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# **Mood affective outcomes from alternate learning strategies: cognitive flexibility and dyslexic education**

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## **Abstract**

It is theorized that persons with dyslexia and associated conditions may be vulnerable to negative wellbeing, alongside academic deficiency, which has been focused on more widely. This study aims to investigate this theory in teenagers, and to draw relationships with teaching methods. Participants were interviewed, and completed the PANAS (Positive and Negative Affect) scale for children, the Matson Evaluation of Social Skills for Youngsters, and the Educational Environment Survey (an assessment of perceptions on education and ability). Participants with dyslexia and associated conditions showed reduced wellbeing compared to controls, and identified distinct experiential differences of education. This study was successful in proving its predictions, and there is strong evidence that this is the result of educational provisions.

## **Introduction**

Learning disabilities such as dyslexia and dyspraxia have in recent years received increased attention from academics and educational policy makers (Kiziewicz & Biggs, 2007). While dyslexia and associated learning disabilities (DLD) were traditionally thought of as difficulties in the use of words, more recent research has dissected the components of the disorders (Pothos, 2001). Impairments in cognitive functions such as memory, executive-function, task switching and the flexibility between cognitive processing styles have been demonstrated to impact capabilities in language tasks (Bell, McCallum & Cox, 2003; Vellutino, Fletcher, Snowling & Scanlon, 2004). Neuro-cognitive research has pinpointed affected regions with the brain, and established links with motor-function (Ramas, Pidgeon & Frith, 2003). Dyspraxia and other DLD are becoming more commonly recognised and researched as a result (Dewey, 1995).

Heading away from the traditional research that focussed on improving academic outcomes, later studies explore the wider implications of DLD (Riddick, 2001; Pothos & Kirk, 2004). Such research has revealed that depression, anxiety, lack of efficacy, stress, and negative adult life-outcomes are reported far more by those with DLD (Carroll & Iles, 2006; Lackaye, Margalit, Ziv & Ziman, 2006; Mellard & Woods, 2007; Baker & Ireland, 2007). The educational setting has long been recognised as a challenging environment for children with DLD (Mellard & Woods, 2007). Progressive research is now looking at the deficits in the teaching styles and environments, and how these can be adapted to accommodate DLD to stop schooling have a negative impact (Sideridis, 2005; Shaywitz, Morris & Shaywitz, 2008).

## **Cognitive Functions and Other Deficits**

Persons with dyslexia and/or associated learning difficulties are well documented to have difficulties with language (Vellutino, et al., 2004). Key areas identified as problematic include: word identification (deciphering), phonic and language comprehension, reaction times and awareness, and memory recall of word words and grammar (Velluntino, et al., 2004; Pothos & Kirk, 2004). Over the last decade research has identified certain compensatory factors, and has localised specific cognitive mechanisms in deficit (Bell, McCallum & Cox, 2003; Motschnig-Pitrik & Holzinger, 2002; Besser, Brooks, Burton, Parisella, Spare, Stratford & Wainwright, 2004).

Relationships between factors of cognitive processing and specific language tasks have identify common factors. Deficits in visual processing speed and in memory are particularly prevalent in tasks for DLD groups (Bell, McCallum & Cox, 2003). There however various explanations for this; Olsen, Kliegl & Davidson (1983) suggest that these disruptions are the result of reduced control and functioning of the ocular muscles, in guiding sequential intake of visual information, an idea that has much support, where research going beyond language tasks identifies fundamental issues (Pavlidis, 1980). More recently the focus has been on cognitive deficits, in search of practical solutions.

Besser, et al. (2004) revealed that DLD groups struggle to identify words within a sentence, and that some struggle to comprehend the meanings of sentences. As these factors do not correlate, this suggests that comprehension can be achieved with alternative reading strategies. This is supported within the same research, where comprehension was least successful with sentences for which the

identification of a key term for interpretation was an unfamiliar and lengthy word. Bell, McCallum & Cox (2003) identified phonological understanding as critical in this process, and showed correlating deficits with reading comprehension, and both decoding, and auditory synthesis. Phonological understanding has long been recognised as essential in ordinary language development (Wagner & Torgesen, 1987).

Successful reading strategy requires cognitive flexibility, and a reflexive relationship has been discovered (Deák, 2003). Global and local, subject and environmental, and adaptive symbiosis of cognitive abilities, tethering links between the linguistic, the logical, the creative and our memories, are needed to dynamically construct and comprehend language. Cognitive flexibility in language is both the versatility in switching between these, and the ease with which conceptual perspectives can be exchanged, modified and integrated. The reflexive component can be described using the linguistic relativity hypothesis – in which thought and language are co-limiting, and the construct of complex concepts relies on the linguistic representations of its parts (Lucy, 1992). Dyslexics show significantly reduced cognitive flexibility (Cheng & Cheung, 2005).

Cognitive flexibility is an aspect executive functioning (EF), which DLD groups have been shown to struggle with to varying degrees and styles (Brosnan, Demetre, Hamill, Robson, Shepherd, & Cody, 2002). EF includes working memory, conceptualisation, inhibition, and strategising (Reiter, Tucha & Lange, 2005), which have previously been identified as necessary for successful reading. Inhibition is part of the selective process with which word discrimination and comprehension takes place. Dyslexics very often test poorly in this area, visible as frequent mistakes in word identification, but also in decision making and task switching, having a pervasive impact on life-skills and regulation of emotions and even movement (Brosnan, et al., 2002; Ramus, Pidgeon & Frith, 2003).

Early recognition of these traits, accompanying accommodations in early instructional environments have been shown to yield more positive outcomes longitudinally, compared with other early strugglers (Scanlon & Vellutino, 2009). Executive function impairments, unless addressed can impair the development of further cognitive functions (Reiter, Tucha & Lange, 2005).

Many persons with learning difficulties have been noted to struggle with symbolic representation and organisation, logical procedures and memory operations (Velluntino, et al., 2004; Chinn, McDonagh, van Elswijk, Harmsen, Kay, McPhillips, Power & Skidmore, 2001), all inherent in mathematics. Avoidant strategies have been observed by DLD groups with mathematical tasks, and non-mathematical cognitive strategies are used by some (with little or no success). Some research indicates that individually directed learning and other alternative teaching methods can assist with this (Motschnig-Pitrik & Holzinger, 2002; Perkins & Croft, 2007). Related methods have been highlighted as general good practice to encourage performance in mathematics (Ramsden, 2006). Freudenthal (1973) explores case studies of specific programs that support this, used in specialist education centres. Dyspraxia can occur as an isolated condition, or comorbidly with other LD (Dewey, 1995). Research is not as complete as with other LD, and the specific cognitive deficits and functions have seldom been investigated. Dyspraxia has a motor-cognitive element, affecting physical co-ordination and visio-spatial comprehension.

There is some variation in the other cognitive differences individuals experience. Difficulty with routine and structure are common; however often the greatest concern of dyspraxics and their parents is in the social activity (Dixon, 2010). Co-ordinating social activities and applying norms and values appears to cause intense stress, which often results in withdrawn and avoidant behaviours.

### **Wellbeing and Dyslexia**

The psychosocial experience of growing up with dyslexia has shown that persons with DLD are likely to suffer with depression and related concerns (Ingesson, 2007). Participants with DLD reported experiencing problems with bullying and lowered self-esteem, or a sense of feeling different or inferior to other children, leading to loneliness. Although no obvious correlation emerged between subjective evaluations of wellbeing, and of academic success, the study ascertained that awareness of DLD negatively affecting efficacy and of social isolation. Although much of the data gathered was subjectively qualitative, it provides a rich narrative of the educational experience for DLD groups.

Sideridis (2007) applied more theoretical models to explain why students with DLD are depressed. The approach successfully identified positive relationships linking academic appraisal with goal-avoidant anxiety, and depression as a result of a cognitive mechanism of abstaining. Self esteem was predicted negatively by performance avoidance, and more significantly, clinical depression was as well, giving this theory credence. Multiple well-established measures, such as the PANAS scale for mood affect (Laurent, Catanzaro, Joiner, Rudolph & Potter, 1999) were used, demonstrating predicted correlation with aspects of academic performance. Sideridis (2007) relates depression and achievement resistance, noting them as opposed in literature, and recognising self-valuation as a common factor. DLD groups are specifically vulnerable because of social comparison effects, and because educational seclusion doubly impacts this (Norwich & Kelly; Dagnan & Sandhu, 1999).

Lackaye, et al. (2006) supports Sideridis (2007), where DLD groups showed that mood and social efficacy were affected. Investment in effort was also significantly affected. Motivation and effort is widely associated with depression (Austin, Mitchell & Goodwin, 2001). Lackaye, et al. (2006) also argues that DLD groups may have reduced social skills because of the social structure of classroom learning, where disengagement may lead to a deficit, or reduced opportunities for interactions with peers; which is supported in high correlations with teacher observations. Although DLD is now clinically and educationally recognised within society, there may still be perceived discrimination. Price and Patton (2003) describe the dyslexic hiding their disability for fear of rejection, whether as a child, or later in life. This idea is supported by qualitative accounts by DLD groups, expressing difficulties or anxieties in peer relations, which many feel relates directly to the experience of poor reading and writing skills in school (Ingesson, 2007).

Anxiety is actually believed to be the most frequent emotional symptom for dyslexics (Ryan, 2004; Goswami, 2008). Fear of failure in school is believed to condition a response that leads to frustration, confusion and withdrawal, and that has been shown to continue to affect persons in adult life. This is strongly supported by Carol and Iles (2006) studied dyslexics at University in England. They demonstrated significantly higher levels of both state anxiety (anxiety in carrying out subject or

cognitive specific tasks), and trait (general) anxiety against controls. This suggests that learnt cognitive mechanisms and avoidant behaviours have pervasive long term effects that are particularly notable in dyslexics. Ryan (2004) suggests that this is partly due to established inconsistency in cognitive function.

Although depression and anxiety are distinct psychological states that can occur individually, with dyslexia, and with other diagnoses, there is high comorbidity (Perry, 1998). Anxiety with DLD often results from a feeling of hopelessness or powerlessness in a range of situations, without direct understanding of why (Ingesson, 2007; Alexander-Passe, 2007). This lack of emotional adjustment can manifest as a delay, or incompleteness in the individuals resolution with their own self-identity and image (Ryan, 2004). Lowered self-efficacious belief and identity is known to increase vulnerability to stress, and to increase emotionally negative and unstable responses such as anger (Lackaye, et al., 2006; Ryan, 2004).

Alexander-Passe (2007) observed that education was experienced differently by DLD groups, and that the types, responses, and specific stressors within this were also different. Males were also found to experience increased stress relative to their academic attainment, compared to female DLD. Social interactions were discovered to be a lead cause of stress for DLD, also leading to increased negative attributions and a negative world view, which it is believed contributed to positive correlations with delinquency and other emotional issues. The research also looked at social-comparison effects and family dynamics – looking outside the educational environment. The results suggested that sibling comparisons were a major factor in resulting self-efficacy and stress, and that this may be even more significant in larger families. For non-DLD, these effects were considerably less.

The way in which DLD groups cope is understood have masked many of the wellbeing issues for decades, but may also reveal aspects within the educational environment that can hinder (Alexander-Passe, 2006). Learnt helplessness can lead to emotional withdrawal, particularly in large schools or classes. Becoming 'invisible' can be a way to avoid attention towards failure or embarrassment. More troublingly correlations with psychosomatic and physical onset symptoms, as a means to avoid attending school were discovered; these coping strategies are both harmful and isolating. Truancy is also found to be more common with DLD groups, replacing illness as children get older, and thus have more independence from parents. The cognitive and affective aspects involved in coping have been shown to differ with gender, which in non DLD research has been identified as differences in cognitive flexibility (Cheng & Cheung, 2005). Cognitive flexibility has been linked directly with wellbeing, suggesting that improved performance in realistic and multi-directional analysis and synthesis leads to the ability to better fulfil ones needs (Moore & Malinowski, 2009; Spiro, Feltovich, Jacobson & Coulson, 1992). Interestingly research has demonstrated ways to increase cognitive flexibility, through the use of mindful meditation, and through specific teaching styles, and formats of information presentation. Presently this author is not aware of any research that has explored either specific strategy with DLD groups. Should more cognitively flexible teaching methods be employed, in both teaching and assessment, such as reducing exams and encouraging creativity in course work?

### **Educational Settings**

There is a wealth of research relating creative expression with the provision of

dyslexic education. Some research indicates that persons with dyslexia and associated learning difficulties may actually excel at creative subjects, despite deficits in other areas (Everatt, Steffert & Smythe, 1999), and other academics suggest that this may also serve to enrich the entire education experience by promoting efficacy and productivity (Alexander-Passe, 2010; Gobbo, 2010). At Bath University a project known as Cascade, with a focus on identifying the usefulness of creative and mixed/multi-media learning styles for the provision for special learning education was set up in 2001. A publication by the group gave strong evidence to support the application of integrating creative learning styles into an array of academic disciplines, and particularly how non-traditional assessments for aspects of dyslexia could be made using computer technology and creative tools (Kiziewicz & Biggs, 2007).

Assistive technology is available in number of universities, and on the open market for persons with learning difficulties. It can assist them with language and spelling, logical ordering, presentation, and schematizing (Draffan, Evans & Blenkhorn, 2007). Such technology has been slower to reach secondary education. There may be a multitude of reasons for this; one explanation is that traditional methods of teaching still dominate, and such new technologies may be viewed as ultimately disadvantageous due to prejudice or lack of understanding (Beacham & Alty, 2006; Lynch, Fawcett & Nicolson, 2000). A number of studies however have demonstrated that such systems can be of significant benefit (Lyytinen, Ronimus, Alanko, Poikkeus & Taanila, 2007; Kast, Meyer, Vögeli, Gross & Jäncke, 2007). A selection of the research suggests that the use of computers in day-to-day life provides an avenue of multi-sensory adaptation to certain cognitive 'barriers', which may have global benefits to certain persons with developmental dyslexia.

Several studies have sought to bring together the findings of what educational strategies are successful for children with DLD (Brooks, 2002; Audit Commission, 2002). Strategies that are heavily structured, compensating for organisational deficits have been shown to be successful. Individual pace and attention has proven to be one of the most significant factors, which may be due to reduced social comparison effects, and relative combined effort in task completion; specialist skill in support is also important, as the complex accommodations required must not limit efficacy (Alexander-Passe, 2007; Kiziewicz & Biggs, 2007). Phonological training is important, but can easily become part of an integrated mainstream approach. Within specialist education, focus on personal and social regulation and development can prove to be as crucial as academic programmes in producing positive outcomes (Brooks, 2002). Early intervention into learning for DLD groups has been shown to have many benefits. Academic performance is significantly harder to correct later on, and some cognitive abilities may not develop if delayed (Fraser, 1998). Avoidance or anxiety to education may be impossible to tackle if complex schema develops around it (Norwich & Lewis, 2001; Schunk, 1989).

### **The Present Study**

The present study has three main aims (1) To measure affect and social skills for DLD group and control, and to explain any differences in relation to cognitive deficits, globalized adaptive learning and shortcomings within the provision of DLD support. (2) To explore aspects of the educational environment from the child's perspective, and to identify distinctive experiences and differing needs between the sampled groups; furthermore, to use this data to support explanation for the first aim. (3) To

assess whether differences (clinical diagnosis and duration of support) in specific histories of DLD group individuals has an effect on wellbeing outcomes, in combination with measures of the first aim.

The study expects to find that the DLD group will test with significantly lower social skills than control. Positive affect will be significantly lower, and/or negative affect will be significantly higher with the DLD group than control. Social skills and affect are also forecasted to show positive correlation for each individual, regardless of grouping. Participants that began dyslexic support earlier will have significantly higher social skills and wellbeing scores than those who began to receive provisions later. It is envisaged that common factors of educational experience will be revealed, and these are likely to differ between DLD and control, and for different grouped clinical diagnoses within the DLD group. Coding the educational experience data, positive correlation between affect and social skills scores, and perceptions of individual academic prowess are also predicted.

## **Method**

### **Participants**

The study used two groups, a learning support group and a control group with partial matching. The first group consisted of 18 school children between the ages of 11 and 13, who were recruited from a private school in Devon, where they receive special learning support to compensate their learning needs based on assessments for learning disabilities that include dyslexia, dyslexia with mathematics difficulties, dyspraxia, and hybridised combinations of these. Based on educational psychology assessments, all of these participants are allocated the highest level of learning support in their school, and have been statemented. The length of time of time each participant has been in receipt of special learning support differed for each pupil, and is a factored variable. Participants have been selected from private schools, rather than public, or a mix of the two environments as due to the financial costs of this education, this provides a degree of socio-economic control, which although not exhaustive virtually eliminates poverty as a mood an affective factor (Schaverien, 2004).

The control group consisted of 18 school children, not allocated any special learning support. Each control group member was selected as a partial match for a participant in the first group. Participants were matched on the school they were from, their age (to the closest number of months achievable, which ranged from 12 years and 11 months to 11 years and 3 months), and their gender. The average age was 11 years and 11 months, and the ratio of male: female was 18: 1. As a result of this matching, pupils are also matched for the subjects which they take (with the exception of a second modern foreign language), and on the subject staff with which they are familiar for all lessons except the additional modern foreign language. The school used to attain the sample accommodates term-time boarding pupils, as well as day pupils. Boarding pupils have been excluded from sampling as research as shown that boarding pupils may experience different emotional issues than day pupils (Fisher, Frazer & Murray, 1986). Participants were not matched on academic ability or social skills, as these directly relate to measured variables (Mellard & Woods, 2007). No physical attributes were matched for; however no participants had obviously identifiable anomalies such as physical disabilities.

The study was approved by the Ethics Committee for the School of Science and Technology at the University of Plymouth and adhered to the British Psychological Society ethical guidelines.

### **Materials**

The study utilized four psychometric scales: a subtest from the Matson Evaluation of Social Skills for Youngsters (MESSY) used a short-form, the Positive and Negative Affect Schedule for Children (PANAS-c), the Educational Environment Survey (EES), and a short-form of the MESSY for staff completion.

A selection of questions from the MESSY focussing on positive sociable responses was used to assess social skill development in the participants. It was necessary to abbreviate the MESSY (originally 62 questions), and the 20 questions selected (grouped) have been shown to have the highest internal correlation (grouped item-total correlation) (Matson, Rotatori & Helsel, 1983). This scale asks participants to rate how often they carry out particular social interactions on five point Likert scale, in general day-to-day life (1 = 'never', 2 = 'rarely', 3 = 'every now and then', 4 = 'sometimes', 5 = 'often'). These responses when totalled provide a score (MESSY Score).

The PANAS-c was used to assess affect or mood. This version of the well-established PANAS scale, adapted for children has been shown to have internal consistency of up to .94, and has been shown to be a consistently significant indicator when compared with clinical diagnosis, and other equivalent scales (Laurent, et al., 1999). This scale asks participants to rate how much they experience 30 particular emotions on five point Likert scale, in general day-to-day life (1 = 'very slightly or not at all', 2 = 'a little', 3 = 'moderately', 4 = 'quite a bit', 5 = 'extremely'). The responses are divided into positive affect and negative affect, and then totalled to provide two scores (PA and NA).

The EES has been constructed for the purpose of this study. The EES consists of 35 open-ended questions, separated into 5 areas of focus – English Language, Mathematics, Creative Expression, ICT and technology, Pride and Encouragement, and Classroom Interactions and Learning Styles.

A selection of research included in the introduction has served as the primary basis for the categorisation of the questions. The questions were derived from the defining areas of the Course Experience Questionnaire (Ramsden, 2006), utilising adapted language to make them suitable for the 11-13 year old participants. The Course Experience Questionnaire was chosen as the basis due to the fact that it had been used to evaluate younger persons before, and that it only evaluates affect towards education, rather than implanting any specific leading question that may lead to an unrecognised bias as a result of a participant's learning disability, or lack thereof. Using research findings focussing on special learning support, as well as evaluation of identified factors for successful learning programmes, combined in reference to documented teaching styles, methods of support, and teaching apparatus in use in the schools used to attain the sample have been used to provide coding criteria (Kelly College, 2009; Kelly College, 2010; Kelly College, 2011; West Buckland School, 2009; West Buckland School, 2010). Responses were coded in one or many of six ways: Confidence, Frequency, Training, Support, Entertainment Value, and Additional Specific.

The scale was designed to identify specific factors within the educational experience that differed between test groups. Learning support category persons are expected to identify differences in perceived strengths and weaknesses, and different preferences for aspects of educational environment. Totals of all values from questions for each of the six focus categories, and totals from response codings give eleven scores for statistical analysis.

In order to reduce the time to sample each participant, the EES response for each participant was recorded using a dictaphone and then coded later on.

The fourth scale is the same selection of questions from the MESSY focussing on positive sociable responses. These questions were issued to staff that had close contact with the participants, such as their form tutor. The perspective of the questions was altered, so that the questions were asked about the pupils.

To ensure that timing and administration of the tests were appropriate, it was piloted using five participants of similar age and varied academic ability, but who were not part of the final sample. Piloting involved running through the testing procedure with participants, however no data was recorded, although the EES was recorded using the dictaphone in order to assess the value of recording this information for ease of the researcher, rather than coding responses ad-hoc. Piloting did identify a possible source of error: miscomprehension, applying possibly to each of the three testing methods that the participants were subjected to. Although miscomprehension was very infrequent (an example was a participant not knowing the meaning of the word jittery, in the PANAS-c scale), this information was used to inform the procedure for miscomprehension on the testing methods. The development of the PANAS-c and MESSY scales exceeds the scope of this dissertation research, and as both scales have been shown to be appropriate for the ages category being sampled, it was not felt to be necessary to amend the phraseology of these scales. Doing so may also affect the calculated balance of PA & NA.

### **Design and Procedure**

This quasi-experimental research will use participants selected based on clinical diagnoses. The experiment aims to identify a variety of relationships, between environmental and individual fixed factors (special education diagnosis, or lack of (DLD), and the number of years such support has been in place) and psychometric test results (PANAS-c, MESSY [averaged], and the eleven EES results). The focal relationships will be those between DLD and PA, DLD and NA, and DLD and MESSY [averaged], as these represent the effect of DLD on affect and social skills, two significant aspects of emotional wellbeing. From the EES, this experiment will:

- 1) Examine the relationship between DLD and areas of focus within the EES.
- 2) Assess the effect that the number of years without support has on areas of focus within the EES
- 3) Identify clustered patterns of responses, relating to PA, NA and MESSY [averaged].

Participants had been briefed by parents or teaching staff before they had agreed to take part in the research and parental consent had been sought. Participants arrived for sampling in a random opportunity order, and therefore waited in the staging area with participants from mixed DLD group. This was to minimize negative attention or reflection from being selected and removed from regular class schedules to take part in the research. Participants were sampled individually, in a small room away from others to maintain privacy. Participants were given a short briefing to confirm their

understanding of the research, and rights to withdraw, etc. The researcher began by reading the instructions for the MESSY. Instructions were repeated for each participant. The researcher said "I will read out some questions, and I would like you to tell me how much you do the thing I ask about. The researcher then indicated to an enlarged Likert scale on the desk, which had the number 1 -5 corresponding to the values 'never', 'rarely', 'every now and then', 'sometimes', 'often'. The participant was asked to respond with the numeric value. The researcher read through the questions and recorded the response. If the participant appeared to not understand the question, then the researcher repeated the question. If the participant did not give an answer, the researcher moved on to the next question. The researcher did not attempt to translate or redefine terminology, as this was considered to represent in infraction on a trait factor relevant to DLD. The MESSY took approximately 4 minutes.

When the MESSY completed, the researcher went straight into the PANAS-c. Similarly, instructions were read out: "I am going to read out different feelings or emotions. All I would like you to do is tell me how often you feel them out of 5. So 5 is every time, and 1 would be never at all. So all I need is a number from you, nothing else." The researcher then indicated to an enlarged Likert scale on the desk, which had the number 1 -5 corresponding to the values 'very slightly or not at all', 'a little', 'moderately', 'quite a bit' and 'extremely'. The researcher read through the words, and recorded the response. If the participant appeared to not understand the word, then the researcher repeated it. If the participant did not give an answer, the researcher moved on to the next question. The researcher did not attempt to translate or redefine terminology, as this was felt this may compensate for dyslexic or similar trait issues which the research is interested in gathering data on. The PANAS-C took approximately 4 minutes.

Finally the EES was administered. The researcher was instructed to encourage a 'gut response' to each question. The researchers did not restate questions, and proceeded to the next question if they did not receive a response, after asking the participant 'what do you think?' if a response is not given automatically. Any additional prompting from the researcher may have given additional information, or created a leading question, obscuring genuine opinions. As the questions asked about aspects of education, all attempts to minimize judgemental or inferential language had to be taken. The conversation of the researcher asking questions, and the responses being given by the participants is recorded using a dictaphone, and coded later. The 35 questions typically took 8 minutes to complete.

After the EES participants were given the opportunity to ask any questions about the research. The order of the tests was assessed in the pilot study. Participants were asked about the order, which revealed the following points: Participants may feel awkward answering questions about aspects of school, fearing their judgement may have consequences – therefore this should not be first, allowing participants time to settle into the research environment. The MESSY was felt to ask the least intrusive questions, as they all relate to positive social interactions.

## Results

Before primary and secondary analysis of data could be done on the dataset, tests of multivariate normality were conducted. Using a Shapiro-Wilk test, it was identified that there was a normal distribution for PA, NA, and MESSY [avg], where there were test significances of 0.05 or greater (see Figure 1).

Figure 1

Diagnosis		Shapiro-Wilk		
		Statistic	df	Sig.
Positive Affect	No Diagnosis	.951	18	.436
	Dyslexia	.945	10	.615
	Dyslexia and maths			
	Dyspraxia	.779	5	.054
Negative Affect	No Diagnosis	.975	18	.882
	Dyslexia	.886	10	.154
	Dyslexia and maths			
	Dyspraxia	.879	5	.306
MESSY (AVG)	No Diagnosis	.885	18	.322
	Dyslexia	.891	10	.174
	Dyslexia and maths			
	Dyspraxia	.899	5	.403

Again using a Shapiro-Wilk test, it was identified that there was not a normal distribution for EES (English, Maths, Creative, IT, Pride and Encouragement, Interactions and Learning Styles, Confidence, Frequency, Training, Support, and Entertainment), where the test significances were inconsistent.

The central focus of this study is in testing the relationship between DLD diagnosis (or no diagnosis), and measures of wellbeing (Positive Affect and Negative Affect, and Social Skills Score), so the first analysis was a Multivariate Analyses of Variance (MANOVA) of this, while the second similar analysis was to assess this effect in relation to the deficit in initiating special education for those with DLD.

Figure 2 below displays the mean wellbeing scale scores for each diagnosis group. Differences can be seen in NA and MESSY, however the range of mean scores for all scales is not large.

Figure 2

	Diagnosis											
	Positive Affect				Negative Affect				MESSY (AVG)			
	No Diagnosis	Dyslexia	Dyslexia and Maths	Dyspraxia	No Diagnosis	Dyslexia	Dyslexia and Maths	Dyspraxia	No Diagnosis	Dyslexia	Dyslexia and Maths	Dyspraxia
<b>Mean</b>	56.22	56.50	59.50	52.83	32.83	38.80	42.50	49.33	93.250	89.417	88.850	78.389

There was a statistically significant difference between diagnosis groups on their wellbeing outcomes,  $F(9, 73.163) = 4.206, P < .0005; \text{Wilk's } \lambda = .362, \text{partial } \epsilon^2 =$

.287. Tests between subject effects reveal that diagnosis has a statistically significant effect on NA ( $F(3, 32) = 8.401; P < .0005; \text{partial } \epsilon^2 = .441$ ) and MESSY [avg] scores ( $F(3, 32) = 8.692; P < .0005; \text{partial } \epsilon^2 = .449$ ), which suggests that DLD diagnosis can be a successful predictor of NA and social skills (by comparison). The relationship between PA and diagnosis was found to not be statistically significant, indicating that PA is not affected by DLD diagnosis. DLD diagnosis appears to have an effect on some aspects of wellbeing, but does not appear to affect all aspects. This could suggest that either other unknown variables have effect PA, or that the PANAS scale is not a suitable measure in this environment. Generally the wellbeing outcomes are in support of previous research and the expectations of the current research.

The significant relationships were further analysed using Tukey's HSD post-hoc test for multiple comparisons.

Figure 3

Dependant	Diagnosis (i)	Diagnosis (j)	Mean Difference (I - J)	Significance
Positive Affect	Dyslexia	No Diagnosis	-.28	1.000
	No Diagnosis	Dyslexia and maths	-3.28	.953
	Dyslexia	Dyslexia and maths	-3.00	.967
	No Diagnosis	Dyspraxia	3.39	.828
	Dyslexia	Dyspraxia	3.67	.833
	Dyslexia and maths	Dyspraxia	-6.67	.767
Negative Affect	Dyslexia	No Diagnosis	-5.97	.172
	No Diagnosis	Dyslexia and maths	-9.67	.288
	Dyslexia	Dyslexia and maths	3.70	.909
	No Diagnosis	Dyspraxia	-16.50*	.000
	Dyslexia	Dyspraxia	10.53*	.037
	Dyslexia and maths	Dyspraxia	6.83	.652
MESSY (AVG)	Dyslexia	No Diagnosis	-10.461*	.002
	No Diagnosis	Dyslexia and maths	-14.861*	.025
	Dyslexia	Dyslexia and maths	-4.400	.827
	No Diagnosis	Dyspraxia	-11.028*	.007
	Dyslexia	Dyspraxia	-.567	.998
	Dyslexia and maths	Dyspraxia	-3.833	.893

Figure 3 shows that for mean scores for NA were statistically significantly different between the non-DLD group and the dyspraxic group ( $P < .0005$ ), and the dyslexic group and the dyspraxic group ( $P = .037$ ), but not between the dyslexia and maths group and the non-LD group ( $P = .288$ ), the dyslexia group and the non-LD group ( $P = .172$ ), or the dyspraxic group and the dyslexia and maths group ( $P = .909$ ). This suggests that only dyspraxia alone can be a significant predictor for NA. Therefore the wellbeing effects of dyspraxia can be considered to be distinct from the effects of dyslexia, and indicates, when considering previous research, that the dyspraxic group have a greater risk of clinically negative outcomes as a result, and may require additional support.

Figure 3 shows that for mean scores for MESSY [avg] were statistically significantly different between the non-LD group and the dyslexic group ( $P = .002$ ), between the non-LD group and the dyslexia and maths group ( $P = .025$ ), and between the non-LD group and the dyspraxic group ( $P = .007$ ). This asserts that all of the DLD groups can be significant predictors of social skills. Other inter-comparisons between dyslexia, dyslexia and maths, and dyspraxia were not significant, which describes the likeness in the distribution of their means. In contrast to PANAS scores, MESSY scores indicate that social skills are negatively affected for all DLD groups, which advocates the division of wellbeing into the selected categories and measures as alternate diagnoses offer different wellbeing predictor profiles.

A separate MANOVA was used to assess the relationship between wellbeing measures and DLD (Total [dyslexic, dyslexia and maths, and dyspraxic]) / non-DLD. Tests between subject effects revealed that the relationship was statistically significant for NA ( $P = .001$ ), and MESSY [avg] ( $P < .0005$ ). This illustrates that all persons with DLD can score significantly lower on measures of wellbeing. The MANOVA for education deficit revealed that this factor was marginally within statistical significance for wellbeing,  $F(54, 45.511) = 1.641$ ,  $P = .044$ ; Wilk's  $\lambda = .040$ , partial  $\epsilon^2 = .658$ . Tests between subject effects reveal that deficit can have a statistically significant effect on NA ( $F(18, 17) = 3.367$ ;  $P < .008$ ; partial  $\epsilon^2 = .781$ ), which suggests that the deficit in receiving special educational support can be a successful predictor of NA. No clear statistical relationship was found between the deficit, and PA or MESSY [avg], which suggests that special educational deficit does not affect PA or social skills directly. This defies previous research, which has suggested that wellbeing and academic outcomes are negatively affected by deficit in DLD education provision, however in keeping with the other findings of this study, this may indicate that only specific aspects of wellbeing are affected.

Kruskal-Wallis ANOVAs were used to assess the relationship between DLD diagnosis and the educational environment (EES: English, Maths, Creative, IT, Pride and Encouragement, Interactions and Learning Styles, Confidence, Frequency, Training, Support, and Entertainment), and to assess this effect in relation to the deficit in initiating special education for those with DLD.

The Kruskal-Wallis H test used between EES and diagnosis revealed statistically significant results for many aspects. For each aspect of the EES (English, Maths, Creative, IT, Pride and Encouragement, Confidence, Frequency, Training, Support, and Entertainment) a statistically significant relationship was observed in relation to diagnosis ( $P < .05$ ). EES Independence and Learning Styles was not found to have a significant relationship to diagnosis ( $P = .350$ ), which suggests that measures within

this category do not represent a single aspect, or include a contrary aspect. The statistical significance of the other areas of the EES suggests that EES scores correlate with the wellbeing findings discovered in the MANOVA.

The mean ranks for each aspect of the EES, for each diagnosis identifies expected differences. EES English means demonstrate that DLD groups experience English lessons very differently to non-DLD groups. Likewise ESS Maths means show the same, with dyspraxics and those with an assessment of mathematical difficulty as well as dyslexia showing much more negative perceptions. EES Creative means reveal that creative aspects are more popular with all DLD groups, whilst relatively unpopular with non-DLD groups, and likewise EES ICT means show the same. EES Pride, EES Training, and EES Frequency means all were considerably higher for non-DLD than DLD groups, which is as expected, suggesting that DLD groups feel negatively about their academic abilities. EES Confidence means suggest that whilst non-DLD groups have the most overall confidence, the most significant reduced confidence is solely with those with dyspraxia, which is consistent with other findings in this study, that wellbeing is most significantly negatively affected for dyspraxics. EES support and EES entertainment means were lowest for non-DLD groups, which suggest that the special educational provisions are different for DLD groups, and that teachers and support staff are able to spend additional time with them, as outlined in the special education policies for the school. When evaluated alongside wellbeing scores for these groups, it suggests that although these interventions can be statistically identified, they are not effective in resolving wellbeing or academic confidence / efficacy issues.

The Kruskal-Wallis H test used between EES and special educational deficit revealed no clearly statistically significant results for aspects of the EES, with the exception of Training ( $P = .029$ ), Frequency ( $P = .042$ ), and English ( $P = .036$ ). These results indicate that perception of readiness and level of support negatively correlate with the deficit, and that English is the most significantly affected area by this.

Factor analysis was used to identify additional clusters of performance and perception within the questions of the EES. A varimax rotation using principle component analysis was used to explore the factors. The analysis produced 18 factors with an eigenvalue greater than 1 (of which the first five were 14.265, 7.583, 5.022, 4.199 and 3.455). These results suggest that there are several significant factors (as expected as the EES covers a range of select aspects of educational experience). The purpose of the factor analysis was to identify additional clustering, beyond the categorization inherent in the EES, therefore identified factors that only describe a single asked question (given that one EES question can have several properties in the factor analysis), or an EES categorization, were not treated as significant (i.e. Factor 5 – where significant contributors to the factor were Question 35, Training, Confidence & Support).

Five significant factors were identified by assessing the conceptual interpretation. The first factor has been designated as “Preference for Visual Learning Styles”, as the contributory elements were positive scores in confidence and support in multimedia use, and positive scores for pictures and diagrams in classroom teaching, whilst negative score for learning information through book reading. The second factor has been named “Clarification and Completion”, as contributing

elements were understanding instructions and successful and timely completion of work. The third factor comprised of elements all relating to training and support, and to select subjects, and so it has been classified as "Appropriate Support". The fourth factor highlighted a relationship between work efficacy and group work, and so it was named "Peer Academia". The final factor appeared to describe representation, which may be interpreted as either social role valorisation effects, or other concept relating to presenting self identity/ability, and as such has been designated "Self Representation".

## **Discussion**

This investigation into the wellbeing outcomes of children with DLD, compared with non-DLD groups suggests that mood and social skills can suffer as a result of having DLD, and that education is experienced differently, which may result in this. Furthermore different DLD diagnoses appear to affect wellbeing and educational experience to different degrees, and in different ways. Deficit in DLD education provision was not found to have expected effects on wellbeing, nor on educational experience, however factors of educational experience were identified as different between groups. Overall wellbeing appears to be measurably different for DLD groups, and related to educational experience.

The finding that significantly reduced social skills were found for DLD groups (each DLD group standalone, and DLD groups as a whole) was consistent with the prediction made, and supports findings from previous research that social relationships may be affected (Ingesson, 2007; Ryan, 2004). Social skills scores were most predictive of DLD grouping, highlighting the importance of studying this phenomenon. Although these findings demonstrate correlation, rather than a causal effect, the measure is proven reliable (Matson, Rotatori & Helsel, 1983), and the experiment was conducted under conditions where interviewer effects and other extraneous social and environmental factors were minimised. As such it is suggested that these findings contribute to the collection of research purporting these outcomes.

In several cases previous research has focussed on social anxiety (Carol & Iles, 2006; Alexander-Passe, 2007), or has assessed social interactivity using qualitative methods (Ingesson, 2007). Whilst these methods offer a narrower perspective that may more easily identify causation, this study is able to highlight that the learning behind social skills is affected, separate to mood. Although matched pairs are not an exact method of controlling for differences, potential participants in all categories were excluded where unusual differences in social history was noted and all were controlled on socioeconomic basis. It can be confidently assumed that significant social skills results are not the effect of individual differences.

Social efficacy can result from reduced self efficacy because the reflection of the interactive capacity of the self-concept model is based upon strategic abilities (Lackaye, et al., 2006). For DLD groups with socially-incompatible cognitive strategies, and experience of failure in communication in front of peers, effect on social efficacy would be expected (Alexander-Passe, 2007). Generalising from these experiences can be predicted through Bandura's social cognitive learning theory, in which reciprocal interaction is learnt as a global function of efficacy (Schunk, 1989). This is supported by Lackaye, et al. (2006) who recognises that group work and interacting with teaching staff in the classroom is a social learning experience.

The most likely outcome of reduced social efficacy is social withdrawal, which decreases opportunity to develop social skills, and may lead to negatively biased evaluation of own social skills (Mellard & Woods, 2007; Lackaye, et al., 2006). Similarly social comparison effects have been shown to cause social withdrawal and lower self esteem in DLD groups where an awareness of stigmatism is combined with reduced efficacy (Dagnan & Sandhu, 1999).

The fulfilment of this study's predictions, indicate potential shortcomings in support. Integrating therapeutic interventions into teaching styles has shown successful improvement in social skills for DLD groups (Narimani, Biabangard & Rajabi, 2006). Brooks (2002) presents a selection of experimental studies and case observations revealing significant effects on social skills and reducing specific psychopathologies (Dagnan & Sandhu, 1999).

The findings of the PANAS-c for DLD groups (each DLD group standalone, and DLD groups as a whole) was consistent with predictions, but was not completely acquiescent. PA displayed no statistical relationship with DLD group, which was not as expected. NA showed strong correlation with DLD group, which supports previous research that identifies various mood and anxiety issues as related (Ryan, 2004; Sideridis, 2007). The PANAS-c is an adapted version, specifically for testing the sampled age range within the school setting (Laurent, et al., 1999). One interpretation for PA showing no correlation is that PA is held artificially high by extraneous factors. Small or private schools often provide increased sense of community, place more focus on positive values, and self identity, and provide better individualised support for pupils (Terling Watt, 2003). These effects are measurable by averagely lower reports of mental health issues, and typically better academic outcomes, and are reflected in the policies and ethos of these schools (Terling Watt, 2003; West Buckland School, 2010; Kasen, Johnson & Cohen, 1990). This encouraged positivity may make the PANAS-c scale incompatible with such groups. This may account for PA, however it is also a possibility that emotional positivity is not affected by DLD, as the impactors for this may be more globally attributed (Clark, Steer & Beck, 1994).

The finding of significantly higher NA goes to further the wealth of research that identifies depression, anxiety, anger and other issues as resulting from DLD (Ryan, 2004). Negative interpretation of self and achievements can lead to symptoms of depression and negative attribution (Sideridis, 2007). Strategies of pro-determinant goal selection protect many people from their failings, by allowing them to 'focus on the good', however DLD groups are particularly vulnerable as they demonstrate performance avoidant behaviours, suggested to relate to a history of frequent failure, and the reduced ability to devise alternative cognitive strategies, or to seek help, given that they may exhibit cognitive deficits in communication (Alexander-Passe, 2006, 2007; Sideridis, 2007). These predictable emotional patterns show that they extend beyond efficacy within the classroom, where studies have shown dyslexic traits to be overwhelmingly present in the prison population (Baker & Ireland, 2007), and for DLD groups to experience familial problems (Ryan, 2004).

The PANAS scale includes emotional states related to depression, anxiety, alertness, enthusiasm, self-reflection, and others. Although this study acknowledges that the PANAS-c does not allow us to identify specific negatively affective areas for DLD groups, it does present a clear case for overall wellbeing as affected by DLD,

highlighting the need for alternative intervention, and beyond factors that may have contributed to high PA.

Previous research indicated that anxiety would be the most frequent negative outcome for DLD groups (Goswami, 2008), however this study suggests that all aspects of negative affect are affected. The general negative affect of DLD groups may have a number of explanations, based on differences in the educational experience (Alexander-Passe, 2007). Specific stressors may differ, but the general nature of the phenomenon suggests a global model. Hopelessness depression is recognised as a distinct sub-type, in which self-attribution, environmental reinforcement, and inflexibility are central (Abramson, Metalsky & Alloy, 1989). DLD groups are known to have reduced capacity in EF and cognitive flexibility, which related research has identified as significant in determining wellbeing (Brosnan, et al., 2002; Deák, 2003; Moore & Malinowski, 2009). Inflexibility is also apparent in the qualitative information gathered in this study. Non-DLD groups expressed more open statements or positively evaluated their academia in the EES.

Research into therapeutic interventions for hopelessness depression indicates that daily interventions and adaptation to the learning environment can help (Abramson, Metalsky & Alloy, 1989; Ingesson, 2007). Integrated solutions are more appropriate than external therapy, as depression appears to be based on situational learning.

The findings from the educational environment survey reveal relationships predominantly consistent with predictions. Appraisals of English and maths were predictably higher for non-DLD groups, as expected due to the cognitive deficits inherent in DLD that pertain to skills in these areas (Chinn, et al., 2001; Deák, 2003). Participants with dyslexia and participants with dyspraxia both showed significantly reduced scores in maths and English, however dyslexics scored lower on English, which was expected as dyslexia affects phonemic and written language skills (Scanlon & Vellutino, 2009.). Dyspraxics showed a huge difference in maths scores compared with dyslexics, which again corresponds with the predicted model, as dyspraxia affects co-coordinative functioning, that is involved in planning and structuring, and symbol manipulation – all skills needed to follow mathematical operations (Rodd, 2005; Dewey, 1995). These deficits are documented in a wealth of research, however compensatory adaptations are absent in most learning environments (Dewey, 1995; Norwich & Lewis, 2001). This strongly supports the educational model, and indicates that these factors of the EES have high criterion validity. In contrary non-LD groups had the highest scores for English and maths, as predicted by the model.

Scores for creativity and ICT were significantly higher for all DLD groups than for non-DLD groups. Consistent with the findings of Everatt, Steffart & Smythe (1999) DLD groups have a positive response to creative elements within education. According to Kiziewicz & Biggs (2007) DLD groups may have less developed cognitive mechanisms (promoted in mature intellectual adulthood), and as such can find a powerful connection to creative expression to satisfy the Freudian Id, with therapeutic quality. The qualitative findings of the present study support this notion, where participants expressed comments such as “... *[being creative] helps me to focus on my work ...*”, and “... *[the teachers] don't like it when I draw on the paper, but it helps [me] ...*”. No similar comments were made by non-DLD groups. ICT scores support research in the last decade exploring assistive technology for DLD teaching

(Dickinson, Gregor & Newell, 2002). Visual systems provide a richer format for students to take in information, and where learning is student centred, it allows particularly those with DLD to develop a sense of independence in their learning, essential to promote efficacy and effort in learning (Kiziewicz & Biggs, 2007; Motschnig-Pitrik & Holzinger, 2002; Sideridis, 2007).

Qualitative information gathered in the present study clearly supports this rationale, where participants expressed comments such as “...*you can always go back over it, work at your own pace, so when some people work faster at some bits, then I might work faster at other bits, so then I am not always behind ...*”, and “... [*Using ICT*] *makes it so much clearer, otherwise I might not understand it ...*”.

These results indicate that the effect of ICT equipment is both measurable, and very much realised by the pupils, suggesting the findings are reliable.

The present study identified that pride and confidence were lower for DLD groups, with lowest mean results in both for dyspraxic participants. These findings are in keeping with predictions, where dyspraxia is understood to have a more pervasive impact on development, as well as in a social capacity (Dewey, 1995; Schunk, 1989). Resulting lower efficacy is the best explanation for the results, where dyspraxics experience the greatest impact on their major sources of self efficacy (Dixon, 2010; Bandura, 1977).

The results for perceived learnt proficiency (Training in the EES) and frequency of given assistant / input (Frequency in the EES) revealed as predicted, significantly higher scores for non-DLD groups. These scores represent perceived levels of academic input, in relation to need, and therefore have a strong theoretical correlation with confidence. As such the findings that dyspraxics reported lowest scores in this is expected. In fact EES Training and Frequency have such little variance in their means, these measures represent the same concept.

The findings that perceived levels of support in education, and entertainment in lessons (EES Support and EES Entertainment) are lowest for non-DLD groups, and comparable among all DLD groups is most likely the result of special educational provisions in place within the school. School policy for inclusion, and strategy for special educational provision confirms this, and these are also common strategies for integrating DLD groups into mainstream education (West Buckland, 2010; Riddick, 2000; Pollock, Waller & Pollit, 2004). These findings however suggest that these provisions are not able to satisfy the needs of DLD groups, as other EES scores indicate that they are not able to compensate other aspects of educational experience. When asked how education was made to be entertaining, DLD groups described games, token economies, and the flexible pacing of lessons. Non-DLD groups however described opportunities for group or sociable activities, which supports Riddick's (2000) suggestion that such strategies in the delivery of educational provisions may harm inclusion.

The deficit in special educational provision is measured as the length of time from 7 years old (identified as the optimum age for beginning the provision of support for DLD groups (Fraser, 1998) until the time when the school began to provide support. The findings of the EES in relation to deficit revealed no clear relationship, which is inconsistent with predictions. Fraser (1998) and Scanlon and Vellutino (1997) both

suggest that early intervention for DLD groups will lead to greater academic achievement, however the current study found that only perceptions of ability in English were significantly affected. The main body of research has focussed on language abilities (Vellutino, Scanlon, Sipay, Small, Pratt, Chen & Denckla, 1996), and so it may have been a mistake to generalise from this so widely. The findings do support research that suggests that phonemic awareness skills and sensitization to alphabetic symbol decoding are age critical, and that later interventions in these areas may be less successful (Scanlon and Vellutino, 1997; Brooks, 2002; Vellutino, Scanlon & Tanzman, 1997). This study is not able to draw any assumptions from these findings, as they do not support any cognitive model of DLD consistently.

As discussed, NA was found to be affected by DLD, however between diagnosis effects reveal that only dyspraxia *alone* is a significant predictor of NA. This was a surprising finding, as although some research indicates that combined effects of dyslexia and dyspraxia may lead to more extreme issues (Selikowitz, 1993), there is little evidence in literature to support the finding that dyspraxia affects more severe outcomes. Dyspraxia may account for NA because, as a motor function impairment, it can be the most visibly distinguishable as a disability, outside of the classroom (Dewey, 1995). It may also prove limited across the largest range of tasks, reducing efficacy, and leading to a dependant sense of helplessness (Dewey, 1995; Abramson, Metalsky & Alloy, 1989). This finding also indicates that among the sample, dyslexia alone is not a significant predictor of NA. Addressing these issues simultaneously, this study suggests that provision for DLD groups that focuses on dyslexia, is significantly successful in reducing NA; however likewise, a paralleling neglect in the understanding and specific support for dyspraxia, evident as inattention in the literature, may explain these findings. (Dixon, 2010) supports this conclusion, noting that dyspraxia has unqualified pervasive effects on a child's development. Among the sample this finding indicates that the learning support provisions are able to address wellbeing issues, or that other accessible opportunities compensate. The open ethos, and impressively inclusive environment of the school's educational support unit, as well as excellent extra-scholastic opportunities for all, may corroborate this finding.

Social skills were shown to be significantly negatively affected for each DLD diagnosis individually, in between diagnosis effects against non-DLD groups. This supports the earlier stated findings of this study, and demonstrates that wellbeing is a multifaceted issue in terms of the selected populations, and advocates the need the study these dimensions further. Wellbeing scores were also assessed against deficit in special educational provision (as described earlier). Deficit only showed a significant correlation with NA. In keeping with this study's findings, NA is shown to have a likely causal correlation with aspects of the education environment, as is supported by the result of deficit on aspects of the EES.

Due to the findings about the wellbeing relationships with dyspraxia, it may not be appropriate to compare dyslexia and dyspraxia in these dimensions. There is scope for dyspraxics to experience affected wellbeing beyond the control of educational environment. Recommendations from reviewing literature highlight a need for expanding policy in positive inclusion for dyspraxics, and the need for further research into the applicable therapeutic interventions for dyspraxia in education.

## **Conclusion**

The findings of this study predominantly support previous research in the multiple presentations of diagnosis and support for DLD. This study has attempted to combine two distinct perspectives in studying this dynamic, by addressing both wellbeing and academia. This study differs from known research in basing the assessment of education in the perception of provision and attainment, rather than empirical measures. The EES results have allowed this study to categorise experiences of education, and demonstrate correlation with wellbeing. This study has expanded on known research by assessing DLD groups both collectively, and by diagnoses. This seats the findings in the context of social psychology, as well as educational, by addressing the perceptions of grouping and classification of DLD.

This study has generally been successful in proving its predictions. There is a strong basis to suggest this is the result of educational provisions, where perceived distinctions in factors proven to be attributable are lacking. The empirical findings within this research support known models for wellbeing, and the diagnoses of dyslexia and dyspraxia. The sample size used was consistent with similar research, and given the minority, the sample is considered adequate to suggest statistical significance; however an ideal expansion of this research could test the effects in multiple schools, to look for normatively.

This study leaves several issues unanswered, and identifies directions where previous known research has been lacking. Possibilities for future includes the involvement of cognitive assessments of specific learning strategies, comparative research of alternative learning strategies, a longitudinal study of life outcomes for DLD groups, and any expansion on research into the educational experiences for dyspraxic individuals.

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