

# Understanding and supporting learners with specific learning difficulties from a neurodiversity perspective: A narrative synthesis

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**Academic and practice-based research constructs specific learning difficulties as a collection of lifelong, within-person conditions that negatively affect learning and daily functioning. Investigation has historically adopted a medical model, specifically a neurodeficit perspective. Conversely, neurodiversity has emerged as a concept that seeks to understand these conditions as part of a person's identity, challenging cures and remediation, and promoting the importance of understanding those with diagnoses as possessing personal differences and strengths. This paper presents a narrative synthesis that collated and analysed current research and scholarship that sought to understand specific learning difficulties from a neurodiversity perspective, thus offering an original contribution to the existing literature. The review focused on three specific learning difficulties: dyslexia, dyspraxia and dyscalculia. Thematic analysis of papers included in the review led to the construction of three major themes, concluding that further neurodiverse research and scholarship is required.**

**Key words:** Neurodiversity, specific learning difficulties, dyspraxia, dyslexia, dyscalculia

## Introduction

Specific Learning Difficulties (SpLD), otherwise referred to as Specific Learning Disorders (SpLDs), are defined as a collection of lifelong conditions that negatively influence learning and daily functioning (American Psychiatric Association [APA], 2013; Nag & Snowling, 2012). They are conceptualised as having their own neurobiological etiology, occurring ‘within person’ (Hulme & Snowling, 2013). There are multiple risk factors for a learner being diagnosed with an SpLD, including environmental, genetic and cognitive factors (Hulme & Snowling, 2013). Dyslexia, dyspraxia, dyscalculia and dysgraphia are SpLDs; however, debate occurs around classification (Hulme & Snowling, 2013; Nag & Snowling, 2012). Some academics and professionals also include Autism Spectrum Condition (ASC), Attention Deficit Hyperactivity Disorder (ADHD) and Tourette’s syndrome as SpLDs, while others classify these as ‘developmental disorders’, ‘developmental conditions’ or ‘developmental disabilities’, with associated learning difficulties (Sewell, 2020; Hulme & Snowling, 2013; Nag & Snowling, 2012). SpLD conceptualisation for this paper includes dyslexia, dyspraxia, dyscalculia and dysgraphia, while ASC and ADHD are conceptualised separately as neuro-development conditions that can result in associated learning difficulties.

The research literature has adopted a psycho–bio–medical model and deficit (sometimes termed ‘neurodeficit’) approach to conceptualising and researching SpLDs (Sewell, 2020; Baron-Cohen, 2017; Somale et al., 2016; Grant, 2015; Robertson, 2010). Deficit-based investigation has typically focused on outlining the specifics of delayed learning acquisition for each condition (such as delayed word reading in dyslexia), cognitive difficulties associated with each condition (such as working memory in dyspraxia), and psychosocial behavior difficulties within and across conditions (such as social interaction) (Hulme & Snowling, 2013; Nag & Snowling, 2012). Accordingly, practice-based research and teaching practice has followed suit. There is a plethora of academic and non-academic literature advising how to support learners in ameliorating difficulties (Grigorenko et al., 2020).

Conversely, the SpLD research and practice literature also shows an emerging trend to understand and teach learners with SpLDs from a neurodiversity perspective, with an emphasis on what strengths learners may also possess (Rappolt-Schlichtmann et al., 2018; Rentenbach et al., 2017; Somale et al., 2016; Clouder et al., 2020; Grant, 2015; Armstrong, 2010; Hendricks, 2010; Robertson, 2010; Pollack, 2009). The autism advocacy movement originated the neurodiversity concept (Kapp et al., 2013). It is

coined as an umbrella term, encompassing the full range of SpLDs and developmental disorders/disabilities. It recognizes the experiences of those diagnosed who self-advocate for the celebration of such conditions ‘as inseparable from identity and challenge efforts to find a cause and a cure’ (Kapp et al., 2013, pg. 3). The concept has been loosely aligned with the social model of disability and positioned as a binary opposite to the medical model of disability (Clouder et al., 2020; Kapp et al., 2013). There is a focus on acceptance of so-called ‘deficits’ and for them to even be perceived as differences to the norm rather than to be automatically assumed as difficulties (Kapp et al., 2013). In an educational setting, this encourages a focus on understanding potential learning strengths and adaptation of the environment to accommodate and support these. Sewell (2020) directly aligns the concept of neurodiversity with SpLDs by proposing the term ‘specific learning differences’.

The emergence of the neurodiversity perspective has influenced pedagogical practice in educational settings. Sewell and Park (2021) outlined a case study for supporting an autistic boy in secondary school from a strengths-based perspective. Intense interests, usually viewed as a difficulty arising from the autistic trait of rigid thinking (Baron-Cohen, 2006), were repositioned as a positive ability to pay close, sustained attention to a single phenomenon. It was suggested that social clubs can be developed around individuals’ specific interests, also benefiting inclusion and belonging in school (Sewell & Park, 2021). Similarly, Dwyer et al. (2022) provide specific pedagogical strategies for an appreciative perspective of neurodiverse students in an American college setting. For example, the creation of disability cultural centres would enable neurodiversity training to be distributed to all on campus and could further provide an avenue for neurodiverse individuals to promote their lived experiences (Dwyer et al., 2022).

Given the growth of the neurodiversity movement, the researcher conducted the narrative synthesis to ascertain the current state of the research literature and its implications. It sought to investigate SpLDs from a neurodiversity perspective and outline any emerging ramifications for inclusive educational practice. Research that veered away from a distinct deficit perspective was sought and analysed. As the size of a potential neurodiverse research body of literature is currently small, a secondary aim of the narrative synthesis was to highlight this to other researchers, encouraging SpLD research conducted from a neurodiversity perspective. Dyslexia, dyscalculia and dyspraxia are focused on as they have the highest profile. (By ‘profile’ the author is referring to

the size of the respective bodies of research literature for the SpLDs and how well-known and responded to each is in educational practice). Dysgraphia was omitted from the research investigation as an initial scope of the literature revealed limited research from either a neurodiverse or a neurodeficit perspective.

## **Literature search strategy**

### *Method*

A narrative synthesis aims to move beyond a descriptive summary of literature to add value by providing an original synthesis, resulting in new meaning and perspectives (Rodgers et al., 2009). The current review therefore aimed to provide an original synthesis across selected SpLDs via the identification of themes as directed by the following clearly defined research questions (Petticrew et al., 2009; Rodgers et al., 2009):

- What potential neurodiverse differences and strengths do learners with SpLDs possess?
- What neurodiverse teaching strategies and learning interventions have been examined in the practice-based literature?

### *Search procedure*

1. Five databases were utilised for the literature search: British Education Index, EBSCO, ERIC, PsychInfo and Science Direct.
2. Boolean logic was applied to the search terms ‘neurodiversity’, ‘neurodiverse’, ‘strengths’ and ‘strengths-based’ along with (‘AND’) dyslexia, dyscalculia and dyspraxia.
3. Initially, this search strategy produced 167 records.
4. These papers were screened for relevancy based on title, abstract and key words. This resulted in 36 records. Relevancy was decided by assessing if the title wording, abstract and key words indicated research conducted into dyslexia, dyspraxia and dyscalculia, and if the search terms outlined in Item 2 were suitably expanded on, indicating initial applicability to research questions.
5. Papers were then included in the synthesis based on the following inclusion criteria:
  - Relevant to educational practice
  - Exclusive focus on SpLDs
  - A focus on neurodiversity and/or understanding of SpLDs from a strengths-based perspective

- Empirical or practice-based research and research reviews
  - Written in English
  - Published after the year 2000
  - Research review papers, and quantitative or qualitative research
6. The final number of papers for inclusion after screening was 23 (15 relating to dyslexia, 7 relating to dyscalculia and 2 relating to dyspraxia). [Table 1](#) presents an overview of the studies included in the thematic analysis.

### *Analysis procedure*

Thematic analysis is a systematic method for achieving a narrative synthesis (Petticrew et al., 2009; Rodgers et al., 2009). It provides a way for contents across related studies to be classified (Petticrew & Roberts, 2006). All data were included as a part of the data/information extraction (inclusive as opposed to exclusive) to ensure that no information was lost as part of the literature synthesis. Thematic analysis of the extracted data/information followed the steps outlined by Braun and Clarke (2006): (1) papers selected as part of the narrative synthesis were read multiple times, (2) initial meaning units were identified, (3) meaning units were assigned descriptive codes, (4) themes were developed by grouping codes that related to each other and (5) themes were named and summarised descriptively.

The pre-assigned research questions directed theme development from codes, and thus, represents a deductive approach to theme generation (Braun & Clarke, 2006). Coding of selected papers occurred across multiple themes as part of the synthesis. [Table 2](#) summarises the thematic analysis with an indication of studies that supported each theme (cross-referenced from [Table 1](#)).

### **Findings**

Three major themes emerged from the literature selection and thematic analysis. These were relative versus absolute cognitive strengths, development of social and emotional strengths, and neurodiverse teaching interventions can foster successful learning. Quantitative studies were in the majority (11), with qualitative (5), reviews (5), semi-experimental research (1) and case study methodology (1) also considered. The following section reports the descriptive summary of each theme constructed as part of the narrative synthesis.

**Table 1:: Summary of studies included in narrative synthesis**

Reference	Origin	Sample	Methodology	SpLD	Summary
1. Alves & Nakano (2014)	Brazil	26 (13 with dyslexia, 13 without)	Quantitative	Dyslexia	No significant difference in creativity scores found between groups
2. Bacon & Bennett (2012)	UK	13	Qualitative, interpretative phenomenological analysis	Dyslexia	Those who experience dyslexia view it as a strength and see themselves as creative
3. Bigozzi et al. (2016)	Italy	190 (95 with dyslexia, 19 without)	Quantitative	Dyslexia	Dyslexic pupils outperformed non-dyslexic pupils on measures of creativity
4. Cancer et al. (2016)	USA	52 (19 with dyslexia)	Quantitative	Dyslexia	Dyslexic pupils performed better than non-dyslexic pupils on creativity connection tasks
5. Wolff & Lundberg (2002)	Sweden	Study 1: 154, Study 2 (replication): 396	Quantitative	Dyslexia	Students studying art showed more signs of dyslexia and had poorer phonological skills than non-art students
6. Tafti et al. (2009)	Iran	52 (26 with dyslexia, 26 without)	Quantitative	Dyslexia	Dyslexic students scored higher on tests of original thinking than non-dyslexic controls and as high on scores of general creativity
7. Everatt et al. (2008)	New Zealand	123 (40 controls)	Quantitative	Dyslexia	Individual strengths present across individuals with dyslexia

**Table 1: (Continued)**

Reference	Origin	Sample	Methodology	SpLD	Summary
8. Attree et al. (2009)	UK	42 (21 with dyslexia, 21 without)	Quantitative	Dyslexia	In a virtual reality computer-generated test, adolescents with dyslexia scored higher for visuo-spatial skills
9. von Karolyi (2001)	USA	62 (40 with dyslexia, 28 without)	Quantitative	Dyslexia	Dyslexic participants outperformed non-dyslexic participants on tests of global visuo-spatial ability
10. Yu et al. (2018)	USA	N/A	Review	Dyslexia	Early language skills showed moderate severity of developmental dyslexia
11. Firth et al. (2013)	Australia	102 (6 with dyslexia)	Quantitative	Dyslexia	Possession of positive and adaptive coping styles build resiliency in learners with dyslexia
12. Stack-Cutler et al. (2015)	Canada	120	Quantitative	Dyslexia	Dyslexic learners with higher personal resiliency experience higher academic, social and general satisfaction
13. Goldberg et al. (2003)	USA	41	Qualitative, ethnographic	Dyslexia	Successful attributes for succeeding with dyslexia are self-awareness, proactivity, perseverance, goal-setting, use of social support and emotional coping strategies

(Continues)

**Table 1: (Continued)**

Reference	Origin	Sample	Methodology	SpLD	Summary
14. Glazzard & Dale (2013)	UK	2	Qualitative, two narrative case studies	Dyslexia	Positive relationships with teachers mediate the self-concept of a learner with dyslexia
15. Kannangara (2015)	UK	3	Qualitative, narrative	Dyslexia	‘Thriving dyslexic’ types are aware of their personal strengths, such as viewing challenges positively, goal-setting and perseverance
16. Gillum (2012)	UK	N/A	Review	Dyscalculia	The label of dyscalculia can lead to a neurodeficit approach, and it may be beneficial to abandon the term
17. Kucian & von Aster (2015)	Switzerland	N/A	Review	Dyscalculia	Teaching style and educational opportunities facilitate development of learning strengths in learners with dyscalculia
18. Reigosa-Crespo (2019)	Cuba	N/A	Review	Mathematical learning disability	Patterns of strengths and differences model shows individual strengths for learners with dyscalculia, which should be considered in learning interventions

(Continues)

**Table 1: (Continued)**

Reference	Origin	Sample	Methodology	SpLD	Summary
19. Williams (2013)	Australia	N/A	Review	Dyscalculia	Positive self-concept and resiliency can be a personal strength fostered in dyslexic learners
20. Kaufmann et al. (2009)	Austria	18 (9 with dyscalculia)	Quantitative	Dyscalculia	Emerging evidence that learners with dyscalculia may use verbal processing skills to compensate for processing skills involved in recognising number magnitudes
21. Peard (2010)	Australia	2	Qualitative: two case studies	Dyscalculia	Most 'difficulties' associated with dyscalculia are learned and can be reduced through strengths-focused teaching
22. Abdulkarim et al. (2017)	Saudi Arabia	19 (10 in intervention group, 9 in control group)	Semi-experimental	Dyspraxia	A multi-sensory teaching programme effectively supported learners with dyspraxia to gain key skills
23. Newman (2019)	UK	10	Qualitative – teaching practice vignettes	Dyslexia and dyspraxia	Multi-sensory teaching techniques aid learning for learners with dyspraxia and dyslexia

**Table 2 : Summary of themes**

Theme	Studies supporting theme
Relative versus absolute cognitive strengths	1, 2, 4, 5, 7, 8, 9, 10, 17, 18, 20, 21
Development of social and emotional strengths	11, 12, 13, 14, 15, 16, 17, 19
Neurodiverse teaching interventions can foster successful learning	7, 17, 21, 22, 23

### **Relative versus absolute cognitive strengths**

Across the papers exploring whether individuals with SpLDs may possess cognitive strengths, there was a tendency to conceptualise these as either relative or absolute. Relative cognitive abilities refer to the individual, arising from personalised assessment. That is, there are areas of cognitive ability that are stronger than areas classified as weaknesses, which are thus deemed personal cognitive strengths. Absolute cognitive strengths refer to those derived from nomothetic empirical research and are tentatively suggested as potential common cognitive strengths for most learners diagnosed with the SpLD.

For example, regarding assessing relative strengths in dyscalculia, Reigosa-Crespo (2019) presents the patterns of strengths and weaknesses model. This involves a cognitive assessment that seeks to discover the learner's unique cognitive difficulties and a profile of any relative cognitive strengths. The patterns of strengths and weaknesses model builds on the perspective that dyscalculia is a heterogeneous condition (Butterworth, 2008); as such, assessing individual cognitive strengths should be an implicit aspect to assessment. Kucian and von Aster (2015) supported this. They reviewed the research and stated that certain environmental factors influence the development and severity of cognitive difficulties associated with dyscalculia. As such, relative individual cognitive strengths need to be acknowledged to prevent the unnecessary development of the severity of cognitive difficulties and promote the development of strengths. Peard (2010) additionally identified the need for teachers to adopt a teaching style that highlights a learner with dyscalculia's individual cognitive and learning strengths during a learning task to improve motivation and engagement. Regarding dyslexia, Everatt et al. (2008) found that personal strengths in cognitive skills differed across individuals with dyslexia and promoted the idea that individual assessment should highlight a learner's relative cognitive abilities.

For all SpLD conditions included in the narrative synthesis, the literature exploring absolute cognitive strength should be heavily caveated as being in its infancy. This finding highlights the potential for certain absolute cognitive strengths, as further research is warranted until these can confidently be called 'cognitive strengths and differences' associated with each SpLD. Even with dyslexia, which presented with the largest number of papers referring to absolute strengths, caution is needed when interpreting the findings' implications.

One of the more frequently espoused potential absolute cognitive strength for people with dyslexia is that they possess heightened creativity skills. Research that shows a higher number of learners with dyslexia studying art post-16, compared to other subjects, provides some evidence for this (Bacon & Bennett, 2013; Wolff & Lundberg, 2002). However, some experimental psychology research investigated whether those with dyslexia score higher on creativity tests and found no significant advantage in general creativity skills (Alves & Nakano, 2014).

A closer look at the type of creativity experimentally tested reveals some interesting findings. Cancer et al.'s (2016) research followed the research trend, finding that dyslexic participants did not score higher than non-dyslexic participants for tests of general creativity. However, on a 'connecting task', which involves generating an unusual combination of ideas, dyslexic participants outperformed non-dyslexic individuals. Tafti et al. (2009) reported a similar finding where dyslexic individuals performed significantly higher for tests of original thinking that involved developing novel ideas. Likewise, Bigozzi et al. (2016) reported that dyslexic teenagers showed more originality in creativity tasks than non-dyslexic teenagers. This can be taken as evidence that inconsistencies in other research may result from the assessment of general creativity, rather than specific types of creativity. Cancer et al. (2016) hypothesised that difficulty with verbal processes may lead individuals with dyslexia to develop strengths in alternative ways of thinking about a problem. Hence, they outperform non-dyslexics on creative tasks requiring generation of original thoughts and connections between divergent ideas.

A second potential absolute cognitive strength for individuals with dyslexia are superior visuo-spatial skills; the ability to understand, remember and respond to the physical location of objects in space and the space between objects (Attree et al., 2009; von Károlyi, 2001). This would have positive implications for creative

learning tasks that involve the successful manipulation of objects and space, such as drawing, painting or sculpting. Yu et al. (2018) additionally stressed how a personal strength of good early language skills can be a strong moderator for the severity of dyslexia through childhood development.

None of the literature reviewed reported or discussed the presence of absolute strengths for learners with dyspraxia. Regarding dyscalculia, Kaufmann et al. (2009) discovered that learners with dyscalculia may use verbal processing skills, as indicated by neural activity in the left intraparietal regions, to compensate for difficulties in brain regions involved in processing number magnitudes. However, this compensation cannot be safely labeled a strength without further empirical investigation, and it is important to observe that the research had a small sample size of nine participants (Kaufmann et al., 2009). In addition, the research was conducted in 2009 and given the absence of other such studies discovered during this review, it does not seem to have developed as an area of research interest.

In summary, within the SpLD neurodiversity literature, there is an emerging tendency to explore what cognitive strengths learners with a diagnosis may possess. The current focus is on personalised assessment seeking relative cognitive strengths for each learner. There is a small, nascent literature consisting predominantly of quantitative studies exploring what absolute cognitive strengths are attributable to each SpLD. Given the small size of this part of the literature, it is important to strongly caution against generalising findings as further research is warranted.

### **Development of social and emotional strengths**

A second theme within the literature reviewed was a focus on how learners with SpLDs have the capabilities to develop social and emotional strengths or to enhance existing social and emotional skills. These strengths were positioned as protective factors against negative outcomes resulting from the difficulties associated with each condition. For example, with dyslexia, in response to research demonstrating associated difficulties with self-esteem, learner self-concept and negative well-being, a small body of literature has emerged showing that developing resiliency can mediate against negative psychological effects (Stack-Cutler et al., 2015; Firth et al., 2013). Higher levels of intrapersonal resiliency mean that those with dyslexia experience greater life satisfaction, and higher levels of interpersonal resiliency mean they have healthier social relationships (Stack-Cutler et al., 2015). Positive, adaptive coping styles that underlie resiliency predict higher reports of life success from those with dyslexia (Firth et al., 2013).

Research seeking to develop positive adaptive coping styles in learners with dyslexia shows that it is important for individuals with dyslexia to be able to set goals, manage frustration, persevere, access help and utilise social support, self-advocate, use positive self-talk, develop mindfulness skills and problem solve (Firth et al., 2013; Goldberg et al., 2003). A good relationship with their teachers supports development of these skills (Glazzard & Dale, 2013). Ultimately, the development of such skills can lead individuals with dyslexia to develop higher levels of self-regulation, which allows them to better control their learning behavior (Kannangara, 2015).

The literature focusing on dyspraxia similarly reported that emotional and social skills were a key domain for personal strengths. Williams (2013) stated that instructional technique can help develop positive academic self-concepts, which can induce resiliency as a personal strength. Kucian and von Aster (2015) also presented personal motivation, similar to the concept of resiliency, as an important mediating factor. Gillum (2012) went as far to recommend that educators may not even want to label a child as having dyscalculia as this label could impact their self-image and limit the development of positive self-concept and coping skills.

In summary, social and emotional strengths emerged as a secondary area for potential difference and strengths in individuals with SpLDs. Compared to the first theme, the literature reviewed placed more emphasis on these strengths being teachable and developable, with an accompanying focus on teacher-led intervention.

### **Neurodiverse teaching interventions can foster successful learning**

The final theme constructed emphasised teaching strategies developed from a neurodiversity perspective. These strategies focus on meeting the perceived learning strengths of individuals with SpLDs. For example, multi-sensory teaching techniques have been postulated as an apt way to enhance engagement and outcomes for learners with dyspraxia (Newman, 2019; Abdulkarim et al., 2017). It is argued that multi-sensory techniques that involve ‘seeing, saying, hearing [and] doing’ (Newman, 2019, p. 12) strengthen recall. For example, role plays help learners experience new ideas, and walking while recalling facts helps create a memory ‘rhythm’. Use of videos to introduce new concepts before a learning activity is another vital medium for presenting information, and the use of visual supports, such as flash cards, is an addition to auditory information (Newman, 2019).

Abdulkarim et al. (2017) reported on implementing a multi-sensory teaching programme for learners with dyspraxia (as well as for learners with dysgraphia) that consisted of 45-minute sessions four times a week for eight weeks. The programme used a range of multi-sensory techniques to highlight learners' developing strengths (reporting of pedagogy strategies did not occur in specific detail in the paper). Pre- and post-measures showed improvements in learning outcomes including fine motor skills, writing, spelling, written expression and improved social-emotional problem-solving (Abdulkarim et al., 2017). This research highlights that if teachers wish to teach learners with dyspraxia by incorporating multi-sensory techniques, it is advisable that this is done frequently and with a high level of intensity, no less than 45-minute sessions four times a week (as this was the minimum intervention input used in the research) (Abdulkarim et al., 2017).

Regarding dyscalculia, several authors of reviews concluded that teaching style was important in fostering successful learning (Kucian & von Aster, 2015; Peard, 2010; Everatt et al., 2008). Kucian and von Aster (2015) argued that a comprehensive intervention should holistically consider the learner, not just remediation strategies. Peard (2010) built on this idea, stating that considering the whole learner and generating strategies in response to this will positively impact their motivation and engagement. Likewise for dyslexia, Yu et al. (2018) stated that early educational intervention should concentrate on developing existing positive skills, such as existing language skills.

In summary, the final theme tentatively suggests that teaching strategies that draw on a neurodiversity perspective may be useful in fostering successful learning. However, as with the first theme, it also highlights the current dearth of practice-based research into such strategies. As such, the narrative synthesis interprets and generalises findings cautiously. It is a useful finding as it should promote further research into teaching interventions conducted from a neurodiverse perspective but should not be interpreted to mean that this is currently evidence-based or occurring frequently in education settings.

## **Discussion**

In answering the first research question, the narrative synthesis generated two domains of differences and strengths that learners with SpLDs may possess. Interestingly, the selected research reviewed diverged between

focusing on cognitive abilities versus social and emotional abilities. Both, however, were positioned as having the potential to successfully support learning and adaptation to challenges encountered as a result of having an SpLD. The final theme (neurodiverse teaching interventions can foster successful learning) is relevant in answering the second research question. On occasion, the literature stated more exacting specific strategies, such as the types of multi-sensory approaches used with learners with dyspraxia (Newman, 2019; Abdulkarim et al., 2017). However, aspects of the literature also adopted a vaguer approach, such as with papers offering sweeping statements about teaching interventions for dyscalculia needing to consider the learner's strengths (Kucian & von Aster, 2015; Peard, 2010; Everatt et al., 2008). As such, the first research question can be critiqued as being more adequately addressed than the second, resultant of the current quantity and quality of research available.

A cross-theme critique is that the current neurodiversity literature for SpLDs concerned with exploring differences and strengths rather than deficits, is aborning. This influences the interpretation, applicability and generalisation of findings, which should be strongly caveated. As an adjunct to this, the existing research mostly focuses on dyslexia. This is likely an indication of the limited understanding and scholarly interest in dyspraxia and dyscalculia, in comparison to dyslexia's larger profile.

While these limitations were predicted at the outset of the narrative synthesis, a clear secondary rationale for completing the project was to highlight the dearth of literature to promote further engagement from a neurodiversity perspective. Within this context, the constructed themes are promotional for the direction of further research and commentary. The first theme indicates the requirement for further empirical research to explore absolute cognitive strengths and practice-based research to explore the assessment of relative cognitive strengths. The second theme should ignite interest in continued investigation into the positive mitigating influence of social and emotional skills, such as resilience and positive coping styles, and fostering the growth of these skills. The third theme, which highlights the largest need for further scholarship, promotes the need for an expanded practice-based literature that explores the *how* and *what* of teaching individuals with SpLD from a neurodiversity perspective.

Another caveat to discuss is that the purpose of the narrative synthesis and findings have not been to dismiss the dominant neurodeficit literature.

Given the substantial body of scholarship conducted from this perspective, it is not surprising that useful and evidence-based remediation has been developed and trialed (Grigorenko et al., 2020). For example, consider the effectiveness of literacy instruction in the case of dyslexia. Instruction that involves explicit, systematic instruction (for example, teaching to mastery by sequentially over-teaching component skills), focusing on an awareness of phonemes and fluency is effective in remediating reading difficulties (Al Otaiba et al., 2022; Gersten et al., 2020; Gersten et al., 2009). This is particularly so with high intensity intervention, such as 80 hours of instruction delivered over two months (Simos et al., 2002). As such, in wishing to progress a neurodiverse agenda, a complete abandonment of this perspective is not called for when specific learning difficulties are sought to be reconceptualised from a social model perspective as specific learning differences (Sewell, 2020).

However, the findings of the current narrative synthesis demonstrate that the general approach is still unbalanced in favor of a medicalisation of difference, rather than seeking to understand human variations in learning ‘as inseparable from identity and challenge efforts to find a cause and a cure’ (Kapp et al., 2013, pg. 3). If challenged, a more holistic, systemically rooted perspective emerges, which offers space for a learner with an SpLD to be an individual with both learning challenges and unique differences and strengths.

This point is critical if the concept of neurodiversity emerges fully from its activist roots to meaningfully influence academic scholarship and associated teaching practice (Clouder et al., 2020; Kapp et al., 2013). Based on the findings of the current narrative synthesis, it can be assumed that such a movement is more espoused than practised in the scholarly literature. Accordingly, teaching practice, which often follows academic research and scholarship in trend development, can also be assumed to verbally promote an appreciation of difference and diversity without meaningfully acting on these claims. This narrative synthesis summarises the existing literature, with themes providing impetus for meaningful change.

## **Conclusions**

This paper presented a narrative synthesis of the SpLD literature written from a neurodiversity perspective. The following two research questions guided the research process:

- What potential neurodiverse differences and strengths do learners with SpLDs possess?
- What neurodiverse teaching strategies and learning interventions have been examined in the practice-based literature?

A nascent literature demonstrates that learners with dyslexia, dyscalculia and dyspraxia have the potential to be understood to have learning differences and strengths associated with these conditions, in addition to the common assumption of them possessing learning difficulties. There is further possibility for learning intervention to be developed based on the knowledge of these differences and strengths, which would complement the deficit, remediation approach that currently dominates teaching practice. These findings are strongly caveated as requiring further research and scholarship, anticipating that this paper will promote these.

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## References

- Abdulkarim, W. F., Abdulrauf, M. S. & Ahmed, A. (2017) 'The effect of a multi-sensory program on reducing dyspraxia and dysgraphia among learning disabled students in Rafha', *Journal of Educational Sciences and Psychology*, VII(lxix), 51–65.
- Al Otaiba, S., McMaster, K., Wanzek, J., & Zaru, M. W. (2022) 'What we know and need to know about literacy interventions for elementary students with reading difficulties and disabilities, including dyslexia', *Reading Research Quarterly*, 1–20.
- Alves, R. J. R. & Nakano, T. D. C. (2014) 'Creativity and intelligence in children with and without developmental dyslexia', *Paidéia (Ribeirão Preto)*, 24(59), 361–369. <https://doi.org/10.1590/1982-43272459201410>
- American Psychiatric Association [APA]. (2013) *Diagnostic and Statistical Manual Of Mental Disorders* (fifth edition). Washington, D.C., APA. <https://doi.org/10.1108/rr-10-2013-0256>
- Armstrong, T. (2010) *Neurodiversity: discovering the extraordinary gifts of autism, ADHD, dyslexia, and other brain differences*. Boston, Massachusetts: Da Capo Press.
- Attree, E. A., Turner, M. J. & Cowell, N. (2009) 'A virtual reality test identifies the visuospatial strengths of adolescents with dyslexia', *Cyber Psychology & Behavior*, 12(2), 163–168. <https://doi.org/10.1089/cpb.2008.0204>

- Bacon, A. M. & Bennett, S. (2013) 'Dyslexia in higher education: the decision to study art', *European Journal of Special Needs Education*, 28(1), 19–32. <https://doi.org/10.1080/08856257.2012.742748>
- Baron-Cohen, S. (2006) 'The hyper-systemizing, assortative mating theory of autism', *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 30(5), 865–872. <https://doi.org/10.1016/j.pnpbp.2006.01.010>.
- Baron-Cohen, S. (2017) 'Editorial perspective: neurodiversity—a revolutionary concept for autism and psychiatry', *Journal of Child Psychology and Psychiatry*, 58(6), 744–747. <https://doi.org/10.1111/jcpp.12703>
- Bigozzi, L., Tarchi, C., Pinto, G. & Donfrancesco, R. (2016) 'Divergent thinking in Italian students with and without reading impairments', *International Journal of Disability, Development and Education*, 63(4), 450–466. <https://doi.org/10.1080/1034912x.2015.1127335>
- Braun, V. & Clarke, V. (2006) 'Using thematic analysis in psychology', *Qualitative Research in Psychology*, 3, 77–101. <https://doi.org/10.1191/1478088706qp063oa>.
- Butterworth, B. (2008) 'Developmental dyscalculia', in J. I. D. Campbell (ed) *Handbook of Mathematical Cognition*. New York and Hove: Psychology Press.
- Cancer, A., Manzoli, S. & Antonietti, A. (2016) 'The alleged link between creativity and dyslexia: identifying the specific process in which dyslexic students excel', *Cogent Psychology*, 3(1), 1190309. <https://doi.org/10.1080/23311908.2016.1190309>
- Clouder, I., Karakus, M., Cinotti, A., Ferreyra, M. V., Fierros, G. A. & Rojo, P. (2020) 'Neurodiversity in higher education: a narrative synthesis', *Higher Education*, 80, 1–22. <http://doi.org/10.1007/s1-734-020-00513-6>
- Dwyer, P., Mineo, E., Mifsud, K., Lindholm, C., Gurba, A. & Waisman, T. C. (2022) 'Building neurodiversity-inclusive postsecondary campuses: recommendations for leaders in higher education', *Autism in Adulthood*, 4, (ahead of print). <https://www.liebertpub.com/doi/full/10.1089/aut.2021.0042>
- Everatt, J., Weeks, S. & Brooks, P. (2008) 'Profiles of strengths and weaknesses in dyslexia and other learning difficulties', *Dyslexia*, 14(1), 16–41. <https://doi.org/10.1002/dys.342>
- Firth, N., Frydenberg, E., Steeg, C. & Bond, L. (2013) 'Coping successfully with dyslexia: an initial study of an inclusive school-based resilience programme', *Dyslexia*, 19(2), 113–130.
- Gersten, R., Compton, D., Connor, C. M., Dimino, J., Santoro, L., Linanthompson, S. & Tilly, W. D. (2009). *Assisting Students Struggling with Reading: response to intervention (RtI) and multi-tier intervention in*

- the primary grades* (NCEE 2009–4045). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. [https://ies.ed.gov/ncee/wwc/docs/practiceguide/rti\\_reading\\_pg\\_021809.pdf](https://ies.ed.gov/ncee/wwc/docs/practiceguide/rti_reading_pg_021809.pdf)
- Gersten, R., Haymond, K., Newman-Gonchar, R., Dimino, J. & Jayanthi, M. (2020) 'Meta-analysis of the impact of reading interventions for students in the primary grades', *Journal of Research on Educational Effectiveness*, 13(2), 401–427. <https://doi.org/10.1080/19345747.2019.1689591>
- Gillum, J. (2012) 'Dyscalculia: issues for practice in educational psychology', *Educational Psychology in Practice*, 28(3), 287–297. <https://doi.org/10.1080/02667363.2012.684344>
- Glazzard, J. & Dale, K., (2013) 'Trainee teachers with dyslexia: personal narratives of resilience', *Journal of Research in Special Educational Needs*, 13(1), 26–37. <https://doi.org/10.1111/j.1471-3802.2012.01254.x>
- Goldberg, R. J., Higgins, E. L., Raskind, M. H. & Herman, K. L. (2003) 'Predictors of success in individuals with learning disabilities: A qualitative analysis of a 20-year longitudinal study', *Learning Disabilities Research & Practice*, 18(4), 222–236. <https://doi.org/10.1111/1540-5826.00077>
- Grant, D. (2015) 'Neurodiversity', in S. Moody (ed) *Dyslexia and Employment: a guide for assessors, trainers and managers*. New Jersey: John Wiley & Sons. <https://doi.org/10.1002/9780470749203>
- Grigorenko, E. L., Compton, D. L., Fuchs, L. S., Wagner, R. K., Willcutt, E. G. & Fletcher, J. M. (2020) 'Understanding, educating, and supporting children with specific learning disabilities: 50 years of science and practice', *American Psychologist*, 75(1), 37–51.
- Hendricks, S. (2010) *The adolescent and adult neuro-diversity handbook: Asperger's syndrome, ADHD, dyslexia, dyspraxia, and related conditions*. London: Jessica Kingsley Publishers.
- Hulme, C., and Snowling, M. J. (2013) *Developmental Disorders of Language Learning and Cognition*. New Jersey: John Wiley & Sons. [https://doi.org/10.1111/j.1471-3802.2010.01151\\_1.x](https://doi.org/10.1111/j.1471-3802.2010.01151_1.x)
- Kannangara, C. S. (2015) 'From languishing dyslexia to thriving dyslexia: developing a new conceptual approach to working with people with dyslexia', *Frontiers in Psychology*, 6, 1–4. <https://doi.org/10.3389/fpsyg.2015.01976>
- Kapp, S. K., Gillespie-Lynch, K., Sherman, L. E. & Hutman, T. (2013) 'Deficit, difference, or both? Autism and neurodiversity', *Developmental Psychology*, 49(1), 59–71. <https://doi.org/10.1037/a0028353>

- Kaufmann, L., Vogel, S. E., Starke, M., Kremser, C., Schocke, M. & Wood, G. (2009) 'Developmental dyscalculia: compensatory mechanisms in left intraparietal regions in response to nonsymbolic magnitudes', *Behavioral and Brain Functions*, 5(1), 35–41. <https://doi.org/10.1186/1744-9081-5-35>
- Kucian, K. & von Aster, M. (2015) 'Developmental dyscalculia', *European Journal of Pediatrics*, 174(1), 1–13. <https://doi.org/10.1007/s00431-014-2455-7>
- Nag, S., & Snowling, M. J. (2012) 'School underachievement and specific learning difficulties', in J. M. Rey (ed) *IACAPAP E-textbook of Child and Adolescent Mental Health*. Geneva: International Association for Child and Adolescent Psychiatry and Allied Professions. <https://doi.org/10.1177/1039856213486219>
- Newman, I. (2019) 'When saying 'go read it again' won't work: multisensory ideas for more inclusive teaching and learning', *Nurse Education in Practice*, 34, 12–16. <https://doi.org/10.1016/j.nepr.2018.10.007>
- Peard, R. (2010) 'Dyscalculia: what is its prevalence? Research evidence from case studies', *Procedia - Social and Behavioral Sciences*, 8, 106–113. <https://doi.org/10.1016/j.sbspro.2010.12.015>
- Petticrew, M. & Roberts, H. (2006) *Systematic Reviews in the Social Sciences*. Oxford: Blackwell Publishing.
- Petticrew, M., Arai, L., Roberts, H., Britten, N. & Popay, J. (2009) 'Testing methodological guidance on the conduct of narrative synthesis in systematic reviews', *Evaluation*, 15(1), 49–73.
- Pollack, D. (2009) *Neurodiversity in higher education: positive responses to specific learning differences*. Hoboken, New Jersey: John Wiley & Sons.
- Rappolt-Schlichtmann, G., Boucher, A. R. & Evans, M. (2018) 'From deficit remediation to capacity building: learning to enable rather than disable students with dyslexia', *Language, Speech, and Hearing Services In Schools*, 49(4), 864–874.
- Reigosa-Crespo, V. (2019) 'Beyond the "third method" for the assessment of developmental dyscalculia: implications for research and practice', in A. Fritz, V. G. Haase and P. Räsänen (eds) *International Handbook of Mathematical Learning Difficulties: from the laboratory to the classroom*. New York: Springer.
- Rentenbach, B., Prislowsky, L. & Gabriel, R. (2017) 'Valuing differences: neurodiversity in the classroom', *Phi Delta Kappan*, 98(8), 59–63.
- Robertson, S. M. (2010) 'Neurodiversity, quality of life, and autistic adults: shifting research and professional focuses onto real-life challenges', *Disability Studies Quarterly*, 30(1). <https://doi.org/10.18061/dsq.v30i1.1069>

- Rodgers, M., Snowden, A., Petticrew, M., Arai, L., Roberts, H., Britten, N. & Popay, J. (2009) 'Testing methodological guidance on the conduct of narrative synthesis in systematic reviews: effectiveness of interventions to promote smoke alarm ownership and function', *Evaluation*, 15(1), 47–71. <https://doi.org/10.1177/1356389008097871>
- Sewell, A. (2020) 'Introducing specific learning difficulties', in A. Sewell and J. Smith (eds.), *Introduction to Special Educational Needs, Disability and Inclusion: a student's guide*. London: Sage.
- Sewell, A. & Park, J. (2021) 'A three-factor model of educational practice considerations for teaching neurodiverse learners from a strengths-based perspective', *Support for Learning*, 36(4), 678–694. <https://doi.org/10.1111/1467-9604.12387>
- Simos, P. G., Fletcher, J. M., Bergman, E., Breier, J. I., Foorman, B. R., Castillo, E. M. ... & Papanicolaou, A. C. (2002) 'Dyslexia-specific brain activation profile becomes normal following successful remedial training', *Neurology*, 58(8), 1203–1213.
- Somale, A., Konedkar, S., Rathi, S. & Iyer, N. (2016) 'Neurodevelopmental comorbidity profile in specific learning disorders', *International Journal of Contemporary Pediatrics*, 3(2), 355–361. <https://doi.org/10.18203/2349-3291.ijcp20160836>
- Stack-Cutler, H. L., Parrila, R. K. & Torppa, M. (2015) 'Using a multidimensional measure of resilience to explain life satisfaction and academic achievement of adults with reading difficulties', *Journal of Learning Disabilities*, 48(6), 646–657. <https://doi.org/10.1177/0022219414522705>
- Tafti, M. A., Hameedy, M. A. & Baghal, N. M. (2009) 'Dyslexia, a deficit or a difference: comparing the creativity and memory skills of dyslexic and non-dyslexic students in Iran', *Social Behavior and Personality: an international journal*, 37(8), 1009–1016. <https://doi.org/10.2224/sbp.2009.37.8.1009>
- von Karolyi, C. (2001) 'Visual-spatial strength in dyslexia: rapid discrimination of impossible figures', *Journal of Learning Disabilities*, 34(4), 380–391. <https://doi.org/10.1177/002221940103400413>
- Williams, A. (2013) 'A teacher's perspective of dyscalculia: who counts? An interdisciplinary overview', *Australian Journal of Learning Difficulties*, 18(1), 1–16. <https://doi.org/10.1080/19404158.2012.727840>
- Wolff, U. & Lundberg, I. (2002) 'The prevalence of dyslexia among art students', *Dyslexia*, 8(1), 34–42. <https://doi.org/10.1002/dys.211>
- Yu, X., Zuk, J. & Gaab, N. (2018) 'What factors facilitate resilience in developmental dyslexia? Examining protective and compensatory mechanisms across the neurodevelopmental trajectory', *Child Development Perspectives*, 12(4), 240–246. <https://doi.org/10.1111/cdep.12293>

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