# A Study of Consonant Clusters in English Compound Words

## A B S T R A C T

**Asst. Lect.Rand Zuhair Younis**

**Al-Noor University College**

* *Corresponding author: E-mail* : اميل الباحث

Consonant clusters are a group or sequence of consonants that appear together in a syllable without a vowel between them. Consonant2 clusters are commonly found in simple words but they can be recognized also in compound words. Therefore, the present study tries to tackle consonant clusters in compound words. The present study aims at distinguishing consonant clusters in different types of compound words in the English language and studying the frequency of consonant clusters within a compound word. The study employs an eclectic model to achieve the intended aims it. The study concludes that a sequence of two juxtaposed elements can be considered as a compound in English and English compounds can be divided into the following types: nominal, adjectival, verbal, and adverb compounds.

"دراسة عن التقاء الاصوات الساكنة للكلمات المركبة في اللغة الانكليزية"

م.م. رند زهير يونس/ كلية النور الجامعة

**الخلاصة:**

التقاء الاصوات الساكنة يعني ان مجموعة او سلسلة من السواكن تتكون مع بعضها في المقطع الصوتي الواحد دون وجود صوت علة بين تلك السواكن. توجد الاصوات الساكنة عادة في الكلمات البسيطة لكن يمكن ملاحظتها ايضا في الكلمات المركبة, لذلك فأن الدراسة الحالية تحاول دراسة الاصوات الساكنة في الكلمات المركبة, تهدف الدراسة الى تمييز الاصوات الساكنة في انواع مختلفة من الكلمات المركبة في اللغة الانكليزية و كذلك دراسة تكرار هذه الاصوات في حدود الكلمة المركبة. وظفت الدراسة

نموذجا انتقائيا لتحليل البيانات لتحقيق الاهداف المرجوة من الدراسة. تستنتج الدراسة أن سلسلة من عنصرين متجاورين ممكن أن يشكل كلمة مركبة في اللغة الانكليزية, والكلمات المركبة في اللغة الانكليزية تنقسم الى الانواع الاتية: اسمي و وصفي و فعلي و ظرفي.

**الكلمات المفتاحية**: الكلمات المركبة, التقاء, السواكن, السواكن الاولية, السواكن الآخرية.

# 1. Introduction

Consonant clusters are those prominent aspects that most world languages have (Chomsky, 1981). These aspects play a very important role when they comes to the production of a target language. Nevertheless, the restrictions in the final and the initial syllable of a word or a phrase vary from one language into another (Chomsky, 1981; Jabbari, 2011; Arnold, 2010). This study presents an account of compound words with a phonological study of the consonant cluster by identifying the classification provided by examples and analytical study.

The present study falls into two parts: the first part is the theoretical part and the second is the practical part. In theoretical part, it is organized as follows: section one presents a brief account on what the paper contains: aims, scope and model of the study. While section two concerns a general account to the phenomenon of compound words and consonants cluster, Moreover the practical part in section three which gives examples about different types of compound words with the distribution of consonant clusters and the frequency of these clusters in compound words.

## 1.1   Aims of the Study

The present study aims at:

1. Distinguishing consonant clusters in different types of compound words in the English language.

2. Studying the frequency of consonant clusters within a compound word.

**1.2    The Scope of the Study**

Types of two-member compounds in English are handled throughout this research: verbal, adjectival, adverbial, and nominal.

**1.3    Model of the Study**

No specific model is adopted through the study. It is rather an eclectic one.

## 2.  The Theoretical Part

**2.1 Compounds: Definition and Nature**

Usually, two free forms can be used to form compound words as in the word 'Greenhouse'. (Stageberg, 1971: 108). Adams (1973: 57) states that when a noun is premodified by another noun, an adjective, or a nominalization may either be a syntactic phrase or a compound. A compound, according to Quirk et al. (1985: 1567), is "a lexical unit consisting of more than one base and functioning both grammatically and semantically like a single word".

In sum, Compounds can be viewed as the outcome of combining two elements with variable relations between the components of the unit (Libben and Jarema, 2006: 2).  Haspelmath and Sims (2010: 85) point out that a compound is a complex lexeme that is made up of two or more lexemes called "Compound Members".

The most yielding process throughout the twentieth century is compounding which can be analyzed as putting words together. The new word that is resulted from compounding can consist of two separate elements like "Airport fiction" referring to those books people buy at airports to read them while traveling (Libben and Jarema, 2006: 1). Similarly, a "hot desk" is a desk that is used by different workers on different days instead of one worker every day. In other cases, the two words are joined to form one single word such as "Jobseeker" (someone trying to find a job), or "Webhead" which refers to a person who uses the internet a lot skillfully. Two hyphened words are also used in English as compounds like "Walk-in" which gives the meaning of a place at which one can go freely without an appointment. According to Libben and Jarema (2006: 24), the concept of compounding means the grammatical combination of words.

Conventionally, all compounds' members are independent words with some exceptions. Aronoff (1976: 10) considers a compound like "Cran-berry morphs" as an exception for the reason that the first member does not occur independently as in "Boysen-berry" and "Huckle-berry" for example. Libben and Jarema (2006: 25), on their part, exclude neoclassical compounds that may contain non-autonomous combining parts like "Helio-graphy", "Bibliography" and "Bibliotherapy".

The main element of a compound is the head which is the second element in two-element compounds, such as "Tree-house". "Tree-house" is a nominal compound because its head is a noun and the whole compound refers to a kind of house, again because the head refers to a house. "Tree-house", then, means a house that is built on a tree, and "tree" is the modifier of the head "house". Thus, Katamba (1993: 56) arrives at the idea that compounding is a very important way of maximizing the English word stuck as it sometimes contains different words order which causes differences in meaning as in "Arm-chair" vs. "Chair-arm".

## 2.2 The Notion of Head

The most important unit in complex linguistic structures is often referred to as the 'Head' and is usually modified by the left-hand member. Such compounds, according to Williams (1981: 248) are called "Modifier-head structure". Plag (2003: 136) adds that the head can be a count noun, a verb, having a feminine gender or being plural according to the head only. Thus, the plural form of "Park commissioner" is not "Parks commissioner" but "Park commissioners" instead.

Katamba (1993: 316) mentions that the heads are crucially important in words, just like phrases in syntax have headed. The head can easily be recognized by certain properties because it has its inflectional properties (tense, number. category, etc.). Syntactically, the head is the dominant part of the whole compound (ibid: 316).

According to Haspelmath and Sims (2010: 133) in general, compounds can indicate hierarchical structures by analyzing them into tree diagrams. Representing compounds in tree diagrams is significant when there are minor compounds within the main compound rather than a compound that consists of only two members, as many different hierarchical structures can be obtained in the first case.

Haspelmath and Sims (2010: 134) give the following possibilities for analyzing compounds in tree diagrams:

N
├ N
│ │
│ Lip
└ N Pl.
  │
  Sticks

V 3sg. Pres.
├ N
│ │
│ Baby
└ V
  │
  sits

**(Diagram -1-) Two-member compounds**

N
├ N
│ │
│ Berkley
└ N
  ├ N
  │ │
  │ Linguistic
  └ N
    │
    Society

N
├ N
│ ├ N
│ │ │
│ │ Particle
│ └ N
│   │
│   Physics
└ N
  │
  Conference
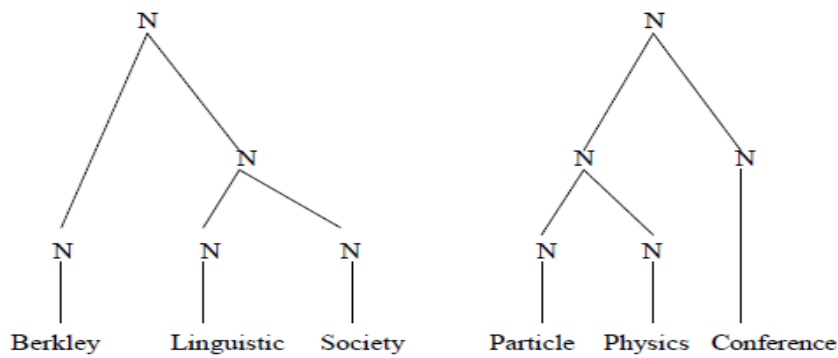
**(Diagram -2-) Three-member compounds**

N
├ N
│ ├ N
│ │ │
│ │ Indiana
│ └ N
│   │
│   University
└ N
  ├ N
  │ │
  │ Linguistics
  └ N
    │
    Club

N
├ N
│ ├ N
│ │ │
│ │ University
│ └ N
│   ├ N
│   │ │
│   │ Cashiers
│   └ N
│     │
│     Office
└ N
  │
  Employee
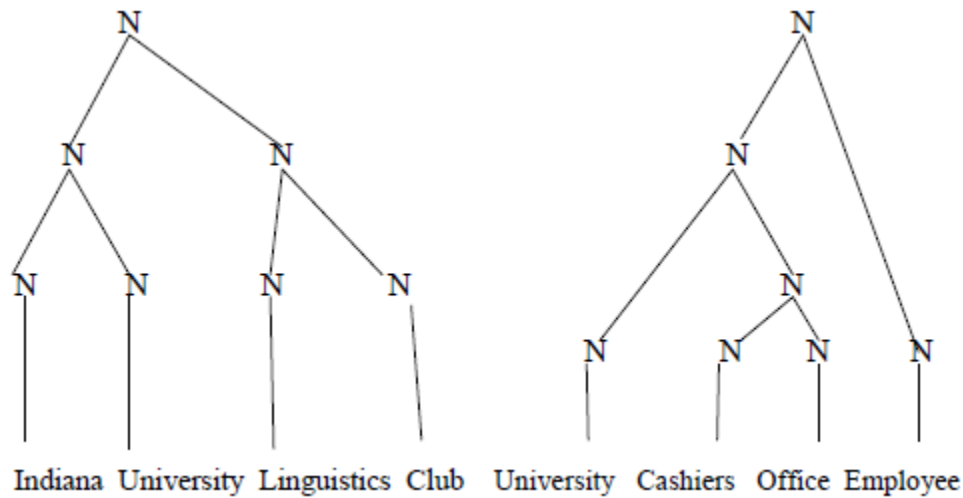
**(Diagram -3-) Four-member compounds**

N

N          N          N
  N    N
Nuclear Power Station

N

  N          N
N    N          N
Nuclear   Power   Station

**(Diagram -4-) The hierarchical structures of compounds of more than two members.**

From the last example, those compounds that have more than two members can give two hierarchical structures, Haspelmath and Sims conclude. Furthermore, Carstairs-McCarthy (1992: 76) maintains that in general, any compound only has two immediate constituents. In "Window oven cleaner"', for example, it is not convenient to say that it is a three-part compound that is semantically supposed to refer to a product for cleaning both ovens and windows. Rather, it is a compound inside another one referring to a product for those ovens with a see-through window. This can be represented in the following tree-diagram, suggested by Carstairs McCarthy, where "Window oven" is a sub-compound in the larger compound (Ibid.: 76):

N

N

N          N          N
Window    Oven      Cleaner
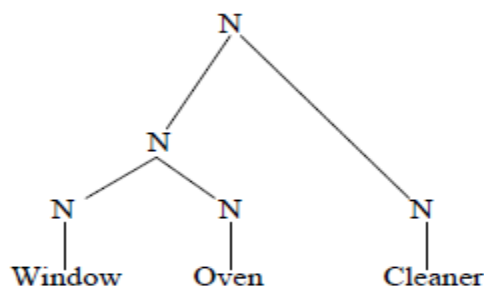
**(Diagram -5-) The immediate constituents of a compound**

Carstairs-McCarthy (1992: 64) adds that the compounds of the adjective plus noun type can either be with or without heads; in "Blackboard" and "Greenstone" the head is obvious where board in the first compound refers to a kind of boards and "stone" is a kind of stones. "Faintheart", on the other hand, is a compound

which refers metaphorically to someone who has a faint heart rather than a kind of hearts, i.e. there is no obvious head but it can be inferred. A similar example is "Redshank" that indicates a type of bird that has red legs, also "Loudmouth" is someone who speaks a lot, and "Stickleback" is a kind of fish with spines on its back. Further instances that can be given in this respect are "Pickpocket" which refers to a person who picks pockets, and "Pass-port" meaning a document that allows passing a port. In "Sabreteeth", is a compound with the head "teeth" which indicates a sort of teeth, while "Sabretooths" is a headless compound referring to animals having saber teeth (Libben and Jarema, 2006: 33).

Furthermore, the compounds that have heads are identified by Williams (1981: 248), they have the term as "Endocentric Compounds", whereas those that are headless are called "Exocentric Compounds". Endo- and exocentricity are two important concepts that are related to both syntactic and semantic headedness. In English, most compounds follow the right-hand head rule which defines the morphological construction of the head as the right-hand member and, thus, these compounds are syntactically endocentric. Still, "there are many English compounds which are a right-sided element which does not determine the class of entities to which the word belongs" (Bawer and Renouf, 2001:2). This group forms the so-called 'exocentric compounds' such as "Redskin" which denotes a person whose skin is reddish rather than a type of skin (ibid.).

## 2.3 Compound Types

The first systematic division of compounds goes back to the history of ancient grammarian Panini (6th century BC) and the majority of his terms are still being used but they lack an obvious notion of the head. (Libben and Jarema, 2006: 31).

In English, certain combinations of words are possible (but not the whole words from all word classes). Different parts of speech are used to formalize the structure of 'two-part compounds'. Al-Jarf (1989:3) believes that English primary and secondary compounds can be formed in various ways; the combination of two compound nouns is the most common and productive one. Other compounds consist of a verb plus a noun, a noun followed by a verb, a verb with a preposition, and a noun preceded by an adjective. These compounds may be written as a single word, hyphenated or separated by a space without any clear rules.

Primary compounds are also called 'Base or Neo-classic Compounds' because they are made of two bases with no derivational affix but with or without some meaningless connecting elements which have Greek or Latin origin, and known as "combining forms". Combining forms are treated as affixes since they are sometimes joined to lexemes just like any other affix. English primary compounds are formed from a large number of Greek roots, such as auto-, bible, graph-, gram-, neuro-, tele-, zoo-, micro-, etc. Additionally, Al-Jarf (1989:144) mentions that "some Greek and Latin prefixes are: ambi-, anti-, ultra-, pro-, sub-, and others". Many Latin roots are there, among them are equ-, cid-, rectus, corpus, civi-, duplicate, fortis, and genus. Full examples of primary English compounds are sinusitis, automatic, subway, telescope, photography, cardiogram, electrocardiogram, zoology, and so on. The meanings of such compounds are generally understood from their parts' meanings.

On the other hand, Secondary or Stem-compounds have stems with no derivational affix. English compounds will be classified into compound nouns, compound verbs, compound adjectives, and compound adverbs. The meanings of them can hardly be understood from the meanings of their parts (Ibid: 5).

- **Compound nouns may consist of:**
- N.+N.: Spaceship

- Possessive N.+ N.: Lady's maid

- V. + N.: Pickpocket

- N. + V.: Lifeguard

- Gerund + N. Living room

- N. + Gerund: Ice skating

- Adj. + N. High school

- Particle + N. Overdose

- V. + Prep./ Adv.: Makeup

- N. + P.P.: Brother-in-law

On the other hand, most of the compound verbs, according to Al-Jarf (n.d.: 6), are constructed by back-formation rather than juxtaposing two members together, such as "Baby-sit" from the origin "Baby-sitter", or conversion from a compound noun like "Ill-treat" which is taken from "Ill-treatment". "Student-teach" is an N.+ V., "Double-check" is formed from a V.+ Adj.; an example of Particle + V. is "Overlook", and "Illtreat" is a combination of an Adv.+ V.   Moreover, Al-Jarf (n.d.: 6) divides the components of compound adjectives as follows:

-N.+ Adj.: sky blue

- Adj.+ Adj.: Good-hearted

- N.+ N.: Coffee-table

- Adj.+ Gerund: Good-looking

 -Adj.+ Participle: Absent-minded

- P.P.: A wall-to-wall carpet

 Infinitive: A hard-to-please employer

- Coordinated elements: A life-and-death struggle

- Coined phrases: A get-rich-quick scheme

- Compound adverbs may be exemplified in "In-sight" and "Overnight" (Ibid:6).

From a semantic point of view, 'Coordinative Compounds', according to Haspelmath and Sims (2010: 141), is a term which is used to indicate the compounds that have more than one semantic head; in this compound, each of the elements has a separate referent and they can be paraphrased by 'and'. It is rare to see such compounds in English and other European languages. Moreover, 'Appositional compounds' is another familiar type of compound. The referent in both members of this compound is the same, such as "Student worker". There are also adjective compounds that can be included under the same type, i.e. appositional compounds like "Bitter-sweet" and "Deaf-mute". Such compounds are listed under the 'endocentric compound' type.

Adams (1973:29) mentions that there are some compounds such as those consisting of an adjective plus a noun are very easy to understand or analyze, or

compound with a verbal element plus a nominal one which is in the relation of subject or object to it. For instance, the compound "Drinking water", can be analyzed as drinkable water. Some compounds which are not in a subject related to the first element or direct object relation to the first element in verb-noun type usually make a problem concerning their meaning like "Living-room" and "Pitch-fork". Noun- noun compounds such as "Night-train", "Fruit-cake", "Garden party" and "bull-ring" are also difficult to analyze.

Some semantic patterns to deal with the problem mentioned above are given by Jesperson (1949) (cited in Adams, 1973: 31):

1. **Subject-Verb:** The agent of the verbal element is the nominal element, such as "bee-sting" which is a noun-verb compound type. Similarly, is "falling-star" where the –ing verb is understood as a gerund and not a participle. With "Playboy" the verb is neutral, whereas in the "reception committee" there is a nominalized verb. Sometimes, the verbal element is there but the heads represent agents of the action with the attributive element as an object, as in "car mechanic".

2. **Verb-Object:** Different categories can be recognized under this type. For instance:

a. Verb (-ing)-Noun: examples are: Chewing-gum, flashlight, etc.

b. Derivational comp. with zero suffixes: for instance: Passport

c. N.-V.: examples are Life-insurance, Fortune-hunting, blood-shed, tongue twister, etc.

**3. Appositional:**

a. Examples are Fuel oil, Panic reaction, codfish, etc.

b. Verb (-er)-N: for example, Killer shark

**4. Associative:** In this type, the second member is associated with the first:

a. Dragon's blood, Mare's nest, Cat's meat.

b. N-S-Man: The –s here is neither genitive nor plural, like Sportsman.

c. Compounds without –s: Three types can be identified here:

1- The second member is part of the first, such as Bottleneck.

2- The second member is associated with the first, such as Horse-shoe.

3- The second member is produced, emitted, or derived from the first, as in Chicken fat.

**5. Instrumental**: In this type, one nominal member refers to the cause or instrument involved in an action, as in, Pleasure boat, Pitchfork, reading glasses, Sleeping pill, gas-mask, etc.

**6. Instrument:** N.-V., such as a Telephone call. Sometimes, the second element functions employing the first as in Football, or the second is caused by the first as in Wind storm or even is obtained through using the first, like Sawdust.

**7. Locative**: Locative type can be recognized either as a V.-N. in which the N. represents a place or time, like, Dance hall, Rush hour, etc. A "school-teacher" and "Night-rider", on the other hand, are N.-V.

**8. Resemblance:** some examples can be realized within this type, such as Spoon-bill, Sponge-cake, Maiden-hair, etc. In some examples, the resemblance is metaphorical as in, Salad days, Devil-fish, etc.

**9. Composition**, either Form or Content: Tear-drop, Fiberglass, Wine-bottle, Sand-paper, Leather-jacket, etc.

**10. Adjective. -Noun.:** examples are: Red skin, Free verse, Well-wisher, Frozen food, Crack brain, Mice meat, Civil rights (, Permissive society, etc.

**11. Names**: For example, Emperor butterfly.

**12. Others**: For example, Kitchen-garden.

Katamba (1993: 318) proceeds that English compounds are unlimited and for that reason they are recursive in principle, particularly noun-noun compounds, such as Lakeside School. For noun-noun compounds, Katamba gives the example of "Water-lily", "Greenfly" as an Adj.-N. example, "Underdog" for a pre-N. compound and "Road sweeper" as a verbal one (Ibid:318).

Plag (2003: 143) introduces the following table to refer to the compounding structure in which the major four word-classes are used:

**Table (2.1): The Structure of Compounds**

|  | Noun (N) | Verb (V) | Adjective (A) | Preposition (P) |
|---|---|---|---|---|
| Noun (N) | Film society | Brainwash | Knee-deep | __ |
| Verb (V) | Pickpocket | Stir-fry | __ | Breakdown? |
| Adjective (A) | Greenhouse | Blackmail | Light-green | __ |
| Preposition(P) | Afterbirth | Downgrade? | Inbuilt? | Into? |

The gaps indicate some compounds which are not attested in, like "Fail-safe" and "Oft- cited", and they are ruled out on a principal basis. The blank boxes are more with these elements having prepositions and marked with a question mark. Certainly, combinations like these should not be considered as compounds but as the result of other word-formation processes like inversion and conversion (Plag, 2003: 144).

Therefore, words with the types of PV, PA, and VP like "Download" (NV.) is the inversion of "load down", and "inbuilt" is inverted from "Built-in". Similarly, "a breakdown" (N.) is the conversion of "to break down" (the V.) (Berg, 1998; cited in Plag, 2003:144).

Complex prepositions, such as those stated in the table above, are not rallying to be considered as compounds rather than lexicalization of two frequently co-occurring prepositions. Finally, Plag (2003: 144) concludes that nouns, verbs, and adjectives can be linked together to form new compounds freely, with some restrictions on some of the combinations of course. Words like "Upon", "Within" and "Without" are scarcely to be found and it is impossible to form new such words as "From under", "Up in", "Only" and so on.

## 2.4 Consonant Clusters

A consonant cluster is characterized as a gathering of consonants that appear together in a syllable without a vowel between them. For instance, /sp/ and /ts/ in the word spots " or /spr/ in the word spring".

## 2.4.1 Consonant Clusters in English

It is the case when two or more consonants occur together, they are called a consonant cluster. ("Cluster" means "group."). There are restrictions on how many consonants and which consonants can occur together in a particular position. For example, in English, /sk/, /pl/, and /spl/ are possible combinations at the beginning of a word, but /sd/, /fp/, and /zpr/ are not. These sounds like they could be possible English words, even though they are not real words: skeb, plore, splib. These are not possible words in English: sdeb, fpore, zprib.

## 3.4.1.1 Initial CC Clusters in English:

- Beginning with oral plosive/p/as the principal part followed by/r, l, j, w, f, s/as second individuals: pray, play, pure
- Beginning with oral plosive/b/as the primary part followed by/r, l, j/as second individuals: brass, bread, blood, block, beauty
- Beginning with oral plosive/t/as the principal part followed by/r, w, j/as second individuals: trail, trade, twin, twice, tune, tutor
- Beginning with oral plosive/d/as the principal part followed by/r, j, w/as second individuals: draft, drill, due/dew, duty, dwell, dwindle
- Beginning with oral plosive/k/as first part followed by/r, l, w, j, n, v/as second individuals: cross, cry, claim, class, quack, cupid, cure
- Beginning with oral plosive/g/as the primary part followed by/r, l, w/as second individuals: grass, grant, glade, glass
- Beginning with nasal plosive/n/as the main part followed by/j, j/as second individuals: new, news, mew, mute
- Beginning with fricative /f/ as the first member followed by / l, r, j / as second individuals: flat, flaw, fresh, freeze, few, fury
- Beginning with fricative /v/ as the first member followed by / j / as the second individuals: view, Vietnam
- Beginning with fricative /θ/ as first member followed by / r, w, j / as second individuals: three, thrill, thwart
- Beginning with fricative /s/ as the first member followed by / t, p, k, l, w, n, m, t, j, r / as second individuals: step, spot, spin, school, sleep, sweep, etc.

- Beginning with fricative /h/ as the first member followed by / j / as the second individual.: humid, human
- Beginning with affricate: all beginning with/s/as the primary individual followed by /pl, pr, pj, tr, tj, kl, kr, kw, kj/as second individuals: Splash, spleen, spring, idiotic, studio, screen. There are 55 last two-consonant clusters in English. They are as a rule ends with /s, z, t, d, o/which represent isolate morphs (Roach 2002: 73) ;/s, z/are the sound forms of finishing - (e)s, and/t, d/represent the completion - (e)d.

## 3.4.1.2 Final CC Clusters in English

- Beginning with oral plosive / p / as the first member followed by / θ, t, s / as second individuals: depth, stopped, wept.
- Beginning with oral plosive / b / as the first member followed by /d, z / as second individuals: robbed, cubs.
- Beginning with oral plosive / t / as the first member followed by /s,/ as the second individual: cuts, mates
- Beginning with oral plosive /d/ as the first member followed by /z/ as second individuals: woods
- Beginning with oral plosive /k/ as the first member followed by /θ, t, s / as second individuals: worked, talked
- Beginning with oral plosive /g/ as the first member followed by /d, z/ as second individuals: begged bags.
- Beginning with nasal plosive /m/ as the first member followed by /p, f, d, z/ as second individuals: camp, bombs.
- Beginning with nasal plosive / n / as the first member followed by /ə, t, d, s, z / as second individuals: tenor, want.
- Beginning with nasal plosive / ŋ / as the first member followed by /d, z, k/ as second individuals: sings, bank.
- Beginning with fricative / f / as the first member followed by /θ, t, s/ as second individuals: fifth, left
- Beginning with fricative / v / as the first member followed by /d, z / as second individuals: saved

- Beginning with fricative / θ / as the first member followed by /s/ as second individual: myths.
- Beginning with fricative / ð / as the first member followed by /d, z/ as second individuals: Wreathed, breathes.
- Beginning with fricative / s / as the first member followed by /p, t, k/ as second individuals: last
- Beginning with fricative / z / as the first member followed by /d/ as the second individual: surprised.
- Beginning with approximant / l / as the first member followed by /p, f, θ, t, d, s, z, k/ second individuals: health

The last three consonant clusters are very various as well, there are 40 of them. They ordinarily end with/s, z, t, d/(which, as of now referenced, can easily be accounted for by morphology since they represent isolate morphones).

### 3.4.1.3 Final CCC Clusters in English

- Beginning with oral plosive / p / as the first member followed by /θs, ts, st/ as second individuals: depths adopts.
- Beginning with oral plosive / t / as the first member followed by /θs/ as a second individual: eighths.
- Beginning with oral plosive / k / as the first member followed by /ts, st/ as second individuals: acts, next.
- Beginning with nasal plosive / m / as the first member followed by /ps, fs/ as second individuals: lamps.
- Beginning with nasal plosive / n / as the first member followed by /ts, dz/ as second individuals: tents, sands.
- Beginning with nasal plosive / ŋ / as the first member followed by /st/ as a second individual: amongst
- Beginning with fricative / f / as the first member followed by /θs, ts/ as second individuals: fifths.
- Beginning with fricative / s / as first member followed by /ts/ as the second member: toasts.
- Beginning with approximant Starting with fricative / l / as the first member followed by /md, m, pt, ps, bz, vd, θs, nz, dz, ks, kt/ as second members: overwhelmed: helped, helps.

### 2.4.1.4 Final CCCC Clusters in English:

- Beginning with oral plosive / k / as the first member followed by /sts, sθs/ as second individuals: sixths, texts.
- Beginning with nasal plosive / m / as the first member followed by /pts/ as the second individual: prompts
- Beginning with approximant / l / as the first member followed by /fθs, kts/ as second individuals: twelfths

English shows that on account of three-consonant groups the phonotactic possibilities of the English phonemes are higher toward the end of the syllable (word). Even though the quantity of two consonant groups is indistinguishable in the word-beginning (syllable beginning) and word-last (syllable coda) position, the three-consonant cluster is uncommon in onsets and frequent in codas, and four-consonant cluster just happens in codas (Duanmu 2009: 171-181).

### 3. The Practical Part: Data Analysis, Discussion, Findings, and Conclusion

### 3.1 Analysis of English Compounds

Many details have been explained in the theoretical part about compound words, definition, how they form, types, and consonant clusters with their examples and different views by various scholars and phonologists. By expressing what are the compound words and how they are divided then what is the phenomenon of a consonant cluster, (i.e. what are the consonants that come initially, medially, and finally). So, in this section, namely the practical part, the researcher has selected **40** compound words to show the position of the consonant cluster and the frequency of this consonant cluster. The following analysis shows what the clusters that come frequent more than others.

**(Table 3.1): Types of Compound Words**

| | Compound words | Types of compound | Transcriptions | Structure | Con. Clus. | Position |
|---|---|---|---|---|---|---|
| 1. | Blue-green | Noun- noun | /bluː'griːn/ | CCV-CCVC | 2CC 2CC - | Initial Middle Final |
| 2. | Checklist | Verb – | /'tʃeklist/ | CVC-CVCC | - | Initial |

74

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | noun | | | | 2CC 2CC | Middle Final |
| 3. | Brother in law | Noun- preposition | /ˈbrʌð.ə.rɪn.lɔː/ | CCVCVC-VC-CV | 2CC - - | Initial Middle Final |
| 4. | Sister in law | Noun- preposition | /ˈsɪs.tə.rɪn.lɔː/ | CVCCVC-VC-CV | - 2CC - | Initial Middle Final |
| 5. | Lovebird | Verb – noun | /ˈlʌvbɜːd/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 6. | Call girl | Verb – noun | /ˈkɔːl gɜːl/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 7. | Radio station | Noun- noun | /reidiəuˈsteiʃn/ | CVVCVV-CCVVCC | - 2CC 2CC | Initial Middle Final |
| 8. | Boat ride | Noun- verb | /ˈbəʊt raid/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 9. | Drop tank | Noun- noun | /ˈdrɒp tæŋk/ | CCVC-CVCC | 2CC 2CC 2CC | Initial Middle Final |
| 10. | White House | Adjective – noun | /ˈwait haʊs/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 11. | Mad-man | Adjective – noun | /ˈmædmæn/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 12. | Dark-blue | Noun- noun | /da:kˈblu:/ | CVC-CCV | - 3CCC - | Initial Middle Final |
| 13. | Mother in law | Noun- preposition | /ˈmʌðərɪnlɔ:/ | CVCVC-VC-CV | - 2CC - | Initial Middle Final |
| 14. | Father in law | Noun- preposition | /ˈfɑː.ðər.ɪn.lɔː/ | CVCVC-VC-CV | - 2CC - | Initial Middle Final |
| 15. | Drive-way | Verb-noun | /ˈdraivwei/ | CCVVC-CV | 2CC | Initial |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | 2CC - | Middle Final |
| 16. | day house | Noun- noun | /'wɔːʃ haʊs/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 17. | Work day | Verb-noun | /'wɜːk dei/ | CVC-CV | - 2CC - | Initial Middle Final |
| 18. | Sunburn | Noun- verb | /'sʌnbɜːn/ | CVC-CVC | - 2CC - | Initial Middle Final |
| 19. | Pay station | Verb – noun | /pei'stei ʃn/ | CV-CCVCC | - 2CC 2CC | Initial Middle Final |
| 20. | Bus stop | Noun- verb | /'bʌs stɒp/ | CVC-CCVC | - 2CC - | Initial Middle Final |
| 21. | Ice fall | Noun- verb | /'ais fɔːl/ | VC-CVC | - 2CC - | Initial Middle Final |
| 22. | Hanger on | Noun-preposition | /ˈhæŋ.ər on/ | CVCVC-VC | - - - | Initial Middle Final |
| 23. | Add to | Verb-preposition | /æd tuː/ | VC-CV | - 2CC - | Initial Middle Final |
| 24. | Machine-wash | Noun- verb | /'məʃiːnwɔːʃ/ | CVCVC-CVC | - 2CC - | Initial Middle Final |
| 25. | Pickpocket | Verb – noun | /'pikpɒkit/ | CVC-CCVC | - 3CCC - | Initial Middle Final |
| 26. | Belong to | Verb-preposition | /bɪˈlɒŋ tuː/ | CVCVC-CV | - 2CC - | Initial Middle Final |
| 27. | Booster shot | Noun- verb | /'buːstə ʃɒt/ | CVCCV-CVC | - 2CC - | Initial Middle Final |
| 28. | Door knob | Noun – | /'dɔː(r)nɒb/ | CVC-CVC | - | Initial |

| | | | | | 2CC - | Middle Final |
|---|---|---|---|---|---|---|
| 29. | Showroom | Verb –noun | /ˈʃəʊruːm/ | CV-CVC | - - - | Initial Middle Final |
| 30. | Bee sting | Noun- verb | /ˈbiː stiŋ/ | CV-CCVC | - 2CC - | Initial Middle Final |
| 31. | Dancehall | Verb - noun | /ˈdaːns hɔːl/ | CVCC-CVC | - 3CCC - | Initial Middle Final |
| 32. | Flag day | Noun- noun | /ˈflæg dei/ | CCVC-CVV | 2CC 2CC - | Initial Middle Final |
| 33. | Forget about | Verb- preposition | /fəˈgɛtəˈbʊt/ | CVCCC-VCVC | - 3CCC - | Initial Middle Final |
| 34. | Compare to | Verb- preposition | /kəmˈpeə(r)tuː/ | CVCCV-CV | - 2CC - | Initial Middle Final |
| 35. | White lie | Noun- verb | /ˈwait ˈlai/ | CVC-CCVCV | - 3CCC - | Initial Middle Final |
| 36. | Bus-driver | Noun- noun | /ˈbʌs draivə(r)/ | CVC-CCVCVC | - 3CCC - | Initial Middle Final |
| 37. | Maidenhair | Adjective-noun | /meidn heə(r)/ | CVCC-CV | - 3CCC - | Initial Middle Final |
| 38. | Blockhead | Adjective – noun | /ˈblɒkhed/ | CCVC-CVC | 2CC 2CC - | Initial Middle Final |
| 39. | Green house | Adjective – noun | /ˈgriːn haus/ | CCVC-CVC | 2CC 2CC - | Initial Middle Final |
| 40. | Speak to | Verb- preposition | /spiːk toː/ | CCVC-CV | 2CC 2CC - | Initial Middle Final |

## 3.2 Results and Findings

Depending on the results obtained from the analysis above, the following points represent the findings which have been arrived at: The present study is limited to investigating the consonant cluster in English and in each type of consonant cluster of different positions. So the following tables and discussions will clarify the frequency of consonant clusters well.

**Table (3.2): Types of Noun-noun compound words**

|   | Compound words | Type of compound | Initial position | Middle position | Final position |
|---|---|---|---|---|---|
| 1 | Blue-green | Noun –noun | 2CC | 2CC | - |
| 2 | Radio station | Noun –noun | - | 2CC | 2CC |
| 3 | Drop tank | Noun –noun | 2CC | 2CC | 2CC |
| 4 | Dark blue | Noun –noun | - | 3CCC | - |
| 5 | Flag day | Noun –noun | 2CC | 2CC | - |
| 6 | Bus driver | Noun –noun | - | 3CCC | - |
| 7 | Day house | Noun –noun | - | 2CC | - |

After Analyzing the compound words statistically namely **(noun-noun),** the result is **(7)** noun-noun compound words**, (3)** of them include two consonants in the initial position, **(5)** of them contain two consonants in the middle position, and **(3)** of them contain three consonants too, and **(2)** of them contain two consonants in final position. To sum up, these statistics contain nouns-noun mostly in middle positions. If one comes to the second type:

**Table (3.3): Types of Verb-noun compound words**

|   | Compound words | Type of compound | Initial position | Middle position | Final position |
|---|---|---|---|---|---|
| 1 | Checklist | Verb – noun | - | 2CC | 2CC |
| 2 | Love bird | Verb – noun | - | 2CC | - |
| 3 | Call girl | Verb – noun | - | 2CC | - |
| 4 | Work day | Verb – noun | - | 2CC | - |
| 5 | Drive way | Verb – noun | 2CC | 2CC | - |
| 6 | Pay station | Verb – noun | - | 2CC | 2CC |
| 7 | Pickpocket | Verb – noun | - | 3CCC | - |
| 8 | Show room | Verb – noun | - | - | - |
| 9 | Dancehall | Verb – noun | - | 3CCC | - |

After Analyzing the compound words statistically namely **(verb-noun),** the result is **(9)** verb-noun compound words, 1 of them include two consonants in the initial position, **(6)** of them contain two consonants in the middle position, **(2)** of them contain three consonants too, and **(2)** of them contain two consonants in final position. To sum up, these statistics include verb-noun mostly in the middle position.

Moreover, the third type is as follows:

**Table (3.4): Types of Noun-verb compound words**

|   | Compound words | Type of compound | Initial position | Middle position | Final position |
|---|---|---|---|---|---|
| 1 | Boat ride | Noun – verb | - | 2CC | - |
| 2 | Sun burn | Noun – verb | - | 2CC | - |
| 3 | Bus stop | Noun – verb | - | 2CC | - |
| 4 | Ice fall | Noun – verb | - | 2CC | - |
| 5 | Machine wash | Noun – verb | - | 2CC | - |
| 6 | Booster shot | Noun – verb | - | 2CC | - |
| 7 | Door knob | Noun – verb | - | 2CC | - |
| 8 | Bee sting | Noun – verb | - | 2CC | - |
| 9 | White lie | Noun – verb | - | 3CCC | - |

After Analyzing the compound words statistically namely **(noun-verb),** the result is **(9)** noun-verb compound words, **(8)** of them contain two consonants in middle position and **(1)** of them contains three consonants too. To sum up, these statistics include noun-verb mostly in the middle position.

Additionally, the fourth type is:

**Table (3.5): Types of Adj-noun compound words**

|   | Compound words | Type of compound | Initial position | Middle position | Final position |
|---|----------------|------------------|------------------|-----------------|----------------|
| 1 | White house | Adj- noun | - | 2CC | - |
| 2 | Mad man | Adj- noun | - | 2CC | - |
| 3 | Maiden hair | Adj- noun | - | 3CCC | - |
| 4 | Blockhead | Adj- noun | 2CC | 2CC | - |
| 5 | Green house | Adj- noun | 2CC | 2CC | - |

After Analyzing the compound words statistically namely **(adjective-noun),** the result is **(5)** adjective-noun compound words, **(2)** of them contain two consonants in the initial position, **(4)** of them contain two consonants in middle position, **(1)** of them contains three consonants too, and **(2)** of them contain two consonants in final position. To sum up, these statistics contain adjective-noun mostly in the middle position.

While the fifth type is:

**Table (3.6): Types of Noun-preposition compound words**

|   | Compound words | Type of compound | Initial position | Middle position | Final position |
|---|----------------|------------------|------------------|-----------------|----------------|
| 1 | Brother in law | Noun-preposition | 2CC | - | - |
| 2 | Sister in law | Noun-preposition | - | 2CC | - |
| 3 | Mother in law | Noun-preposition | - | 2CC | - |
| 4 | Father in law | Noun-preposition | - | 2CC | - |
| 5 | Hunger on | Noun-preposition | - | - | - |

After Analyzing the compound words statistically namely (noun-preposition), the result is **(5)** noun-preposition compound words, **(1)** of them contains two consonants in the initial position and**(3)** of them contain two consonants in the middle position. To sum up, these statistics contain noun-preposition mostly in the middle position.

Finally, the verb-preposition type is analyzed as follow:

**Table (3.7): Types of Verb- preposition compound words**

|  | Compound words | Type of compound | Initial position | Middle position | Final position |
|---|---|---|---|---|---|
| 1 | Add to | Verb- preposition | - | 2CC | - |
| 2 | Belong to | Verb- preposition | - | 2CC | - |
| 3 | Forget about | Verb- preposition | - | 3CCC | - |
| 4 | Compare to | Verb- preposition | - | 2CC | - |
| 5 | Speak to | Verb- preposition | 2CC | 2CC | - |

After analyzing the compound words statistically namely **(verb-preposition),** the result is **(5)** verb-preposition compound words, **(1)** of them contains two consonants in the initial position, **(4)** of them contain two consonants in the middle position, and **(1)** of them contains three consonants too. To sum up, these statistics contain verb-preposition mostly in the middle position.

## 3.3 Conclusion

The present study has come up with the following conclusions:

1. A sequence of two juxtaposed elements can be considered as a compound in English. Such constructions can be written as one word "Spaceship", two hyphened words "Bottle-neck", or as two words separated by a space "Moon bean".
2. English compounds can be divided into the following types: nominal, adjectival, verbal, and adverb compounds.
3. No specific type of consonant clusters can be limited for this phenomenon.
4. Consonant clusters in compound words can occur between different grammatical category.

# References

**Adams, V. (1973).** An Introduction to Modern English Word-Formation. London: Longman.

**Al-Jarf, R. (1989).** Contrastive Analysis for Translation Students. King Saud University. AL-Obeikkan Printing Press

**Aronoff, M. (1976).** Word Formation in Generative Grammar. Massachusetts: MIT Press.

**Arnold, A. (2010).** Pronouncing Three-Segment Final Consonant Clusters: A Case Study with Arabic Speakers Learning English. Hamline University. Hamline University. Retrieved from: file:///C:/Users/Saleh1/Downloads/ESLcapstone_aarnold.pdf

**Bawer, L., and Renouf, A. (2001**). A Corpus-Based Study of Compounding in English.

**Chomsky, N., and Halle, M. (1968).** The Sound Patterns of English. New York: Harper and Row.

**Chomsky, N. (1981).** Lectures on Government and Binding. Dordrecht: Foris.

**Carstairs-McCarthy (1992).** Current Morphology. London: Routledge.

**Duanmu, S. (2009).** Syllable Structure. The Limits of Variation. Oxford: Oxford University Press.

**Haspelmath, M., and Sims, A. (2010).** Understanding Morphology. London: CPI Antony Rowe.

**Jabbari, A. A., & Samavarchi, L. (2011).** Persian Learners' Syllabification of English Consonant Clusters. International Journal of English Linguistics IJEL. Retrieved from: file:///C:/Users/Saleh1/Downloads/9784-29575-1-PB%20(1).pdf

**Katamba, F. (1993).** Morphology. Basingstoke: Macmillan.

**Libben, G., and Jarema, G. (2006).** The Representation and Processing of Compound Words. Oxford: Oxford University Press.

**McMahan, A. (2002).** An Introduction to English Phonology. Edinburgh: Edinburgh University Press.

**Plag, I. (2003**). Word-Formation in English. Cambridge: Cambridge University Press.

**Quirk, R., Greenbaum, S., Leech, G., Savartvik, J. (1985**). A Comprehensive Grammar of the English Language. London: Longman Group Ltd.

**Stageberg, N. (1971).** An Introductory English Grammar. (2nd ed.). New York: Holt, Rinehart, and Winston, Inc.

**Williams, E. (1981).** "On the Notions 'Lexically Related' and 'Head of a Word" in Linguistic Inquiry. Vol. (12). Massachusetts: MIT Press. pp. 245-274.