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Frequency and Production: The Usage of Feeling Adjectives Among British Children

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Abstract

Studies have shown that input frequency can positively affect children's vocabulary development. This current study focused on the frequency effect on children's output of feeling words. Also, this paper has compared previous findings from external ratings with the current result from a corpus study on the basis of the same wordlist. The findings suggested that British children produced the words with higher input frequency more often. At the same time, they used sensory feeling words more frequently, even though these words were less frequent than emotional words in their input. Also, this study found that children did not use high frequency words in a more complex way than words with lower frequency.

Keywords

input frequency, feeling words, children's vocabulary output

1. Introduction

Being able to put feelings into words demonstrates preschool children's literacy ability, and is a predictor of academic performance in later primary school life [1]. Additionally, learning how to express feelings is the foundation for comprehending and building social relationships [2]. Meanwhile, empirical studies have found that the input frequency has a positive effect on children's language development, such as verb inflection [3], the use of negation [4], and phonotactics alternations [5]. It takes years for children to acquire adult-like use of feeling words, but whether the input frequency of these feelings words influences children's production is less clear. Based on the literature on feeling vocabulary development [6], the current study will examine the relationship between the input frequency and children's usage of feeling words. Also, this paper will investigate in detail how children aged between two to three use feeling words in the contexts.

The paper begins with a discussion of findings in previous literature, followed by a description of methods adopted in the essay. Next, the investigation of children's input and production of feeling words be demonstrated in the following section, with a comparison to findings based on external ratings. Moreover, this paper will assess two children's use of feeling words in the contexts to figure out the effect of frequency in real usage of children. Finally, the conclusion section will summarise the implications of the current findings.

2. Background

Producing feeling vocabulary poses challenges for children since these words have no physical reference but describe either bodily sensation (e.g. *hot* and *cold*) or mental state (e.g. *happy* and *sad*). Moreover, using feeling words is the outcome of a nexus of developments in emotion, cognition and social connectedness [7], which makes children typical start to use feeling vocabulary at two years old [8, 9]. Also, children continue learning feeling words and tailor their usage to an adult-like manner as they grow up till eighteen [10, 11].

In terms of vocabulary development, a wealth of empirical studies report the positive effect of input frequency, which means that the more often a particular word is exposed in the environment, the earlier it will be learned by children [12]. For example, Goodman, Dale and Li [13] have investigated that for words within the same lexical category, terms with a higher frequency will be acquired by children earlier than terms used less frequently by caregivers based on corpora in the CHILDES database. Later, Roy, Frank and Roy [14] have found that even treating all words as a whole, children will produce the more frequent words in their language environment at an earlier age by using the Speechome Audio Corpus. Moreover, in a corpus study conducted among German children aged between four to five, Grosse et al. [15] have highlighted that the input frequency has a significant effect on the production frequency concerning emotional vocabulary. In addition, the output frequency and the age of word acquisition can also be influenced by other factors. For instance, some studies have revealed that utterance position and morphological variation can contribute to the production rate of acquisition of nouns and verbs by comparing English, Italian and Chinese [15], while other studies concerning abstract words have discovered that exempting the input frequency of a specific word, the frequency of its occurrence in diverse syntactic frames will also be associated with the order of acquisition of the 25 discussed verbs [16].

To analyse children's production of feeling words, researchers mainly adopt four ways: (1) using the fluency task by instructing children to list as many emotional terms as they know [2], (2) conducting the elicited experiments to know what feeling words children will label for the particular stimulus, such as pictures of emotional faces [11, 17, 18], (3) using reports from caregivers (or teachers) via wordlists, such as Oxford Communicative Development Inventory (or Oxford CDI) [19], to suggest which words the child can produce at a specific age [8, 9, 20], and (4) conducting the corpus-study by using corpora available on the CHILDES website (https://childes.talkbank.org/access/) [4, 6]. The two former methods benefit from a particular focus on feeling vocabulary, which can gain sufficient data covering both sensory perception and mental states, but simply listing words or labelling emotional stimulus cannot reveal the real usage pattern of children concerning feeling words. External assessments from caregivers or teachers can lack objectivity and validity for the reason that reports might be erroneous and imprecise [21]. For corpus studies, to avoid collecting brief samples at limited time points, such as merely including data of children at 18 and 24 months or 25 and 32 months in the corpus built by Dunn, Bretherton and Munn [22], researchers turn to build large longitudinal and dense naturalistic corpora, making the extensive analyses of early use of feeling words more feasible. For instance, on the basis of longitudinal data from five English-speaking children in North America, Wellman et al. [6] have uncovered that children use an increasing number of new emotional words between two to five, with the use extending from mainly expressing their own past, present and future emotions to refer to others' feelings (e.g. second and third person) in hypothetical situations.

While a large number of research conducted to date emphasise the association between the input frequency and order of word acquisition, investigating the usage of feeling words with high frequency in early years is also important to gain a better understanding of the process of learning abstract words and expressing feelings. Therefore, this current study aims to figure out whether the input frequency will influence the development of feeling vocabulary among British children. Also, the paper will draw a comparison between reports from external ratings via Oxford CDI in Wordbank (http://wordbank.stanford.edu) [19, 23, 24], which is an open dataset comprised of developmental vocabulary data across 29 languages. Further, this study will examine the role of frequency plays in word production of children by considering the subjects of feeling words (first, second, third person and demonstrative pronoun), the tense (past, present and future) and the type of use (statement or question), which will be compared to the production of children in other communities, such as North American [6], Germany [11, 25] and China [21]. If the findings supported the effect of input frequency, the words children exposed to more frequently will be used by them more often in wider settings (e.g. appearing in different tenses), whereas words with lower frequency will be produced less and applied into limited situations (e.g. only occurring in one specific tense).

The input of children will be represented by the utterances delivered by their mothers, as all mothers who participated in the study are mainly caregivers.

In this analysis, both emotional and sensory adjectives will be investigated as growing studies from neurosciences find bodily sensations and mental feelings are tightly associated with each other [26, 27]. The link between bodily and mental feeling can also be found in the way people express emotions, such as people may say *they feel a shiver down their spine* when they hear their favourite songs. Also, apart from sensory words related to five basic senses (smell, sight, sound, touch, and taste) (e.g. *soft* and *wet*), this study will contain words about three additional senses [28, 29], which are vestibular sense, proprioception and interoception, taking *hungry* and *tired* as examples.

3. Method

3.1 Subjects

The data analysed in the study are drawn from twelve children (half boys and half girls), predominantly from middle-class families, who participated in a longitudinal study of early language development in the United Kingdom [30]. All children were the first-borns, living in monolingual English-speaking families and being primarily cared by their mothers. These participating families were recruited through newspaper advertisements and local nurseries. The children were around two years old, ranging from 1;8.22 to 2;0.25, to be specific, with MLUs (mean length of utterance) ranging between 1.06 to 2.27 in morphemes when the study began. During the one-year study, all children were audiotaped in their homes lasting for one hour on each of two separate occasions every three weeks. These files were recorded when children were engaged in normal daily interactions with their mothers, such as playing with toys. There were 149 valid records collected and transcribed by using the CHILDES system [31]. Table 1 displays the summary data for the twelve longitudinal language samples.

Two children (a girl named Anne and a boy named Joel) were selected as representatives for the twelve children to undergo a detailed investigation of the usage of feeling terms as they shared similar input and output frequency.

3.2 Searching for feeling vocabulary

The sequence of adjectives was all selected from the description section in the Oxford CDI [19], including all feeling words in Oxford CDI. The feeling adjectives consist of three positive emotional terms, three negative emotional terms and eight sensory feeling terms, listed in Table 2. It is needed to mention that this study focused only on adjectives, while verbs or nouns implying feelings (e.g. *cry* or *smile*) were not discussed in this paper. The final wordlist does not include *hurt* existed in the description section since all children in the corpus used this word as a verb instead of an adjective.

Table 1: Total used feeling tokens by speakers

Name	Child	Mother
Anne	161	566
Aran	150	503
Becky	191	392
Carl	203	479
Dominic	62	317
Gail	109	426
Joel	160	581
John	129	778
Liz	180	292
Nicole	148	576
Ruth	138	1051
Warren	93	544
Mean (SD)	144 (41)	542 (207)
Total	1724	6505

Table 2: Complete list of feeling vocabulary by type

Positive emotion	Negative emotion	Bodily sensation
good	bad	hot
fine	sad	cold
happy	scared	tired
		hungry
		thirsty
		dry
		wet
		soft

The transcripts from twelve children were analysed by using the Child Language Analysis (CLAN) software. The commands *freq +t*CHI +s"good" @* and *freq +t*MOT +s"good" @* were used in CLAN to search for the frequency of discussed feeling terms (e.g. searching *good*) produced by children and their mothers, respectively, in the one-year period. The same command would be applied repeatedly until all fourteen words were measured. Furthermore, another command *kwal +t*CHI +s"happy" +w3 -w3 @* was used to access the situations children used feeling words, which displayed three previous and three following utterances of the targeted line with the feeling terms. For example, the command shown above would list the utterances behind and after the sentence containing *happy*.

3.3 Coding

Initially, all tokens used by Anne and Joel were assigned to one of three categories: fragments, simple and complex. The fragments include utterances without either a subject or predicate, including one-word utterances (e.g. *hot* or *it warm*). The complete sentences with a target term without the cause of feelings would be coded into the simple group, such as *I'm hungry* or *he's a bit of tired*. The complex group comprised three types of sentences: (1) utterances in which children identified the entity or event making they have a specific feeling, (2) utterances showing the object at which the feeling was directed, or (3) utterances including the feeling word as a resulting action, such as *I'm scared because of monsters*. Only utterances in the simple and complex categories would be coded in the next step for coding the tense (past, present and future), the grammatical person of subjects (first, second, third and demonstrative pronouns) and the type of use (declarative and interrogative).

Additionally, the fourteen words would be divided into high and low frequent groups according to the rank of input frequency. The former half words were high frequency words while the latter half terms were low frequency ones.

4. Result and Discussion

4.1 Overall Distribution of Feeling Vocabulary in British Children's Input and Output

Table 3 shows the frequency of feeling words ranked from high to low in children's production and their language input, reflecting that the half words with higher frequency in mothers' utterances are identical to the items used by children. This finding aligns with previous findings on the positive effect of frequency on expressive vocabulary acquisition in general [11, 13]. Although the frequency of a specific word ranked in different places in the mothers' input and children's production, both children and mothers used *hot*, *good*, *wet*, *cold*, *tired*, *happy*, and *hungry* more frequently than the rest of the feeling adjectives in daily conversations.

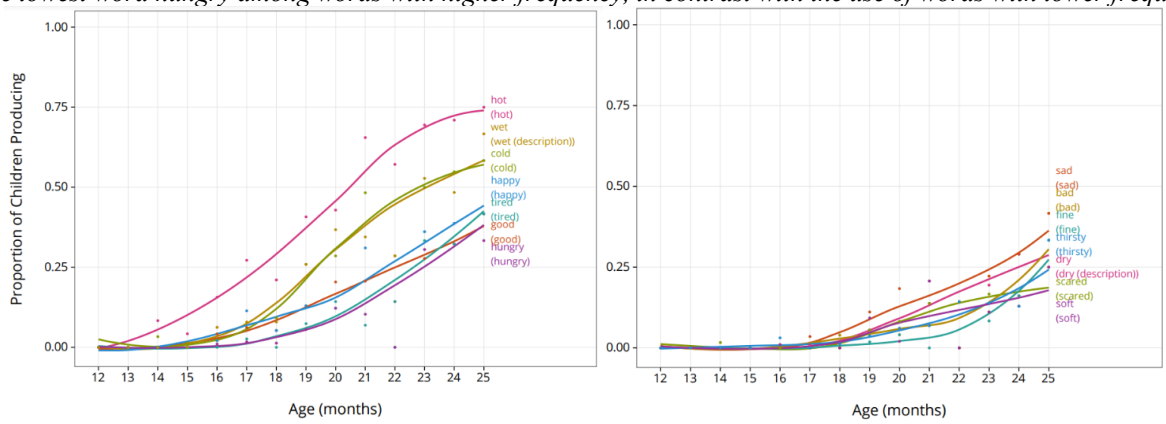
This finding supports the results based on the reports from caregivers or teachers via the same Oxford CDI (Hamilton, Plunkett & Schafer 2000; Floccia 2017; Frank et al. 2017) in Figure 1, which shows that children acquired the same sequence of words (*hot*, *good*, *wet*, *cold*, *tired*, *happy*, and *hungry*) better than other words in terms of production. However, within the higher frequency group, it is noticeable that *good* (57.1%) is the predominant feeling word used by mothers, while other feeling words account for less than 10% of the usage. Conversely, children used less *good* (17.6%) in conversations on the one hand. On the other hand, speakers aged between two to three applied more different feeling words during interactions,

such as *hot* (21.2%), *wet* (13.2%) and *cold* (12.5), which are even higher than the input frequency (5.9%, 4.3% and 6.5% respectively).

Table 3: The frequency of feeling words among children and mothers by words

Child Word	Number	%	Mother Word	Number	%
hot	365	21.2	good	3714	57.1
good	303	17.6	cold	424	6.5
wet	228	13.2	tired	424	6.5
cold	215	12.5	hot	384	5.9
tired	127	7.4	wet	278	4.3
happy	117	6.8	happy	265	4.1
hungry	103	6	hungry	225	3.5
dry	83	4.8	bad	180	2.8
sad	69	4	dry	169	2.6
bad	58	3.4	sad	143	2.2
scared	24	1.4	fine	128	2
fine	21	1.2	soft	63	1
thirsty	6	0.3	thirsty	61	0.9
soft	5	0.3	scared	47	0.7
Total	1724			6505	

Figure 1: The left graph shows the production rating for words with relatively high frequency in this study, while the right graph displays the production rating for the rest of the seven words. The dotted line identifies the proportion of the lowest word hungry among words with higher frequency, in contrast with the use of words with lower frequency

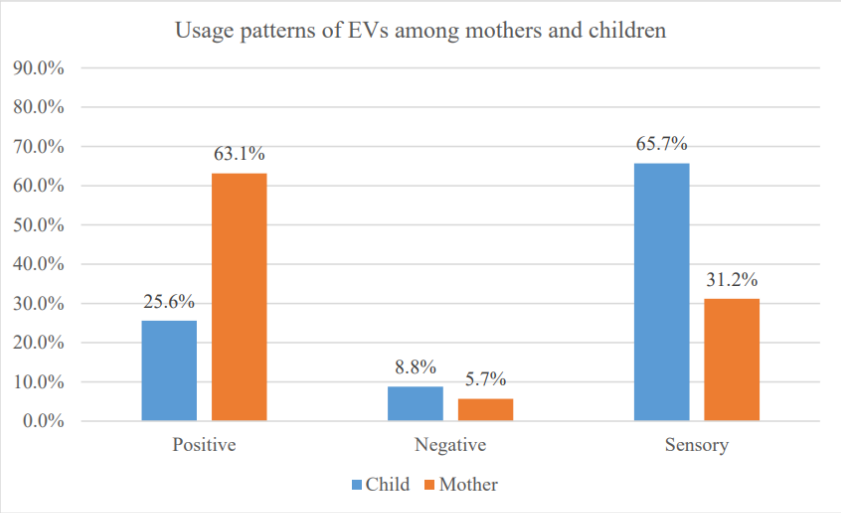


Moreover, Figure 2 shows that children's usage pattern of feeling words differs from that of their mothers. Overall, mothers produced a larger number of emotional words than sensory items, while children inclined to deliver utterances expressing bodily sensations than mental feelings. To be specific, children used more sensory words (over 60%) than positive (around 25%) and negative emotional items (8.8%), while mothers produced positive emotional terms (63.1%) more frequently than sensory (31.2%) and negative emotional ones (5.7%). The children's usage pattern is contradictory to the finding shown in the study of Wellman et al. [6], which has discovered that emotional terms (256 tokens) used by children outnumber terms regarding body sensations (195 tokens). However, more utterances with emotional terms than those with sensory terms found by Wellman et al. [6] may be caused by the uneven number of the wordlist, consisting of 34 emotional words but only 10 sensory words.

For the distinction between using sensory and emotional terms, it may suggest that the frequency is not the only factor contributing to the children's production of feeling words, consistent with prior results that the link between frequency and production is not simply a linear correlation [13]. Also, the study discovering children used more sensory words than emotional terms despite of the higher exposure to emotional terms might be justified by the concreteness effect observed in empirical studies [32-35], which suggests that concrete words can be processed faster and used more accurately than abstract ones. Words describing sensations are more concrete than items showing emotions since sensory words are associated with physical things, such as *hot* and *cold* related to temperature. In contrast, emotional words show a higher degree of contextual diversity and ambiguity, which hinder the process of emotional vocabulary [36].

Another feature is that both in the input and output, positive emotional words have gained a higher frequency than the negative emotional terms, along with findings among Chinese children [21], which may suggest the emotional valence in the abstract vocabulary development.

Figure 2: The graph shows the percentage of using different feeling words among children and their mothers



	Child	Mother
N	1724	6505

	Positive	Negative	Sensory
N	4548	521	3160

4.2 Analysis of Feeling Vocabulary Usage Among the Representatives

On the ground of the frequency rank in Table 3, the high frequency category is made of *hot*, *good*, *wet*, *cold*, *tired*, *happy*, and *hungry*, and the rest of the seven words were allocated to the low frequency category. Table 4 reflects that words in high and low frequency groups occurred most frequently in the simple category (56.6% and 65.6% separately), followed by fragments (39.2% and 28.2%, respectively) and the complex category (both around 5%). A chi-square test (df = 2, N = 321) finds that the input frequency has no significant effect on the usage (X2 = 1.53, p = 0.47). This finding is in line with the finding based on North American children, who used 58.5% and 59.5% of simple utterances showing mental and bodily feelings, respectively, when aged two, and they increased the production of complex sentences in three years old concerning emotion (59.8%) and sensation (around 48.9%).

Table 4: Percentage of three types of utterances including feeling vocabulary

Usage	High frequent		Low frequent	
	N	%	N	%
fragment	113	39.2	9	28.1
simple	163	56.6	21	65.6
complex	12	4.2	2	6.3
Total	288		32	

Table 5 exhibits how children used words with higher frequency and those with lower frequency about the grammatical person of subjects, function, and tense. While high frequency words co-occurred mainly with third-person subjects (47.4%) and demonstrative pronouns (28%), their counterparts appeared more frequently with demonstrative pronouns (34.8%) and first-person subjects (30.4%). This finding corresponds to previous studies, showing North American children used feeling words frequently with first-person (35.5%) and third-person subjects (32.7%). However, a chi-square test (df = 3, N = 198) discovers that the input frequency has no significant effect on the grammatical person of subjects (X2 = 4.03, p = 0.26). In addition, feeling words occurred more frequently in declarative (both over 90%) than interrogative sentences (around 5%), and predominantly existed in present tense utterances (both above 85%). Also, a chi-square test (df = 1, N = 198) finds that the input frequency has no significant effect on the function of utterances (X2 = 0.01, p = 0.92), and another chi-square test (df = 1, N = 198) finds that the input frequency has no significant effect on the tense of sentences (X2 = 5.94, p = 0.0513).

Table 5. Summary of the usage of feeling words by subject, function, and tense

Subject	High frequent N	High frequent %	Low frequent N	Low frequent %
1st	33	18.9	7	30.4
2nd	10	5.7	2	8.7
3rd	83	47.4	6	26.1
Demonstrative pronoun	49	28	8	34.8
Total	**175**		**23**	
Function $p = 0.26 > 0.05$, not significant				
Function	High frequent N	High frequent %	Low frequent N	Low frequent %
Declarative	164	93.7	22	95.7
Interrogative	11	6.3	1	4.3
Total	**175**		**23**	
Tense $p = 0.92 > 0.05$, not significant				
Tense	High frequent N	High frequent %	Low frequent N	Low frequent %
Past	6	3.4	1	4.3
Present	167	95.4	20	87
Future	2	1.1	2	8.7
Total	**175**		**23**	

This finding contradicts findings in the study among German children aged between four to eleven (Grosse et al. 2021), which have uncovered that the input frequency can account for the production frequency of children among all four age groups (4-5 years, 6-7 years, 8-9 years and 10-11 years). The age of participating children may explain the different findings. When children are around two years old, they only start to acquire feeling words [9] and produce a limited number of utterances expressing feelings in daily interaction. Therefore, this finding in the initial stage may reflect that the development of feeling expression is a years-long process and it is possible that the input frequency has long-term effect as demonstrated by older children [11].

5. Conclusion

This corpus-based study of British children's production of feeling words first has supported the findings from external ratings used the same wordlist (Hamilton, Plunkett & Schafer 2000; Floccia 2017; Frank et al. 2017), showing that words frequently used by children were the same sequence of feeling adjectives being considered as acquired better in the reports of caregivers or teachers. Second, along with prior findings in North America [6], this study exhibits that British children aged approximately two to three can use feeling words in different situations, but more frequently apply them with first-person, third-person and demonstrative-pronoun subjects than the second-person subjects. Additionally, British children favour using feeling terms in declarative utterances with a present-tense predicate. Moreover, similar to findings in Chinese children [21], positive feelings words are used far more often than the negative ones in both children's input and output, which may reflect the effect of emotional valence in the process of abstract vocabulary. Finally, against the finding among German children [11], the chi-square tests have found that input frequency has no significant effect on subject, function and tense respectively in terms of children's production.

However, the current study has a limitation in data composition concerning the detailed investigation of children's production, which was only composed of utterances given by two children aged around two years old. The utterances containing feeling terms are relatively inefficient, such as only one sentence with a low frequency word used in the past tense. Therefore, the study of children in different age groups will be beneficial to gain a more complex picture of how feelings words develop among British children. Another limitation is that participated families are mainly from the middle class, which requires more research conducted in other socioeconomic status (SES) groups before generalising the findings in this paper to all British children. Moreover, further studies can also be conducted to investigate the development of emotional synonyms in languages such as Chinese [27, 37, 38], Kaytetye (an Australian language) [39], and Korean [40], which contain massive emotional expressions containing body parts or bodily sensations (e.g. *heart-broken* in English) sharing the same meanings with abstract emotional terms accordingly (e.g. *sad* in English). Research in this area may help understand the concreteness effect in expressions about feelings better.

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Conflicts of Interest

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