

Parent Understanding of Specific Learning Disabilities

Gabrielle Wilcox
Erica Makarenko
Frank P. MacMaster
Rose Swansburg*
University of Calgary

Parents play a vital role in supporting children with learning disabilities, but little is known about their understanding of this diagnosis. The experiences of parents with the diagnostic process and the services their children receive post-diagnosis vary widely. Parents who participated in this study reported that they understand learning disabilities broadly but not their underlying neurobiology. Those who noted understanding the neurobiology indicated that it helped them better support their child, and those who did not understand it wanted to learn more. Parents generally noted that their children received less support during COVID-19 and that they had to seek more private services in order to support their child's academic progress, which caused additional strain on families. Finally, parents reported that having a child with a learning disability negatively affected their mental health, especially when parents feel like they have had to advocate strongly for their child to receive services.

Keywords: Psychoeducational Assessment, Learning Disabilities, Parents, Parent Perceptions, Neurobiology

INTRODUCTION

Although there is debate in the field as whether specific learning disorders or disabilities (LD) are specific (Berninger et al., 2015) or not (Peterson et al., 2021), we are using the current DSM-5-TR definition which, which notes that LDs are biologically based disorders with behavioral signs (American Psychiatric Association [APA], 2022). LDs are categorized as related to impairments in reading, written expression, or mathematics. In the United States, students often receive services when they fit and special education classification (IDEA, 2004), but most psychologists in private practice and in Canada diagnose use the DSM-5-TR (APA, 2022). For the purposes of this paper, we use diagnose, acknowledging that this is not the term used in all contexts.

Students with LDs each have a unique pattern of strengths, but they also have difficulties related to gaining specific academic skills. Consequently, LDs negatively affect academic achievement, vocational success, social skills, and emotional development (Hakkaart-Van Roijen et al., 2011). Adolescents with LDs are more likely to report suicidal thoughts, depression, and distress than youth without an LD (Svetaz et al., 2000). Furthermore, LDs often result in significant economic costs for families in order to identify the LD and provide appropriate education (Karande et al., 2019). Early identification and intervention are necessary to help children with LDs achieve academic and vocational success. Additionally, parent involvement in

*Please send correspondence to: Rose Swansburg, Werklund School of Education, University of Calgary, 2500 University Drive NW, Calgary Alberta T2N 1N4, Canada, Email: rose.swansburg@ucalgary.ca.

children's education improves outcomes for children with disabilities (Burke, 2012). Further, parents are expected to take an active role in individualized education plan (IEP) development (IDEA, 2004), so it is reasonable to assume that knowledge of their child's diagnosis would help parents collaborate in that process.

Parent Experiences with LD diagnosis

In this paper, we use the term *parents* to encompass biological parents, adoptive parents, and other guardians and caregivers for children and youth who have been diagnosed with an LD. This conceptualization of parents allows for an inclusive scope as a means to encompass many diverse family and household dynamics and viewpoints. Parents have differing experiences of their child's LD assessment and diagnosis based upon their own characteristics, the diagnostic process, and their experience after the diagnosis. Positive parental experiences included feeling that they learned more about their child through the diagnostic process, that their child would have access to more supports in school, and that they were better equipped to support their child at home (Kabuto, 2020). Teachers played a positive role in this process for some parents. In a study conducted in the United States, parents described teachers as listening to them, seeing their child as an individual, and being willing to support their child (Seals, 2010).

Not all experiences were positive, however. Some parents who were diagnosed with an LD themselves reported being teased and ostracized because of their diagnosis; consequently, they associated the diagnosis with negative stereotypes (Kabuto, 2020). Conversely, parents who did not have an LD themselves noted that it was difficult for them to understand their child's struggles (Kabuto, 2020). Unfortunately, parents reported that their child's LD diagnosis did not necessarily result in subsequent services, and many parents had to actively advocate for their children to obtain services, and school personnel sometimes demonstrated negative attitudes towards their children (Chien & Lee, 2012; Kabuto, 2020). In a qualitative study, fathers reported that they, as parents, received inadequate support from both the school and community to support their child (Chien & Lee, 2012). Many parents also reported experiencing an initial period of denial where they needed to grieve their expectations for their child's educational experiences (Sahu et al., 2018). Teachers negatively impacted the experience for some parents; in one study, parents reported that teachers did not accept accountability for providing supports, looked out for themselves instead of the child, or failed to provide meaningful supports (Seals, 2010).

Delivery of LD Services

Parents who reported negative experiences with individual education plan (IEP) meetings noted that they did not understand the process or what they could ask for, felt blamed for their child's difficulties, and felt stupid (Seals, 2010). When parents had positive experiences with IEP meetings, they noted that they felt like the team understood their child's strengths and weaknesses, provided tools parents could use to support their child, and provided differentiated teaching strategies to support their child (Seals, 2010). Unfortunately, some parents felt like their children did not receive interventions or other supports (Seals, 2010) or received minimal supports (Kabuto, 2020) even after their LD diagnosis.

COVID-19 significantly impacted methods of school delivery, and research suggests this disproportionately negatively affected students with disabilities access to instructional supports, widening the gap in their academic achievement (Goldberg, 2021). Families reported challenges in supporting their child's learning at home with limited services from schools. Consequently, parents felt like schools failed their children and they, in turn, failed their children by not providing the support children needed (Averett, 2021). However, some parents indicated that teachers provided the best supports they could or that being removed from the social aspects of school actually reduced their child's anxiety (Averett, 2021). Others found students had difficulty completing their work independently, requiring a significant amount of parent support, and although many parents reported that they received adequate communication when asked in a survey, during an interview, their reports of the communication from school staff were actually minimal (Ortiz et al., 2021).

LD and Mental Health

Parents reported feeling drained and burned out from the extra effort they invested in order to support their child's educational experiences, requiring them to reduce the time they spent on other activities including recreational and leisure activities (Chien & Lee, 2012; Sahu et al., 2018). They also experienced greater levels of anxiety about their child's academic performance and for their child's future (Chien & Lee, 2012; Sahu et al., 2018). In addition to the demands of advocating for services from the school, parents reported spending significant time getting their child to complete homework, resulting in frustration and a temptation to stop putting forth the intense effort required to get their child to complete homework (Seals, 2010). In an Italian study, parents of children with LD experienced greater distress than parents of typically developing children, and some parents reported clinically significant levels of distress (Bonifacci et al., 2016). In another study, being a mother of a child with an LD resulted in poorer psychological and social relationships to the same degree as having a chronic illness (Kulkarni, 2009). Additionally, having a job while parenting a child with an LD reduced access to leisure activities, and being a mother or having a son with an LD resulted in lower reported energy levels (Kulkarni, 2009).

Parent Knowledge of LD

Despite reporting high education levels and affluence, Indian parents of children with LD demonstrated a limited understanding of LD, thinking that their child would outgrow the difficulty, which negatively impacted the support they provided to their child (Sahu et al., 2018). Unfortunately, parent knowledge of LD was primarily gleaned from movies and people they knew (Sahu et al., 2018). Many parents indicated that they did not understand their legal rights and did not seek information unless there was a conflict with the school (Seals, 2010). Chien and Lee (2012) found that Chinese parents had a limited understanding of LD and mostly obtained their understanding from websites, books, and other parents.

Another study conducted in India implemented a single-session training to improve parent understanding of LD (Karande et al., 2007). They found that prior to the study, 64% of parents correctly defined LD, and after the training, all parents correctly defined it. Parent understanding of the causes of LD, unfortunately, did not

improve significantly after the intervention. Parents in this study were affluent and well educated but were initially uninformed about LD. Considering the limited research on parent understanding of LD broadly, it is not surprising that we were unable to locate any research on parent understanding of the neurobiological underpinnings of LD even though this is well established (Pennington et al., 2019).

Current Study

There is currently limited information on parent understanding of their child's LD, especially the neurobiological basis of LD. Consequently, this study aimed to identify three areas:

- (1) parent understanding of LD and the neurobiology of LD. We hypothesize that parents have limited understanding of the neurobiology of LD but somewhat better understanding of the definition of LD;
- (2) Parent perceptions of the supports and services their child receives and the impact of COVID-19 on these services. We hypothesize that parents generally found that COVID-19 negatively affected the services their child received; and
- (3) The mental health of parents of children with LD. We hypothesize that parents of children with LD will report negative mental health impacts for themselves in relation to caring for a child with LD.

Our aim is to provide evidence for the necessity of increased supports within school systems to support children and youth with LD to better support these children, their parents, and families as a whole.

METHODS

Participants and Procedure

Participants were recruited through social media platforms (e.g., Facebook, LinkedIn, Twitter) and through organizations and associations that support families of children with LD. Inclusion criteria were 1) parent of a child, aged 5-18, with an LD, 2) able to read and write in English, and 3) live in Canada or the United States. The survey, approved by the University of Calgary Conjoint Faculties Research Ethics Board (REB21-0961), was active from June 28, 2021–October 31, 2021. Participant demographic information is included in Table 1.

Demographics

The majority of respondents reported living in Canada (n=160) compared to the US (n=30). In Canada, most respondents were from Alberta (39%), Ontario (21%), and New Brunswick (19%). Mean child age was 11.20 (SD 2.7, range 6-18 years), with approximately two-thirds of the total LD sample identified as male (62%) and one-third as female (38%). Three-quarters of the children with LD (74%) were 6-12 years old (hereafter labelled “children”), and one-quarter (26%) were 13-18 years old (hereafter labelled “youth”). There were twice as many male children than female children (94 males and 47 females), but there was an equal sex distribution of youth (23 males and 25 females), $X^2(1) = 8.178$ $p=0.017$.

Table 1. Demographics of SLD Survey Sample

Survey Questions		Canada (N=160)		USA (N=30)		Total Sample (N=190)	
		N	%	N	%	N	%
Biological Sex	Female	60	31.6	12	6.3	72	37.9
	Male	99	52.1	18	9.5	117	61.6
	Prefer not to answer	1	0.5	-	-	1	0.5
Ethnicity*	Caucasian	151	79.5	27	-	178	93.7
	Asian	8	4.2	3	1.6	11	5.8
	Black/African American	1	0.5	-	-	1	0.5
	Hispanic/Latin American	1	0.5	5	2.6	6	3.2
	First Nations or Metis	5	2.7	1	0.5	6	3.2
	Other	4	2.1	1	0.5	5	2.6
Child's Learning Disability Diagnosis*	SLD (unspecified)	63	33.2	12	6.3	75	39.5
	Dyslexia	116	61.1	21	11.1	137	72.1
	Dysgraphia	81	42.6	17	8.9	98	51.6
	Dyscalculia	44	23.2	14	7.4	58	30.5
Provider Who Diagnosed Child's Learning Disability?	Physician	4	2.1	8	4.2	12	6.3
	Psychologist	137	72.1	12	6.3	149	78.4
	Psychiatrist	6	3.2	1	0.5	7	3.7
	Other	13	6.8	9	4.7	22	11.6
Child Received an Assessment?	Yes	157	82.6	29	15.3	186	97.9
	No	3	1.6	1	0.5	4	2.1
If yes, where was Assessment Provided?	Through School (free)	31	16.7	10	5.4	41	22.0
	Psychologist (paid)	112	60.2	18	9.7	130	69.9
	Other	14	7.5	1	0.5	15	8.1

Two-fifths (38%) of the children reportedly had a diagnosis of attention-deficit/ hyperactivity disorder (ADHD). ADHD was comorbidly reported alongside unspecified LD (17%), dyslexia (27%), dysgraphia (24%), and dyscalculia (12%). Almost half (45%) of the children met cut-off scores for inattention on the SNAP-IV scale, one-quarter (27%) met cut-off scores for hyperactivity/impulsivity, and one-tenth (9%) for opposition/defiance. Parents reported that ADHD symptoms made it very or extremely difficult for their child to do work, take care of things at home, or get along with other people for 26% of the study sample; these activities were somewhat difficult for 44% of the sample, and not difficult at all for 17%. Mann Whitney tests showed higher hyperactivity/impulsivity scores in children (mean 9.56,

SD 6.7) than youth (mean 6.40, SD 5.9), $U(N_{\text{child}} = 135, N_{\text{youth}} = 46) = 2333, z = -2.846, p=0.004$, and a trend toward higher oppositional/defiant scores in children (mean 7.34, SD 5.5) than youth (mean 5.76, SD 5.2), $U(N_{\text{child}} = 135, N_{\text{youth}} = 46) = 2543.5, z = -1.834, p=0.067$. Inattention scores were the highest in both age groups but not significantly different from each other (child mean 14.76, SD 6.5; youth mean 14.67, SD 7.5). Slightly more females ($N=10$) than males ($N=7$) met parent cut-off scores for opposition/defiance ($X^2(1) = 3.969 p=0.046$), but no sex differences were detected in the SNAP-IV subscale scores through Mann Whitney analyses.

Parents reported mental health diagnoses for their children in half of the study sample (52%), with the most prevalent diagnoses being ADHD (38%) and anxiety (32%). Less than one-tenth of the sample had autism spectrum disorder (8%), oppositional defiant disorder (7%), or depression (6%). Three-fifths of the sample (58%) were currently receiving intervention for their LD or mental health diagnosis: medication (49%), academic intervention outside of school (36%), academic intervention at school (26%), counselling (17%), occupational therapy (10%), and speech therapy (9%). More children (31%) were participating in academic intervention outside of school than youth (4%), $X^2(1) = 10.372 p=0.001$, and more children (9%) were participating in occupational therapy than youth (1%), $\chi^2(1) = 2.757 p=0.031$.

Measures

Quantitative

In addition to the demographic questions parents answered, parents also completed several other questionnaires. The comorbidity between LD and ADHD is about 45% (DuPaul et al., 2013), and this comorbidity increase the functional impact on students, so it is imperative to measure ADHD symptoms in students with LD. Parents rated their child's symptoms of ADHD using the SNAP-IV 26 question scale, which is a screener of ADHD symptoms (Bussing et al., 2008). This is an abbreviated form of the full Swanson, Nolan, and Pelham SNAP Questionnaire (SNAP; Swanson et al., 1992). It uses a 4-point Likert scale ranging from *not at all* to *very much* and provides scores for each of three areas with cut-off scores for inattention (1.78; e.g., "Often does not seem to listen when spoken to directly."), hyperactivity/impulsivity (1.44; e.g., "Often fidgets with hands or feet or squirms in seat."), and opposition/defiance (1.88; e.g., "Often is angry and resentful."). This measure was included to gather information related to comorbidities and behavioural difficulties that their child may be facing related to their LD diagnosis, specifically executive functioning difficulties such as planning, organization, attention, and working memory.

Learning disability questions were designed by the study team to capture understanding of a child's LD, including the neurobiology of a child's LD (e.g., "Do you understand the neurobiology of your child's learning disability?"; "Does understanding the neurobiology of your child's learning disability help you support your child?"), the assessment process (e.g., "who diagnosed your child?" "How long did you wait for an assessment?"), implementation of individual education plans ("Does your child's IEP address the interventions and supports your child needs due to their learning disability?"), impact of COVID-19 (e.g., "Has the COVID-19 pandemic im-

pacted the educational supports your child receives?”), and mental health of children with LD (e.g., “How often has your child been bothered by feeling down, depressed, irritable, or hopeless in the last two weeks?” and parents of these children (e.g., “Supporting my child has increased my levels of stress and worry.”).

Qualitative

Participants answered open-ended questions related to their experiences related to their understanding of their child’s LD. These included questions about comments parents wanted to share about their child with an LD including resource needs the family has or about their understanding of their child’s LD.

Analyses

This is part of a larger study that includes additional mental health and lifestyle questions. Survey responses at least 80% complete were included in analyses (190 of 203 initiated responses retained). Quantitative data was analyzed in Statistical Package for the Social Sciences (SPSS) version 28 using descriptive analyses, chi square tests for categorical variables, and Mann-Whitney tests for numerical data (data not normally distributed). Prevalence values were calculated at the sample level (N=190) unless otherwise indicated in the text or table. Data was analyzed separately by sex (male, female) and age of the child (6-12 years, 13-18 years); only significant differences are reported. Qualitative data from open-ended questions were analyzed deductively, based on the survey questions, using the six stages of thematic analysis outlined by Braun and Clarke (2006).

RESULTS

Parent Understanding

The first research question aimed to identify parent understanding of the neurobiological basis of LD. The majority of parents (79%) reported that they understood their child’s LD diagnosis. However, fewer than half (45%) felt that they understood the neurobiology of their child’s LD. Of those parents who understood the neurobiology (n=85), the majority (90%) reported that this understanding helps them better support their child. Of those who did not understand the neurobiology of their child’s LD (n=105), four-fifths (82%) were interested in learning more. Of parents who reported that they understood their child’s LD diagnosis (n=150), only half (55%) reported that they understood the neurobiology of their child’s LD ($X^2(1) = 28.416$ $p < 0.001$). Parent understanding of child’s LD was not associated with type of LD.

Parents were asked which professionals helped explain the neurobiology of their child’s LD: psychologists (54%), physicians (18%), teachers (9%), and occupational therapists (5%) were identified. However, one-fifth (20%) of parents noted that they had to do their own research to understand the biology of their child’s LD. Moreover, of parents who reported that they understood their child’s LD diagnosis (N=150), almost half (45%) reported that the primary person who helped them understand their child’s LD was themselves (“I did my own learning”) in comparison to psychologists (36%), physicians (2%), and teachers (1%). Whether a parent under-

stood their child’s LD diagnosis, or the neurobiology of their child’s LD was not significantly influenced by the professional(s) who explained the biology of their child’s LD, but parents highlighting “I did my own research” was significant ($X^2(1) = 6.769$ $p=0.009$; $X^2(1) = 5.643$ $p=0.018$).

In the open-ended question asking participants who helped them to understand their child’s LD, two indicated that they or their spouse were diagnosed with an LD, which helped them to understand their child’s LD. Several also indicated that their professional experience supported their understanding (nurse [1], teacher [2], psychologist [1], physician [1]). However, many (35 participants) reiterated that no one helped them understand the biological underpinnings of their child’s LD, with many adding that they needed to seek out their own information to understand this.

Educational Experiences

The second question aimed to identify parents’ perceptions of the support and services their child received, including the impact of COVID-19 on these services. At the time of this study, three quarters (73%) of the sample (children and youth) were attending school in-person (Table 2). Half of the sample (50%) reported receiving regular help from a tutor (1-3 hours/week for 82% of those receiving help), with more children (41%) receiving help from a tutor than youth (9%), $X^2(1) = 5.024$ $p=0.025$. The majority of children and youth (84%) had an IEP. Parents reported that their child’s IEP supported their child’s LD (70%), but some (15%) noted that the IEP did not support their child’s LD, or they were unsure (15%). Fewer than half of the parents (41%) reported that their child’s IEP was implemented as written, with one-third (30%) reporting it was not, and one third (29%) unsure. About half of the parents (55%) reported that their child’s IEP did not address the neurobiological underpinnings of their child’s LD; 13% reported that it did, and 32% were unsure. Table 3 shows significant differences in parent understanding of LD and IEP questions.

Table 2. Child’s Educational Supports and Pandemic Impacts

Survey Questions	Total Sample (N=190)	
	N	%
School Environment	In School	138 72.6
	Learning Online	12 6.3
	Blended In-School/ Online	18 9.5
	Other	22 11.6
Does Child Receive Regular Help from a Tutor?	Yes	96 50.5
	No	94 49.5

	<1 hour/week	6	6.3
	1 to <2 hours/week	44	45.8
If Yes, Hours/Week Child Works with Tutor (N=96)	2 to <3 hours/week	35	36.5
	3 to <4 hours/week	2	2.1
	4 to <5 hours/week	5	5.2
	More than 5 hours/week	4	4.2
Does Child Have an IEP/IPP?	Yes	159	83.7
	No	31	16.3
If Yes, Does Child's IEP/IPP Address Supports that Child Needs due to SLD? (N=159)	Yes	111	69.8
	No	24	15.1
	Unsure	24	15.1
If Yes, Does Child's IEP/IPP Address the Neurobiological Underpinnings of SLD? (N=159)	Yes	21	13.2
	No	87	54.7
	Unsure	51	32.1
If Yes, is Child's IEP/IPP Implemented as Written? (N=159)	Yes	66	41.5
	No	47	29.6
	Unsure	46	28.9
Has the Pandemic Impacted Child's IEP/IPP Implementation? (N=159)	Yes	107	67.3
	No	30	18.9
	Unsure	22	13.8
Has the Pandemic Impacted Child's Educational Supports?	Yes	124	65.3
	No	40	21.1
	Unsure	26	13.7
If Yes, How Has the Pandemic Impacted Child's Educational Supports?*	More frequent support	6	3.2
	Less frequent support	92	48.4
	Higher quality of support	-	-
	Lower quality of support	61	32.1
	My child is showing more academic difficulties	52	27.4
	My child is showing fewer academic difficulties	5	2.6
	Other	28	14.7

*Parents could select multiple options

Table 3. Parent Understanding of Child's Learning Disability Associations with Education Questions

	Do you feel like you understand your child's learning disability diagnosis?		Do you understand the neurobiology of your child's learning disability?	
	N	%	N	%
Do you understand the neurobiology of your child's learning disability?	82	43.2	-	-
				Chi Square
				$\chi^2(1) = 28.416 p < 0.001$
Does your child receive regular help from a tutor?	77	40.5	45	23.7
				$\chi^2(1) = 0.186 p = 0.667$
Does your child have an IEP?	131	68.9	75	39.5
				$\chi^2(1) = 6.949 p = 0.008$
Does your child's IEP/IPP address the interventions and supports your child needs due to their learning disability? (N=159)	95	59.7	56	35.2
				$\chi^2(2) = 4.885 p = 0.087$
Does your child's IEP/IPP address the neurobiological underpinnings of their learning disability? (N=159)	19	11.9	17	10.7
				$\chi^2(2) = 7.321 p = 0.026$
Is your child's IEP/IPP implemented as written? (N=159)	60	37.7	35	22.0
				$\chi^2(2) = 6.975 p = 0.031$
Has the COVID-19 pandemic impacted the implementation of your child's IEP/IPP? (N=159)	83	52.2	46	28.9
				$\chi^2(2) = 6.167 p = 0.046$
Has the COVID-19 pandemic impacted the educational supports your child receives?	95	50.0	48	25.3
				$\chi^2(2) = 9.486 p = 0.009$
				$\chi^2(2) = 16.345 p < 0.001$

*Significant at $p \leq .05$

Parents reported concerns about the level of support their children received when asked to provide additional comments about their child's education. Generally, parents who responded expressed significant frustration regarding the level of support their children receive (53 participants). One of the most common themes was that school personnel have limited training on LD and evidence-based practices, and teachers cannot provide support that they do not understand (15 participants). One parent wrote that "The education system does not seem to be set up to empower success in kids with LD." Another stated:

I feel like an utter failure. His IQ is sufficient (high average) but his testing shows that after 12 years in school, he is "minimally proficient". [sic] The school and teachers are not at all equipped to teach the way his brain needed to learn.

Relatedly, other parents indicated that their children received limited services, were excluded from school activities, or services were limited to sitting alone in a resource room. Some indicated that their requests for services were ignored or actively denied. Several indicated that they had to advocate strongly (33 participants) including filing for due process or hiring a lawyer to try to get services for their children. Parents reported that their children suffered from lack of services with one parent noting "my daughter has actually dropped out of school and will get her GED [general education diploma]. There is no support at her school." Some had more positive experiences with the supports their children received (10 participants), but half of these parents indicated that their children attended private school that the family had to pay for directly, which influenced financial hardship.

The COVID-19 pandemic impacted educational supports for 65% of the children and youth in this study: children and youth received less frequent (48%) and lower quality support (32%), in comparison to more frequent (3%) and higher quality support (0%; Table 3) compared to pre-COVID levels. Receiving lower quality support impacted children (20%) more than youth (12%), $\chi^2(1) = 6.665$ $p=0.010$. In addition, one-quarter (27%) of the sample demonstrated increased academic difficulties during the pandemic. Parents reported that the pandemic impacted the implementation of their child's IEP for two-thirds (67%) of the sample, with 19% reporting that it did not, and 14% were unsure.

Parents were also asked if the COVID-19 pandemic impacted their child's educational supports in an open-ended question. Those parents who responded reported that their child's access to educational supports was negatively impacted by COVID-19, especially school-based supports (12 participants). Some noted that they accessed private pay services, which was a significant financial burden, or that they needed to provide all supports themselves (5 participants). For example, one parent noted that "The schools abandoned us." And another stated, "All academic instruction was removed." Those whose children had some access to educational supports had limited teacher interaction, and the supports focused solely on accommodations with no access to interventions. One parent noted that moving to online tutoring increased their access due to their rural location, but others indicated that they had more difficulty accessing tutors during the pandemic (8 participants). Unfortunately, some parents indicated that there was no change because their children did not receive any supports prior to the COVID-19 pandemic (2 participants). On the other hand, one

parent noted that their daughter benefited: “The pandemic helped her grow! I could teach her at home, no bullying, she can use a computer all the time.”

Parent Mental Health

The third question attempted to understand the quality of mental health of children with LD. Most participants in this study (84%) reported that their child’s LD affected their mental health. When asked to indicate all of the ways in which their mental health was affected, 79% endorsed increased worry and stress, and 41% endorsed increased sadness and hopelessness, suggesting that many parents experienced negative mental health outcomes. When asked how their child’s LD positively affected their mental health, 6% endorsed decreased sadness and hopelessness, and 4% endorsed decreased worry and stress. ADHD behaviours on the SNAP-IV scale were significantly higher in children and youth whose parents reported that their child’s LD affected their mental health.

When asked *how* their child’s LD affects their mental health, many respondents noted ways in which their child’s LD added stress to their lives, paralleling survey responses. Some of the common sources of stress were needing to advocate to get their children services (6 participants), especially when they were not successful, resulting in one parent indicating they had to teach their child themselves because the school did not. This negatively affected their marriage and family life (4 participants), with one parent indicating that “supporting my child has strained my marriage,” and another noted that “it’s a full-time job on top of a full-time job.” One parent highlighted the intersection between their mental health diagnoses and the stress of parenting a child with a LD stating, “I have always struggled with depression but it got much worse when my daughter was struggling with bullying in middle school.” Relatedly, parents reported stress from the financial burden of paying for services (6 participants) not provided by schools. A few parents noted that after their children received supports, their stress lessened (5 participants). Parent responses suggest that the amount of time and effort they must expend to advocate for and support their child causes stress that affects their wellbeing, including exacerbating existing mental health diagnoses, and their relationships.

DISCUSSION

The first question identified parent understanding of LD and the neurobiology of LD. Parent responses indicated that they generally feel like they understand their child’s diagnosis but not the neurobiology of LD. Most parents who reported understanding the neurobiology of LD thought that it helped them to better support their child, and most who did not have a strong understanding wanted to learn more. Parents in this study noted that they had a higher level of understanding of their child’s LD diagnosis than is generally found (Chien & Lee, 2012; Sahu et al., 2018; Seals, 2010); however, this study did not include an objective measure of parent understanding of LD, so their true knowledge of LD neurobiology may differ from their perceptions. We were not able to locate previous research or information on parent understanding of the neurobiology of LD, making it impossible to compare our findings with other research. Of parents who noted that they understood the neurobiological bases of LD, over half of them indicated that a psychologist explained

it to them. Unfortunately, almost half who understood the diagnosis more broadly indicated that they had to research on their own to gain that understanding.

The second question asked parents' perceptions of the support their child received including the impact of COVID-19 on their service delivery. Half of the parent participants reported that their child received tutoring and most had an IEP. Unfortunately, almost half indicated that the IEP was not implemented as written, and over half indicated that it did not address the neurobiological underpinnings of their child's LD. In spite of this, most parents thought that the IEP generally supported their child's learning. Qualitative findings suggested that many parents were frustrated with the challenges of attempting to obtain services, highlighting that school staff often do not have the knowledge to support children with LDs and sometimes refuse to provide services. In addition, many parents reported that COVID-19 negatively impacted their perceptions of both the frequency and quality of the educational supports their child receives, and that this reduction in services has had a detrimental effect on their children. They also indicated that their child's IEP implementation was reduced during the COVID-19 pandemic.

Finally, the third question examined the mental health of parents who have children with LD. Parents indicated increased anxiety and depression related to having a child with an LD that was amplified for parents of children who had comorbid ADHD. This is similar to other research demonstrating that having a child with an LD increases symptoms of mental health concerns in parents (Chien & Lee, 2012; Kalkarni, 2009; Sahu et al., 2018). Parents' qualitative responses indicated that their child's LD diagnosis has affected their marriage and family life and exacerbated existing mental health problems; these effects were related to the effort required for advocating for and supporting their child and worrying about long-term prospects for their children.

Implications

The results of this study demonstrate the desire of parents to understand their child's LD and their frustrations with limited supports for children and youth with LD in schools. Parents want to understand how their child's LD impacts their development to support them as best they can, but parents often must seek understanding independently. Parents are entitled to a comprehensive and accurate description of their child's strengths and vulnerabilities in cognitive processing and a clear explanation of the data and clinical interpretations leading to the LD diagnosis. Without this, parents are left without direction or understanding of the LD and how to help their child most effectively. This, in turn, can negatively impact family functioning, home/school relationships, and parent satisfaction with their child's educational experience.

This study highlights the need for school personnel, especially school psychologists and teachers, to better understand LDs. School psychologists typically conduct an assessment for LD, and in reaching a diagnosis, they must identify a psychological process that interferes with academic skill development and achievement. To identify cognitive processing breakdowns, psychologists need to understand the neurobiology themselves to properly apply diagnostic criteria (Wilcox et al., 2022). If school psychologists are not learning the neurobiology of

LDs as part of their training, then they will not have the skillset to complete this task fully and may run the risk of misdiagnosis or inaccurate identification of a child's deficit(s). Providing professional development to teachers about neuroscience can also support their understanding of how best to support students with a variety of needs (Hachem et al., 2022). Parents reported frustration with school personnel having limited understanding of LDs both broadly and related to the neurobiological underpinnings. Consequently, supporting school psychologists and teachers to better understand LDs will allow them to better support students and their parents. Schools may also consider offering learning sessions for parents of children with LDs to provide more specific information on what LDs are and how parents can support their children with LDs more effectively at home.

Parents also reported frustration with school-based support and implementation of IEPs. The most common reasons parents provided were similar to other research: teachers struggle to deliver supports or differentiated instruction for children and youth with LDs, and they lack knowledge of LDs (Merawi, 2018), large class sizes (Suprayogi et al., 2017), and lack of resources (Smale-Jacobse et al., 2019). Teachers commonly indicated that their pre-service training was inadequate in addressing individual differences in inclusive classrooms (Dixon et al., 2014), and while they are not opposed to having learners with LD in their classrooms, teachers are unsure of how to best support them and feel unprepared to do so (Fuchs, 2010). As such, while parents may perceive a lack of classroom or school supports as a *won't*, it is more likely that teachers are in a position of *can't*. This demonstrates an ongoing need for improvement in pre-service teacher training regarding LDs and differentiated instruction to support all learners. It would benefit pre-service teachers to receive more training on individual differences, specifically LDs, during their training to be better prepared to support this population of students in their career.

Finally, this study shows that parents want to be heard and included as members of their child's IEP team. Struggles with parental mental health and family stress stem from an excessive need for parent advocacy for their child to receive necessary supports. When supports are not well-established in schools, parents and families either need to advocate for them or pay out of pocket to ensure their child receives what they need. This is a strain of time, availability, and finances. Student success is correlated with wrap-around support and strong home/school partnerships (Collier et al., 2015), and including parents in planning for their child with an LD can increase positive academic and social/emotional outcomes.

Limitations

A few limitations are worth noting in the present study. We had initially set a survey response goal at 385 participants (sample size calculator used a 95% confidence interval, 5% margin of error for an estimated population of 3.3 million children with LDs across Canada and the United States). However, our total sample for the study was 190 participants, which was just under half of the desired response rate; with this sample, the 95% confidence interval is 7.1%, limiting the power of our findings. Future research would benefit from a larger sample to increase power and meaning from the results.

In addition, the demographic make-up of the total sample leans towards homogenous in many aspects, limiting the overall generalizability of the results. Homogeneity, the total sample was nearly 80% Caucasian, and nearly 79% of the sample reported a household income over \$100,000 per year. These data are not representative of the overall population in North America, nor of children and youth with LD. As such, results should be interpreted with caution and future studies should intentionally aim towards gathering a more heterogenous and representative sample.

This study also relied solely on parent reports for data collection. Analyzing responses from only one perspective, that of parents, may include bias, as people who participate in research studies frequently do so in light of either a very positive or very negative experience with the topic. The survey relied on parents to accurately report their child's disability, which we were not able to confirm independently. We did not include a knowledge-based assessment of parent understanding of the neurobiology of LD. There may be varying levels of accuracy of knowledge if measured objectively versus self-report. In the future, the inclusion of an objective measure of knowledge of LD neurobiology may add to the reliability.

Finally, the study included open-ended questions which required thematic analysis to glean overarching themes from respondents. While thematic analysis is a practice that is well established in qualitative research, it is subject to researcher bias. This practice allows for themes and insights to emerge based on the responses from participants, which provides flexibility for researchers. However, thematic analysis of brief written responses allows little interpretive power beyond description, which limits utility of the findings.

CONCLUSION

Parents play an integral role in supporting and advocating for their children with LDs. Their ability to provide the best support is limited by their understanding of the neurobiological underpinnings of their child's disability. How parents come to learn and understand their child's disability depends on their initiative, ability to access reliable and credible sources of information, and the shared knowledge of their child's school team. In our study, parents reported limited knowledge of the neurobiology of their child's LD. Parents also reported that often their understanding of neurobiology came from their own research, not from an educational professional, which caused frustration with the goals and supports provided in the school. Parents reported varying levels of satisfaction with the IEP implementation process and supports provided for their children. The COVID-19 pandemic caused a shift to online learning, that negatively impacted the level and amount of support their children received. Finally, parents indicated that their own mental health has been negatively impacted by their child's LD, specifically in terms of additional financial resources, unreasonable advocacy efforts, and strained family dynamics. These findings suggest a need for increased training for teachers and school psychologists in understanding LDs and individual differences to provide this information to parents, and then to assist parents and teachers in applying this knowledge to best support their child at home and in school. Better understanding of their child's LD would likely improve parents' mental health, home dynamics, and home/school relationships. While there are limitations with this study, including sample size, homogeneity of the sample,

reliance solely on parent report, and lack of an objective measure of LD neurobiology knowledge, this information can inform pre-service teacher training and professional learning for teachers and school psychologists to include more on differentiated instruction based on neurobiology as well as the importance of shared goal setting, knowledge, and supports for children both at home and in school.

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