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Hull, Elinor (2018) The frequency, syntactic and pragmatic functions of adjectives in scripted and spontaneous child directed speech aimed at British 3 year-olds. University of Bath. (Unpublished)

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The Frequency, Syntactic and Pragmatic Functions of Adjectives in Scripted and Spontaneous Child Directed Speech aimed at British 3 year-olds

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The Frequency, Syntactic and Pragmatic Functions of Adjectives in Scripted and Spontaneous Child Directed Speech aimed at British 3 year-olds

ABSTRACT

Children master adjectives at a later stage in development compared to other word classes (Ravid & Levie, 2010). Past research suggests that this could be due to adjectives being inherently complex (Tribushinina et al., 2013), or because adjectives are used infrequently (Sanhofer & Smith, 2000). However, a vast amount of research suggests that the Syntactic function and Pragmatic function of adjectives may also influence children's acquisition. This study aimed to examine what in terms of exposure can explain children's later acquisition of adjectives. Since frequency, Syntactic and Pragmatic function have an effect on learning verbs and nouns (Blackwell, 2005) and different types of speech yield different amounts of language exposure (Tamis-LeMonda et al., 2017); these elements were investigated for adjectives in two different speech sources that were compared. Using a self-devised coding scheme, texts from 16 picture books and 16 transcripts of parental speech were coded for adjective use. The results showed that book text contained statistically more adjectives, attributive adjectives and descriptive adjectives, whereas parental speech contained significantly more predicative and contrastive adjectives. The findings are discussed in regards to the theories behind children's later adjective acquisition and ideas for language interventions are introduced.

KEY WORDS:	ADJECTIVES	SYNTACTIC FUNCTION	PRAGMATIC FUNCTION	SCRIPTED SPEECH	SPONTANEOUS SPEECH
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1. Introduction

Infants start to develop language skills in their early months of life. Word comprehension and the understanding of phonetics have been observed to occur with nouns at around 6 to 9 months of age (Friedrich & Friederici, 2011; Shukla, White & Aslin, 2011; Bergelson & Swingley, 2012). However, speech production emerges later than comprehension. Children start verbalizing words at approximately 11 months and onwards, where the first words produced are predominantly nouns (objects) and names (e.g. Mummy and Dada) (Just, Alcock, Meints & Rowland, 2015). Indeed, in their early years of life, evidence shows that children have a bias for object categories (Waxman & Kosowski, 1990) and therefore pick up nouns more straightforwardly. When looking at other word classes, past research suggests that the acquisition of adjectives, words describing people and objects, arrives much later in development compared to nouns (Salerni, Assanelli, D'Odorico & Rossi, 2007; Ravid & Levie, 2010). Young children are found to master nouns at an earlier age and with fewer mistakes compared to adjectives (Gasser & Smith, 1998). It is not until the age of 7 years that adjectives are used grammatically correct in typically developing children (Tribushinina & Gillis, 2012).

On the other hand further research has found that children younger than 20 months know what an adjective is. Waxman and Booth (2001) investigated infants' ability to categorize words into nouns and adjectives through eye tracking. At 14 months, infants are able to distinguish nouns and adjectives. However, being able to distinguish adjectives from nouns does not entail adjective acquisition, as demonstrated by children's protracted developmental course in both the comprehension and production of adjectives (Berman, 1988; Ninio, 1988; Ramscar & Gitcho, 2007; Waxman & Booth, 2001). In addition to this, research suggests that children undergo an intensive period of adjective acquisition, which tends to begin from around the age of 20 months until the age of 36 months (Tribushinina & Gillis, 2012; Tribushinina et al., 2013; Tribushinina et al., 2014). It is at the end of this period where adjectives start to emerge in child speech in a correct context, but at the same time, the learning of adjectives reaches a plateau (Tribushinina & Gillis, 2012). Before this, adjectives in children's output are underrepresented and sometimes used inaccurately. However, children's incomplete adjective acquisition is still present in their production at 5 years of age. Studies report that despite their ability to understand that adjectives are necessary when multiple objects of the same kind are present (Huang & Snedeker, 2012), 5 year-olds are still found to be under-informative when describing objects to addressees in a finding game with multiple versions of an object (Davies & Kreysa, 2016). Meanwhile 7 year-olds and adults managed to provide sufficient information when describing objects. This further demonstrates that adjectives take a longer time to master even though the word class is present in production.

As a word class, adjectives are not vital in a sentence to convey a message, however they have multiple roles in a sentence. Firstly, they can help children predict upcoming nouns in the speech stream (Tribushinina & Mak, 2016), and are essential for describing and differentiating concepts due to their descriptive nature. It is therefore crucial that children master them in order to develop narrative abilities and language complexity to achieve future success in communication and academia (Feinstein & Duckworth, 2006; Rowe, Raudenbush & Goldin-Meadow, 2012).

Adjective acquisition is additionally an important aspect to research as children with Specific Language Impairment and Cochlear Implants have shown to understand and use adjectives much later than their typically developing peers due to their disabilities (Davies, Andrés-Roqueta & Norbury, 2016; Tribushinina, Gillis & De Maeyer, 2013). Thus there is a particular demand to research adjectives in order for language interventions to reflect the needs of children with language difficulties.

There are currently two theories explaining typically developing children's delayed acquisition of adjectives. Some researchers argue that adjectives are demanding to learn because they are inherently complex and variable (Tribushinina et al., 2013; Tribushinina, Voeikova & Noccetti, 2015). However, since children younger than 4 years have basic adjective vocabularies and can use adjectives flexibly (Klibanoff & Waxman, 2000), it questions the theory that adjectives require a certain level of development to be learned. Indeed, according to Sandhofer and Smith (2007) adjectives present a great challenge to young learners not due to their conceptual complexity, but because far fewer adjectives occur in parental input relative to nouns and verbs. Naturalistic studies indicate that parental adjective use is highly influential on children's adjective production, and that adjective frequency in child directed speech has a strong correlation to the adjective frequency in children's speech (Murphy & Jones, 2008; Tribushinina et al., 2014). Although as time passes adjective frequency in parents' speech reduces when their children become older and use adjectives themselves (Tribushinina et al., 2014). These findings have been shown cross-culturally with Croatian, Dutch, French, German, Italian, Lithuanian, Russian and Turkish children and parents (Tribushinina et al., 2013), and demonstrate that adjective frequency may not be high enough for learning to occur and provides an answer for why an adjective plateau forms at 36 months. In addition, research suggests that there is an optimal amount of adjectives in a noun phrase for young children. In a picture finding game, Morisseau and colleagues (2013) found that 3 and 5 year-olds reacted with a confused look to utterances that were under descriptive but 5 year-olds also reacted similarly to over informative utterances, where descriptive components were redundant. Thus adjectives may have to be used more frequently to allow learning, but cannot be used too often as this will cause confusion in young children. However, there are other aspects of exposure that can affect the learning of adjectives which further suggest that exposure may not be productive and effective enough to foster learning.

Adjectives can be placed in a sentence in three different ways, which is known as the Syntactic function of adjectives. Adjectives can fall before the noun in a sentence (attributive; e.g. a *dry* towel), after the noun (postpositive; e.g. keep the towels *dry*) or after a verb (predicative; e.g. the towel is *dry*). Ninio (2004) argues that children tend to focus on the noun content rather than the descriptive content when they hear a noun phrase with an adjective. This leads children to frequently fail at interpreting utterances with attributive adjectives since it distracts the child from the noun. This has been demonstrated experimentally in a novel word-learning task where 3 year-olds were unable to learn the meaning to new words presented when one or more adjectives were attributively presented in the phrase (He, Kon & Arunachalam, 2017). This suggests that either the children did not know the adjectives presented and/or that children have a limit of what they can process at an early age. Either way, the children's lack of knowledge of the descriptive components hindered them from learning a new word.

As well as affecting the learning of other word classes, Ninio (2004) asserts that word order in noun phrases with adjectival modifications could affect children's adjective learning, and that children tend to have better comprehension of predicative adjectives than attributive or postpositive ones. Indeed, when listening to parents' spontaneous speech about pictures in a picture finding task, 3 and 4 year-old children were faster at finding the target when the picture had been post-nominally modified (predicative and postpositive) compared to pre-nominally (attributive) (Arunachalam, 2016). Similar findings have been found by Dye (2013) with colour adjectives. In a crayon-colour finding task, 2 year-olds had a higher rate of picking the correct crayon when the experimenter asked, "*Could you pass me the crayon that is blue?*" compared to when the experimenter asked them to "*Pass the blue crayon*". These pieces of evidence further show that predicative adjectives are easier for young children to comprehend. Dye explains that the reason for this bias of comprehension is down to attention and that we as humans make use of visual information in conversations. Children do this as well but they have a lot more to grasp about the world, which adults can take for granted. By mentioning the adjective predicatively after a noun it narrows children's attention to the object before the particular property. Thereby, the child is not looking for objects all around the room with the same properties (e.g. colour, size), but they are zooming into the object then its' appearance. Furthermore, adjective learning has been found to be more linked to one's ability to control attention rather than vocabulary size (Yoshida et al., 2011). After assessing participants' attention and vocabulary sizes, the researchers found that attention reliably predicted adjective learning in a novel adjective task. This suggests that attention plays a pivotal role in adjective learning.

Another way proposed to help children learn adjectives is by their Pragmatic function. The Pragmatic function of an adjective is the way in which the word is presented in terms of context. There are two different types of pragmatic functions, a descriptive function (e.g. the ball is soft) and a contrastive function (e.g. the teddy is softer than the ball). Using contrastive contexts (i.e. using the adjective for a comparison) has been found to scaffold the learning of adjectives rather than just using adjectives for a descriptive purpose (Tribushinina et al., 2014). Thus both the Syntactic and Pragmatic function of an adjective can also affect children's learning of the word class. However, these aspects of adjectives have not been quantified in terms of children's exposure, and on average, not a lot is known about adjective exposure apart from the frequency of its' occurrence. Therefore it is difficult to find the source for children's delayed acquisition. This project will be looking at the exposure of adjectives in terms of frequency, Syntactic function and Pragmatic function to provide research with findings to help tease apart the reason for the later acquisition of adjectives. To further provide future research with more data on adjective exposure, a comparison will be made on two types of naturalistic child directed speech samples.

One of the speech types that will be investigated is parents' spontaneous speech to their children. This type of input has been widely used in language research as parental speech affects children's vocabulary, speech and knowledge in their early years (Weisleder & Fernald, 2013). However, children do not only learn from spontaneous adult speech, they can also learn from scripted speech, i.e. books, television programmes and films. Using scripted speech in research is currently a

rare source to investigate; yet it contains rich linguistic information that children can learn from on a daily basis. Another advantage of looking at scripted speech is that different type of inputs will yield different language exposures. Tamis-LeMonda and colleagues (2017) found that 5 minutes of structured tasks in a parent and child dyad produced more words from mothers per minute than 45 minutes of naturalistic play sessions. Thus making it important to look into different inputs, as both type and length of exposure can have an effect on frequency if not other structures.

The other type of naturalistic child directed speech that will be investigated is book text. Books were used as the scripted speech source, because past research has found that the content in children's books has the potential to play an important role in children's grammatical development (Cameron-Faulkner & Noble, 2013). Other researchers have additionally found that children learn well from parents reading books to them (Chiong & DeLoache, 2012) and are even able to learn novel adjectives (Mareovich and Peralta, 2016). In Mareovich and Peralta's experiment, 2 to 3 year-olds were exposed to novel adjectives denoting a visual property when reading a picture book with an adult. In the experiment children successfully learned novel adjectives and successfully extended them to different objects pictured in the book. Again, it is proposed that this is due to attention; that the parent is directing the attention of the child to a specific picture or page and providing a verbal utterance to accompany the visual information. Since attention has an effect on adjective learning (Yoshida et al., 2011), it is important to research a source that can shift and promote attention.

The evidence thus far shows that the frequency, Syntactic function (attributive, predicative, and postpositive) and Pragmatic function (contrastive and descriptive) have an effect on children's adjective acquisition and language skills development. These elements of language have additionally been shown to play a part in children's acquisition of other word classes (Blackwell, 2005), and they are therefore important to research. Since the source of the delay of adjectives in young children is still unknown, this investigation will be looking at children's linguistic input to explore what in terms of the exposure can explain the later acquisition, specifically focussing on the frequency, Syntactic, and Pragmatic function of adjectives. The project will compare spontaneous child directed speech to scripted child directed speech for these three components of adjectives because there is evidence to suggest that these sources can be different from each other (Tamis-LeMonda et al., 2017). This type of investigation has not yet been done with adjectives, however it shares similarities of previous research, which compared sentence structures in spontaneous child directed speech and book text (Cameron-Faulkner & Noble, 2013). Significant differences in exposure were found in that study. Therefore, for this project, it is hypothesized that adjective frequency, Syntactic and Pragmatic function will differ between the samples, but this will remain non-directional, as there is no past research that indicates any differences on these adjective elements on scripted and spontaneous speech. Lastly, the exposure of British 3 year olds will be explored as adjective studies on British children are scarce and at the age of 3 children have a sizeable vocabulary without the help of official schooling.

2. Methods

2.1 Samples

2.1.1 Scripted child directed speech.

The scripted child directed speech sample is comprised of 16 popular children's picture books aimed at 3 year-olds. These books were sampled by a stratified sampling method and were chosen through similar methods and criteria as the previous study using books as a sample (Cameron-Faulkner & Noble, 2013). The books were selected based on being *best sellers* aimed at 3 year-olds on October 3rd 2016 using the online organisation Amazon UK, renowned for high book sales. The bestselling books are Amazon UK's most popular products based on sales, which is updated hourly. Out of 1200 books, 67 books were best sellers. These books were then examined in the order they had appeared in on the website and excluded if:

- They were preschool workbooks intended for children to learn how to count, read, or write.
- They were "I Spy" books that required children to play a finding game (I spy) in certain places e.g. the seaside, airport, or garden.
- A book with the same author had already been selected.
- A book in the same series was already selected (e.g. *Ten little X*, *The Queen's X*).
- They were inappropriate for the target cohort. Books were inappropriate if the contents and theme of the book was not suitable for 3 year-olds. Customer reviews were taken into account to decide this. In some instances where customer reviews were not helpful, the books were borrowed in libraries and looked over by experimenters before being accepted and added to the final book list.
- They had a specific theme, such as a religious theme or similar. Themed books would limit the audience and therefore be under representative to the typical 3 year-old population as a whole.
- They were only available in Kindle edition.

51 books were further excluded for these reasons when establishing the source materials. The list of books can be found in Appendix D.

2.1.2 Spontaneous child directed speech.

The spontaneous speech sample consists of 16 transcripts from a parent's verbal interaction with their child during a play session from Tommerdahl and Kilpatrick's study (2013), made available on an online research platform called TalkBank. The TalkBank website has numerous freely available data which has created a multilingual corpus to be used for research purposes. All data in the corpus is ethically approved to be on the website and is anonymous on retrieval. The sample was obtained through opportunity and volunteer sampling due to it being on the TalkBank website and because it was the only sample available that fit the required age group and nationality.

The mean age of the children is 3 years and 2 months (Min=2; 9, Max=3; 9, SD= 2.9 months). Eight children were male and eight children were female. One male child played with their father, the remaining participants experienced their play session with their mother. All children played in the same room with the same set of toys for approximately 35 minutes with their parents. Every child was growing up in a monolingual home and was screened with a hearing test to establish normal hearing prior to participating. The children were regarded as typically developing based on parental report on five aspects:

- The child had not been referred to speech and language therapy.
- The parents did not feel that their child began using language later than their peers.
- No one in the immediate family had been suspected of having a language or communication difficulty.
- Parents did not suspect a language or communication difficulty in their child.
- The child had no known neurological disorders.

2.2 Design

This project has a between subjects design looking at the differences in adjective use in terms of frequency, syntactic and pragmatic function in the scripted and spontaneous child directed speech samples described above. The independent variable is speech type, which is either spontaneous or scripted. The dependent variables are the percentage of attributive, predicative, postpositive, descriptive and contrastive adjectives in relation to total number of adjectives in a sample text, as well as the percentage of adjectives in relation to the total number of words and nouns in a sample text.

2.3 Procedure

2.3.1 Scripted speech.

The children's picture books were borrowed from public libraries around Boston, Bath and Leeds. Every sentence in a book was transcribed and put into one excel sheet. One sentence was equivalent to one row in Microsoft Excel. Each word in every sentence was then checked using a self-devised coding scheme outlined in section 2.4. The number of words, nouns, and adjectives were counted, as well as, the number of attributive, predicative, postpositive, descriptive and contrastive adjectives. From these values the percentages for the measures were computed. This procedure was repeated for every book in the scripted speech sample.

2.3.2 Spontaneous speech.

The transcripts were downloaded from Talk Bank where each participant was downloaded as a separate file that was converted into Microsoft Excel. Children's utterances during the play session were disregarded, and one uttered sentence by a parent was equivalent to one row in Excel. Each word in every sentence that the parents uttered in presence of their child was subsequently checked and coded using the same coding scheme as the scripted speech sample (outlined in section 2.4). Lastly, the number of words, nouns, adjectives, attributive modifications,

predicative modifications, postpositive modifications, contrastive modifications and descriptive modifications were calculated. From these values the percentages for the measures were computed. This procedure was repeated for each spontaneous speech file.

2.4 Coding

The coding scheme for this investigation is made up of two stages. In the first stage, every word in each excel row was coded into abbreviations for word classes outlined in Table 1.

Table 1.

Word categories used in the coding scheme with the abbreviations and example words

Word category	Abbreviation	Example
Adjective	Adj	Intelligent
Adverb	Adv	Really
Noun	N	Book
Noun compounds	N-N compound	Cherry Tree
Number	Num	11
Possessives	Poss	Yours
Pronouns	Pro	She
Proper names	Proper	Harold

The reason for coding all these word categories was to ensure that the adjectives and nouns in the text would not be misinterpreted. Additionally, a noun compound was counted as one noun. An example of a transcribed and coded text can be found in appendix E.

In the second stage of the coding, each adjective was analysed in more depth for six categories in a separate sheet in excel. Every adjective was explored for 1) bare form of adjective, 2) whether the adjective was modified by another word, 3) Grade, 4) Syntactic Function, 5) Gradability, and 6) Pragmatic Function. These categories were used based on grammar books that highlight these aspects as important for adjectives (Greenbaum & Quirk, 1990; Huddleston & Pullum, 2005). All categories apart from Syntactic and Pragmatic Function were coded as part of a larger project and were not used in the analysis in this dissertation. For the Syntactic Function it was noted whether the adjective was attributive (adjective before noun), predicative (adjective preceding a verb) or postpositive (adjective preceding a noun) to figure out the different types of adjectives children hear. The Pragmatic Function indicated

what source the adjective was. Adjectives could either have a descriptive nature or a contrastive one. An example of the adjective analysis can be found in appendix F.

It is important to note that there were utterances that only contained an adjective. These freestanding adjectives were coded as predicative since this form made the most sense despite the minimal contextual information. One word adjectival utterances were only found in the spontaneous speech data and were uncommon. In addition to this, coding was crosschecked for inter-rater reliability for the scripted speech sample by a linguistics professor from the University of Leeds who had helped devise the coding scheme. The professor only checked the scripted speech sample, as it was the first sample that was coded and mistakes were found to be few. Inter-rater reliability was not checked in the spontaneous speech coding because the researcher coding it was a reliable scripted speech coder and was experienced with the coding scheme. Since the coding was done in an all-or-nothing fashion (i.e. either the word was a noun, an adjective, or it was neither, either the adjective fell before a noun, after a noun or after a verb) the experience was sufficient to not be crosschecked.

3. Results

3.1 Adjective frequency

The percentages of adjectives in relation to word count and adjectives in relation to nouns were used to address the frequency of adjective use in the samples. Table 2 presents the mean number of adjectives, nouns and words found, as well as the mean percentage of adjectives to word count and the mean percentage of nouns that are modified with an adjective. It shows that the spontaneous speech sample contains on average more words, nouns and adjectives compared to the book sample. However, when looking at the percentage of adjectives in relation to word count, the scripted speech sample shows to have more adjectives. Still, both samples contain a very small amount of adjectives in comparison to word count. Additionally, when looking at the amount of nouns that are modified by an adjective, nearly half of the nouns in the book texts are modified with adjectives (41%), whereas only a quarter of noun phrases in the parental speech sample contain an adjective.

Table 2.
Means and Standard Deviations of words and adjectives in scripted and spontaneous speech.

	Scripted		Spontaneous	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Word count	696.81	973.15	2001.50	969.30
Adjective count	39.88	57.50	48.00	26.33
Noun count	130.38	199.90	196.00	102.90
Percentage of adjectives to word count	11	21	2	1
Percentage of nouns modified by adjectives	41	24	25	7

To calculate whether the adjective frequency in relation to text length differs between the two samples, a Mann-Whitney U test was performed. This was due to non-normality and outliers in the scripted speech sample. The outliers were not caused by an input error and remained in the sample for the analysis. The Mann-Whitney U test indicated a significant difference in the proportion of adjectives in relation to text length in scripted speech ($Mdn = .0644$, $n = 16$) and spontaneous speech ($Mdn = .0258$, $n = 16$), $U = 32$, $z = -3.618$, $p < .001$, $r = .64$. This showed that the book sample contained, on average, significantly more adjectives than the parental speech with a large effect size.

Looking further at how adjective frequency differs between scripted and spontaneous child directed speech, it was tested whether there was a difference in how many nouns were modified with adjectives. Due to the normality of the data for this measure, an independent samples t-test was conducted to compare the samples. As a consequence of violating the assumption for the homogeneity of variances, the results were interpreted as equal variances not assumed. There was a significant difference in the scores for scripted speech ($M = .41$, $SD = .24$) and spontaneous speech ($M = .25$, $SD = .065$; $t(17.16) = 2.63$, $p = .018$, two-tailed). The magnitude of the differences in the means (mean difference = .16, 95% CI: .03 to .30) was large (eta squared = .19). This analysis indicated that on average the scripted child directed speech sample had significantly more adjectives than spontaneous child directed speech.

3.2 The Syntactic Function of Adjectives

The percentages of attributive, predicative and postpositive adjectives were used to compare the differences in the use of Syntactic Functions in the samples. Figure 1 shows that attributive adjectives are used the most, then predicative and postpositive adjectives are used the least in both samples. An inspection of the mean scores indicated that scripted speech reported higher amounts of attributive adjectives compared to spontaneous speech, and spontaneous speech reported higher amounts of predicative adjectives and postpositive modifications compared to scripted speech.

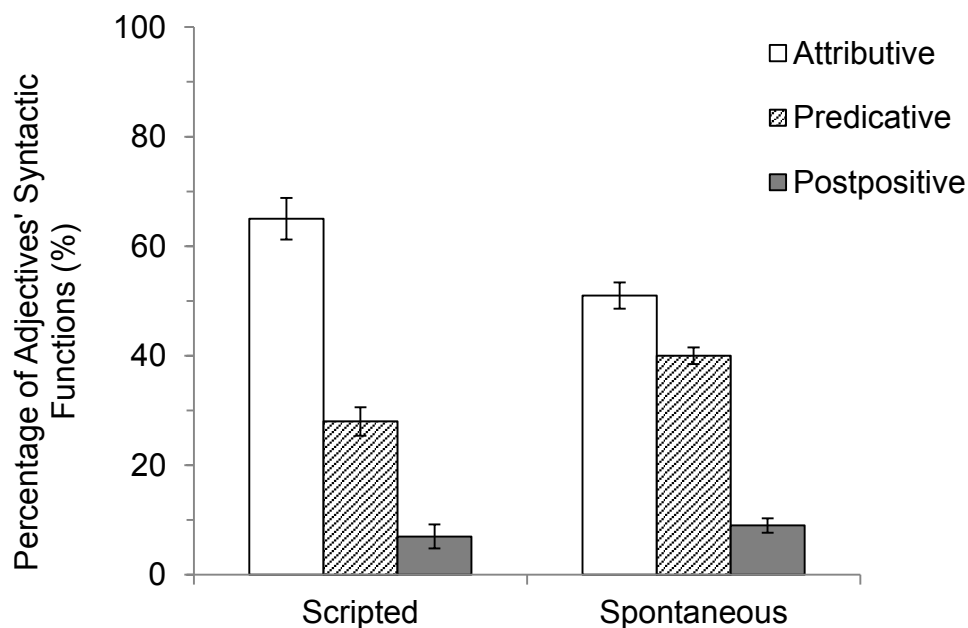


Figure 1. Mean percentage of attributive, predicative and postpositive adjectives with Standard Error as error bars for scripted ($n = 16$) and spontaneous child directed speech ($n = 16$).

To investigate whether there are statistical differences in the type of child directed speech and adjective Syntactic function, a one-way between groups multivariate analysis of variance was performed. Preliminary assumption testing showed no serious violations for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity. A statistically significant difference between scripted and spontaneous speech on the combined dependent variables was found, $F(2, 29)=6.80$, $p=.004$; Wilks' Lambda=.681; $\eta p^2 =.319$. When the results for the dependent variables were considered separately a Bonferroni adjusted alpha level of .017 was used. The only variables to reach significance was attributive adjectives, $F(1, 30)=10$, $p=.004$, $\eta p^2 =.25$, and predicative adjectives, $F(1, 30)= 14.06$, $p=.001$, $\eta p^2=.319$. The mean score for the use of attributive adjectives was significantly higher in the scripted speech sample,

whereas the mean score for the use of predicative adjectives was significantly higher in the spontaneous speech sample.

3.3 The Pragmatic Function of adjectives

The percentages of descriptive and contrastive adjectives were used to compare the differences in the use of Pragmatic Functions in the samples. Figure 2 shows the mean percentage of adjective Pragmatic function. It shows that both samples have a similar pattern of Pragmatic function, where descriptive adjectives are the most frequent modification and contrastive modifications are the least. When examining the means, the scripted speech sample is found to have a higher rate of descriptive adjectives compared to the spontaneous speech sample, and the spontaneous speech sample has a higher rate of contrastive modifications.

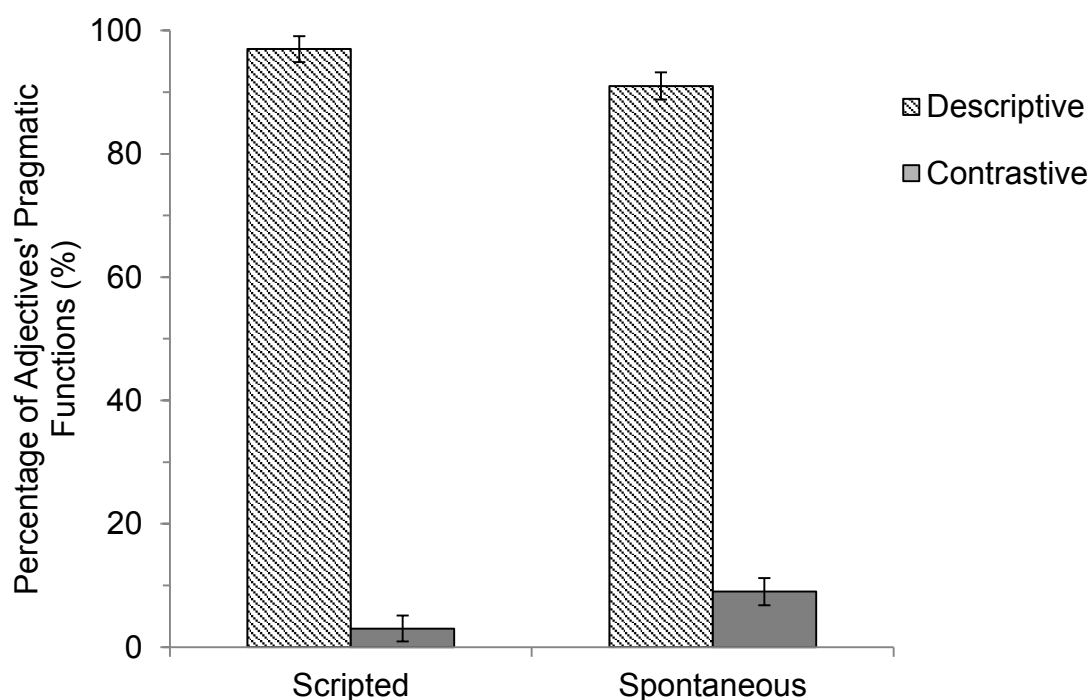


Figure 2. Mean percentage of descriptive and contrastive adjectives with Standard Error as error bars for scripted ($n = 16$) and spontaneous child directed speech ($n = 16$).

Due to the data being non-normal and a violation in the multicollinearity assumption for a one-way between groups multivariate analysis of variance, two separate Mann-Whitney U tests were run on the measures. A Bonferroni adjusted alpha level of .025 was implemented to avoid type 1 errors (Pallant, 2010).

The first Mann-Whitney U test was conducted to explore the differences between the two samples on the use of descriptive adjectives. The test revealed a statistically significant difference in the use of descriptive adjectives in scripted ($Mdn = 1.00$, $n = 16$) and spontaneous ($Mdn = .9230$, $n = 16$), $U = 64.5$, $z = -2.527$, $p = .012$, $r = .45$. This analysis indicated that the magnitude of the differences in the means was large and that on average the scripted child directed speech sample used significantly more descriptive adjectives than spontaneous child directed speech.

The second Mann-Whitney U test was conducted to explore the differences between the two samples on the use of contrastive adjectives. The test revealed a statistically significant difference in the use of descriptive adjectives in scripted ($Mdn = 0.00$, $n = 16$) and spontaneous ($Mdn = .08$, $n = 16$), $U = 64.5$, $z = -2.53$, $p = .012$, $r = .45$. The analysis showed that the magnitude of the differences in the means was large and that the spontaneous child directed speech used, on average, significantly more contrastive adjectives compared to scripted child directed speech.

4. Discussion

The current project investigated whether different types of exposure, scripted or spontaneous child directed speech, aimed at British 3 year-olds differed in adjective use in terms of adjective frequency, Syntactic and Pragmatic function. The findings from this investigation can help inform how adjective exposure can influence children's late adjective acquisition in relation to other word classes, and have important applications for future research and the development of language interventions. The results are discussed below.

Firstly, in terms of adjective frequency, the analysis showed that the scripted speech sample contained significantly more adjectives compared to spontaneous child directed speech. This finding supports the hypothesis that the samples would be different in exposure and proposes that scripted speech contains rich linguistic information that children can learn from, since the scripted speech sample contains significantly more adjectives. Past research has discovered that children from deprived backgrounds do not have access to scripted materials and this has a profound effect on school success and vocabulary (Mol & Bus, 2011; Neuman & Moland, 2016). Therefore, children without access to scripted materials will have less exposure to adjectives and will have to rely on parental speech to expand their vocabulary knowledge. However, since parents have been found to reduce their use of adjectives when their children utter adjectives themselves (Tribushinina et al., 2014), frequency reduces as age increases making the opportunity of learning adjectives more difficult for children not accessing scripted materials. Therefore this finding shows that children who do not have access to scripted input may be in a more disadvantaged position by having less exposure to adjectives, and this can affect their vocabulary growth.

Furthermore, the descriptive results showed that adjectives only made up a very small proportion of the input from the samples. Supporting the findings from Sanhofer & Smith's study (2007), this observation suggests that children are exposed to fewer adjectives than other word classes through both books and spontaneous parental speech, and proposes that the exposure of adjectives may not be sufficient enough to learn the word class earlier in development. However, since adjectives are not essential to convey a message, this can explain its' infrequent use in children's exposure. Yet, past research suggests that adjective frequency cannot be too frequent, as this will cause confusion (Morriseau et al., 2013). This view corresponds with other research, showing that quantity does not equal language learning, but that quality does (Cartmill et al., 2013). Therefore the Syntactic and Pragmatic functions of adjectives may be more representable constructs affecting adjective learning than frequency because they affect the quality of speech.

When looking at adjective Syntactic function, the samples revealed a similar pattern of exposure, as most of the adjectives were attributive, followed by predicative, with the least frequent being postpositive (see figure 1). Past research suggests that adjectives rarely follow nouns in the English language (Gisborne, 2000) and this can therefore explain the low frequency of postpositive adjectives and why attributive and predicative modifications are the most widely used Syntactic functions. In terms of the differences between the samples, the hypothesis was partially supported. The scripted speech sample contained significantly more attributive modifications compared to the spontaneous sample. However, even though the most used Syntactic function in the spontaneous sample was still attributive, the sample contained significantly more predicative adjectives compared to the scripted speech sample. There was no significant difference found for postpositive adjectives, however descriptively, the spontaneous speech sample contained a higher average of postpositive modifications.

A reason for attributive adjectives to be of higher use in the book sample could be because book text is methodologically thought out and planned, making attributive adjectives the more concise modification option to use. When looking at the spontaneous speech sample, the high amount of attributive adjectives appeared to result from parents praising their children during the play session, e.g. “*good job*” or “*good girl*”. Previous research suggests that the presence of attributive adjectives in children’s input may be less effective in encouraging adjective acquisition than predicative adjectives (Ninio, 2004). Therefore, since the attributive form is shown to be the most frequent in the samples, it offers an explanation for children’s delayed learning of adjectives.

In terms of the exposure of predicative adjectives, there are four possible explanations to why this form is more frequent in parent’s spontaneous speech. First, since book text is more thought out than a spontaneous utterance, parents could have uttered a noun and then added the description of it after a pause, e.g. “*Pass me the toy... that is green.*”. In this aspect the parent realised in their stream of speaking that they needed to differentiate between the toys. The second reason, which incorporates the first point, is that parents directed more questions to their children than books did. The questions appeared to elicit a different type of sentence structure than sentences that were not questions (e.g. “*Is the plate blue?*” and “*How blue is the plate?*”), which could have affected the adjectives’ Syntactic functions. Incorporating together that spontaneous speech is less planned and the different word structure in questions (“*Can you point to the plate .. that is blue?*”), this could be a reason for finding significantly more predicative adjectives and descriptively more postpositive adjectives in the data.

As well as sentence structures affecting the style of adjectives, the words that adjectives modified could also have had an effect on the syntactic function. When coding the spontaneous speech data, it was apparent that adjectives were used to modify pronouns and proper names more frequently than nouns. This observation is evidenced in the adjective frequency measure; since out of all the modifiable nouns parents uttered, only a quarter of them had modifiers. Additionally, it is abnormal to use attributive modifications with pronouns, as this would be grammatically incorrect (e.g. *happy she is* V.S. *she is happy*). This lends further explanation to the higher amount of predicative adjectives found in the data. Lastly, reason four is because

freestanding adjectives uttered by parents were coded as predicative. The predicative option made the most sense for all the freestanding adjectives compared to the other Syntactic functions. With more contextual information a more informative decision could have been made. For these reasons, predicative adjectives may have had a higher occurrence in the spontaneous speech sample. However, the higher occurrence of predicative adjectives is found to be better for children's adjective learning (Dye, 2013), showing that parent's speech reflects a more helpful adjective exposure than books. Yet, even though the results show a relatively high proportion of predicative adjectives (28% for scripted speech and 40% for spontaneous speech) in both samples, it questions whether predicative adjectives have a large effect on adjective learning since children's adjective use at 3 years is still far from faultless (Tribushinina & Gillis, 2012).

Lastly, in terms of adjective Pragmatic function, this investigation found that descriptive modifications were used the majority of the time compared to contrastive ones. The hypothesis was supported by the fact that the scripted speech sample reported a significantly higher average of descriptive adjectives and the spontaneous speech sample reported a significantly higher average of contrastive adjectives. The use of more descriptive adjectives in the books could be down to the fact that books are more descriptive in nature (Sipe, 1988) and lacks contrastive modifications as the visual materials accompany the text. On the other hand, the spontaneous speech sample may have a higher average of contrastive adjectives due to the physical environment within which the conversation took place. Differences in the objects had to be made clear in the context and therefore more contrastive modifications were needed. However, it is important to note that the spontaneous speech sample contained more descriptive adjectives (91%) than contrastive (9%), and even though the effect sizes of both the results are seen as large, the samples had minimal differences. Therefore the results should be considered cautiously. Given that contrastive modification has been previously shown to encourage adjective acquisition (Tribushinina et al., 2014), these findings suggest some explanation for children's delayed mastering of adjectives. Additionally, given the minimal exposure to contrastive adjectives, the Pragmatic function of adjectives may affect adjective learning more than Syntactic function.

After incorporating the past research on adjectives, as evidenced above, the results showed that the adjective exposure young children have may be far too infrequent to foster adjective learning at a young age and adjective exposure may not be effectively presented for learning to take place. This lends support to the idea that there could be an interaction between the aspects of adjective frequency and production that limits children's learning of the word class. Yet, another theory could be that adjective exposure is variable across different sources. Therefore learning could be prevented as the exposure differences create another obstacle. Nevertheless, past theories cannot be ignored and future research has to further investigate why children's adjective acquisition happens later in development. Either way, this investigation portrays the adjective exposure in children's input in terms of frequency, Syntactic and Pragmatic function in two different speech samples, which is an important foundation for future research. It showed that book text contained statistically more adjectives, more attributive adjectives and more descriptive modifications in comparison to parental speech, which contained significantly more

predicative and contrastive adjectives. However, since the investigation is the first of its kind, there are some limitations that must be discussed.

This investigation found that the text in a published story yields different linguistic output to parental spontaneous child directed speech. However, this may have not been a fair comparison. Children can learn from overhearing parents speaking to others (Gampe, Liebal & Tomasello, 2012) therefore it may have been more representative to compare parents' spontaneous child directed speech with parents' adult directed speech, or by comparing picture book texts with parents telling a story off the top of their heads. Yet, while the samples may be different, they are still representative as the linguistic exposure children hear on a daily basis and it is important to know these differences to inform further research and intervention strategies. Furthermore, using Amazon UK as the book list generator may not have been representative for children. The Amazon website is recognised worldwide as the leader in selling books (Booksellers Association, 2015), however when searching the website for the top selling books for 3 year-olds, many of the classic picture books (e.g. *The Cat In The Hat*, *The Gruffalo*, *The Very Hungry Caterpillar*, or *The Tiger That Came For Tea*) were not considered as best sellers. This observation is surprising and proposes that picture books may not commonly be purchased online. However, the books on Amazon UK could also simply reflect the new generation of classical children's books. I suggest that in the future, research looks both at books most commonly bought online as well as on the high-street bookshops to make up a more representative book sample.

In terms of the coding scheme, there can be differences in its future use. Even though the coding system was of an all-or-nothing fashion, it could be used more leniently in regards to noun compounds. A noun compound is two nouns acting as one noun or could be regarded as a noun being used as an adjective to modify another noun (e.g. apple tree). In this investigation, this was coded as a noun compound and counted as one noun. However, it could be regarded that it should be coded as two separate nouns or an adjective and a noun. As this investigation was looking at adjectives as a word class and not at words modifying nouns, noun compounds were regarded as one noun. Yet, depending on the lead investigator and research question, noun compounds could be interpreted differently. Nevertheless, in this investigation the coding scheme was used consistently across three different coders although there was a potential for a different interpretation.

Lastly, in this study we maintained a limited understanding of what word classes could be modified by adjectives. One of the adjective frequency measures, the percentage of nouns modified by adjectives, was supposed to emphasise how many of the modifiable words had an adjective. However, nouns are not the only words that can be accompanied with an adjective. Pronouns (e.g. you) and Proper Names (e.g. Lucy) can also be modified with adjectives and when coding the texts from the different samples, the spontaneous child directed speech contained many pronouns. This questions whether the measure could have distorted the results on adjective frequency as the measure failed to encompass all the word classes that could be modified by an adjective. Future research should address this and not keep a limited interpretation of what word classes that can have adjectives to allow for a better investigation. Yet, since this investigation was new, the measurement could not be

supported by past research and it was decided that we were to limit the interpretation to nouns only as it is one of the main word classes.

There are a few applications that can be drawn from this investigation. First and foremost there is a need to develop a productive way of using adjectives in order for learning to take place effectively in children. Past research suggests that predicative adjectives (Arunachalam, 2016; Dye, 2013; Ninio, 2004) and contrastive adjectives (Tribushinina et al., 2014) promote adjective learning the most. This investigation revealed that contrastive adjectives are used infrequently and predicative adjectives are not the most common Syntactic function, hence speech needs to change to reflect these aspects of adjectives. In terms of scripted speech, a precise understanding is achieved through pictures being supplemented by text (Sipe, 1998). However, the text in picture books may have to be reformed to present adjectives in a particular way to promote adjective learning. We suggest that book text should use more predicative adjectives and contrastive modifications. For spontaneous speech, becoming more aware of your conversation partner and adapting to their language skill level can help them learn and follow the conversation better. As with book text, more predicative and contrastive adjectives should be used in order for interactions to be more educational. Yet, adjectives should only be used when truly necessary (Morriseau et al., 2013).

On top of this, the investigation shows the importance of a varied exposure to different types of linguistic input. Children are able to learn differently from both parental and scripted speech sources. Interventions should be in place for children that do not have access to scripted materials, as it is a rich source for adjectives and learning. Past research has investigated such interventions with positive outcomes for 3 and 4 year-old children who managed to score higher on standardised assessments after regular reading sessions with parents or teachers over a six-week period (Lonigan & Whitehurst, 1998). Additionally, adjective interventions for children with Specific Language Impairments and children with Cochlear Implants should also be considered as they fall even more behind in their use of adjectives compared to their typically developing peers (Davies et al., 2016; Tribushinina et al., 2013). These interventions should adopt the optimum way for children to learn adjectives by using predicative Syntactic functions and contrastive Pragmatic functions. However, further evidenced-based findings about children's later adjective acquisition are needed in order for appropriate interventions to be developed. For example, figuring out whether attention tasks are valuable in adjective interventions, since attention affects learning (Yoshida et al., 2011), can provide developers a new technique to incorporate in programs.

It is also not only important to undertake further investigations for the purpose of interventions, but because the use and knowledge of adjectives can have an impact on children's vocabularies and hence their future success (Rowe et al., 2012). For a more complete account on why children are delayed in learning adjectives, future research should compare children's adjective knowledge in novel adjective tasks, where children get a different ratio of adjective frequency, Syntactic and Pragmatic functions. The comparison would provide an answer to the optimum adjective use for the three components of adjectives. Additionally, a further suggestion is to look at other aspects of adjectives that this study disregarded. For example, looking at the effects of which grade the adjective is in (plain, comparative, or superlative) and

whether modifications with adverbs (*many beautiful planes*) play a part in the delayed acquisition of adjectives. This could help tease a part the debate regarding whether the word class is inherently difficult to learn because of its' many components (Tribushinina et al., 2013; Tribushina et al., 2015) or whether it is not used in a productive way that fosters learning.

Since the current literature on adjectives is limited, this investigation provides a better understanding of the frequency, Syntactic and Pragmatic functions of adjectives that 3 year-old British children are exposed to, which lends valuable information for future research and interventions. The study shows that there are significant differences between types of input, which can have an effect on children's adjective acquisition depending on their most likely exposure. However, this investigation alone cannot offer a resolution to why adjective acquisition is later in development, but provides support that the exposure of adjectives may not be used in the most productive way for a child to learn the word class. By gaining more findings in this area, we can formulate adjective-based interventions for speech therapy and provide evidence-based advice on how to design interventions to boost all children's language abilities.

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