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Diagnosis of Developmental Language Disorders in Incarcerated and Non-incarcerated Adolescents: A Systematic Review

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Abstract

Adolescents with Developmental Language Disorders (DLD) often have academic difficulties, experience limited vocational opportunities, and are potentially more likely to be incarcerated. This review sought to determine how DLD is defined and evaluated in the current literature and if this differs in studies specifically concerning incarcerated adolescents. This review also aimed to discern if and how the current research literature considers comorbid disorders when studying these populations. The search for this review was conducted in ComDisDome and yielded 24 eligible articles. The results indicate that the current literature does not have a consistent way of defining or testing for DLD, and the majority of the articles reviewed did not consider co-existing conditions in their populations of study. More research with consistent assessment and diagnostic methods and thorough consideration of comorbidity is necessary to accurately determine the prevalence of DLD in incarcerated populations. An accurate estimate of the prevalence of DLD in these populations could allow for policy changes regarding the provision of services for incarcerated adolescents and early intervention for at-risk youth.

Introduction

Communication skills can impact many areas of one's life, and a deficit in oral language can result in a multitude of poor outcomes (Clegg, Hollis, Mawhood & Rutter, 2005; Eadie, Conway, Hallenstein, Mensah, McKean & Reilly, 2018; Justice & Redle, 2014). Language disorders cause difficulties with learning and social use in areas including morphology, phonology, and syntax (American Speech-Language-Hearing Association (ASHA), 1993; Pawlowska, 2014). The terminology used for this population has varied over the last several decades. Diagnostic terms used have included developmental aphasia, specific language impairment, and most recently, developmental language disorder (Bishop, 2017). For the purposes of this paper, the term developmental language disorder (DLD) will be used.

DLD results in functional impairment in language and persists into adolescence (Bishop, Snowling, Thompson & Greenhalgh, 2017; Bishop, Snowling, Thompson & Greenhalgh, 2016; Clegg, et al., 2005; Johnson, Beitchman & Brownlie, 2010). DLD affects approximately 7% of the population (Norbury, Gooch, Wray, Baird, Charman, Vamvakas & Simonoff, 2016; Tomblin, Records, Buckwalter, Zhang, Smith & O'Brien, 1997). Preschool children with DLD often use simple syntax and inaccurate pronouns, and they often have limited vocabulary and poor discourse skills (Justice & Redle, 2014). They also may exhibit behavioral problems (Kesuma, Rismarini, Theodorus, Azhar, 2014; Prior, Bavin, Cini, Eadie, & Reilly, 2011). School-age children with DLD often have trouble with word finding, staying on topic, and conversational repair (Justice & Redle, 2014). These language difficulties continue into adolescence resulting in poor pragmatics, difficulty expressing themselves, difficulty initiating conversations, immature or simple discourse, and inappropriate answers to questions (Clegg et al., 2005; Eadie, et al., 2018; Ek, Norrelgen, Westerlund, Dahlman, Hultby & Fernell, 2012; Justice & Redle, 2014).

Individuals with DLD often also have difficulty with written language, including reading, simple vocabulary and grammar, as well as poor organization in written narratives (Williams, Larkin & Blaggan, 2010). As these difficulties persist into adolescence, they can result in academic problems (Clegg et al., 2005; Whitehouse, Watt, Line & Bishop, 2009; Snow & Powell, 2006), poor vocational outcomes (Whitehouse, et al., 2009), and social emotional problems (Eadie, et al., 2018; Snowling, Bishop, Stothard, Chipchase, Kaplan, 2006).

These challenges may also be associated with a greater risk of being incarcerated (Colins, Vermeiren, Vreugdenhil, van Den Brink, Doreleijers & Broekaert, 2010; Cook & Kang, 2016; Pyle, Flower, Fall & Williams, 2016; Quinn, Rutherford, Leone, Osher & Poirier, 2005; Snow & Powell, 2006; Prins, 2014). According to the current research literature, DLD is more common in incarcerated adolescents than in the general population (Bryan, Garvani, Gregory & Kilner, 2015). Although there is a large body of literature concerning the educational factors that lead to adolescents dropping out of school and eventually becoming incarcerated, the unmet needs for treatment of kids with DLD in order to prevent this greater risk of incarceration is rarely examined (Barnert, Perry, Azzi, Shetgiri, Ryan, Dudovitz, Zima, Chung, 2015; Pyle, et al., 2016). Incarcerated adolescents are particularly vulnerable population because they are often from lower-socioeconomic households (Balfanz, Spiridakis, Neild, Legters, Wald & Losen, 2003; Defoe, Farrington, Loeber, 2012), and minorities are overrepresented in the juvenile justice system (Moore & Padavic, 2010; Pope & Feyerherm, 1995; Wordes & Jones, 1998; Hsia, Bridges & McHale, 2004). Incarcerated adolescents are also more likely to have mental health disorders (Colins, et al., 2010; Pyle et al., 2016; Quinn, et al., 2005), and their disorders are less likely to be identified (Burrel & Warboys, 2000; Leone & Weinberg, 2014). In addition, adolescents with DLD, but especially incarcerated adolescents (Hughes, Chitsabesan, Bryan,

Borschmann, Swain, Lennoz & Shaw, 2017; Snowling, Bishop, Stothard, Chipchase & Kaplan, 2006), are likely to have an additional co-existing condition like attention deficit/hyperactivity disorder (ADHD), social difficulties, General Anxiety Disorder, and Conduct Disorder (Cohen, Vallance, Barwick, Im, Menna, Horodezky & Isaacson, 2000; McGrath, Hutaff-Lee, Scott, Boada, Shirberg & Pennington, 2008; Tirosh & Cohen, 1988).

Although there is a higher rate of comorbid conditions and DLD in incarcerated populations, there are also few studies specifically concerning this phenomenon. Not considering comorbid disorders can complicate accurate identification and effective treatment of DLD (Cohen, et al., 2000; Hughes, et al., 2017; McGrath, et al., 2008; Redmond, 2016; Redmond, Ash & Hogan, 2015; Tirosh & Cohen, 1998). Therefore, it is important for the literature to identify and examine co-existing conditions during assessment and treatment of these populations. It is unclear if the current literature does this.

It is also important for the literature to have consistency in defining and testing for DLD in order to make accurate assumptions about the prevalence of DLD in certain populations. However, due to the lack of an agreed upon term and clear diagnostic criteria surrounding DLD, there is little consistency throughout the literature (Bishop, 2017). This could make it challenging to accurately test for and diagnose DLD. While much of the current literature suggests that DLD affects a large portion of the population (Norbury, et al., 2016; Tomblin, et al., 1997) and is even more common in incarcerated populations (Bryan et al., 2015), it is difficult to make these assumptions without a consistent definition and methodology for assessing the disorder.

Assessment is a particularly problematic area, as some studies have found that standardized testing materials are not always valid and reliable (Dollaghan & Horner, 2011;

Spaulding, Plante, Farinella, 2006). Norm referenced tests can be helpful in allowing the examiner to obtain a score for an individual and then compare that score to other age matched peers. However, it is problematic when the test being used is not as valid or reliable as is necessary to accurately diagnose someone with a disorder (Betz, Eikhoff & Sulliva, 2013; Hutchinson, 1996). For example, previous versions of the Clinical Evaluation of Language Fundamentals (CELF; Semel, Wiig & Secord, 2003), have been determined to be not sensitive enough to identify some language disorders (Paslawski, 2005; Spekman & Roth, 1984; Summers, 1996). Furthermore, standardized tests, specifically norm-referenced tests, have been recognized as being culturally or linguistically biased and, therefore, not being sensitive enough to properly assess culturally or linguistically diverse populations (Laing & Kamhi, 2003). If the materials used to assess and diagnose DLD are not always accurate or reliable, it is difficult to assume that the current research literature is accurately estimating the prevalence of DLD in adolescent populations.

This review of the literature concerns the population of adolescents with DLD. The purpose of this review is to describe: how the literature has defined DLD in adolescents, and if this differs when the population being studied is incarcerated; what methods are used for assessment of DLD in adolescents, and if different testing methods are used if the population is incarcerated versus not incarcerated; and if the studies consider comorbid disorders in all adolescents with DLD. This is important because without a clear definition and sensitive assessment tools, it is difficult to evaluate the prevalence of a specific disorder. A consistent and well-defined base of research behind DLD would encourage more research, inform more people about the risks associated with DLD, and inform policy surrounding the services required for incarcerated individuals.

Methods

Inclusion Criteria

Studies were included if they had a clear, defined population that included adolescents ages 10:0-18:0 (American Psychological Association, 2002). Two studies with participants with an average age of 24 were included because they are longitudinal studies concerning the outcomes of DLD in regards to incarceration or vocation and were useful to include in the review due to their focus on DLD outcomes (Conti-Ramsden, Durkin, Toseeb, Botting, & Pickles, 2017; Winstanley, Webb & Conti-Ramsden, 2018). Studies written during or after 1994 were included to ensure that all studies in the review occurred after the Violent Crime Control and Law Enforcement Act, also known as the "Tough on Crime Act", of 1994 was passed. This act changed the demographics of the justice system by allowing juveniles to be tried as adults, increasing maximum penalties for drug related offenses, and allocating funding towards supporting youth who have been or are at risk of being incarcerated (Department of Justice, 1994). Studies concerning individuals with acquired or neurological disorders, including hearing impairment, autism spectrum disorder (ASD), and developmental delays were excluded because the population under investigation for this review concerns only adolescents with DLD. One study by Mathrick, Meagher, and Norbury concerning adolescents with ASD was still included because the primary concern of the study is adolescents with DLD (2017). This article specified that a portion of the participants included had a co-existing diagnosis of ASD but focused mainly on DLD.

Search

Two searches were conducted to identify articles for this systematic literature review. Both searches used the database ComDisDome. This database was selected because it includes

literature from the field of speech-language pathology while incorporating the multidisciplinary nature of the field of Communication Sciences and Disorders, is not solely based in the domains of medicine or education, and is updated monthly. Searches were designed to capture articles concerning adolescents with DLD. Synonyms of language impairment were utilized to capture more articles. The first search was as follows:
(ti(adolescents) OR ti(youth) AND (ab(oral language impairment) OR ab(oral language disorder) OR ab(language learning disorder) OR ab(developmental language disorder) OR ab(language learning impairment); after 1993, peer reviewed; conducted on 5/22/2018.

The first search did not yield as many results as were necessary to conduct a thorough review, so a second search was conducted. The second search was as follows:
(su(adolescen*) OR su(youth) OR su(young)) AND (su(language disorder) ORsu(language impair*) OR su(oral language impairment) OR su(oral language disorder) OR su(language learning disorder) OR su(language learning impairment) ORsu(developmental language disorder)) NOT (su(Autism) OR su(dyslexia) OR su(ADHD) OR su(hearing loss) OR su(deaf) OR su(hearing impair*) OR su(child*) ORsu(acquired) OR su(TBI) OR su(Traumatic Brain Injury) OR su(stroke) OR su(head injury) OR su(injury) OR su(neuro*) OR su(adult)); after 1993, peer reviewed; conducted on 11/6/2018.

Titles and abstracts of articles yielded in each search were reviewed to ensure exclusion criteria were met. Articles concerning preschool or school-age populations, acquired disorders, language delay, exclusively written language, systematic reviews, and studies without a clearly defined population were excluded (see Figure 1).

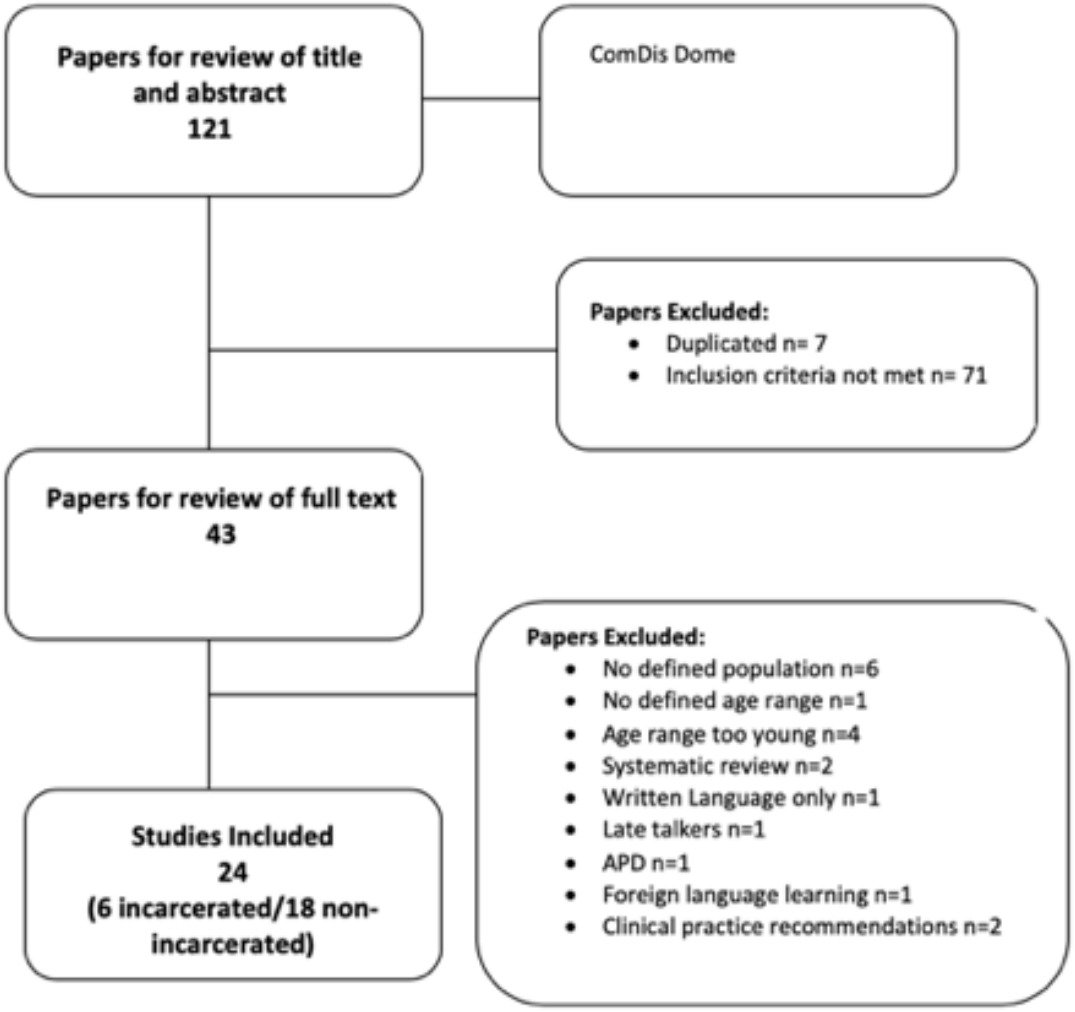

Figure 1. Outline of studies yielded from search in ComDisDome and studies excluded during application of inclusion criteria.

The full text of each article was then reviewed, and a table was used to organize data from each article (see Appendix A). The collected data included year published, type of study, number, age, gender, and demographics of the population, origin of the study, skills assessed, tests/methods used, how the study defines DLD, if the population in the study is incarcerated or not, and if comorbidity is considered.

Results

As described in Figure 1, The search yielded a total of 121 articles. After screening the abstracts, 43 articles were accepted. Studies were excluded at this stage if they did not specify or include the population under investigation, had too young of a population or an unspecified age range, were systematic reviews, or were concerned with disorders other than DLD. For these reasons, 19 articles were excluded, leaving 24 eligible articles to be included in the review. These 24 articles were assessed for risk of inconsistent DLD definitions, testing methods, and consideration of comorbid disorders.

Of all the studies reviewed, five were concerned specifically with incarcerated adolescents, one study considered incarceration risk/the likelihood of an adolescent committing a crime, and 18 studies observed non-incarcerated adolescents.

DLD Definition

Of the 24 included studies, one study did not provide a definition of DLD (Bryan, Freer, & Furlong, 2007), four used previously diagnosed participants (Mathrick, et al., 2017; Miller, Leonard & Finneran, 2008; Snowling, Adams, Bishop & Stothard, 2001; Ward-Lonergan, Liles & Owen, 1996), 16 defined DLD as a below average score on a language test (e.g., Nippold, Masfield, Billow & Tomblin, 2008; Reed, Patchell, Frederick, Coggins, Truman & Hand, 2007; Weismer, Plante, Jones & Tomblin 2005), and three used students enrolled in "Language Units" (Conti-Ramsden, et al., 2017; Rinaldi, 1998; Winstanley, Webb & Conti-Ramsden, 2018). Language Units are specific to the United Kingdom; they are classrooms within mainstream schools with an emphasis on language where children with language impairment may be placed (Conti-Ramsden & Botting, 1999). While the eligibility criteria for enrollment in Language Units may vary depending on the school, children with a Statement of Special Education Needs (SEN) indicating they have a language impairment are considered eligible for and are often enrolled in

Language Units (Dockrell, Lindsay, Letchford & Mackie, 2006). Of the 16 studies that relied on standardized language tests to define DLD, 15 of them used a previous version of the CELF language test (e.g., Sanger, Moore-Brown, Magnuson, & Svodoba, 2001; Snow & Woodward, 2016; Winstanley, et al., 2018). Furthermore, the 16 studies relying on standardized tests to define DLD utilized varied cutoff points. Of the 16 studies, seven used a cutoff score of one standard deviation below the mean (e.g., Botting & Conti-Ramsden, 2008; Conti-Ramsden, Durkin, Toseeb, Botting, & Pickles, 2008; Durkin, Conti-Ramsden, Walker & Simkin, 2009; Lee, 2016; Snow & Woodward, 2016; Wadman, Durkin & Conti-ramsden, 2008; Wetherell, Botting & Conti-Ramsden, 2007). Three used a cutoff score of 1.25 standard deviations below the mean (Nippold, et al., 2008; Reed, et al., 2007; Weismer, et al., 2005). Three used a cutoff score of 1.3 standard deviations below the mean (Sanger, Creswell, Dworak & Schultz, 2000; Sanger, et al., 2001; Sanger, Moore-Brown, Montgomery, Rezac & Keller, 2003). One study did not specify an exact cutoff point (Miller, Leonard, Kail, Zhang, Tomblin & Bruce, 2006). The remaining two studies used scores within the 25th percentile as a cutoff point (Miller & Gilbert, 2008; Young, Bietchman, Johnson, Douglas, Atkinson, Escobar & Wilson, 2002).

Of the articles specifically concerned with incarcerated adolescents, four relied on standardized testing materials (specifically the CELF-3 and CELF-4), one utilized previously diagnosed participants currently enrolled in language units, and one did not clearly define DLD.

Of the studies considering non-incarcerated adolescents, two used participants who were previously diagnosed, two used participants enrolled in language units, and twelve used standardized testing measures to define DLD. Of the twelve that used standardized testing measures, four utilized the CELF-4, three used the CELF-3, and two relied on the CELF-R for testing for/defining DLD.

Tests/Methods

Many studies utilized quantitative measures to test for DLD, some used qualitative measures, and some used a combination of quantitative and qualitative measures. A previous version of the CELF was used by 15 studies to test for DLD (e.g., Sanger, et al., 2001; Snow & Woodward, 2016; Winstanley, et al., 2018). Six studies used the CELF-4, seven used the CELF-3, and two studies used the CELF-R. In addition, five studies utilized The Adolescent WORD test (WORD Test; Zachman, Huisingh, Barret, Orman, Blagden, 1989; Conti-Ramsden, et al., 2008; Conti-Ramsden, et al., 2017; Sanger, et al., 2001; Sanger, et al., 2003; Snowling, et al., 2001), and eight studies used some form of cognitive test (e.g., Sanger, et al., 2001; Young, et al., 2002). Of the eight studies that relied on cognitive tests, three used the Wechsler Abbreviated Scale of Intelligence (WASI; Wechsler, 1999), one used the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981), four used the Wechsler Intelligence Scale for Children-Third Edition (WISC-III; Weschler, 1991), and one used the WISC-III and the Universal Nonverbal Intelligence Test (UNIT-IQ; Bracken & McCallum, 1998). Of the total studies, six relied on interviews as a qualitative measure (e.g., Sanger, et al., 2000; Sanger, et al., 2003; Young, et al., 2002).

As for the quantitative measures used for each population, five of the six studies concerning incarcerated individuals relied on a previous version of the CELF (3rd or 4th edition) when testing for or defining DLD, and nine of the 18 studies concerning non-incarcerated individuals also used a previous version of the CELF (R-4). Regarding qualitative measures, four of the studies concerning incarcerated populations utilized interviews as an assessment method, and two of the studies of non-incarcerated populations interviewed participants as an assessment method.

Comorbidity

Out of the 24 studies, seven studies considered co-existing conditions within their population (Conti-Ramsden, et al., 2008; Conti-Ramsden, et al., 2017; Lee, 2016; Mathrick, Meagher & Norbury, 2017; Miller, et al., 2006; Wadman, et al., 2008; Winstanley, et al., 2018). Four of the studies observed behavioral disorders, one study considered anxiety, four studies considered ADHD, one observed social/emotional disturbance, and one study noted ASD. In addition to these seven studies, two studies mentioned the importance of gathering data and considering co-existing conditions within the study's population but did not include any information about observing co-existing conditions of their participants in their study (Bryan, et al., 2007; Snow & Woodward, 2016). Of the studies that examined or tested for co-existing conditions in their participants, all but one found that some portion of their study participants had a coexisting condition. One article that examined comorbidity found that no participants within the study had a co-existing condition of ADHD (Wadman, Durkin & Conti-Ramsden, 2008). This article was included in the grouping of articles that considered comorbidity for the purposes of this review; the remainder of the articles did not consider comorbidity in any capacity.

Of the six studies concerning incarcerated adolescents, two considered co-existing conditions. Similarly, five of the 18 studies concerning non-incarcerated adolescents considered co-existing conditions.

Discussion

This literature review was conducted to determine how the current literature concerning adolescents with DLD defines DLD, measures DLD, and if comorbidity is taken into consideration as well as how these factors might differ between literature on incarcerated versus non-incarcerated adolescents. The results of the comparison of incarcerated and non-incarcerated

adolescents reveal that there were no obvious inconsistencies between the two groups of studies. The results of this comparison do, however, reveal that there are inconsistencies throughout all of the literature rather than exclusively within studies on one population (incarcerated or not). These inconsistencies include unclear or vastly differing definitions of DLD, potentially inadequate assessment tools, and a limited consideration of comorbid conditions. According to the current research literature, co-existing conditions can affect assessment and intervention, so it is important for studies to understand and consider how their participants' might be affected by comorbidity.

The results revealed that the current literature does not have a consistent way of defining and measuring DLD in adolescents. While many studies relied on standardized test scores to determine the presence of DLD, others utilized previous records/diagnoses or more qualitative measures, like interviewing. According to the current research literature, not all standardized testing materials are sensitive, valid, or reliable enough to accurately determine the presence of a language disorder (Paslawski, 2005; Summers, 1996; Speckman & Roth, 1984). The majority of the studies reviewed utilized tools and materials to test and define DLD that may potentially be less sensitive in identifying characteristics of language disorders.

Some limitations to this review should be acknowledged. First, the search for studies to be reviewed only utilized one database, which may have limited the scope of articles included in the search. Furthermore, the search criteria yielded a small number of articles. This small number likely resulted from the omission of written language as part of the search criteria. Studies concerning written language impairments were excluded because the scope of this review was aimed specifically at understanding how DLD is considered and studied in adolescents. In

addition, including written language disorders would have potentially complicated the review and made the results more difficult to interpret.

Future research should continue to investigate adolescents with DLD. Having more studies concerning DLD in incarcerated adolescents and the potentially higher prevalence in that population is important. The current research literature claims that DLD is more prevalent in incarcerated populations. It is difficult to make this claim without a larger foundation of literature with a shared criterion for measuring DLD. If future research utilizes a consensus DLD definition, more valid, reliable, and culturally sensitive assessment instruments, and a more careful consideration of comorbidity in study populations, a more accurate measurement of the prevalence of DLD in specific populations is possible. Bishop's consensus article regarding the terminology and diagnostic criteria of DLD provides a strong consensus definition that is recommended for future research (2017). A more accurate estimate of the prevalence of DLD in adolescents, specifically incarcerated adolescents, could inform further research and policy change to support this vulnerable population in terms of services given while incarcerated and early intervention for vulnerable populations to prevent incarceration.

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Appendix A

Study:	Authors	Date:	Age:	n=?	INC?	Tests/Methods:	DLD Definition	Comorbidity?
Intervening to address communication difficulties in incarcerated youth: A Phase 1 clinical trial	Snow & Woodward	2016	N/A	6	Yes	CELF-4, LCQ, SCG, TLC-E, Kaufman Brief Intelligence Test (non-verbal)	CELF-4 (1 SD below)	No*
Language and communication difficulties in juvenile offenders	Bryan, Freer, & Furlong	2007	15:2-18:1	58	Yes	TROG-2, BPVS-II, TOAL-3, Self assessment, Basic Skills Initial Assessment	Unclear	No*
Prevalence of language problems among adolescent delinquents: a closer look	Sanger, Moore-Brown, Magnuson, & Svodoba	2001	13.5-18.4	67	Yes	WISC-III (IQ scores), IEP, CELF-3, WORD test, interviews, PPVT-III, CASL-Pragmatic Subtest	CELF-3/WORD (1.3 SD below)	Yes, behavioral disorders and ADHD
More or less likely to offend? Young adults with a history of identified developmental language disorders	Winstanley, Webb, Conti-Ramsden	2018	$\bar{x}$=24	84	Yes*	CELF-4 and interviews	Language Units	Yes, behavior disorders/aggression and rule breaking, substance abuse,
Education and employment outcomes of young adults with a history of developmental	Conti-Ramsden, Durkin, Toseeb, Botting, & Pickles	2017	$\bar{x}$=24	84	No	CELF-4, TOWRE, WORD, education data, employment status	Language Units	No

language disorder								
Pragmatic comprehension in secondary school-aged students with specific developmental language disorder	Rinaldi	1998	11:11-14:10	64	No	British Picture Vocabulary Scale, IEPs	Language Units	No
Young adult academic outcomes in a longitudinal sample of early identified language impaired and control children	Young, Bietchman, Johnson, Douglas, Atkinson, Escobar, Wilson	2002	18-19	264	No	WAIS-R, WJ-R, WCST, RAN, Pig Latin (phonology), interviews, background info	Below cutoff-unspecified	Yes, learning disorders; also interviewed about behavioral problems, didn't show results
Episodic memory retrieval in adolescents with and without developmental language disorder (DLD)	Lee	2016	x=16.73	23 DLD; 23 w/o DLD	No	WASI, EVT-2, PPVT-4, TOAL-4, CELF-4	1 SD below average score	No
Cultural analysis of communication behaviors among juveniles in correctional facility	Sanger, Creswell, Dworak, Schultz	2000	13:1-18:9	78	Yes	Interviews, observation, CELF-3	CELF-3 (1.3 SD below)	No
Female incarcerated adolescents with language disorders talk about their own	Sanger, Moore-Brown, Montgomery, Rezac, Keller	2003	13:6-17:7	n=13	Yes	Reviewed records, Interviews, CELF-3, WORD, PPVT-III, CASL	CELF-3/WORD (1.3 SD below)	No

communication behaviors and learning								
Grammaticality judgements in adolescents with and without language impairment	Miller, Leonard, Finneran	2008	16	181	No	Sentence pairs with grammatical errors	previously diagnosed participants	No
Contextual strategy instruction: socially/emotionally maladjusted adolescents with language impairments	Ward-Lonergan, Liles, Owen	1996	13-16:11	20 (10 LI, 10 no LI)	No	20 sentences containing nonsense word	previously diagnosed participants	Yes; socially/emotionally maladjusted diagnosed participants
Response time in 14-year-olds with language impairment	Miller, Leonard, Kail, Zhang, Tomblin, Bruce	2006	14	66	No	PPVT-RSS, CRVT-RSS, CELF-3 RSS, QRI	Below cutoff score; unspecified	No
Narrative in adolescent specific language impairment (SLI): a comparison with peers across two different narrative genres	Wetherell, Botting, Conti-Ramsden	2007	13:1-15:3	118 (99 no DLD, 19DLD)	No	Story telling tasks: Frog, where are you? and spontaneous narrative task	IQ greater than 80 and 1 SD below mean on one or more standard language assessment tests	No
The role of language, social cognition, and social skill in the functional social outcomes	Botting, Conti-Ramsden	2008	16	139	No	CELF-R & social skills measures/ questionnaires	IQ above 80 & CELF-R less than 85 (1 SD below mean)	No

of young adolescents with and without a history of SLI								
Educational and interpersonal uses of home computers by adolescents with and without specific language impairment	Durkin, Conti-Ramsden, Walker, Simkin	2009	16:2-18:2	55	No	PIQ/WASI, CELF-4, TOWRE, WRAT-3	IQ above 80 & one standard language test score below 1 SD below mean	No
Comparison of performance on two nonverbal intelligence tests by adolescents with and without language impairment	Miller, Gilbert	2008	x=13:9	n=204	No	WISC-III IQ, WISC-III Block Design, WISC-III Picture Completion, UNIT IQ, UNIT Symbolic Memory, UNIT analogic reasoning	Above cutoff (25th percentile) in non-verbal IQ but below cutoff (25th percentile) in language scores (RAN, WCST)	No
Informativeness of the spoken narratives and of younger and older adolescents with specific language impairments and their counterparts with normal language	Reed, Patchell, Frederick, Coggins, Truman, Hand	2007	12-16:11	60 (30 DLD)	No	Frog, where are you?	Below 1.25 SD on CELF-3 or TOWK	No
A functional magnetic resonance imaging	Weismer, Plante, Jones, Tomblin	2005	x= 14:1	16 (8 DLD, 8 control)	No	WISC-III, CELF-3, PPVT-R, CREVT, Nonword	1.25 SD's below mean on 2/5	Yes

investigation of verbal working memory in adolescents with specific language impairment						repetition task, Competing Language Processing Test-Word Recall	composite scores	
Language and independence in adolescents with and without a history of specific language impairment	Conti-Ramsden, Durkin, Toseeb, Botting, & Pickles	2008	15:2-16:9	120	No	CELF-R, WORD, PIQ	Greater than 80 on PIQ (WISC-III) and below 85 (1 SD below) on CELF-R	No
Educational attainments of school leavers with a preschool history of speech language impairments	Snowling, Adams, Bishop, Stothard	2001	16-27	71	No	PIQ (WISC-III), VIQ, (WORD)	previously diagnosed participants	No
Evaluation of interview skills training package for adolescents with speech, language, and communication needs	Mathrick, Meagher, Norbury	2017	17-19	12 & 34 (2 studies)	No	WASI, Conducted interviews; WASI, & total language composite	previously diagnosed participants; in special education	ASD, ADHD, Anxiety
Syntactic Development in Adolescents With a History of Language Impairmen	Nippold, Masfield, Billow, Tomblin	2008	14:6-17:5	102	No	CELF-3, SYN, Peer conflict resolution spoken discourse task	1.25 SD below mean for 2 or more composite test scores (subtests from test	No

ts: A Follow-Up Investigation							of language development)	
Self-Esteem, Shyness, and Sociability in Adolescents with Specific Language Impairment (SLI)	Wadman, durkin, conti-ramsden	2008	16-17	54	No	RSES; CELF-4 & IQ(WASI)	Core language score below 1 SD, IQ 80 or above, no ASD diagnosis, no hearing impairment	Yes, ADHD