Reading and Writing (2024) 37:1753–1777
https://doi.org/10.1007/s11145-023-10434-2

How do Hong Kong bilingual children with Chinese dyslexia perceive dyslexia and academic learning? An interview study of metaphor analysis

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Accepted: 15 March 2023 / Published online: 30 April 2023
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Abstract

While extensive quantitative research has shed light on the cognitive mechanisms of dyslexia, few mixed-methods studies have been conducted to examine the perceptions of and attitudes towards learning in children with dyslexia, especially in Hong Kong, a bilingual context. In addition, the validity of the metaphor elicitation technique, which was adopted in previous interview studies, has not yet been examined in children. Therefore, 30 children with dyslexia (age range: 8–13; 10 females) in Hong Kong were interviewed for metaphors regarding six domains: Chinese reading, Chinese writing, having Chinese lessons, English reading, solving maths problems, and dyslexia. Word reading fluency and parent-rated learning interest and confidence were measured to validate the use of the metaphor elicitation method in assessing children's reading attitudes in both Chinese and English using correlation analyses. Perceptions were examined by way of qualitative analyses based on the metaphor entailments. Results showed that children who expressed more positive attitudes towards English reading performed better in English reading. Moreover, the attitudes also positively correlated with the corresponding parents' ratings. These findings suggested that the metaphor elicitation technique is a valid method for assessing attitudes towards English reading in children with dyslexia. Furthermore, their perceptions of dyslexia and learning generally corresponded to those from previous interview studies despite differences in languages and contexts. Importantly, descriptions related to multiple themes, including metalinguistic awareness, cognitive skills, coping strategies, and dyslexia, were well-aligned with scientific findings, demonstrating that children already have a good understanding of dyslexia and various learning domains.

Keywords Metaphor · Interview · Dyslexia · Hong Kong · Mixed methods · Bilingual

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Dyslexia is a specific learning disability that is characterized by difficulties with accurate and/or fluent word recognition due to poor spelling and decoding abilities despite normal cognitive abilities and the provision of effective classroom instructions (Lyon et al., 2003). While an abundance of research has focused on the academic achievement and cognitive abilities of children with dyslexia (e.g., McBride et al., 2018; Siu et al., 2018), studies that address perceptions of dyslexia and learning are scarce. Yet it is important to examine children's perceptions of dyslexia and learning because such perceptions influence how learners construe what they experience in the classroom and their learning behaviour (Fisher, 2013).

Perceptions of and attitudes towards dyslexia and learning

A perception is defined as an idea or way of thinking about something (Qiong, 2017). Previous studies on perceptions of dyslexia have primarily been conducted with typical-reading adults, including the general public, practitioners, and teachers (e.g., Ade-Ojo, 2012; Berent & Platt, 2021; Castillo & Gilger, 2018). The findings revealed a mix of correct and incorrect conceptualizations of dyslexia. For instance, adults in the USA recognized some characteristics of dyslexia that were consistent with scientific findings; for example, they noted that the hallmarks of dyslexia were difficulties in reading and writing (Castillo & Gilger, 2018). Yet they also had some misconceptions, such as the belief that vision problems are sometimes symptoms of dyslexia (Castillo & Gilger, 2018) as children with dyslexia generally have the same visual function as children without such a condition (Handler et al., 2011). Another recent study demonstrated that there were misconceptions about dyslexia among members of the general public, with people viewing it differently when distinct aspects were emphasized (Berent & Platt, 2021). For example, laypeople considered dyslexia to be more severe and genetically transmissible when it was associated with visual confusion than when it was linked to phonological deficits. While the above studies examined perceptions by conducting surveys and quantitative analyses, other studies combined them with participants' qualitative narrations to examine perceptions of dyslexia and learning. For instance, most teachers in a focus group stated that they were not confident about teaching learners with dyslexia (Ade-Ojo, 2012). In general, the findings from the focus group were aligned with those from the survey (Ade-Ojo, 2012). Furthermore, some studies only used a qualitative method, or an interview, to examine adults' perceptions of dyslexia and learning (e.g., Kormos et al., 2009; Stampoltzis & Polychronopoulou, 2009). While the foregoing studies provided insights into different participants' perceptions of dyslexia and various learning domains, they mainly focused on their feelings and experiences, whereas children's understanding of these domains has not been thoroughly examined.

Many studies have examined students' perceptions of solving maths problems. The findings mostly focus on the perceived importance, usefulness, and self-efficacy of math learning (e.g., Pajares & Miller, 1994; Uesaka et al., 2007). A few studies have investigated the cognitive strategies involved in learning. For instance, Meltzer et al. (1998) invited children with learning difficulties and their teachers to rate children's competence on multiple strategies in various domains including reading,

spelling, and math (e.g., " I have a step-by-step plan before I start solving a math word problem"). The finding revealed a sharp contrast: the teachers rated the competence of students with learning difficulties as lower than the students themselves. This discrepancy calls for in-depth analyses of the perceptions of children with learning difficulties across domains.

On the other hand, an attitude has been defined as an inclination to react favourably or unfavourably to a construct (Sarnoff, 1960), and it can be categorized as negative, neutral, or positive (Koropeckyj-Cox & Pendell, 2007). By this definition, attitude is different from perception, but the former can be inferred by the latter. For example, the perception of dyslexia as a bad thing may indicate a negative attitude towards dyslexia. Previous studies have shown that children with dyslexia are prone to having negative reading attitudes (e.g., van Kraayenoord & Schneider, 1999). Examining children's attitudes towards reading is important since it is positively associated with reading motivation as well as reading abilities in both first and second languages (Polychroni et al., 2006; Yamashita, 2004). The same applies to the domain of math learning. Math attitude is positively associated with math achievement (e.g., Hemmings & Kay, 2010). Note that we only review models of reading attitude below, which is the focus of our current study.

Various models have been proposed to elucidate the constituents of reading attitude (e.g., Lewis & Teale, 1980; Mathewson, 1994; McKenna, 1994; van Kraayenoord & Schneider, 1999). For instance, Lewis and Teale (1980) postulated that reading attitude has three factors, namely individual development, the utilitarian aspect, and enjoyment. Individual development relates to the value placed on reading to gain insight into self, others, and life. The utilitarian factor corresponds to the role of reading in educational or vocational success and the management of one's life. Enjoyment refers to the pleasure derived from reading. While most of the models and findings related to reading attitudes mentioned above are based on alphabetic languages, the reading attitudes of children who use a logographic language such as Chinese may not be the same due to the different characteristics between these two types of language (see "Hong Kong: A Bilingual Context" below for a detailed description of Chinese). Furthermore, previous studies measuring children's attitudes towards reading have mainly used questionnaires (e.g., Smith, 1990). Due to the heavy reading load imposed, this method may not have been suitable for the participants in the current study, who were children with dyslexia, due to the difficulties they have in reading and writing, and sometimes in verbal expression (Jin et al., 2013). An interview using the metaphor elicitation technique may be a more suitable method.

Metaphor elicitation technique

According to Conceptual Metaphor Theory, metaphor is defined as an expression that uses words that are outside of the normal meaning in order to convey a similar concept; this involves cross-domain mapping in the conceptual system (Lakoff, 1993; Lakoff & Johnson, 1980). Metaphor is a major and essential part of how we conceptualize the world, and the locus of metaphor is not language but

rather thought (Lakoff, 1993). A metaphor can be understood as a process of mapping from a source domain, which is concrete and easy to understand, to a target domain, which is often abstract (Jin et al., 2013; Lakoff, 1993). For instance, in the expression "Writing is climbing a mountain," "writing" is the target domain whereas "climbing a mountain" is the source domain (Jin et al., 2013). Interviewers often ask interviewees to generate sources for the targets in an interview that uses the metaphor elicitation technique. However, the source domain alone is not sufficient to understand what the interviewee wants to express. Entailment, the underlying meaning of a metaphor that is based on comparison and goes beyond the basic mapping, is necessary to ensure that the interpretation is correct because metaphors are ambiguous and open to many possible interpretations (Jin et al., 2013). In the above example ("Writing is climbing a mountain"), one possible entailment that an interviewee could provide would be, "Both writing and climbing a mountain require great effort." Furthermore, to ensure that interviewees make a comparison between the source and the target, simile (e.g., "Writing is like climbing a mountain"), an explicit expression of a metaphorical mapping (Lakoff & Johnson, 1980), is commonly used in metaphor research (Fisher, 2015). Therefore, a metaphor can underlie a simile. Although metaphors may sometimes not capture every aspect of the target (Kampourakis, 2016) and they may not be used actively by the generators to guide thinking or acting (Low, 2008), metaphors do to a certain extent capture what the generators feel about their experiences (Fisher, 2013).

Previous studies have examined children's perceptions of dyslexia and academic domains using the metaphor elicitation technique. For example, Burden and Burdett (2007) interviewed British boys with dyslexia and investigated, based on the metaphors they generated, whether they perceived the challenges of dyslexia as being surmountable or not. Some metaphors described dyslexia as a surmountable barrier that could be overcome by effort. In contrast, dyslexia was viewed as an unsurmountable barrier in other metaphors, which reflected the interviewees' learned helplessness and depression. Jin et al. (2013) examined metaphors generated by children with dyslexia in a Singaporean context and delved into their perceptions of and attitudes towards dyslexia and multiple learning domains including reading, writing, learning English, learning a second language, expressing thoughts, solving maths problems, and learning science. The metaphors showed an uneven profile of positive or negative perceptions across categories of learning, indicating diverse strengths and weaknesses in dyslexic children in different academic subjects. Furthermore, Fisher (2013) asked adolescents who were learning a foreign language (German) in England to generate metaphors about how they perceived their learning experiences. Some adolescents perceived learning German as a pleasure, while others emphasized how difficult they found it to be. Interestingly, adopting a longitudinal study, the authors revealed that more participants chose metaphors representing beliefs that were conducive to language learning after a pedagogical intervention. Recently, Ellis and Ibrahim (2021) conducted a metaphor elicitation study with five-year-old children to understand their experiences of learning English. They found that the children associated English language learning mainly with their lived experiences. While these studies provided insights into children's perceptions of dyslexia or/and learning, the findings mainly revealed their personal experiences and feelings.

However, there have not yet been any thorough investigations using metaphor analysis to determine whether children with dyslexia have misconceptions about dyslexia and learning, so this remains unknown. It is important to examine this aspect of perception because it may signal a potential need for parents and teachers to instil children with more accurate concepts. Furthermore, the unique characteristic of Chinese, which will be described below, might lead to different perceptions of dyslexia from previous studies conducted with children who spoke alphabetic languages.

Hong Kong: a bilingual context

The bilingual context of Hong Kong provided a unique opportunity to delve into children's perceptions of and attitudes towards learning two specific languages: Chinese as a first language (L1) and English as a second language (L2). Hong Kong children are exposed to both Cantonese and English at the pre-school level (Li & Rao, 2005). The Chinese orthography and the literacy learning experiences of Chinese children are different from those who learn to spell and read in English (Li & Rao, 2005; McBride, 2016). First, unlike in English, the written unit in Chinese is a character, which occupies the same square space on a page and maps onto a single syllable, usually corresponding to a single unit of meaning (McBride, 2016). Each character consists of radicals formed by strokes, or unbroken lines written in a single movement, and there are two types of radicals: semantic and phonetic (McBride, 2016). Notably, Chinese contains approximately 800 phonetic radicals, 200 semantic radicals, and thousands of characters, standing in stark contrast to the small number of notational units (22–30 letters) in alphabetic languages (McBride, 2016). Moreover, there is no one-to-one correspondence between the pronunciation of a character and its phonetic radical; similarly, the relationship between the meaning of a character and its semantic radical can be opaque (Shu et al., 2003). In addition, there are different methods for teaching and learning Chinese versus English. The drill-and-practice approach is emphasized in teaching Chinese characters in Hong Kong, whereas the phonological approach tends to predominate in early English literacy instruction (Li & Rao, 2005). Hence, different feelings, difficulties, and strategies regarding Chinese literacy can be expected due to the varying characteristics and instructional methods for Chinese and English. It is for this reason that there is a need for the present study, which focuses on Chinese dyslexia and three aspects of learning Chinese for children with Chinese dyslexia: reading, writing, and having lessons. In addition, questions about English reading and maths were also asked so as to examine whether children's attitudes towards learning are context-specific (Conradi et al., 2014). Therefore, the first research aim of the present study is to examine the perceptions of and attitudes towards learning and dyslexia in Hong Kong children with dyslexia using a qualitative and quantitative analysis, respectively. As mentioned above, we focus on children's understanding of dyslexia and academic domains. Based on the findings above and the assumption that children might generate metaphors and entailments related to their understanding of the academic domains, we expected to identify conceptualizations that both aligned and misaligned with scientific findings. Our first research question may not only inform

teachers and parents of children's understanding of the concepts of dyslexia and various academic domains but also shed light on some effective teaching and learning methods that may alleviate their negative feelings and enhance their academic performance in a comprehensive way.

Evidence for validity

Previous studies that employed interviews and metaphor analyses have provided insights into children's attitudes towards dyslexia and academic learning (Burden & Burdett, 2007; Fisher, 2013; Jin et al., 2013). Moreover, a recent study has shown that the metaphor assessment method has good short-term reliability when used to understand underlying beliefs about learning in young adults (Wegner et al., 2021). However, it remains unclear whether metaphor elicitation is a method with high validity when examining reading attitudes in children. Evidence for validity is important because self-reported information may be exaggerated or understated, and incorporating a variety of assessments may provide a more comprehensive picture of what the learners are experiencing (Nelson & Harwood, 2011). Therefore, the second objective of the present study is to assess the validity of the metaphor elicitation method in children by comparing their attitudes towards reading reflected by the metaphors with their reading abilities as well as their parents' perceptions of children's learning interest and confidence. Specifically, the reading performance was adopted to examine the criterion validity because children with more positive attitudes towards reading or with greater reading interest may participate in more reading activities, thereby facilitating the development of reading abilities (Chu et al., 2011; Leppänen et al., 2005). Moreover, previous studies (e.g., McGeown et al., 2015) have established positive correlations between reading interest or confidence and word reading abilities. In the current study, reading performance was evaluated using a word reading fluency task since the ability to read with sufficient speed predicts reading performance, especially in at-risk children (Compton, 2000). Moreover, word reading fluency is positively related to print exposure and reading practice for both typical-developing adults (Mano & Guerin, 2018) and struggling readers (Wilfong, 2008). Finally, the concurrent validity was assessed by correlating the attitudes illustrated by the metaphors generated by the children and their learning interest as indicated by their parents in a questionnaire, given that moderate correlations between the ratings of children's literacy interest made by the children themselves and their parents were commonly observed (Carroll et al., 2019; Huo & Zhang, 2021).

Present study

To conclude, by conducting a semi-structured interview with dyslexic children and adopting a mixed-methods approach by combining qualitative and quantitative analyses, we examined our first research question: In Hong Kong, where the first and second languages are Cantonese and English, respectively, what are

dyslexic children's perceptions of and attitudes towards dyslexia and different learning domains? In addition, coupled with the reading task and parental survey, we addressed our second research question quantitatively: namely, whether the metaphor elicitation interview method has a high concurrent and criterion validity when used to examine reading attitudes in children.

Method

Participants

We recruited 30 children with Chinese dyslexia (age: $M = 10.8$ years, $SD = 1.2$ years, range: 8–13 years; 10 females) from grades three to six in Hong Kong. Their native language was Cantonese, which was the language used in the interview. Participants were recruited from randomly-selected primary schools. The schools are located in a variety of districts in Hong Kong. In all schools, Chinese is the medium of instruction for maths, while a mix of Chinese and English is used for English lessons. All participants were formally diagnosed with Chinese dyslexia by either educational or clinical psychologists based on the Hong Kong Test of Specific Learning Difficulties in Reading and Writing for Primary School Students – Third Edition [HKT-P(III)] (Ho et al., 2016). Its criteria included adequate IQ (higher than 85), poor literacy (− 1 SD or below), and at least one area of cognitive-linguistic deficits (− 1 SD or below; Chung, 2017). The overview of the socioeconomic status (SES) of participants' households, including family income and parents' education levels, is summarized in Table S1. Written consent for the interview was obtained from the children and their guardians. After the interview, participants received a small gift as compensation. This study was approved by The Survey and Behavioral Research Ethics Committee (SBREC) at the Chinese University of Hong Kong.

Procedure

Children first completed the word reading fluency task, followed by the interview. A break was allowed between these two tasks. While the children were doing the tasks, we asked their parents to fill in a questionnaire in another room. All three tasks are detailed below.

Word reading fluency

Both the Chinese and English word reading fluency tasks contained three parts each (Siu et al., 2018). In each part, participants were asked to read as many words as possible (80 maximum) aloud in one minute. In Chinese, the items in the first two parts all consisted of single characters, whereas each item in the third part was a two-character word. In English, all items in the first two parts were short words containing one morpheme, whereas each word in the third part contained two morphemes.

Each correct answer received a score of one point, making the total score of the word reading fluency task for each language 240. The Cronbach's alphas of the Chinese and English word reading fluency tasks were 0.82 and 0.83 respectively.

Interview

The procedure of the semi-structured interview was adapted from the one described in the study by Jin et al. (2013) (see Supplementary Information II for the full interview protocol translated from Chinese into English). An interview session was conducted on a one-on-one basis for around 15 min by a research assistant (the second author). First, the children were given a training session to give them the chance to understand what a metaphor was and produce a metaphor with an entailment. Children were encouraged to make a metaphor about their parents, whom they were familiar with, with an entailment. Also, the interviewer chatted with the child during the training phase to establish a rapport. Then, in the main interview session, the children were asked to provide metaphors about the following domains in a random sequence: dyslexia (only if children said they understood the meaning of dyslexia, 27 children said they did), reading Chinese text, reading English text, having Chinese lessons, writing or dictating Chinese characters, and solving maths problems. While drawing was considered to be a useful activity for generating metaphors in the study by Jin et al. (2013), the first several participants in the current study refused to draw. Therefore, we only showed prompts such as toys (animals or fruit) and cards (scenery or colour) to children who were struggling to generate metaphors so as to facilitate metaphor elicitation (see Fig. 1 for all the prompts). They were encouraged to choose one of the toys or cards to generate a metaphor. In each question, children were asked to provide entailments for the metaphors they had generated. Three of the interviews were conducted online via Zoom due to the pandemic, whereas the other 27 interviews were conducted in a laboratory in a face-to-face setting. Audio recordings were made of the interviews with the participants' informed consent, and these were transcribed verbatim in Cantonese afterwards.

Parent-rated learning interest and confidence

We asked parents to report their child's learning interest and confidence in English and Chinese using a 5-point Likert scale (1: strongly disagree; 5: strongly agree). The scale included four items for each language, and they were similar to items used on other questionnaires related to parent-reported child interest (e.g., Baroody & Diamond, 2013; Huo & Zhang, 2021). Specifically, two items measured children's competence (i.e., "My child thinks learning Chinese (English) is easy" and "My child has high confidence in learning Chinese (English)") and two items assessed children's enjoyment (i.e., "My child likes reading Chinese (English) books" and "My child likes learning Chinese (English)") from their parents' perspectives. The

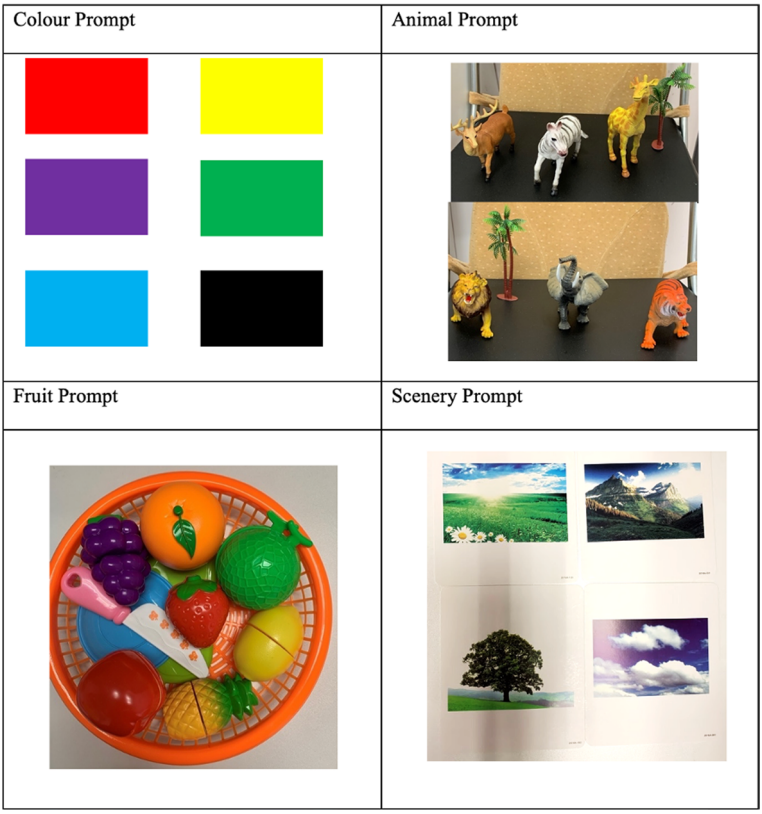


Fig. 1 Prompts used in the interview

scale had a Cronbach's alpha of 0.91 for Chinese and 0.94 for English, indicating a high internal consistency reliability.

Data analysis

To answer the first research question about the perceptions of and attitudes towards dyslexia and learning in children, two raters (the first rater being an undergraduate student majoring in linguistics who was well-trained by the last author, while the other one is the first author) independently evaluated whether the children successfully generated a metaphor with an entailment in the training phase. Then, they identified the statements that the children made after the interviewer had asked each target question. If the statements contained metaphors, the source and target domains with the entailments of the metaphors were indicated. Next, the two raters determined whether each metaphor was valid by taking the entailment into account, and they provided ratings about the attitude (0: negative; 1: neutral; 2: positive) manifested by each valid metaphor and entailment. For example, a negative metaphor with entailment was "Dyslexia is like the colour

black because dyslexia is a bad thing and black represents bad"; a neutral one was "English text is like grains of worms and beans because it cannot be separated like Chinese"; and a positive one was "Having Chinese lessons is like spring because both are relaxing." Discrepancies in ratings were reconciled by the third rater (the last author). The remaining disagreements were resolved by discussion. The numbers of positive, neutral, and negative attitudes in each domain were counted to provide a general picture of the attitudes. In addition, so as to examine children's perceptions of dyslexia and learning, the qualitative metaphor analysis was adapted from the method introduced by Cortazzi and Jin (2020). First, all the targets, sources, and entailments were listed. Then, entailments with shared meanings were grouped together, and metaphor networks were created by cross-matching between sources and entailments. Based on the networks, themes were discussed and extracted by the first author and the last author.

For the second research question about the validity of the metaphor elicitation method, the aforementioned attitude ratings in both Chinese and English reading were correlated with the reading abilities and the children's learning interest and confidence perceived by parents.

Results

General overview

A total of 217 statements were generated across the six domains, of which 134 (61.75%) were valid metaphors. A valid metaphor has to bring together two incongruous ideas and the expression encourages a meaningful interpretation (Cameron & Low, 1999). For example, "reading English text is like reading a story with words" is not a valid metaphor because it does not bring together two incongruous ideas. Although "reading Chinese text is like a melon, which does not have kernel" contains such a comparison, an entailment is missing so this metaphor is also not valid. An example of a valid metaphor is "dyslexia is like hurdling because we need to jump over the difficulties." Regarding the question as to whether the metaphors were valid, the agreement percentage of the first two raters was 76.04%, which was higher than 70%, a commonly acceptable criterion (Stemler, 2004). The inconsistent ratings were reconciled by the third rater, and the interrater reliability of the three raters was 83.72%.

Among the valid metaphors, 63 (47.01%) of them were generated by the children's own words, while 71 (52.99%) of them were facilitated by one of the prompts shown in Fig. 1. Twenty-four (80%) children successfully generated at least one metaphor with an entailment during the training session, with high percentages of agreement between the first two raters (86.67%) and among the three raters (91.11%). These indicated that children with dyslexia are capable of using metaphors to express ideas. Nonetheless, six children did not produce any valid metaphors during the training phase, but they could express ideas with informative metaphors in the interview session. Thus, interview data from all participants were included in further analyses.

The numbers of valid metaphors elicited in each domain ranged from 19 (reading Chinese text) to 26 (solving maths problems). There were some data missing for the attitude ratings because some children did not generate any valid metaphors in each domain (see Table 1 for the number of remaining participants in each domain). Furthermore, three items of data were missing for parent-rated learning interest and confidence. No data were missing for the word reading fluency.

Attitudes towards learning and dyslexia

Regarding the rating of attitude, the strengths of agreement between the first two raters (82.09%) and between the three raters (88.06%) were both good. Around half of the metaphors (53.73% or 72/134) were negative, while positive (23.13% or 31/134) and neutral metaphors (23.13% or 31/134) accounted for half of the remaining proportion, respectively. The numbers of positive, neutral, and negative metaphors generated in each domain are summarized in Fig. 2. In general, more negative metaphors and entailments were produced than positive ones in all domains, except for having Chinese lessons, which had the same number of negative and positive metaphors. This finding underscored the pervasiveness of negative attitudes towards dyslexia and learning in dyslexic children. Interestingly, children's attitudes were context-specific even within the same language or subject as shown by the distinct profiles in reading Chinese text, having Chinese lessons, and writing Chinese characters (see Fig. 2). Table 1 summarizes the descriptive statistics of the attitude ratings from the interview, the word reading fluency and the parent-rated learning interest and confidence.

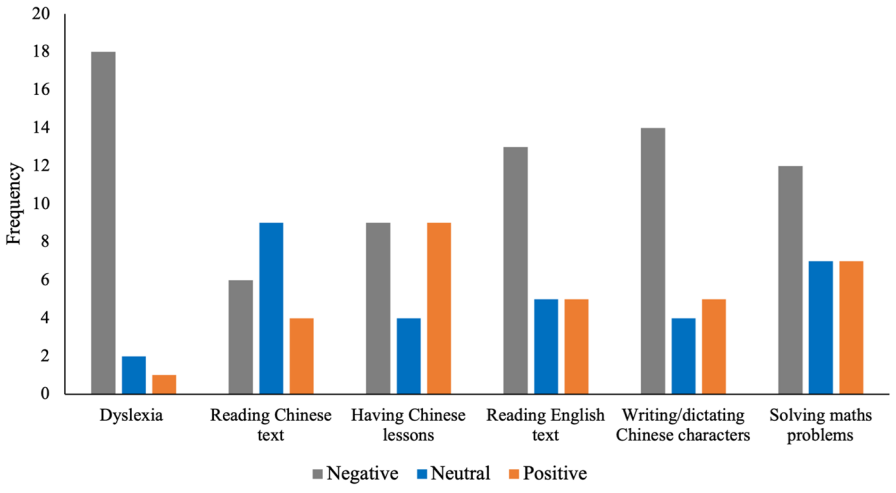


Fig. 2 The proportion of attitude of metaphors in each domain

Table 1 Descriptive statistics for attitude ratings, word reading fluency, and parent-rated learning interest and confidence in Chinese and English

Variable	n	M	SD	Range
Attitude rating for dyslexia[a]	19	0.2	0.5	0–2
Attitude rating for having Chinese lesson[a]	19	1.1	0.9	0–2
Attitude rating for Chinese writing[a]	21	0.6	0.9	0–2
Attitude rating for solving maths problems[a]	25	0.8	0.9	0–2
Attitude rating for reading Chinese text[a]	18	0.9	0.8	0–2
Attitude rating for reading English text[a]	22	0.7	0.8	0–2
Chinese word reading fluency (max: 240)	30	116.0	51.6	4–200
English word reading fluency (max: 240)	30	73.1	76.2	0–240
Parent-rated Chinese learning interest and confidence[b]	27	2.8	0.9	1–4.3
Parent-rated English learning interest and confidence[b]	27	2.5	1.3	1–5

[a]0: Negative; 1: Neutral; 2: Positive

[b]1: Strongly disagree; 5: Strongly agree

Perceptions of learning and dyslexia

Based on the metaphor analysis, there were seven themes related to our primary research question emerged: metalinguistic awareness, cognitive skills, feelings about learning, Chinese lesson experiences, coping strategies for learning, understanding of dyslexia, and social support.

Metalinguistic awareness

Four descriptions are related to children's metalinguistic awareness, which is defined as the ability to reflect on and manipulate the structural features of a language (Tunmer & Herriman, 1984). For instance, two children pointed out that one characteristic of Chinese is that some Chinese words originate from pictographs through the metaphor: "Some Chinese words are like the things that the words describe. For example, when the teacher teaches me how to write the word 'rabbit' in Chinese (兔), I will think of a real rabbit"; "Chinese words are like pictures drawn by people a long time ago or pictographs because some Chinese characters originate from them. I feel familiar when I see those characters. Pictographs are rare and they do not appear often in the dictionary." These quotes illustrate that some children already have significant knowledge about the characteristics of Chinese. Indeed, among 56,000 Chinese characters, most of them are phono-semantic compounds and only around 600 of them are pictographs (Zhen, 2014). Another child emphasized the length characteristic of English words and compared it to Chinese characters: "English words are like grains of worms and beans moving on books. They cannot be separated like the Chinese ones." This description matches the visual properties of the two languages; while English words are composed of a string of letters of the alphabet, Chinese characters occupy the same square space on a page (McBride, 2016). Another participant pointed out important properties of the two languages

when comparing Chinese and English dictation: "Chinese dictation is like an extremely difficult exam… I like English dictation more because even though I don't know the English words, I can still try to spell them. Chinese can only be learned by reciting." This corresponds to the phonological nature of alphabetic scripts and the absence of one-to-one correspondence between the pronunciation and the phonetic radical of Chinese characters (McBride, 2016). To conclude, at least some Hong Kong children with dyslexia have good metalinguistic awareness of Chinese and English, and it may influence their learning methods. This is an important finding that has not been reported in previous interview studies with dyslexic children.

Cognitive skills

Our interview data showed that children with dyslexia have a good understanding of the cognitive skills needed in Chinese writing and solving maths problems. Three children mentioned different skills that are important in Chinese writing or dictation: "It is like looking for something in tons of rubbish but I cannot search for it, just like I can't remember many things, and I can't look for the word"; "It is like a competition because it does not have enough time sometimes, and I need to be quick"; "It is like grapes because we need to pay attention to each word to avoid making mistakes, just like we have to be careful when we tear grapes." These descriptions are aligned with previous studies demonstrating that writing is not just a motor skill. Memory (Vellutino, 1979), speed (Tseng & Chow, 2000), and attention (Frith, 1980) are important cognitive abilities involved in writing. In a previous interview study by Jin et al. (2013), children with dyslexia in Singapore also related their difficulty in writing to cognitive demands.

Many children emphasized speed in relation to solving maths problems. For instance, a child mentioned that he solves maths problems at lightning speed, while another child considered it to be a slow process: "It is like a snail because I calculate and think slowly, just as a snail moves slowly." In addition, children brought up various skills related to solving maths problems, which they compared to "an animal who is paying attention because I pay attention to the teacher when I am solving maths problems"; "a puzzle since we need to understand and calculate using the correct method before getting the answer, particularly for word problems, which I think are more difficult"; and "untying a knot because we need to solve the questions by understanding and calculating them." From the children's perspectives, paying attention during maths lessons, thinking about and understanding the questions, and using the correct method for calculation are important elements in solving maths problems. These skills are in line with evidence from previous studies showing that attention and language-based processes play a paramount role in maths performance (e.g., Barnes & Raghubar, 2014). Additionally, the narration about the difficulty of solving word problems was corroborated by previous studies showing that these problems posed great difficulties for children with dyslexia because poor reading skills may hinder the establishment of a correct problem representation (e.g., Träff & Passolunghi, 2015).

Feelings about learning

Most children generated metaphors about their feelings in each domain. Some examples of negative metaphors for Chinese text included: "It contains many words, just like a rubbish dump has a lot of rubbish. They both make me confused"; "It is like garbled text. Both are confusing and I don't like to read either one. I also feel afraid because I do not understand the text." Based on these quotes, most of these children felt confused and unhappy when reading Chinese text, especially ones that contained many words, and some of them exhibited low self-efficacy in reading Chinese. On the other hand, one child expressed a positive attitude about reading Chinese text: "It is colourful because some Chinese books are interesting, and they can enhance my knowledge. I like reading Chinese text." This echoes the reading model by Lewis and Teale (1980) that reading attitudes do not just constitute enjoyment but also individual development.

Although most children had negative perceptions of reading English text, several children illustrated high self-efficacy in this activity: "It is easy to read English text, just like a cloud is light." Other children used distinctive metaphors to express their disappointment, irritability, and helplessness in reading English text: "It is like a melon. I am inside the melon and I want to escape but am unsuccessful because the melon opens its mouth and keeps the people inside constantly"; "I am afraid of English the most, as if I were a deer who is afraid of being surrounded and eaten by cruel animals such as lions and tigers. I am trapped by English words"; "It is like traffic congestion because the English words are dense. I feel bored when I am in traffic and I prefer a road that doesn't have any traffic, which is like a text that is easy to understand."

Chinese lesson experiences

The multifaceted metaphors in this domain provided insights into what an ideal Chinese lesson looked like in children's minds. Some children harboured a strong negative attitude towards Chinese lessons: "It is like being in hell, which is red and black. Everyone in my class dislikes Chinese lessons because they are boring and Chinese is difficult. I feel bored and tired, and I want to leave the hell"; "It is like being in jail, or even worse. The teacher always scolds us even though nothing happens. There are many constraints in Chinese lessons, like we need to sit still and raise our hands to ask the teacher if we want to get a drink of water." Other children shared positive feelings about Chinese lessons: "It is like playing games because the lesson is interactive and the teacher does not just teach according to the textbook. The teacher talks about something not related to the lesson, so it is not boring. I prefer having a Chinese lesson like this more than a traditional Chinese lesson, which is a bit boring"; "It is like a quiz competition. The Chinese teacher asks a question and students who raise their hands quickest can answer. Students can get a sticker if they answer a difficult question correctly. After students collect a certain amount of stickers, they can enjoy some

privileges. For example, they can dictate fewer words or hand in homework later. I like this kind of quiz, and also the privileges."

Based on the above excerpts, it is clear that although most children feel bored of or dislike having Chinese lessons due to the difficulty of Chinese or their teachers' pedagogical styles, a Chinese lesson that is interactive, contains games or quizzes with positive reinforcements, and includes few restrictions may alleviate such negative feelings. Our current findings parallel the model of language learning experiences of students with dyslexia based on an interview study with students with dyslexia in a Hungarian context (Kormos et al., 2009). It postulated that when teachers' behaviors and instructional methods are unsuitable, they can undermine students' self-confidence and may cause learning anxiety, thereby inducing negative attitudes towards language learning and low learning motivation.

Coping strategies for learning

Children mentioned or implied various coping strategies when they elaborated on the metaphors for different domains. The children emphasized how small and dense English words are: "Reading English text is like a needle poking at my eyes because I don't like reading English text. It makes my eyes feel tired since the words are so small and packed. It would be better if the words were larger"; "Reading English text is like a hell with many condensed English words." These quotes correspond to the recent evidence that larger font and spacing can facilitate dyslexics' reading speed (Marinus et al., 2016; Rello & Baeza-Yates, 2017). Teachers should therefore provide reading materials with larger font sizes and spacing if children with dyslexia require them.

When children encounter Chinese words they don't know, checking the dictionary is a common coping strategy. For example, the child who compared Chinese words to pictographs said, "I think checking the dictionary will give me a stronger impression compared to consulting with others because I have to look for the radicals and strokes by myself." There was another child who mentioned using the same strategy for reading English text: "Reading English text is like (solving) a difficult problem… I check the dictionary with my father using an iPad when I encounter an unknown word. I feel happy after I find out the meaning." Hence, when children with dyslexia encounter difficult words, checking the dictionary may deepen their impression and this may enhance their learning satisfaction, in comparison with being provided the meaning by others.

Understanding of dyslexia

Children with dyslexia were aware that the disorder refers to the specific difficulty in reading: "Dyslexia is like being blind because people with dyslexia read slowly, just like blind people need to touch braille slowly to know the direction"; "Dyslexia is a kind of hindrance to reading because people with dyslexia read more slowly than other people." In addition, some children elicited metaphors based on their negative feelings about dyslexia. For example: "Dyslexia is like the colour black because

dyslexia is a bad thing, and black represents something bad." Only one child associated dyslexia with a positive metaphor: "Dyslexia is like yellow, a colour that I like because last time I did carpentry in the dyslexia centre and I made a gyro with my mother."

Importantly, some children focused on whether dyslexia is surmountable. Some maintained that dyslexia is insurmountable and that it cannot be changed despite any effort or help: "Dyslexia is a bat devil that seizes on some people's writing ability. People who are grasped by this devil will lose their writing ability forever. Nothing can help them." On the contrary, most children said they thought that dyslexia was surmountable: "It is like a hindrance to reading, which is like the situation I am experiencing now. I think the training program provided by the Chinese University of Hong Kong helped a bit. Previously, I always scored zero, but after I joined the training program, many times I have not gotten a zero score. Therefore, I believe that dyslexia is surmountable if suitable assistance is provided. I am confident that I can surmount it."

To sum up, the insightful reflections above demonstrated that most children understand what dyslexia is and think that the negative effects of dyslexia can be ameliorated with effort. In fact, recent studies have shown that the reading performance of children with Chinese dyslexia can be improved through interventions that focus on a myriad of cognitive-linguistic skills, namely phonological sensitivity, morphological awareness, visual-orthographic processing, and fluency (McBride et al., 2018) and their metalinguistic skills can be enhanced when the semantic and phonetical radicals of Chinese are emphasized (Siu et al., 2018). Therefore, in general, children have a clear understanding of dyslexia and their views align with research findings.

Social support

Social support is crucial to enhancing children's confidence in surmounting dyslexia and alleviating their negative feelings associated with learning. The importance of social support was illustrated by an imaginative metaphor: "Dyslexia is like grapes because grapes are easily crushed, so we need to take great care of them (people with dyslexia)." Some children emphasized that their mothers provided the greatest help to battle dyslexia: "Dyslexia is like hurdling because we need to jump over the difficulties. When I can't jump over a hurdle, I will find my mother for help. If my mother is by my side, I can mostly jump over the hurdle." In addition to the process of surmounting dyslexia, family support serves as a protective factor in different learning domains, such as solving maths problems: "I feel helpless if I cannot untie the knot (solve a maths problem). I will try asking my mother for help. Sometimes we can untie a tricky knot together, and then I feel very happy." This description speaks to the fact that family support not only facilitates children's learning but also makes a positive impact on their feelings about learning. In addition, some children highlighted support from school and teachers: "People with dyslexia are like people with disabilities because they have some parts that are not that good, but at the

same time they can receive help from others, such as some tutorial classes. I enjoy attending those classes."

To conclude, social support, especially family support, is a chief catalyst for enhancing children's self-esteem and confidence in overcoming dyslexia and learning difficulties in different domains. Parents also provide practical assistance when children encounter learning difficulties. This reaffirms the importance of family support illustrated by interviews with students with dyslexia in a variety of contexts (e.g., Kormos et al., 2009; Stampoltzis & Polychronopoulou, 2009).

Validity of metaphor elicitation technique

The Chinese and English reading attitude ratings from the interview, word reading fluency, and parental ratings of learning interest and confidence were used for assessing the validity of the metaphor elicitation technique (see Table 1 for descriptive statistics). A Spearman's correlation analysis with pairwise deletion was conducted between the attitude ratings for reading and word reading fluency in both Chinese and English to examine whether children's feelings converged with their own reading performance. The correlation results are summarized in Table 2 for Chinese and Table 3 for English. An insignificant correlation was shown in Chinese (see Fig. 3a), but a significant, positive, and moderate correlation was found in English (see Fig. 3b), illustrating that children's English reading attitudes were positively associated with their English fluency but the same relationship was not found in Chinese.

A Spearman's correlation analysis with pairwise deletion was then performed to investigate whether the reading attitudes of children matched their learning interest and confidence as perceived by their parents. No significant correlation was found between these two variables in Chinese (see Fig. 3c), but a significant, positive, and large correlation was shown in English (see Fig. 3d), implying that parents of children who expressed more positive feelings about English reading believed that their children have stronger interest and confidence in learning English, but this relationship was absent for Chinese.

Due to the wide age range of the participants, we conducted the aforementioned correlation analyses with the age variable controlled. The results were the same (see

Table 2 Correlations of attitude ratings, word reading fluency, and parent-rated learning interest and confidence in Chinese

Variable	1	2	3
1. Attitude rating for reading Chinese text[a]	–	0.46	0.25
2. Chinese word reading fluency	–	–	0.44*
3. Parent-rated Chinese learning interest and confidence[b]	–	–	–

[a]0: Negative; 1: Neutral; 2: Positive

[b]1: Strongly disagree; 5: Strongly agree

*$p < .05$. **$p < .01$. ***$p < .001$.

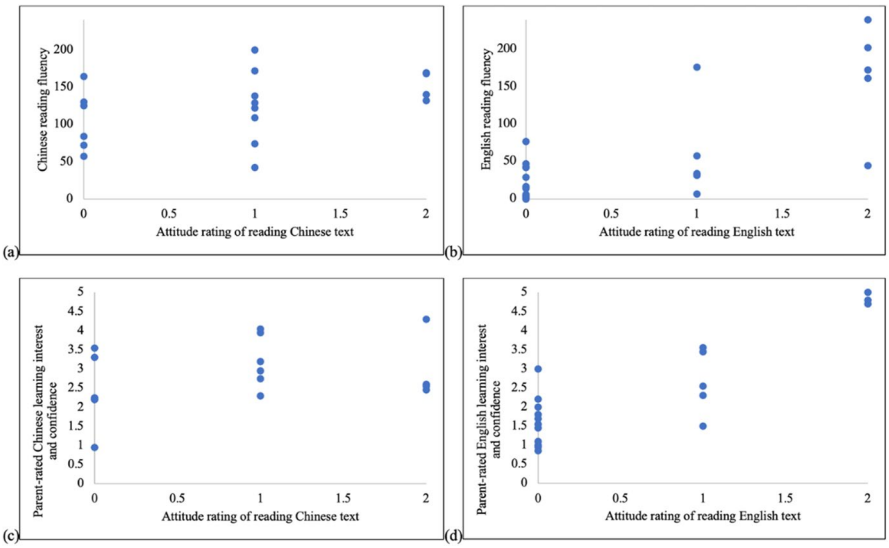


Fig. 3 Scatter Plot of Correlations **a** Relationship between Attitudes towards Reading and Reading Fluency in Chinese **b** Relationship between Attitudes towards Reading and Reading Fluency in English **c** Relationship between Attitudes towards Reading and Parent-rated Learning Interest and Confidence in Chinese **d** Relationship between Attitudes towards Reading and Parent-rated Learning Interest and Confidence in English

Table 3 Correlations of attitude ratings, word reading fluency, and parent-rated learning interest and confidence in English

Variable	1	2	3
1. Attitude rating for reading English text[a]	–	0.67***	0.76***
2. English word reading fluency	–	–	0.69***
3. Parent-rated English learning interest and confidence[b]	–	–	–

[a]0: Negative; 1: Neutral; 2: Positive

[b]1: Strongly disagree; 5: Strongly agree

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$

Tables S2 and S3), indicating that age had minimal influence on the relationships between the variables.

General discussion

The variety of metaphors and descriptions mentioned during the interview not only illustrated that children are able to generate creative and meaningful metaphors and link them to their learning experiences and feelings, which corroborated findings from previous studies (Burden & Burdett, 2007; Jin et al., 2013), but also showed that their metaphors can be associated with children's understanding. Crucially, most of the content related to metalinguistic awareness, cognitive skills, coping

strategies for learning, and understanding of dyslexia as expressed by children's metaphors were in line with scientific findings. Therefore, children with dyslexia generally showed a good understanding of dyslexia and various learning domains. Furthermore, children's perceptions of learning and dyslexia in terms of cognitive skills, social support, and Chinese lesson experiences highly coincided with findings from previous interview studies conducted in other contexts (e.g., Jin et al., 2013; Kormos et al., 2009), demonstrating that learners' perceptions are consistent despite differences in language and context.

The current study showed that Hong Kong children with dyslexia generally held negative attitudes towards dyslexia and most learning domains. For dyslexia, only one positive metaphor was generated. This stands in stark contrast to the interview study by Jin et al. (2013), in which more positive metaphors were observed. Nonetheless, children in the present study discussed some positive aspects of dyslexia, such as being able to receive help from others. In addition, not all children with dyslexia dislike reading or think that reading Chinese text is difficult, and this corroborates the corresponding finding by Jin et al. (2013) about children who have dyslexia and speak English as their first language. Moreover, it is not uncommon for children with Chinese dyslexia to face enormous difficulties in and to hold negative views about reading English text, but some may demonstrate a positive attitude towards English reading with high self-efficacy. These results substantiated previous findings from studies using behavioral tasks to assess children's performance (Ho & Fong, 2005; Huo et al., 2021).

Although we outlined a general picture of the views of our participants, it is important to note that the main purpose of the current study is not to generalize our findings from a small sample size to all Hong Kong children with dyslexia. Even among our participants, children brought up a variety of themes (e.g., metalinguistic awareness, cognitive skills, etc.) when responding to the same questions, and there were individual differences in perceptions of the same topic. In addition, a child may hold a variety of attitudes about different subjects, which reveals the importance of having a thorough understanding of each child's profile. The main significance of this study is that it demonstrates that children with dyslexia can have a good understanding of dyslexia and academic domains, as many of their views coincided with scientific findings. Moreover, the present study has illustrated that the metaphor elicitation technique with the use of prompts is a useful method for facilitating the understanding of dyslexic Hong Kong children's perceptions of dyslexia and learning.

We believe that using prompts when children are initially unable to elicit any metaphor does not limit their imagination or the content they want to share. In the interview, many children used fruit to describe their perceptions based on our provided prompts, but even though they chose the same fruit, the individual children paid attention to different features in order to make associations with their feelings, understanding, and experiences. For example, some talked about the taste and some mentioned the appearance. Some children even imagined the fruit to be a monster and told a creative story to express their fear and helplessness. Therefore, prompts are effective tools for inspiring children to share, since it is easier for them to start talking about something concrete that is in front of

them before moving on to discuss abstract concepts such as dyslexia. Therefore, teachers and parents are encouraged to use this method for discussing abstract concepts related to learning so as to understand children's views on them, and also their learning needs, so that suitable assistance can then be offered. This is crucial not only to their learning achievement but also to their self-efficacy and confidence in terms of overcoming dyslexia.

The children's reading attitude in the interview was positively correlated with the reading performance and the corresponding parent ratings in English, indicating that metaphor elicitation has at least some degree of criterion validity and concurrent validity in measuring English reading attitudes in children. However, no significant correlation was found in Chinese, and there are several possible reasons for this. First, most children expressed neutral attitudes towards Chinese reading during the interview, which might obscure the correlation effect. One potential reason for this is that children do not have a choice in learning Chinese because it is their first language, which is essential for communication in Hong Kong. However, for English learning, children expressed more extreme attitudes since they can choose not to learn it. Furthermore, since our participants were children with Chinese dyslexia, the narrower Chinese reading performance and the parental variables between participants might not allow enough variation to detect the effect as the variance was smaller in Chinese than in English. Therefore, future studies may need to include various measures to validate the metaphor elicitation method in children. Nonetheless, the significant findings in English showed that metaphor elicitation is a valid method when it is used for assessing reading attitudes in children.

There are several limitations related to the quantitative analysis to be noted. First, our participants had a wide age range as adapted by Jin et al. (2013). Although our partial correlation analysis did not show that age plays a role in explaining our findings, the relevant predictors of reading performance may be different at distinct learning stages (Tong & McBride-Chang, 2010; Yeung et al., 2016). Future studies may focus on children with a narrower age range to examine the validity of the metaphor elicitation technique. In addition, we only used word reading fluency as a reading measure. Although some previous studies have shown that word reading fluency predicted reading comprehension (e.g., Liao et al., 2020; Yeung et al., 2016), future studies may include reading measures at a higher level, such as reading comprehension, to examine this topic in older children with dyslexia since language comprehension accounted for more variance in reading after Grade 2 compared with word reading (Peng et al., 2021). Furthermore, the validity was only investigated in terms of Chinese and English reading. Therefore, we can only conclude that metaphor elicitation may be a valid technique for measuring English reading attitudes, but not for other domains, such as writing and solving maths problems. Whether using metaphor elicitation to examine other academic domains or even non-academic domains is valid remains an open question for future studies to investigate. Finally, some aspects of the metaphor interview as an assessment tool were not examined in this study. For example, future studies can examine the short-term reliability of the metaphor elicitation method in children by adopting the test-retest method used by Wegner et al. (2021).

Conclusion

The present study demonstrated that children with dyslexia in Hong Kong have a good understanding of dyslexia and learning domains since most of their perceptions are well-aligned with research findings. Moreover, their perceptions of learning and dyslexia are similar to those of learners who speak different languages, as documented in previous interview studies. The validity of using the metaphor elicitation method to measure English reading attitude was evidenced. Teachers and parents should utilize this method to understand their dyslexic children's views on abstract concepts, such as dyslexia and various learning domains. It is important to understand individual views before offering suitable assistance since perceptions of the same construct and their needs may be different from one another.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s11145-023-10434-2.

Acknowledgements We thank all the children for spending time sharing their experiences and feelings with us.

Author contributions Conceptualization: BWLW, JWKL, SH. Methodology: BWLW, JWKL, SH. Investigation: HCL. Formal analysis: BWLW, SH. Writing—original draft preparation: BWLW; Writing—review and editing: BWLW, JWKL, UM, SH; Funding acquisition: BWLW, JWKL, SH; Resources: UM; Supervision: SH.

Funding This work was supported by the Interdisciplinary Research Seed Funding of the Social Science Faculty of the Chinese University of Hong Kong (5501689).

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

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