Effectiveness of a whole class vocabulary programme for secondary school students from areas of social disadvantage

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Abstract

**Background:** Decreased vocabulary skills have been identified in adolescents from socially disadvantaged backgrounds. Reduced language competence during adolescence is linked to poor academic achievement and social, emotional and behavioural difficulties. Research for adolescent language intervention is limited and there is a lack of evidence for effective intervention with adolescents from socially disadvantaged backgrounds.

**Aims:** To investigate whether a whole class vocabulary programme implemented by teachers in socially disadvantaged secondary schools will improve students’ performance on selected vocabulary measures. The study also aimed to investigate if there is a relationship between students’ pre intervention scores and amount of improvement following intervention.

**Methods & Procedures:** 245 first year students (M= 12; 8) from four socially disadvantaged secondary schools participated in the study. Whole schools were randomly assigned to two groups: treatment versus waiting controls. All participants were assessed pre and post intervention on the BPVS III and CELF 4 subtests. The treated group received 12 weeks of whole class vocabulary intervention delivered by secondary school teachers in a classroom setting. The vocabulary programme targeted key concepts and vocabulary through word associations, categorisation, mind mapping and word-building.

**Outcomes & Results:** There were significant interaction effects (time x group) for 3 of 5 vocabulary raw score measures, indicating a greater degree of improvement for the treated group. Pos-hoc analysis demonstrated that the treated group made significant gains over time on all vocabulary measures. Correlations showed significant (p < .05) small to medium negative correlations between the treated group’s scores at pre intervention and amount of improvement for the majority of vocabulary measures.

**Conclusions & Implications:** The current study is one of the first randomised control trials to demonstrate improved student performance on widely used vocabulary measures following whole class vocabulary intervention delivered by teachers in socially disadvantaged schools. The findings provide positive support for SLT and teacher collaborative work, adolescent vocabulary intervention and whole class intervention for adolescents from socially disadvantaged backgrounds. The positive results may encourage future research with adolescents from socially disadvantaged backgrounds and influence the professionals who work with this population.
Introduction

There has been an increased interest in adolescent language development, impairment, and intervention in recent years (Joffe and Nippold 2012). The current literature suggests that important advanced language skills develop during adolescence (Nippold 2007). For some adolescents, their language skills do not advance to the same level as their age matched peers (Paul 2012). Decreased language competence, specifically reduced vocabulary, has been identified in adolescents from socially disadvantaged backgrounds (Spencer et al 2012). Adolescent language difficulties can have serious negative implications for academic achievement and social, emotional and behavioural functioning (SEBF) (Joffe and Black 2012). Additionally, intervention services for adolescent language difficulties are limited (DCSF 2008). This literature review aims to explore the development of language in adolescence, social disadvantage and language, the impact and prevalence of adolescent language difficulties, vocabulary intervention, and adolescent language intervention and service delivery.

Adolescent language

Although the majority of language development occurs during the pre-school and school age years, language continues to grow and develop during adolescence (Nippold 2007). Vocabulary, complex reasoning, figurative language, sentence structure, narrative skills, and sophisticated social communication skills develop throughout the adolescent years (Nippold 2007; Hartshorne 2011).

Vocabulary growth is particularly extensive, with the average school student learning approximately 7 to 10 new words per day (Hartshorne 2011). This advanced vocabulary growth is acquired through both direct and indirect sources (Nippold 2007). Direct methods involve dictionary and thesaurus usage, or direct instruction from a knowledgeable
individual (Nippold 2007). Indirect methods involve the use of word learning strategies, such as contextual abstraction and morphological analysis (Nippold 2007).

**The importance of adolescent language development**

The advanced language skills acquired during adolescence are required to successfully access the secondary school curriculum. Increased demands are placed on adolescents’ language abilities once they transition to second level education. Students are required to read and understand more complex and expository texts across a multitude of subject areas (Paul 2012). They must also produce more complex written forms (e.g., persuasive and expository writing), which require increased metacognitive and metalinguistic skills (Paul 2012).

Adolescents’ extended vocabularies and associated skills are particularly critical for accessing curricular material. The words that adolescents encounter at school are increasingly decontextualised and abstract, and do not commonly occur in spoken language (Nagy et al 1993). Students must rely on their advanced vocabulary abilities to interpret the increasingly complex material (Paul 2012). Moreover, mastery of curricular material enables students to successfully participate in both classroom discussions and assignments (Montgomery et al 1995).

During adolescence, competent spoken language skills are essential for establishing and maintaining peer relationships, and for successful participation in social interactions (Hartshorne 2011). In contrast to early childhood, when friendships are established through shared activities, spoken language becomes the main median for adolescent peer interactions (Paul 2012). Additionally, adolescents’ ability to use slang plays a key role in peer acceptance (Nippold 2007).

Although various aspects of language development are required to develop competent spoken language skills, vocabulary growth is distinctively important. The ability to use varied and complex vocabulary enhances our spoken output (Nippold 2007). A deep understanding of word meanings and word connections is required to use and comprehend metaphors and idioms, which are the basis of adolescent slang (Nippold 2007).
Social disadvantage and language

Adolescents from socially disadvantaged backgrounds are at risk of failing to develop adequate language skills. Research suggests that up to 50% of children from socially disadvantaged backgrounds demonstrate early language delays (Ginsborg 2006). The literature has specifically identified decreased vocabulary and slower rates of vocabulary growth in children from socially disadvantaged backgrounds (Walker et al 1994; Whitehurst and Fischel 2000).

In recent years, Spencer et al (2012) explored the relationship between social disadvantage and language in adolescence. They found that adolescents attending school in an area of socioeconomic disadvantage performed 1 SD below the expected normative mean on two standardised vocabulary measures (WASI vocabulary subtest and BPVS). Furthermore, when these scores were compared with a cohort of students from an area of relative socioeconomic advantage there were large effect sizes (Cohen’s d score of -1 and -1.1), indicating a significantly large difference between the cohorts on standardised vocabulary measures. The students from the area of social disadvantage also performed significantly below the mean on other language measures, but only vocabulary measures were outside the average range. These findings are supported by Myers and Botting (2008), who found that adolescents attending school in an area of social disadvantage had receptive vocabulary difficulties, indicated by BPVS scores significantly below the normative mean. Additionally, the adolescents demonstrated literacy and expressive language difficulties.

The prevalence of adolescent language difficulties

There is limited research indicating the prevalence of adolescent language difficulties. Some research suggests that approximately 10% of children and young people have speech, language and communication needs (SLCN) (Hartshorne 2011). However, it is possible that there are additional young people with SLCN who have not been identified. Firstly, there are limited speech and language services available to identify adolescence with language difficulties (DCSF 2008). Secondly, adolescent language difficulties can be difficult to
identify (Hartshorne 2011). Finally, Spencer et al (2012) found that 20% of students in a socially disadvantaged secondary school had undiagnosed language impairments.

**The impact of adolescent language difficulties**

Poor academic achievement has regularly been attributed to inadequate language skills for accessing the curriculum (Ginsborg 2006). A history of language impairment can negatively affect academic achievement in later life (Young et al 2002). Inadequate communication skills strongly impact literacy ability (Myers and Botting 2008). Given the focus on text based learning in the secondary school curriculum, literacy is a critical skill required for academic progress (Dockrell et al 2011).

An increased prevalence of social, emotional and behavioural difficulties (SEBD) has been identified in adolescents with language problems (Joffe and Black 2012; Conti Ramsden and Botting 2008; Lindsay and Dockrell 2000). In a recent study, Joffe and Black (2012) found a significant link between measures of vocabulary and SEBD. Clegg et al (2009) found that a high proportion of adolescents, who were at risk of permanent school expulsion, had unidentified language difficulties. Adolescents with language difficulties are more likely to encounter problems with social relationships and making friends (Durkin and Conti Ramsden 2007). The negative impact on social and academic life often leaves adolescents with language difficulties vulnerable to decreased levels of self esteem (Wadman 2008). Additionally, decreased language skills reduce the likelihood of future employment, as many employers rate communication skills as their highest priority (Snowling et al 2001).

**Adolescent language intervention**

Despite clear evidence for the prevalence of adolescent language difficulties and the associated negative effects on academic performance and SEBF, there is limited language intervention and support available for secondary school students (Larson et al 1993; DCF S 2008). Often, adolescents with language difficulties receive no intervention from a speech and language therapist (SLT) (Nippold 2010), and many adolescent language impairments
regularly go undetected (Spencer et al 2012; Joffe and Black 2012). In most secondary school classrooms the focus is largely on academic content and there is limited time spent on language related skills (Larson and McKinley 2003). Moreover, secondary school teachers have limited knowledge on how to support the needs of adolescents with language difficulties in the classroom (Lindsay and Dockrell 2002). The research relating to adolescent language intervention is limited (Joffe and Nippold 2012; Nippold 2010; Larson et al 1993). However, the available evidence suggests that adolescent language intervention is critical, effective and beneficial (Larson and McKinley 2003; Starling et al 2012; Joffe 2011; Lesaux et al 2010; Ebbels et al 2012).

**Vocabulary intervention**

Many researchers consider the promotion of adolescent vocabulary development to be specifically important (Joffe and Black 2012; Spencer et al 2012; Joffe 2006). This is likely due to the significant relationship between vocabulary development, literacy, oral language and access to curricular material (Paul 2012; West et al 1993).

There is widespread support for vocabulary intervention that promotes a deep and solid understanding of words (Joffe 2011a; Nelson and Stage 2007; Lesaux et al 2010). To achieve this, intervention should teach students about semantic and morphological word relations across rich contexts (Kelley et al 2010). Additionally, it is critical that vocabulary intervention incorporates word learning strategies, as it is not possible to directly teach students’ the meaning of every word that they will encounter (Nelson and Stage 2007). Word learning strategies allow adolescents to independently expand their vocabulary (Lesaux et al 2010).

Joffe (2011a) carried out a randomised control trial (RCT) using the Vocabulary Enrichment Programme (VEP; Joffe 2011b). Teaching assistants were trained to implement group vocabulary intervention with adolescents who had identified specific language impairments. The programme integrated all the principals of how we typically learn words i.e. direct instruction was used (e.g., dictionary and thesaurus use) and word learning strategies were taught (e.g., contextual abstraction and morphological analysis). The findings indicated significant (time x group) interaction effects (p < .05) for three non
standardised vocabulary measures, indicating a greater degree of improvement for the students who received the intervention.

This research provides positive evidence for adolescent vocabulary intervention and collaborative work between school staff and SLTs. However, the traditional pull out approach used in this study is often received negatively by adolescents, as it singles them out from their peers (Larson and McKinley 2003). This can have negative implications for therapy effectiveness (Larson and McKinley 2003). By removing students from class, they subsequently miss out on curriculum related instruction (Larson and McKinley 2003).

**Alternative approach to service delivery**

An alternative service delivery approach, which also addresses classroom language needs, is a whole class language intervention model. This approach involves training teachers to implement language intervention in a typical classroom setting. Starling et al (2012) carried out an RCT where whole class language intervention was implemented to support adolescents with identified language difficulties in typical mainstream classrooms. The programme consisted of modifying teachers’ oral and written language, using visual tools to aid processing, and specific vocabulary intervention. The results showed significant (time x group) interactions effects ($p < .05$) for standardised measures of written expression and listening comprehension, indicating a greater degree of improvement for the students who received intervention.

This study provides positive evidence for teacher training and whole class intervention with language impaired secondary school student, but also poses several limitations. Firstly, no specific measures of vocabulary skills were administered to assess the effects of the vocabulary instruction. Furthermore, the intervention approaches responsible for the significant interaction effects cannot be identified, as several intervention methods were used. Finally, this study failed to look at the impact of whole class intervention for the non language impaired students in the classes.
**Intervention for adolescents from socially disadvantaged backgrounds**

Joffe (2011a) and Starling et al (2012) both demonstrated positive outcomes for adolescents with identified language impairments. However, they did not address the decreased vocabulary skills of adolescents from socially disadvantaged backgrounds.

Lesaux et al (2010) implemented a whole class vocabulary programme in urban middle schools with high numbers of students from socially disadvantaged backgrounds. The programme target academic vocabulary and was significantly text based. Subsequently, there was a limited focus on oral language, which is important for participation in classroom discussions (Paul 2012). The results showed significant effects on researcher designed vocabulary measures, which were based on the intervention. There were no significant effects on formal vocabulary measures. Therefore, it is difficult to generalise the outcomes to growth beyond the specific vocabulary targeted in the programme. Moreover, a major design weakness in this study was the lack of a randomised control.

**Conclusion and current study**

There is limited support available for adolescents with language difficulties. The research on adolescent vocabulary intervention is limited (Cirrin and Gillam 2008). Moreover, the available research has primarily investigated the effects of intervention for adolescents with identified language impairments. Thus, few researchers have addressed the language needs of adolescents from socially disadvantaged backgrounds. The need for collaborative, inclusive, intervention in socially disadvantaged secondary schools has been identified (Spencer et al 2012). The current study aims to address these apparent gaps in the literature.

There is considerable evidence supporting collaborative work between SLTs and teachers (Joffe 2011a; Starling et al 2012; Lesaux et al 2010). Additionally, the benefits and positive outcomes of whole class language intervention have been identified (Starling et al 2012; Lesaux et al 2010). Considering this evidence, the current study used a whole class
intervention approach, which was implemented by teachers, who were trained and supported by the research SLT.

Previous research has identified the specific vocabulary deficits associated with adolescents from socially disadvantaged backgrounds (Spencer et al 2012). Consequently, the intervention in the current study aimed to improve the vocabulary skills of students from socially disadvantaged backgrounds. The vocabulary programme, adapted from Joffe (2011b), included the necessary components to teach both a deep understanding of words and word learning strategies. Additionally, the programme involved both text and oral based activities, and incorporated the use of visual aids (e.g., mind maps).

In summary, the current study is the first randomised control trial to examine the effectiveness of a collaborative, whole class vocabulary intervention for adolescents from socially disadvantaged backgrounds.

**Study Aims**

- To investigate whether a whole class vocabulary programme implemented by teachers in socially disadvantaged secondary schools will improve students’ performance on selected vocabulary measures.

- To investigate if there is a relationship between students’ pre intervention scores and amount of improvement following intervention.
Method

Participants

Information sheets and forms requesting consent to participate were sent to the parents of 247 first year students from four Irish secondary schools in areas of social disadvantage. In total 99% (n=245) agreed and 1% (n=2) declined. The cohort consisted of 170 females and 75 males. Age at pre assessment (time 1) ranged from 11 to 14 years, with a mean age of 12; 08 and SD of 6.6 months. 31 participants had English as an additional language (EAL). 10 students were absent and 4 students had left the schools at re-assessment stage (time 2). Therefore, pre and post data were collected for 231 students (94% of the original cohort). Inclusion in the study required participants to be first year students who had obtained parental consent. Students whose parents did not consent were excluded from the study, but were still included in the intervention.

Convenience sampling was used to recruit participants. The principals of 4 schools, in which the research speech and language therapist already provided services, were sent information packages - all agreed to participate.

Ethical approval was obtained from the University of Limerick, Faculty of Education and Health Sciences Research Ethics Committee. In addition to parental consent, participants verbally assented to participation prior to data collection and received verbal and written explanations from the testers before signing participant consent forms.

Design

An RCT design was used. RCTs are considered the ‘gold standard’ for investigating the effectiveness of intervention (Portnoy and Watkins 2009). Whole schools were randomly assigned to treated (n=142) versus control (n=88) groups. Both groups were assessed at Time 1 and Time 2. Assessments were administered and scored by two SLTs and six speech and language therapy graduate students. The testers were aware of participants’ group assignment, but each tester assessed different participants at time 1 and time 2. The
treated schools received intervention following pre assessment and the control schools were placed in a wait condition.

Materials

*The British Picture Vocabulary Scale, third edition (BPVS 3; Dunn et al 2009)*

The BPVS 3 is a widely used test of receptive vocabulary where participants are required to point to a picture from a selection of four following a spoken single word prompt. It is a standardised assessment with extensive evidence of adequate reliability and validity (Dunn et al 2009). The BPVS was administered to assess participants’ single word receptive vocabulary.

*The Clinical Evaluation of Language Fundamentals, fourth edition UK (CELF-4; Semel et al 2006)*

The CELF-4 is a widely used standardised language assessment with subtests designed to assess vocabulary. The publishers provide extensive evidence of adequate reliability and validity (Semel et al 2006). The following subtests were administered to assess participants’ receptive and expressive vocabulary:

- Word Classes-Receptive (involves understanding the links between words)
- Word Classes-Expressive (involves explaining why two words are linked)
- Word Definitions (involves defining words given in a sentence context)
- Word Associations (involves listing vocabulary terms in a given category)

Procedure

Assessment procedure

Pre and post assessments were administered for the treated and control groups. Participants were assessed individually over a two week period at each testing stage. Assessments took 45-60 minutes to complete and were carried out in no particular order.
Administration and scoring instructions from the respective test manuals were followed. Appropriate raw and standard scores were calculated.

**Intervention procedure**

7 English teachers and 4 resource teachers were trained by the research SLT to implement the intervention programme. The teachers delivered the intervention twice weekly for 12 weeks in a classroom setting, with support from the SLT once per week. The programme was a shortened version of the *Vocabulary Enrichment Programme* (VEP; Joffe 2011b). The VEP was appropriately adapted for whole class teaching. Sessions 1-10 of the VEP were completed, and two revision sessions and additional resources were added. Each session took approximately two 40 minute classes to complete. The programme targeted key concepts and vocabulary through word associations, categorisation, mind mapping and word-building. Word etymology, synonyms, antonyms, multiple meanings, definitions, idiomatic and figurative language were integral components of the programme, as was the use of dictionaries and thesauruses. The programme involved both text and oral based activities, and incorporated the use of visual aids. A teacher booklet and resource folder offered various teaching/homework options for meeting the session objectives.

**Statistical Analyses**

Descriptive and inferential statistics were carried out using SPSS version 21. The data set (table 1) consisted of pre and post test scores for the control and treated groups. Raw score data refers to the number of items participants answered correctly in each subtest. It gives a measure of improvement of skills relative to where the participant started. Standard score data was derived from raw scores using the norm referenced scales in the respective test manuals. The standard scores represent the degree to which a score deviates from the mean score of an aged matched standardised sample.
Amount of improvement for each of the variables was added to the data set for the treated group. This was calculated by subtracting pre test scores from post test scores for each of the treated group participants.

Normality tests indicated that a number of variables violated the assumption of normality. This is a common occurrence with large sample sizes and the use of parametric tests is still deemed appropriate (Pallant 2007). Parametric analyses included independent t tests, mixed between subjects analysis of variance (ANOVA), paired sample t-tests and correlations. The mean scores of the 14 participants absent at post testing were not significantly different to the remainder of the cohort. Therefore, the original cohort (n=245) was included in the initial analysis of the pre test scores. The main analyses involved split plot ANOVAs and paired t-tests, which required both pre and post test scores. Thus, only 231 participants were included in these analyses.

The critical probability p-value of < 0.05 was used to determine if differences were considered statistically significant.

### Table 1. Summary of data set

<table>
<thead>
<tr>
<th>Pre and Post Raw Score (RS) Variables</th>
<th>Pre and Post Standard Score (SS) Variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>BPVS</td>
<td>BPVS</td>
</tr>
<tr>
<td>Word Classes-Expressive</td>
<td>Word Classes-Expressive</td>
</tr>
<tr>
<td>Word Classes-Receptive</td>
<td>Word Classes-Receptive</td>
</tr>
<tr>
<td>Word Definitions</td>
<td>Word Definitions</td>
</tr>
<tr>
<td>Word Associations</td>
<td>*</td>
</tr>
</tbody>
</table>

* There was no SS for Word Associations as it is criterion referenced score.
**Results**

As a precursor to the analysis carried out to determine the effects of intervention, independent sample t-tests investigated whether the participants in the control and treated groups differed at Time 1. The results (Appendix A) indicated that there was no significant difference between the groups (all measures: p < .05, 2 tailed). Results will be discussed according to the aims outlined in the introduction.

**Effect of intervention**

To evaluate whether treatment improved participants’ vocabulary scores, mixed between within subjects ANOVAs were carried out for each of the vocabulary measures, with time and group as the independent variables. The results showed that there was a significant interaction for three measures.

1. **BPVS Raw Scores**

Figure 1 highlights a significant interaction (time x group) for BPVS Raw Scores, F (1, 229) = 6.45, p = 0.012, indicating a greater degree of improvement for the treated group. There was a significant main effect for time, F (1,229) = 42.75, p < .05, but not for group, F (1, 229) = .727, p = .395, suggesting the groups combined improve across time and no overall difference between the groups when both times are combined.
2. Word Classes-Expressive Raw Score

Figure 2 highlights a significant interaction (time x group) for Word Classes Expressive Raw Scores, $F(1, 229) = 6.06, p = 0.015$, indicating a greater degree of improvement for the treated group. There was a significant main effect for time, $F(1, 229) = 26.70, p < .05$, but not for group, $F(1, 229) = .2.18, p = .14$, suggesting the groups combined improve across time and no overall difference between the groups when both times are combined.
Figure 2. Significant interaction effect (time x group) for Word Classes Expressive Raw Scores

3. Word Associations Raw Score

Figure 3 highlights a significant interaction (time x group) for Word Classes Expressive Raw Scores, F (1, 229) = 6.811, p = 0.010, indicating a greater degree of improvement for the treated group. There was a significant main effect for time, F (1,229) = 14.729, p < .05, but not for group, F (1, 229) = .444, p= .506, suggesting the groups combined improved across time and no overall difference between the groups when both times are combined.
There was no significant interaction (time x group) for Word Classes Receptive Raw Scores and Word Definitions Raw Scores ($p > .05$). Additionally, there were no interaction effects for the standard score measures ($p > .05$).

**Post-Hoc Analysis**

ANOVA does not provide analysis for the changes in scores across time for the groups separately. Therefore, post hoc paired t-tests were administered for each group to establish if there was a significant improvement in scores across Time 1 and Time 2.

The results of paired t-tests in table 2 highlight a significant improvement on all raw scores measures for the treated group.
Table 2. Treated group overall improvement- Raw Scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Time 1</th>
<th>Mean Time 2</th>
<th>Mean Difference</th>
<th>95% C.I.</th>
<th>T</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Classes Receptive</td>
<td>12.552</td>
<td>13.727</td>
<td>-1.1748</td>
<td>Between -1.6066 and -0.7431</td>
<td>-5.379</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td></td>
<td>(SD=3.957)</td>
<td>(SD=3.961)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word Classes Expressive</td>
<td>7.671</td>
<td>9.210</td>
<td>-1.5385</td>
<td>Between -2.0608 and -1.0162</td>
<td>-5.823</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td></td>
<td>(SD=3.375)</td>
<td>(SD=3.752)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word Definitions</td>
<td>17.056</td>
<td>18.993</td>
<td>-1.9371</td>
<td>Between -2.7405 to -1.1336</td>
<td>-4.766</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td></td>
<td>(SD=7.780)</td>
<td>(SD=8.581)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>BPVS</td>
<td>125.042</td>
<td>129.378</td>
<td>-4.3357</td>
<td>Between -5.5479 and -3.1234</td>
<td>-7.070</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td></td>
<td>(SD=17.730)</td>
<td>(SD=16.877)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Word Associations</td>
<td>45.825</td>
<td>49.524</td>
<td>-3.6993</td>
<td>Between -5.1741 and -2.2245</td>
<td>-4.959</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td></td>
<td>(SD=11.325)</td>
<td>(SD=11.763)</td>
<td></td>
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</tr>
</tbody>
</table>

*p< .05 (two tailed)

Table 3 shows that the control group did not significantly improve on Word Classes Expressive and Word Associations Raw Scores.

Table 3. Control group overall improvement- Raw Scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Time 1</th>
<th>Mean Time 2</th>
<th>Mean Difference</th>
<th>95% C.I.</th>
<th>T</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Classes Receptive</td>
<td>12.398</td>
<td>13.182</td>
<td>-.7841</td>
<td>Between -1.2686 and -0.2996</td>
<td>-3.217</td>
<td>87</td>
<td>0.002*</td>
</tr>
<tr>
<td></td>
<td>(SD=4.375)</td>
<td>(SD=4.484)</td>
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</tr>
<tr>
<td>Word Classes Expressive</td>
<td>7.477</td>
<td>8.023</td>
<td>-.5455</td>
<td>Between -1.1073 and 0.0164</td>
<td>-1.930</td>
<td>87</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td>(SD=4.003)</td>
<td>(SD=4.116)</td>
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<tr>
<td>Word Definitions</td>
<td>16.750</td>
<td>18.318</td>
<td>-1.5682</td>
<td>Between -2.5936 and -0.5428</td>
<td>-3.040</td>
<td>87</td>
<td>0.003*</td>
</tr>
<tr>
<td></td>
<td>(SD=9.123)</td>
<td>(SD=9.742)</td>
<td></td>
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<td>BPVS</td>
<td>124.148</td>
<td>126.057</td>
<td>-1.9091</td>
<td>Between -3.2993 and -0.5189</td>
<td>-2.730</td>
<td>87</td>
<td>0.008*</td>
</tr>
<tr>
<td></td>
<td>(SD=20.165)</td>
<td>(SD=20.832)</td>
<td></td>
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<tr>
<td>Word Associations</td>
<td>48.352</td>
<td>49.057</td>
<td>-.7045</td>
<td>Between -2.3306 and 0.9216</td>
<td>-0.861</td>
<td>87</td>
<td>0.392</td>
</tr>
<tr>
<td></td>
<td>(SD=12.588)</td>
<td>(SD=13.617)</td>
<td></td>
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</tr>
</tbody>
</table>

*p< .05 (two tailed)
Post hoc paired t-tests were also carried out for standard scores. Table 4 highlights significant improvement across time for the treated group on all standard score measures.

Table 4. Treated group overall improvement- Standard Scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Time 1</th>
<th>Mean Time 2</th>
<th>Mean Difference</th>
<th>95% C.I.</th>
<th>T</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptive</td>
<td>7.510 (SD=3.146)</td>
<td>8.224 (SD=3.376)</td>
<td>-.7133</td>
<td>Between -1.0754 and -.3512</td>
<td>-3.894</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td>Word Classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expressive</td>
<td>6.035 (SD=2.844)</td>
<td>6.923 (SD=3.035)</td>
<td>-.8881</td>
<td>Between -1.3229 and -.4533</td>
<td>-4.038</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td>Word Definitions</td>
<td>6.175 (SD=2.8217)</td>
<td>6.755 (SD=3.0724)</td>
<td>-.5804</td>
<td>Between -0.8717 and -.2892</td>
<td>-3.939</td>
<td>142</td>
<td>.0001*</td>
</tr>
<tr>
<td>BPVS</td>
<td>83.09 (SD=12.748)</td>
<td>85.853 (SD=12.929)</td>
<td>-2.7622</td>
<td>Between -3.8974 and -1.6271</td>
<td>-4.810</td>
<td>142</td>
<td>.0001*</td>
</tr>
</tbody>
</table>

*p < .05 (two tailed)

Table 5 highlights that the control group did not significantly improve on Word Classes Expressive Standard Scores.

Table 5. Control group overall improvement- Standard Scores

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Time 1</th>
<th>Mean Time 2</th>
<th>Mean Difference</th>
<th>95% C.I.</th>
<th>t</th>
<th>df</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptive</td>
<td>7.330 (SD=3.463)</td>
<td>7.807 (SD=3.720)</td>
<td>-.4773</td>
<td>Between -0.8899 and -0.0646</td>
<td>-2.299</td>
<td>87</td>
<td>0.024*</td>
</tr>
<tr>
<td>Word Classes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expressive</td>
<td>5.705 (SD=3.281)</td>
<td>6.000 (SD=3.311)</td>
<td>-.2955</td>
<td>Between -0.7612 and 0.1703</td>
<td>-1.261</td>
<td>87</td>
<td>0.211</td>
</tr>
<tr>
<td>Word Definitions</td>
<td>5.943 (SD=3.320)</td>
<td>6.523 (SD=3.549)</td>
<td>-.5795</td>
<td>Between -0.9700 and -0.1891</td>
<td>-2.950</td>
<td>87</td>
<td>0.004*</td>
</tr>
<tr>
<td>BVPS</td>
<td>83.39 (SD=12.937)</td>
<td>84.989 (SD=14.494)</td>
<td>-1.6023</td>
<td>Between -2.8955 and -0.3090</td>
<td>-2.463</td>
<td>87</td>
<td>0.016*</td>
</tr>
</tbody>
</table>

*p < .05 (two tailed)
The paired t-tests support the significant interaction effects found on ANOVA. Furthermore, they provide additional support for the positive effects of intervention on the Word Classes Expressive and Word Associations subtests.

*Association between Time 1 scores and amount of improvement*

A correlation analysis was carried out to determine if there was a relationship between the treated group’s Time 1 scores and amount of improvement. Preliminary analysis for correlation indicated the use of Pearson r analysis. Table 6 shows significant (p < .05) small to medium negative correlations for all language measures except Word Definitions. This indicates that lower scores at pre-intervention are associated with greater amounts of improvement following intervention.

Table 6. Association between treated group Time 1 scores and amount of improvement

<table>
<thead>
<tr>
<th>Time 1 scores</th>
<th>Amount of improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word Classes Expressive RS</td>
<td>-.342*</td>
</tr>
<tr>
<td>Word Classes Receptive RS</td>
<td>-.328*</td>
</tr>
<tr>
<td>Word Definitions RS</td>
<td>-.139</td>
</tr>
<tr>
<td>Word Associations</td>
<td>-.344*</td>
</tr>
<tr>
<td>BPVS RS</td>
<td>-.320*</td>
</tr>
<tr>
<td>Word Classes Expressive SS</td>
<td>-.387*</td>
</tr>
<tr>
<td>Word Classes Receptive SS</td>
<td>-.239*</td>
</tr>
<tr>
<td>Word Definitions SS</td>
<td>-.164</td>
</tr>
<tr>
<td>BPVS SS</td>
<td>-.243*</td>
</tr>
</tbody>
</table>

* p < .05 (2 tailed)
Discussion

The primary aim of the current study was to investigate whether a whole class vocabulary programme implemented by teachers in socially disadvantaged secondary schools will improve students’ performance on selected vocabulary measures. An additional research aim was to determine if students’ pre intervention scores were associated with amount of improvement following intervention. Within this section, the results of the analysis will be discussed and comparisons with other studies will be made, prior to discussing the study limitations and possible contributions of this analysis.

Effectiveness of intervention

The results suggest that intervention was effective in improving 3 of the 5 raw score vocabulary measures. Word Classes Expressive, Word Associations and BPVS scores showed significant (time x group) interaction effects, indicating that the treated group improved significantly more than the control group on these measures. These positive findings suggest intervention related gains for both receptive and expressive vocabulary skills.

Improvement on Word Classes Expressive scores demonstrates students’ increased ability to explain the dimensions of relationships between words (e.g. whether words belong to the same word class, are antonyms or synonyms or have other underlying relationships). Gains on the Word Associations subtest suggest increased efficiency at searching the stored lexicon and retrieving appropriate category words. This improvement in retrieval and categorisation could be a result of intervention effects which increased and strengthened students’ semantic links between words. The improved BPVS scores demonstrate an increased understanding of single word vocabulary. BPVS vocabulary was not targeted during intervention. It is therefore possible that intervention improved students’ ability to apply vocabulary learning strategies to receptively interpret single words.

There were no significant (time x group) interaction effects for Word Classes Receptive and Word Definitions raw scores. A possible justification for the Word Classes-Receptive result is related to the significant improvement on Word Classes-Expressive scores. Correct
Word Classes Receptive responses were required in order for the Word Classes Expressive improvement to have occurred. At Time 1, Word Classes Receptive scores (M=12.55) were greater than Word Classes Expressive scores (M=7.67). Therefore, it is plausible that intervention increased students’ ability to explain the link between two words which they identified correctly, but could not explain at Time 1, resulting in a non significant interaction for Word Classes Receptive scores.

Although a significant interaction for Word Classes Receptive gains may have been less probable, it was still possible. Additionally, the non significant interaction for Word Definitions must be explored. A potential explanation for the results of these two subtests is related to the intervention. The Intervention did not target specific vocabulary knowledge. Instead, the focus was on improving students’ vocabulary learning strategies. Word Classes Receptive and Word Definitions require adequate knowledge of the specific vocabulary used in the tests. Therefore, even with improved vocabulary strategies, students were less likely to demonstrate gains on these subtests if they were not familiar with the specific test vocabulary.

The standardised measures of the vocabulary subtests did not demonstrate significant (time x group) interactions, suggesting no significant difference between the treated and control groups, when standardised scores were applied. These results are unsurprising, as standard scores are less sensitive to change (Flippo and Caverly 1999). The findings are also in line with similar previous research. Following implementation of the Vocabulary Enrichment Programme, Joffe (2011a) found significant interactions on vocabulary test raw score measures but not on standard score measures.

Additional results, relevant to the primary aim, were demonstrated on the post-hoc paired t-test analyses. The findings showed positive changes for the treated group, demonstrating significant improvement on all of the vocabulary measures over time. The results also showed that the control group made significant improvements across time. Some control improvement was expected, as word learning ability increases with intellectual maturation and individuals learn new words as a result of their daily experiences (Cirrin and Gillam 2008). However, an imperative difference between the groups was that the control group did not significantly improve on Word Classes Expressive and Word Associations raw score measures. Moreover, they did not show significant improvements
on Word Classes Expressive standard scores. These findings provide additional support for the positive effects of intervention on the Word Classes Expressive and Word Associations subtests. Furthermore, they support the significant raw score interaction effects.

**Comparison with previous studies**

The positive intervention effects in the current study support the findings of previous related research. Joffe (2011a) also carried out an RCT using the *Vocabulary Enrichment Programme (VEP)* and similarly found positive significant (time x group) interaction effects on three raw score vocabulary measures ($p < 0.5$). Moreover, the programme was also delivered by secondary school staff who were trained by an SLT. Thus, the current findings provide additional support for the use of the VEP and collaborative work between school staff and SLTs.

The current study also adds positive information to Joffe’s findings. Joffe (2011a) used a traditional pull out intervention approach, which can be received negatively by adolescents and results in students missing out on curriculum related instruction (Larson and McKinley 2003). The current study demonstrated positive effects for an adapted whole class VEP, which had an effect of generally good attendance. Moreover, in contrast to the language impaired adolescents in Joffe’s study, the current study showed positive outcomes for adolescents from socially disadvantaged backgrounds.

However, it is important to note that Joffe (2011a) found a significant interaction effect on a vocabulary definition task ($p= .077$), where as the current study found no significant interaction on the Word Definitions subtest ($p=0.57$). A possible explanation for the contrast in findings is the exclusion of specific curriculum vocabulary instruction in the adapted whole class VEP. Alternatively, the smaller group instruction in Joffe’s study may have contributed to greater performance on vocabulary definition tasks.

Starling et al (2012) carried out an RCT to investigate the effects of whole class intervention delivered by secondary school teachers. Their results showed positive interaction effects ($p < .05$) for standardised measures of written expression and listening comprehension. Thus, the current study adds additional support for their use of a whole
class intervention approach delivered by secondary school teachers. Starling et al (2012) also incorporated the use of vocabulary intervention. However, they did not specifically measure vocabulary gains in their assessments. Furthermore, their intervention consisted of multiple techniques, and therefore the specific intervention responsible for the significant interaction effects cannot be identified.

The current study’s findings add to those of Starling et al (2012) by demonstrating significant gains on selected subtests designed to measures vocabulary. Moreover, Starling et al (2012) did not carry out their study in a socially disadvantaged secondary school and they only assessed the language impaired students in the classes that received the intervention. The current study adds positive findings for a whole class approach, which includes outcomes for all adolescents in participating socially disadvantaged secondary school classes.

Lesaux et al (2010) examined the effect of whole class vocabulary intervention delivered by teachers in socially disadvantaged secondary schools. They found positive outcomes on 4 researcher designed vocabulary measures (p < 0.5). Thus, the current study provides additional support for the use of whole class vocabulary intervention delivered by teachers in socially disadvantaged secondary schools. Furthermore, the current study adds to the findings of Lesaux et al (2010) and addresses several of their limitations. Firstly, the researcher designed tests used by Lesaux et al (2010) measured the specific vocabulary targeted in their intervention. The current study found positive outcomes on widely used formal vocabulary measures which are more representative of global vocabulary gains. Secondly, Lesaux et al (2010) did not randomise their control and treated group assignment, leaving their findings open to bias. The current study incorporated a more robust RCT design. Finally, Lesaux et al (2010) used a primarily text based intervention which involved learning specific academic vocabulary - their findings did not demonstrate significant interaction effects on formal vocabulary measures. In contrast, the current study provides evidence for the use of whole class vocabulary intervention which is text and oral based and focuses on vocabulary learning strategies, with outcomes demonstrated on widely used formal vocabulary measures.
Relationship between pre test scores and amount of improvement

The second aim of this study was to investigate if there was a relationship between the treated group’s pre test scores and amount of improvement. The results showed that there were significant small to medium negative correlations for all measures except Word Definitions. This finding indicates that for the majority of measures, lower scores at pre intervention were associated with greater amounts of improvement. This discovery is of potential importance, as it suggests the weaker students in the classes benefitted most from the intervention. This supports the findings of Starling et al (2012) and Lesaux et al (2010) who found that weaker language impaired students and language minority students made significant gains following whole class intervention. The correlation in the current study provides additional evidence against the usual protocol in school settings, which is to take weaker students out of the classroom for intervention. Furthermore, the findings demonstrate a refreshing situation for weaker students in classroom settings, where the typically seen ‘Matthew effect’ (the rich get richer and the poor get poorer) was rejected.

Limitations

There were several limitations identified in the current study. The use of double blinding is considered best practice in RCT designs to control for the Rosenthal effect (Polgar and Thomas 2000). Testers and participants were not blinded in the current study and thus double blinding was not employed. This may have affected outcomes by altering tester and/or participant expectations. A convenience sampling method was used. This may have resulted in a biased, unrepresentative sample of the population (Polgar and Thomas 2000). An additional potential sample bias is that the four schools involved in the study were working in collaboration with the research speech and language therapist prior to the study. Furthermore, the current study did not carry out follow up assessments. It would be relevant to establish if there were long term positive effects of therapy in order to strengthen the efficacy of the intervention approach. Finally, the vocabulary measures used in the current study did not directly measure students’ use of vocabulary learning strategies, which was the primary focus of the intervention.
Clinical implications and Recommendations

The current study responds to the previously highlighted need for high quality adolescent intervention studies (Larson and McKinley 2003) and whole class vocabulary intervention in socially disadvantaged secondary schools (Spencer et al 2012). It is the first randomised control trial to demonstrate improved student performance on formal vocabulary measures following whole class vocabulary intervention delivered by teachers in socially disadvantaged secondary schools.

The outcomes provide additional support for collaborative work between SLTs and secondary school teachers. The findings and indication that weaker students may have benefitted most from intervention could potentially encourage more teachers to focus on basic language skills and collaborate with SLTs in the future.

The study offers additional support for the use of adolescent vocabulary intervention that focuses on oral and text based language and word learning strategies. It provides new evidence for the effectiveness of this approach with adolescents from socially disadvantaged backgrounds. Future research using measures that are sensitive to students’ use of word learning strategies is recommended.

The findings offer additional support for the use of a whole class vocabulary intervention approach for adolescents from socially disadvantaged backgrounds. Importantly, the improved vocabulary skills could help break down barriers to academic and ultimately lifelong success for this socially disadvantaged population. Additionally, the study provides support for alternative service delivery options for SLTs working in school settings.

Previous research has identified that there are high instances of language impairment in socially disadvantaged secondary schools (Spencer et al 2012; Joffe and Black 2012). The current study did not identify students with specific language impairments. It would be important for future research using this intervention approach to identify the students with specific language impairments. A whole class approach in isolation may not be sufficient for students with specific language impairments (Starling et al 2012). Moreover, follow up assessments are recommended for future research. A whole class approach may be
sufficient in producing long term gains for students who have decreased vocabulary skills associated with social disadvantage.

Finally, this study is the first to address the identified vocabulary needs of adolescents from socially disadvantaged backgrounds in the UK and Ireland. It is hoped that the findings will encourage future research with adolescents from areas of social disadvantage. Furthermore, it is hoped that the positive outcomes will influence decision makers, teachers and SLTs who work with this disadvantaged population.
Conclusion

This study found that whole class vocabulary intervention delivered by teachers in socially disadvantaged secondary schools improved students’ scores on widely used vocabulary measures. The results also suggest that the students with the lowest scores made the greatest improvements following intervention. The findings are significant in demonstrating the success of teacher and SLT collaborative work. The study provides support for the use of strategy based vocabulary intervention with adolescents. Furthermore, this study demonstrates exciting evidence for the effectiveness of a whole class vocabulary approach with adolescents from socially disadvantaged backgrounds. The significant gains in vocabulary could help break down barriers to academic and lifelong success. Further research is recommended to determine the long term effects of the intervention using more sensitive measures. It is hoped that this study will encourage more research with this population, and that the findings will influence the professionals who work with socially disadvantaged adolescents.
References


Dockrell, J. E., Lindsay, G., and Palikara, O. (2011) ‘Explaining the academic achievement at school leaving for pupils with a history of language impairment: Previous academic achievement and literacy skills’, *Child language teaching and therapy*, 27(2), 223-237.


## Appendix A. Independent t-test for Control versus Treated groups at Time 1

<table>
<thead>
<tr>
<th>Measure</th>
<th>Mean Treated group</th>
<th>Mean Control group</th>
<th>Mean Diff</th>
<th>95% C.I.</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Word Classes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptive (RS)</td>
<td>12.423 (SD=4.021)</td>
<td>12.490 (SD=4.360)</td>
<td>-.0668</td>
<td>Between -1.1383 and -1.0048</td>
<td>-.123</td>
<td>243</td>
<td>.902</td>
</tr>
<tr>
<td>Expressive (RS)</td>
<td>7.611 (SD=3.364)</td>
<td>7.521 (SD=4.010)</td>
<td>.0899</td>
<td>Between -.8458 and 1.0256</td>
<td>.189</td>
<td>243</td>
<td>.850</td>
</tr>
<tr>
<td><strong>Word Definitions</strong></td>
<td>16.738 (SD=7.824)</td>
<td>16.823 (SD=9.4724)</td>
<td>-.0847</td>
<td>Between -2.2776 and 2.1083</td>
<td>-.076</td>
<td>243</td>
<td>.939</td>
</tr>
<tr>
<td><strong>BPVS</strong> (RS)</td>
<td>124.785 (SD=17.890)</td>
<td>124.052 (SD=20.741)</td>
<td>.7332</td>
<td>Between -4.1792 and 5.6455</td>
<td>.294</td>
<td>243</td>
<td>.769</td>
</tr>
<tr>
<td><strong>Word Associations</strong></td>
<td>45.738 (SD=11.285)</td>
<td>48.719 (SD=13.164)</td>
<td>-2.9805</td>
<td>Between -6.0881 and .1271</td>
<td>-1.889</td>
<td>243</td>
<td>.060</td>
</tr>
<tr>
<td><strong>Word Classes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Receptive (SS)</td>
<td>7.416 (SD=3.1795)</td>
<td>7.375 SD- (SD=3.4466)</td>
<td>.0411</td>
<td>Between -.8061 and .8883</td>
<td>.096</td>
<td>243</td>
<td>.924</td>
</tr>
<tr>
<td>Expressive (SS)</td>
<td>5.980 (SD=2.8391)</td>
<td>5.729 (SD=3.2750)</td>
<td>.2507</td>
<td>Between -.5271 and 1.0285</td>
<td>.635</td>
<td>243</td>
<td>.526</td>
</tr>
<tr>
<td><strong>Word Definitions</strong></td>
<td>6.054 (SD=2.8493)</td>
<td>5.990 (SD=3.4054)</td>
<td>.0641</td>
<td>Between -.7346 and .8628</td>
<td>.158</td>
<td>243</td>
<td>.875</td>
</tr>
<tr>
<td><strong>BPVS</strong> (SS)</td>
<td>82.99 (SD=12.843)</td>
<td>83.58 (SD=13.059)</td>
<td>-.590</td>
<td>Between -3.923 and 2.743</td>
<td>-.349</td>
<td>243</td>
<td>.728</td>
</tr>
</tbody>
</table>