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Meta-analysis of receptive and expressive language skills in autism spectrum disorder

Elaine Y.L. Kwok [a], Heather M. Brown [b], Rachael E. Smyth [c], Janis Oram Cardy [a,c,*]

[a] School of Communication Sciences and Disorders, University of Western Ontario, Elborn College, London, Ontario, Canada N6G 1H1
[b] Department of Psychology, University of Western Ontario, Westminster Hall, London, Ontario, Canada N6A 3K7
[c] Graduate Program in Health and Rehabilitation Sciences, University of Western Ontario, Elborn College, London, Ontario, Canada N6G 1H1

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ABSTRACT

Clinical anecdotes suggest that children with autism spectrum disorder (ASD) often show an atypical language profile in which expressive language exceeds receptive language competency. However, the few studies to directly explore this language profile have yielded inconsistent findings. This meta-analysis examined 74 studies that reported the receptive and expressive language performances of children and youth with ASD. Four potential predictors (age, language domain, source of language data, method of ASD diagnosis) were separately analyzed for their contribution to the relative receptive and expressive language impairment in ASD. Contrary to popular belief, the current meta-analyses found no evidence that an expressive advantage is common in ASD. Overall, children and youth with ASD showed equally impaired receptive and expressive language skills, both falling roughly 1.5 *SD* below peers with typical development. No discrepancies were found in receptive and expressive language across developmental stages, cognitive abilities, vocabulary, global language skills, caregiver report measures, clinician-administered measures, mixed method measures, or method of ASD diagnosis. Although some individual children with ASD may have an expressive-better-than-receptive language profile, this profile is not common enough to be a useful marker of ASD.

1. Introduction

Impairment in communication for social purposes is a hallmark feature of autism spectrum disorder (ASD; American Psychiatric Association, 1994). Impairment in the understanding and use of language (i.e., in receptive and expressive language functioning) is more variable across the population, but is fairly common (Bishop, 2010; Kjelgaard & Tager-Flusberg, 2001). For example, Loucas et al. found that roughly 57% of their sample of children with ASD and normal non-verbal intelligence had language impairments. Although many studies of children with ASD have included

* Corresponding author at: School of Communication Sciences and Disorders, University of Western Ontario, Elborn College, London, Ontario, Canada N6G 1H1. Tel.: +1 519 661 2111x88000; fax: +1 519 850 2369.
E-mail addresses: ekwok5@uwo.ca (Elaine Y.L. Kwok), heather.brown@alumni.uwo.ca (H.M. Brown), rsmyth5@uwo.ca (R.E. Smyth), janis.cardy@uwo.ca (J. Oram Cardy).

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measurement of their receptive and expressive language performance, relatively less attention has been paid to directly exploring these abilities in relation to one another (Kjelgaard & Tager-Flusberg, 2001). Nonetheless, clinical anecdotes report that children with ASD commonly present with an atypical language profile in which expressive language exceeds receptive language competency. That this pattern is characteristic of, and perhaps unique to autism, has also been suggested in the scientific literature (Cohen & Volkmar, 1997; Hudry et al., 2010; Mitchell, Oram Cardy, & Zwaigenbaum, 2011; Volden et al., 2011). If this pattern is indeed a hallmark of ASD, it may hold potential to support differential diagnosis of ASD from other developmental disorders (Cohen & Volkmar, 1997; Mitchell et al., 2011). Moreover, it implies that language development and impairment may follow a unique trajectory in ASD relative to other disorders, and motivates unique intervention targets and approaches for this population (Hudry et al., 2010).

A handful of studies have directly explored the relative impairment in receptive and expressive language in individuals with ASD (see Table 1). More often than not, results have supported the presence of an expressive-better-than-receptive pattern in children with autism. However, some studies have found a pattern in the opposite direction and others have failed to find a discrepancy. The results of several studies suggest that whether a receptive and expressive language gap is found may be dependent on the choice of language measure used. For example, Weismer et al. (2010) administered receptive and expressive portions of the *Vineland Adaptive Behavior Scales* (*VABS*, Sparrow, Balla, & Cicchetti, 1984), *Sequenced Inventory of Communication Development* (*SICD*, Hedrick, Prather, & Tobin, 1984), and the *Mullen Scales of Early Learning* (*MSEL*; Mullen, 1995) to the same group of children with ASD. Performances on the *SICD* and *MSEL* suggested an expressive advantage whereas the *VABS* scores suggested the opposite pattern. Luyster, Kadlec, Carter, and Tager-Flusberg (2008) found a similar pattern, in which expressive language skills of children with ASD were stronger than their receptive skills as measured by the *MSEL* and the *MacArthur-Bates Communicative Development Inventory* (*MCDI*; Fenson et al., 1992), but in the opposite direction on the *VABS*. The constellation of findings on these studies suggests that the expressive advantage might be specific to the source of the language data. The *MSEL*, which is based on direct clinician measurement of a child's language ability, suggested an expressive advantage in both studies, whereas the *VABS*, which is based on caregiver report, suggested a receptive advantage. However, this account is not entirely satisfactory because Luyster et al. found an expressive advantage using a second caregiver report measure, the *MCDI*.

Choice of language measure is also not an adequate account for all inconsistent findings because some studies have found different receptive-expressive patterns using the same measures. For example, Kover, McDuffie, Hagerman, and Abbeduto (2013) and Kjelgaard and Tager-Flusberg (2001) both used the *Peabody Picture Vocabulary Test–III* (*PPVT-III*, Dunn & Dunn, 2007) and *Expressive Vocabulary Test* (*EVT*; Williams, 1997) to compare receptive to expressive vocabulary skills in participants with ASD who had gold standard *Autism Diagnostic Observation Schedule-Generic* (*ADOS-G*, Lord, Rutter,

Table 1
Studies directly comparing receptive and expressive language in individuals with ASD.

Author, Year	ASD Diagnosis	Age of ASD participants (years)	Receptive language measure	Expressive language measure
More advanced expressive than receptive language				
Kover et al., 2013	ADOS-G and ADI-R	4–11	PPVT-III	EVT
Volden et al., 2011	ADOS-G and ADI-R	2–4.92	PLS-IV	PLS-IV
Maljaars et al., 2012	DSM-IV-TR	3.3–11.3	Reynell/Dutch-CDI	Schlichting/Dutch-CDI
Weismer, Lord, & Esler, 2010	ADOS-G and ADI-R	2–3	MSEL (1989 or 1995), SICD	MSEL (1989 or 1995), SICD
Hudry et al., 2010	ADOS-G only	2–4.9	PLS-3-UK, VABS-II, CDI (Vocabulary)	PLS-3-UK, VABS-II, CDI (Vocabulary)
Luyster et al., 2008	ADOS-G and ADI-R	1.5–2.75	MSEL, CDI (Vocabulary)	MSEL, CDI (Vocabulary)
Luyster, Lopez, & Lord, 2007	ADI-R (Toddler) only	~2.5 (range not available)	CDI (vocabulary)	CDI (Vocabulary)
Charman, Drew, Baird, & Baird, 2003	ICD-10	1.5–7.33	CDI-Infant form	CDI-Infant form
Kjelgaard & Tager-Flusberg, 2001	ADOS-G and ADI-R	4–14	CELF (preschool or III)	CELF (preschool or III)
More advanced receptive than expressive language				
Luyster et al., 2008	ADOS-G and ADI-R	1.5–2.75	VABS	VABS
Weismer et al., 2010	ADOS-G and ADI-R	2–3	VABS/VABS-II	VABS/VABS-II
Equivalent receptive and expressive language level				
Loucas et al.	ADOS-G and ADI-R	9–14	BPVS	CELF-III-UK
Kjelgaard & Tager-Flusberg, 2001	ADOS-G and ADI-R	4–14	PPVT-III	EVT
Jarrold et al., 1997	DSM-IV	5.5–19.6	BPVS, TROG	WFT, APTG

Note. ADOS-G = Autism Diagnostic Observation Schedule-Generic; ADI-R = Autism Diagnostic Interview-Revised; DSM = Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994); ICD = International Classification of Diseases (World Health Organisation (WHO), 1993); PPVT = Peabody Picture Vocabulary Test, EVT = Expressive Vocabulary Test, PLS = Preschool Language Scale, Reynell = Reynell Developmental Language Scales (Reynell & Gruber, 1990); CDI= MacArthur-Bates Communicative Development Inventory (Fenson et al., 1992); Schlichting = Schlichting Test for Dutch language production (Schlichting, Van Eldik, Lutje Spelberg, Van der Meulen, & Van der Meulen, 1995); MSEL = Mullen Scales of Early Learning; SICD = Sequenced Inventory of Communication Development; VABS = Vineland Adaptive Behavior Scales; CELF = Clinical Evaluation of Language Fundamentals (CELF-III: Semel, Wiig, & Secord, 1995; CELF-III-UK: Semel, Wiig, & Secord, 2000; CELF-P: Wiig, Secord, & Semel, 1992); BPVS = British Picture Vocabulary Scale (Dunn, Dunn, Whetton, & Burley, 1997); TROG = Test for Reception of Grammar (Bishop, 1983); WFT = Renfrew Word Finding Vocabulary Test (Renfrew, 2010); APTG = Action Picture Test Grammar Scale (Renfrew, 1988).