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### The Language Abilities of Justice-Involved Adults

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Language Abilities of Justice-Involved Individuals

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### **Abstract**

This study explores the relationship between language abilities and involvement with the justice system across the lifespan. Previous research has demonstrated a significantly higher prevalence of language impairment in juvenile justice populations, relative to the general population. These language impairments have been found across both expressive and receptive abilities, often previously undiagnosed. Further, juvenile justice involvement is a well-established predictor for later adult criminal behavior. However, no studies to date have explored the effects of language abilities and juvenile justice involvement on future outcomes, namely continued justice involvement in adulthood. The current study utilizes archival data on 95 incarcerated men to analyze the relationships among language, juvenile justice involvement, and adult justice involvement. Language abilities were hypothesized to moderate the relationship between juvenile justice involvement and adult justice involvement in this sample. Unfortunately, this hypothesis was not able to be tested due to the unexpected lack of significant relationships between adult justice involvement and both language abilities and juvenile justice involvement, and the surprising positive correlation between language abilities and juvenile justice involvement in this sample. Several limitations related to the sample, measures, statistical plan, and design of the current study may explain these unexpected findings. Given the high occurrence of language impairments in forensic populations, additional research should be conducted to further delineate the relationships among language abilities, juvenile justice involvement, and adult justice involvement to inform clinical practice and policy.

*Keywords:* language impairment, developmental language disorder, juvenile justice involvement, criminal justice involvement, criminal behavior

### Language Abilities of Justice-Involved Individuals

Language is important to consider in justice involvement across the lifespan, since the ability to verbally communicate and understand abstract information is crucial to successful engagement in the juvenile and adult justice systems. Juvenile justice involvement is linked to future adult justice involvement (Benda et al., 2001; Piquero & Buka, 2002; Rhoades et al., 2016). Language abilities, juvenile justice involvement and adult justice involvement have never been studied together, potentially because language is mostly studied as a developmental matter. Each of these topics will be discussed based on the foundational literature, and a novel study will be introduced to investigate language abilities, juvenile justice involvement, and adult justice involvement in an archival dataset of justice-involved adults.

#### **Language**

Language is a structured system of communication, containing rules that support the process of linguistic comprehension and production (Brownlie et al., 2004). Individuals with language impairments may have problems with language referring to events. Spatial concepts such as beside or behind, and time concepts of yesterday or tomorrow may also present as a difficulty. Children with expressive language limitations may use language lacking in detail, while children with receptive language deficits may have problems understanding and following directions at school and at home. Speech impairments, which is distinct from language impairments, involves difficulties physically articulating spoken language, such as stuttering, apraxia, and dysarthria, which may interfere with their being understood.

Language ability includes, at least, receptive and expressive semantics, morphology, and syntax. It can be influenced by an individual's early communication environment. Maternal language input and experience of caregiver-child interaction are cited as instrumental in language

development (Hoff, 2003). Language scores for children and adolescents attending schools in areas of social disadvantage have been shown to be significantly lower (Spencer et al., 2012). Language difficulties have been related to increased internalizing and externalizing behavior (e.g. aggression, mental health issues), some of which are risk factors for criminality and delinquent behavior (Cohen et al., 1998; Clegg, Hollis, Mawhood, & Rutter, 2005; Beitchman et al., 1999; Bryan, Garvani, Gregory, & Kilner, 2015). An abundance of literature suggests a high prevalence of language impairments among youth involved in the criminal justice system, relative to the general population and controls within studies.

### **Language and Juvenile Justice Involvement**

Research has shown, relative to the general population, a disproportionate amount of young people involved with the juvenile justice system have Developmental Language Disorders (DLD). Overall, studies indicate that in comparison to control groups, justice involved individuals do significantly worse on language measures and across all aspects of language (Bryan, 2004; Bryan, Freer, & Furlong, 2007; Snow & Powell, 2008; Blanton & Dagenais, 2007; Lount, Purdy, & Hand, 2017; Humber & Snow, 2001), indicating justice-involved individuals have limitations verbally communicating and understanding information.

In the United States, 10% of general population have a history of DLD, yet studies have found much high prevalence rates in forensic samples (Davis, Sanger, & Morris-Friehe, 1991; Hopkins, Clegg, & Stackhouse, 2018; Blanton & Dagenais, 2007). However, much of the most illustrative research has been conducted outside of the US. For example, approximately 60% of young offenders in the UK have DLD, compared to 1% of general population (Bryan, 2004). Research conducted by Lount et al. (2017) in New Zealand found that 58% of young offender participants could be classified as having moderate-to-severe language disorder, compared with

only 8% of the controls. In addition, 87% of the youth offender group had scores below the mean (Lount et al., 2017). Snow and Powell (2008) determined that just over half of their Australian sample of young male offenders had language impairments, and were approximately 2 years behind their non-offending peers. Similarly, Bryan et al. (2007) surveyed UK juvenile offenders and found that no participant gained a score consistent with their chronological age. Two-thirds of the sample had not achieved Level 1 in literacy, compared with rates of 3% to 12% in typically developing groups of non-offenders (Bryan et al., 2007). Humber and Snow (2001) assessed a group of male adolescents serving community orders in Australia and compared their abilities with a control sample from local schools. Findings indicated a large discrepancy between all aspects of language measured, with the children who had offended scoring significantly below their peers. Specifically, subtests for understanding ambiguous sentences, making inferences and understanding metaphors were significantly lower for the offender group than control group, yet, none of the samples had received intervention for language difficulties (Humber & Snow, 2001).

A noteworthy finding across international studies in forensic samples is that language difficulties have previously gone unrecognized and undiagnosed; therefore, some young offenders go through life with no intervention or treatment for these language difficulties (Hopkins et. al., 2018; Bryan et al., 2015; Humber & Snow, 2001; Blanton & Dagenais, 2007; Gregory & Bryan, 2011). Gregory and Bryan (2011) found 20% of the children in a forensic sample displayed severely delayed skills, previously undiagnosed. Bryan et al. (2015) later found around 30% of the participants scored 1.5 SD below the mean on the language assessments, but that only 2 participants had a previous record of language difficulties.

The relationship between justice involvement has been further researched to link language development to offending and offending severity. Several studies have furthered the exploration of language and criminal behavior with experiments and longitudinal studies elaborating on the impact of early language difficulties on later offending behavior. Stattin and Klackenber-Larsson (1993) conducted a longitudinal study of typically developing children from birth to adulthood and found significant correlations with registered criminality and language development as early as at 6 months, with language measured by a psychomotor developmental test. Hopkins et al. (2018) found that for every unit increase in language ability scores, participants were 1-5 times more likely to be categorized as a non-offender. Over half of their young offender sample scored more than 2 SDs below the age-matched norm for receptive language abilities, and 95% scored 2 SD below the age-matched norms for expressive language abilities. Similarly, Snow and Powell (2011) reported an elevated rate of DLD in young offenders convicted of more serious offenses; when language competence was examined as a function of offending severity, those with higher offending scores performed more poorly on the language measures than their counterparts with lower offending scores.

Prior research clearly demonstrates that many individuals involved with the justice system have underdeveloped language skills, and that language impairment may play an important role in their criminal behavior. Moreover, these language impairments may present as impertinence or uncooperativeness, which may further disadvantage an individual in a justice setting that is highly dependent on following rules (Snow et al., 2016). These results emphasize the role of language in understanding delinquent behavior. When controlling for important socioeconomic status and family factors, individuals with language impairments are still at an increased likelihood of displaying criminal behavior (Brownlie et al., 2004).

### **Juvenile Justice Involvement and Adult Justice Involvement**

Juvenile justice involvement has been shown to be strongly related to adult justice involvement, though delinquency and criminal behavior also appears to decrease for most over time (Farrington, 1986). Previous research indicates that prior incarceration and age of first offense to be strong predictors of adult justice involvement (Benda et al., 2001). Chronic juvenile offending was found to be the strongest predictor of adult offender status among both male and females in their sample (Piquero & Buka, 2002). Rhoades et al. (2016) found support for these results, in that each additional juvenile referral increased the risk of arrest in adulthood by 9% for any arrest and 8% for felony arrest. There are many factors that may contribute to the relationship between juvenile and adult justice involvement. This study explores language as a potential contributor.

### **Current Study**

There are strong theoretical links between language abilities and juvenile justice involvement, and juvenile justice involvement and adult justice involvement. However, no prior research has explored if language impacts the relationship between juvenile justice involvement and adult justice involvement. This is the aim of the current study. Specifically, based on literature indicating that the probability of being a non-offender increases with language ability (Hopkins et al., 2018), this study hypothesizes that language ability will have a negative relationship with juvenile arrest history, such that as language abilities increase, juvenile arrest history decreases (*Hypothesis 1*). Additionally, although no prior research has studied this relationship, given the high occurrence of language difficulties in juvenile samples and its relationship with offending, it is possible that this relationship also exists within adult samples. Therefore, this study hypothesizes that language ability will have a negative relationship with

adult arrest history such that as language abilities increase, adult arrest history decreases (*Hypothesis 2*). In accordance with prior research indicating prior incarceration and chronic juvenile offending are predictors of later adult justice involvement, this study further hypothesizes that juvenile arrest history and adult arrest history will have a positive relationship, such that as juvenile justice involvement increases, adult justice involvement increases (*Hypothesis 3*). Finally, it is hypothesized that there will be a relationship between language ability, juvenile justice involvement, and adult justice involvement; specifically, language ability will moderate the relationship between juvenile and adult justice involvement (*Hypothesis 4*). In other words, when controlling for language ability, the relationship between juvenile and adult justice involvement will be reduced, suggesting that language is an important factor that contributes to the relationship between juvenile and adult justice involvement.

## **Methods**

### **Design**

The current study is a secondary analysis of archival data from a prior study exploring the ability of neuropsychological assessment to inform violence risk assessment (LaDuke, 2015). The results of that project do not significantly overlap with the current study in terms of focus or content. The current study uses a cross-sectional, correlational design to analyze the relationship between language, juvenile justice involvement, and adult justice involvement.

### **Participants**

Between February 2014 and April 2015, individuals at a private correctional facility in a large Mid-Atlantic state were randomly selected for invitation to participate (LaDuke, 2015). The sole inclusion criterion was being a resident of the correctional facility. Exclusion criteria included being a woman; placement at the correctional facility from a county jail, or due to a

parole violation; having been diagnosed with a major psychotic or mood disorder, blindness, deafness, or upper extremity impairment; and lack of proficiency in comprehending English, as defined by less than a 5<sup>th</sup> grade reading level.

A total of 217 individuals were invited to participate, of which 122 indicated interest and 100 ultimately completed informed consent. Of these 100 voluntarily consented participants, 4 lacked proficiency in comprehending English and were not included in further analyses. The first participant served as a pilot participant and was not included in further analyses. Therefore, the final sample included in further analyses include 95 participants.

Participants identified themselves as Black or African American ( $n = 53$ , or 56%); White or Caucasian ( $n = 26$ , or 27%); Hispanic, Latino, or Spanish ( $n = 18$ , or 19%); American Indian or Native Alaskan ( $n = 7$ , or 7%); Asian or Asian American ( $n = 1$ , or 1%); and Other ( $n = 7$ , or 7%). Participants identified their dominant language as English ( $n = 88$ , or 93%); Spanish ( $n = 5$ , or 5%); or Other ( $n = 2$ , or 2%). The average age of participants was 33.71 years ( $SD = 10.75$  years). The average education level for participants was 11.92 years ( $SD = 1.49$  years). Participants identified themselves as right-hand dominant ( $n = 74$ , or 78%) or left-hand dominant ( $n = 10$ , or 11%) (handedness was not identified for  $n = 11$ , or 12%).

### **Procedure**

Incoming individuals at the correctional facility were selected for invitation to participate in the current study using a random numbers table. Those who were interested received a brief eligibility screening for the study. Following informed consent, participants were verbally administered a demographic questionnaire and completed a screening of the WRAT4 Word Reading subtest to ensure reading proficiency eligibility was met. Consented participants who satisfied inclusion and exclusion criteria were administered the battery of neuropsychological

and other clinical measures across two sessions. The data collection was completed by Graduate-level research assistants, trained by a team of experienced forensic psychologists and neuropsychologists board certified through the American Board of Professional Psychology. Relevant neuropsychological and clinical measures were administered in a randomized order to ensure confounds related to participant motivation, reactivity, and withdrawal were balanced across measures. Performance validity was assessed through two embedded performance validity measures. No participants were removed due to invalid performance. Each case file was randomly assigned to two appropriately trained coders, who input all variables independently. Only datapoints that had consistency between both coders were included in the analyses.<sup>1</sup>

## **Measures**

### ***WRAT-4- Wide Range Achievement Test, 4th edition (WRAT4)***

The WRAT4 (Wilkinson & Robertson, 2006) is a measure of basic academic skills and consists of four subtests: Word Reading, Sentence Comprehension, Spelling, and Math Computation. Each subtest receives a raw score, grade equivalent score, and age- and grade-referenced standard scores. The WRAT4 (including the Word Reading subtest) exhibits high test-retest and alternate form reliability, content validity and internal consistency. The WRAT4 has high convergent validity with prior versions of the WRAT, alternate achievement tests, and measures of intelligence (Wilkinson & Robertson, 2006). The raw score on the WRAT4 Word Reading was used in the current study as a measure of receptive language ability.

<sup>1</sup> Due to social distancing regulations put in place due to covid-19, reconciliations between coders were unable to be completed. Datapoints were deleted for the following variables: WRAT-4 Word Reading Subtest (n = 5), WASI-II vocabulary subtest (2), juvenile arrests (2), juvenile dispositions (2), juvenile placements (2), adult overall arrests (3), adult convictions (3), adult incarcerations (3).

***Wechsler Abbreviated Scale of Intelligence, 2<sup>nd</sup> Edition (WASI-II)***

The WASI-II (Wechsler, 2011) is a brief measure used to estimate intelligence (IQ) and consists of four subtests: Vocabulary, Similarities, Block Design, and Matrix Reasoning. The WASI-II has shown high internal consistency, test-retest reliability, and convergent validity (Wechsler, 2011); and increased convergent validity with the updated Wechsler intelligence measures for adults (WAIS-IV) and children (WISC-IV). The Vocabulary subtest is designed to measure verbal concept formation and word knowledge by prompting test takers to verbally define words that are presented both visually and orally. The raw score on the Vocabulary subtest was used in the current study as a measure of verbal intelligence.

***FAS and Animal Naming***

The FAS and Animal Naming tests (Heaton et al., 2004) are verbal fluency tasks which evaluate individuals' ability to spontaneously produce words under restricted search conditions. These typically begin with the same letter (phonemic fluency) or in the same category (semantic fluency), respectively, with lower scores reflecting higher impairment in verbal fluency. More specifically, FAS task is an oral task of phonemic verbal fluency in a timed condition where individuals are asked to provide as many words as possible beginning with the letters F, A, and S. The total number of admissible words across all three conditions are summed and compared to age- and education-stratified normative data to calculate a standardized FAS score. The Animal Naming task is an oral task of semantic verbal fluency in a timed condition where individuals are asked to provide as many types of animals as possible. The total number of admissible words are generally summed and compared to age- and education stratified normative data to calculate a standardized Animal Naming score.

Verbal fluency tasks are widely used neuropsychological measures of executive functioning (Rabin et al., 2005). They have demonstrated high internal consistency and test-retest reliability (Tombaugh et al., 1999); good convergent validity with similar verbal fluency tasks and measures of verbal ability and executive functioning (Strauss et al., 2006); and the ability to significantly discriminate violent and nonviolent offender groups ( $d = .36$ ,  $SE = .03$ ; Ogilvie et al., 2011; see also Morgan & Lilienfeld, 2000). Raw scores for FAS and Animal Naming scores were used in the current study to measure phonemic and semantic verbal fluency, respectively.

### ***Justice Involvement***

Prior incidents of juvenile and adult arrests, convictions, and incarcerations were counted in participants' official criminal records housed within the correctional facility. The total number of juvenile arrests was used in the current study to measure juvenile justice involvement, and the total number of adult arrests was used to measure adult justice involvement.

### **Statistical Analysis Plan**

Hypothesis testing will consist of an initial series of one-tailed Pearson correlations, and a final partial correlation. The Bonferroni corrected  $p$ -value will set the significance value at .0125. Effect sizes ( $r^2$ ) will be interpreted as small, medium, and large at .10, .30, and .50, respectively.

### **Results**

Preliminary analyses demonstrated significant positive relationships among most of the variables selected to measure language (see Table 1). Although Animals and WRAT-4 Word Reading were not found to be significantly positively correlated, there was a trend in this direction ( $p = .06$ ). Additionally, these two variables measure constructs that are strongly theoretically related to language ability. Therefore, FAS ( $M = 39.98$ ,  $SD = 12.45$ ), Animals ( $M =$

20.03  $SD = 4.86$ ), WRAT-4 Word Reading ( $M = 53.76$ ,  $SD = 6.66$ ), and WASI-II Vocabulary ( $M = 33.70$   $SD = 6.92$ ) were combined into the planned composite variable of language ability.

Specifically, each of these language variables were transformed to the same standardized metric (i.e., z-scores based on sample  $M$  and  $SD$ ; LaDuke et al., 2017) and averaged to create the language composite score (*range*: -1.46 – 2.19). Of note, all language variables and the language composite are in the same direction (i.e., higher scores indicating better performance).

**Table 1**

*Correlations ( $r$ ) among language composite variables, with effect sizes ( $r^2$ ) and sample size ( $n$ )*

Variable	1	2	3	4
1. FAS	--			
2. Animals	.525*** .27 90	--		
3. WRAT4 Word Reading	.298** .08 91	.163 .03 90	--	
4. WASI-II Vocabulary	.318** .10 86	.260** .06 85	.354*** .13 86	--

*Note:* \*\*  $p < .01$ . \*\*\* $p < .001$ .

A Pearson correlation found a small but significant positive correlation was found between language ability and juvenile arrest history,  $r(78) = .211$ ,  $p = .032$ ,  $r^2 = .04$ ; this result does not support, and in fact contradicts the second hypothesis that language will have a negative relationship with juvenile justice involvement (Hypothesis 1). No significant relationship was found between language abilities and adult arrest history,  $r(77) = .088$ ,  $p = .240$ ,  $r^2 < .01$ . The analysis did not support the third hypothesis that language ability will have a negative relationship with adult justice involvement (Hypothesis 2). No significant relationship between juvenile arrest history ( $M = 2.87$ ,  $SD = 4.05$ , *range*: 0 -15) and adult arrest history ( $M = 13.08$ ,

$SD = 11.79$ , range: 1 - 62) was found in this sample,  $r(77) = .122$ ,  $p = .144$ ,  $r^2 = .01$ ; this result does not support the hypothesis that juvenile justice involvement and adult justice involvement will have a positive relationship (Hypothesis 3). The final analysis intended to use a partial correlation to analyze the relationship between all three variables (Hypothesis 4); however, this analysis could not be conducted because the lack of relationship in this sample for the preliminary hypotheses. Adjusting the Bonferroni corrected p-value based on the three completed analyses ( $p < .017$ ) had no effect on the interpretation of these results.

The status of the aforementioned results prompted further exploratory analyses using individual language measures, rather than the language composite. The language composite was comprised of WRAT-4 Word Reading, WASI-II Vocabulary, FAS, and Animals. Exploratory analyses revealed that FAS and Animals each had a small but significant positive relationship with juvenile arrest history (Table 2; next page). No other significant relationships were found.

**Table 2**

*Correlations (r) among individual language variables and justice involvement, with effect sizes (r<sup>2</sup>) and sample size (n)*

Variable	<i>M</i>	<i>SD</i>	FAS	Animals	WRAT4 Word Reading	WASI-II Vocabulary
Juvenile arrest history	2.87	4.04	.263* .07 78	.224* .05 77	.082 .00 78	.069 .00 75
Adult arrest history	13.08	11.79	.144 .02 77	.035 .00 76	.124 .02 77	-.034 .00 74

*Note:* \*  $p < .05$ .

### Discussion

The current study used an archival dataset with 95 adult men in a private correctional facility to investigate the relationship between language, juvenile justice involvement, and adult justice involvement. Contrary to expectations, a significant *positive* relationship was found between the language ability composite and juvenile justice involvement in this sample. Language abilities were hypothesized to have a significant negative correlation with juvenile justice involvement in this sample. This was based on the literature suggesting not only a high prevalence of language deficits within juvenile samples (Davis et al., 1991; Snow & Powell, 2008; Hopkins et al., 2018; Bryan, 2004; Bryan et al., 2007; Bryan et al., 2015; Blanton & Dagenais, 2007; Lount et al., 2017), but also that severity of the offense increases with language impairments (Snow & Powell, 2011). Given these findings in direct opposition to the prior literature, further analyses explored the individual language assessments in relation to juvenile justice involvement, which revealed that this positive relationship appeared to be driven by both assessments of verbal fluency (i.e., FAS and Animals). It is unclear why increased adult verbal fluency abilities would relate to increased juvenile justice involvement, especially considering that one of these assessments (FAS) relates to executive functioning, which develops with time and age (Best & Miller, 2010; Tombaugh et al., 1999). One possibility is that juvenile justice involvement acclimates individuals to finding words under restricted situations, and therefore increases later adult verbal fluency capabilities. It is also possible that this finding is primarily due to executive functioning skills, and further, that there are individuals involved with the justice system with skills above their peers that are also prone to increased juvenile justice involvement. Additionally, this finding may represent an artifact of the current study that is not a true finding within the population of justice-involved adults.

Further, no significant relationship was found between language abilities and adult justice involvement in this sample. This analysis was of interest to the current study due to gaps in the literature about the relationship between language and adult justice involvement. No prior literature has explored this relationship, since all previous studies were restricted to younger age ranges (i.e., adolescents to young adults). Given the lack of significant findings in this study, further analyses explored individual language assessments in relation to adult justice involvement. The findings also suggest that the individual language abilities were not related to adult justice involvement in this sample. It is possible that language has more of a developmental impact, and that adults have developed coping skills for language deficits; therefore, though language ability may be impaired, it may not impact their justice involvement. In addition, juvenile justice involvement was, surprisingly, not a predictor of adult justice involvement within this sample. This finding is at odds with the literature showing that juvenile justice involvement is a predictor of later criminal justice involvement (Benda et al., 2001; Piquero & Buka, 2002; Rhoades et al., 2016). This study may have come to this finding due to the fact that although prior incarceration is the strongest predictor, delinquency is also a variable that discontinues with age (Farrington, 1986). Therefore, because offending should decrease with age, it may be understandable that arrests history between juvenile and adults were not related. Unfortunately, these findings precluded further analysis of the relationships among language abilities, juvenile justice involvement, and adult justice involvement within the same statistical model.

### **Limitations & Future Directions**

Several limitations related to the sample, measures, statistical plan, and design of the current study may explain these unexpected findings. Specifically, limitations of the current study include its small sample size. This study consisted of 95 participants. A small sample size

may not allow for enough variability for a significant relationship to be found. In the future, researchers should be sure to utilize a larger sample to ensure variability is captured. It is worth noting the prior studies exploring language in forensic samples that found significant results among the variables included here typically consisted of comparable or slightly larger samples (Hopkins et al., 2018; Brownlie et al., 2004; Stattin, & Klackenberg-Larson; 1993; Beitchman et al., 1999). However, a potentially key difference is that the prior research included a much more restricted age range than the current study, suggesting that both the size and composition of the sample may be important to consider. Additionally, this could indicate that language is a more important factor to consider in its developing years.

Although participants were randomly selected in the current study, this sample may be somewhat biased for a number of reasons. For example, the original study only included male participants. Individuals of different biological sex or gender identities may rely on language abilities differently, and therefore may relate to justice involvement in varying ways. Past research primarily consists of male participants, but studies with both men and women note their differences in regard to justice involvement (Rhoades et al., 2016; Piquero & Buka, 2002). Future research should strive to be as inclusive as possible to distinguish how language abilities may impact men and women in forensic populations.

Additionally, the correctional institution from which the sample was recruited was a minimum-security 2-year facility, potentially limiting the severity of offenses captured. Varying levels of language abilities may be present in facilities of different levels of security. Past research has primarily explored lower level security forensic populations (Gregory & Bryan, 2011; Hopkins et al., 2018; Bryan et al., 2007; Snow & Powell, 2011), perhaps because of the relative ease in accessibility, suggesting the prevalence of language impairments in forensic

populations may be underestimated in the literature. Future research should consider using forensic samples that have yet to be studied to contribute to the current literature.

This sample may have also been biased because participants with language proficiency under grade 5 were excluded from the study, for practical reasons—such as not being able to complete the other measures and screenings included in the original study ( $n = 4$ ). This eliminated the ability to analyze what justice involvement looks like for those selected to participate with the most severe language deficits. Past research has either used exclusion criteria of nonverbal IQ or performance IQ below specific scores (e.g., Clegg, 2005; Lount et al., 2017), or no exclusion criteria in regard to testing. Future research should use language measures with the largest age ranges to ensure inclusion of as many individuals as possible. In addition, although 217 individuals were approached, less than half of the individuals consented, mostly due to apparent lack of interest. The voluntary nature of participation may not have provided a great selection of individuals with poorer language abilities, due to their potential disinterest in testing, and in turn not truly representing the language abilities of this population.

Limitations of the current study also include the language composite and individual measures. The assessments for measuring language abilities could have been more intentionally chosen had archival data not been used, for a more comprehensive language composite. Past research has utilized a variety of standardized neuropsychological language and cognitive assessments, primarily different editions of the Clinical Evaluation of Language Fundamentals (CELF; e.g., Blanton & Dagenais, 2007; Gregory & Bryan, 2011; Snow & Powell, 2008, 2011, 2016; Bryan et al., 2015). The use of standardized and validated language assessments should be used in future research, for replication and validity purposes.

The operationalization of justice involvement as number of prior arrests may also be a limitation of this study. The sample contained individuals who have all been convicted of crimes as an adult, some (but not all) of which had a history of juvenile arrest. Much of the prior literature highlights juvenile conviction and/or placement as a risk factor for future crime, not necessarily arrest. Additionally, previous research has focused on juvenile and later-life offending using a prospective approach (Rhoades et al., 2016; Piquero & Buka, 2002; Benda et al., 2001), as opposed to the retrospective approach used here. Overall, these differing conceptualizations of justice involvement may have contributed to the non-significant results in the current study.

It should also be noted that room for error was increased with the use of archival data and the construction of a database. Past research has utilized data from birth cohorts, but studies mainly use primary data. Future research should consider their available resources, and independently collect data if possible.

### **Conclusion**

Given the high occurrence of language impairments in forensic populations, additional research should be conducted to further delineate the relationships among language abilities, juvenile justice involvement, and adult justice involvement to inform clinical practice and policy. It remains important to ensure that those under the jurisdiction of the justice system are able to benefit from verbally facilitated interventions (e.g., police interviews, court proceedings, therapeutic intervention programs), as well as ensure they are not being further marginalized from behavioral infractions or increased sentencing terms. It is noteworthy that language impairments are amenable to treatment, and research shows no significant difference between

those with a history of a developmental language disorder (DLD) that had been treated, and those with no history of DLD or language impairments.

Overall, research supports that individuals involved with the justice system may not have the necessary language skills to cope with verbally mediated interventions aimed at reducing re-offending. The findings of the current study suggest future research should explore different types of language abilities among juveniles (e.g., verbal fluency). Among other things, these results shed light on the controversy over the role of cognitive factors in delinquency development. Future research on juvenile behavior should consider language ability as a potential covariate to further delineate the relationship it has with offending behavior. Research exploring language abilities in juveniles should consider extraneous variables such as mental health, substance abuse, and antisocial or aggressive behavior to better understand the biopsychosocial profile of justice involved individuals.

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