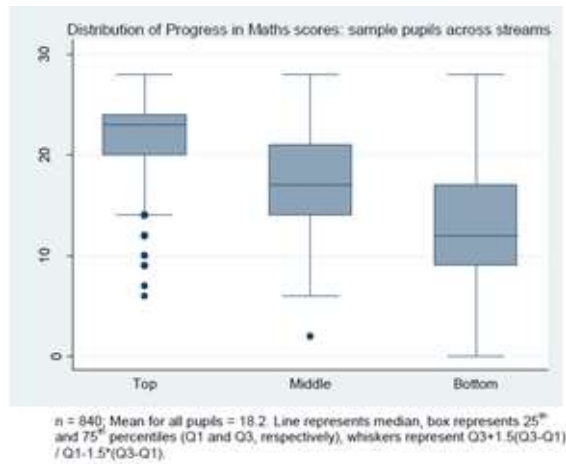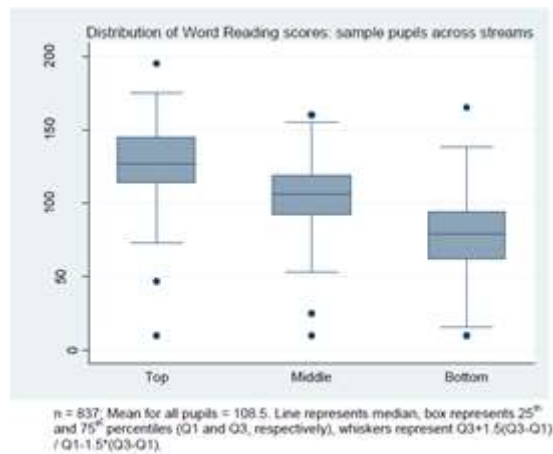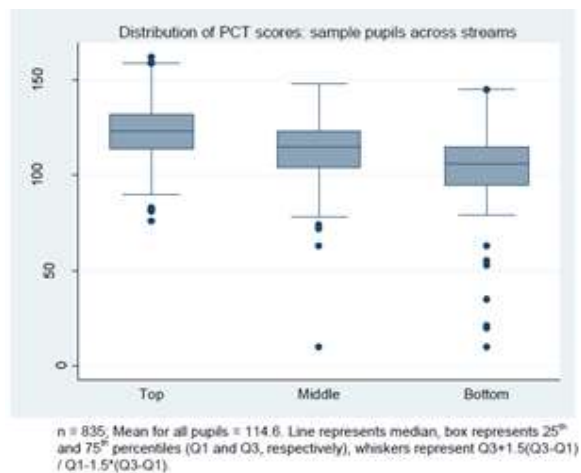

Figure 5.

Figure 6.

Figure 7.

As shown in figures 8 and 9, children with problematic behaviour were also over represented in the bottom stream and these behaviours largely increased as the years progressed. The study also found that teachers' judgements of ability and attainment were closer linked to higher stream placements and teachers' judgements were associated with the placing of children in lower sets. Teachers were also

shown to place pupils with higher perceived abilities in the top stream even if they had the same
cognitive testing score in maths or reading as a pupil in a lower stream. These children who are in the
higher stream but score the same as a child in a lower stream are also more likely to be assessed at a
higher level. Campbell (2014) also found that teachers with less teaching experience (1-3 years) were
more likely to be teachers of lower streams; but lower streams were also more likely to have teachers
who had taught in the school for a longer period of time which appears to be contradictory.

	Top stream	Middle stream	Bottom stream
Emotional Symptoms^ (n=799)	1.3	1.4	1.8
Conduct Problems^ (n=802)	1.3	1.7	2.3
Hyperactivity^ (n=795)	2.9	3.6	5.0
Peer Problems^ (n=801)	1.0	1.2	1.7
Pro-Social Behaviour^^ (n=802)	8.3	8.4	7.7

	Top stream	Middle stream	Bottom stream
Emotional Symptoms^ (n=799)	**1.4**	**1.8**	**2.2**
Conduct Problems^ (n=802)	**0.6**	**0.8**	**1.6**
Hyperactivity^ (n=795)	**1.7**	**3.3**	**5.4**
Peer Problems^ (n=801)	**1.0**	**1.3**	**2.1**
Pro-Social Behaviour^^ (n=802)	**8.3**	**7.6**	**6.4**

Figures 8 & 9. The mean score on the strengths and difficulties questionnaires completed by parent at
age 5 (figure 8) and teacher at age 7 (figure 9) (Campbell 2014).

> Figure 8 & 9: The tables represent the mean score on the strengths and difficulties questionnaires
> completed by parent at age 5 (figure 8) and teacher at age 7 (figure 9).
> From "Selected at seven: The relationship between teachers' judgments and assessments of pupils,
> and pupils' stream placements", by T. Campbell, (2014), p. 19 & 20.

Discussion

This review contributes to the relatively small evidence base focussed on the use of ability grouping of
any form in the primary school and its impact on children from lower income backgrounds' learning. The
review looked to explore if children from lower SES homes were more likely to be placed in lower ability
groups and, if so, what impact this may have on their overall learning cognitively and behaviourally. It is
interesting that even though the three studies which were included focused on different forms of
grouping by ability (setting, streaming and within class); their results were largely homogenous.

Are children from low income backgrounds more likely to be placed in lower ability groups?
Firstly, all three studies highlighted that coming from a poorer home was a strong indicator of being in
the lowest group, set or stream (Campbell, 2014; Hallam & Parsons, 2013; Tach and Fargaz, 2006). Tach
and Fargaz (2006) interestingly explored grouping from entering school at Kindergarten (equivalent to
primary 1) and found that children were largely placed in groups in correlation with their cognitive
testing results. This saw many children with a lower SES being placed in lower ability groups. This is not
surprising as Goodman and Gregg (2010) recognised that children from lower income homes typically
arrive at school in primary one at a lower cognitive level than their more affluent counterparts and so,
on cognitive testing, children with a poorer result on entering school would be kept in lower groups.
Being placed in a low ability group very early on could be a reason children from lower income
backgrounds largely struggle to catch up with their more affluent peers in terms of attainment as
McSherry and Ollerton (2002) found that movement between groups can be limited.

It is worth noting that both Campbell (2014) and Hallam and Parsons' (2012) evidence shows that children from lower SES backgrounds are more likely to attain slightly higher in maths than literacy. But if the practice of streaming is adopted, which is general curricular ability placing; children from lower backgrounds still seem to find themselves in the lower streams regardless of their maths results (Campbell, 2014). These findings are in accordance with Hallam and Parsons (2012) and Tach and Fargaz (2006) who stated that although groupings were organised predominantly on cognitive testing results, teacher's own judgements of ability, attainment and behaviours could influence the placing of some individual children. The findings support the statement that children from lower SES homes can be placed on factors other than just their cognitive abilities, like behaviour and perceived ability (Allebone, 2006). This could encourage these children to be placed in lower groups as poorer children are more likely to display negative behaviours in comparison to more affluent children (Kiernan & Mensah, 2009).

What are the effects of ability grouping on the cognitive attainment of children from low income households?
Hallam and Parsons (2012) examined the difference in attainment over two years between ability groups. This saw the bottom ability group making very limited learning progress in comparison to the top group. Campbell (2014) found that teachers with less teaching experience were more likely to teach the bottom ability stream. These findings relate back to Hallam and Parsons (2013) who affirmed that the lowest ability group were often taught by lower quality teachers with less experience. A further link may also be made to Ireson and Hallam (1999) who recognised that children in the lower ability groups were given more structured and monotonous activities which may reflect the low expectations of these learners, as well as poorer quality teaching .This gives weight to the hypothesis that children who are placed in the bottom ability group may remain there because they do not receive the same quality of teaching as other groups as they are not expected to progress at the same rate.

Hallam and Parsons' (2012) research findings, which indicate higher ability groups make significantly higher improvements on cognitive testing between age 5 and 7 than the bottom group, support the research which sees ability grouping favouring the learning of the more able students (Hornby & Whitte, 2014). However, as Tach and Fargaz (2006) evidence, the top group progressing much further than the bottom group will encourage the attainment gap to further widen resulting in educational inequality. Educational inequality, or the achievement gap widening between the more and less able, is a situation which the OECD (2010) and the Scottish Government (2015) are working to minimise and so one would assume that any practice which encourages this inequity would be called in to question.

What are the effects of ability grouping on the behaviour of children from low income households?
As previously intimated, it has been found for some children from poorer backgrounds to display negative behaviours from a young age (Kiernan & Mensah, 2009) and statistics in Campbell's (2014) study show a greater number of children with negative behaviours were in the lower ability streams than any other. Although it is unclear from this study whether these behaviours are as a result of being in the bottom stream, or whether they were prevalent before being placed in the lower stream, Tach and Fargaz (2006) found that grouping by ability actually had a negative effect on children's behaviour in lower groups. In relating back to previous cognitive effects, one could assert that lower ability groups provide access to a less stimulating curriculum, teacher and activity opportunities (Hallam & Parsons, 2013; Ireson & Hallam, 1999), and so children may act out in response to boredom or disengagement. The lack of cognitive stimulation due to fewer opportunities to work in groups or on meaningful tasks could also be connected to teachers' management of this behaviour (Kutnick *et al.*, 2006). The environment is more structured and controlled leaving little scope for choice and active learning which may benefit these students' learning. Teachers may find it difficult to maintain order and facilitate good quality teaching in a group comprised of a possible 68.6% children whom they perceive to display varying forms of negative behaviour (Hallam & Parsons, 2012). This raises the issue of placing children

based on factors other than attainment like behaviour; it may hold back and further contribute to problems which are already prevalent instead of raising attainment. This is especially true for children from low income backgrounds who may be being failed in their education as they are held back due to their behaviour and not their cognitive ability.

Conclusion

This choice of methodology has several limitations which need to be taken into account when assessing the evidence it presents. Firstly, some studies may have been missed due to search keyword combinations or databases. In this review, only one researcher was involved in the searching, screening and analysing process which limits the amount of time which could be spent on the literature retrieval and is why only the first 250 results were examined in every search. Based on the data which became available through the searches, only three studies were identified to analyse. This could be seen as a limitation as it is quite a small number of results to base the review on. However, because each study had a relatively large sample size and the data originated from part of larger longitudinal studies (MCS and ELCS-K) it gave the overall review weight and findings could begin to be generalised to the overall educational picture. The small number of studies seemingly available for this analysis also raises suspicions that such a widely utilised organisational structure, as ability grouping, perhaps does not have the evidence base to support its use. The last limitation was that streaming, setting and within class ability grouping were largely generalised. This could be seen to be an inaccurate representation of the data as the three groupings are different in nature. However, as only three studies were eligible for the review, the generalisation was justified as all three did segregate pupils by ability into low, middle and top groups which is the main idea behind any form of ability grouping and the implications for learning it creates.

The study aimed to analyse the learning gap associated with lower SES and how teachers may further influence this with their classroom practices, specifically ability grouping. This project is not intended to portray ability grouping as the sole reason for the continuing attainment gap between less and more affluent children. However, the review has highlighted that children from lower income homes are more likely to be placed in lower ability groups and so may be subjected to a less challenging curriculum and teacher expertise; thus affecting their chance to catch up cognitively on entry to school (Hallam & Parsons; 2013; Kutnick *et al*., 2006). This placing could also influence already prevalent behaviour problems or contribute to the development of such issues (Tach & Fargaz, 2006). Factors associated with ability grouping, like differing expectations and learning opportunities, are directly related to the teacher and so knowing the effects of these on learning is vital in the fight to close the attainment gap. This study holds implications for all teachers and professionals in this field in that it shows the limitations of ability grouping and that it is not an evidenced way of raising attainment. The consequences of such practices must be acknowledged by teachers before adopting this structure in their classroom. Teachers should be adopting evidenced based practices which are proven to be successful in raising attainment, especially for more disadvantaged groups like poorer children. It still remains unclear how one can justify the equity of this practice, especially in the Scottish educational context, as the evidence shows that ability grouping does not promote the learning of less affluent children and widens the achievement gap (Tach & Fargaz, 2006). It is clear from the lack of available studies which concentrate on ability grouping and its effects on the learning of children with a lower SES, that future research should be carried out. Research needs to be conducted to look at the long term effect of grouping, specifically, to further evidence the profound effect that this structure may have on their overall learning.

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