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RESEARCH ARTICLE

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Children's vocabulary and friendships: A comparative study between children with and without Specific Learning Disorder and Attention Deficit Hyperactivity Disorder

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Language skills are important in the formation and maintenance of friendships. Children with specific learning disorder (SLD) or attention-deficit/hyperactivity disorder (ADHD) experience difficulties with their relationships and have language-related problems. This study aims to examine how expressive and receptive vocabulary may relate to friendships of children with and without SLD or ADHD. Participants were 64 children with SLD, 64 children with ADHD, and 64 typically developing (TD) children, aged 8–12 years (M_{age} = 9.77 years, *SD* = 1.22), attending Grades 3 to 6 in inclusive primary schools of Attica, Greece. The Greek versions of the Peabody Picture Vocabulary Test and the expressive vocabulary subscale of the WISC-III were administered along with the sociometric nominations of friends and the self-reports of best friendship duration. Results showed that children with SLD and ADHD reported best friendships of shorter duration and had significantly poorer receptive and expressive vocabulary. Children with ADHD had significantly fewer close and best friends than children with SLD, who in turn had significantly fewer close and best friends than the TD children. Children's vocabulary in all three groups was positively correlated with the duration of

†deceased.

their best friendships and was found to moderately predict children's close friendships.

KEYWORDS
ADHD, expressive vocabulary, friendship, receptive vocabulary, SLD

Practitioner points

- Children with specific learning disorder (SLD) or attention-deficit hyperactivity disorder (ADHD) encounter difficulties in their friendships with peers at school.
- Children with SLD or ADHD have poorer receptive and expressive vocabulary when compared with their typically developing (TD) peers.
- Vocabulary, both expressive and receptive, is associated with and can predict children's number of friends and the duration of their best friendships.
- The present study expands scientific knowledge and provides evidence that links vocabulary and friendships in children with SLD or ADHD.
- This study pinpoints the need for educational programmes that develop the vocabulary of children with SLD or ADHD and facilitate the maintenance of their friendships.

1 | INTRODUCTION

The role of language as a powerful means of social understanding and the reciprocal nature of the relation among intentional communicative acts, linguistic competence, and social behaviours have been acknowledged and thoroughly discussed by many scholars for many years (Bruner, 1983; Müller & Carpendale, 2000; Piaget, 1954 [1937]; Vygotsky, 1986 [1934]). The meaningful social context in which the child is embedded provides opportunities for language learning, but at the same time, language use is important for the development of social interaction, communication, and social behaviours (McCabe & Meller, 2004). According to Bronfenbrenner's ecological approach to learning (Bronfenbrenner, 1979), proximal environmental factors, including family and friends, serve as major sources of influence on children's communication skills and their expressive and receptive language abilities (Bloom, 1998; Hart & Risley, 1995). While the dynamic nature of the aforementioned relations has been supported by plenty of theoretical and empirical evidence, most of the research emphasizes the pragmatic aspect of language, which refers to what meaning utterances communicate in a particular situation or context (Bignell & Cain, 2007; Geurts & Embrechts, 2008; Staikova, Gomes, Tartter, McCabe, & Halperin, 2013).

Relatively few studies have focused on the link between friendship and children's expressive and receptive vocabulary (Durkin & Conti-Ramsden, 2007). Vocabulary is an important component of language development which contributes to school achievement, provides better access to new information, facilitates communication and interaction with others (Rowe, 2012), and assists to maintain contact and create solidarity among friends (Kyratzis, Shuqum Ross, & Koymen, 2010). As children with neurodevelopmental disorders (ND), such as specific learning disorder (SLD) and attention-deficit/hyperactivity disorder (ADHD) (APA, 2013), encounter difficulties in both linguistic and social domains, examining their friendship relationships would offer a better understanding of the dynamic interconnection of vocabulary and social development. The present study sought to provide an insight of the

aforementioned association in children diagnosed with SLD or ADHD and their typically developing (TD) peers, as research in this field is quite limited.

1.1 | Friendships and language competence

Friendship is a voluntary, dyadic relationship which presupposes the existence of an emotional bond among its members, and it is observed across ages and in every society and socio-cultural context (Delgado, Ettekal, Simpkins, & Schaefer, 2016). Children often presume that their friendships are mutual in nature, and they deem their friends to be an important part of their lives (Hartup, 1996). Depending on the level of commitment, friendship relationships can be characterized as casual, close, and best (Policarpo, 2015). The basic difference among these three types of friendships is how children view their friends, what qualitative features they attribute to their friendships, and what efforts they make to maintain them (Sebanc, Kearns, Hernandez, & Galvin, 2007). Thus, children can have many casual friends with whom they share activities and interests, meet occasionally, and do not feel particularly distressed when the friendship is dissolved. They can also have a lot of close friends with whom they spend time, can trust and rely upon, and consider them closer than their casual friends, but not as close as their best friends. Finally, children may experience only few best friendships that are more stable and mutual (based on mutual attraction and liking, where each friend names the other as best friend) (Tur-Kaspa, Margalit, & Most, 1999), distinguished by greater positive (e.g., companionship, intimacy, security, and guidance) and less negative qualities (e.g., conflicts, betrayal, antagonism, and jealousy) and both best friends seek to maintain their friendship and feel devastated when dissolved (Bagwell, Schmidt, Newcomb, & Bukowski, 2001; Furman & Rose, 2015).

Childhood friendships are conducive to cognitive and socio-emotional development (Furman & Rose, 2015), as children learn to control their emotions, co-operate, communicate, exchange ideas, practice social roles, engage in more affective expressions, and resolve disagreements and conflicts in their relationships through negotiation (Hartup, 1996; Sebanc et al., 2007; Wiener & Schneider, 2002). Moreover, from early childhood to adolescence, friends play an important role in the development of language, vocabulary, and the socially acceptable use of speech (Durkin & Conti-Ramsden, 2007; Maynard, 2005). Specifically, friendships provide the context in which children can develop their language and communication skills, express their needs, intentions, desires, and thoughts (Carpendale & Lewis, 2006; Davies, Lancaster, & Camarata, 2016), adapt their speech to their listeners' needs, seek information, narrate, discuss, disagree, and try to reconcile after a quarrel (Camirand & Poulin, 2019; Gallagher, 1999; Hay, Payne, & Chadwick, 2004).

1.2 | Friendships in children with language difficulties

Nevertheless, language acquisition is not robust for all children, and discrepancies that emerge early in children's lives may persist over and influence their interpersonal relationships and academic achievement (Helland & Helland, 2017; Hemphill & Tivnan, 2008; Law, Rush, Schoon, & Parsons, 2009; Taylor, Christensen, Lawrence, Mitrou, & Zubrick, 2013). Language problems encountered from early childhood may be heterogeneous and associated with difficulties in other aspects of children's development, such as prosocial behaviour (Toseeb, Pickles, Durkin, Botting, & Conti-Ramsden, 2017). It has been maintained that children who have speech and language difficulties, compared with their TD peers, face greater problems in their dyadic interpersonal relationships (Gallagher, 1999), but not necessarily in their social acceptance by their peers (Mikami, Münch, & Hudec, 2017). These children have consistent and persistent difficulties in their communication skills across settings and age groups (Bryan, Burstein, & Ergul, 2004), make more effort to participate in a conversation (Gallagher, 1999), have less socially accepted behaviours (Cassidy, Werner, Rourke, Zubernis, & Balaraman, 2003; Hartas, 2011), are less able to control their emotions, and experience difficulties in conflict resolution (Horowitz, Jansson, Ljungberg, & Hedenbro, 2006). Their behaviours lead to frequent quarrels and to the dissolution of friendships (Fujiki, Brinton, Isaacson, & Summers, 2001).

Comprehension-related language deficits have been highly related with antisocial behaviour and problems with peers (Benner, Nelson, & Epstein, 2002), while deficits in expressive vocabulary have been related with self-regulation difficulties (Bohlmann, Maier, & Palacios, 2015; McClelland et al., 2007). Even when their language difficulties are surmounted, children continue to encounter problems in their interpersonal relationships (Glogowska, Roulstone, Peters, & Enderby, 2006), which remain in poor quality (Wiener & Tardif, 2004), and they are likely to be avoided by their TD peers. This may result in a decrease in the number of reciprocal friendships, an increase in the number of reciprocal rejections, and in high levels of loneliness and poor sense of coherence (Al-Yagon & Margalit, 2006; J. S. Cohen & Mendez, 2009; Tur-Kaspa et al., 1999). Consequently, children with language difficulties have less opportunities to participate in common activities with their classmates and to further develop their language and social skills at school, and gradually are rejected by their peers (Monopoli & Kingston, 2012).

1.3 | Friendships and language competence in children with SLD and ADHD

Social skills and language are interrelated, as both serve a fundamental role in children's socialization and in their interpersonal relationships (McCabe & Meller, 2004). The degree to which children are socially and linguistically competent is related to the success in their relationships with peers and adults, and can predict future social adjustment (Beitchman et al., 1996). Several studies link linguistic and social competence, pointing out the importance of peers in language development, as they provide role models and opportunities for practice (Gallagher, 1999), and report social skills to be less favourable for children with language difficulties (Bryan, Wheeler, Felcan, & Henek, 1976; Clegg, Hollis, Mawhood, & Rutter, 2005; Fujiki et al., 2001; Pickles, Durkin, Mok, Toseeb, & Conti-Ramsden, 2016; Toseeb et al., 2017). For example, the early work of Bryan and her colleagues (Bryan, Donahue, Pearl, & Sturm, 1981) has demonstrated associations between language skills and friendship relations in children with SLD, who might be competent listeners in responding to their friends' messages, but, as speakers, have difficulties in formulating satisfactory answers or conveying adequate information. In addition, the same study has shown that mainly the boys with SLD tend to use shorter and less complex utterances when talking to their friends. However, not many studies have thoroughly examined the interplay between friendships and language competence in children with SLD and ADHD.

Children with SLD demonstrate delays or deficits in several areas of language development, and not only in those related to written language. Phonological problems associated with SLD may lead to significant differences in vocabulary growth (Boada & Pennington, 2006; Pennington & Bishop, 2009), both receptive and expressive (Van Viersen et al., 2017). Moreover, it has been shown that consistent and persistent struggles with learning in school can lead children to various socio-emotional difficulties, including problems in forming and maintaining friendships (Burton, 2004; Martínez & Semrud-Clikeman, 2004; Parhiala et al., 2015; Wong, 2003). Several studies have shown that reading skills are positively related with social, emotional, and school adjustment, and negatively with behavioural problems (Kavale & Mostert, 2004; Ralli, Karagiannopoulou, & Antaraki, 2017), and that pupils with SLD often have issues with social status, peer acceptance, maintenance of their friendships, or feelings of loneliness (Al-Yagon & Margalit, 2006; Meadan & Halle, 2004; Terras, Thompson, & Minnis, 2009). Children with SLD have few close friendships and face difficulties in maintaining them because of their insecurities, impulsivity, and poor social skills. They avoid disclosing their learning disabilities even to their best friends, as they are often teased and laughed at by their peers resulting in feelings of embarrassment, stress, and inferiority (Doikou-Avlidou, 2015; Hellendoorn & Ruijssenaars, 2000; Leseyane, Mandende, Makgato, & Cekiso, 2018).

Similarly, children with ADHD tend to encounter difficulties in social relationships and language competence. Although most studies focus on the pragmatic difficulties of children with ADHD (Gardner & Gerdes, 2015; Ronk, Hund, & Landau, 2011), or the association between social perspective taking and language skills (Marton, Wiener, Rogers, Moore, & Tannock, 2009), there are some which examine their vocabulary (Gremillion & Martel, 2014). The findings, however, are contradicting, especially regarding the receptive vocabulary. Thus, while some studies suggest that children with ADHD have no difficulty in receptive vocabulary (N. J. Cohen et al., 2000; O. H. Kim & Kaiser, 2000) and in language comprehension overall (Luo & Timler, 2008; Redmond, Thompson, & Goldstein, 2011), others

maintain that these children have major difficulties in their vocabulary understanding and in their oral and written language (Bruce, Thernlund, & Nettelbladt, 2006). On the other hand, there is a convergence of views regarding the expressive vocabulary of children with ADHD, which is characterized by considerable difficulties compared to that of TD children (K. Kim & Lee, 2009; Re, Pedron, & Cornoldi, 2007).

Children with either SLD or ADHD have language problems which can be associated across development with a range of behavioural, emotional, and social difficulties (Gardner & Gerdes, 2015; McCabe & Meller, 2004). However, findings documenting the influence of receptive and expressive vocabulary on the SLD or ADHD children's friendships are scant. Since both disorders are associated with difficulties in vocabulary, it can be assumed that these difficulties hinder a child's ability to interact with peers and friends and to adequately respond in social situations.

Research evidence on children with ADHD suggests that they find it difficult to form and maintain qualitative and supportive friendships (Heiman, 2005), regardless of their gender and age (Kouvava & Antonopoulou, 2020; Mikami, 2010). Often, this difficulty is acknowledged by both parents (especially the mothers) and teachers of ADHD children who are less likely to corroborate that these friendships even exist (Marton, Wiener, Rogers, & Moore, 2015; Wiener & Sunohara, 1998). It seems to be the case that children with ADHD have fewer stable friendships than their TD peers, both at school (Glass, Flory, & Hankin, 2012; Kouvava, Antonopoulou, & Maridaki-Kassotaki, 2016) and other environments (Blachman & Hinshaw, 2002), with whom they spend less time together (Marton et al., 2015). They tend to form friendships with other children with ADHD or with conduct disorder and often complain that their friendships have negative characteristics, as they face conflict, rivalry, competition, and relational aggression (Normand et al., 2011).

1.4 | The present study

Children with SLD or ADHD encounter difficulties in their interpersonal relationships at school and more specifically in their friendships. In addition, language impairments have been reported in children with both SLD and ADHD to a larger extent when compared to their TD peers. However, there are no studies investigating and directly linking expressive and receptive vocabulary difficulties to friendship relationships in primary school children with SLD or ADHD. This study aims to contribute with research evidence to bridge the aforementioned gap.

Thus, the present study sought to answer the following research questions:

1. Are there any differences in the number of close friends (named and mutual), the formation of best friendships with ND peers, and the duration of best friendships among primary school children with and without SLD or ADHD?
2. Are there any differences among children with SLD or ADHD, and their TD peers, in their receptive and expressive vocabulary?
3. Do friendship variables correlate with vocabulary variables across the three groups of children?
4. Do receptive and expressive vocabulary predict the number and duration of friendships in children with and without SLD or ADHD?

2 | METHODS

2.1 | Participants

Sixty-four children with SLD, 64 children with ADHD, and 64 TD children, aged 8 to 12 years ($M_{age} = 9.77$ years old, $SD = 1.22$), from randomly selected inclusive mainstream primary schools in Attica, Greece, took part in this study. Pupils attended Grade Levels 3 to 6, and had a medium socio-economic background, according to the school records. However, the influence of parents' educational level and occupation on children's vocabulary or on their

friendships was not examined in the present study. In addition, no diagnostic procedures were carried out in this study, as all the participating children had an official diagnosis ascertained by public Educational and Counselling Centres supervised by the Greek Ministry of Education. These are professional multidisciplinary bodies responsible for the assessment of children's educational and psychological needs. These diagnoses stated that the children had either ADHD or SLD, with no comorbid disorders and no other ND. To safeguard pupils' sensitive personal data, schools granted access only to the diagnoses of the participating children, with their parents' permission. No additional tests or scales were administered by the researchers to confirm participants' diagnoses or to search for comorbid disorders. All participating children received combined mainstream and specialized programme (up to 15 teaching hours weekly) by a special education resource teacher who withdrew them to a different classroom within the mainstream school. This type of in-school support is compulsory for all diagnosed ND children attending mainstream schools in Greece according to the law. Moreover, according to teachers' reports, no ADHD pupil was taking any medication. The TD participants fell in the typical development spectrum according to teachers' quarterly reports on their academic achievement and progress at school. Finally, the three groups did not have significant differences regarding their gender and age, as shown in Table 1.

2.2 | Measures

2.2.1 | Demographics questionnaire

All participants were given a short demographic questionnaire, which included information about their gender, date of birth, and school grade.

2.2.2 | Sociometric nominations and best friendship duration

To find out whether a child had close friends and, among them, a best friend in class, a two-step sociometric nomination procedure was used (Parker & Asher, 1993). Initially, children were asked to name up to three of their classmates who they considered to be their close friends, and then to indicate among them who they deemed to be their

TABLE 1 Demographics of the participants with and without SLD/ADHD

	SLD ($n = 64$)		ADHD ($n = 64$)		TD ($n = 64$)		
	N	%	*N*	%	*N*	%	$\chi^2_{(df,\ N = 192)}$
Gender							
Boys	33	51.6	32	50	31	48.4	$0.13_{(2,\ 192)}$
Girls	31	48.4	32	50	33	51.6	
School grade							
3	16	25	16	25	16	25	$0.21_{(6,\ 192)}$
4	15	23.4	16	25	17	26.6	
5	17	26.6	16	25	16	25	
6	16	25	16	25	15	23.4	
	M	*SD*	M	*SD*	M	*SD*	$F_{(2,\ 189)}$
Age (in years)	9.82	1.21	9.81	1.3	9.68	1.15	0.27

Abbreviations: ADHD, attention-deficit hyperactivity disorder; SLD, specific learning disorder; TD, typically developing.

best friend (Step 1). To establish the mutuality of children's friendships, their peers nominated as close and best friends were then asked to also name up to three of their close friends from their classroom and among these three, to specify their best friend (Step 2). The *number of named close friends* is the number of the peers named by the children in Step 1. The *number of mutual close friends* was calculated after comparing the nominations of all named children in Steps 1 and 2. For example, if an SLD/ADHD/TD child names three peers as close friends in Step 1, and all these peers include in their own nominations this specific SLD/ADHD/TD child in Step 2, the number of mutual close friends for this SLD/ADHD/TD child is 3. If only one peer nominates this SLD/ADHD/TD child in Step 2, then this child will have 1 mutual close friend. *Best friendships* were established when both mutual close friends selected each other to be their best friend. In the case when the best friend was an ND peer, *best friendship with an ND child* was established. Finally, participants were asked to indicate the *duration of their best friendship* using the following question: "How long have you been together with your best friend?" Children's responses were calculated in months. Only the duration of best friendships in children was examined in this study because best friendships are characterized by great stability (Berndt & Hoyle, 1985).

2.2.3 | Receptive vocabulary task

The receptive vocabulary was evaluated using the Greek version of the Peabody Picture Vocabulary Test-Revised (PPVT-R; Dunn & Dunn, 1981; Simos, Sideridis, Protopapas, & Mouzaki, 2011). This test, which includes questions of semantic recognition of words of increasing difficulty, can be administered to children and adolescents between 2.5 and 18 years. Individuals just point to the right answer, by selecting among four images presented to them in an A4 size folder, the image which best represents the semantic content of the word expressed by the examiner. The test terminates after five wrong answers. The test has a strong internal consistency, as the Cronbach α in English was found to be between .95 and .98 (Dunn & Dunn, 1981), while in the adaptation of the test in Greek, Cronbach's α was .95 (Simos et al., 2011). In the present study, the Cronbach's α for the Greek PPVT-R test was .94.

2.2.4 | Expressive vocabulary task

The expressive vocabulary was evaluated by the relevant subscale of the Wechsler Intelligence Scale for Children – WISC-III (Georgas, Paraskevopoulos, Bezevegis, & Giannitsas, 1997; Wechsler, 1991). WISC III was designed for children and adolescents between 6 and 16 years of age and evaluates general intelligence. The expressive vocabulary subscale constitutes of 30 words and the individual is required to define each word. The test stops after four wrong definitions. The reliability for the subscale of the expressive vocabulary in the Greek standardized version of WISC-III was found to be .76 to .84 for the ages 8 to 13 (Georgas et al., 1997), while in the present study, Cronbach's α was .91.

2.3 | Procedure

The Institute for Educational Policy, a consulting body of the Greek Ministry of Education, granted permission for 84 randomly selected inclusive mainstream primary schools, from various areas of Attica, Greece, to participate in the present study. Initially, the head teachers of all the approved schools were approached and informed about the purpose of the study. Interest was expressed by 58 schools which had one or two classes for each grade level. After the aims and the procedure of the research were presented to mainstream teachers, special need teachers, and parents, during afterschool meetings, the final number of the schools willing to participate was reduced to 31. The main reasons for this drop-out were the lack of interest in the topic of the study by both teachers and parents and the absence of pupils with an official diagnosis of ADHD or SLD. Two-hundred and eighty-three pupils, whose parents

provided informed written consent, were initially involved in the study. Although all children completed the study's research instruments, only the responses of 192 pupils (68%) with mutual friendships were used for further analyses. Teachers provided a code number for each participating student and noted if the named friends had an ND. Data collection took place in a quite area in children's schools. The first author administered all the questionnaires to the children, explained thoroughly the instructions of each questionnaire, and read loud the items to all children. Each child completed separately the tasks and the whole procedure lasted about 30 minutes. The anonymity of the participants was guaranteed.

3 | RESULTS

Chi-square tests of independence were performed to examine the relation among presence of SLD or ADHD in children, best friendships, and best friendships with an ND child. One-way ANOVA was performed to examine group differences on the number of close friends (named and mutual) and best friendship duration. Pearson correlations were used to test for possible correlations among the different variables. Finally, a single hierarchical regression analysis was computed for the friendship variables, in order to examine major determining factors including vocabulary, group, age and gender. All statistical analyses were performed with IBM SPSS version 24 statistical software.

Post-hoc comparisons using the Bonferroni test have shown that ADHD children named significantly fewer close friends than the other two groups ($p < .01$), and had significantly fewer close mutual friends than SLD children ($p < .01$) and their TD peers ($p < .001$), while SLD children had significantly fewer close mutual friends than their TD peers ($p < .001$). Additionally, TD children were more likely to experience long lasting best friendships than were the SLD ($p < .001$) or ADHD children ($p < .001$), whereas SLD children reported longer friendships than the ADHD group did ($p < .001$). Moreover, significantly more TD children were found to have best friends when compared to their ADHD and SLD counterparts ($p < .01$) and significantly fewer TD children were best friends with an ND peer when compared to their ADHD and SLD counterparts (($p < .01$) (1st research question) (Table 2).

Table 3 presents the statistically significant differences in the receptive and expressive vocabulary of children with ADHD, children with SLD, and their TD peers resulting from a one-way ANOVA (2nd research question).

Post hoc comparisons with the Bonferroni test showed that while the ADHD and SLD groups do not differ in receptive and expressive vocabulary, both these groups of children differ significantly from their TD counterparts in

TABLE 2 Friendship characteristics of the participants with and without SLD/ADHD

	SLD ($n = 64$)		ADHD ($n = 64$)		TD ($n = 64$)		Group differences (ANOVA)		
	M	*SD*	M	*SD*	M	*SD*	$F_{(2,189)}$	η^2	Post hoc comparisons
Number of named close friends	2.78	0.52	2.5	0.67	2.95	0.28	12.71*	.119	ADHD < SLD, TD
Number of mutual close friends	1.77	0.89	1.23	0.85	2.64	0.63	50.95*	.350	ADHD < SLD < TD
Best friendship duration (in months)	24.75	12.21	17.92	11.95	34.87	5.11	43.54*	.319	ADHD < SLD < TD
	N	%	*N*	%	*N*	%	$\chi^2_{(8,192)}$		Cramer's V
Best friendship									
Yes	37	57.8	32	50	63	98.4	40.29*		.458
No	27	42.2	32	50	1	1.6			
Best friend with ND									
Yes	17	26.6	26	40.6	6	9.4	16.49*		.293
No	47	73.4	38	59.4	58	90.6			

Abbreviations: ADHD, attention-deficit hyperactivity disorder; SLD, specific learning disorder; TD, typically developing.
*$p < .01$, Bonferroni correction of critical p values when performing post hoc multiple comparisons.

TABLE 3 Mean scores, *SDs*, and mean differences in the receptive and expressive vocabulary of children with and without ADHD/SLD

	SLD ($n = 64$)		ADHD ($n = 64$)		TD ($n = 64$)		Mean differences	
	M	*SD*	M	*SD*	M	*SD*	$F_{(2,189)}$	η^2
Receptive vocabulary	24.89	7.98	23.95	6.36	36.65	7.54	59.724*	.387
Expressive vocabulary	19.48	7.99	18.47	6.34	33.95	8.11	74.803*	.442

Abbreviations: ADHD, attention-deficit hyperactivity disorder; SLD, specific learning disorder; TD, typically developing.
*$p < .001$.

TABLE 4 Correlations among receptive and expressive vocabulary, number of named/mutual close friends, and best friendship duration in children with and without ADHD and SLD

	Receptive vocabulary				Expressive vocabulary			
	SLD ($n = 64$)	ADHD ($n = 64$)	TD ($n = 64$)	Total sample ($N = 192$)	SLD ($n = 64$)	ADHD ($n = 64$)	TD ($n = 64$)	Total sample ($N = 192$)
Number of named close friends	0.14	0.18	0.26*	0.30**	0.10	0.01	0.28*	0.25**
Number of mutual close friends	0.28*	0.35**	0.54**	0.59**	0.30*	0.23*	0.52**	0.58**
Best friendship duration	0.32**	0.37**	0.44**	0.54**	0.32**	0.27*	0.44**	0.53**

Abbreviations: ADHD, attention-deficit hyperactivity disorder; SLD, specific learning disorder; TD, typically developing.
*$p < .05$; **$p < .01$.

both receptive and expressive vocabulary. Specifically, ADHD children's vocabulary appears to be significantly less developed than that of their TD peers (receptive: $p < .001$, expressive: $p < .001$). The same pattern of results emerged for the SLD group which appeared to achieve significantly lower in receptive ($p < .001$) and expressive ($p < .001$) vocabulary as compared to the TD group.

Positive correlations were found among the duration of best friendships, the number of mutual close friends, and receptive and expressive vocabulary for each group separately and for the total number of participants. Additional significant positive correlations emerged among the vocabulary variables and the number of named close friends only for the TD group and for the total number of participants (3rd research question) (Table 4).

In order to examine whether variance in children's number and duration of friendships would be partially explained by the existence or not of ND (group), their age, gender, and their vocabulary, a hierarchical regression analysis was computed separately for each of the three friendship variables (number of named close friends, number of mutual close friends, and best friendship duration). Age and gender were entered at Step 1, group (ADHD, SLD and TD) at Step 2, and the two vocabulary variables (expressive and receptive vocabulary) at Step 3 (Table 5) (4th research question).

For the number of named close friends, only receptive vocabulary predicted 11% of the variance, with better receptive vocabulary predicting greater number of named close friends for all the groups of children. Age, gender, group, and expressive vocabulary did not significantly predict the number of named close friends in the final model. As regards the number of mutual close friends, age and gender did not explain significant variance. At Step 2, group was found to predict 15% of the variance, meaning that TD children had more mutual close friends than the ADHD/SLD groups. At Step 3, receptive and expressive vocabulary added another 23% to the prediction, explaining in total 38% of the variance. Finally, the group explained 12% of the variance in children's friendships duration, showing that

TABLE 5 Summary of hierarchical regression analysis for the prediction of friendship duration, number of named close friends, and mutual close friends

Variable	β	*t*	*F*	R^2	ΔR^2	ΔF
Number of named close friends						
Step 1			.39	.01	.01	.39
Age	−.06	−.80				
Gender	−.03	−.42				
Step 2			1.31	.02	.02	3.12
Age	−.05	−.71				
Gender	−.03	−.46				
Group	.13	1.77				
Step 3			4.54	.11	.09	9.22**
Age	−.15	−1.93				
Gender	−.01	−.05				
Group	−.07	−.86				
Receptive vocabulary	.32	2.14*				
Expressive vocabulary	.06	.35				
Number of mutual close friends						
Step 1			.83	.01	.01	.83
Age	.02	.31				
Gender	−.09	−1.24				
Step 2			10.59	.15	.14	29.86**
Age	.04	.60				
Gender	−.09	−1.46				
Group	.37	5.47*				
Step 3			22.55	.38	.23	34.77**
Age	−.15	−2.34*				
Gender	−.05	−.88				
Group	.01	.17				
Receptive vocabulary	.28	2.27*				
Expressive vocabulary	.36	2.68*				
Best friendship duration						
Step 1			.70	.01	.01	.71
Age	.07	1.01				
Gender	−.04	−.56				
Step 2			8.18	.12	.11	22.97**
Age	.09	1.31				
Gender	−.05	−.72				
Group	.34	4.97**				
Step 3			17.97	.33	.21	28.03**
Age	−.08	−1.24				
Gender	−.01	−.07				
Group	.01	.13				

TABLE 5 (Continued)

Variable	β	*t*	*F*	R^2	ΔR^2	ΔF
Receptive vocabulary	.31	2.35*				
Expressive vocabulary	.29	2.11*				

*$p < .05$; **$p < .01$.

absence of ND can predict more long-lasting friendships. Receptive and expressive vocabulary added to the earlier explanation an additional 21% increasing the total explained variance to 33%.

4 | DISCUSSION

The present study sought to examine differences in the number of close friends (named and mutual), best friendship duration, and expressive and receptive vocabulary of children with SLD or ADHD and their TD peers. Furthermore, it explored whether receptive and expressive vocabulary would predict children's number of close named and mutual friends, and the duration of their best friendships.

The results showed that primary school children with either SLD or ADHD had close friends and best friends in their classroom. However, ADHD children's reported friendships were not always reciprocal, and thus, ADHD children had significantly fewer mutual close friends than children with SLD and TD. Children with SLD had, also, significantly fewer mutual close friends than their TD peers. Additionally, more SLD and ADHD children were found to have a best friend with ND when compared to their TD counterparts. The earlier findings are consistent with previous research evidence, both international and Greek, suggesting that ADHD children tend to have fewer friends (Blachman & Hinshaw, 2002; Kouvava & Antonopoulou, 2020; Mikami, 2010), and prefer to form and maintain friendships with other children with ND (Heiman, 2005; Normand et al., 2011; Wiener & Schneider, 2002). Perhaps, this lack of close friends and the tendency to make friend with other ND peers can explain why ADHD children often report feelings of loneliness at school (Al-Yagon & Margalit, 2006; Tur-Kaspa et al., 1999; Wiener & Tardif, 2004). An interesting finding, however, not well documented in the literature, refers to SLD children's tendency to formulate best friendships with ND peers in spite the fact that they have close friends at school (Doikou-Avlidou, 2015). It may be that SLD children, who are more likely to feel less confident due to their reading and writing difficulties (Doikou-Avlidou, 2015; Leseyane et al., 2018), feel secure and/or identify better with peers who also experience difficulties and are less judgmental. Children were also compared in their best friendships duration. In line with other studies (Al-Yagon & Margalit, 2006; Blachman & Hinshaw, 2002; Hartup, 1996; Kouvava et al., 2016), ADHD and SLD children experience best friendships of significantly shorter duration when compared to those of TD children indicating less-stable friendships and difficulty to maintain them.

Furthermore, the three groups of children were compared in their vocabulary. ADHD children's receptive and expressive vocabulary was significantly less developed compared to that of their TD peers. Previous research has also identified major difficulties in ADHD children's vocabulary (Gremillion & Martel, 2014), either expressive (K. Kim & Lee, 2009; Re et al., 2007), or receptive (Bruce et al., 2006), whereas other studies report no particular difficulties in the receptive vocabulary of children with ADHD (N. J. Cohen et al., 2000; Luo & Timler, 2008; Redmond et al., 2011). This controversy could be due to the great variation in the participants' age, as some studies involved preschool and others adolescent population. Moreover, this variation could also be justified by the different structures of the educational system of each country and the emphasis given on language learning and vocabulary development. SLD children also encountered difficulties in their receptive and expressive vocabulary which significantly differed from their TD counterparts. This finding supports previous research maintaining that children with SLD have poorer vocabulary comparing to TD children (Boada & Pennington, 2006; van Viersen et al., 2017), use simpler

utterances (Bryan & Pftaum, 1978), and have difficulties in vocabulary and expressive language when engaged into conversation (Bryan et al., 1981; Gallagher, 1999; Pennington & Bishop, 2009).

The present study also revealed significant associations between the friendship measures and the vocabulary measures. The number of close mutual friends and the best friendship duration were positively correlated with both receptive and expressive vocabulary in all three groups of participating children. For TD children (and the whole sample), there was an additional positive correlation between the number of named close friends and expressive and receptive vocabulary. The results have, also, shown that significant percentages of the variance in mutual close friends' numbers and friendship duration were explained by a combination of group, expressive and receptive vocabulary. The number of named close friends was predicted only by receptive language. This pattern of associations is in line with the group differences discussed earlier and, also, supports and expands previous findings on the link between social competence and linguistic skills (Clegg et al., 2005; Fujiki et al., 2001; Gallagher, 1999; Marton et al., 2009; Pickles et al., 2016; Toseeb et al., 2017). For example, some studies indicate that children with ADHD or SLD, who have difficulties in several areas of language development including expressive and receptive vocabulary, are less favoured in the formation and duration of their friendships (Burton, 2004; Martínez & Semrud-Clikeman, 2004; Marton et al., 2015; Parhiala et al., 2015; Van Viersen et al., 2017; Wiener & Tardif, 2004; Wong, 2003) and in the number of their friends (Doikou-Avlidou, 2015; Glass et al., 2012; Hellendoorn & Ruijssenaars, 2000; Kouvava et al., 2016; Leseyane et al., 2018; Wiener & Schneider, 2002). Thus, it can be assumed that children facing problems with their receptive or expressive vocabulary may also have problems with their friendship relationships, as deficits in receptive language have been associated with antisocial behaviour (Benner et al., 2002), and deficits in expressive language with self-regulation difficulties (Bohlmann et al., 2015; McClelland et al., 2007). On the contrary, children who understand and use a broad vocabulary are able to easily express their views, to discuss with more confidence and to resolve possible disputes with their friends, to overcome their conflicts and to make efforts to maintain their best friendships for a long time. In addition, children who are proficient in speech attract the interest of their classmates, who are more likely to approach and become friends with them. Consequently, TD children who do not confront any vocabulary difficulties have more close friends and their best friendship relationships last longer, while children with SLD and ADHD who have less developed receptive and expressive vocabulary encounter significant difficulties in both domains. Our results also point out that vocabulary must be taken into great consideration in the study of children's interpersonal relationships, although the direction of the relationship between vocabulary and friendships may be influenced by underpinning factors which are not included in this study, such as family environment.

The present study suffers certain limitations. Friendship relationships were examined exclusively at school, and more particularly at classroom level, in order to ensure their reciprocity, deliberately ignoring the fact that some children may have friends, and possibly more than 3, at school but also in other classes or outside school, for example in their neighbourhood. Moreover, in future studies, with larger samples of pupils and a variety of assessment tools, including school achievement tests, it would be worth investigating the impact of all aspects of children's language (e.g., pragmatic, morpho-syntactic, and phonological reading and writing) on different types of friendship relationships (casual, close, and best). Future studies' researchers are, also, advised to be particularly careful in the selection of their participants or even to investigate for overlapping symptoms, given the high levels of comorbidity in certain disorders, as for example in ADHD and SLD (Germanò, Gagliano, & Curatolo, 2010). In the present study, the selection of children with ADHD or SLD was solely based on their official diagnoses which clearly stated the disorder with no comorbidities. As ADHD often coexists with SLD or other disorders, such as anxiety or oppositional defiant disorder (APA, 2013), it would be interesting to replicate the present study involving ADHD children with comorbidities. Finally, the use of medication by ADHD children has to be carefully examined to better understand its role in the reduction of ADHD behaviours often rejected by peers, within social skills and behavioural management interventions (Hoza, 2007). The participating children of the present study did not receive any medication, may be because ADHD medications are cautiously prescribed in Greece, depending on the severity of symptoms, and parents often resist in the use of drugs by their ADHD children.

The present study advances scientific knowledge by providing evidence linking expressive and receptive vocabulary to the formation and maintenance of friendship relationships in primary school children with and without ND. Given the increasingly recognized role played by friendships in individuals' social adjustment and mental health, this study addresses an important area of development. In addition, as in most countries, students with SLD and ADHD attend mainstream schools at all levels of education; vocabulary difficulties could have an impact not only on their academic achievement but also on their relationships with peers and friends, and on their adjustment and well-being. Therefore, a practical implication of the study would be to inform parents, the school community, and all professionals working with children, of the importance of both receptive and expressive vocabulary on children's friendship relationships and the need to implement support programmes for enhancing children's vocabulary and alleviate their difficulties (Hochman, Carter, Bottema-Beutel, Harvey, & Gustafson, 2015; Leigers, Kleinert, & Carter, 2017). These programmes could involve children with and without ND in activities that interest and entertain them and which, through discussion and reflection, would aim at the development of linguistic and social skills, and the formation and maintenance of stable and high-quality friendships. Future research can build upon the current findings by including more aspects of language development and their impact on children's friendship relationships.

DATA AVAILABILITY STATEMENT

Research data are not shared.

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