The Constructionist Approach Offers a Useful Lens on Language Learning in Autistic Individuals

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The constructionist approach argues that communication is central to language learning, language use, and language change. We argue that the approach provides a useful perspective on how autistic children learn language, as it anticipates variable outcomes and suggests testable predictions. First, a reduced ability and interest in tracking the attention and intentions of others should negatively impact early language development, and a wealth of evidence indicates that it does. Secondly, and less discussed until recently, a hyper-focus on specifics at the expense of generalizations, common among people on the spectrum, should also negatively impact language development, and recent evidence suggests this is also the case. Pace Kissine (this volume), it is unsurprising that children can learn some second language from watching videos, and it is unclear how an appeal to "innate" language-specific knowledge could explain the range of outcomes of individuals on the autism spectrum.

1. AUTISM

A clinical diagnosis of Autism is made on the basis of persistent deficits in social communication and interaction, as well as restricted, repetitive behaviors that include two or more of the following: repetitive movements or repetitive speech, an insistence on unchanging routines or ritualized verbal or nonverbal behavior, intense highly specific interests, and an unusual sensitivity to sensory patterns (DSM-5). Specific symptoms and the severity of symptoms vary widely. As a common saying goes, 'if you've met one autistic child…you've met one autistic child.'

At the same time, a significant delay in language comprehension is common among children diagnosed with Autism Spectrum Conditions (Kim, Paul, Tager-Flusberg, & Lord, 2014; Jones, Gliga, Bedford, Charman & Johnson, 2014; Henry, Farmer, Manwaring, Swineford, & Thurm, 2018), and up to 20-30% of children on the spectrum are unable to regularly produce utterances that are meaningful and communicative (Anderson et al. 2007; Loucas et al., 2008; Wodka et al., 2013; Kim et al., 2014; Tager-Flusberg & Kasari, 2013, Yoder et al., 2015). This situation demands that we as language researchers take an interest in factors that support or inhibit language learning, as the stakes could hardly be higher.

We argue that the usage-based constructionist approach provides a useful perspective on language learning in children on the autism spectrum as it anticipates variable outcomes and makes testable predictions. We focus in particular on two aspects of the diagnostic criteria. First, the constructionist approach emphasizes the importance of communication for language learning and appropriate language use. Early comprehension relies on an ability to understanding what a speaker (or signer) is attending to or what they intend (e.g., Tomasello 2008; Lieven 2017). While this ability does not require the learner to actively engage in communicative exchanges themselves, evidence indicates that interest, opportunity and skill

in following others' attention and interpreting their intentions correlates with early language development in neurotypical and autistic children (section 3).

A second factor has been less commonly invoked, yet a usage-based approach predicts it should be relevant to language learning. Beyond challenges with communication and social interaction, individuals on the spectrum typically tend to hyper-focus on distinctions, which leads to a reduced ability to detect similarities and relationships across experiences, when compared to neurotypical (NT) individuals. They have been found to find it more difficult to form abstract categories on the basis of instances that are noticeably distinct, because attention tends to be drawn to specific distinctions rather than to similarities. Rather than generalizing, children on the spectrum show a tendency to treat similar instances as entirely new (Molesworth, Bowler, and Hampton 2005; Mottron et al. 2006; Mottron, Morasse, and Belleville 2001). For instance, Plaisted, O'riordan, and Baron-Cohen (1998) found that autistic children were significantly less successful than NT children on average at identifying new instances of a category of dot patterns, tending instead to treat similar dot patterns as entirely novel. Children on the spectrum show a reduced ability to sort by gestalt principles (Brosnan et al. 2004) or to categorize entities along more than a single dimension at a time (Klinger, Grofer, and Dawson 2001). Challenges in generalization lead to challenges transferring successful strategies from one context to the next (De Marchena, Eigsti and Yerys 2015). Increased attention to specifics and relative neglect of generalization also explains the fact that autistic individuals have been found to be less likely than NTs to fall prey to believing they had witnessed a target word in the false memory paradigm of Roediger and McDermott (1995); that is, they are less likely to falsely believe that a target word (e.g., *sleep)* had been seen after witnessing a number of strong associates of the target word (e.g., *bed*, *dream*, *night*) (Beversdorf et al. 2000).

A hyper-focus on specifics to the neglect of recognizing relationships and generalizations is consistent with the idea that autistic individuals tend to find it challenging to form accurate predictions (Sinha et al. 2014; Van de Cruys et al. 2014). Predictions require one to perceive relevant similarities between the current and previous contexts. For instance, learning to predict an upcoming event requires a recognition of how the current context is similar to previously experienced contexts. In cases in which individuals who were once diagnosed with autism no longer qualify for the diagnosis a few years later, an ability to generalize has been found to be a particular area of strength (Fitch, Fein, & Eigsti 2015).

As described below, the usage-based constructionist approach makes testable predictions that are consistent with available evidence (Tomasello 2008; Lieven 2017; Abbot-Smith 2020). On the other hand, Kissine (this volume) claims to provide evidence which challenges the constructionist perspective and instead supports the notion of a "language-specific genetic endowment" or what is commonly referred to as a "Universal Grammar" (UG). Before reviewing the evidence that leads to such different perspectives, we briefly introduce readers to the CONSTRUCTIONIST APPROACH (section 2).

2. CONSTRUCTIONIST (USAGE-BASED) APPROACH TO LANGUAGE

The constructionist approach argues that communication is central to language learning, language use, and language change (Abeillé et al. 2020; Ambridge 2020; Bybee 2010; Christiansen and Chater 2016; Culicover, Borkowski, & Nowak 2014; Diessel 2019; Goldberg 2006, 2019; Herbst 2018; Jackendoff & Audring 2016; Kapatsinski, 2018; Kim & Michaelis 2020; Langacker, 1988; Lieven et al. 2003; Matthews & Bannard, 2010;

Tomasello, 2003, 2008). Language learners need to understand messages on the basis the formal patterns they witness, and need to select formal patterns that successfully convey their intended messages. In order to approximate these goals, children must learn how formal patterns are paired with communicative functions. These pairings of learned form and function define constructions, which exist at varying levels of complexity and abstraction (see Table 1 for examples).

TABLE 1. English constructions at varying levels of complexity and abstraction; capitalization is used to indicate lemmas, which appear with various tense and agreement markers.

Construction	**Examples**
Words	*milkshake, again, saunter, afraid*
Words with open slots	*pre*-N, V-*ing*, #th
Noun compound construction (lexically unfilled, recursive)	[N N]$_N$ (e.g., *Saturday am LSA poster session*)
Lexically-specified idioms, collocations	*SPILL tea, HUG it out, happily ever after, Pass it on*
Idioms, collocations with open slots	*e.g., I don't know <which people/who> NEED to hear this*
The Xer the Yer construction (minimally lexically filled)	the <comparative$_1$> S, the <comparative$_2$> S *e.g., the more you think, the less you understand*
Verb complement construction(recursive)	V [(that) [S]]
Passive construction	*Subj [BE [VP$_{participle}$ PP$_{by}$]]* *The bear was killed by a lion.*

The constructionist approach emphasizes that knowledge of language consists of a rich interrelated network of partially generalized and interrelated information. We do not assume a sharp division between syntax and the lexicon, nor between 'core' constructions and some sort of 'residue.' Instead, the usage-based constructionist approach expands the familiar *lexicon* to include a vast dynamic network of partially-filled word templates (i.e., morphology), collocations, idioms, and grammatical constructions (Ambridge 2020; Bybee 2010; Culicover, Borkowski, & Nowak 2014; Diessel 2019; Goldberg 2019; Herbst 2018; Jackendoff & Audring 2016; Kapatsinski, 2018; Kim & Michaelis 2020; Langacker, 1988; Matthews & Bannard, 2010; Tomasello, 2003). The approach allows for a broad and inclusive view of language that includes conventional rhetorical devices of various kinds, which can extend beyond individual sentences (e.g., Dancygier 2011; Harris et al. 2017; Hoffman 2015; Hoffman & Bergs 2018; Pérez-Hernández 2020; Ruppenhofer & Michaelis 2010) and can even include multiple modalities (Steen & Turner 2013).

The approach predicts two factors should impact language development in children on the spectrum:

(A) To the extent that ability, motivation, and/or opportunity to share attention and infer others' intentions is reduced, early comprehension should be negatively affected.

(B) The degree of deficit in the ability to recognize relationships among instances should predict the degree of deficit in using constructions in new, contextually appropriate ways.

We first consider the wealth of evidence in support of the prediction in (A) as it applies to both neurotypical and autistic populations in section 3. This is followed by a review of the situation described by Kissine (this volume; Kissine et al. 2019) in section 4. Finally, the newer prediction (B), is introduced in section 5, along with suggestive evidence in support of it.

3. SHARING ATTENTION AND INFERRING INTENTIONS

3.1. In neurotypical language learners

It is impossible to learn a language by only listening to the radio, since there would be no way to understand what is being spoken about. It is well-established that infants are more successful in early vocabulary learning when they share attention with the speaker, or when the speaker shares attention with them. This situation of shared engagement toward an entity or event is often referred to as JOINT ATTENTION (Bruner 1978; Kuhl, Tsao, &Liu 2003; Mundy & Jarrold, 2010; Tomasello 2009; Yu & Smith 2016), although as just described, the sharing of attention can be instigated by the child or the caregiver rather than being jointly negotiated. For instance, Tomasello and Farrar (1986) found that NT children whose caregivers were more likely to refer to objects within their child's focus of attention at 15 months had larger vocabularies at 21 months (see also Yu & Smith 2016; Suarez-Rivera, Smith, & Yu, 2019).

Simply sharing attention is not sufficient, since speakers do not simply utter language about whatever is in our field of attention: e.g., *computer, coffee, fingernails, ceiling*. Instead, learning a language requires inferring another's intentions and goals or 'intention-reading' (Tomasello & Carpenter 2005). For example, if an adult says, 'I'm going to dax' and then carries out two actions – one accidental and one intentional – neuro-typical toddlers will map the novel word onto the intentional action (Tomasello & Barton 1994). Neither shared attention nor intention-reading require that the learner interact directly with the speaker (or signer), although such interaction is facilitative (e.g., Kuhl 2007). For instance, Akhtar, Jipson, Callanan (2001) found that 2 ½ year old typically developing children learned novel object and action labels by attending to a conversation between two adults. And in certain Mayan cultures, adults only speak directly to children roughly 30 minutes a day, yet the same children have ample opportunity to watch others engage in communicative interactions (Casillas, Brown, & Levinson, 2019; Shneidman & Goldin-Meadow 2012).

It is worth noting that the vast majority of work demonstrating the importance of joint attention and intention-reading focuses on their role in the early stages of language comprehension. Once a child has acquired a foundation of language, that foundation can be used to bootstrap additional language learning, because the learner can infer new intended meanings on the basis of the context provided by already familiar words and constructions.

For instance, additional words, constructions, and even new dialects can be learned from reading in literate cultures.

3.2. In autistic individuals

If everyone with a diagnosis of autism were incapable sharing attention or inferring others' intentions, it would be hard to explain how any autistic individual could learn language. Yet as emphasized in the introduction, individuals on the spectrum are highly variable in their social abilities.

Kissine (this volume: 9) equivocates about whether there exists a correlation between skill in joint attention and language development in people with autism:

> Some retrospective analyses do suggest that, in autistic children, lower social impairment or better joint attention skills correlate with later language levels (Wodka et al., 2013; Yoder et al., 2015). However, in a significant number of other large longitudinal or prospective studies *socio-communicative variables do not systematically predict language outcomes,* especially once non-verbal IQ is factored in (Anderson et al., 2007; Bennett et al., 2015; Ellis Weismer & Kover, 2015; Thurm et al., 2015) [italics added]

However, in the vast majority of studies, including those cited by Kissine himself *in the same passage*, report that joint attention *is* predictive of autistic language development. For example, Anderson et al. (2007), a longitudinal study of autistic children between the ages of 2 and 9, finds that 'Nonverbal IQ and joint attention emerged as strong positive predictors of verbal outcome (abstract).' Ellis Weismer & Kover (2015), another longitudinal study of autistic children, between the ages of 2 ½ and 5 ½, similarly reports that 'cognition, maternal education, and *response to joint attention* correctly classified over 80% of total cases' of the highest and lowest language performers (1327; italics added); the study emphasizes that a lack of joint attention at the initial visit was a strong predictor of particularly low language ability three years later. A study by Paul et al. (2013) reported that children with autism who displayed stronger joint attention skills learned significantly more vocabulary over the 12-week study. Citing the Paul et al. paper, Thurm et al. (2015) similarly emphasizes the importance of joint attention in initial language learning: 'Based on results from the present study and recent findings by Paul et al. (2013)…we might suggest that the importance of joint attention in language development is at the preverbal stage or for children who remain minimally verbal after age 5 years.'[i]

Other studies report consistent results as well (e.g., Carpenter & Tomasello 2000; Mundy, Sigman, and Kasari 1990; Kuhl, Coffrey-Corina, Padden and Dawson 2005; Sigman et al. 1999; Sigman & McGovern, 2005; Paul 2013). For instance, Charman et al. (2003) found that joint attention ability in autistic infants at 20 months predicted higher language comprehension at 42 months. Siller & Sigman (2008) found that the language development of children with autism was predicted by the extent to which children and parents' managed to coordinate joint attention. Su et al. (2020) report a longitudinal analysis of children with autism over a 2-year period starting between the ages of 1 and 3,

and found that better language outcomes correlated with a greater earlier tendency to seek out and attend to social interactions.

In fact, the empirical report published by Kissine et al. (2019:2) acknowledges the link between joint attention and language development:

> The capacity to monitor eye-gaze direction, to establish joint attention, and, more generally, to show sensitivity to social cues and speakers' intentions bootstraps language development (e.g., Luyster, Kadlec, Carter, & Tager-Flusberg, 2008; Tomasello, 2008; Yeung & Werker, 2009). Poor orientation to social information in the early stages of life may thus have a cascading effect on the acquisition of language (e.g., Kuhl et al., 2013; Preissler & Carey, 2005). In a sense, then, language development delays and deficits in ASD underscore the importance of sociopragmatic factors for language learning.

Given that variable skill in joint attention predicts variable early language development among autistic individuals, it is incongruous to read in the perspective article that "comprehension of language in autistic individuals remains limited to an 'egocentric' perspective by the difficulties in mind-reading that are inherent in the autism diagnosis" (Kissine, this volume: 4), or that, 'when autistic individuals use and interpret language in context, they do so without projecting themselves in the minds of their conversational partners' (pg. 7). To support these sweeping generalizations, Kissine suggests that autistic individuals are incapable of interpreting irony or language which requires adopting the speaker's perspective (pg 6). Yet autistic children display huge variability in these skills, as they do in other skills. Many studies report a range of performance that overlaps with that of neurotypical children (e.g. Bauminger-Zviely, Karin, Kimhi & Agam-Ben-Artzi 2014; de Marchena & Eigsti 2016; Dahlgren & Dahlgren Sandberg 2008; Pexman et al. 2011, Glenwright & Agbayewa, 2012; Malkin, Abbot-Smith, Williams & Ayling 2018). The majority of verbally-fluent autistic children are willing and able to engage in 'small talk' conversations, particularly with friends (e.g. Bauminger-Zviely et al. 2014; Heasman & Gillespie 2018). And verbally-fluent autistic children are far more likely than not to respond to their conversation partner's turn by providing relevant, on-topic information (Nadig, Lee, Singh, Bosshart and Ozonoff, 2010).

To summarize, as predicted by the usage-based constructionist approach which emphasizes the importance of communication and meaning, early comprehension depends on the ability to infer what another person is attending to or intends. Most relevant for the discussion of autism is the fact that the early language abilities correlate with children's ability, inclination and opportunity to share attention and infer others' intentions.

4. KISSINE (THIS VOLUME)

Kissine et al. (2019) reports that five autistic Tunisian children, between the ages of 5 ½ and 11 years old, showed a 'remarkable mastery of MSA [Modern Standard Arabic]' and 'favor MSA in everyday conversations' (Kissine et al. 2019: 4). Modern Standard Arabic is only taught in schools and is used in writing and formal broadcasts. It is also spoken by characters in cartoons as a way to introduce children to the higher register language used in classrooms. Since the children in question did not attend school, they must have learned MSA in the noninteractional context of cartoons. We don't wish to dispute the

observations in Kissine et al. (2019). However, we take issue with the claim that the children's knowledge of MSA poses a challenge to the constructionist approach.

Critically, each of the five autistic children reported on in Kissine et al. (2019) engaged in a 10-20 minute conversation with an adult. This demonstrates that each child had non-trivial skill and inclination for joint attention: coherent conversations presuppose shared attention toward the content that is discussed. That is, children who are able to communicate successfully must have some skill and interest in sharing attention with others because successful communication involves directing another's focus of attention and interpreting their communicative intentions.

Is it surprising that children are able to learn some language from cartoons? Examples of cartoons in MSA, available on YouTube, tend to involve engaging characters who speak in short utterances often directed at the camera. As long as children are able to partially understand what the characters are attending to and partially infer their intended messages, we can expect some amount of language learning to occur. Presumably the cartoon characters use language to communicate either with other character or with the viewer (the child). We have already established that children are capable of language learning without necessarily interacting directly with speakers. The children needed to understand the cartoon character's attention and infer its intentions as it produced MSA. Thus, the facts do nothing to undermine the usage-based constructionist approach.

Regardless of whether the usage-based constructionist approach allows it to be *possible*, we would find it surprising if the five autistic Tunisian children learned *all* of their knowledge of language only by watching cartoons without having an opportunity to hear or use language in live communicative contexts.[ii] Fortunately for the children involved, this is by no means the situation described. The children learned MSA, in addition to the local Tunisian dialect they were exposed to through live social interactions. We know this because the children's MSA productions were responses to an experimenter who spoke to them in Tunisian Arabic. Thus, the children must have comprehended Tunisian Arabic well enough to respond to it. More than that, as is clear in Table 2 (based on data in Kissine et al. 2019), all but one child ('C') relied on Tunisian Arabic in their own productions more than they relied on MSA; and the data for child C was particularly meager: a total corpus of 67 utterances. Given that the children ranged in age from 5 to 11, they all had had ample opportunity to learn the local Tunisian Arabic *and* some amount of MSA. Moreover, the children's local community was able to comprehend MSA, as evidenced by the fact that the children were able to communicate successfully by producing it; this afforded the children ample opportunity to practice producing MSA in communicative contexts.

Table 2: Data based on Kissine et al. (2019) for 5 Tunisian children (A-E), their ages, total number of utterances spoken by the children during the 10-20 minute interview, and the percentage of utterances that were produced in Modern Standard Arabic (MSA), the local spoken dialect (TA), or a mixture of the two languages (Mixed).

Child	A	B	C	D	E
age	5;6	7;11	10;11	8;7	8;1
(# of utterances)	(144)	(101)	(67)	(115)	(185)

Modern Standard Arabic (MSA)	27%	26%	56%	22%	9%
Mixed: MSA & TA	26%	32%	12%	16%	30%
Tunisian Arabic (TA)	47%	42%	32%	72%	69%

To summarize, the constructionist approach predicts that initial language comprehension should be delayed to the extent that skill and interest in joint attention is reduced. A preponderance of evidence supports this conclusion, the accompanying perspective notwithstanding. It is unsurprising that the children on the spectrum, who were demonstrably capable of joint engagement and who had learned a functional amount of Tunisian Arabic, which was spoken by those around them, learned some additional language (MSA) from watching cartoons. The only thing that is unusual is that the children used MSA in their speech. It is interesting to ask why this should be the case, or more generally, why children on the spectrum are wont to use constructions in contextually-inappropriate ways. It turns out, that beyond joint-attention, the usage-based perspective predicts another relevant cognitive factor is relevant to language learning in autistic individuals, as discussed in section 5.

5. CHALLENGES IN GENERALIZATION PREDICT CHALLENGES IN LANGUAGE LEARNING

Recall that the constructionist approach argues that language is learned by clustering partially abstract (i.e., imperfect or *lossy*) memory traces within our high-dimensional representational space (Goldberg, 2019). Semantic generalizations are needed for constructions to be used in new contextually-appropriate contexts. For instance, by the age of 2, neurotypical children tend to generalize a novel count noun (e.g., *a dax*) to other entities with the same shape, while overlooking differences in size, texture, or color. This 'shape bias' is learned on the basis of a correlation in experience: count nouns are more likely to be identifiable by shape than size, texture or color (Landau, Smith, & Jones, 1988; Smith, Jones, Landau, Gershkoff-Stowe, & Samuelson, 2002). The shape bias is substantially delayed in children on the spectrum (Tek, Jaffery, Fein, & Naigles, 2008), who show a great deal of individual variation in their sensitivity to it (Hartley, Trainer, & Allen, 2019; Potrzeba, Fein, & Naigles, 2015). Highly verbal children on the spectrum eventually develop the shape bias (Tovar, Rodríguez-Granados, & Arias-Trejo, 2019). The delay in developing the shape bias and the fact that the individual variation correlates with language skill is predicted on the constructionist approach, since linguistic generalizations require the recognition of relationships among instances, which individuals on the spectrum are challenged by, to varying degrees.

The need to only generalize *appropriately* has implications for language far beyond the shape bias. Many words and phrases are restricted to certain contexts. For instance, certain phrases are associated with fairy tales (*once upon a time, happily ever after*), with flight attendants (*place your seat back and folding trays are in their full upright position*), or with certain books (*the places you will go! goodnight air).* People on the spectrum may struggle to pick up on the contextual dimensions that restrict how language is used, because they have more difficulty distinguishing relevant contextual cues from irrelevant ones. The fact that some autistic children use MSA in speech while neurotypical children do not may be due to a failure to identify that MSA is not used in informal speech outside of cartoons.[iii]

The role of recognizing relationships among instances applies to word learning in a very general way. By way of background, first observe that the majority of early-learned words are complex in that they can be used for a variety of related yet distinct meanings. Examples

of such POLYSEMOUS words include: *bath* (the tub, the activity, the room), *eye (eyes, eye* of a needle*, eye* of a storm*); leg (*left *leg, leg* of a table*)*; and *sorry* (genuine apology; polite means of squeezing by someone; expression of sympathy). Neurotypical children and adults find it relatively easy to extend a word to a distinct but related meaning (e.g., Srinivasan, Berner, Rabagliati 2018) while the assignment of multiple unrelated HOMONYMOUS meanings to a single label is more challenging (e.g., baseball *bat* and flying *bat*) (Casenhiser 2005). In a direct comparison of novel polysemy and novel homonymy learning, Floyd & Goldberg, (2020) found that neurotypical children enjoy a robust, long-lasting advantage for polysemy learning. That is, the fact that the multiple meanings of most words are semantically *related* facilitates vocabulary learning in neurotypical children.

Critically, Floyd, Jepssen & Goldberg (2020) compared novel polysemy and homonymy learning in 40 children diagnosed with autism and 40 matched neurotypical children (out of a group of 60 NT children). Each child was exposed to 4 polysemous words and 4 homonymous words, with 3 meanings apiece. Importantly, the NT and Autism groups were matched on their ability to learn homonyms, which was above-chance but fairly weak, particularly when retested on the same materials a week later without intervening exposure. Of particular interest was the groups' performance on the novel polysemous words. The neurotypical children found polysemous words much easier to learn than homonyms, and showed much stronger retention of the polysemous words after a week delay, replicating the findings from Floyd & Goldberg (2000). Strikingly however, the verbal autistic children failed to show the same advantage for polysemy over homonymy. In fact, the autistic children essentially found polysemous words as challenging as homonymous words. This is predicted if, unlike their NT peers, the autistic children failed to recognize the relationships among polysemous meanings. It was unclear from this cross-sectional study whether the ability to generalize increases among those on the autism spectrum, but there was no evidence of an age effect suggesting that autistic children may face ongoing challenges in generalizing appropriately.

Again, since autism is a spectrum disorder, we expect individuals to vary in whether or how affected they are in their ability to generalize. The constructionist approach predicts that linguistic generalizations should be impaired to the extent that generalizations of non-linguistic categories are impaired. The idea requires further testing on various types of generalizations, and various types of linguistic constructions, and with children who are learning different languages.[iv] More work is needed to better understand the extent that widespread challenges in generalization underlie widespread challenges among individuals on the spectrum in learning language.

6. CONCLUSION

The constructionist approach offers a particularly useful lens for studying language development and language use in populations on the autism spectrum. We have briefly reviewed the extensive evidence documenting that deficits in sharing attention and inferring intentions impact language development in both neurotypical and autistic populations. We have also briefly described how the approach predicts that challenges faced by autistic individuals in forming generalizations will pose additional challenges. New evidence suggests this is the case, but more work is needed. There is nothing surprising in the fact that verbal children, whether on the spectrum or neurotypical, can learn some second language from watching videos. The fact that some children on the spectrum incorporate into their

own speech a language that has only been witnessed used in cartoons (in their experience) reflects the fact that children on the spectrum tend to have more difficulty recognizing which contextual features are relevant.

In conclusion, it is important to ask, can an appeal to some sort of 'language-specific genetic endowment' (or UG, for short) explain any aspect of the language profile of autistic individuals? Kissine (current volume) suggests it can (pg. 15). Yet the perspective provides no indication of any particular way a UG might be relevant. The only observation made renders UG mysterious and unhelpful: 'The content of the first factor [the language-specific genetic endowment] varies across different instantiations of nativism and is fairly frugal in the latest version of Chomsky's model of language' (pg. 16). Indeed, any appeal to a UG raises a stark dilemma: If a UG is assumed to be unaffected in autistic individuals, it is unclear why 20-30% fail to acquire functional language. But if a UG is assumed to be impaired in autistic individuals, it is unclear how 70-80% manage to successfully acquire language. More generally, appeal to a Universal Grammar is meaningless unless one is explicit about exactly which specific properties are supposed to be impaired or unimpaired (Dąbrowska 2015; Tomasello 2009; Ambridge, Pine & Lieven, 2015). The constructionist approach, on the other hand, focuses squarely on skill and interest in joint engagement, and in forming generalizations, both of which are subject to individual variation.

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[i] The final study cited in this passage, Bennett et al. (2015), examined effects of social abilities that were broader than joint attention, namely "social competency" over a 12-month period in children 2-4 with a diagnosis of ASD. This study also included evidence that social competency and language skill was "moderately to highly correlated" at the initial assessment and they tended to diverge over time.

[ii] Is it possible to learn all of one's knowledge of language from watching videos? While neurotypical infants learn less from video than from witnessing real world events and interactions (Kuhl, Tsao, & Liu 2003; Strouse, & Samson, 2020), less is known about whether the same is true for autistic children. While a child might learn to understand a language from watching videos, learning to produce language in contextually appropriate ways would seem to require that learners attempt to communicate with others.

[iii] Alternatively, it is possible that the children recognize that MSA is only used in restricted contexts by others, but do not themselves feel compelled to conform. They may be working with an alternative – neuro-diverse – way of assuming common ground (e.g. Heasman & Gillespie 2018). This latter possibility, that there is an autistic 'style' of interacting – akin to a cultural difference – is worth considering, particularly given that, even within neurotypical populations across the world, there exists great variability regarding the appropriateness of eye contact, the timing of conversational responses and the types of utterances which count as under-informative (see e.g. Gardner & Mushin, 2016).

[iv] We might further predict that an unusual ability to remember and recall contextually-rich exemplars can compensate for impairments in the ability to generalize across exemplars; possible interactions between generalization ability and memory recall remain to be investigated, but could address rare cases of individuals who apparently have autism who

appear particularly adept at learning languages (Smith & Tsimpli 1996). See Bates (1997) for discussion of this case.