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## Bilingual language development and ASD

A case-study

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## Abstract

Research into bilingual language development in autistic children is a new field and the number of studies published to date are very scarce. Around the world exceptional cases are being reported to support the theory that bilingual language development in autistic children is different to that of typically developing children leaving an obvious gap in knowledge. In this essay, a case study is presented of an 11-year-old autistic native Swedish boy with an impaired speech disorder who has developed a bilingual proficiency in English with YouTube as his only source of exposure. The study showed mixed results as when the tasks were performed Swedish was the reciprocating language. However, in the interview all replies were in English, even though spoken to in Swedish, suggesting a preference for speaking English when allowed to speak freely. Furthermore, this study challenges the notion that children with impaired speech disorders would experience even slower language emergence if simultaneously exposed to an L2. These findings call for further research at a higher level than a Bachelor's thesis.

Keywords: autism, bilingualism, language development, language preference

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# 1. Introduction

Humans have been communicating since the dawn of our species; however, we have a unique and complex way of mediating thoughts, beliefs and ideas, namely language. First language acquisition begins during early childhood when the typically developing child (TD) will begin acquiring the language that is spoken by others in their surroundings. A TD child will roughly follow the same developmental schedule during language acquisition no matter what language the child is being exposed to. However, there is a subcategory of children born with autism (ASD) who deviate from this schedule. ASD is a developmental disorder which affects, among other things, the ability to acquire and develop language. Subsequently, many children born with ASD either experience a delayed or impaired first language acquisition (L1) (Prévost & Tuller, 2022).

Research into L1 acquisition in ASD has been conducted for many years; however, it is only during the last decade that research into L2 acquisition and bilingualism in ASD has developed. Bilingual language acquisition in TD children is typically linked to quantity and quality of language exposure and use. ASD children, who are predisposed to delayed language development are often expected to be disadvantaged by an L2 as this is believed to lead to an even slower language emergence. However, bilingual language development in ASD children is different compared to TD children, as research suggests that bilingualism does not lead to further language delay (Beauchamp & MacLeod, 2017). Nonetheless, the amount of research into bilingual language acquisition in ASD is surprisingly sparse with only a handful well documented cases of individuals with sometimes spectacular abilities to learn a second language (Smith & Tsimpli, 1995; Vulchanova, Talcott, Vulchanov & Stankova, 2012; Þráinsson, 2012).

These cases describe individuals who possess abilities that do not seem to require the same amount of language exposure in order to acquire an L2 as a TD child would need.

The purpose of this case study is to investigate if a native Swedish ASD child with an impaired-speech disorder can not only develop a higher proficiency in L2 despite quantitatively and qualitatively less exposure to the latter language but also have a preference for communicating in L2. Furthermore, this study hopes to contribute, with case-specific information, an attempt to bridge the gap in knowledge of bilingual language acquisition in autism which will enable further research on the subject.

## 2. Theoretical Background

### 2.1 What is autism?

According to the American Psychiatric Association's diagnostic and statistical manual of mental disorders, (DSM-V, 2013), the criteria for autism spectrum disorder (ASD) are lasting deficiencies in the ability to socially communicate in various contexts together with limited and repetitive patterns in behaviour, interests and activities. ASD is described as a lifelong developmental disorder to which there is no cure but through practice and strategies the person can live a successful and fulfilling life in society.

Since 2013, the diagnosis no longer subcategorizes into various types of autism but rather refers to a spectrum of the disorder in which individuals experience various degrees of difficulties. The diagnosis set today is ASD specified into levels 1, 2 and 3 (3 being the most severe) indicating the level of support required. Diagnoses set prior to 2013, such as Aspergers syndrome or Kanner's syndrome (among others), remain unchanged.

Autistic people share the same type of difficulties; however, the degree of impairment varies between individuals. One of the main symptoms is impairment in communication, both verbal, and non-verbal which subsequently leads to difficulties in developing normal social relationships (Baron-Cohen, Leslie & Frith, 1985).

Independent of any other mental developmental impairment, autistic children lack 'theory of mind' (ToM), meaning that they are unable, or struggle greatly, to conceive of others' mental state i.e., "knowing that other people know, want, feel or believe things" (Baron-Cohen et al., 1985, p 38). Moreover, other social communication deficits may include inability to interpret and/or use non-verbal gestures such as body language or facial expressions as well as delayed or impaired language development resulting in stilted, scripted or eco-speech (Gillberg, 1999).

Other common denominators are restricted interest and repetitive behaviours which can include the need for a very structured lifestyle with very little or no tolerance for change, overly focused on special interests with expectations that others be equally interested in said subject, sensory hypersensitivity such as smell, touch, light or sound as well as ritualistic movement i.e., rocking, flapping of hands or spinning (Gillberg, 1999 & APA, 2013).

Furthermore, it is not uncommon for other conditions to accompany ASD, for example eating disorders, sleeping problems, attention deficit hyperactivity disorder (ADHD), epilepsy, language delay and intellectual disability (ID) (Gillberg, 1999).

## 2.2 Language acquisition and bilingualism

Typically developing children (TD) begin learning their L1 from birth, going through different developmental stages until they reach roughly the age of 10, when they have more or less developed mature speech (Mitchell, Myles & Marsden, 2019). According

to Mitchell et. al, these different levels of development, i.e., cooing, babbling, one- and two-word utterances etc., seem to be similar for all children no matter what language they are acquiring. Learning an L2 can take place at any time or age. However, different theories of L2 acquisition suggest various hypotheses of how humans learn a second language.

One of the more popular theories is the theory of Universal Grammar (UG) by Noam Chomsky, which focuses on the structure of language, theorizing that humans are born with an innate ability to organize language into grammar (Mitchell et. al, 2019).

According to Chomsky, all languages are structured the same way with grammatical elements such as noun phrases (NP) and verb phrases (VP). By understanding the structure of the L1 language elements, the learner can recognize similar syntactic structure of the L2, subsequently identifying where these structures differ, facilitating the learning of a second language. Thus, this theory presumes that the L1 is in place in order to learn the L2. Moreover, L2 acquisition in this context refers to the conscious learning of a second language which normally occurs in a school setting.

Autistic children do not generally process information in the same way as TD children. Therefore, research into L1 acquisition, but more importantly L2 acquisition, for children with ASD is required. This field is, however, fairly new with few publications, leaving major gaps in knowledge. The majority of all literature on the subject has been published during the last ten years (Prévost & Tuller, 2022). Furthermore, most participants in this research have been children or adults with high-functioning ASD. The term “high-functioning” refers to an autistic person with functional language without an intellectual disability (ID), which is problematic as this excludes a large part of the ASD community. According to Prévost and Tuller (2022), the biggest gap in this



research is the lack of adequate and appropriate tools used for measuring language structures in autistic children.

There are a number of terms used in the English-speaking world to describe a person with the ability to speak more than one language: heritage speakers, ESL (English as second language) or multi-cultural (Hoffman, 2014). What unites these three examples is that they all refer to a person who, in their normal social surrounding, is exposed to more than one language, thus, acquiring two languages at the same time outside of the formal setting used in schools. The term “heritage speaker” refers to a person learning their L1 at home from the parents, yet living in a country or community where a different language (L2) is spoken (Mitchell et al., 2019). In most cases, the heritage speaker has a stronger L2 than L1.

A child living in an English-speaking country and attending an English-speaking school with a different L1 and little knowledge of English is referred to as an ESL-child. Multi-cultural (or multi-ethnic) are people with parents from two different cultures or nationalities, i.e., a Spanish mother and an English father.

There are not always clear distinctions between these terms. However, they all refer to bilingual people. Bilingualism is the ability to use and alternate between two different languages at the same time. Nonetheless, the definition of when one counts as bilingual is very vague as there are no definitions of the degree of proficiency required for the two languages (Hoffman, 2014). Should the bilingual person be equally proficient in two different languages or is it enough to be proficient in one language but have the ability to read a little in a second language? Depending on the discipline and the specialist, the answers to these questions vary. Thus, there is a lack of universal consensus of the definition of bilingualism. For the purpose of this essay, the definition

applied will be that of Grosjean and Li (2013), who defined bilingualism as “the use of two or more languages (or dialects) in everyday life” (Grosjean & Li, 2013, p. 5).

### 2.3 Similar phenomena

Around the world there are cases reported of individuals who deviate from what researchers think they know about L2 acquisition. Cases where there are no apparent or logical explanation as to the individual’s ability to speak or communicate in a second language to which the individual has no connection, neither through community nor social interaction and has had minimal exposure to.

The most famous and well-known of these cases is Smith and Tsimpli’s (1996) case study of Christopher, a young man who suffers from severe impairment in several cognitive domains, rendering him unable to execute the simplest of tasks such as dressing himself. Nonetheless, he is a linguistic savant with the ability to speak, read and write in roughly 20 different languages. Christopher is reported to have an amazing ability to learn new languages from very little exposure and often without any social interaction or communication.

Práinsson (2012) wrote an essay about three adolescent Icelandic boys who all are on the spectrum with consequent delayed or impaired L1 acquisition (Icelandic). Despite that, they are all inexplicably proficient in English (L2). The first boy, Jonathan, has been diagnosed with Asperger syndrome (ASD) and developed at a very young age adult like speech, which is typical for this diagnosis (Gillberg, 1999). However, when speaking Icelandic (L1), Jonathan often hesitates as if he cannot find the correct word whereas when speaking English (L2) this does not occur. He finds it easier to read English as he claims that both grammar and spelling are easier. Thus, he prefers to communicate in English. The second boy is Albert, who is not officially diagnosed with

ADS but according to both his mother and his supervisor he meets the criteria for the diagnosis. Albert's L1 acquisition was considerably delayed and is yet not fully developed compared to his peers. However, his proficiency in English (L2) is more salient, rendering his speech more fluent, and he claims to think in English.

Furthermore, his written competence in English is significantly better than in Icelandic. Samuel, the third boy, is diagnosed with ADS and has impaired Icelandic (L1) speech. He is reported to speak very slowly with considerable effort and his Icelandic pronunciation sometimes sounds as if he is non-native. His English proficiency is significantly better as he speaks effortlessly with an American accent and uses longer and more complex sentences when speaking. He claims that English grammar is easier and is more comfortable in speaking English (Þráinsson, 2012). None of these boys have any connection to an English-speaking community or relatives. They are all native-born Icelandic but, nonetheless, show similar language qualities to heritage-speakers such as a weaker L1 compared to L2, although the only connection to English is through on-line gaming and/or other types of internet use.

In a study by Vulchanova, Talcott, Vulchanov and Stankova (2012) a ten-year-old Bulgarian girl with Aspergers syndrome (ASD) showed remarkable language proficiency in German (L2) even though she had never been exposed to the language except from watching children's programmes on a German TV-channel. Unknown to her caregivers, she began acquiring the German language at the age of 3-4 and this was first discovered when she had reached the age of 6. The study showed that "at age 10 she had mastered the nominal systems of both Bulgarian and German and has command of noun phrase-internal agreement phenomena" (Vulchanova et al, 2012).

Furthermore, a young French autistic girl has been reported by Marine Rocquebert to speak English to herself on a regular basis; however, she barely speaks a word of

French to anyone and both her parents are monolingual French speakers. The only exposure this girl has had to English is via educational computer games (Prévost & Tuller, 2022). Likewise, Guillemett Henry has reported of a Lebanese boy speaking exclusively in French even though his parents are monolingual Arabic speakers (Prévost & Tuller, 2021).

### 3. Methodology

#### Case history

Thomas, whose real name was anonymised for ethical reasons, is an 11-year-old boy born and raised in Sweden by Swedish-speaking parents. In 2016, at the age of 3:7 he was formally diagnosed with Autism level 2 as stipulated by the criteria in the DSM-V (APA, 2013). At the time of diagnosis, Thomas's L1 speech development was severely delayed rendering him non-verbal. He mainly used "his own" language whilst playing, which was perceived by others as fast babbling and noises. His speech therapist noted at the age of 4:3 his ability to echo-speak, copying longer phrases from children's movies in Swedish. However, he had begun using English to denominate certain items, for example colours.

At the beginning of 2019, at the age of 6:3, Thomas underwent WPPSI-IV, a cognitive developmental test used internationally to measure pre-school children's cognitive development. The purpose of the test was to determine whether Thomas also had an intellectual disability (ID) as this would affect which type of school would be suitable. The results showed that Thomas scored considerably below average on the verbal index, while on the visuospatial test and other subtests he scored an average. The conclusion was that Thomas did not have an ID. However, the results prompted further need to assess his linguistic abilities. The same year, at the age of 6:8, Thomas was additionally

diagnosed with F80.2B severe Developmental Language Disorder of receptive and expressive language (DLD). At the time, his vocabulary size was assessed to be the equivalent to that of a TD child under the age of three. Again, the speech therapist noted that some words or expressions were denominated in English, for example “*It was a tiger*” or “*banana*” however, when speaking in Swedish he would only produce two-word sentences unless he performed echo-speech in which he was able to copy sentences consisting of more than nine words. It was also noted that he could produce a four-word sentence in English. However, unable to do the same in Swedish.

It is noteworthy that in Sweden, English as a foreign language is first introduced at school from the age of 7-9 (age varying between schools) as stipulated by the curriculum Lrg 22 (Skolverket). Assuming that a child is born of native Swedish-speaking parents, the exposure to the English language would be limited prior to school. Some exposure is likely to occur through television programs and music. However, most children’s channels in Sweden are dubbed. No other language than Swedish has ever been used in neither Thomas’s home nor any other social setting. He has never had any connection to an English-speaking community and all TV-channels or DVDs he receives input from are dubbed into Swedish. The only exposure to English has been through YouTube, which has been limited, especially during his first five years when he did not have access to any devices without supervision.

Around the age of four or five, Thomas began using expressions in English more frequently, which his parents initially perceived as random echo-speech. However, gradually English utterances became more dominant in Thomas’s communication. By the age of seven, Thomas’s L2 proficiency had surpassed his L1. English had become his dominant spoken language, puzzling both family and school staff. Today, at the age

of 11, Thomas still has an underdeveloped L1. Nonetheless, when speaking English, he seems to be more proficient in constructing sentences and expressing himself.

### 3.1 Methods

This case study was conducted through qualitative data collection methods using both interview and experiments to gather information for analysis. The purpose of the experiments was to try to determine if the subject, Thomas, verbally has an equal proficiency in, and shows a preference for, communicating in his L2, thus subsequently help determine if he can be considered bilingual even though there has been considerably less exposure to L2 compared to L1 spoken by the parents, at school and in his community.

The experimental tasks consisted of (1) a vocabulary naming task, (2) a picture matching task, (3) a semantic matching task. These tasks were followed by (4) an interview with Thomas and (5) an interview with his special needs teacher. All tasks and interviews were held in Swedish.

### 3.2 Ethical Considerations

Prior to both experiment and interview, Thomas's parents and his special needs teacher were contacted and informed of the purpose of the study and that a video recording of their participation would be made. Thomas's parents have been present during all experiments representing his interest as it can be difficult to understand or interpret him when unfamiliar with his manners. A consent form was signed by the parents and Thomas's special needs teacher in which their right to discontinue their participation was clearly stated. Furthermore, the consent form guaranteed anonymity and that all personal information would be handled with confidentiality.

### 3.3 Materials

During the vocabulary naming task and the two matching tasks, a set of twenty-four pictures were used. The pictures were downloaded from Bildstöd.se which is a website that provides free imagery support for anybody with the need for visual aid. All the pictures on the website are drawn images of words, visually very simple and distinct. Every picture was accompanied by two additional notes on which the word matching the picture was written; one in English and the other in Swedish, totalling forty-eight written notes. These notes were made using a standard Word-document, printed and cut into suitably sized pieces.

### 3.4 Procedure

Three different tasks were designed with the aim to establish whether Thomas indeed prefers to communicate in his L2 rather than his L1, subsequently determining if he has a higher proficiency in the L2.

All three tests were video recorded and conducted at the kitchen table in Thomas's house. Thomas was placed at the table opposite the researcher with the video camera aimed at Thomas and the table directly in front of him in order to capture both the test laid out in front of him and his responses. The setting and structure for the tasks was formal, purposefully similar to the ones used by his school, speech therapist and psychologist, so that Thomas would recognize the situation, thus feel safe and comfortable.

All instructions were purposefully communicated in Swedish in order to duplicate a normal everyday situation and not influence or encourage Thomas to speak English. Both parents and school staff testify that the majority of times Thomas will reply in English even though being spoken to in Swedish.

The first task was a vocabulary naming task where Thomas was shown the twenty-four pictures, one at a time, and asked to orally name what was on the picture. Naming tasks are typically used for measuring language skills and in particular the difference in processing L1 and L2 (Plat, Lowie & de Bot, 2018). The aim of the test was to establish in which language he would most naturally name the item on the picture, indicating his preferred language. An example is shown in Figure 1.

Figure 1.

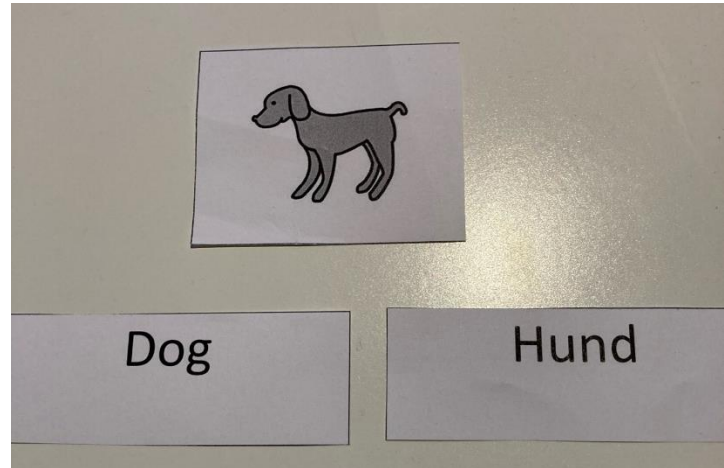


The second task was a receptive picture matching task testing Thomas's reading comprehension and ability to match words to pictures. The same twenty-four pictures were used; however, this time with the additional forty-eight pieces of paper on which the words matching the pictures were written, as previously mentioned. Thomas's task was to read the words and match his preference to the picture. For example, when presented with a picture of a dog, two written notes would simultaneously be presented, spelling the words "dog" and "hund". Thereafter, he would be asked to choose the word that he thought would match the picture. This test would show his cognitive



choice of word indicating which language he thinks and processes in. An example is shown in Figure 2.

Figure 2.



The third and final test was yet another receptive task using semiotics to test Thomas's ability to recognize and identify the two languages by using the Swedish and British flags. Thomas was shown the two flags and asked which country they represent to ensure his ability to differentiate between the two. Once established, the flags were placed on the table in front of Thomas, one to the right and the other to the left.

Subsequently, he was presented with the word-notes used in the previous task and asked to pair them with the correct flag. All forty-eight notes were presented in a mish-mash on the table in front of him. Thereafter he was asked to place the notes he thought were written in English under the British flag and subsequently the Swedish words under the Swedish flag. The aim of the test was to investigate whether or not Thomas had a cognizance of the two separate languages thus indicating his awareness of choice in language. An example is shown in Figure 3.

Figure 3.



One final measurement was taken via an interview with Thomas. This was conducted in a more relaxed and informal setting during which Thomas was allowed to play a game on his iPad. He was asked a series of questions regarding what he was doing, what he enjoys doing, what he likes to eat etc. The purpose of the conversation was to let him speak freely and form his own sentences to establish which language he would naturally prefer to use.

In addition to the tests an interview was held with Thomas's special needs teacher. The interview was held via Microsoft Teams and was comprised of nine questions:

- (1) How long have you been working with Thomas?
- (2) Compared to a TD child, on what level would you place Thomas's linguistic ability?
- (3) Which grammatical constructions does he master (syntax, negations, tense)?
- (4) Which language would you say that Thomas speaks when allowed to speak freely?
- (5) Which language does he speak in the structured learning environment (i.e. during lessons)?
- (6) Do you think that there is a difference in his ability to understand instructions in Swedish as opposed to English?
- (7) Is there a difference in response time depending on which language he is using?
- (8) Is there a difference in his ability to express himself between Swedish and English?
- (9) In which language do you think he processes and what makes you think that?

## 4. Results

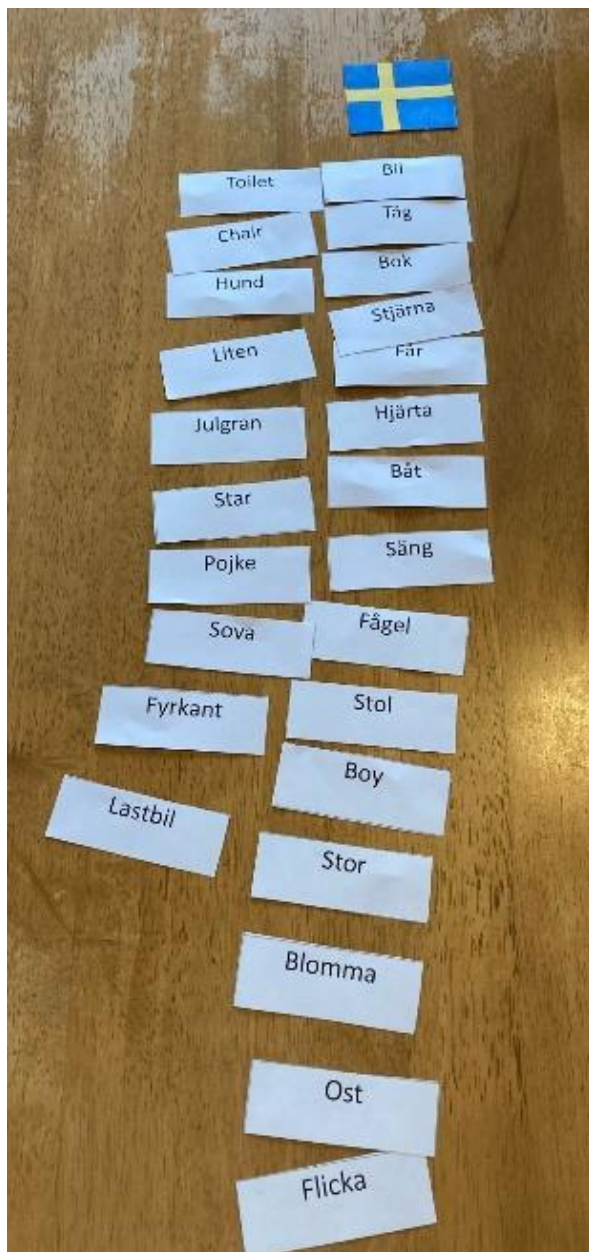
For the vocabulary naming task, Thomas performed well and was able to name 100% of the pictures accurately. However, out of the twenty-four pictures he only named five in English (20,83%). The remainder were named in Swedish. These words were “*sheep*”, “*truck*”, “*beach*”, “*square*” and “*sister*”. The picture he named “*sister*” showed a girl, suggesting that he to some extent still overextends certain words. This conclusion was supported by his parents who confirmed that he regularly overextends the word “*sister*” when speaking of girls. The result of the first test was surprising as it was unexpected that Thomas would name nineteen of the pictures (79,17%) in Swedish. However, when reviewing the transcription of the test, it became apparent that when prompted in a formal setting, he replies in Swedish because his perception is that he is expected to do so. All other utterances prior to, and during the test, were in English as can be seen from the extract below (Thomas’s comments in italics):

- *Because I no more*
- Nej, nej, It’s ok.
- *No, not ok!*

In the picture matching test, Thomas's reading comprehension was tested. Out of the twenty-four pictures, he matched twenty-three with the Swedish word (95,83%) and only one with an English word (4,17%), which was the word "girl". The results of this test highlight two issues; firstly, that he seems to struggle with the Swedish word "flicka" as he was unable to choose this word. Thus, opted for the English "girl". Secondly, all the words that he previously named in English in the first experiment were now correctly chosen in Swedish. This suggests bilingualism as Thomas seemed to be able to access both languages simultaneously. During the vocabulary naming task, when asked to freely name the pictures, he would answer both in English and Swedish, using the language from which he retrieved his answer first. However, in the picture matching task which provided visual support, he was able to recognize Swedish and choose that.



The purpose of the semantic matching task was to test whether Thomas could distinguish between the two languages, thereby determining his cognitive awareness of his own language use. The results from this experiment were slightly mixed, however the majority of the words were placed with the correct flag. Under the British flag he placed twenty-three words, subsequently twenty-five words under the Swedish flag. Three of the words placed under the British flag were in Swedish (13,04%) and three words in English (12%) were placed under the Swedish flag, as can be seen from the pictures below. Thomas managed to separate the Swedish and English words with a mean 87,3% accuracy.



It proved slightly difficult for Thomas to read some of the words in English. It was later revealed that his teacher has been reluctant to teach him English, especially the alphabetical morphemes, afraid that this would interfere with Thomas's L1 development. Therefore, Thomas's reading proficiency in English is considerably inferior compared to his ability to speak in the same language. He could nonetheless identify most of the English words on his own, yet required some support to complete the task. Due to his DLD, his ability to read and write is also delayed. However, when some morphemes were uttered by the researcher, he could immediately identify them as either English or Swedish. He started off by identifying all words written with the Swedish letters "å, ä, ö", indicating awareness of the difference in alphabet between the two languages. He then proceeded to randomly pick up a note, read it out loud to the best of his ability, thus identifying the language in which the word was written. Most of the words chosen for the test were morphologically different between the two languages apart from one, which was "toilet". When sounding out this word, Thomas would use Swedish morphemes, which made it difficult for him to distinguish between the two languages.

Finally, in the interview the subject of the conversation was Thomas's interest to which he answered and spoke freely in English. During the first three experiments, the results had been mixed; therefore, the aim of the interview was to see if the same mixed results would occur. The extract below shows that his replies were all in English even though spoken to in Swedish (Thomas's comments in italics):

- Berätta; vad gör du? Vad är detta?
- *It's racing candy.*
- Racing candy? Ok. Och vad gör du då?
- *Go in rainbow car and start to race.*
- Jaha. Är det roligt?
- *Mmm*

The conversation was still laconic and the replies were sometimes difficult to understand due to his DLD. However, there was a flow in his speech production that was more unhindered than any utterances previously made in Swedish. When speaking in Swedish, the flow is interrupted by a lot of pauses, as if he is hesitating, searching for the word or translating from English. The response time also seems to be quicker when he is spoken to in English as opposed to Swedish, as if it takes him longer to process a question or a demand in Swedish.

#### 4.1 Interview with the special needs teacher

The special needs teacher who has been working with Thomas for roughly three and a half years confirmed that Thomas's speech and vocabulary has indeed improved over the last two years. She describes his improvement as a set of stairs where he will plateau for a while until suddenly jumping up a level, rather than a gradual improvement. They have been meeting once a week for a 60-minute session working on expanding Thomas's Swedish vocabulary as well as word classes and syntax. In her professional opinion she assesses his expressive ability to be equivalent to that of a child five years younger (or even younger than that). At the same time, she points out that his impressive ability is greater; therefore, he has the ability to understand more than he can express. According to the special needs teacher he can produce sentences containing four-to-five-words but rarely uses conjunctions. She points out that her task is to train and help Thomas develop his vocabulary in Swedish. Thus, Thomas is expected and required to communicate in Swedish during their sessions. Nonetheless, she confirms that in between tasks, during free play or break, Thomas will switch to speaking English, which seems to be more developed with a broader vocabulary and higher proficiency to produce longer sentences. Furthermore, when instructing Thomas in Swedish does not work, she has on occasion resorted to English, resulting in what she

perceives as a better and quicker comprehension. In addition, she confirms that when asked a question Thomas will produce an answer much faster in English as opposed to Swedish, where his reply can sometimes take several minutes. In general, when asked questions during sessions, Thomas usually replies with one or two words in Swedish whereas when asked about his interests and allowed to speak freely he switches to English and produces both more and longer sentences. She points out that it is sometimes difficult to know if the short expressions in Swedish are due to his ASD or a weak vocabulary. Overall, she does not reject the idea that Thomas processes and thinks in English. Additionally, she suggests that he is code-switching, indicating bilingualism. Nevertheless, she is reluctant to give a definite answer to the question of which language she thinks is his dominant one as she feels uncertain.

## 5. Discussion

The purpose of this case study was to investigate whether it is possible for a child with ASD and DLD to develop a higher proficiency in L2 than in L1, despite quantitatively and qualitatively less exposure to the L2. In the study, five tests were conducted: three experiments and two interviews. The tests showed mixed results as Thomas replies were inconsistent between the experiments and the interview. In the vocabulary naming test he named 79% of the pictures in Swedish and only 21% in English. Furthermore, in the picture matching experiment he chose to match 95% Swedish words with the pictures and picked only 5% English words. In the semantic matching experiment, he could correctly separate English and Swedish words with a mean 87,3% accuracy. The experiments indicate that Thomas uses Swedish as an L1 to communicate and execute tasks presented to him in Swedish. Furthermore, the experiments show that he is cognitively aware of the two different languages thus being able to separate them.



Therefore, the tests show a preference for speaking Swedish which do not support the theory that Thomas has an equal proficiency in the L2 nor does he seem to prefer to answer in the L2.

However, it became apparent during the interviews that there was a limitation in the design of the experiments. The formal setting and structure used during the test had been chosen to create a sense of comfort and security for Thomas, thinking that in a familiar situation he would be more obliged to cooperate with the researcher.

Nonetheless, as the special needs teacher pointed out, Thomas is always expected and required to answer in Swedish in these settings. Therefore, when recognizing the situation, he defaulted to what he has been taught and trained to do, namely reply in Swedish. The natural and spontaneous replies that were sought after failed to appear due to a rehearsed behaviour in a too familiar and formal setting which had not been anticipated. However, the complement of the interview with Thomas proved to be fruitful as, in this manner, he was allowed to communicate in a relaxed and natural setting thus choosing to speak in English. The results were, in this sense, mixed insofar as the experiments yielded a preference for Swedish while the interviews suggested that English was the preferred language.

Furthermore, according to Plat, Lowie and de Bot (2018), during naming tasks, naming in L2 is consistently slower than naming in L1 due to the L1 naming being automatized. Although the experiments in this study were conducted without any software to measure response times, no delay was detected during the vocabulary naming task where Thomas named five of the pictures in English. It would therefore seem that both his L1 and L2 are automatized as he code-switches effortlessly without noticeable delay.

According to the special needs teacher, Thomas code-switches between Swedish and English frequently and does so both during lessons where he is required to speak Swedish and during recess when he speaks English. This would suggest that Thomas is bilingual.

Moreover, the special needs teacher confirmed that outside of the structured learning environment, Thomas naturally speaks English. This occurs during recess but also in between tasks in the classroom when he is allowed a break. When speaking English his sentences are more elaborate and speech production is both faster and unhindered in contrast to his L1. This was corroborated by the interview with Thomas where he spoke solely in English even though spoken to in Swedish.

As previously mentioned, Thomas has had very little exposure to English, the only source being YouTube. Apart from going away on vacation abroad with his family once a year, Thomas has never had any connection to an English-speaking community. Nevertheless, he has naturally acquired L2 to the same degree as L1 in which he is actively working with a special needs teacher to expand his mental lexicon. Learning L1 has been a struggle involving many hours of training and repetition whereas L2 has developed naturally and effortlessly without any support.

## 6. Conclusion

The aim of this essay was to determine whether it is possible for a native Swedish born autistic child to develop a higher proficiency in the L2 than the L1 without being either a heritage speaker or multi-cultural. The findings suggest that there is a strong indication that Thomas indeed is bilingual and prefers to communicate in his L2. A follow-up study of Thomas would be interesting once he has gotten older as well as his

language hopefully having developed further. With a higher language proficiency both in L1 and L2 he would be able to better communicate how he has come to learn English, as well as which language he prefers to communicate in, as he is unable to express such reasoning at the present time.

Although research into language acquisition and ASD during the last ten years has increased, the field is still new and there is an apparent gap in knowledge. Most researchers have focused on L1 acquisition in young ASD children, which according to Prévost and Tuller (2022) raises an issue, as many children with ASD experience delayed language acquisition. Therefore, the population sample needs to be older children in order to gain better understanding of ASD language development. Very few studies have focused on either ASD children with a more developed L2 than L1, especially when growing up in a non-bilingual environment, or ASD children's language preference. Further research on a larger scale is called for.

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