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# The Combination of Lexical Morphemes: Forming Co-ordinate Compounds and Blends in Child Language

by

Marni Manegre 

A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

Department of Linguistics

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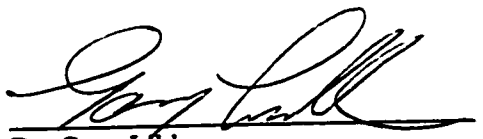

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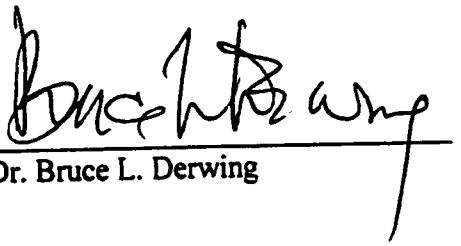

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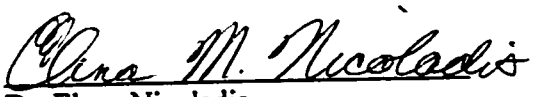

Dr. Elena Nicoladis

This thesis is dedicated to Paul Raymond Courtoreille

and to my mother Laural Jean Young Manegre

**Abstract**

This thesis addresses how children combine co-ordinate lexical morphemes to form compounds and blends. Three acquisitional principles outlined in the recent literature, namely the Principles of Transparency, Simplicity, and Productivity, suggest that co-ordinate compounds would be formed before blends in child language. This hypothesis was tested across four age groups of children (2-, 4-, 6-, & 8-year-olds) using a Forced Choice paradigm and a Free Answer paradigm. The results of the two tasks suggest that the onset of the ability to form blends occurs at a surprisingly early age, since the majority of the 4-year-olds and one of the 2-year-olds have provided evidence for the creation of intentional morphological blends. Therefore, it cannot be determined from the tasks in this thesis whether there is a developmental progression in the order of combining lexical morphemes.

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# CHAPTER 1

## Introduction

### 1.1 Background

Lexical creativity is common in child language. Children discuss what they are interested in; they do not restrict their conversations to the words in their lexicons. They have several options available to them so that they can express what fascinates them (Clark, 1991). Children can express themselves by using overextensions to refer to objects (e.g., if the object has four legs and fur, the child may call it a *doggy*), by using general terms or diectic expressions, or by creating a new word using the existing words in their lexicons as building blocks, such as creating compounds (e.g., *nose* + *beard* = *nose-beard*, from Becker, 1994) and blends (e.g., *in* + *under* = *inder*). The new words that children create are of interest because they reveal the parts of words that children have identified as having meaning. They also reveal the types of words that children understand can be combined with other words (Clark, 1991). Because compounding is a highly productive word-formation device in English (Quirk, Greenbaum, Leech & Svartvik, 1985), the compounding strategies employed by children to create lexical innovations have been extensively studied (Becker, 1994; Clark, 1981, 82, 87, 91; Clark & Berman, 1987; Clark & Cohen, 1984; Clark, Gelman & Lane, 1985; Clark & Grossman, 1998; Clark, Hecht & Mulford, 1986; Elbers, 1988; Windsor, 1993). Blends, another word-formation device, are very similar to compounds in that both of these constructions are created by combining lexical morphemes. It has been determined that children master the ability to create

novel N + N compounds by the age of two years (2;0)[1], and they understand the modifier-head relation by approximately 2;6 (Clark, Gelman & Lane, 1985); however, it is uncertain when children master the ability to blend lexical morphemes together.

The purpose of this thesis is to explore how these two word-formation devices interact and develop in child language. The goal is to determine the approximate onset of the ability to blend compared to what is known of the onset of the ability to compound. Since compounds are more productive in the English language and children look to adults for the most productive forms in their language (Clark, Hecht & Mulford, 1986), it might be expected that children learn to create compounds before they learn to create blends. Because both compounds and blends are created by combining lexical morphemes and compounds are the more productive construction in the English language, it is possible that there is a developmental sequence whereby children must acquire the understanding of compounds and ability to compound before they acquire the understanding of blends and the ability to blend. To address these issues, it is important to first discuss several key points: how compounds are formed in English, how blends are formed in English, how compounds and blends are accessed in the lexicon, and how children produce lexical innovations. These key points are addressed in the subsequent sections that include discussions of the topics that are necessary to understand how children view compounding and blending and how they use these word formation types to create new words.

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[1] I adopted the notation where the age is represented with years before the semicolon and months after (years;months). This notation is used throughout this thesis. Years;months.days is also used.

## 1.2. Forming Compounds by Combining Lexical Morphemes

Compounding is the process of combining two lexical categories such as nouns, verbs, adjectives, and prepositions to form a larger word (e.g., *black* + *board* = *blackboard*). The majority of English compounds result in the formation of a compound noun, a compound verb, or a compound adjective (O'Grady & de Gusman, 1992), as illustrated in Table 1.

Table 1. *Examples of N, V, and A Compounds*

| Noun Compounds | Verb Compounds | Adjective Compounds |
|---|---|---|
| fire truck (N + N) | log roll (N + V) | skin deep (N + A) |
| blackboard (A + N) | dry clean (A+ V) | white-hot (A + A) |
| jump rope (V + N) | jump kick (V + V) | ingrown (P + A) |
| in-laws (P + N) | over estimate (P + V) | - |

In English, the rightmost constituent is the *head* of the compound and the leftmost constituent is the *modifier*. The modifier of the compound typically receives heavier stress than the head (Clark, Hecht & Mulford, 1986; Fabb, 1998; O'Grady & de Guzman, 1992; Quirk, Greenbaum, Leech & Svartvik, 1985). The stress on the modifier is the key factor to identify a compound, since the orthographic representation is not a reliable indicator that the form is a compound. There are three orthographic forms of compounds: compounds that form one word (*solid* compounds), compounds where the constituents are separated by a hyphen, and compounds where the modifier is separated from the head by a space (*open* compounds). There is an orthographic progression from solid to open compounds as the compounds become established and accepted as permanent lexical items (Quirk et al.). The head of the compound represents the core

meaning of the form (Fabb, 1998) and it determines the lexical class of the compound (see Figure 1).

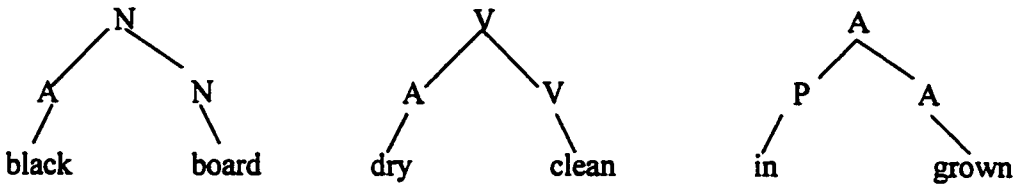


Figure 1. *The Components of a Compound*

Figure 1 demonstrates that the lexical class of the compound is determined by the rightmost constituent, which is why Table 1 is labeled the way it is. The rightmost constituents in the compounds in Table 1 belong to the same lexical classes as the entire forms. Quirk et al. (1985) specifies that the modifier of a compound should be classified in terms of the head. However, not all compounds have simple modifier-head relations. Co-ordinate compounds (e.g., blue-green) consist of two words that equally share head-like characteristics (Fabb, 1998). The first constituent in a co-ordinate compound is not classified in terms of the second constituent, rather both of the constituents belong to the same lexical class and together they determine the lexical class of the compound.

It has been determined that compounding is the most productive and frequent morphological device in English (Quirk et al., 1985). The high frequency of compounds is likely due to the fact that the compound can be easily constructed and deconstructed. The two constituents in the compound are easily identified because they have undergone little or no modification.

Of all the compound classes, compound nouns constitute the largest class of compounds in English (Clark, Hecht & Mulford, 1986). This is most likely because compound nouns are the most common compounds constructed as lexical innovations. With verbs, children typically use conversion to fill lexical gaps, whereas with nouns, they use compounding both to name new nouns and also to distinguish among nouns in a particular class (Becker, 1994; Clark, 1982; Clark, Hecht & Mulford, 1986).

Novel compounds may be described as the innovative combination of at least two lexical morphemes. Exposure to novel compound exemplars increases compound use (Clark et al., 1985, Berman & Clark, 1989). This suggests that if children observe the formation of compounds, then they are likely to form compounds as innovations. However, it is not certain whether exposure to blends would increase blend use. Blends are similar to compounds in that they both contain at least two constituents, but the use of blends has not been as thoroughly explored as the use of compounds. The available literature of what is known on the formation of intentional morphological blends is summarized in the following section.

### 1.3. Forming Blends by Combining Lexical Morphemes

Blending is the process of combining lexical morphemes using only fragments of the morphemes to create a simplified word (e.g., *smoke* + *fog* = *smog*). In English, blends are often formed by combining the onset of the first constituent with the rime of the second constituent (Treiman, 1983)[2].

[2] Blends are formed this way in other languages that split the syllable between the onset and the rime (e.g., in German *ja* + *nein* = *jein*)

Unlike compounds, blends cannot be easily deconstructed into their constituent morphemes. This may be because the constituent morphemes are not wholly visible in the construction of blends, only parts of the constituents are visible. Another difficulty in dealing with blends is that they may have become "so integrated into the standard vocabulary of English that speakers are unaware of their status" (O'Grady & de Guzman, 1992:134). Thus, although many speakers of English know what a *modem* is, they are often unaware that the term was formed from the constituents *modulator* and *demodulator*. This is also true for the other English blends represented in Table 2.

Table 2. *Examples of English Blends (from O'Grady & de Guzman, 1992)*

| Blend | Constituents |
|---|---|
| *brunch* | breakfast + lunch |
| *smog* | smoke + fog |
| *telethon* | telephone + marathon |
| *motel* | motor + hotel |
| *bit* | binary + digit |
| *modem* | modulator + demodulator |
| *chunnel* | channel + tunnel |
| *aerobicise* | aerobics + exercise |
| *spam* | spiced + ham |
| *comsat* | communication + satellite |
| *infomercial* | information + commercial |

From examining the English blends seen above, there appear to be two types: (1) blends formed from existing compounds and (2) blends formed from co-ordinate relations, which often exist as co-hyponyms, such as *smoke + fog = smog*. The blends formed from compounds, such as *motor + hotel = motel*, would suggest that they have been created to ease articulation in rapid speech and to

simplify the production of the form. Such blends are typically created for new technical inventions, such as *modem, comsat,* and *bit.* Blends formed from co-ordinate relations, such as *brunch* and *smog,* are the most common type used for lexical innovations, especially if the lexical innovations are coined for a specific context and may not be intended for general use English.

Blends are often created for one time use for comedic purposes (see Table 3 for some English examples).

Table 3. *Blends Created for One Time Use*

| Blend | Constituents | Meaning |
|---|---|---|
| *busband* | bride + husband | (from Will & Grace, January, 2001) which refers to the bride in a same sex marriage |
| *irritaining* | irritating + entertaining | (from a local radio show, December 2000) which refers to a program that is so annoying that you have to watch it. |
| *klivingchen* | living room + kitchen | (from Third Rock From the Sun, October, 1999) which refers to the combination of the living room and kitchen so that the kitchen appliances are in the living room. |

From these examples, it is evident that these blends are created as innovations, and are not likely to be adopted for general use. These blends are typically formed from constituents in a co-ordinate relationship.

Adults are easily able to create blends but little is known of the ability of children to do so. How adult speakers form blends from monosyllabic non-words has been investigated. Weibe & Derwing (1994) found that when speakers create blends from monosyllabic words they usually divide the syllable at their most

natural breaking points. In English, this breaking point occurs between the onset and the rime (Treiman, 1983). As an example, the words *spiced* and *ham* blend together to form *spam* and not *spime*. This tendency is often extended to blends involving longer words. Because children split syllables in the same place as adults (Derwing, in press), it is likely that, at the phonological level, preschoolers will blend constituents together using the same general pattern as adult speakers of their language, if they do form blends at all.

We've seen then that blend formations are relatively easy among adult native speakers of English and that, in phonological terms, blends follow a relatively well established pattern. The next question to address is the manner in which the words created by the phonological processes of blending and compounding are subsequently represented in the minds of the speaker. This is addressed in Section 1.4. below.

**1.4. Blends, Compounds & the Lexicon**

How blends are stored in lexicon has not yet been examined. However, compounds and other polymorphemic words have been extensively investigated to determine how they are stored in the mental lexicon (see Sandra, 1994). Osgood & Hoosain (1974) found evidence that compounds are perceived as single units and not in terms of their constituents. However, there is contrary evidence (Libben, Derwing, Elliot & Cooper, 1998; Taft, 1981; Taft & Forster, 1975, 76) that has found that the recognition of multimorphemic forms routinely involves morphological decomposition. That is, words that contain more than one morpheme are processed in the mind by breaking the words into their constituents

and processing each constituent individually. Libben, Gibson, Yoon, & Sandra (in press) claim that semantic transparency is crucial to the understanding of the manner in which multimorphemic words are represented suggesting that semantically transparent compounds should be more easily deconstructed than non-transparent compounds.

This, however, does not account for the decomposition of blends. Blends, like compounds, are constructed from two constituent morphemes. If morphological decomposition is necessary for the comprehension of compounds, then are blends, which also have semantically related constituents, decomposed into their constituents in order to be processed in the mind? As we have seen above, the dominant view of multimorphemic processing is one in which multimorphemic forms are deconstructed in order to be processed. If this is true, then blends should also be segmented into their constituents. The Taft & Forster approach would suggest that blends are accessed by the first syllable, which would indicate that some blends are stored by their first constituent (i.e., *aerobicise* would be accessed though *aero*). This is problematic because the first syllable may be only part of the first constituent (i.e., *aerobics*) and the second constituent (i.e., *exercise*) may not be stored for lexical retrieval. Both of the constituents in a blend are equally related to the form (there is no modifier-head relationship), unless the blend was formed from a compound. Therefore, if a blend is deconstructed into its constituent morphemes to be accessed in the mental lexicon, both of its constituents should be available for access instead of only the initial part of the first constituent.

Taft & Forster have also mentioned that "once morphological structure is noticed, the form in which a word is stored will change" (1975: 645). If children cannot deconstruct familiar compounds, this would be evidence for the idea that children store compounds in the mental lexicon as single units. As metalinguistic awareness increases, however, children become able to deconstruct compounds and they will then begin to store the compounds in the lexicon in terms of their constituents. If children can create novel compounds from other constituents, then these novel compounds, the results of morphological creativity, are also stored in the mind in terms of their constituents.

If children understand the meaning of a blend but they cannot identify the constituents, then this would be evidence for the view that children store this particular blend as a single unit. However, if children can deconstruct blends and they can form novel blends, then this would be evidence that children store these blends in the lexicon in terms of their constituents. To further investigate how children access compounds and blends in the mind, we must discuss how children form compounds, blends, and other lexical innovations.

## 1.5. Lexical Innovations

### 1.5.1. How and Why Lexical Innovations are Formed

Human language is characterized by creativity. Since imagination is an integral part of an interesting conversation, we frequently create new words so that we can effectively express our novel concepts and thoughts. Lexical innovations not only surface to discuss new ideas, they arise in particular contexts to fill lexical gaps, such as when the name of a concept being discussed has been

momentarily forgotten or the name is unknown. Innovations are widespread in language use. We create and process lexical innovations so frequently that we are often unaware of doing so (Clark, 1981).

We occasionally use innovations to clarify to the listener what we are talking about in a particular context. As an example, if a mother asks her child to fetch her the *hot air brush* (a hair styling device that is a combination between a brush, a hair dryer, and a curling iron), the mother may ask her child to fetch the "hair dryer-curling iron-brush-thing", and it is likely that the child would understand what she is asking for. Since lexical innovations are often context dependent, such as in the example above, they are frequently coined for one-time use and then disappear.

Children learn very early that the lexicon can be used innovatively and this knowledge plays an important role in acquisition. As children acquire language they construct new words to convey novel meanings (Clark, 1991). Because children have small vocabularies, the number of conventional words that they know is limited and therefore they must often rely on creating new words to express their ideas. According to Clark (1982), there are two things that we must look at when we observe children's lexical innovations: *why* children create new words and *how* children create new words. The reason why children produce innovations is because they need a way to express particular meanings on particular occasions. Children create new words because they want to talk about what they are interested in and, in order to discuss new and interesting topics, they must not restrict themselves to talking only about the items in their limited

vocabularies (Clark, 1991). They discuss items and concepts for which they may not have lexical entries. Therefore, they must be creative and descriptive when creating lexical innovations so that the speaker understands what they are referring to. Children are able to do this by drawing on the words and morphemes that they already know and by combining these words with other words and affixes (Clark, 1991). As an example, if a child encounters a painter and the child understands that this is a man who creates art, the child may coin the word *art-man* to refer to the painter, if she/he has no lexical entry for the word 'painter'.

Children's innovations are interesting because they are extensions of their existing knowledge. What children understand of a word is displayed by the types of innovations that they use and the purpose of those innovations. Children can only produce lexical innovations, on the basis of constructions that are part of their lexical knowledge (Becker, 1994). Constructions that are not part of their lexical knowledge will not emerge until the child gains an understanding of them. If a child creates the word *art-man* to refer to a painter, this implies that the child understands the N + N compound construction and that N + N compounds are part of this child's lexical knowledge.

Clark (1981, 82) mentions that innovations are more influenced by lexical knowledge that can form the basis of generalizations than by lexical gaps that need to be filled. Even though lexical innovations are formed when there is a lexical gap, they are formed on the basis of some word-formation device that the child understands. A child is more likely to coin a N + N compound because she/he understands the compound construction than because there is a lexical gap.

Moreover, children not only use innovations to discuss new ideas and concepts, but they also use innovations, such as compounds, to contrast members of a category (Clark, Gelman & Lane, 1985; Clark 1991). Newly formed compounds have a taxonomic purpose and children use compounds as a categorization technique to contrast members of the same category, e.g., a *snow-tree* (a fir tree without snow on it, from Clark, 1991) verses a *Christmas tree.*

When young children want to express new meanings, they rely on whatever word-formation devices they already know (Clark & Cohen, 1984). Because not all word-formation devices are part of young children's lexical knowledge, children below the age of four years express only a few of the options that are available to adults.

One of the first word-formation devices used by children is *conversion* (Clark, 1982; Becker, 1994), the process by which a lexical item changes syntactic category with little or no addition of overt affixes. As an example, a child may use the noun *pancake* as a verb to refer to flattening something and say, "I want to *pancake* it." In the developing stages of morphological ability, children may be inclined to make the fewest changes possible when using words as building blocks to form new words. Conversion is one of the first word-formation devices employed by children because there are few changes made to the base of the word when the word shifts into another syntactic category (see Table 4).

Table 4. *Children Using Conversion (from Clark, 1982)*

| Child | Age | Utterance |
|---|---|---|
| DH | 2;3 | (talking about getting dressed): *Mommy trousers me.* |
| CB | 3;11 | (putting crackers in her soup): *I'm crackering my soup.* |
| CB | 4;2 | (using a rag to wash the car): *I need it watered and soaped.* |
| SA | 5;10 | (to his mother): *Will you chocolate my milk?* |

English-speaking children are not the only ones who use conversion as one of their first word-formation devices. Clark (1982) found that French- and German-speaking children produce innovations created by conversion in a similar fashion to those produced by English-speaking children. Because children often have more nouns than verbs in their vocabularies in the preschool years, they use nouns as verbs because they need the vocabulary to talk about actions with a degree of precision otherwise not available. They want to express precise meanings and they do not have other devices that would allow them to be sufficiently explicit (Clark, 1982). Children typically use nouns as verbs until they learn the appropriate verbs to express the meanings that they wish to convey.

Compounding, along with conversion, is one of the first word-formation devices to appear for English-speaking children (Becker, 1994). Clark, Gelman & Lane (1985) have determined that children understand the modifier-head relation in compounds approximately by age 2;6 (see Table 5).

Table 5. *Children Using Compounds (from Becker, 1994)*

| Age | Utterance |
|---|---|
| 2;6 | *Mom, here's the paint-things.* (containers to hold paint) |
| 2;7 | *That's a mustache and that's a real beard and that's a nose-beard.* (whiskers) |
| 2;9 | *We saw a light man.* (a man who fixes lights) |
| 4;11 | *He has real sneak-shoes or slippers.* (quiet shoes Santa Claus uses to sneak into houses) |

Clark (1987) contrasts the difference between Illegitimate Compounds and Legitimate Compounds. Illegitimate Compounds are those that are used instead of an existing word, such as *nose-beard* for whiskers, and Legitimate Compounds are those that are used when there is no conventional word, such as coining a name for a new object or invention. Clark specifies that Illegitimate Compounds are the compounds most often used by children, because children have not learned the appropriate terms and they require the use of Illegitimate Compounds to fill the gaps in their lexicons.

Windsor (1993) claims that not all novel compounds are used to fill gaps, but that some novel compounds have no particular communicative function and are used when existing words and other options are available. Since Clark (1987) specifies that children rely on Illegitimate Compounds for their innovations, it is obvious that children have other options available to them. Although Clark mentions that a lexical gap exists only when there is no other option but to use an innovation, it is possible that the lexical gap exists because the existing lexical entry has been momentarily forgotten. A lexical gap may momentarily exist; it may not be a permanent gap.

Windsor (1993) proposes an alternate prospective on the role of lexical innovations in children's language and on the role of compound innovations in particular. She criticizes Clark (1987) for suggesting that novel compounds are created only for communicative purposes. Windsor suggests that N + N compounds do not always allow the child to communicate more precisely. As an example, she uses an utterance from a child who is 3;3:

Adam: ...A monkey-train. A monkey-train. A monkey-train. Monkey on a train, train, train. Ooh, ma ma ma ma ma. A monkey-train. He a monkey-train backing up.

It appears from this utterance that this child may be merely playing with language rather than trying to be communicatively precise. Although it is difficult to know this for certain, it seems clear, however, that while innovations are usually used for communicative purposes, they are not exclusively used in this way. Both children and adults play with language and may coin new words for comedic purposes. However, it is possible that, in the above example and in the other examples cited by Windsor, the child could have been trying to communicate something. All of Windsor's examples used to support her claim are extracted from the CHILDES database system. What she observed as non-communicative lexical innovations could actually have communicative intent, because the gestures made by the children when the innovations were produced were sometimes not observed or adequately coded.

Elbers (1988) also believes that not all compounds serve a communicative function, since some compounds have a metaphoric purpose rather than a communicative purpose. Although it is not certain whether the novel compounds cited by Windsor serve a communicative function, Elbers has determined that children produce novel compounds when established lexical or syntactic alternatives could have been used. Although some lexical innovations are created in the place of existing lexical entries or paraphrastic devices, the child may be momentarily unaware of the alternatives or may want to express the concept

lexically rather than through syntax. An example of using an innovation in the place of an existing lexical entry occurred when a boy who was 5;4 had just had a haircut and he was boasting of his *bee-haircut*, which is the term he created for his hairstyle after forgetting the correct term, *buzz cut.* As it is evident from the above example, if the child is unaware of the alternatives at the time of the utterance, then the innovation is in fact used as a communicative tool.

There are several principles identified in the recent literature on lexical innovations that describe children's strategies for forming new words. The first two principles are the Principle of Contrast and the Principle of Conventionality. Contrast and conventionality guide children in coining new words based on their existing linguistic knowledge. These two principles interact with the remaining principles, namely the Principle of Transparency, the Principle of Simplicity, and the Principle of Productivity. Transparency, simplicity, and productivity characterize the types of lexical innovations that children will form and are predictors of the types of innovations likely to be used by young children. Each of these principles are outlined below.

### 1.5.2. The Principle of Contrast

The Principle of Contrast assumes that different forms in a language have different meanings and that innovations must contrast in meaning with established terms in order to be acceptable (Clark, 1991; Clark, 1987). Adults typically avoid coining a new word with a meaning already represented in the lexicon. Although children have small vocabularies, they should also avoid coining new words with meanings already represented in their lexicons (Clark, 1991).

Windsor identifies Clark's principle of contrast as the idea that "every two forms in a language contrast in meaning" (1993: 121). Clark's principle of contrast actually refers to the idea that children understand that words have different meanings and you cannot create a new word in the place of an already existing word. This is obvious from the fact that they reject synonymy at an early age (Clark, 1991). An innovation should only occur if it contrasts in meaning with all other lexical entries (i.e., there are no other lexical entries with exactly the same meaning).

### 1.5.3. The Principle of Conventionality

The second principle governing children's lexical innovations is the Principle of Conventionality (Clark, Hecht & Mulford, 1986; Clark, 1991). Conventionality assumes that all words have conventional meanings and for each meaning there is a certain word that is used by the language community. Children will discover the words that are conventionally used and add these words to their repertoires.

### 1.5.4. The Principle of Transparency

The Principle of Transparency states that the preferred forms in a language are ones where the constituents can be identified. When children form new words they do so by using the familiar words in their lexicons (Clark, 1991). Therefore, there is an early reliance on compounding and conversion. The constituents used in compounding and in conversion are transparent because they can easily be identified and segmented. As an example, the constituents in the compound *doghouse* can easily be segmented and recognized as *dog* and *house*.

### 1.5.5. The Principle of Simplicity

The idea behind the Principle of Simplicity (Clark, Hecht & Mulford, 1986, Clark & Berman, 1987, Clark, 1991, 93, Becker, 1994) is that simple forms are easier to acquire than complex forms. When children are creating new words from words that already exist in their vocabularies, they will make as few changes as possible. This is because children have a cognitive preference for simple forms with the least modification to the base forms (Clark, 1991). Thus, compounding is likely to appear early in language development because it so often involves unmodified constituents being brought together. Thus, compounding would be expected by the principle of simplicity to emerge early.

Clark & Berman (1987) have determined that the fewer changes children have to make to the head nouns of compounds, the easier it is for them to master that compound pattern. So, if the compound does not have affixed constituents, that compound pattern is mastered before compounds that have affixed constituents, i.e., the compound pattern of *blackboard* is mastered before the compound pattern of *diving board* since the modifier in the latter case contains the suffix *-ing*. Clark & Berman have found that production, but not comprehension, is strongly affected by simplicity of form. Children should therefore be able to understand complex word forms before they are able to produce them.

The meaning of Simplicity of Form is that the least changed form is the simplest and so should be the easiest to acquire. As children get older and learn

more about their language, they should add more complex forms to their repertoires.

### 1.5.6. The Principle of Productivity

The Principle of Productivity (Clark, 1991, Clark & Cohen, 1984, Clark, Hecht & Mulford, 1986) proposes that children observe how adults create lexical innovations and are receptive to the kinds of innovations adults produce. Therefore, children will use the word-formation devices that are most often used by adults, i.e., the most productive devices in the language.

Clark & Grossman (1998) state that children's learning of new word meanings is guided by the pragmatic directions that adults offer. Preschoolers listen to the language of adults and make repairs to their own constructions so that their language is similar to adult language. Repairs typically move the young child's pronunciation closer to the adult's.

### 1.5.7. What the Principles Predict for the Formation of Compounds and Blends in Child Language

If children rely on these principles to form new words into their lexicons, then if they have the option of forming either a simple N + N compound or a blend, they would most likely form the compound. First, the N + N compound is *transparent*, since both of the constituents can be easily identified and segmented. This would suggest that compounds would be acquired before blends, since the constituents of blends are not transparent. Second, there is no modification to the base forms when constructing a N + N compound, which would characterize this type of construction as a *simple*. A blend is a word formed by combining part of

the first constituent with part of the second constituent. Because the base forms in a blend are modified to the point where they cannot easily be identified, the N + N compound is a simpler form and should be acquired first. Finally, there are only a few blends in the English language and a vast number of compounds. Compounds are more *productive* in the English language, which would also suggest that compounds are acquired before blends. Young children may not blend lexical morphemes together because they may not know that blends exist and that blending is possible. They may view a blended structure as an arbitrary form. When blends emerge productively in child language, this is evidence that blends exist in the child's lexical knowledge and that the child understands something about how blends are formed.

A study conducted by Becker (1994) is particularly relevant to this research because it targets children's knowledge of both compounds and blends. It was a longitudinal study of one child from 2:4.24 to 5;0.11. All of the child's sessions were transcribed and coded for word-formation devices, such as prefixation, suffixation, conversion, compounding, compounding with suffixation, reduplication, abbreviation, blending, and familiarity marking. Compounds accounted for 60% (140/250) of the child's total lexical innovations for all sessions. Blends, on the other hand, accounted for 1.2% (3/250) of the child's total lexical innovations. Even in these three cases it is not certain from this study whether the blends were formed intentionally or were the result of retrieval errors. The only blends that were produced by this child were recorded at age 5;0 and were formed by blending prepositions together (e.g., *in* + *under* = *inder*). It is not

certain from this study if children can intentionally blend nouns together, nor is it certain whether children younger than 5;0 can construct blends as a productive word-formation device.

At this point there is relatively little literature on children's morphological blending ability. Nevertheless, because of the principles cited above, especially transparency, simplicity and productivity, it may be suggested that children will acquire the ability to compound before they will acquire the ability to blend. In the studies presented above, it has been determined that compounding emerges in child language sometime around the age 2;0, and that blending may appear at about the age of 5;0 or later, depending on whether the blends are created intentionally or whether they occur as retrieval errors.

Because the components of blends are not immediately transparent and blends cannot be easily deconstructed, it is probable that the ability to create compounds would precede the ability to blend.

**1.6. Objectives of the Present Study**

The main objective of this study was to better understand the manner in which children acquire the ability to combine lexical morphemes. How children understand and produce novel combinations of co-ordinate morphemes is of special interest. Specifically, this study is aimed to determine whether there is a developmental progression in how lexical morphemes are combined as co-ordinates. This study is aimed in part to test the predictions derived from the literature, namely that according to the Principles of Transparency, Simplicity,

and Productivity, compounding is likely to precede blending within the domain of morphological operations.

As will be detailed in the following sections, this study involves first checking to see whether children understand the morphological constituency of existing compounds and blends in the language, and then to explore their comprehension and production of novel forms.

# CHAPTER 2

## Method

### 2.1. Introduction

This study was designed to determine the approximate onset of the ability to blend lexical morphemes and to determine if there is a developmental progression in the ability to combine lexical morphemes. The subsequent sections of this chapter describe the participants, as well as the materials and procedures of the three tasks included in this study, namely the Preliminary Decomposition Task, the Forced Choice Lexical Morpheme Combination Task, and the Free Answer Lexical Morpheme Combination Task.

### 2.2. Participants

The children that participated in this study were in one of four age groups: 2-years, 4-years, 6-years, and 8-years. Eighteen children were recruited in each age group. Three of the 2-year-olds were eliminated from the study because they had requested to discontinue their participation ("I don't want to do this!"). All of the children who participated were monolingual speakers of English. The 2- and 4-year-olds were tested in daycare centres in Edmonton and St. Albert, Alberta, Canada. The 6- and 8-year-olds were tested in an inner city after-school centre in Edmonton and in an elementary school in St. Albert. The mean age and range for each age group are represented in Table 6 below.

Table 6. *The Mean Age and Range for Each Age Group*

| Age Group | N | Mean Age | Range |
|---|---|---|---|
| 2-years | 15 | 2;5.20 | 2;0.5 - 2;9.27 |
| 4-years | 18 | 4;5.17 | 4;0.0 - 4;11.14 |
| 6-years | 18 | 6;5.25 | 6;1.15 - 6;11.5 |
| 8-years | 18 | 8;7.3 | 8;0.22 - 8;11.22 |

After testing the four age groups of children, six adults were included in this study to determine whether any of the age groups of children performed similar to adults on the three tasks. All of the adults included in the study were native speakers of English residing in Edmonton, Alberta, Canada. At the time of the study, three of the adults were graduate students in the Department of Linguistics at the University of Alberta. The remaining three adults were undergraduate students who were majoring in fields unrelated to linguistics.

**2.3. Materials and Procedure**

**2.3.1. The Context of Testing**

The children were tested in their natural environments, in the daycare centre or elementary school that they attended. The children participated in the experiment with the permission of their parents and under the supervision of an employee at the school or daycare centre. The adults were tested in a quiet room in the Department of Linguistics at the University of Alberta. All of the participants were told at the beginning of the session that all of the answers they provided were correct, and that there are no wrong answers.

**2.3.2. Preliminary Decomposition Task**

Each session began with a preliminary decomposition task that asked the participants to determine why words have the name that they do. The purpose of

this task was to provide a quick assessment of the extent to which the participants were familiar with the constituent structure of existing English blends and compounds. This task contained eight high frequency compounds that Canadian children were likely to be familiar with, such as *orange juice*, and four of the most frequent blends. The words used in this task are represented in Table 7 below along with their frequency and age of acquisition.

Table 7. *The Frequency and Age of Acquisition of the Compounds and Blends Used in the Preliminary Decomposition Task (data from the MRCDataBase)*[3]

| Word | Analysis | Frequency | Age of Acquisition |
|---|---|---|---|
| orange juice | orange + juice | 17 | 2.265 |
| toothbrush | tooth + brush | 32 | ~2.14 |
| highchair | high + chair | 281.5 | - |
| bathtub | bath + tub | 19.5 | ~1.72 |
| bedroom | bed + room | 255 | 2.065 |
| playground | play + ground | 193 | 2.25 |
| facecloth | face + cloth | 207 | ~1.66 |
| daycare | day + care | 424 | - |
| brunch | breakfast + lunch | - | - |
| motel | motor + hotel | 24 | - |
| smog | smoke + fog | 1 | - |
| telethon | telephone + marathon | - | - |

Note: the approximate values listed in the AOA column indicate that the AOA for the compound was not found. The value represents the AOA for one of the constituents of the compound (brush, bath, and face respectively).

Each question was presented orally and all of the answers were recorded on a score sheet and tape-recorded for a quality check. All of the participants, regardless of their age group, were asked the exact same questions in the same order (see Appendix A). The adults were given the same set of questions as the

children and they received similar instructions, but instead of responding orally, the adults were asked to write their answers down on an answer sheet that was provided to them. For both the compounds and blends, the participants were first asked if they could identify the word. If they could not identify the word, they were reminded of the meaning of the word. The explanation of the words in this task consisted of paraphrases that did not contain the constituents that were used to create the compound or blend (e.g., for the word *highchair*, the children were reminded that highchairs were used as seats for babies during meal times). After identifying each word, the participants were asked why the word has that name (e.g., Why do you call A BEDROOM A BEDROOM?).

**2.3.3. Forced Choice Task**

To avoid any interference related to contrast and conventionality, only non-words were used in this task. All of the non-words were phonotactically legal English CVC syllables. Each of the non-words was matched to a picture of a non-Earth animal and represented the name of the animal. All of the pictures of the non-Earth animals were drawn and coloured by hand. The animals in each set were different colours. The pictures were cut out and mounted on plain white paper and then inserted into clear plastic covers. All of the pictures were contained in a 1" binder. When the binder was open, the page on the left side consisted of two animals and the page on the right consisted of one animal that shared the features and colours of the two animals on the left side. The animal on the right page did not have a name (see Appendix D).

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[3] www.psy.uwa.edu.au/MRCDataBase/uwa_mrc.htm

In this task, the participants were asked to choose a name for an unnamed animal that shared the features of two other animals. Since the younger age groups required a logical explanation for how an animal could contain the features of two other animals, the subjects were told that the two animals on the left page were the "mommy" and the "daddy" and the animal on the right page was the "baby". They were then told that the mommy and the daddy both had special names, but their baby did not yet have a name. The participants were asked to use both the mommy's name (e.g., *a podge*) and the daddy's name (e.g., *a leem*) together to give a name to the baby. Since this task was a forced choice task, the participants were asked to choose the best name for the baby from a set of four presented names (see Appendix B). The nature of this task allowed for co-ordinate compounds, blends, and co-ordinate phrases. The choices for the names were presented in a fixed random order and consisted of a blend formed from the names of the two animals (e.g., *a peem*), a co-ordinate compound formed from the names of the two animals (e.g., *a podgeleem*), a co-ordinate phrase of the two names using a conjunction (e.g., *a podge and a leem*), as well as an arbitrary monosyllabic form (e.g., *a gep*). Because the choices in each set were in a different order, each of the types of answers presented to the subject had a 25% chance of being selected as the best name for the baby. The position or order of the presentation did not influence the answers. There were 20 sets in this task that were presented in the same order to each participant. Since some of the children were preliterate, the children were asked provide their answers orally. The adults

were asked to write their answers down on a provided work sheet. The same protocol was used for each age group.

**2.3.4. Free Answer Task**

The Free Answer Lexical Morpheme Combination Task occurred after the Forced Choice Lexical Morpheme Combination Task. Similar to the Forced Choice Task, the subjects were presented with two pictures of non-Earth animals on the left page and they were told the names of the animals (e.g., This is a *deet* and this is a *sape*). The subjects were then presented with a picture of an animal on the right page that shared the features of the two animals on the left page. The same instructions were given for this task that were given for the Forced Choice Task. This time, however, the participants had to provide a name for the baby rather than choose one from among a set of four possibilities. All of the words and pictures used in the Free Answer Task were different from those employed in the Forced Choice Task. They were designed, however, to possess the same visual and phonological properties (see Appendix C). As in the Forced Choice Task, the children were asked to respond orally and the adults were asked to write down their answers on a provided answer sheet. There were also 20 trials in this task and they were presented in the same order to each participant.

# CHAPTER 3

## Results

### 3.1. Introduction

This chapter depicts the results that were obtained from testing the participants on the three tasks. In the sections below, the results of the Preliminary Decomposition Task and Forced Choice Lexical Morpheme Combination Task are outlined. These sections are followed by the results of the Free Answer Lexical Morpheme Combination Task, which includes an analysis of individual responses of compounds and blends and an analysis of the types of blends that are produced in each age group.

### 3.2. Preliminary Decomposition Task

Because the Forced Choice Task and the Free Answer Task evaluate how the participants combine lexical morphemes to create new words, a preliminary decomposition task was administered to determine whether the participants can deconstruct existing English bi-constituent words, such as compounds and blends. The purpose of this task was to determine if the participants could properly identify compounds and blends as words that have multiple constituents. Since the purpose of the task was to determine if children understood the constituent properties of compounds and blends, the deconstructions were considered to be correct if the children identified at least one of the constituents and showed an understanding of the relationship between them. As an example, all of the responses in Table 8 below were counted as correct, even though some of the children were only able to identify one of the constituents.

Table 8. *Answers to the Question "Why do we call a bathtub a bathtub?"*

| Age | Response |
|---|---|
| 2;9.16 | *'Cause it's to bath in* |
| 4;10.28 | *Because you take a bath with it* |
| 6;11.2 | *'Cause it's a tub and you can...and it's kind of a bath.* |
| 8;5.14 | *Because it's a tub and you have a bath in it* |

The types of correct deconstructions and the amount of times the deconstructions were made are represented below on Table 12 and Table 13 (on pages 32 & 33 respectively). Figure 2 below shows the individual responses for the correct deconstructions of compounds and blends. As can be seen in Figure 2, the ability to deconstruct bi-constituent words tends to increase with age.

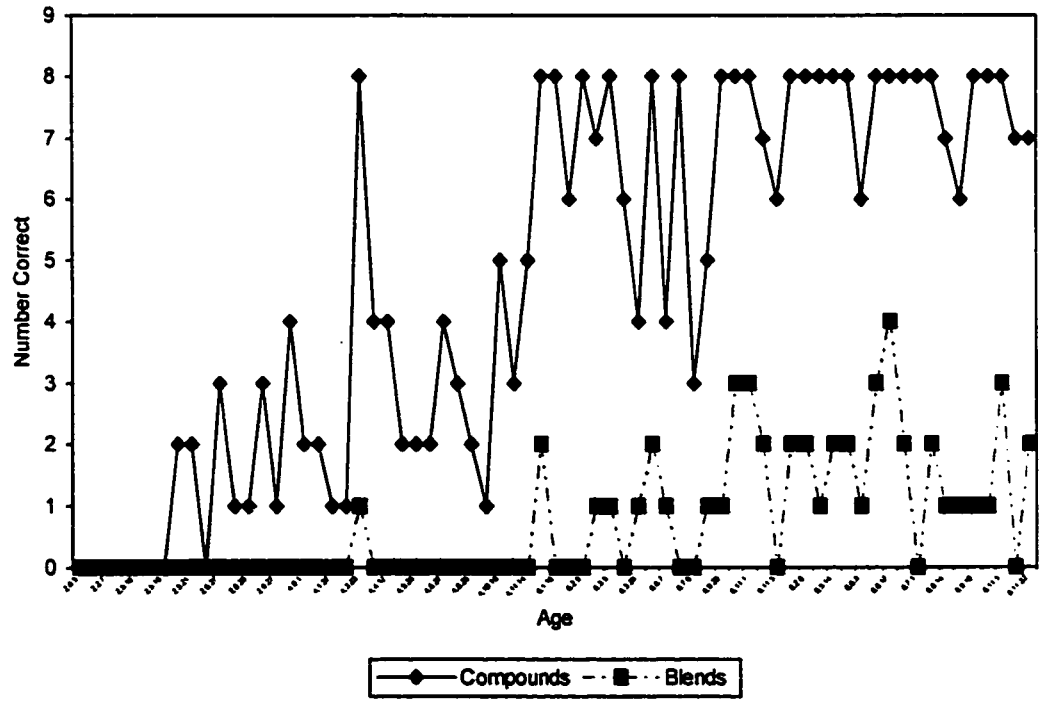


Figure 2. *The Number of Correct Compound and Blend Deconstructions for Each Participant*

note: the total number of compounds is eight and the total number of blends is four

The responses in Figure 2 reveal that the 2-year-olds and most of the 4-year-olds did not deconstruct any of the blends. It is also evident from this figure that the ability to deconstruct compounds emerges around 2;5. This was predicted by Clark, Gelman & Lane (1985), who have determined that children understand the modifier-head relation around 2;6. Since it has previously been determined that children can produce novel compounds by around 2-years (Becker, 1994), the children who demonstrate evidence of the ability to deconstruct compounds in Figure 2 should also be able to produce novel compounds, regardless of whether they show this ability on the subsequent tasks.

To analyze the group performance on this task, the following table was constructed. Table 9 below contains the mean number of compounds and blends that were successfully deconstructed by the children in each of the age groups.

Table 9. *Mean Number of Compounds & Blends Deconstructed*

| Age Group | 2-years | 4-years | 6-years | 8-years | Adult |
|---|---|---|---|---|---|
| Compounds | .75 | 3.06 | 6.67 | 7.61 | 8 |
| % Correct | 9% | 38.25% | 83% | 95% | 100% |
| Blends | 0 | 0.06 | 1 | 1.67 | 3 |
| % Correct | 0% | 1.5% | 25% | 41.75% | 75% |

note: total of eight compounds and four blends

As seen in Table 9, children begin to understand the relation of compound constituents around the age of 3;0. Table 9 also indicates that children seem to have very limited lexical representations for blends until around 6;0. This does not mean that children younger than 6;0 cannot form blends, but rather that young children may have not been told of the constituents of the blends and they may lack the metalinguistic knowledge to determine the constituents from the

meanings of the blends. As an example, Table 10 demonstrates the responses of children in different age groups to the blend *brunch.*

Table 10. *Answers to the Question "Why do we call brunch brunch?"*

| Age | Response |
|---|---|
| 2;5.20 | *'Cause it comes with sweet.* |
| 4;2.13 | *Because it's from food.* |
| 6;.9.25 | *You have breakfast and lunch together* |
| 8;0.22 | *Because it starts with a br- for breakfast and –unch is for lunch and it's between breakfast and lunch.* |

These responses show that although the preschoolers have a general idea of what the blend is referring to, they are not yet aware that this word is a blend and they are not yet able to determine the constituents of the blend. The older children's responses reveal that they are aware of the constituents, possibly because they have been informed of the constituents at some time. The older the children become, the greater the metalinguistic awareness and the stronger the ability to analyze the constituents and determine which parts of the constituents have been combined together. However, since blends are created from only parts of their constituents, it is not always possible to look for the constituent boundaries in blends to determine what the constituents are. As an example, in Table 11 below it is clear that most of the children understand the word *motel* as having more than one constituent, but they cannot identify both of the constituents.

Table 11. *Answers to the Question "Why do we call a motel a motel?"*

| Age | Response |
|---|---|
| 2;5.19 | *Because I do.* |
| 4;3.23 | *It's a type of hotel.* |
| 6;4.0 | *It's from hotel with mo-.* |
| 8;0.22 | *Because it's kind of in a way a hotel and they take the 'h' away and put a 'm' in case then it's not more than one story high.* |

For some blends, adults can figure out the constituents without being told what they are. Two of the adults that participated in this study were able to guess the initial constituent of *motel*. Based on the meaning of *motel*, these adults hypothesized that the initial constituent was most likely *motor*. These two adults did not only understand what the word meant but also understood the semantic constituency of *motel*. It is only possible to find constituency by understanding the semantic constituents of the word.

Since blends accounted for few of the stimulus items and compounds accounted for the majority of the stimulus items, the types of compound deconstructions were further analyzed. The compound deconstruction types were analyzed for the different age groups to see if one of the deconstruction types was particular to one of the age groups. Three types of compound deconstructions were coded as correct. The codes for the three types of compound deconstructions are displayed in Table 12 below.

Table 12. *The Types of Compound Deconstructions*

| Deconstruction | Code | Example |
|---|---|---|
| Modifier + Pronoun | M + PRO | *Orange juice* is called *orange juice* because *it* is made from *oranges*. |
| Modifier + Head | M + H | *Orange juice* is called *orange juice* because it is *juice* made from *oranges*. |
| Description + Head | DES + H | A *bedroom* is called a *bedroom* because it is a *room* where people *go to sleep*. |

Of the three correct responses shown in Table 12, the first two types of compounds were displayed by all groups and the last type of compound was only produced by the 6- and 8-year-olds (see Table 13).

Table 13. *The Correct Deconstructions of Compounds*

| Age Group | M+PRO | % M+PRO | M+H | %M+H | DES+ H | %DES +H | Total |
|---|---|---|---|---|---|---|---|
| 2-years | 8 | 38% | 5 | 62% | 0 | 0 | 13 |
| 4-years | 39 | 71% | 16 | 29% | 0 | 0 | 55 |
| 6-years | 53 | 44% | 63 | 55% | 4 | 3% | 120 |
| 8-years | 39 | 28.5% | 93 | 68% | 5 | 3.5% | 137 |
| Adult | 2 | 4.16% | 46 | 95.84% | 0 | 0 | 48 |

Table 13 shows the types of compound deconstructions used by each age group. This table indicates that the different compound deconstructions are generally not particular to any of the age groups. This task shows that the ability to deconstruct compounds and blends increases with age, but that the types of compound deconstructions that occur, may occur at any age.

### 3.3. Forced Choice Task

#### 3.3.1. Group Performance

Because the task was administered orally and no feedback was given regarding the answers that were provided, the 2-year-olds often supplied an

answer that was not among the four choices. These other choices were coded in the following manner. If the child opted to pass on a particular question or answered the question as "I don't know", then this response was coded as a *zero* answer. If the child chose not to combine the two stimuli to create a new name and chose one of the original stimuli as the answer for the new word, then this answer was coded as a *single* answer. The other answers that the children could provide were the *compound* of the two constituents, a *blend* of the two constituents, the two constituents joined by a *conjunction*, and an *arbitrary* form. Some of the children answered some of the questions with an arbitrary form that was not presented as a choice for the new word. In this situation, the arbitrary forms that the children provided were coded the same as the arbitrary forms that were presented as one of the four possible choices. At the onset of this study it was expected that the 2-year-olds would choose one of the possible answers and that there would be an equal chance that one of the four provided answers would be chosen. After testing the children it became evident that there were actually six possible answers that the participants could provide. Since the participants may either choose the arbitrary form provided or they may create their own arbitrary form, the 2-year-olds have provided more arbitrary responses than any other type of response (as seen in Figure 3).

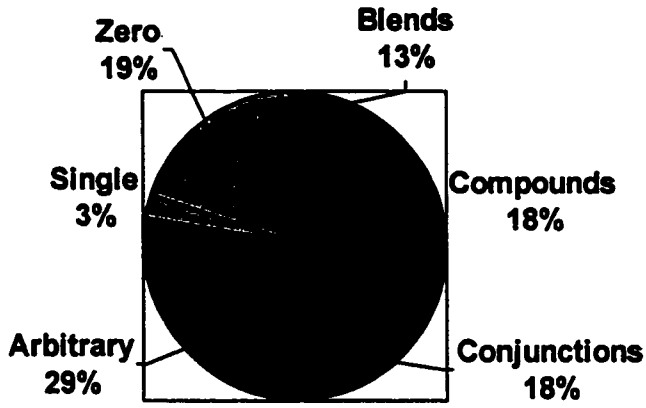


Figure 3. *The Performance of the 2-year-olds in the Forced Choice Task*

In Figure 3 (and in the subsequent sections in the Forced Choice Task) the light gray area represents the percent of responses that were not provided as one of the choices for the new word. The dark gray area represents the responses that were provided as possible answers. Since the 2- and 4-year-olds responded with some arbitrary forms that were not provided as choices for the new words, the dark gray area for both the 2- and 4-year-olds is slightly inflated for this task.

For the 2-year-olds, the difference between their choice of blends, compounds, and conjunctions in this task was not significant ($\chi 2=2.36$, $df=2$, $p>.1$). The difference between the choice of blends and compounds in this task was also not significant ($\chi 2=1.86$, $df=1$, $p>.1$). This indicates that the 2-year-olds did not show a preference for any of the forms that involved combining co-

ordinates. The 2-year-olds produced more arbitrary forms in this task than any other type. This is likely because the 2-year-olds may not have understood the instructions.

The 4-year-olds also provided responses in the six categories listed above. Because the 4-year-olds understood the task better than the 2-year-olds, which is indicated by the larger dark gray area on Figure 4 below, they produced fewer arbitrary forms that were not provided in the data set. The 4-year-olds generally chose one of the four provided answers, with the exception that they also choose some single forms (see Figure 4).

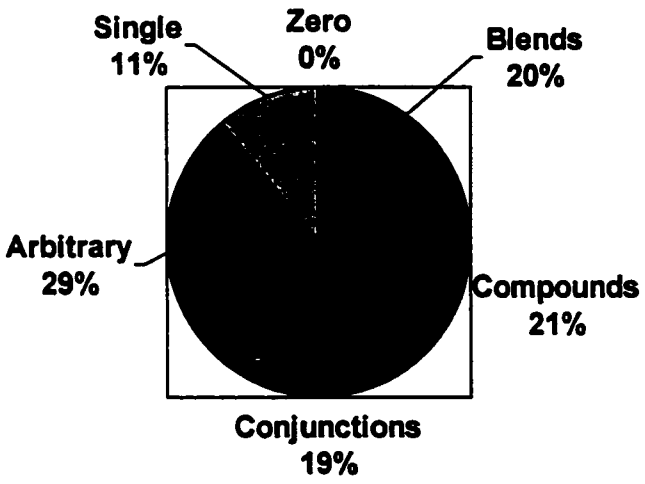


Figure 4. *The Performance of the 4-year-olds in the Forced Choice Task*

For the 4-year-olds, the difference between their choice of blends, compounds, and conjunctions on this task was not significant ($\chi 2=0.17$, $df=2$, $p>.1$). The difference between blends and compounds produced on this task was

also not significant ($\chi 2=0.06$, $df=1$, $p>.1$). The 4-year-olds did not show a preference for any of the forms that involved combining co-ordinate lexical morphemes, even though they appeared to have a better understanding of the task.

The 6-year-olds' responses were similar to those of the 4-year-olds, with the exception that they revealed a slight preference for compounds over the other presented choices. The 6-year-olds were also less inclined to choose single forms (see Figure 5).

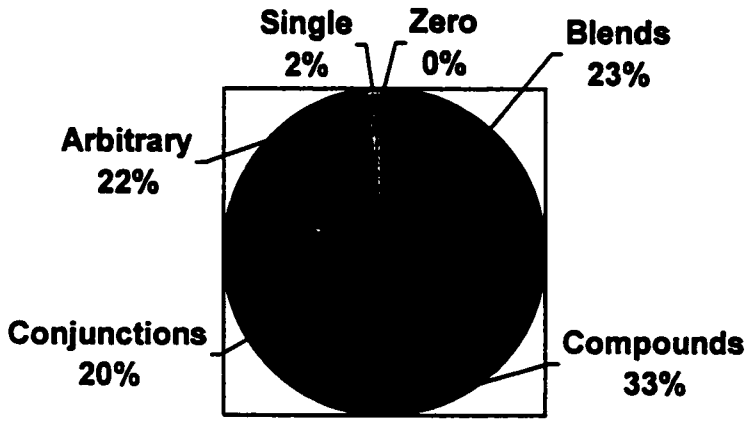


Figure 5. *The Performance of the 6-year-olds in the Forced Choice Task*

As can be seen in Figure 5, compounds were chosen slightly more often than blends and conjunctions. This difference turned out to be significant ($\chi 2=14.79$, $df=2$, $p<.01$). When looking at just the compounds and blends, the difference between these forms was also significant ($\chi 2=6.74$, $df=1$, $p<.01$). The results of this task indicate that when combining co-ordinate lexical morphemes, 6-year-olds show a preference for compounds over the other combining options.

The 8-year-olds provided the same types of answers as the other groups; however, as can be seen in Figure 6, they showed a much stronger preference for the compounds on this task.

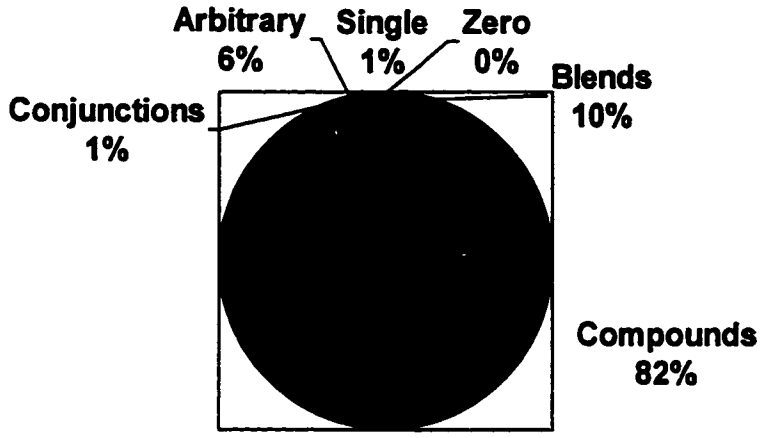


Figure 6. *The Performance of the 8-year-olds in the Forced Choice Task*

The choice of compounds over blends and conjunctions is significant ($\chi 2$=472.62, *df*=2, p<.01). More specifically, the difference between the choice of compounds and blends is significant ($\chi 2$=210.88, *df*=1, p<.01), which indicates that the 8-year-olds strongly prefer to combine co-ordinate lexical morphemes by compounding the forms instead of blending the forms.

Figure 7 shows the responses from all of the age groups. This figure reveals that the 8-year-olds have the strongest preference for any one of the forms. The 8-year-olds are approximating more adult-like performance when it comes to compounds, but not when it comes to blends. As can be seen in Figure 7, the

adults do not have as strong a preference for compounds as the 8-year-olds. The adults also provide more blends than any other age group.

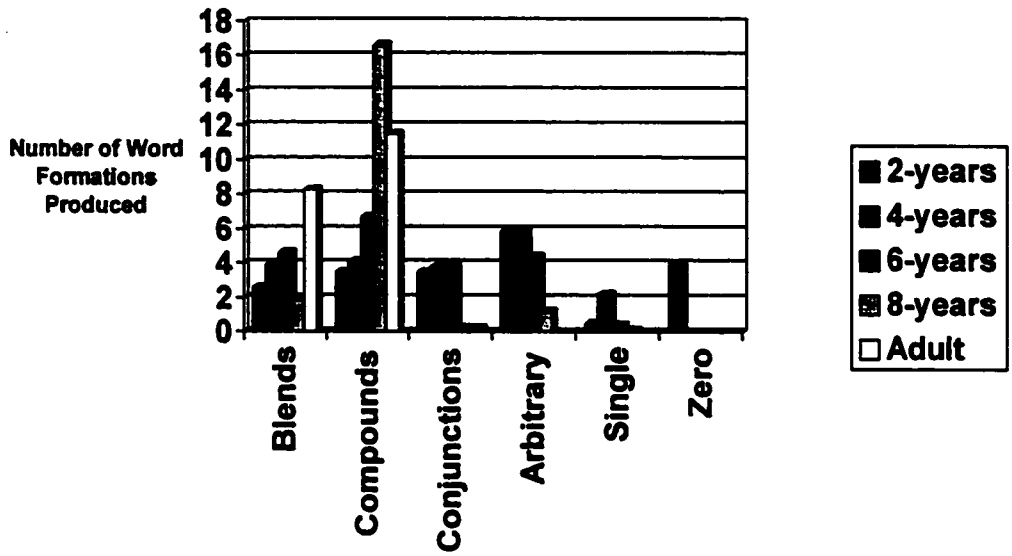


Figure 7. *The Performance of All Age Groups on the Forced Choice Task*

The adults revealed a preference for compounds on this task. The difference between compounds and blends is not significant ($\chi 2=3.04$, $df=1$, $p<.1$). Adults do not show a preference for compounds or blends on this task.

### 3.4. Free Answer Task

#### 3.4.1. Group Performance

The Free Answer Task was similar to the Forced Choice Task in that participants were again given two nonsense words. In this case, however, instead of choosing an answer from among four choices provided, they were asked to supply their own answer. As in the Forced Choice Task, the responses were categorized as blends, compounds, conjunctions, arbitrary forms, zero forms, and

single forms. In this task, however, an additional category was required, namely, *blended compounds.* Blended compounds consist of two blends compounded together. For example, if the constituents were a *kip* and a *teek*, the blended compound would be a *keektip.*

Figure 8 below represents the responses provided by the 2-year-olds in the Free Answer Task.

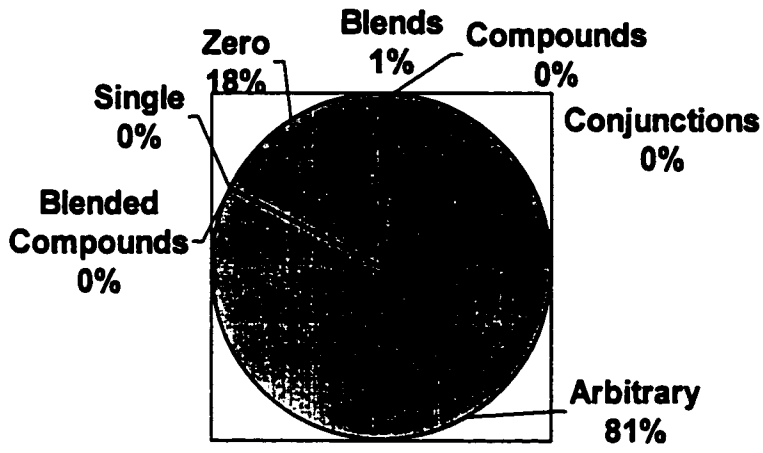


Figure 8. *The Performance of the 2-year-olds in the Free Answer Task*

The light gray area in this figure signifies the responses where there was no combination of lexical morphemes. The dark gray area in this figure signifies where lexical morphemes were combined. This shading contrast was also employed in the subsequent figures for this task.

As can be seen in Figure 8, most of the forms provided by the 2-year-olds were arbitrary forms. It appears that many of the 2-year-olds did not understand the instructions, and so they did not attempt to combine the constituents. However, the difference between the combined forms in this task is significant

($\chi 2=6$, *df*=2, $p<.05$) with preference for blends over the other combined forms. However, the difference between only blends and compounds is not significant ($\chi 2=3$ *df*=1, $p< .1$). Although the difference between blends (1%) and other combined forms (0%) is not very large, as will be seen in the following sections the difference between blends and other combined forms is part of a developing trend (see also Figures 13 & 15).

The 4-year-olds' responses consisted of all of the answer types. The children in this age group had a greater understanding of the task, as can be seen by the increased size of the dark gray area in Figure 9 below.

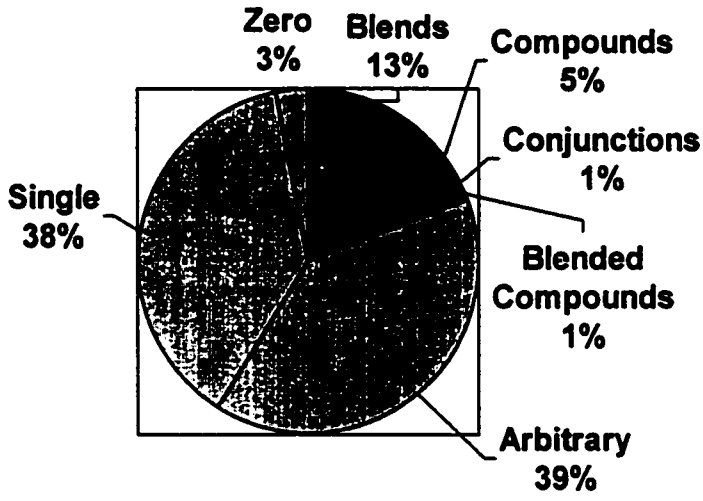


Figure 9. *The Performance of the 4-year-olds in the Free Answer Task*

It is evident in Figure 9 that the 4-year-olds produced more blends than the other combined forms. The higher proportion of blends in this task turned out to be significant ($\chi 2=66.59$, *df*=3, $p<.01$). When comparing just the blends and compounds, the results are also significant ($\chi 2=12.64$, *df*=1, $p< .01$), which

indicates that 4-year-olds preferred to combine co-ordinate lexical morphemes by blending them together.

The 6-year-olds produced a high number of single forms in their answers. However, unlike the 4-year-olds, the 6-year-olds were more likely to compound the constituents together than to blend the constituents together (see Figure 10).

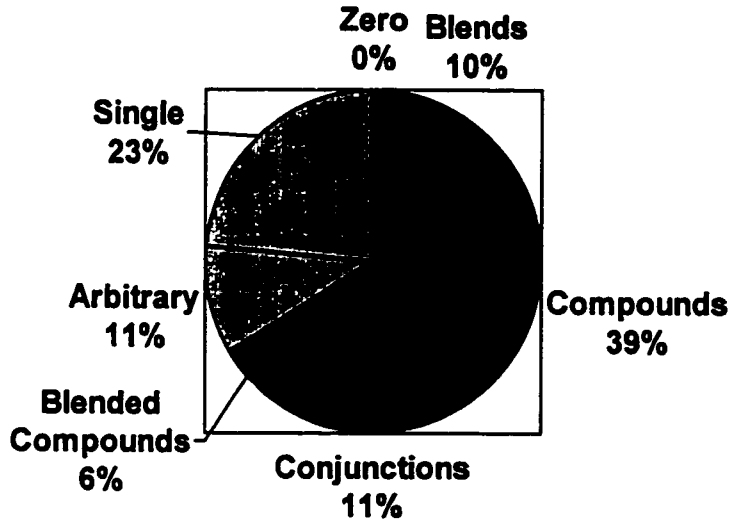


Figure 10. *The Performance of the 6-year-olds in the Free Answer Task*

When comparing the combined forms in this task, there appears to be more compounds produced by the 6-year-olds than any other form. The preference for compounds over the other combined forms is significant ($\chi 2=156.45$, $df=3$, $p< .01$). More specifically, when just comparing the compounds and blends, the preference for compounds is also significant ($\chi 2=64.68$, $df=1$, $p< .01$).

As can be seen in Figure 11, the responses of the 8-year-olds showed a continuation and strengthening of the trend towards compound preference.

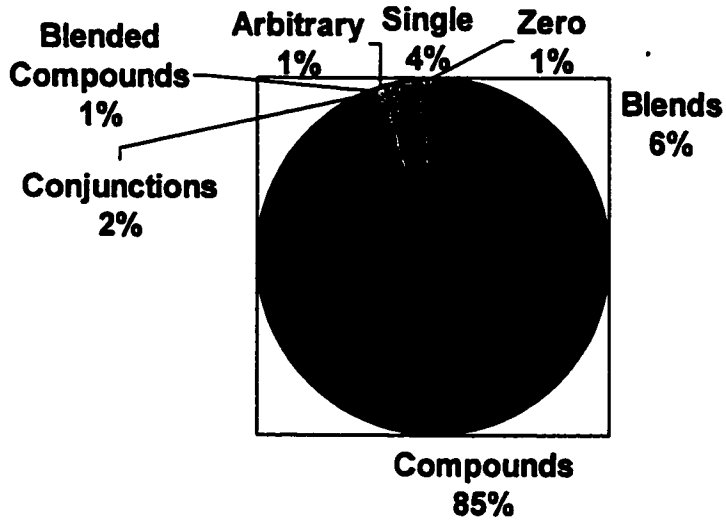


Figure 11. *The Performance of the 8-year-olds in the Free Answer Task*

The 8-year-olds produced a much larger number of compounds than the other combined forms. The differences among combined forms was significant ($\chi 2=791.44$, $df=3$, $p< .01$), as was the difference between compounds and blends ($\chi 2=257.38$, $df=1$, $p< .01$).

The data patterns for all age groups are summarized in Figure 12 below. For comparison purposes, this figure also contains response proportions provided by the adults.

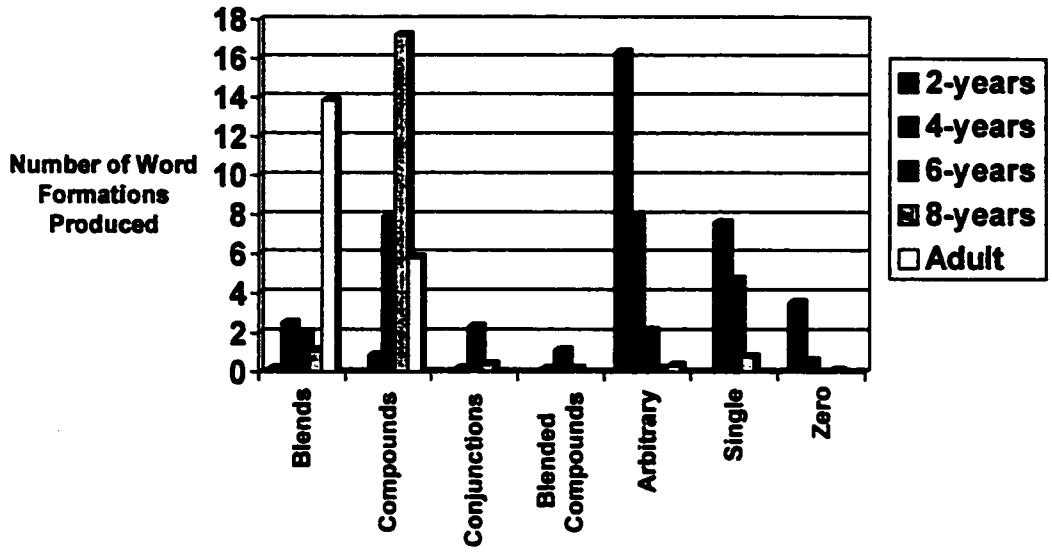


Figure 12. *The Performance of All Age Groups in the Free Answer Task*

As can be seen in Figure 12, the 2-year-olds and 4-year-olds demonstrate some ability to blend. Not only can these children blend, but also they show a preference for blending over compounding. The 6- and 8-year-olds, on the other hand, show a greater number of compounds than blends. Because compounds are more productive than blends, it appeared that the 8-year-olds were beginning to produce adult-like responses. After testing adults on the same task, it became apparent that the 8-year-olds did not provide the same answers as adults. Adults show a preference for blends over compounds on this task. The high preference for blends is significant ($\chi 2=19.52$, $df=1$, $p< .01$). This is also evident in Figure 13 below.

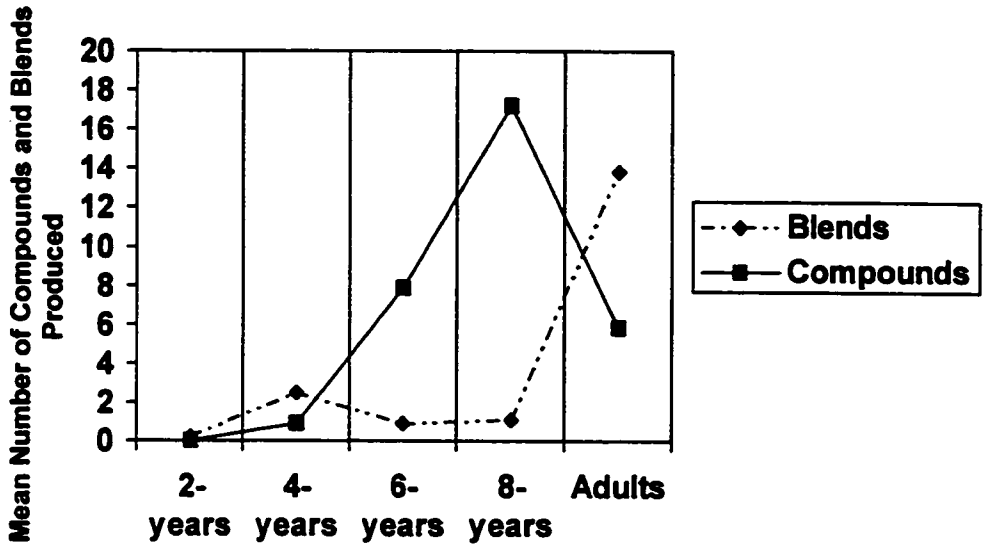


Figure 13. *Mean Number of Compounds and Blends For All Age Groups*

Figure 13 shows that blends appear before compounds and there is a slight peak for blends around 4-years. At 4-years, the number of compounds produced rises steadily and peaks at 8-years, while the number of blends remains quite low. There is a drastic change for the adult group, however, where the number of blends produced increases greatly and the number of compounds produced drops. These results will be explained in the subsequent chapter (Section 4.4. & Section 4.5.)

### 3.4.2. Production of Compounds and Blends by Each Subject

To further analyze the compounds that were produced in each of the age groups, an analysis by items was done to determine whether the compounds produced are characteristic of all of subjects in each age group (see Figure 14).

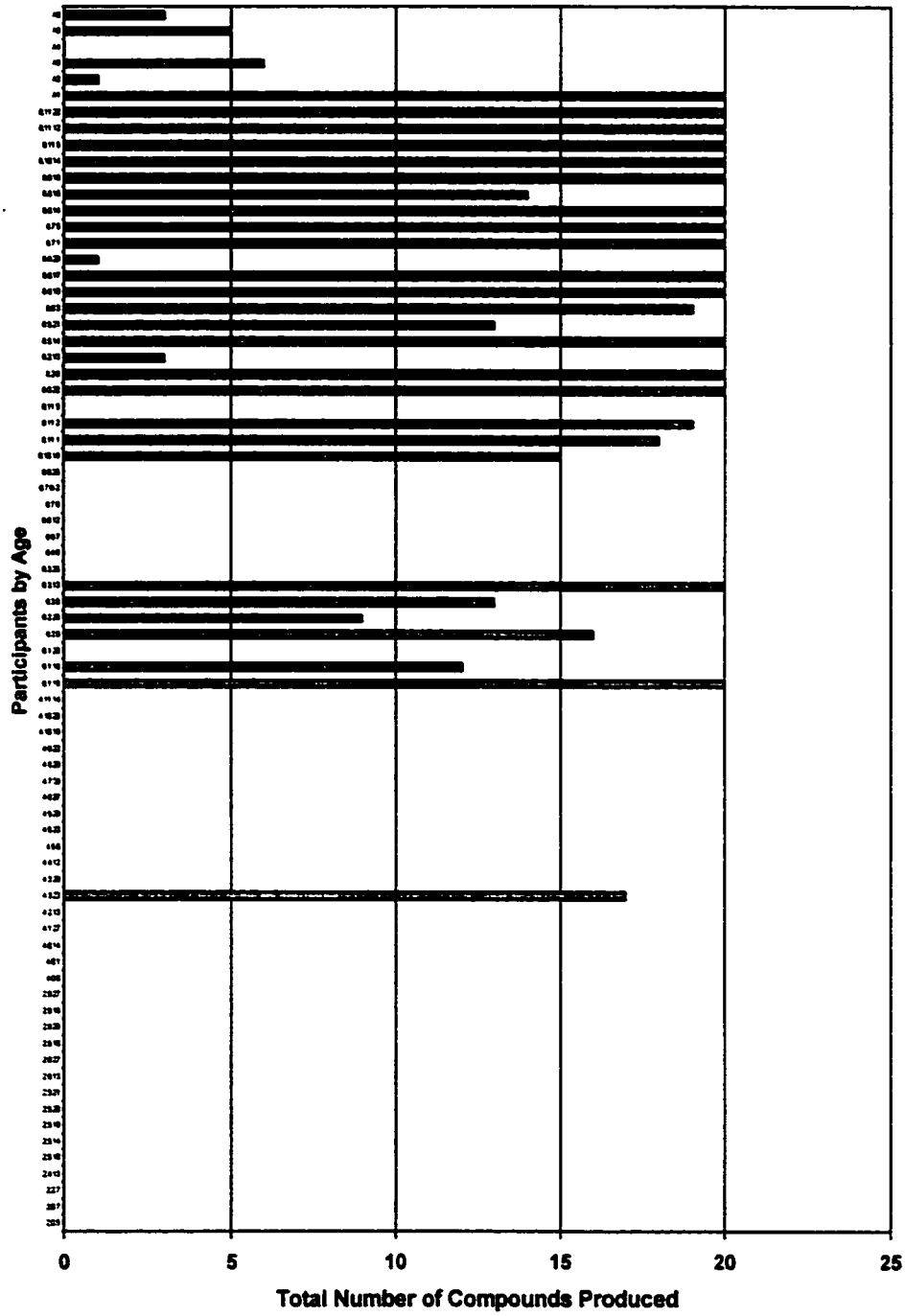


Figure 14. *The Number of Compounds Produced by Each Subject on the Free Answer Task*

Figure 14 shows the number of compounds that were produced by each participant in the Free Answer Task. As can be seen in the figure, compounding began to appear at the age of four, but was restricted to a single participant. At age six, we begin to see increases in compounding among participants. By the age of eight almost all of the participants show a strong preference for compounding over the other combined forms.

Blending responses were analyzed in the same manner, as can be seen in Figure 15 below.

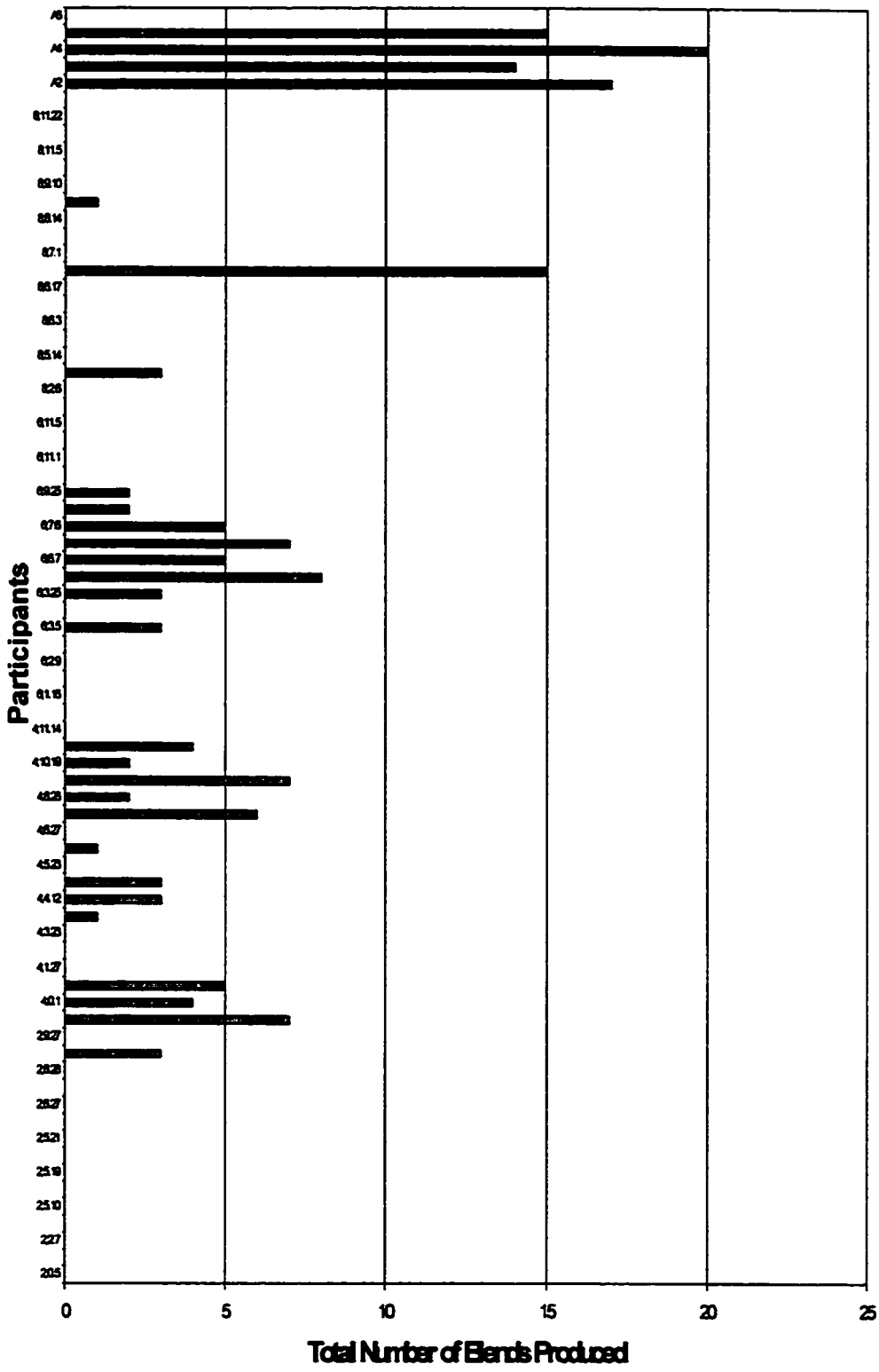


Figure 15. *The Number of Blends Produced by Each Subject on the Free Answer Task*

Blending appears in the 2-year-old group, but is restricted to a single participant. There is a substantial increase in blending among the 4-year-olds where 60% of the group are producing blended forms. Several 6-year-olds also produce blending patterns. At 8-years there is a decrease in the production of blended forms, as can be seen in Figure 15, where the majority of blends were produced by a single participant.

### 3.4.3. Types of Blends Produced

The types of blends that were constructed by the children in the Free Answer Task were analyzed to determine whether children and adults construct blends in the same manner. As was discussed in Section 1.3., adult native speakers of English typically blend two monosyllabic forms by adding the onset of the first constituent with the rhyme of the second constituent (Treiman, 1983; Weibe & Derwing, 1994). The types of blends produced in the Free Answer Task and their corresponding codes are represented in Table 14 below.

Table 14. *The Codes for the Blends Produced in the Free Answer Task*

| Code | Name | Description | Example |
|---|---|---|---|
| $O_1 + R_2$ | onset plus rhyme | The onset of the first constituent combines with the rime of the second constituent | *sate* + *deng* = *seng* |
| $B_1 + C_2$ | body plus coda | The body (O+N) of the first constituent combines with the coda of the second constituent | *dit* + *poon* = *din* |
| $OC_1 + N_2$ | onset-coda plus nucleus | The onset and coda of the first constituent combines with the nucleus of the second constituent | *kipp* + *teek* = *keep* |
| $B_1 + O_2$ | body plus onset | The body of the first constituent combines with the onset of the second constituent | *dapp* + *ting* = *dat* |
| $C_1 + R_2$ | a coda plus rhyme | The coda of the first constituent combines with the rime of the second constituent | *geep* + *ruck* = *puck* |

These codes for the blends, which appear in Table 15 below, show the frequency of each type of blend that were produced by each age group[4].

Table 15. *Types of Blends Produced in the Free Answer Task*

| Age | $O_1 + R_2$ | $B_1 + C_2$ | $OC_1 + N_2$ | $B_1 + O_2$ | $C_1 + R_2$ | Total | Significance |
|---|---|---|---|---|---|---|---|
| 2-years | 1 | 2 | 0 | 0 | 0 | 3 | $\chi 2=0.34$ |
| Percent | 67% | 33% | - | - | - | 100% | $df=1, p>.1$ |
| 4-years | 30 | 7 | 6 | 1 | 1 | 45 | $\chi 2=64.66$ |
| Percent | 66% | 15% | 13% | 3% | 3% | 100% | $df=4, p< .01$ |
| 6-years | 20 | 8 | 2 | 2 | 3 | 35 | $\chi 2=33.83$ |
| Percent | 57% | 23% | 6% | 6% | 8% | 100% | $df=4, p< .01$ |
| 8-years | 17 | 1 | 1 | 0 | 0 | 19 | $\chi 2=27.09$ |
| Percent | 90% | 5% | 5% | - | - | 100% | $df=4, p<.01$ |

As can be seen above, the difference between the blends produced by the 2-year-olds is not significant. The difference between the blends produced by the 4-, 6-, and 8-year-olds is significant with preference for the $O_1 + R_2$ pattern. It is also evident in Table 15 that the 8-year-olds produce a much higher percent of adult-like blends than any other age group. Table 15 is consistent with the view that children begin blending forms together by using various techniques. As they become older, their blending patterns begin to approximate those of adult speakers of their language.

[4] On the Free Answer Task, the blending responses of adults were all $O_1 + R_2$

# CHAPTER 4

# Discussion

## 4.1. Introduction

This chapter discusses the implications of the results from the preceding chapter. The findings from each of the tasks of this study are outlined and interpreted below, comparing them with the predictions from the background literature. The Conclusion section describes what was determined by the tasks of this study and their presentation order and whether the tasks support the hypotheses as outlined in the Objectives section (Section 1.6.).

## 4.2. Preliminary Decomposition Task

The deconstructions in the Preliminary Decomposition Task were based on whether the participants understood the relationship between the constituents of the constructions. It is not necessary to have a complete understanding of the meanings of compound constituents in order to deconstruct compounds. The view that compound deconstruction does not depend on the full understanding of its constituents is supported through consideration of words such as *cranberry*, which is easily understood by both adults and children as a type of berry, even though there is no lexical representation for the form *cran-*. The results of this task provide evidence that children as young as 2;5.20 understand this relationship.

Compounds can be deconstructed even if the individual is unfamiliar with the meaning of the compound (e.g., children who claimed to be unfamiliar with a *highchair* could still identify the compound as meaning a *chair* that is *high*). However, it is necessary to understand the meaning of a blend and to understand

that a blend contains more than one constituent in order to deconstruct this form. It seems reasonable to assume that the 2- and 4-year-olds were not familiar with the blends and could therefore not determine the constituents, since none of the 2-year-olds were able to deconstruct any of the blends and only one instance of blend deconstruction appeared in the 4-year-old group.

In summary, the purpose of the Preliminary Decomposition Task was to provide a quick and easy measure of the children's state of knowledge with respect to blends and compounds as they entered the study. The results of this task were much as expected, showing that blends are more difficult to deconstruct than compounds for a variety of reasons, such as differences in transparency, simplicity, and productivity in the English language. If you are unfamiliar with the meaning of a compound, you can figure it out from its constituents and the relationship of the constituents, but if you are unfamiliar with the meaning of a blend, you cannot figure it out from its constituents if you are do not know what the constituents are.

**4.3. Forced Choice Task**

The structure of this task was designed to test the principles of acquisition. The subjects were asked to select an appropriate response in which co-ordinates have been combined. If the participants chose the conventional form of combining co-ordinates, they would have chosen to blend the forms, since all of the constituents were co-ordinates and co-ordinate nouns are usually blended together in English (see Table 3, Section 1.3.). If the participants chose to combine the forms based on the acquisitional principles, they would have chosen

to compound the forms together, since compounds are simpler, more transparent and more productive than blends. In a task such as this, where children are asked to combine co-ordinates, both 6-year-olds and 8-year-olds show a preference for compounding over blending, which suggests that they rely on the acquisitional principles. Both the adults and the preschoolers, however, did not show a preference for any of the combined forms on this task and, therefore, it cannot be determined from this task whether these participants rely on the acquisitional principles to form innovations. Also, it cannot be determined from this task whether these principles would influence the production of compounding before blending.

In order to determine if the acquisitional principles influence the word-formation devices employed when combining lexical morphemes, it may be necessary to modify this task by removing the arbitrary response types and the conjunction response types from the task or replacing these response types with other blends and compounds, so that there are only two word-formation devices to choose from. Restricting the number of choices this would likely reduce the types of responses to the particular forms that are being compared.

**4.4. Free Answer Task**

In *free play* sessions, such as those analyzed by Becker (1994), complex word forms are not likely to appear. Just because these forms do not normally appear in child language does not entail that children cannot produce these forms. Studies that are structured to elicit specific responses are more likely to produce these types of responses, especially if the responses involve the production of low

frequency word-formation types. The goal of this task was to provide the kinds of circumstances that would elicit responses where co-ordinates have been combined. Since co-ordinates are usually combined in English by blending, this study was designed to enhance the occurrence of blending responses. In a cross-sectional study such as this, where children are encouraged to either compound or blend, the results indicate that children acquire the ability to blend sometime before 4;0.

The Free Answer Task provided the most revealing data in this study. Firstly, because children had to produce forms rather than choose among them, we can be relatively certain that early responses of blending reflect true ability rather than occurrence by chance. I found, for example, that only one of the 2-year-olds produced blends on this task, but that 2-year-old did so three times, which demonstrates that even children at this age can produce such constructions. This task suggests that children as young as 2;9 may be able to create blends and that blends may be part of their lexical knowledge. Although only one of the 2-year-olds consciously created blends, what is suggested is that it may be possible for other children in this age group to form these constructions. A more thorough investigation of the acquisition of blends among 2- and 3-year olds is necessary to determine the exact age of the onset of blending and to determine if blending emerges within a particular age group, or if it emerges within a particular developmental stage that is independent of chronological age.

The 4-year-olds in this task produced a greater number of blends than compounds. This was not predicted by the principles of transparency, simplicity,

and productivity, since blends are not transparent, are not simple and are less productive in English than compounds. The school-aged children, on the other hand, produced a greater number of compounds than blends. This suggests that at this stage, children rely more on the acquistional principles stated above than on conventionality, since the most conventional way to combine co-ordinates as an innovation in English is to blend the constituents together. Finally, the adult-participants produced a greater number of blends than compounds on this task, unlike the school-aged children. This is likely because the adults are more influenced by the conventional method of combining co-ordinates in English, which is to produce blends (e.g., *bride* + *husband* = *busband*); thus, *busband* seems like a more suitable name than *bridehusband.*

One reason why blends appeared in the responses of only one of the 2-year-olds might have been because, as discussed above, the other 2-year-olds that participated in this study may have had difficulty in understanding the task instructions. The responses of the 2-year-olds were negatively influenced by the instructions of this task because most of the 2-year-olds were distracted by the term *baby* and responded that the best name for the baby was *baby.* If the task were modified so that the 2-year-olds understood the instructions better (i.e., if the kinship terms were removed from the instructions), it is likely that 2-year-olds would show an increased number of blending responses. This task would then be a better indicator of the true abilities of the younger participants.

**4.5. The Presentation Order of the Tasks**

Although the adults were included in this study as a check to determine if the 8-year-olds produced adult-like responses, it is possible that the presentation order of the tasks may have biased the responses from the adult group. The adults did not show a preference for either blends or compounds on the Forced Choice Task, but they did show a strong preference for blends on the Free Answer Task. It appears that the adult participants might have been influenced by the presentation of the response types in the Forced Choice Task and that exposure to novel blends may have increased blend use on the Free Answer Task. It is also possible that some of the preschool children may have been affected in this way, enhancing their tendency to produce blends in preference to compounds. The school-aged children, however, showed a significant preference for compounding on both of the tasks, which indicates that they were not strongly affected by a possible blending bias.

In any event, the order of presentation used was chosen in order to facilitate the understanding of the instructions of the Free Answer Task (especially for the pre-schoolers). Presenting the tasks in the opposite order may not have produced the desired combinatory patterns on that task.

**4.6. Conclusion**

The experiments in this study were designed to better understand the emergence of blending and compounding as word-formation devices. In view of the acquisitional principles of transparency, simplicity, and productivity, I expected to find a developmental progression, whereby compounds are acquired before blends. Although the older children did produce many more compounds

than blends, the ability to consciously blend appeared at a surprisingly early age. Therefore, it was not possible to determine, from this study, whether there is a clear-cut developmental sequence in the order of acquisition for blends and compounds. As is often the case, the new data serves here to show that the developmental picture may not be as clear as previously thought.

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# APPENDIX A

## Preliminary Decomposition Task

1) Why do you call ORANGE JUICE ORANGE JUICE?

2) Why do you call a TOOTHBRUSH a TOOTHBRUSH?

3) Why do you call a HIGHCHAIR a HIGHCHAIR?

4) Why do you call a BATHTUB a BATHTUB?

5) Why do you call a BEDROOM a BEDROOM?

6) Why do you call a PLAYGROUND a PLAYGROUND?

7) Why do you call a FACECLOTH a FACECLOTH?

8) Why do you call a DAYCARE a DAYCARE?

9) Why do you call BRUNCH BRUNCH?

10) Why do you call a MOTEL a MOTEL?

11) Why do you call SMOG SMOG?

12) Why do you call a TELETHON a TELETHON?

# APPENDIX B

## Forced Choice Lexical Morpheme Combination Task

1) If you combine a PODGE and a LEEM you would call it:

   A) A PODGELEEM

   B) A PEEM

   C) A GEP

   D) A PODGE AND A LEEM

2) If you combine a CHAPE and a NIMM you would call it:

   A) A CHIM

   B) A CHAPE AND A NIMM

   C) A CHAPENIMM

   D) A WECK

3) If you combine a THAB and a GOPE you would call it:

   A) A NUNG

   B) A THABGOPE

   C) A THAB AND A GOPE

   D) A THOPE

4) If you combine a HETT and a WUP you would call it:

   A) A HETT AND A WUP

   B) A CHACK

   C) A HUP

   D) A HETTWUP

5) If you combine a KONG and a SALL you would call it:

A) A KONGSALL

B) A KONG AND A SALL

C) A TUP

D) A KALL

6) If you combine a BANE and a DOKE you would call it:

A) A BOKE

B) A BANEDOKE

C) A BANE AND A DOKE

D) A JUME

7) If you combine a MOTT and a SHUBE you would call it:

A) A LOPE

B) A MUBE

C) A MOTTSHUBE

D) A MOTT AND A SHUBE

8) If you combine a FIP and a BUNG you would call it:

A) A FIP AND A BUNG

B) A DEET

C) A FUNG

D) A FIPBUNG

9) If you combine a VENN and a CHUPE you would call it:

A) A VENN AND A CHUPE

B) A SEECH

C) A VUPE

D) A VENNCHUPE

10) If you combine a NUCK and a LANG you would call it:

A) A NANG

B) A NUCKLANG

C) A NUCK AND A LANG

D) A MICK

11) If you combine a JEEK and a SEPP you would call it:

A) A HONG

B) A JEEK AND A SEPP

C) A JEEKSEPP

D) A JEPP

12) If you combine a PUME and a HOTE you would call it:

A) A PUMEHOTE

B) A POTE

C) A WAN

D) A PUME AND A HOTE

13) If you combine a WUTE and a BITHE you would call it:

A) A WUTEBITHE

B) A WUTE AND A BITHE

C) A WITHE

D) A LING

14) If you combine a SHAD and a NING you would call it:

A) A SHING

B) A SHADNING

C) A KUNN

D) A SHAD AND A NING

15) If you combine a VELL and a THONE you would call it:

A) A VELLTHONE

B) A LUTT

C) A VELL AND A THONE

D) A VONE

16) If you combine a NAYSH and a GUCK you would call it:

A) A JATT

B) A NAYSH AND A GUCK

C) A NAYSHGUCK

D) A NUCK

17) If you combine a FECK and a SCHISS you would call it:

A) A FECK AND A SCHISS

B) A FISS

C) A FECKSCHISS

D) A BAM

18) If you combine a LOME and a HOFF you would call it:

A) A LOFF

B) A LOMEHOFF

C) A CHUPE

D) A LOME AND A HOFF

19) If you combine a THUTT and a HUNE you would call it:

A) A GOME

B) A THUTT AND A HUNE

C) A THUNE

D) A THUTTHUNE

20) If you combine a KAV and a MABE you would call it:

A) A KAVMABE

B) A DEM

C) A KAV AND A MABE

D) A KABE

# APPENDIX C

## Free Answer Lexical Morpheme Combination Task

1) If you combine a KIPP and a TEEK what would you call it?

2) If you combine a SATE and a DENG what would you call it?

3) If you combine a GOOM and a SHUPP what would you call it?

4) If you combine a LOMM and a BOKE what would you call it?

5) If you combine a LEET and a THUPE what would you call it?

6) If you combine a GADE and a CHONE what would you call it?

7) If you combine a CHEN and a JONG what would you call it?

8) If you combine a SHICK and a THUBB what would you call it?

9) If you combine a DIT and a POON what would you call it?

10) If you combine a MENG and a TOKE what would you call it?

11) If you combine a GEEP and a RUCK what would you call it?

12) If you combine a BAIN and a NOPP what would you call it?

13) If you combine a KANG and a WOBE what would you call it?

14) If you combine a DAPP and a TING what would you call it?

15) If you combine a CHEP and a JITT what would you call it?

16) If you combine a DUPP and a CHONE what would you call it?

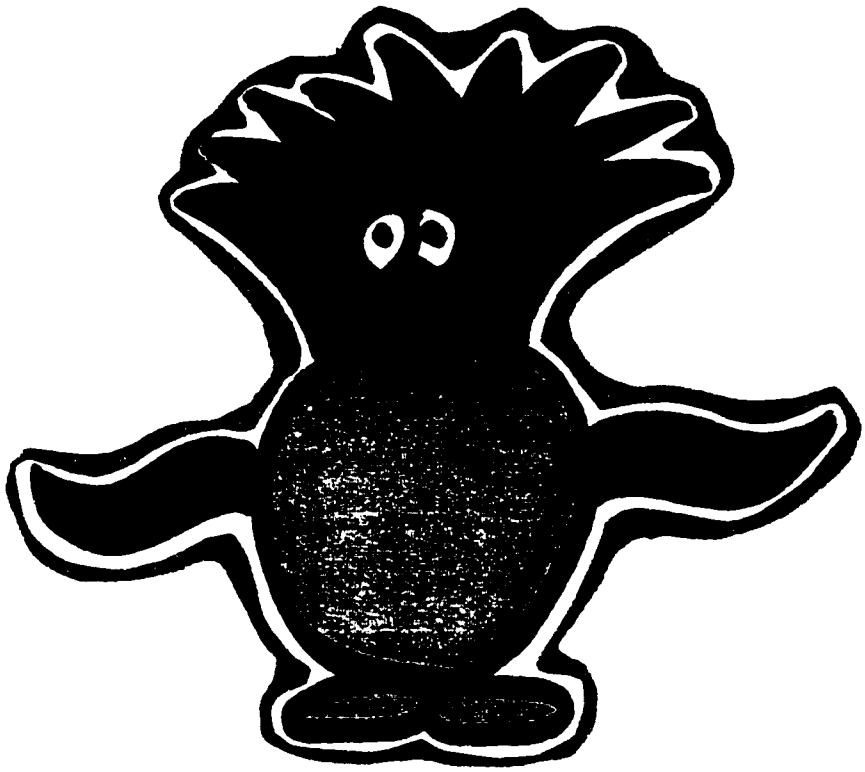
17) If you combine a GOME and a HUKE what would you call it?

18) If you combine a WAME and a LATT what would you call it?

19) If you combine a GEET and a NAKE what would you call it?

20) If you combine a SENN and a THUBE what would you call it?

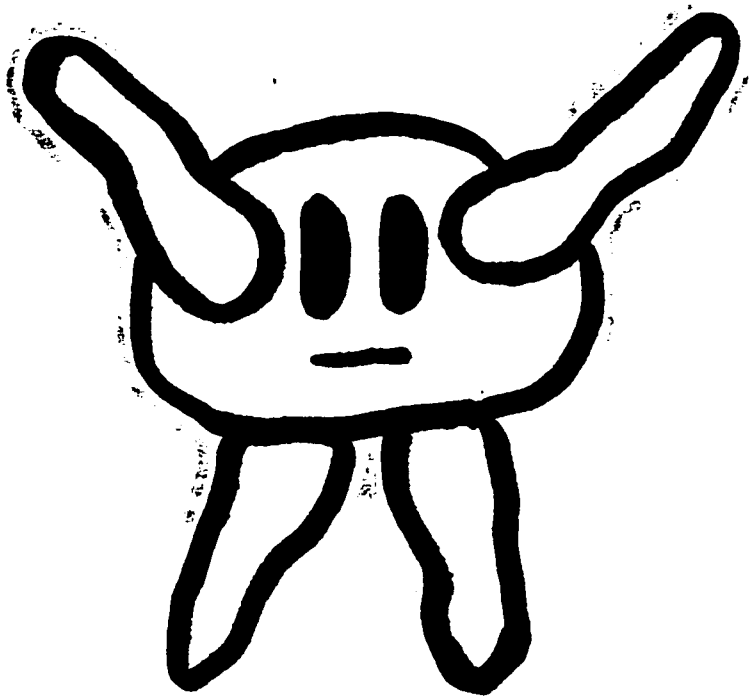
Right Page - Forced Choice Task

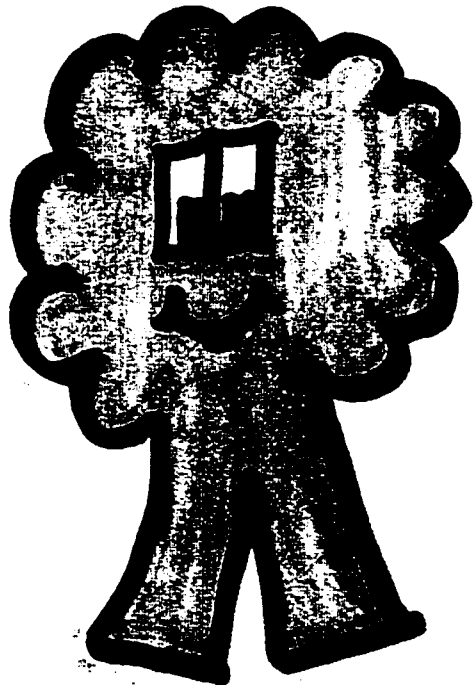


5) If you combine a KONG and a SALL you would call it:

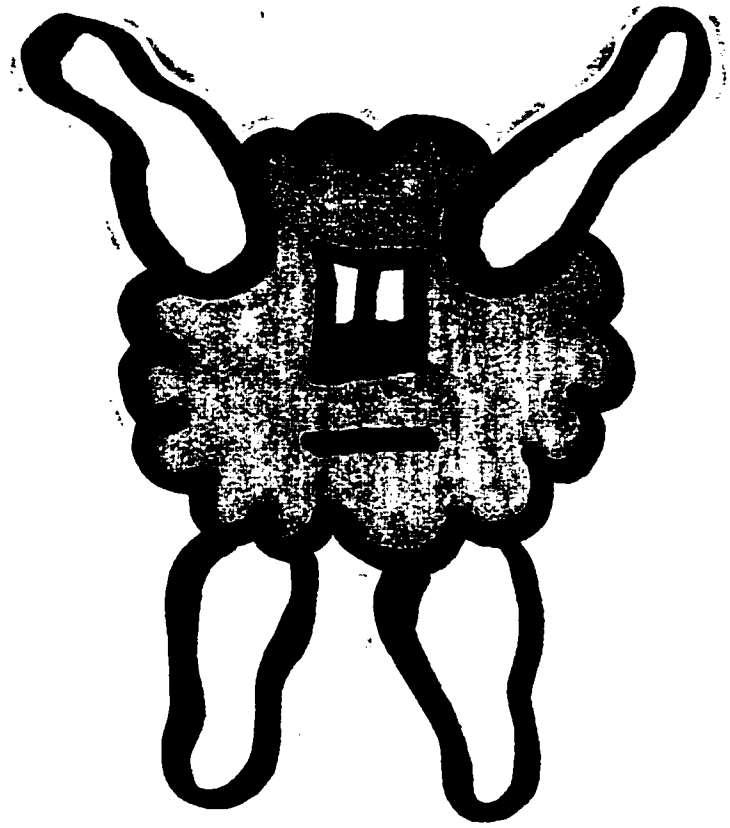
A) A KONGSALL
B) A KONG AND A SALL
C) A TUP
D) A KALL

Left Page - Free Answer Task





Right Page - Free Answer Task



17) If you combine a GOME and a HUKE what would you call it?