# Bilingual Code-switching: Persian Compound verbs 

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#### Abstract

Code-switching is one of the most interesting topics in bilingualism. Since the structure of bilingual compound verbs is a type of code-switching, this study is aimed to investigate the production of compound verbs in bilingual speakers' speech that are switched/inserted from their L2 into their L1. Furthermore, it investigates whether any grammatical category information is available during bilingual language processing. The aim is to examine what processes are involved in the production of Persian-Dutch bilingual compound verbs (BCVs). Compound verbs mainly consist of a nonverbal element which can be a noun, an adjective, a past participle, an adverb, or a preposition, and a verbal element. A bilingual compound verb is formed when the nominal constituent of a compound verb is replaced by a constituent from the other language. In the previous studies on BVCs, for instance English-Tamil (Annamalai, 1989); German-Hungarian ( Moravcsik, 1975); Greek-Australian (Tamis, 1986); JapaneseEnglish (Stanlaw, 1982); Persian-English ( Purmohammad, 2015); and Popoloca-Spanish (Veerman-Leichsenring, 1991), it was reported that the nominal constituents are replaced by a verb from the other language. The main question is whether these observations apply to PersianDutch BCV production as well. This study investigates the process of BCV production using both naturalistic and experimental data. The first part of the present study is dedicated to the naturalistic data which has been collected via friendly conversations with 22 participants. The collected data amounts to 1009 minutes of conversations collected within 2 weeks and found 979 instances of code-switched utterances. In 149 (15.2\%) of the switched cases, insertions occurred within the Persian compound verb structure, hence, resulting in BVCs. The second part of the study addresses the BVCs with two experiments, first a picture-word interference experiment and second a storytelling experiment. The aim is to examine whether in the production of Persian-Dutch BVCs, Dutch verbs compete with the corresponding Persian


compound verbs as a whole; whether Dutch verbs compete with the nominal constituents of Persian compound verbs only; or whether the inserted Dutch verbs are infinitives that have nominal properties rather than verbal properties. The Persian-Dutch bilingual speakers named pictures depicting actions in 4 conditions in Persian (L1). Afterwards, the participants read three stories in Dutch (L2) and had to retell the story in Persian (L1). This experiment was designed specifically to observe whether the Persian-Dutch bilingual speakers treat Dutch compound verbs the way they treat Persian compound verbs. In other words, whether they replace the preverbal element of the/a Dutch compound verb with a word from Persian or whether they treat compound verbs like simple verbs and substitute the nominal constituent of the Persian compound verb with the whole Dutch compound verb and produce BCVs.

The results revealed that naming latencies were shorter in the nominal linguistic unit compared to the compound verb (CV) linguistic unit. That is, the participants were faster to produce the nominal constituent of the compound verbs in the context of a semantically related Dutch distractor verb. The results of the interaction between the versions of the experiment (CV and nominal version), linguistic unit (nominal and CV linguistic unit), and relation (semantically related and unrelated distractor words) showed that the response times of the participants were faster in the semantically related nominal linguistic unit compared to the response times in the semantically related and unrelated CV and nominal linguistic unit in both versions. The results of the storytelling experiment have also revealed that the Persian-Dutch bilingual speakers treat Dutch compound verbs as Dutch simple verbs and replace the nominal constituent of the Persian compound verb with the whole Dutch compound verb. The analysis of the naturalistic data and both of the experiments suggest that the Dutch infinitives that replace the nominal constituent of the Persian compound verbs exhibit nominal properties more than the verbal properties and behave more like nouns than verbs.

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## List of abbreviations and symbols

## Abbreviations

$\mathrm{BCV}=$ bilingual compound verb
$\mathrm{CE}=$ Christian Era
CS = code switching
$\mathrm{CV}=$ compound verb
DEF $=$ definite
Det $=$ determiner
DOM = direct object marker
$\mathrm{EZ}=$ ezafe (linking enclitic)
$\operatorname{Imp}=$ present imperfect
Inf. $=$ infinitive
Iom $=$ indefinite object marker
Lit. = literally
$\mathrm{N}=$ noun
NEG = pre-verbal negator
$\mathrm{P}=$ person
$\mathrm{PFV}=$ perfective
$\mathrm{Pl} .=$ plural
POSS = possessive
Prog $=$ progressive
PTCP = participle
Sbj $=$ subjunctive
Sg. = singular
$\mathrm{V}=\mathrm{verb}$

Symbols
$\overline{\mathrm{a}}=/ \mathrm{a} /$ as in 'arm'
$\check{s}=/ \mathrm{sh} /$ as in 'share'
$\mathrm{u}:=/ \mathrm{u} /$ as in 'rude'
$\check{c}=/ \mathrm{ch} /$ as in chair
P = glottal stop as in 'uh-oh'
$\mathrm{q}=$ voiceless uvular stop
$x=$ voiceless velar fricative as in Dutch 'acht' or Scottish 'loch'

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## Chapter 1: Introduction

### 1.1. Aim of this study

A bilingual is a person who speaks two languages proficiently. Each language of a bilingual has its own components and structures such as syntax and lexicon. During the language production, the components of these two languages may interact (Kroll et al., 2006). For instance, a monolingual speaker may have to select between two or more options of synonymous words, e.g. "šād" and "xošhāl" in Persian meaning happy, while a bilingual speaker faces a wider range to select from during speech production in each language since almost every word has an equivalent in the other language (Gollan \& Ferreira, 2009). This process of selection leads to a competition between the components of the two languages. For example, a Persian-English bilingual speaker has to choose between "šād" and "xošhāl" from Persian, "happy" and "glad" from English. As it can be seen, the option of words to select from has become wider for a bilingual speaker which can lead to a competition between these pairs of words (components) from the two languages. Yet, all the linguistic requirements including form and meaning of the selected item that belongs to the intended rather than the competing language have to be properly met (Bialystok, 2009).

The aim of this study is to investigate the features of bilingual language production such as language selection and language processing in switched utterances, especially the grammatical encoding and lexical access. This study focuses on the production of PersianDutch bilingual compound verbs (hereafter BCVs). Grosjean, Munte and Rodrigues (2003) believed that researchers from different fields such as psycholinguistics, neurolinguistics, and
sociolinguistics need to come together to help understand the nature of bilingual language production better.

Not many studies regarding BCVs have been carried out. One study, by Purmohammad (2015), looked at the process involving the production of bilingual compound verbs (BCVs) in Persian-English language contact. Following the analyses of the naturalistic and experimental data, he concluded that in the case of the production of BCVs, English verbs compete with the nominal constituent of the Persian compound verbs, suggesting that grammatical category does not necessarily provide a constraint on lexical access. For instance, a Persian compound verb expressed in a sentence like (1), consisting of a noun "modiriyyat" (management) + a light verb "kard" (did), will be produced as sentence (2) consisting of a verb "manage" from English that has substituted the nominal constituent "modiriyyat" + a light verb "kard" in Persian by a bilingual Persian-English speaker.
(1) modiriyyat ${ }_{\mathrm{N}} \operatorname{kard}_{\mathrm{V}}$ management-did
'he/she managed'
(2) manage ${ }_{V} \operatorname{kard}_{\mathrm{V}}$ manage-did
'he/she managed'

Purmohammad (2015) considers "manage" in sentence (2) as a verb from English that has replaced the nominal constituent of the BVC. However, I argue that, firstly, English is not a helpful language to investigate BVCs for the reason that in English only the third person singular verbs appear differently than the rest of the conjugated forms. Secondly, the only difference between a verbal base form and an infinitive is "to", which in this case we cannot unquestionably claim that although there are no "to's" in such instances, "manage" is certainly
a verb ${ }^{1}$ and not an infinitive. Thirdly, since in the production of BCVs, an infinitive from L2 may replace the nominal constituent of the Persian compound verb in L1, there might not be a competition in mental lexicon between the two lexical categories as suggested by Purmohammad (2015). In chapter 2, more details of Purmohammad's (2015) study on PersianEnglish BCVs will be elaborated since his research is the inspiration behind the current research. This study attempts to closely replicate Purmohammad's study in the production of BCVs in Persian-Dutch bilingual speakers.

Why the Dutch language? As I have previously explained, English is not a helpful language to investigate BCVs, since the infinitives and the verbs do not look so different. Hence, English can be considered as a language with weak inflectional features and root infinitives can only be detected in third-person singular context: presence of the suffix '-s' in the context of third-person singular indicates that we are dealing with a finite verb, whereas its absence suggests that the verb is nonfinite. On the other hand, Dutch infinitives can be easily identified both syntactically (final position) and morphologically (suffix -(e)n). For example, "lezen" in "ik vind het leuk om te lezen" is a Dutch infinitive that is located at the end of the sentence and is accompanied by the suffix '-en'.

Dutch is a more appropriate language for the reason that all the infinitives end in the suffix "-(e)n" and if the verb is not in the plural form, this difference can be seen clearly. Another reason for choosing the Dutch language for this research is that like Persian language, Dutch also displays the use of compound verbs. Dutch verbs such as "schoonmaken" (to clean), "bekendmaken" (to announce), "plaatsvinden" (to take place), consist of a(n) noun/adjective +

[^0]a light verb, precisely like Persian compound verbs. I will explain more about the compound verbs in both Persian and Dutch in the following chapters.

In this study, both naturalistic and experimental data will be used to examine the processes involved in the production of BCVs in Persian-Dutch language contacts. In a bilingual compound verb, an element (mostly a noun or a verb) from the other language of a bilingual (L2) replaces the nominal constituent of a compound verb in the target language (L1). For example, while "moqāyeseh kard" (literally meaning comparison-did, "compared" that has a noun + light verb construction) is a monolingual compound verb, "vergelijken kard" is a bilingual compound verb. Not so many studies have been previously carried out to investigate the processing of BCVs using both naturalistic and experimental data. I used naturalistic data because studying "naturally occurring code-switching does offer a number of insights about the nature of language that either complement existing psycholinguistic findings or suggest new avenues for study" (Myers-Scotton, 2006b: 211). But I will always draw on the usefulness of the other measures to understand the processes involved in the production of bilingual compound verbs, and that is by studying their production in experimental conditions. The main purpose of the present research is to accomplish three goals:

- To advance the understanding of grammatical encoding and lexical access in bilingual language processing, especially during BCV production both experimentally and naturalistically;
- To examine whether the structure of these code-switched BCVs are undoubtedly and unquestionably a verb from Dutch + a light verb from Persian or a noun (nominal infinitive) from Dutch + a light verb from Persian;
- To investigate how the Persian-Dutch bilingual speakers treat a Dutch compound verb; do they replace the preverbal element of the Dutch compound verbs with an element
from Persian or replace the nominal constituent of the Persian compound verb with the whole Dutch compound verb and produce a BCV.

I hypothesize that in the switched Persian-Dutch bilingual compound verbs, the nominal constituent of the Persian compound verb is replaced by an infinitive from Dutch which exhibits nominal properties rather than bearing the main characteristics of a verb in Dutch. Regarding the Dutch compound verbs, I hypothesize that Persian-Dutch bilingual speakers replace the nominal constituent of the Persian compound verb with the whole Dutch compound verb and produce BCVs. In other words, the bilinguals will not treat the Dutch compound verbs differently than a Dutch simple verb.

In this Chapter, I will discuss the degrees to bilingualism. According to Grosjean (2010), half of the world's population speak more than one language. Considering the fact that two types of bilinguals have been included and taken part in this research, I found it necessary to explain who can be considered as a bilingual and to describe different types of bilingualism.

Since the present study investigates the production of BCVs that occur in the PersianDutch language contact situation, it is imperative to present a short introduction of the Persian language and the structure of Persian compound verbs, followed by a short introduction of the Dutch language. And considering that compound verbs occur in the Dutch language as well, it is necessary to present descriptions and examples of these verbs as well. And for the reason that my hypotheses revolve around infinitives, I will also present descriptions of infinitives being used as nouns in different situations in both languages. Moreover, I will be discussing the production of BCVs in other language-contact conditions to shed more light on the structure of BCVs.

Three experiments are conducted for this research. In Chapter 2, first I will analyze the naturalistic code-switching data gathered in experiment 1 to examine bilingual lexical access and grammatical encoding during the natural production of Persian-Dutch BCVs. More specifically, I examine whether words from the assumed different categories across two languages compete for selection. Second, in Experiment 2 I will investigate whether the grammatical category information of the words is available during bilingual language processing. In this experiment, I will examine whether in the case of the production of BCVs, Dutch verbs (infinitives) compete with their corresponding Persian compound verbs as a whole, or whether the Dutch verbs (infinitives) compete with the nominal constituent of Persian compound verbs only, and whether the Dutch verbs (infinitives) carry verbal/nominal properties. Third, experiment 3 is aimed to investigate the participants' behavior toward the Dutch compound verbs. In this experiment, I will examine whether the Persian-Dutch bilingual speakers replace the nominal constituent of the Persian compound verb with the whole Dutch verb or whether they replace the preverbal element of the Dutch compound verb with an element from Persian.

### 1.2. Degrees of bilingualism

Nowadays more than one language is being spoken or heard in many societies, for example in countries such as the U.S., Canada, Switzerland, etc.. Shin and Kominski (2010) carried out a survey on language use in the U.S. and reported that in 1980 about 23.1 million people living in the U.S. speak a language other than English at home. In 2007, that number had amounted to 55.4 million people who speak a language other than English at home. This is
an indication of a 34 percent growth in the U.S. population during this period and a 140 percent increase in bilingual speakers.

Currently more than half of the people all around the world are exposed to at least two languages (Crystal, 1997), and since one third of the world's population uses more than one language to communicate at their work and/or in their daily life (Grosjean, 2010), it has become difficult to determine who is bilingual. If we consider the large number of people who use a language other than their native tongue in some specific situations (e.g. at school, business meetings, government appointments) as bilingual speakers, it will become even more difficult to answer this question (Wei, 2000).

The term 'bilingual' was initially used to describe a person who has acquired two languages, but recently the definition of bilingualism has been more narrowly defined by several criteria (Baker \& Prys Jones, 1998). Some of these criteria are, for instance, Language proficiency and fluency, speakers' self-assessment of their language proficiency (see Marian et al., 2007), speakers' language use in their everyday life, time of exposure to the languages (see De Houwer, 2006), and years of exposure to the languages (see Marian et al., 2007), to name a few.

Yet defining bilingualism gives rise to some potential problems and questions. For example, is a person who can comprehend a language but cannot speak it a bilingual? I have met Persian speakers in the Netherlands who could understand, write and read Dutch without any problems but speak it very poorly.

Some scholars have presented definitions for bilingualism with respect to specific criteria. Peal and Lambert (1962) introduced 'balanced bilinguals' and 'dominant bilinguals' to differentiate the degrees of proficiency in bilingual speakers. They have also distinguished
between 'early bilingualism' and 'late bilingualism' to indicate whether a speaker acquired a second language before or after adolescence. Lambert (1974) suggested 'additive bilinguals' and 'subtractive bilinguals' to highlight the effects of the second language of a speaker on their native language. In this view, a 'subtractive bilingual' is a speaker "whose second language is acquired at the expense of the aptitudes already acquired in the first language" (Wei, 2000: 5).

Grosjean (2010) also proposed two terms in defining bilingualism, 'simultaneous bilingualism' and 'successive bilingualism'. According to him, a simultaneous bilingual is a person who has acquired two languages at the same time and has received a dual language input from the very beginning of language onset. A successive bilingual is a person who has acquired one language first, mostly at home, and then a second language at school or in the community, or in some cases even later in life due to emigration.

There are many definitions for bilingualism. However, there are two classic definitions that are especially worth mentioning here as well. On the one hand, Bloomfield (1933: 56) defines bilingualism as "the native-like control of two languages". On the other hand, Weinreich (1953: 7) defines it as "the practice of alternately using two languages". However, as more studies on bilingualism were carried out, these view-points seemed to be at the two extreme ends (see Edwards, 2004 for more reviews). Grosjean (1989) suggested that there are many points in-between these two ends that depend on numerous factors. Accordingly, it can be said that there are different degrees to bilingualism.

Wei (2000) recorded more than 37 terms to describe bilingual speakers, e.g. additive bilingual, ascendant bilingual, maximal bilingual, asymmetrical bilingual, and etc. Although in some cases, it seems that two different definitions refer to the same population. For instance, a 'semibilingual' seems to be the same as a 'receptive bilingual' (Wei, 2000). If we looked closer
to the listed terms by Wei (2000), we could find that some terms describe a particular kind of speakers only. For example, a 'vertical bilingual' is a speaker "who is bilingual in a standard language and a distinct but related language or dialect" (Wei, 2000: 5). Purmohammad (2008a; 2009) reported that Iranian bilingual speakers do not fit in most of the definitions of bilingualism.

With regard to the bilingualism, it can be said that a bilingual is a person who can speak two languages to some degree of proficiency (Bialystok, 2001). With respect to the discussed definition of bilingualism so far, it is safe to say that bilingualism is not a subject about which everyone agrees on a concrete definition (Chin \& Wigglesworth, 2007). I have adopted Grosjean's (2010) two terms for bilingualism in this research: ‘simultaneous bilinguals' and 'successive bilinguals'.

According to Grosjean (1996), it is nearly impossible to have the complete knowledge of two languages. Paradis (2004) suggested that nowadays a speaker is considered a bilingual when he/she can use two languages with automaticity and accuracy. In most current literature, the term 'bilingual' refers to speakers who can use two languages (Edwards, 2004) with different interlocutors for different purposes (Grosjean, 1992). Therefore, in this study the term 'bilingual' is adopted to refer to the same type of speakers.

### 1.3. Persian

Persian or Farsi belongs to the west Iranian language family of Indo-European languages along with Gilaki, Baluchi, Kurdish, Mazandarani, and Talysh (Windfuhr, 2009). Persian is the official language of Iran. However, there are three main varieties of Persian that
are spoken in different countries. For instance, Persian Farsi spoken in Iran, Persian Dari spoken in Afghanistan and Pakistan, and Persian Tajik spoken in Tajikistan and parts of Uzbekistan. As Beeman (2005: 6) has stated "Persian, Dari and Tajik are languages in the sense that they have concretized canonical forms that are transmitted through institutionalized schooling and reference works, however structurally they are all varieties of Persian".

As far as word order is concerned, the Persian language is SOV. However, it can be said that it is more flexible and has a free word order (Izadi \& Rahimi, 2015), especially in spoken Persian. According to Izadi and Rahimi (2015), Persian has a free word order because all of its parts of speech are totally unambiguous. According to Naseh LotfAbadi (2002: 71), Persian "exhibits head-initial word order in noun-genitive, noun-adjective, and preposition-noun phrases as well as noun-relative clauses". It is a pro-drop and verb final language (Gebhardt, 2009).

### 1.3.1. Persian compound verbs

Persian language employs two ways to convey a meaning or a concept in a verb form: 1. With a simple verb as in the sentences shown in (3); and 2 . With a compound verb form (these types of verbs are also called light verb constructions) as in sentences shown in (4) (Tabātabāi, 2005).
(3) a. xord

Eat-he/she.past.sg
'He/she ate'
b. porsid-am
ask-I.past.sg
'I asked'

## c. raqsid-im

dance-we.past.pl
'we danced'
(4) a. tamāša kard-and
watch do-they.past.pl
'they watched'
b. $b \bar{a} z \quad$ kard-am
open do-I.past.sg
'I opened'
c. rāh mi-rav-ad
way Imp.go-he/she.present.sg
'he/she walks'

The compound verbs in Persian consist of a nonverbal constituent which can be a noun, an adjective, a past participle, an adverb, or a preposition/prepositional phrase, and a verb constituent (a semantically weak verb). Dabir-Moqaddam (1997) classifies two main lexical processes in forming Persian compound verbs: combination and incorporation. The nonverbal constituent of the compound verbs that are formed via combination, is combined with a light verb. In this form of compound verbs, if the nonverbal element is a noun, the verbal element functions as an action-maker. However, the meaning of this new compound verb, which has resulted from the combination of a noun and a light verb, may not be obvious since it does not convey the meanings of either of those elements separately (Dabir-Moqaddam, 1997). The structure of compound verbs in Persian is a controversial issue in the field of linguistics. Lambton (1953) presented the taxonomy of Persian compound verbs as: N+V, Adj+V, Preposition/Adv+V, prepositional phrase+V. However, Seyfollāhi and Tabibzādeh (2013) argued that not all combinations of $\mathrm{N} /$ adjective/adverb+simple verb make a compound verb, especially strings such as $\mathrm{Adj}+\mathrm{V}$ as in 'nārāhat šod' (meaning 'became unhappy') or Adj.
phrase +V as in 'be šeddat nārāhat šod' (meaning 'became extremely unhappy'). These types of strings are to be treated as a predicative structure and should not be considered as a compound verb. Sentences (5) and (6) are examples of compound verb formation via combination.
(5) Rezā zamin xord

Rezā earth eat.past.sg
'Reza fell down’
(6) man āhang gu:š kard-am

I song ear do-I.past.sg
'I listened to a song'

According to Dabir-Moqaddam (1997: 41), in compound verbs that are formed via incorporation, a nominal element that functions as a direct object of the verb "loses its grammatical ending(s)" such as ' $r \vec{a}$ ', the direct object marker (DOM), the plural suffix ' $-h \vec{a}$ ', and the possessive pronominal suffix and some prepositional phrases lose their preposition in order to incorporate with the verb. Sentences (7) and (8) are examples of compound verbs formed via incorporation.
(7) qazā xord-am
food eat-I.past.sg
'I ate food'

they fish take-they.past.pl 'They fished’ (Purmohammad, 2015)

Dabir-Moqaddam (1997) noted some differences between the compound verbs formed via combination and incorporation. Firstly, every incorporated compound verb has a corresponding non-incorporated version. Sentences (9) and (10) are the non-incorporated versions of sentences (7) and (8) respectively.
(9) man qaza-yam rā xord-am

I food-my DOM eat-I.past.sg
'I ate my food'
(10) $\bar{A} n h \bar{a}$ māhi-hā rā geref-t-and
they fish-pl DOM take-they.past.pl
'they caught the fish'

Secondly, while the compound verbs formed via combination can be either transitive or intransitive, all the incorporated compound verbs are intransitive. And finally, compound verbs formed via combination are less productive than incorporated compound verbs (DabirMoqaddam, 1997).

Both types of compound verbs, combined and incorporated, have been chosen for this research.

As we have already discussed, Persian compound verbs consist of two elements: nonverbal and verbal elements. The nonverbal element can be a noun, an adjective, a past participle, an adverb, or a preposition phrase, and the verbal element is a light verb. The light verbs in compound verbs are assumed to possess very little semantic content as they mainly carry the inflectional and aspectual information (Karimi-Doostan, 1997; Tabātabāi, 2005). To put it simply, the light verbs essentially have grammatical functions such as the inflectional elements. Megerdoomian (2001) and Butt (2010), however, argue that the light verbs do not completely lack semantic predicative content and may convey meaning to the whole compound verb. For instance, the light verb 'kard' meaning 'did' and ‘šod' meaning 'became’ in 'estexdām kard' (lit. employment-did meaning 'he/she employed') and 'estexdām šod' (lit. employmentbecame meaning 'he/she became employed') carry both grammatical information (/-d/ in 'šod' and 'kard' is a past tense suffix) and meaning. As can be seen, the former means 'to employ' and the latter means 'to be employed'. Therefore, other than providing grammatical
information, the two light verbs also influence the meaning of the compound verbs. Many Persian compound verbs such as 'bāzi kard' lit. playing-did meaning 'he/she played', have a semantically close equivalent simple verb in other languages such as in English (e.g. played) and Dutch (e.g. speelde).

According to Tabātabāi (2005), the most frequent light verb in Persian language used in making compound verbs is 'kardan' (to do). About one third of Persian compound verbs contain 'kardan' as their light verb (Rostam Pur, 1980; see Khanlari, 1976 for more details). Other verbs used in compound verbs are: 'dādan' (to give), 'gereftan' (to get/take), 'šodan' (to become), 'kešidan' (to pull), 'zadan' (to hit/strike), 'xordani' (to eat), 'raftan' (to go), 'goftan' (to say).

### 1.4. Dutch

Dutch is a language that is used in different countries: in the Netherlands; in the northern part of Belgium; the majority population of Suriname; Aruba; Curaçao; and Sint Maarten. It belongs to is the Indo-European family of languages and is grouped within the Germanic languages. There are three stages in the history of the Dutch language: Old Dutch (form $8^{\text {th }}$ century to the beginning of $11^{\text {th }}$ century); Middle Dutch (from $12^{\text {th }}$ century to $16^{\text {th }}$ century); and Modern Dutch (from $16^{\text {th }}$ century to the present day) (Brachin, 1985).

Like Persian Language, Dutch is also an SOV language. This means that the position of the verb is after object or at the end of the sentence (Koster, 1975). In a normal matrix sentence, the verb has to move to the second position (Verb Second; see example 28). If a modal verb or an auxiliary appears in the sentence, the lexical verb stays in its original position which is clause final (see example 29).
(28) de jongen leest een boek the boy reads a book
(29) de jongen heeft een boek gelezen the boy has a book read "the boy has read a book"
(Broekhuis \& Corver, 2019: 600)

### 1.4.1. Dutch compound verbs

There are two types of compound verbs in the Dutch language: separable compound verbs such as 'opbellen' (to call up), ‘afzeggen' (to call off), 'wegblazen' (to blow away); and inseparable compound verbs such as 'ondervragen (to interrogate), 'overleven (to survive), 'ondersteunen' (to support), 'achtervolgen (to chase) (van Kemenade \& Los, 2003). According to van Kemenade and Los (2003: 79), these two types of compound verbs are "functionally equivalent in the sense that they denote complex events that involve a change of state in a resultative construction". Each of these verbs can be decomposed to their components. For instance, the separable compound verbs can be broken down: 'wegblazen' to 'weg' (away) and 'blazen' (to blow), 'opbellen' to 'op' (up) and 'bellen' (to call). The components 'weg' and 'op' are syntactically independent from the verbs 'blazen' and 'bellen'. The inseparable compound verbs can also be broken down to their components: 'achtervolgen' to 'achter' (behind/after) and 'volgen' (to follow), 'ondervragen' to 'onder' (under) and 'vragen' (to question). The components 'achter' and 'onder' in these examples are prefixes that have become part of the compound verbs and cannot be separated.

The construction of compound verbs in Dutch, just like in many other languages are: N+V, Adj.+V, Adv.+V, Preposition+V (Behrens, 1998). The following examples show the
structure of the compound verbs in detail. Note that all these verbs are separable compound verbs.
(30) $\mathrm{N}+\mathrm{V}$ : 'deelnemen' (to participate)
(31) Adj.+V: ‘goedkeuren’ (to approve)
(32) Adv.+V: 'weggooien’ (to throw away)
(33) Prep.+V: 'aansluiten' (to connect)

According to Booij (1990), some separable compound verbs' first constituents can either be an adjective (e.g. 'goed' in goedkeuren 'to approve', 'vol' in volhouden 'to go on'), a noun (e.g. 'adem' in ademhalen 'to breathe', 'stof' in stofzuigen 'to vacuum', 'feest' in feestvieren 'to have a party'), or a morpheme that does not exist independently (e.g. 'gade' in gadeslaan 'to watch'). Booij also noted that two of these adjectives 'vol' (full) and 'mis' (wrong) can occur as the first constituent of the inseparable compound verbs (e.g. misstaan 'to suit ill', volbrengen 'to accomplish'). Van Marle (2002) also noted the difference between separable and inseparable compound verbs in his study. Inseparable compound verbs occur in three situations: with an adjective, a noun or a verb. In contrast to the former two types, the latter type hardly ever occurs (Vries, 1975).

Van Marle (2002) has made an interesting point in his paper, that inseparable compound verb types such as 'mastklimmen' (lit. pole-climb 'to climb the slippery pole'), 'hardlopen' (lit. fast-walk 'to run'), 'zwartrijden' (lit. black-ride 'to dodge fare'), 'kaartlezen' (lit. map-read 'to read maps'), 'touwtrekken' (lit. rope-draw 'to play tug-of-war'), 'buikspreken' (lit. belly-speak 'to ventriloquize') cannot be inflected and therefore the right-hand constituent is not a verb at all but a noun (Booij \& van Santen, 1998). According to Booij and van Santen (1998), the righthand constituent (e.g. 'klimmen', 'lopen', 'rijden', 'lezen', 'trekken', and 'spreken') in the above compound verbs is a deverbal noun and is comparable to, for example, 'maneschijn'
(moonlight), 'banketbakker' (confectioner), and 'waterleiding' (waterworks) which also have $\mathrm{N}+\mathrm{N}$ structures with a deverbal noun as their right-hand constituent.

Both separable and inseparable Dutch compound verbs will be used in this study.

### 1.5. Bilingual compound verbs

Most of the languages all around the world that have been in a contact situation contain bilingual compound verbs (BCVs). One of the most common structures of BCVs in language contacts is assumed to be a 'foreign verb+a light verb'. When the nominal constituent of a monolingual compound verb is replaced by a word, most often a verb, from the bilingual's other language, a bilingual compound verb is created. Many scholars in the fields of structural linguistics and contact linguistics have discussed the structure of BCVs (see Backus, 1992, 1996; Edwards \& Gardner-Chloros, 2007; Romaine, 1995; Muysken, 2000). The BCVs occur in a variety of languages regardless of their structures, such as Greek-Australian (Tamis, 1986), German-Hungarian (Moravcsik, 1975), Japanese-English (Stanlaw, 1982), Popoloca-Spanish (Veerman-Leichsenring, 1991), and English-Tamil (Annamalai, 1989), Persian-English (Purmohammad, 2015). Purmohammad (2015) presented a proposal for the production of BCVs since the structure of BCVs frequently occurs in many language contact situations. This proposal is as follows (Purmohammad, 2015: 27):
"BCVs may occur in a language-in-contact condition if at least one of the two languages of a bilingual speaker frequently uses compound verbs. One of the structures used in the construction of BCVs in many languages in contact situations is 'an alien main verb + a native light verb', however,

BCVs may sometimes use 'an alien noun + a native light verb' structure or more rarely a structure consisting of 'an alien noun/verb + a native light verb + a native light verb' ".

One of the language families that frequently uses compound verbs is that of the Indian languages (e.g. Urdu, Hindi, Bengali, among others; see Muysken 2000; Annamalai, 1989 for further details). The structures of compound verbs in Indian languages are $\mathrm{N}+\mathrm{V}$ or $\mathrm{V}+\mathrm{V}$. The $\mathrm{N}+\mathrm{V}$ structure in Indian languages is similar to Persian where the noun is followed by a light verb. For instance, in Bengali, 'kora' (meaning 'do') is the light verb in the compound verb 'bikri kכra' (sale-do meaning 'to sell') which has a N+V construction (Chatterjee, 2014). According to Chatterjee (2014), only a noun can appear before a Bengali verb 'kora' (do) in a monolingual Bengali compound verb such as 'bikri kכra' (sale-do meaning 'to sell'). However, in Bengali-English BCVs, both nominal and verbal elements from English can appear before the Bengali 'kora' (do) verb (Muysken, 2000).

Romaine (1986) based her influential study on 77 cases of BCVs produced by 11 Panjabi-English bilingual speakers. She found that 'kərna' (do) was the most frequent light verb in the bilingual compound verbs produced by these speakers. According to her reports, most of the BCVs were formed by 'English verbs+Panjabi light verbs'. The following examples come from Romaine's study.
(11) show off hona/kərna
(12) depend hona/kərna
(13) learn kərni
(14) improve kərna
(15) involve hona
(16) appreciate kərna
(17) look down upon kərna
(Romaine, 1986)

The nominal constituent is frequently replaced by English verbs in Tamil-English BCVs. For instance, Shanmugan Pillai (1968, as cited in Muysken, 2000) listed BCVs in which the Tamil verb 'paNNu' (expressing accomplishment or causation) was used. 'PaNNu' can only be combined with nouns. However, Shanmugan Pillai noted 194 cases (e.g overtake paNNu 'overtake'; watch paNNu 'keep a watch'; fight paNNu 'fight'; waste paNNu 'waste') in which an English verb was used in place of the nominal constituent.

Chatterjee's (2014) used the recording of informal conversations of thirty BengaliEnglish bilingual speakers in India to investigate the structure of BCVs. The structure of Bengali compound verbs is also $\mathrm{N}+\mathrm{V}$, however, both English nouns and verbs can replace the Bengali noun in Bengali-English compound verbs. She reported that English verbs were more frequent than English nouns. The following examples from her study show that English verbs were used with Bengali light verb 'kəra' (do) in active constructions.

```
(18) O tui already apply kor-e \(\mathrm{p}^{\mathrm{h}}\) el-ec \(\mathrm{c}^{\mathrm{h}}\) i- S
    oh 2sg already apply do-PFV.PTCP throw-PFV.2P
    'Oh, you have already applied (completely)?'
(19) are Pritam gaan-ta delete kor-e bos-ec \({ }^{\text {h}}\)-e
    So Pritam song-DEF delete do-PFV.PTCP sit-PFV.3P
    'Pritam has (unintentionally) and suddenly deleted the song.'
(20) Professor solution-ta simplify kor-e di-l-o
    Professor solution-DEF simplify do-PFV.PTCP give-past-3P
    ar explain kor-e di-l-o
    CONJ explain do-PFV.PTCP give-past-3P
    'professor simplified and explained the solution.'
```

Chatterjee (2014, p. 56-58)

Each of these English verbs (apply, delete, explain, and simplify) can be produced in Bengali either using a Bengali noun+Bengali ‘do’ verb or a Bengali simple verb (Chatterjee, 2014). For instance, the English verb 'to renovate', can be produced in Bengali with either 'renovate kora' or 'sharano' (Bengali simple verb)/ 'notun kora' (Bengali N+V).

Annamalai's (1989) investigation into Tamil-English BCVs showed that unbalanced bilinguals (weaker in English) are more likely to use the N + the dummy verb paNNu structure such as 'reservation paNNu', while balanced bilinguals use the $\mathrm{V}+$ the dummy verb paNNu construction such as 'reserve paNNu'. He proposed that unbalanced bilinguals might tend to preserve the basic structure of the monolingual compound verbs, which is $\mathrm{N}+$ the dummy verb paNNu in Tamil. This difference between the unbalanced and balanced bilingual use of compound verbs is captured in the following examples.
(21) Balanced bilinguals: avan enne confuse-paNNiTTaan

Unbalanced bilinhuals: avan enne confusion-paNNiTTaan
he me did
'he confused me.'
(22) Balanced bilinguals: onakku oru eDam reserve-paNNirukkeen

Unbalanced bilinguals: onakku oru eDam reservation-paNNirukkeen
for one a location made
'I have reserved a place for you.' (Annamalai, 1989: 51)

Kishna (1979, cited in Muysken, 2000) investigated the effect of Dutch on the Sarnami (Hindustani) language. In her study, the language production of 31 Dutch-Sarnami speakers were analyzed from a structural point of view. She found instances of BCVs in which Dutch verbs were used with Sarnami verbs (Dutch verb + Sarnami Verb). The following examples represent the 'Dutch verb + Sarnami Verb' construction found in Kishan's study. 'Kare' (meaning 'do') is the most frequent light verb in the BCV construction in Sarnami (Muysken, 2000). It is interesting to note here that in (23), (24) and (25), the Dutch verbs are in stem forms
and in (26) and (27) they are in the infinitive form. However, Kishna (1979) did not account for this difference in her research.
(23) luk ho:ve
succeed be
'succeed'
(24) schoon-maak kare
clean do
'clean'
(25) uitleg kare
explain do
'explain'
(26) meemaken kare
experience do
'experience'
(27) opgeven kare
give up do
'give up'
(Sarnami/Dutch; Kishna 1979)

Purmohammad (2015) examined the production of BCVs in the Persian-English bilingual speakers using both naturalistic and experimental data. He investigated how a lexical component that corresponds to a verb node can replace noun lemma. He examined whether lexical access is restrained by the grammatical category of a word and whether words from different classes across the two languages of bilinguals can compete for selection. He suggested that, regarding the production of BCVs, lexical nodes corresponding to verbs from L2 enter into competition with the lexical nodes corresponding to nouns from L1. He further proposed that the grammatical class of the words does not constrain the lexical access during the production of BCVs.

In his study, Purmohammad (2015), used 2298 minutes of naturalistic data from a popular Persian TV show based in London. The speech of 132 Persian-English speakers was analyzed for the production of BCVs. He recorded 962 switched utterances within which 83 instances were code-switched Persian compound verbs and BCVs. The rest of the switched utterances consisted of adjectives, nouns, noun phrases, adverbs, and sometimes a whole English sentence. The following examples taken from Purmohammad's (2015) naturalistic data present the code-switched utterances where nouns (28, 29), an adjective (29), and BCVs (30, $31,32)$ were produced. The code-switched utterances are presented in Italics.
(28) fruit-hā-š -pl.his/hers.poss very fresh were-they 'his/her fruits were very fresh'
(29) bā friend-hā-ye jaded-e-š honest bāš-e
with -pl-EZ new-EZ-his/hers.poss be '[one] must be honest with his/her new friends'
(30) bāyad xodam ro protect kon-am
should myself DOM do-I
'I should protect myself'
Persian equivalent of the BCV: hefāzat ${ }_{(\mathrm{N})}$ konam $_{\text {(V) }}$
(31) man aslan insist na-kard-am

I at all NEG-did-I
'I did not insist at all'
Persian equivalent of the BCV: esrār $_{(\mathrm{N})}$ nakardam $_{(\mathrm{V})}$
(32) alān man starter-am ro prepare mi-kon-am
now I -my.poss DOM Impf-do-I
'now I prepare my starter'
Persian equivalent of the BCV: āmādeh $_{(\mathbb{N})}$ mikonam $_{(\mathrm{V})}$

None of the instances of the reported BCVs in Purmohammad's (2015) naturalistic data carried inflectional information. That is to say, none of the participants produced the past tense of an English verb in their production of BCVs, and after all no present '-s' nor 'to' was attested either. For instance, the participants produced only BCVs as in (33) and not (34) in which the English verb that would be used in place of the nominal constituent of the Persian compound verb 'lezzat bordan' (to enjoy) expressed information about tense. Since this is also relevant to the current research, I will discuss it in detail in the following chapter.

> (33) xeyli xošhal šod-am bacheh-hā ro did-am, enjoy kard-am very happy become-I guy-pl DOM saw-I did-I
> 'I became very happy when I met the guys. I enjoyed it'
> Persian equivalent of the BCV: lezzat $_{(\mathbb{N})}$ bordam $_{(\mathrm{V})}$
> (34) *xeyli xošhal šod-am bacheh-hā ro $\quad$ did-am, enjoyed kard-am

According to Purmohammad (2015) the results of the naturalistic data revealed that, with respect to BCVs such as 'insist kard' ((s)he insisted), all the connected nodes get activated. In other words, when 'ESRA $\bar{R}$ KARDAN' is activated, the lemmas 'esrār' (insistence) and 'kardan' (to do) in Persian and 'insist' and 'insistence' in English receive activation as well and at the end 'insist' and 'kardan' get selected. He concluded that, for this reason, the grammatical class does not constrain lexical access during the production of BCVs.

Purmohammad (2015) also investigated the process of BCVs from a psycholinguistic perspective. He used a picture-word interference paradigm in order to examine the crosslanguage activation at the lexical level in bilingual language production (see Hermans et al., 1998; Vorwerg, 2012). Picture-word interference paradigm can be used to investigate the effect of lexical activation of the non-intended language on the lexical access of the target language
(Giezen \& Emmorey, 2015). In this experiment, Purmohammad (2015) investigated whether the English verbs compete with the corresponding Persian compound verbs as a whole or whether only with the nominal constituent of the Persian compound verbs. Four conditions were designed for this experiment. In each condition, the participants named pictures depicting actions with either a whole Persian compound verb or only their nominal constituent while an English distractor verb was available to them. For instance, in condition 1 the participants were to produce the Persian compound verb 'qezāvat kard’ (lit. judgment did meaning he/she judged) and the English distractor verb that they would see on the picture was 'judge. Another instance for condition 4 is that the participants were to produce the nominal constituent 'qezāvat' (judgment) of the Persian compound verb 'qezāvat kard' and the English distractor verb was 'prefer'. All the distractor verbs were superimposed on the pictures in random positions to prevent participants from predicting their positions. The distractor verbs (i.e. related and unrelated) were presented to the subjects to see how long it would take them to name the pictures when a verb from the other language is available. The response time of the participants were calculated and analyzed. The idea behind the different conditions was to see how the participants would behave while completing the nominal constituent of the Persian compound verb when a semantically related English distractor verb was available and to observe whether there is a competition between the English verb and Persian noun for selection. His hypothesis was that since two words from different lexical and grammatical categories across the two languages of bilinguals compete for selection, there should not be a facilitatory effect when the participants complete the nominal constituents of Persian compound verbs in the context of a semantically related English distractor verbs.

Purmohammad (2015) suggested that since the grammatical class does not constrain the lexical access during the production of the nominal constituent of BCVs, the naming latencies
of target pictures should increase when a semantically related English distractor verb was present, while the naming latencies should decrease when the English distractor verb was semantically unrelated. And if more facilitatory effect was observed when participants complete the nominal constituent of Persian compound verbs in the context of its semantically related English distractor verb, it provided evidence that words from different categories do not compete for selection.

In this experiment, Purmohammad (2015) examined 22 Persian-English bilinguals residing in Switzerland. Before the experiment, participants filled out the Language Experience and Proficiency Questionnaire (LEPQ) developed by Marian, Blumenfeld and Kaushanskaya (2007). 20 pictures of action Persian compound verbs as the target, 80 pictures as the filler and 40 English distractor verbs, were selected for this experiment. Persian borrowed compound verbs such as 'telephone kardan', 'reserve kardan' and 'fax kardan' were discarded. Each participant received a total of 160 trials within 4 blocks. Prior to the experiment all participants were presented with all of the target pictures along with their expected names in Persian in random order without the distractor verbs. Two factors were manipulated in the experiment: linguistic unit (CV linguistic unit and nominal linguistic unit): the subjects were to name pictures either with a whole Persian compound verb or only with the nominal constituent; and relation (semantically related or unrelated): the subjects were presented with semantically related or unrelated distractor verbs.

The results revealed a difference in response time between semantically related and unrelated distractors. In other words, the naming latencies were increased in the nominal linguistic unit when the distractors were semantically related to the target verbs. This means that the reaction time of the participants was faster while completing the nominal constituent of a compound verb in the context of an unrelated English distractor verb compared to when they
named pictures by completing the nominal constituent of the compound verb in the context of its semantically related English distractor verb. With respect to the obtained results, Purmohammad (2015) concluded that two words from different categories across the two languages of bilinguals compete for selection during the production of the nominal constituent of BCVs. In other words, the lexical nodes corresponding to verbs from the other language (in this case English) enter into competition with the lexical nodes corresponding to the noun category in Persian. He concluded further that the grammatical class of words "does not provide a rigid constraint on lexical access during the production of BCVs" (Purmohammad, 2015: 132).

It was already explained in the introduction section that the hypotheses for this research is reflected on the infinitives. For this reason, the next section is dedicated to introducing and discussing the infinitives in both Persian and Dutch.

### 1.6. Infinitives

Infinitives occupy a special position among the parts of speech, a grammatical category that has been vastly debated. Based on the notion of 'Nominal Aspect' proposed by Rijkhoff (1991, 2002), it has been suggested that infinitives are halfway between a verb and a noun. Rijkhof $(1991,2002)$ proposed this concept as a nominal counterpart of the way verbs encase the way actions and events are conceptualized, to capture in a way the crosslinguistic variability in the types of interpretations available to nouns. He characterized two dimensions of variation, space and boundedness, which are encoded by the two binary features [ $\pm$ structure] and [ $\pm$ shape] to define four lexical kinds of nouns, as shown in (34).

| $(34)$ | + structure | + shape | collective nouns |
| ---: | :--- | :--- | :--- |
| + structure | - shape | mass nouns |  |
| - structure | + shape | individual nouns |  |
| - structure | - shape | concept nouns |  |

It has been argued that the infinitives match very closely the aspectual profile of the socalled concept nouns, those that only in discourse become actualized lexemes (Palmerini, 2006).

Haspelmath (1995: 28) defines infinitives as having two functions: in addition to their use as complements, they are used as adverbial modifiers to express purpose as well. This view is consistent with Van der Auwera's (1998: 275) proposal to consider infinitives as "distributing over" or "intermediate between" action nominals and converbs ${ }^{2}$. However, infinitives, in spite of the traditional idea of them being a part of the non-finite or nominal verb forms, have not been labeled verbal nouns in recent literature. Verbal nouns are considered to be action nominals which have essentially all morphological and syntactic properties of nouns, whereas infinitives lack such properties (e.g. case inflection; see also Koptjevskaja-Tamm 1993: 36-37). It is, after all, disappointing to regard the infinitives as a type of non-finites that do not have a new word-form word-class and that it should not be concluded that infinitives must be classified as verbs and verbs only (Haspelmath, 1995; Noonan, 1985). The definition of infinitives and action nominals look very much alike when it comes to functional approaches to non-finites (Ylikoski, 2003).

According to Stowell (1982), infinitives lack the morphological feature [ $\pm$ past] but it does not necessarily mean that they lack a tense operator. This status of being neither present nor past, implies that the time frame of the infinitives is unrealized with respect to the tense of

[^1]the matrix in which they appear. This 'unrealized' tense is reflected in their purposive interpretation. All these views regard infinitives when they appear in a sentence in a monolingual situation, not in a bilingual contact situation. How do infinitives behave in the Persian and Dutch languages? First, I will explain the construction of infinitives in Persian and then in Dutch.

From a morphological point of view, Persian infinitives behave like nouns. For instance, they take the nominal plural marker '-hā' (e.g. 'xordan-hā' lit. eating-pl meaning 'the acts of eating'), take the suffix '-i' which can only be added to nouns to form adjectives (e.g. 'xordani' meaning 'eatable') (Kahnemuyipour, 2003), or the attachment of ezafe '-e' which can only be attached to infinitives and participles but not to finite verbs (e.g. 'xordan-e āb' lit. eating-EZ water meaning 'drinking water') (Samvelian, 2007). The following sentence is an example of the attachment of ezafe '-e' to infinitives.
(35) baPd az raftan-e pedar be mādar zang zad-am after from going-EZ father to mother bell hit-I 'after dad's leaving, I called mom'

In Persian, the best choice for an infinitival form is the citation form of the verb. consider the following pair of sentences:
(36) a. Sima dust dar-e ketab be-xun-e

Sima friend have-3sg book Sbj-read-3sg
'Sima likes to read books'
b. Sima ketab xundan rā dust dar-e

Sima book reading DOM friend-have-3sg
'Sima likes reading books’

Comparing the two sentences above, the fact that the citation form of the verb 'xundan' (to read) is used in (36b) and it is marked with '-rä' (the case marker that appears after direct
objects) suggests that it is a nominal constituent (Ghomeshi, 2001). The citation form of the verb or the infinitives have been referred to as a nominal verb (Chodzko 1852, as cited in Kahnemuyipour, 2003), a verbal noun (Lazard 1992) and a gerund (Hashemipour, 1989).

The sentences below will further illustrate the nominal infinitives in Persian language. According to Karimi, Samiian and Stilo (2008), the infinitive consists of the past stem plus the infinitive morpheme '-an' that appears as a suffix on the verbal stem. If we look at the translation of the infinitives, we see that even in English these infinitives do not convey the meaning as verbs but as nouns in gerund forms.
(37) Kār kardan dar in šarāyet xeyli saxt-e
work do-inf in this conditions very difficult-is
'Working in these conditions is very difficult.'
(38) Dir āmadan kār-e xubi nist
late come-inf work-EZ good not-is
'Coming late is not a good thing'

The use and characteristics of infinitives in Persian is discussed above. It is essential to discuss the characteristics and behavior of Dutch infinitives here as well. As was already mentioned, Dutch is a SOV language. However, when there is only one verb in the sentence, the verb moves to the second position which is after the subject. What happens when more than one verb, a modal verb or an auxiliary appears in the sentence? The lexical verb stays in its original position which is clause final. In Dutch, infinitives can be easily identified. Because of the inflection, the finite verb moves to second position in main clauses (Den Besten, 1983; Koster, 1975; Zwart, 1997) and infinitives remain in sentence-final position. Moreover, infinitives are marked with a distinct suffix (-en). In Dutch, infinitives behave simultaneously as verbs and as nouns which means that they can have both verbal and nominal properties
(Booij, 1993). The presence of the linking phoneme '-s' in the following examples, shows this nominal property.
(39) a. lijden-s-verhaal 'passion'
b. eten-s-tijd 'dinner time'
c. sterven-s-begeleiding 'terminal care’
d. zien-s-wijze 'point of view'

The examples in (40), compounds with infinitival heads, are verbal compounds that belong to a productive morphological category and show that infinitives also have patterns like nouns.
(40) a. school-zwemmen
school-swimming’
b. boek-binden 'book-binding'
c. hout-hakken 'wood-chopping'
d. trouw-trekken 'rope-pulling'
(Booij, 1993)

Another example that shows Dutch infinitives can behave like nouns sometimes is the occurrence of 'de/het' (the) and 'een' (a/an) with the infinitive. See the following examples:
(41) het roken van sigaretten is niet goed voor je the smoke of cigarettes is not good for you 'the smoke of the cigarettes is not good for you'
(42) het eten van te veel eieren kan ongezond zijn the eating of too much eggs can unhealthy to be 'eating too much eggs can be unhealthy'

The reason for the use of infinitival form rather than the verbal stem is that the infinitive form functions as verbal nominalization. Although the deverbal nominalizing suffix in Dutch is '-ing', this suffix hardly ever attaches to underived verbs. For the verbs above, the infinitive form is the only possible form of nominalization, otherwise they would be ill-formed: *lijding,
*eting, *sterving. Another example of the infinitives behaving like nouns is a form of the verb 'zijn' (to be) followed by 'aan het + infinitive'. The verbal infinitive in this structure can function as a neuter noun (Booij, 2002). Dutch infinitives can be preceded by determiners such as 'een' (a) and 'het' (the) and can also feed both derivation and compounding. The set of examples in (40), compounds with infinitival heads, show that this category is productive in Dutch and since infinitives have nominal properties, they can be considered as nominal compounds. Therefore, this can imply that a word like 'school-zwemmen' is not the infinitive of a verbal compound but a compound with an infinitival head (Booij, 1996).

This section introduced infinitives in both Persian and Dutch that can behave like nouns and carry nominal properties. The notion of infinitives having both verbal and nominal properties provides evidence that infinitives cannot undoubtedly and unquestionably be regarded only as verbs when they occur in code-switched utterances, especially BCVs, as it was previously believed by many researchers (e.g. Annamalai, 1989; Chatterjee, 2014; Kishna, 1979; Purmohammad, 2015; Romaine, 1986). My purpose for this research is to provide further evidence that the Dutch infinitives that occur in the construction of BCVs in the Persian-Dutch bilinguals' production of compound verbs, in fact, exhibit nominal properties more than verbal properties and behave more like nouns.

### 1.7. Grammatical category and lexical access

One of the oldest discoveries in the field of linguistics is "the division of words into distinct categories or parts of speech" (Baker, 2003:1). Verbs, Just like nouns, are distinguished from one another in almost every language (Crepaldi et al., 2011). According to Bhat (2000), the distinction between verbs and nouns is of more importance than the other word class
distinctions such as adverb-verb and adjective-noun. Yet, grammatical class, especially the noun-verb distinction, has been a controversial issue in linguistics. While the noun-verb distinction is considered a language universal, many linguists such as Anderson (2004) and Laudanna et al. (2002) assume that such a distinction is not universal or at least a debated issue. The reason is that some languages such as Polynesian and Nootkan languages do not distinguish nouns from verbs (Croft, 2000).

In some languages, the grammatical category of the words provides constraints on their functions, while some languages allow their words to appear anywhere in the sentence without any restrictions or modifications. Therefore, it can be said that, with respect to the noun-verb distinction, languages vary in the degree in which they distinguish between the two classes (Bhat, 2000). For example, in English some words (e.g. proper noun, pronoun) cannot be inflected, whereas in Mundari (an Austro-Asiatic language) every word can be a predicate and take inflections such as tense and agreement markers (Bhat, 2000).

One of the striking facts is that some words can be classified as both nouns and verbs. According to Luuk (2010), stems such as 'walk', 'love', and 'kill' are ambiguous and flexible because depending on the context, they can appear as either nouns or verbs. The results of linguistic studies on grammatical class appear to be inconsistent. The effect of grammatical class was observed in word substitution and exchange errors (Garrett, 1980), whereas it became less and less clear in the processing of single words (Vigliocco et al. 2008). Vigliocco, Vinson, Arciuli and Barbers (2008) argued that the inconsistent results in the literature is due to the semantic and syntactic differences between verbs and nouns.

According to Pechmann and Zerbst (2002), speakers need to access the syntactic information and the word class of the lexical items in order to produce appropriate utterances. Natural languages each have their own grammar and it is this grammar that specifies whether a
sequence of words of different grammatical categories are acceptable or not. In order to examine whether the syntactic information is available to the bilingual speaker when producing a BCV , three experiments were conducted which I will discuss them in the following chapter.

## CHAPTER 2: The production of code-switched bilingual compound verbs

### 2.1. Introduction

To better understand the processes involved in the production of bilingual compound verbs, it is crucial to expand our knowledge of the mental lexicon. Since compounding occurs in almost all languages, understanding how these compounds are stored, processed, accessed and retrieved from the mental lexicon across different grammatical categories is crucial. Marian (2009) assumed that the main source of organizing principles of syntactic representation in the mental lexicon is the differences between words' grammatical categories. She suggested that several features distinguish nouns from verbs. Nouns are used to name objects, but verbs are used to express relations and actions. Research on naturally occurring substitution errors (e.g. I put the table on the book) revealed that speakers pay attention to the lexical and grammatical information when they are speaking spontaneously (Vigliocco \& Hartsuiker, 2002). According to the authors, substitution errors respect the constraints on word class, meaning that the errors found in spontaneous speech always follow the rules and have "the same grammatical class as the intended word" (p. 445).

Gentner (1981) reported that processing nouns is easier than verbs. Speakers may remember nouns with less difficulty than verbs whether as cue (Thorndyke, 1975), as item-to-be-recalled (Kintsch, 1974), or as lexical items to-be-recognized (Reynolds \& Flagg, 1976). According to Gentner (1982), nouns are also learned earlier than verbs.

Yet, the distinction between nouns and verbs in the bilingual mental lexicon has not received much attention. Gentner (1981), however, investigated the degree of cross-linguistic variability of word class using relative translatability. The results revealed that nouns show greater cross-linguistic stability than verbs. Van Hell and de Groot (1998) investigated the conceptual representation of the meaning of words in bilingual memory. They asked DutchEnglish bilingual speakers to perform a discrete word association task on a series of either Dutch or English nouns and verbs that varied in concreteness and cognate status. The results revealed that retrieving an associate was easier with nouns compared to verbs. According to Van Hell and de Groot (1998: 193), the findings suggested that "conceptual representation in bilingual memory depends on word-type and grammatical class".

Fausey, Gentner, Asmuth and Yoshida (2006) investigated the processing patterns for nouns and verbs across languages. In this study, the researchers asked Japanese and English speakers to paraphrase sentences of the form 'The noun verbed' (e.g. The blender talked). They evaluated the degree to which the speakers altered the default word meanings by asking another group to read the paraphrases and to determine which word was used in the original sentence. The authors found that English speakers could determine more paraphrased nouns than verbs, which suggests that verb meanings in the paraphrases were altered more than noun meanings. They, however, found no difference between nouns and verbs in the results of Japanese speakers. According to the authors, these findings did not provide concrete evidence for a universal difference between nouns and verbs in sentence processing.

Several studies on grammatical class have considered its effects, especially during the processing of single words, to be vague (Pechmann \& Zerbst, 2002; Pechmann et al., 2004; Vigliocco et al., 2005, 2008). According to Vigliocco, Vinson, Arciuli and Barber (2008),
although there was a strong correlation between grammatical class and semantic features in most of imaging and neuropsychological studies (e.g. Tyler et al., 2001) and neuroimaging studies (e.g. Siri et al., 2007), no specific activation in brain regions for either nouns or verbs was observed. The results of these studies, however, cannot undoubtedly be attributed to grammatical class.

Several studies pointed out the problems regarding the effect of grammatical class. One problem with respect to the effect of grammatical class is that this effect was found only when there was a context available (Pechmann \& Zerbst, 2002; Vigolicco et al., 2005). For instance, Pechmann and Zerbst (2002) suggested that the word class of a lexical item should be available when it is inserted into an existing syntactic frame and therefore, its grammatical category information would become activated. Moreover, Vigliocco, Vinson, Arciuli and Barber (2008) argued that their results illustrated that the word's syntactic information and grammatical class cannot be accessed automatically during word recognition process.

### 2.2. The current study

The present study investigates the natural occurrence of BCVs and its processing. As we already know, BCVs are compound verbs that occur in language contact situations. Most natural languages are comprised of compound verbs. Hence, Understanding the processes involved in compounding and how to access compounds is crucial to our knowledge of the mental lexicon (Gagne \& Spalding, 2006). According to Jarema (2006), in order to understand how speakers store and organize compound words and how they retrieve them from their memory, it is necessary to study how compounds are represented and processed. Since
compound words are created very creatively and productively, it is very likely that one encounters a new compound word that has not been seen or heard before (Libben, 2006). The same can happen when a BCV is produced. Bilingual speakers may take one item from one language and another item from the other language and produce a BCV that does not exist or has never been produced or heard before. Most studies in both monolingual and bilingual lexical processing use single words in their experiments while compounding itself is very productive in many languages and can provide more reliable results for the production, processing and accessing compound words and BCVs (Semenza \& Mondini, 2006). Given the nature of compounding and its productivity in many languages, more cross-linguistic research on compound words is expected but unfortunately, they are quite infrequent (Jarema, 2006).

For the study of bilingual compound verbs, one of the data collection methods used in this study is naturalistic data. I examine whether lexical access is mediated by the grammatical category of a word and whether words of different classes across the two languages of a bilingual speaker can compete for selection in the production of BCVs. Monolingual Persian compound verbs consist of a Persian noun/adjective/adverb and a Persian light verb. It was proposed by many researchers that bilingual compound verbs have a verb+verb construction (Annamalai, 1989, Tamil-English; Chatterjee, 2014, Bengali-English; Kishna, 1979, DutchSarnami; Purmohammad, 2015, Persian-English; Romaine, 1986, Panjabi-English; Tamis, 1986, Greek-English).

Purmohammad (2015) argued that words from different classes across the two languages of bilinguals compete for selection. In other words, lexical nodes that correspond to verbs from the other language enter into competition with the lexical nodes that correspond to nouns and finally it is the verb from the other language that gets selected and replaces the
nominal constituent of the compound verb in the native language. He suggested further that words' grammatical class does not constrain lexical access during the production of BCVs. On the contrary, I hypothesize that verbs from the other language and nouns from the first language may compete for selection across the two languages of bilinguals and the verb may get selected at the end. However, this verb is not a finite verb but a nominal infinitive that replaces the nominal constituent of the bilingual compound verb. As was discussed in chapter 1 , infinitives have both verbal and nominal properties. And it is unrealistic to regard infinitives in the codeswitched utterances as verbs without any doubts. The aim of this research is to provide evidence that in the production of BCVs, the infinitives that replace the nominal constituent of the Persian compound verbs exhibit nominal properties more than verbal properties.

For the purpose of this research, three experiments were designed and conducted. Experiment 1, naturalistic data: this experiment allows me to investigate the production of BCVs in a natural setting. Experiment 2, picture-naming paradigm: this experiment was conducted to investigate the production of Persian compound verbs as a whole or only the nominal constituent of the Persian compound verbs in the context of a Dutch distractor verb. Experiment 3, storytelling: this experiment was conducted to investigate the production and process of Dutch compound verbs in a Persian story setting. In the following sections, I will discuss all the experiments in detail.

### 2.3. Experiment 1

The data for the naturalistic experiment of this study have been collected through phone and video call conversations with the participants. I had searched for TV or radio shows (reality shows such as a cooking competition or otherwise) but I could not find any with Persian-Dutch bilingual speakers. Therefore, I decided to interview some of my acquaintances and for the rest of the participants, I have posted on different group pages of Facebook and asked bilinguals to participate in my study. First, they messaged me on Facebook to set up a time and date for the interview. Then I would call them on the agreed upon date and time to have a friendly conversation about different topics with them. The participants were free to pick the topic of their own choosing, otherwise I would have initiated the conversation by asking questions such as their daily activities, hometown, hobbies, interests, and experiences in the Netherlands. The interviews took between 30 to 75 minutes. Of course, it was more convenient and appropriate to hold these conversations in person either with a group of participants or just a one-on-one interview. However, due to the contact restrictions caused by Covid-19, it was not possible to have a gathering in order to conduct the interviews. Therefore, I decided to have a phone conversation or a video call via Zoom with the participants instead. The total amount of the conversations were up to 1009 minutes. Before the start of the conversation, each participant read an information letter, signed a consent form, and sent a copy to me via email or WhatsApp. These conversations were recorded to be analyzed later. The recordings will be deleted after the relevant data is transcribed by the researcher. The transcriptions, in turn, will be given a code that can only traced back to the participants with a key. The keys were destroyed within a few days and all research data became anonymized. There were 22 Persian-Dutch participants selected for the collection of naturalistic data. They all used informal Persian. All the
participants were residing in the Netherlands. All of them talked about the number of years they had been living in the Netherlands. The mean length of their residence was 22.68 years. They frequently switched from Persian to Dutch. 979 switching cases were recorded. They produced almost all type of code-switched utterances and inserted all types of Dutch words into their Persian utterances. Nouns, adjectives, adverbs, verbs and phrases (intra-sentential switching) from Dutch were inserted into their Persian utterances. Sometimes a Dutch noun phrase (e.g. kleine verschil meaning 'small difference') or a whole Dutch sentence (inter-sentential switching or alternation) were inserted into the Persian utterances (see Table 1 for the characteristics of the switchings). As Table 1 shows, in the present data 135 switched words were adjectives. In $12 \%$ of the cases, a past participle was used either with ‘šodan' (to become) or 'kardan' (to do) Persian light verbs. See the following example in which the word 'aangepast' (adapted) is produced within one utterance with both verbs.
(43) 7 sāl-e dār-im aangepast mi-kon-im hanooz aangepast na-šode 7 year-EZ have-we-Aux adapted Imp-do-we still adapted Neg-become-ptcp 'it has been 7 years we are adapting, it hasn't been adapted yet'

149 cases of switched utterances ( $15.2 \%$ ) were found in which the participants codeswitched inside the Persian compound verb structure and formed BCVs. These switches were sometimes deliberate and controlled (see Paradis, 2009). Paradis (2009) proposed that the general mechanisms of explicit task-switching is involved in controlled switching and it is dependent on declarative memory. Lexical items are not inserted from the other language automatically in intentional switching and are "subserved by cerebral structures that sustain declarative memory processes" (Paradis, 2009: 155). It has been observed that the speakers use controlled switching mainly for further clarification. Table 1 represents the characteristics of the participants' language switches.

| Adjective | Adverbs | Nouns | Noun phrase | Inter-sentential <br> switching | Phrase | Verb | Interjection | Infinitive |
| :--- | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| $135(13.79 \%)$ | $27(2.75 \%)$ | $413(42.18 \%)$ | $117(12 \%)$ | $69(7 \%)$ | $20(2.04 \%)$ | $149(15.2 \%)$ | $21(2.14 \%)$ | $13(1.32 \%)$ |
|  |  |  |  |  | Total $=979$ |  |  |  |

Table 1- The characteristics of participants' code-switching in the naturalistic data

The patterns of CS in participants' speech indicates their level of language proficiency. As we have seen, the participants produced almost all types of CS. This suggests that they have a high level of proficiency in their L2. They produced 69 cases of inter-sentential switching, which requires a high level of proficiency because it often "entails the production of full clauses in each language" (Bullock \& Toribio, 2009: 3). We can see in Table 1 that the participants produced 889 cases of intra-sentential CS. Many researchers believe that speakers' "ability to switch at the intra-sentential level correlates with increased mastery of linguistic structures" because what is required for intra-sentential CS is a high degree of proficiency in both languages (Bolonyai, 2009: 8). As a result, it is safe to assume that they are highly proficient bilinguals.

### 2.3.1. Data analysis

It is preferable to analyze the data in terms of the adaptive control hypothesis proposed by Green and Abutalebi (2013) to interpret the interactional context. According to Green and Abutalebi's (2013) hypothesis, as speakers attempt to produce a lexical item, competing representations of that lexical item become activated in the working memory. Subsequently, the interactional context determines which representation should be selected. There are three interactional contexts: a single-language context, a dual-language context, and a dense code-
switching context. Essentially, in a single-language context one of the languages of the bilinguals is used in one situation and the other in another distinct situation. For instance, no frequent switching is expected to occur when a non-dominant language is used in the work environment while the dominant language is spoken mainly at home (Green \& Abutalebi, 2013). In contrast, both languages of bilinguals are used to communicate but with different speakers in a dual-language context. In a dual-language context, According to Green and Abutalebi (2013), switching within a conversation occurs but not within an utterance. Finally, speakers frequently mix both languages within a single utterance in a dense code-switching context and incorporate words from one language into the other language and create a "congruent lexicalization or dense CS" (Green \& Wei, 2014: 500) (see Muysken, 2000 for the notion of congruent lexicalization). In a dense code-switching context, speakers may incorporate words through addition or morphosyntactic adaptation (Green \& Abutalebi, 2013).

It is reasonable to consider that, based on the qualities and quantities of the present codeswitching data, many participants were in a dense code-switching environment since they produced many code-switched utterances (979 cases altogether). Moreover, as seen above, participants produced almost all types of CS such as insertion, alternation, etc.. According to the hypothesis, the partners "implicitly agree that the two languages are in play in CS" (Green \& Wei, 2014: 503). Hence, such a process is cooperative rather than competitive (Green \& Abutalebi, 2013). Green and Wie (2014) indicated that alternation requires no adaptation whereas insertion requires varying degrees of adaptation and lexicalization (e.g. inserting affixes). Such a congruent lexicalization can be seen in example (44) from the data in which the Dutch item 'reden' (reason) is suffixed with both the Persian plural suffix /-hā/ and the Persian possessive clitic pronoun /-š/.
(44) elmi natoon-i beg-i reden-hā-š chi bood-e scientific neg-can-you say-you reason-pl.poss what was 'you can't say what its reasons were scientifically'

In examples (45) and (46) from our data, items from the two languages were used alternately and it can be seen how the two languages are morphologically interwoven.
(45) ye gesprek-e belangrijk-i dasht-am
a conversation-EZ important-Iom have-I-past
'I had an important conversation'
(46) veiligheid to prioriteit-eshoon hast
safety in olaviyat-linking enclitic-poss.pl is
'safety is their priority'

As mentioned above, participants produced 149 instances of BCVs overall. The most important characteristic of BCVs in our corpus is that the nominal constituents of Persian compound verbs were replaced by a verb with the suffix '-en' that forms an infinitive in Dutch in almost all the cases. The following utterances are the examples of BVCs in the data.
(47) bāyad xuna-ro verbouwen kon-am
should house-DOM to renovate do-I
'I should renovate the house'
Persian equivalent of the BCV: bāzsāzi ${ }_{N}$ kon-am
(48) man moškel dār-am accepteren kon-am, vertrouwen kon-am va loslaten kon-am

I difficulty have-I to accept do-I to trust do-I and to let go do-I
'I have difficulties to accept, to trust and to let go'
Persian equivalent of $\mathrm{BCVs:}_{\text {: }}$ qabul $_{\mathrm{N}}$ kon-am, etemād ${ }_{\mathrm{N}}$ kon-am, rahā $\overline{A d j}$ kon-am
(49) mi-tun-an az in tariq compenseren kon-an

Imp-can-they from this way to compensate do-they
'they can compensate this way'
Persian equivalent of BCV : jobrān $\mathrm{n}_{\mathrm{N}}$ kon-an

There were instances in the data that either a Dutch infinitive was used somewhere other than BCV or the inflected form was used but with a noun meaning (see the examples).
(50) sociale omgaan-ešun ziad qavi na-bud (omgaan=infinitive) social interaction-linking enclitic-poss-their very strong Neg-be-past 'their social interaction was not very strong'
(51) bexāter-e inke programmeren bud avaz kard-am (programmeren=infinitive) because-EZ that programming was change do-I-past 'I changed it because it was programming'
(52) to inschrijven ham dār-i tu šahr-ā-ye dige?
you registration too have-you in city-pl-EZ other
'do you have registration in other cities?'
(53) ensān-hā moškel-e barā-šun relativeren (relativeren=infinitive)

Human-pl difficult-is for-linking enclitic-poss to relativize 'it is difficult for humans to relativize'
(54) xodet-o bescherm kon-i
yourself-DOM protect do-I
'protect yourself'
(55) danešju xodeš ne-mitoone aanvraag anjām be-de
student her/himself Neg-can-3sg. application doing Sbj-give 'a student can't submit the application him/herself'

Let us have a look at the two sentences (56) and (57) below. In (56), the Dutch infinitive 'opvoeden' (to raise, to educate) has replaced the nominal constituent of Persian compound verb 'tarbiyat kardan' (lit. education-do meaning 'to educate'), where as in (57) the Dutch noun 'opvoeding' (education, upbringing) has replaced the nominal constituent of the same Persian compound verb.
(56) bache-hā-ro opvoeden mi-kon-im child-pl-DOM to educate Imp-do-we 'we should educate the children'
(57) mā-hā ke opvoeding mi-kon-im
we-pl that education Imp-do-we 'we who educate'

Although the translation of both 'opvoeden and 'opvoeding' is the English verb 'educate' with regard to the whole sentence, they do not behave like verbs in either of the situations. In both utterances, the Persian light verb 'kardan' (to do) has appeared in present imperfect mood 'mi-kon-im'. We know that Persian compound verbs consist of a N+V. In (57), 'opvoeding' which is a Dutch noun accompanies the Persian light verb. Therefore, a noun from the second language (Dutch) has replaced the nominal constituent of the Persian compound verb. In (56), 'opvoeden' which is a Dutch infinitive has replaced the nominal constituent of the Persian compound verb. As noted in chapter 1, Dutch infinitives have nominal properties. Hence, I propose that the infinitive Dutch such as in examples (47), (48), (49) and (56) are all nominal infinitives replacing the nominal constituent of the Persian compound verbs. These results are consistent with Vigliocco and Hartsuiker's (2002) claim that the speakers pay attention to the categorical information of lexical items in their spontaneous speech and follow the rules of grammatical category of the intended items.

Persian light verbs in both monolingual and bilingual compound verbs carry the inflectional information (featural information) such as tense and number. Appropriately, none of the participants produced an utterance like example (58) in which the past tense form of a Dutch verb was used. This indicates that bilinguals retrieved the necessary information to construct well-formed switch utterances, meaning that there was no expressing of information about tense twice. In our data, almost all the BCVs followed the same patterns as in example (59) and (60) instead. An asterisk (*) indicates both the ill-formedness of the sentence and that such a structure was never produced by the participants.
(58) *rāh-hā-ye moxtalefi ro probeerde kard-i

Way-pl-EZ different-Iom DOM tried did-you 'you have tried different ways'

Persian equivalent of the BCV: emtehān kard-i
(59) rāh-hā-ye moxtalefi ro proberen kard-i

Way-pl-EZ different-Iom DOM to try did-you
'you have tried different ways'
Persian equivalent of the BCV : emtehān kard-i
(60) saxt-e be-xa-y in-hame dars xundan-o achterlaten bo-kon-i difficult-is Sbj-want-you this-much lesson to read-DOM to leave behind Sbj-do-you 'it is difficult if you want to leave all those years of studying behind'

Persian equivalent of the BCV : poštesar be-zar-i

By paying close attention to example (60), one can see that a Persian compound verb has been used in the infinitive form 'dars xundan' (to study). As we have discussed in chapter 1, Persian infinitives behave like nouns from a morphological point of view. They can take the nominal plural maker /-hā/ (Kahnemuyipour, 2003), and take the linking enclitic ezafe /-e/ (Samvelian, 2007). In example (60), /-o/ which is the colloquial form of /rā/, the direct object marker in Persian, appears at the end of the Persian infinitive suggesting that it is a nominal constituent (Ghomeshi, 2001). Other examples can be seen in (61) and (62).
(61) hamiše mi-xā-m proberen kon-am ye ja dige zendegi kardan-o always Imp-want-I to try do-I one place other life to do-DOM
'I always want to try living in another place'
(62) bā varzeš kardan salāmat be-š-an
with exercise to do healthy Sbj -become-they
'they become healthy with exercise'
I have found some occurrences of a Dutch adjective with a Persian light verb in the infinitive form and a Dutch infinitive with a Persian light verb in the infinitive form. See the following examples. In (63), 'stom budan' (being stupid) was produced after 'bexater-e'
(because of) which is always followed by a noun and since 'stom' (stupid) without a verb does not make much sense in the meaning of the whole sentence, it is followed by 'budan' (to be) to make a complete noun phrase. In (64), 'roddelen kardan' (lit. to gossip-to do) is the subject of the sentence and behaves like a noun, regardless of being a Dutch or Persian infinitive.
(63) bexāter-e stom budan man dars-am-o vel kard-am Iran because-EZ stupid to be I lesson-poss-my-DOM free do-I Iran 'because of being stupid, I quit my studying in Iran'
(64) roddelen kardan to inā ham hast

To gossip to do in here too is 'gossiping exist here as well'

The analysis of the data shows that in $78 \%$ of the BCVs, subjects used the same light verbs as would be used in the monolingual Persian compound verbs. In the remaining cases, where the same light verbs were not accessed, participants used 'kardan' (to do) instead. 'Kardan' is the most frequent light verb in Persian compound verbs' structure (see example 65).
(65) tu park wandelen mi-kon-am in park to walk Imp-do-I
'I walk in the park'
Persian equivalent: qadam mi-zan-am

### 2.3.2. Discussion and conclusion

The processing of BCVs provides important insights into bilingual lexical access and language processing. In summary, the basic characteristics of Persian-Dutch BCVs are: a) the nominal constituent of a compound verb is replaced by an infinitive from the other language
(Dutch); b) this infinitive behaved like a noun; c) the morpho-syntactic ${ }^{3}$ properties of the Dutch infinitives as verbs are not retrieved, only their properties as nouns are retrieved; d) the inserted infinitive is integrated into the base language (Persian); e) the Persian light verbs that follow the Dutch infinitives are inflected for tense, number and person (see Fotiou, 2010); f) the majority (78\%) of the BCVs used the same Persian light verbs as in the monolingual compound verbs. In the remaining cases, the participants used the most frequent light verb in Persian 'kardan' instead.

According to Purmohammad (2015), in the production of the nominal constituent of BCVs, the lexical node corresponding to the verb category rather than the noun category from the other language enters into competition with the lexical nodes that correspond to the noun category in Persian. In other words, when the speaker produces the nominal constituent of the compound verb, the lexical node corresponding to nouns in the base language and the lexical nodes corresponding to verbs in the other language get activated. He suggested that grammatical class does not provide a rigid constraint on lexical access during the production of BCVs.

On the other hand, I suggest that the lexical nodes corresponding to the verbs in Dutch gets activated but the verbs are in infinitive form. These infinitives are without any verbal (morpho-syntactic) properties. Sometimes the verbs also appear in the form of 'verb+-ing'. Both of these forms behave like nouns. The lexical node corresponding to nouns in Persian also gets activated as we have seen in the data so far. The activated lexical nodes in both languages enter into a competition to get selected. At the end, the lexical node that corresponds to infinitives get selected. This can be due to several reasons: a) participants are highly proficient

[^2]in Dutch language since most of them have been living in the Netherlands for more than 20 years and they switch between the two languages more frequently; b) they speak Dutch more on the daily basis; c) the Dutch infinitive is easier to produce than the verb+'-ing' form; d) Dutch infinitives have higher threshold and can get activated with more ease; e) when producing an infinitive, there is no need to retrieve any morph-syntactic information; and f) infinitives are more frequent than other forms.

According to Moravcsik (1975), "borrowed verbs are never borrowed as verbs but are borrowed as nouns instead (cited in Wohlgemuth, 2009: 279). She claimed that in the construction of BCVs, the alien verbs are actually nouns rather than verbs. Although I do not consider the production of BCVs as borrowing but code-switching, I agree with Moravcsik' view. There may be other studies providing evidence that it is the verb that gets inserted within the compound verb structure in BCVs, yet I strongly believe that inserting verbs as such is problematic both morphologically and syntactically and the inserted Dutch infinitives in the construction of BCVs in our data are actually nominal infinitives and not verbs.

The studies on compound verbs have indicated that several factors affect the processing and representation of compounds: "the semantic transparency of constituents, an individual's language history, frequency and productivity of compounds in a given language, orthographic and phonological characteristics of compounds, formal and structural similarities between languages" (Levy et al., 2006: 7-8). This can also be true for the production of BCVs. The frequency of the lexical items can more likely determine which word replaces the nominal constituent of Persian compound verbs regardless of which language it belongs to. Further research is required to test this proposal by investigating the production of BCVs in other language contact situations.

Marian's (2009) study indicated that verbs are more tied to linguistic context and nouns are likely to be more accessible across languages and contexts. The present analysis of the production of Persian-Dutch BCVs shows that nominal infinitives tend to be remarkably more accessible across languages and contexts in some circumstances.

### 2.4. Experiment 2

### 2.4.1. Introduction

So far, a corpus of naturalistic data has been used to study bilingual language processing, especially the processing of BCVs. A summary of the results will be presented here to provide a background for the next experiments. As stated in chapter 3, 1009 minutes of friendly interviews and conversations were conducted. Participants frequently switched from Persian to Dutch. 979 switching cases were recorded. The participants code-switched inside the Persian compound verb structure in 149 instances ( $15.2 \%$ of the switched cases) and formed BCVs. In the BCVs, the Persian nominal constituents were replaced by Dutch infinitives. In example (66), 'bāvar ne-mi-kon-am' (lit. belief Neg-Imp-do-I meaning 'I don’t believe') which has a $\mathrm{N}+\mathrm{V}$ structure is a monolingual compound verb. In example (67), 'geloven ne-mi-kon-am' (to believe Neg-Imp-do-I meaning 'I don't believe') which has a Inf.+V structure is an example of a BCV. As can be seen in example (67), the nominal constituent of a Persian compound verb was replaced by a Dutch Infinitive.
(66) man xodam in čizā-ro bāvar ne-mi-kon-am

I myself this things-DOM belief Neg-Imp-do-I
'I don't believe these things myself'
(67) man xodam in čizā-ro geloven ne-mi-kon-am

I myself this things-DOM to believe Neg-Imp-do-I
'I don't believe these things myself'

Thus, the results of the analysis of naturalistic data presented above shows that the Persian-Dutch bilingual speakers replace the nominal constituent of Persian compound verbs with Dutch infinitive. And we have seen so far that Dutch infinitives have nominal properties. Therefore, experiment 2 allows us to generalize this idea further to see whether the infinitives behave like nouns or verbs in the structure of BCVs. And since Dutch is a language that contains compound verbs just like Persian with the same structure, experiment 3 was designed and conducted that would allow us to investigate whether the participants treat the Dutch compound verbs the way they treat Persian compound verbs in a bilingual context.

The present research investigates whether the information on grammatical category is available during the processing of BCVs in bilingual language production. As we have seen so far, some studies have examined the effect of grammatical category in monolingual language processing (Pechmann \& Zerbst, 2002; Vigliocco et al. 2005; Vigliocco et al. 2008), while research on this effect in bilingual language processing is limited (see Van Hell \& de Groot, 1998). Van Hell and de Groot (1998) used a bilingual variant of the word association task and asked Dutch-English bilinguals to associate to nouns and verbs that differed in concreteness and cognate status, once in the language of the stimuli and once in the other language. Their results revealed that retrieving an associate was easier with nouns than verbs in both withinand between-language association.

Psycholinguistic research on language production employs tasks such as picture naming to examine the time-course of lexical access (Hall, 2011), therefore, it is a befitting task to use
in bilingual language production research in order to examine cross-language activation at the lexical level (Hermans et al., 1998; Vorwerg, 2012). According to Giezen and Emmorey (2015: 3), "The picture-word interference paradigm has not only been used to provide evidence of cross-language activation in bilingual speech production, but also as a window into the role of competition in lexical selection". Costa (2005) put forward the language non-specific selection account which indicates that lexical alternatives from both languages compete for selection. According to this account, between-language semantic distractors result in a semantic interference effect (Costa, 2005).

Purmohammad (2015) examined the encoding of grammatical category information in the processing of BCVs from a psycholinguistic point of view. He investigated whether words from different categories across the two languages of bilinguals compete for selection. In other words, whether the English verbs compete with the Persian compound verbs as a whole or with the nominal constituent of the Persian compound verbs only in the production of BCVs. He used a picture-word interference paradigm and asked the participants to name pictures of actions in Persian in four conditions while ignoring distractor words in English (see 1.5. Bilingual compound verbs for more details on Purmohammad's study). The results of his study revealed that two words from different categories across the two languages of bilinguals compete for selection during the production of the nominal constituent of BCVs. In other words, the lexical nodes corresponding to verbs from the other language (in this case English) enter into competition with the lexical nodes corresponding to the noun category in Persian. He concluded that the grammatical class does not constrain lexical access during the production of BCVs.

In the current research, two experiments were designed and conducted, one to investigate whether words from different categories across the two languages of bilinguals compete for selection, and the other to investigate whether the participants produce BCVs within a Dutch compound verb or whether they replace the nominal constituent of the Persian compound verb with the whole Dutch compound verb. More precisely, this study addresses whether in the case of the production of BCVs, the Dutch verbs compete with the corresponding Persian compound verbs (experiment 1), and whether Dutch compound verbs compete with the nominal constituent of the Persian compound verbs or the nominal constituent of the Dutch compound verb is replaced by a word from Persian. In the next two sections, these experiments will be explained in detail.

### 2.4.2. Picture naming paradigm

In order to investigate whether words from different categories across two languages of bilinguals compete for selection in the production of BCVs, I have relatively replicated Purmohammad's (2015) experiment of a picture-word interference paradigm. The same methods have been used in this study as well. Persian-Dutch bilinguals were asked to name pictures of actions in their L1 (Persian) in four different conditions while ignoring distractor words printed in Dutch.

Purmohammad (2015) suggested that there is no facilitatory effect when participants complete the nominal constituent of a Persian compound verb in the context of a semantically related distractor verb from the other language (English in his study), because when completing the nominal constituent of Persian compound verbs, the semantically related English verb enters
into competition with the nominal constituent of Persian compound verbs. He hypothesized that since two words from different classes across the two languages of bilinguals compete for selection in the production of BCVs, there should not be a facilitatory effect when completing the nominal constituents of the compound verbs while a semantically related English verb is present as a distractor. The hypothesis for the current study is that the Persian-Dutch bilingual speakers do benefit from the facilitatory effect when they are completing the nominal constituent of the Persian compound verbs in the presence of a semantically related Dutch distractor verb. The basis of this hypothesis is the result of the naturalistic data where the subjects produced mainly Dutch infinitives in the place of the nominal constituent of Persian compound verbs. Since Dutch infinitives have nominal properties and can behave like nouns, I suggest that there might be a competition between the words from the two languages but this competition may not be between two grammatical classes of words as suggested by Purmohammad (2015).

To put it more simply, I hypothesize that as the grammatical class of a word may constrain the lexical access during the production of the nominal constituent of BCVs, the naming latencies of target picture should decrease when participants complete the nominal constituent of a compound verb in the presence of a semantically related distractor verb. In other words, the participants will be faster when they complete the nominal constituent of a compound verb in the presence of its semantically related Dutch distractor verb compared to when they name pictures of actions by completing the nominal constituent of a compound verb in the presence of a semantically unrelated Dutch distractor verb.

On the contrary, if an inhibitory effect is found while completing the nominal constituent of Persian compound verbs in the presence of its semantically related Dutch distractor verb,
this would provide evidence that words from different classes across the two languages of bilinguals compete for selection during the production of BCVs . However, if more facilitatory effect is observed, this would provide evidence that the words are relatively from the same category and have similar characteristics, because when there is no competition between two lexical items across languages, facilitatory effects would be observed (see Costa, 2005).

In addition, the Language Experience and Proficiency Questionnaire (LEPQ) developed by Marian, Blumenfeld and Kaushanskaya (2007) has been used to investigate whether there is a correlation between participants' language status (e.g. their self-reported ratings on language proficiency, their daily exposure to Dutch) and their linguistic performance.

### 2.4.2.1. Methods

### 2.4.2.1.1. Participants

Participants were 20 Persian-Dutch bilinguals. 10 of them were simultaneous bilinguals and 10 were successive bilingual speakers. The mean age of participants was 33.5 with a range from 26 to 40 . The mean year of their formal education was 13.2. Twelve participants were male and 8 participants were female. 7 out of 12 male participants were simultaneous bilingual speakers and the rest were considered successive bilingual speakers. 3 out of 8 female speakers were simultaneous bilinguals and 5 were successive bilingual speakers of Persian and Dutch. At the time of testing, all participants were residing in the Netherlands. They were all given a Merci chocolate box as a token of appreciation for participating in this study. At the beginning of the session, the participants read the information letter and signed a consent form for the data
to be used in this study. Before the experiment, participants filled out the Language Experience and Proficiency Questionnaire (LEPQ) developed by Marian, Blumenfeld and Kaushanskaya $(2007)^{4}$. Two version of this questionnaire were used, one for the simultaneous bilinguals in Dutch and one for successive bilinguals in Persian. The reason for using two different versions of this questionnaire was that almost all of the simultaneous bilingual speakers could not read in Persian orthography. I did not include all the questions from the questionnaire in the present analysis. The analysis of Participants' self-reported measures of Dutch proficiency (speaking, comprehension and reading) revealed that they were all proficient in Dutch (see Table 3). They reported their extent of language exposure, years of education and their vision health. None of the participants had difficulty regarding their vision. A separate questionnaire was devised for the participants to self-report on the amount of BCV use on a scale of zero to ten. The language history and proficiency characteristics of the participants can be seen in Table 2.

| Characteristics |  |  |
| :--- | :---: | :---: |
|  |  |  |
| Age in years | 33.5 | $(4.51)$ |
| Education in years | 13.2 | $(3.19)$ |
| Self-reported amount of using BCVs on scale of 0-10 | 6.7 | $(0.80)$ |
| Percentage (out of 100\%) of daily exposure to Dutch | 58.45 | $(21.76)$ |
| Self-rated L2 understanding of spoken language on a scale of 0-10 | 7.9 | $(0.94)$ |
| Self-rated L2 speaking proficiency on a scale of 0-10 | 8.35 | $(1.01)$ |
| Self-rated L2 reading proficiency on a scale of 0-10 | 8.1 | $(0.95)$ |

Table 2- Means and Standard deviation for participants' demographic data

[^3]
### 2.4.2.1.2. Materials and design

In this experiment, participants named a series of pictures of actions in their L1 (Persian) using either a Persian compound verb or by completing the nominal constituents of Persian compound verbs while ignoring the Dutch distractor verbs. In order to design the experiment, 40 pictures of actions were presented to 5 native speakers of Persian. The monolingual equivalent of those BCVs from the naturalistic data that were picturable were selected as the target compound verbs. The Persian native speakers were asked to provide the name of the actions presented in the pictures as accurately as possible. 20 pictures with a high level of naming agreement were chosen as the target pictures (see Appendix A for the naming agreement questionnaire). 40 Dutch verbs were also selected as distractor words. The light verbs of the target Persian compound verbs were presented below the pictures to the participants as in condition 2 and 4 (see Appendix B for target picture names and distractor words used in the experiment). The pictures of 80 action compound verbs were also selected as fillers.

The experiment consisted of four different conditions: 1) In Condition 1, participants named pictures of actions using a Persian compound verb in the presence of its Dutch equivalent distractor verb. For example, the target Persian compound verb was 'pardāxt kard' (lit. payment-did meaning 'paid') and the distractor verb was 'betalen' (to pay), or the target Persian compound verb was 'dars dād' (lit. lesson-gave meaning 'taught') and the distractor verb was 'lesgeven' (to teach); 2) In Condition 2, only the nominal constituent of the compound verb was produced in the context of the light verb of the target Persian compound verb and in the presence of the same distractor verb as in Condition 1, which was a semantically related Dutch distractor verb to the Persian nominal constituent. For example, the target nominal constituent of the Persian compound verb was 'pardāxt' (payment) and the distractor verb was 'betalen' (to
pay), or the target nominal constituent of the Persian compound verb was 'tekrār' (repetition) and the distractor verb was 'herhalen' (to repeat); 3) In Condition 3, the whole Persian compound verb was produced in the presence of a semantically unrelated Dutch distractor verb. For instance, the target Persian compound verb was 'pardāxt kard' (lit. payment-did meaning 'paid') and the distractor verb was 'bellen' (to call), or the target Persian compound verb was ‘āzmāyeš kard' (lit. examination-did meaning 'examined') and the distractor verb was 'bewaren' (to keep); 4). In Condition 4, only the nominal constituent was produced in the context of the light verb of the target Persian compound verb and in the presence of the same distractor verb as in Condition 3, which was a semantically unrelated Dutch distractor verb to the Persian nominal constituent. For instance, the target nominal constituent of the Persian compound verb was 'pardāxt' (payment) and the distractor verb was 'bellen' (to call), or the target nominal constituent of the Persian compound verb was 'ezāfe' (addition) and the distractor verb was 'kopen' (to buy).

To find the appropriate distractors that are acceptable translations of the target Persian compound verbs, an 8-point scale judgment task was conducted in Qualtrics survey platform through the Utrecht University student website ${ }^{5}$. A group of 8 Persian-Dutch bilinguals were asked to rate the translation accuracy of the distractor verbs. Words and their translations rated above 6 were used as the experimental items (see Appendix Ca for the Translation accuracy questionnaire).

I was adamant about not including words that were borrowed from English into the Persian language. Sometimes a borrowed English verb is combined with a Persian light verb

[^4]like 'kard' (did) and forms a new compound verb such as 'telephone kard' (lit. telephone did meaning 'telephoned'), 'reserve kard' (lit. reserve did meaning 'reserved') and 'fax kard' (lit. fax did meaning 'faxed') and becomes a fixed expression in Persian. Since all the participants are highly educated and know English well, and since these borrowed English words have become part of Persian lexicon and have no competitors within- and between-languages, I excluded them from target words in this study.

The Dutch distractor verbs were presented to the participants in citation form. However, the participants were supposed to name the pictures of actions using an inflected form of the verb (third person singular in the past tense) to examine the effect of grammatical class. Each participant received a total of 160 trials, 80 critical and 80 filler trials. Distractors appeared in boldface lowercase letters with Times New Roman font and font size 24 . The distractors were superimposed on the target pictures but in random positions to prevent subjects from anticipating the position of the distractors. However, for a given picture, the distractor words were always in the same position throughout all conditions. The light verbs were presented below the pictures along with dotted lines in boldface with Times New Roman font and font size 32. It is worthy to mention that the light verbs were presented below the pictures mainly in Persian orthography. However, since some of the participants had difficulties reading in Persian, I replaced them with the Romanized version of the Persian light verbs for them (see Figures 1 and 2 for the difference between the two). Therefore, some of the participants were presented with the Romanized light verb version and the rest with the Persian orthography version. Pictures were presented on a white background with $1920 \times 1080$ display resolution. Hence, the target pictures appeared in a fixed location in the center of the screen.


Figure 1- light verb with Persian orthography

... raft

Figure 2- Romanized light verb

The experiment was designed with four blocks of 40 items ( 20 critical and 20 filler items each block). Two versions of the same experiment were constructed. Half of the participants received version 1 (hereafter the CV version) and the other half received version 2 (hereafter the nominal version). In the CV version, the participants were presented with a mix of items of conditions 1 and 3 (production of the whole compound verb) in the first two blocks followed by a mix of items of conditions 2 and 4 in blocks 3 and 4. The participants who received the nominal version were first presented with a mix of items of conditions 2 and 4 (production of the nominal constituent) in the first two blocks followed by a mix of items of conditions 1 and 3 in block 3 and 4. The order of the items were designed to be random to minimize the position effects. I expect to observe facilitatory effect in condition 2. In other words, I expect to observe
faster response times when the participants were to provide the nominal constituent of the Persian compound verb in the context of a semantically related Dutch distractor verb.

### 2.4.2.1.3. Procedure

The construction of each trial was as follows: First, a fixation dot appeared for 400 ms in the center of the screen. Second, a picture appeared along with the Dutch distractor verb, which was in the citation form. The picture remained on the screen until the participant responded. In order to name the pictures, the participants were to press 'enter' on the keyboard to be led to the next page where they could write their answers (see Figure 3 and 4). The light verbs of the corresponding Persian compound verbs were presented below the pictures in half of the trials in which participants were to produce the nominal constituents of the compound verbs. There were two sets of dotted lines below the pictures in the other half of the trial items in which the participants produced the whole compound verbs including the nominal constituent along with the light verb.


Figure 3 - an example of a light verb with dotted line in condition 4


Figure 4- after pressing 'enter' the participants would be lead to this page to write their answers

Before carrying out the experiment with the participants, 5 Persian-Dutch bilingual speakers took part in the pilot study. The reason for conducting a pilot test was to see whether the designed experiment worked properly in OpenSesame or it needed some alterations and corrections; and whether the results were logged properly. The results of the pilot study was not included the main research.

Prior to the experiment, the participants were asked to fill out the Language Experient and Proficiency Questionnaire developed by Marian, Blumenfeld and Kaushanskaya (2007) to record their self-rating of their Dutch proficiency and language history. There were four phases in this experiment altogether. At the beginning of the experiment, phase 1, each participant was presented with all of the target pictures along with their corresponding Persian compound verbs in a random order and were asked to use them in the actual experiment. However, no distractor verb was included in this phase of the experiment. Afterwards, in phase 2, they were given a set of 10 practice trials including all four conditions in order to familiarize themselves with the experimental tasks. The pictures and distractor verb used in practice trials were not included in any of the experimental trials. Before each phase, the participants received instruction for the upcoming phase. Phases 3 and 4 were dedicated to the main experiment. The participants were instructed to use a Persian compound verb to name pictures or complete the nominal constituent of a Persian compound verb whenever the light verb was presented below the pictures. They were also instructed to name the pictures as quickly and accurately as possible in Persian. The participants were asked to write their answers in Romanized Persian since the keyboard of the laptop used for this experiment did have Persian alphabet on the keys. Instructions were given in both Persian and Dutch. Item presentation and data collection were done using OpenSesame software (Mathôt, Schreij \& Theeuwes, 2012). A logger item was placed after each phase to collect the data automatically. Each participant was assigned a code for their results by

OpenSesame. Naming latencies were measured by these logger items. Participants' responses were recorded for analysis of accuracy. They were tested individually and the experimental session lasted approximately thirty minutes.

In this experiment, two factors were manipulated: linguistic unit and relation. Each factor had two levels. Linguistic unit included compound verbs as a whole (hereafter the CV linguistic unit) and the nominal constituent of the compound verb (hereafter the nominal linguistic unit) levels. Relation included semantically related or unrelated levels. In the semantically related level, the distractor verb was semantically related to the target compound verb, while in the semantically unrelated level, the distractor verb was semantically unrelated to the target compound verb. As stated before, two versions of the experiment were designed: the CV version and the nominal version (see materials and design).

### 2.4.2.1.4. Data analyses

The mean response times of the participants on the target trials were calculated in SPSS version 28. The response times of each trial were measured from the onset of the stimulus to the beginning of the response (by pressing 'enter' on the keyboard) by the logger in OpenSesame. There were instances of naming the pictures inaccurately by some participants, therefore, these responses were excluded from the analysis (less than 4\%).

Correlations (2-tailed) between the variables over participants were calculated. The two different versions of the experiment ( CV and Nominal version), the self-reported ratings of language proficiency and bilingual type (simultaneous and successive) were used as betweenspeakers factors. A linear mixed models test was conducted over participants, bilingual type
and experiment version with linguistic unit and semantic relation as independent variables, and with Response Time as the dependent variable.

### 2.4.3. Results

The correlation between participants' self-rating language proficiency and the amount of BCVs they use was found not significant $(r=.092)$. Note that the significance level is $0.01^{6}$. No significant correlation ( $r=.436$ ) between participants' self-rating of language proficiency and reported daily exposure to Dutch was also found. The analysis yielded no significant correlation between participants' self-rating of language proficiency and years of formal education $(r=.310)$. The correlation between reported daily exposure to Dutch and the amount of BCV used by participants was not found significant either ( $r=-.101$ ). Moreover, no significant correlation ( $r=.093$ ) between years of education and reported daily exposure to Dutch was found. There was a significant correlation ( $r=-.200$ ) between the bilinguals (simultaneous and successive) and the experiment version (CV and Nominal version). Another significant correlation was found between bilingual type (simultaneous and successive) and language proficiency $(\mathrm{r}=-.644)$. The results revealed that the participants were faster in condition 1 and 2 in which the distractor verb was semantically related to the target picture ( $r$ $=-.214,-.197$ for conditions 1 and 2 respectively). However, no significant correlation in conditions 3 and 4 in which the distractor verbs were semantically unrelated to the target pictures ( $r=.005$ and -.036 for conditions 3 and 4 respectively). These results showed that the

[^5]participants exhibited more interference in the semantically related conditions (1 and 2) than in the semantically unrelated conditions (3 and 4). See Table 3 for the correlational results.

|  | Language proficiency | BCVs | Exposure to Dutch | Years of education | Experiment version | Bilingual type |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| Language proficiency | 1 | . 092 | . 436 | . 310 | . 232 | -.644** |
| BCVs | . 092 | 1 | -. 101 | -. 226 | -. 128 | -. 128 |
| Exposure to Dutch | . 436 | -. 101 | 1 | . 093 | . 232 | -. 278 |
| Years of education | . 310 | -. 226 | . 093 | 1 | -. 158 | -. 284 |
| Experiment version | . 232 | -. 128 | . 232 | -. 158 | 1 | -. 200 |
| Bilingual type | -.644** | -. 128 | -. 278 | -. 284 | -. 200 | 1 |
|  | Subjects | CV related | Nominal related | CV unrelated | Nominal unrelated |  |
| subjects | 1 | -.214** | -.197** | . 005 | -. 036 |  |
| CV related | -.214** | 1 | . 080 | . $246 * *$ | . 056 |  |
| Nominal related | -.197** | . 080 | 1 | . 064 | .278** |  |
| CV unrelated | . 005 | .246** | . 064 | 1 | . 040 |  |
| Nominal unrelated | -. 036 | . 056 | .278** | . 040 | 1 |  |

Table 3 - Correlations across participants between L2 experience and proficiency variables

A linear mixed models test was carried out over participants, bilingual type and experiment version with linguistic unit and semantic relation as independent variables, and with Response Time as the dependent variable. The effect of conditions (linguistic unit and relation) was significant $(F(3,1574)=63.984, p=<.001)$. The effect of bilingual type was not found significant $(F(1,18.135)=.918, p=.350)$. However, the interaction between these two variables was found significant $(F(3,1574)=6.478, p=<.001)$. The effect of experiment version (CV and Nominal version) was not found significant $(F(1,18.083)=.125, p=.727)$, but the interaction between conditions and experiment version was significant $(F(3,1574)=$
$37.945, p=<.001$ ). Naming latencies were lower in the nominal linguistic unit compared to the CV linguistic unit. This means that the participants were faster to produce the nominal constituent of the compound verbs compared to when they were producing the whole compound verbs. The mean and standard deviation were also calculated for simultaneous and successive bilinguals for each condition and experiment version (see Table 4 and 5). Figure 5 reports the distribution of naming latencies as per condition ${ }^{7}$ and by bilingual type and figure 6 represents the distribution of naming latencies by experiment version for each bilingual type.


Figure 5- Mean response time for each condition by bilingual type

[^6]

Figure 6 - Mean response time for each experiment version by bilingual type

As it can be seen in figure 5, the naming latencies for both simultaneous and successive bilinguals were lower in conditions 1 and 2 ( CV related and N related) compared to conditions 3 and $4\left(\mathrm{CV}\right.$ unrelated and N unrelated) ${ }^{8}$. The participants, regardless of being either simultaneous or successive bilingual, were faster in responding when they had to produce the nominal constituent of the compound verb in the context of a semantically Dutch distractor verb. It is worth mentioning that the participants were also fast when they were to produce the whole compound verb in the context of a semantically related Dutch distractor verb. However, the difference between CV related and N related is not significant. It is interesting to note that simultaneous bilinguals performed better in conditions 1 and 2 compared to conditions 3 and 4 than successive bilinguals. Figure 6 shows the difference between the experiment version by bilingual type. Simultaneous bilinguals performed a little faster in the CV version, although it

[^7]is not that significant. However, successive bilinguals performed much faster in the nominal version.

| Conditions | Bilingual type | Mean | SD |
| :---: | :--- | :---: | :---: |
| CV Related | Simultaneous | 1876.19 | 1245.48 |
|  | Successive | 2021.97 | 1398.53 |
| N Related | Simultaneous | 1703.73 | 977.33 |
|  | Successive | 1818.64 | 1020.24 |
|  | Simultaneous | 3393.17 | 2710.72 |
| CV Unrelated | Successive | 2910.74 | 1930.24 |
|  | Simultaneous | 3416.61 | 2706.67 |
| Total Unrelated | Successive | 2634.76 | 2023.29 |
|  | Simultaneous | 2597.42 | 2221.62 |
|  | Successive | 2346.53 | 1700.16 |

Table 4- Mean and SD for bilingual type per condition

| Experiment <br> version | Bilingual type | Mean | SD |
| :---: | :--- | :---: | :---: |
| CV | Simultaneous | 2480.87 | 2088.96 |
|  | Successive | 2545.00 | 1792.33 |
|  | Simultaneous | 2675.13 | 2304.69 |
|  | Successive | 2048.82 | 1505.99 |
| Condition | Experiment version | Mean | SD |
| CV Related | CV | 2361.53 | 1533.54 |
|  | N | 1536.63 | 907.81 |
| N Related | CV | 1594.04 | 955.61 |
|  | N | 1928.34 | 1016.54 |
| CV Unrelated | CV | 3705.34 | 2490.93 |
|  | N | 2598.56 | 2090.57 |
| N Unrelated | CV | 2416.48 | 1718.18 |
|  | N | 3634.89 | 2833.51 |
| Total | CV | 2519.35 | 1915.48 |
|  | N | 2424.61 | 2045.50 |

Table 5- Mean and SD for bilingual type and experiment version vs.
experiment version and condition.

The interaction between linguistic unit, relation and version of the experiment were also calculated. As Table 6 shows, while there is no significant difference between naming latencies for the two linguistic units when the nominal version was presented first to the participants, naming latencies were longer in the CV linguistic unit when the CV version was presented to the participants first.

| Experiment version | Linguistic unit | Mean response time |
| :--- | :--- | :--- |
| CV first | CV | 3033 |
|  | Nominal | 2005 |
| Nominal first | CV | 2835 |
|  | Nominal | 2781 |

Table 6- The interaction between linguistic unit and experiment version

Table 7 shows that in both versions of the experiment, the naming latencies were longer when the distractor verb was semantically unrelated to the target compound verb. The participants were faster when they were to produce the nominal constituent of the compound verb in the context of the semantically related distractor verb in both version of the experiment (see Table 7).

| Experiment version | Linguistic unit | Relation | Mean response time |
| :--- | :--- | :--- | :--- |
| CV first |  |  |  |
|  | CV | Semantically related | 2361 |
|  |  | Semantically unrelated | 3705 |
| Nominal first |  | Semantically related | 1534 |
|  |  | Semantically unrelated | 2416 |
|  |  |  |  |
|  |  | Semantically related | 1596 |
|  |  | Semantically unrelated | 2598 |
|  |  | Semantically related | 1328 |
|  |  | Semantically unrelated | 3634 |

Table 7- The mean response time in different linguistic unit and relations in two versions of the experiment

The analysis of naming latencies revealed a significant effect of linguistic unit and relation, meaning that naming latencies were faster in the nominal semantically related condition (Condition 2) in which only the nominal constituent was produced while the light verb of the target Persian compound verb was present and it was in the context of a semantically related Dutch distractor verb compared to the semantically related CV linguistic unit condition (Condition 1) in which the whole compound verb was produced in the context of a semantically related Dutch distractor verb. Naming latencies were faster in the semantically related nominal linguistic unit when the nominal version was presented first compared to when the CV version was presented first (see Table 7). A facilitatory effect was observed ( +206 ms ) in the nominal linguistic unit when the nominal version of the experiment was presented first. This facilitatory effect was also observed in all semantically related conditions in both versions of the experiment, especially in the nominal linguistic unit when the distractor verbs were semantically related to the target compound verb. No significant interaction was found between language proficiency and the version of the experiment $(F(2,8)=.480, p=.635)$. These results shows that there is no difference between bilinguals and how proficient they are.

### 2.4.4. Discussion

This research reports an experiment in which the performance of Persian-Dutch bilingual speakers in a picture-naming task was tested. It investigated whether in the production of BCVs, the Dutch verbs compete with the corresponding Persian compound verbs as a whole or whether the Dutch verbs compete with the nominal constituent of the Persian compound verbs only as it was reported by Purmohammad (2015) in the case of Persian-English BCVs. More specifically, it was investigated whether words from different categories across the two
languages of a bilingual compete for selection. In this experiment, a novel task was used (a relatively close replication of Purmohammad's study) in which in one of the critical conditions the grammatical class of the target word was a noun, however, the distractor word was a verb from the other language, in this case Dutch. A monolingual speaker may not experience switching or competing between a noun and a verb in their daily language use (Abutalebi \& Rietbergen, 2014). However, according to previous studies in bilingualism, a bilingual speaker who uses BCVs experiences competition between a noun and a verb across the two languages.

The crucial condition in this experiment was when the participants named pictures of actions by completing the nominal constituent of a Persian compound verb in the presence of a Persian light verb and in the context of a semantically related distractor verb from the other language (Dutch). It was argued that if words from different categories across the two languages of bilinguals do not compete to be selected in the place of the nominal constituent of BCVs, one should observe a facilitatory effect in Condition 2 (the semantically related nominal linguistic unit). It was also argued that, in the case of Persian-Dutch BCVs, the infinitive that replaces the nominal constituent of the Persian compound verb behaves like a noun and has nominal properties, therefore, a facilitatory effect would be observed in this condition since both constituents are nominals. However, if the competition occurs between Dutch verbs and the Persian nominal constituent, an inhibitory effect would be observed in Condition 2. The results confirmed the former hypothesis as the results of the experiment (see Table 8) showed that participants were faster when they named pictures of actions by completing the nominal constituent of a Persian compound verb in the context of a semantically related distractor verb from Dutch compared to when they provided the whole Persian compound verb in the context of its Dutch translation equivalent. The results of the experiment support the following generalization: in the case of Persian-Dutch BCVs, a word's grammatical class does provide
constraints on lexical access during the production of BCVs. Thus, the results of the experiment confirm the analysis of our naturalistic data. I have observed almost no interference between Dutch verbs and the nominal constituents of Persian compound verbs than between Dutch verbs and the Persian compound verbs as a whole (see Table 8 and figures $5 \& 6$ ), suggesting that these Dutch verbs (infinitives to be more specific) from bilinguals' L2 clearly have nominal properties. A facilitation effect was also observed (+206 ms) for the Nominal linguistic unit when the participants did the nominal task first. This means that the naming latencies were shorter in the nominal linguistic units when the participants did the nominal tasks. The results also revealed a difference in response time between semantically related and unrelated distractors, indicating that in the nominal linguistic unit in both versions of the experiment the response times decreased when the distractor verbs were semantically related to the target words. This confirms our hypothesis that naming latencies will be faster when the participants complete the nominal constituent of a Persian compound verb in the context of a related Dutch distractor verb compared to when they name pictures of actions by completing the nominal constituent of a Persian compound verb in the context of its semantically unrelated Dutch distractor verb. Our findings are opposed to those of Purmohammad's (2015) study. He hypothesized that the naming latencies will be faster when the participants completed the nominal constituent of a Persian compound verb in the context of an unrelated English distractor verb resulting in the competition between the two grammatical categories of words (i.e. a verb and a noun).

The different results found in this study and Purmohammad's (2015) study can be explained through syntactic context. Several studies reported the effect of grammatical class only when a syntactic context was available (Pechmann \& Zerbst, 2002; Vigliocco et al., 2005). For instance, Pechmann and Zerbst's (2002) assumption is that the word class of an item must
be available when it is inserted into an existing syntactic structure such as sentential or phrasal context. I suggest that, contrary to Purmohammad's (2015) conclusion, there was a context available in Condition 2 in which the nominal constituent was produced in the presence of the Persian light verb and in the context of a semantically related Dutch verb and therefore provided a facilitatory effect in this condition. In other words, the word class of the lexical item must have been available when it was inserted into an existing syntactic structure and consequently the naming latencies were shorter when producing the nominal constituent of the Persian compound verb when the semantically related Dutch distractor verb was available to the participant (as in Condition 2) compared to producing the whole compound verb in the context of its translation equivalent verb (Condition 1). This could be an indication that producing words within a context provide enough constraint on the grammatical class.

As was stated before, Dutch, just like Persian, consists of compound verbs which have the same formation as the Persian compound verbs (see Chapter 1), such as "stofzuigen" (to vacuum), "bekendmaken" (to announce), "plaatsvinden" (to take place). In order to see how the participants behave when encountering these verbs, an experiment was designed and carried out. In the following section, the aim and the procedure of this experiment will be elaborated in detail.

### 2.5. Experiment 3: Storytelling

Previous research has found that speakers often activate various ways of speaking about a referent before making a selection (Levelt et al., 1999; Peterson \& Savoy, 1998). The mental process involved in choosing a word to speak about concepts is referred to as lexical selection
(Levelt, 2001). Researchers have mainly relied on experimental tasks eliciting single words such as picture naming tasks to study lexical selection (Levelt, 2001; Poulin-Dubois et al., 2013). The purpose of this experiment is to test lexical selection of Persian-Dutch bilingual speakers in stories. According to Nicoladis and Jiang (2018), few studies have addressed how speakers select the words to tell a story. Lexical selection in storytelling may be similar to the process obtained from experimental tasks. Downing (1980) found that speakers preferred to select words that are easy to access when telling a story, similar to the findings with experimental tasks.

In this experiment, the participants were presented with 3 Dutch short stories and were asked to retell the story to the researcher in Persian. The underlying purpose of this study, other than investigating the production of Persian-Dutch BCVs, is to see whether the Persian-Dutch bilingual speakers treat the Dutch compound verbs the way they treat Persian compound verbs or whether they look for a Persian equivalent for the Dutch compound verbs as a whole unit. In other words, it investigates whether they replace the preverbal element in a Dutch compound verb with a noun from Persian or whether they replace the nominal constituent of the corresponding Persian compound verb with the whole Dutch compound verb and produce a BCV.

### 2.5.1. Methods

### 2.5.1.1. Participants and Materials

The same 20 participants that took part in the first experiment did the second experiment as well in the same session (see section 2.4.2.1.1. for more details). They first did the picture-naming task followed by the storytelling task after a break. They were given three
short stories in Dutch and were asked to read these stories and then retell the story to the researcher in Persian as soon as they were ready while they were being recorded (see Appendix D for the list of the stories). To find the appropriate verbs and their translations for this experiment, an 8-point scale judgment task was conducted in Qualtrics survey platform through Utrecht University student website ${ }^{9}$. A group of 8 Persian-Dutch bilinguals were asked to rate the translation accuracy of the Dutch verbs. Words and their translations rated above 6 were used as the experimental items (see Appendix Cb for the Translation accuracy questionnaire). 20 verbs were selected for this experiment among which 15 verbs were Dutch compound verbs. These compound verbs contained different structures such as $\mathrm{N}+\mathrm{V}$, Adj.+V, Prep.+V, Adv.+V. The following compound verbs are examples of each category. For instance, proefdraaien (to test run) has a $\mathrm{N}+\mathrm{V}$ structure, klaarmaken (to prepare) has an Adj.+V structure, uitleggen (to explain) has a Prep.+V structure and toegeven (to admit) has an Adv.+V structure. These 20 verbs were spread into the three stories; story 1 contained 7 compound verbs, 6 compound verbs were used in the second story and the last remaining 7 compound verbs were included in the third story.

The participants had already read the information letter about the experiments and signed a declaration of consent for their data to be collected (their voices to be recorded for this experiment) by the researcher in order to be analyzed later. These recordings will also be deleted after the relevant data is transcribed and is given a code (the same code as the OpenSesame logger) that can be only traced back to the participant with a key. These keys will be destroyed within a few days and from then on the research data will be anonymized.

[^8]
### 2.5.1.2. Results

The transcriptions of the recordings were analyzed by the researcher. The results were as following; only 46 instances of Dutch verbs out of the total of 400 verbs ( 20 verbs for 20 participants) were produced as BCVs (see Table 8). None of the Dutch compound verbs were produced as BCVs. In other words, the preverbal elements of the Dutch compound verbs were not replaced by a word from the other language, in this case Persian. I wanted to see whether the participants treat the Dutch compound verbs that have $\mathrm{N}+\mathrm{V}$, Adj.+V, Adv.+V, Prep.+V structures the way they treat the Persian compound verbs with the same structure; or whether they translate the Dutch compound verb into a Persian compound verb; or whether they treat them as a whole unit and use the Dutch compound verb in the place of the preverbal element within a BCV. The results of this experiment revealed that all participants treated the Dutch compound verb as a whole unit and used them within the BCVs as the preverbal (nominal constituent) element.

| Verbs | No. of usage | Dutch compound verb | Dutch verb structure |
| :--- | :--- | :--- | :--- |
| Meemaken | 3 | $\checkmark$ | Adv.+V |
| Bevestigen | 4 | $\mathbf{x}$ | V |
| Gebruiken | 0 | $\mathbf{x}$ | V |
| Proberen | 1 | $\mathbf{x}$ | V |
| Vertrouwen | 2 | $\mathbf{x}$ | V |
| Verwachten | 6 | $\mathbf{x}$ | V |
| Verlengen | 6 | $\mathbf{x}$ | V |
| Besteden | 3 | $\mathbf{x}$ | V |
| Beslissen | 0 | $\mathbf{x}$ | V |
| Toegeven | 3 | $\checkmark$ | Adv./Prep.+V |
| Uitleggen | 2 | $\checkmark$ | Prep.+V |
| Rondkomen | 5 | $\checkmark$ | Adv.+V |
| Ziekmelden | 4 | $\checkmark$ | Adj.+V |
| Kennismaken | 1 | $\checkmark$ | N+V |
| Plaatsvinden | 0 | $\checkmark$ | N+V |
| Loslaten | 2 | $\checkmark$ | Adj.+V |
| Waarnemen | 0 | $\checkmark$ | Adj.+V |
| Bekendmaken | 0 | $\checkmark$ | Adj.+V |
| Klaarmaken | 0 | $\checkmark$ | Adj.+V |
| Proefdraaien | 4 | $\checkmark$ | N+V |

Table 8- Storytelling verbs and the number of usages by the participants

The aim of this experiment was to see whether the participants separate the constituents of the Dutch compound verbs and replace the preverbal element with an element form the Persian language or use the whole Dutch compound verb within the structure of a BCV. For instance, would the participants produce a BCV as in (68) or as in (69)? The Dutch verbs are presented in italics.
(68) bāyad xodam ro mariz melden
should myself DOM sick to report
'I should call in sick'
(69) bāyad xodam ro ziekmelden konam
should myself DOM to call in sick do-I
'I should call in sick'

If the participants were to treat the Dutch compound verbs the way they treat the Persian compound verbs, sentences like (68) were expected to be observed in the speech of the participants. However, this did not occur for any of the participants, in fact, they all treated the Dutch compound verbs as a whole unit (just like simple verbs) and used them in the construction of the BCVs like the utterance in (69). In addition, just like the results found in the naturalistic data, all the nominal constituents of the BCVs were in the infinitive form. The following sentences are more examples of the participants' use of BCV in their speech. The infinitive forms of the Dutch (compound) verbs are shown in Italics.
(70) lāzem nist uitleggen konam necessary is not to explain do-I 'it is not necessary to explain myself'
(71) to ye šerkat-e jadid proefdraaien miram in one company-EZ new to test run Imp-go-I 'I will go to a new company for a test run'
(72) bā hamkār-a-ye jadid kennismaken konam
with colleague-pl-EZ new to get acquainted do-I
'I get acquainted with my new colleagues'
(72) rai:s-am goft bāyad vertrouwen dāšte bāši

Manager-my said should to trust have-present perfect-you 'my manager told me to trust in yourself'

Most of the participants tried to find the equivalent or the translation of the Dutch (compound) verbs in Persian, some were successful and some were less successful. As was mentioned before, only 46 instances out of the possible 400 cases of BCVs were found in their speech. The most occurrences of BCVs were found in the speech production of two of the successive bilinguals whose scores of proficiency were higher than 8 on the scale of 0 to 10 . The rest of the participants, regardless of their language proficiency, either found the exact equivalent in Persian or tried to explain what the verbs mean in Persian. Dutch verbs such as 'rondkomen' (to make ends meet) do not have a translation or an equivalent in Persian with only one simple or compound verb, rather they have to be explained with a phrase or with a whole sentence. It is interesting to mention that 'rondkomen' was only produced 5 times and the rest of the times it was either explained with a phrase or was ignored all together.

### 2.5.2. Discussion

Another experiment which is reported in this research is the storytelling in which the performance of Persian-Dutch bilingual speaker regarding the Dutch compound verbs is investigated. This experiment studied whether the participants produced the Dutch compound verbs the way they produce BCVs (replace the nominal constituent of the Persian compound
verbs with the whole Dutch compound verb) or whether the preverbal element of the Dutch compound verb is replaced by a constituent from Persian. To my knowledge, the research into Dutch compound verbs has never been done before. Therefore, I have no previous research to compare these results with. However, the results revealed that the Persian-Dutch bilingual speakers treat the Dutch compound verbs as a whole unit, they do not separate the constituents of the compound verb from each other to replace one part from the other language, rather they insert the Dutch compound verb into a BCV. In the construction of the BCV, they still use the Dutch compound verb the way they use a Dutch simple verb. For instance, they produce a BCV in which the nominal constituent of the Persian compound verb is replaced by a Dutch compound verb accompanied by a Persian light verb. The reason could be that either separable or inseparable Dutch compound verbs are accessed and activated as a whole unit just like simple verbs in the bilinguals' mental lexicon when they are producing utterances in Persian. We know that when the Dutch compound verbs that can be separated are used in a normal situation (i.e. when spoken in Dutch) within a matrix sentence, the constituents of the compound verb get separated. In other words, in a sentence like (73) the $V$ constituent of the compound verb moves to the second position and the preverbal element remains at the end of the sentence where the verb is originally situated. However, sentences like (74) did not occur in the utterances of Persian-Dutch bilingual speakers in the storytelling experiment, only sentences like (75) were produced.
(73) Ik laat mijn kat niet in de wijk los

I let my cat not in the neighborhood loose
'I don't let my cat go in the neighborhood'
(74) man laat un ehsās ro los konam

I let that feeling DOM loose do-I
'I let go of that feeling'
(75) man un ehsās ro loslaten mikonam

I that feeling DOM to let go Imp-do-I
'I let go of that feeling'

The Dutch (compound) verbs that were used in this experiment replaced the nominal constituent of the BCVs in 46 cases and none of the participants separated the constituents of the separable compound verbs in any of the cases. They produced the verbs in the infinitive form and treated them as nominals. This can be a further proof that the Dutch infinitives that replace the nominal constituent of the BCVs in the speech production of Persian-Dutch bilingual speakers have nominal properties and behave like a noun.

### 2.6. Conclusion

The data used in this study reflects on bilingual lexical access during language production in L1. In other words, it dealt with a cross-language interaction in Persian-Dutch bilinguals during speaking in L1. It also investigated the production of BCVs in different situations. The results of the three experiments in this study is an indication that the grammatical classes of the words from the two languages exhibit more similarities than differences. To put it simply, two words of different classes (a noun in Persian and an infinitive in Dutch) across the two languages of bilingual speakers compete for selection during the production of the nominal constituent of BCVs and in languages such as Dutch the word that gets selected at the end is an infinitive that has nominal properties and behaves like a noun. Therefore, it can be said that although there is a competition between the two categories across the two languages of a bilingual speaker, the similarities between them are more visible. The results suggest that
speakers process words within a context that demands word class information and employ this information during the production of BCVs. The results also suggest that Dutch compound verbs do not go through the same process as Persian compound verbs. Dutch compound verbs are treated as simple verbs by Persian-Dutch bilingual speakers.

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Appendix A. Naming agreement questionnaire


|  |  |  |
| :---: | :---: | :---: |
|  |  |  |
|  | 2388 |  |
| 是 |  | ared |



## Appendix B. Target picture names and distractor words used in the first experiment

| No. | Target verbs | Dutch distractor verbs | Literal translation of target verbs | English translation | Pronunciation |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Condition 1 |  |  |  |  |  |
| 1 | حمله كرد | aanvallen | attack-did | attacked | hamle kard |
| 2 | محافظت كرد | beschermen | protection-did | protected | mohāfezat kard |
| 3 | سفارش داد | bestellen | order-did | ordered | sefāreš dād |
| 4 | تحويل داد | bezorgen | delivery-did | delivered | tahvil dād |
| 5 | جدا شد | scheiden | separation-did | separated | jodā šod |
| 6 | شنا كرد | zwemmen | swimming-did | swam | šenā kard |
| 7 | پرداخت كرد | betalen | payment-did | paid | pardāxt kard |
| 8 | آشيزى كرد | koken | cooking-did | cooked | āšpazi kard |
| 9 | كريه كرد | huilen | crying-did | cried | gerye kard |
| 10 | دنبال كرد | volgen | following-did | followed | donbāl kard |
| 11 | غلو كرد | overdrijven | exaggeration-did | exaggerated | qolov kard |
| 12 | ماهى گرفت | visvangen | fish-caught | fished | māhi gereft |
| 13 | درس داد | lesgeven | lesson-gave | taught | dars dād |
| 14 | هشدار داد | waarschuwen | warning-gave | warned | hošdar dād |
| 15 | جارو كرد | stofzuigen | broom-did | vacuumed | jāru: kard |
| 16 | تكرار كرد | herhalen | repetition-did | repeated | tekrār kard |
| 17 | آزمايش كرد | onderzoeken | testing-did | tested | āzmayeš kard |
| 18 | تميز كرد | schoonmaken | clean-did | cleaned | tamiz kard |
| 19 | اضافه كرد | toevoegen | addition-did | added | ezafe kard |
| 20 | شكل داد | vormgeven | shape-gave | shaped/formed | šekl dad |
| Condition 2 |  |  |  |  |  |
| 21 | حمله | aanvallen |  | attack (n) | hamle |
| 22 | محافظت | beschermen |  | protection | mohāfezat |
| 23 | سفارش | bestellen |  | order (n) | sefāreš |
| 24 | تحويل | bezorgen |  | delivery | tahvil |
| 25 | جدا | scheiden |  | separation | jodā |
| 26 | شنا | zwemmen |  | swimming | šenā |
| 27 | پرداخت | betalen |  | payment | pardāxt |
| 28 | آشپّى | koken |  | cooking | āšpazi |
| 29 | كريه | huilen |  | crying | gerye |
| 30 | دنبال | volgen |  | following | donbāl |
| 31 | غلو | overdrijven |  | exaggeration | qolov |
| 32 | 0اهى | visvangen |  | fish | māhi |
| 33 | درس | lesgeven |  | lesson | dars |
| 34 | هشدار | waarschuwen |  | warning | hošdar |
| 35 | جارو | stofzuigen |  | broom | jāru |
| 36 | تكرار | herhalen |  | repetition | tekrār |
| 37 | آزمايش | onderzoeken |  | test (n) | āzmayeš |
| 38 | تميز | schoonmaken |  | clean (adj) | tamiz |


| 39 | اضافه | toevoegen |  | addition | ezafe |
| :---: | :---: | :---: | :---: | :---: | :---: |
| 40 | شكل | vormgeven |  | shape (n) | šekl |
| Condition 3 |  |  |  |  |  |
| 41 | حمله كرد | aanmelden | attack-did | attacked | hamle kard |
| 42 | محافظت كرد | ervaren | protection-did | protected | mohāfezat kard |
| 43 | سفارش داد | besteden | order-did | ordered | sefāreš dād |
| 44 | تحويل داد | bedoelen | delivery-did | delivered | tahvil dād |
| 45 | جدا شد | sluiten | separation-did | separated | jodā šod |
| 46 | شنا كرد | besluiten | swimming-did | swam | šenā kard |
| 47 | برداخت كرد | bellen | payment-did | paid | pardāxt kard |
| 48 | آشيزى كرد | wonen | cooking-did | cooked | āšpazi kard |
| 49 | كريه كرد | hulpen | crying-did | cried | gerye kard |
| 50 | دنبال كرد | dromen | following-did | followed | donbāl kard |
| 51 | غلو كرد | bezoeken | exaggeration-did | exaggerated | qolov kard |
| 52 | ماهى كرفت | vergelijken | fish-caught | fished | māhi gereft |
| 53 | درس داد | wandelen | lesson-gave | taught | dars dād |
| 54 | هشدار داد | sruderen | warning-gave | warned | hošdar dād |
| 55 | جارو كرد | zetten | broom-did | vacuumed | jāru: kard |
| 56 | تكرار كرد | brengen | repetition-did | repeated | tekrār kard |
| 57 | آزمايش كرد | bewaren | testing-did | tested | āzmayeš kard |
| 58 | تميز كرد | houden | clean-did | cleaned | tamiz kard |
| 59 | اضافه كرد | kopen | addition-did | added | ezafe kard |
| 60 | شكل داد | blijven | shape-gave | shaped/formed | šekl dad |
| Condition 4 |  |  |  |  |  |
| 61 | حمله | aanmelden |  | attack (n) | hamle |
| 62 | محافظت | ervaren |  | protection | mohāfezat |
| 63 | سفارش | besteden |  | order (n) | sefāreš |
| 64 | تحويل | bedoelen |  | delivery | tahvil |
| 65 | جدا | sluiten |  | separation | jodā |
| 66 | شنا | besluiten |  | swimming | šenā |
| 67 | پرداخت | bellen |  | payment | pardāxt |
| 68 | آشإىى | wonen |  | cooking | āšpazi |
| 69 | كريه | hulpen |  | crying | gerye |
| 70 | دنبال | dromen |  | following | donbāl |
| 71 | غلو | bezoeken |  | exaggeration | qolov |
| 72 | ماهى | vergelijken |  | fish | māhi |
| 73 | درس | wandelen |  | lesson | dars |
| 74 | هشدار | sruderen |  | warning | hošdar |
| 75 | جارو | zetten |  | broom | jāru |
| 76 | تكرار | brengen |  | repetition | tekrār |
| 77 | آزمايش | bewaren |  | test (n) | āzmayeš |
| 78 | تميز | houden |  | clean (adj) | tamiz |
| 79 | اضافه | kopen |  | addition | ezafe |
| 80 | شك | blijven |  | shape (n) | šekl |

## Appendix Ca. Translation accuracy questionnaires

Utrecht
University

Beoordeel de vertaalnauwkeurigheid van de woordparen (de hoogste score 8)

Beoordeel de vertaalnauwkeurigheid van de woordparen (de hoogste score 8)

1. ملاقات كردن = ontmoeten
12345678
2. اضـافه كردن = toevoegen
1234 5 67 8
3. دعوت كردن = uitnodigen
12345678
4. دنبال كردن = volgen
12345 6
 78
5. فضـاوت كردن = beoordelen
1
2345 6 7 8
6. حفاظت كردن = beschermen
12345678
7. تنكرار كردن = herhalen
1234
567 8
8. الستر احت كردن = ontspannen
$\square$ 3 $\square$ 45678
9. آشّشٌّى كردن = koken
123 45678
10. بپرداخت كردن = betalen
12345678
11. تمركز كردن = concentreren 2 $\qquad$ 345678
12. نصرو كردن = voorstellen
1234 - 5678
13. آماده كردن = voorbereiden
12
345678
14. اهدا كردن = doneren
12345678
15. تمام كردن = afmaken
12345678
16. ثبت نام كردن = inschrijven
12345678
17. تُحويل دادن = leveren
12345678
18. غلو كردن = overdrijven

$$
1
$$

$\qquad$ 2 $\square$ 345
 678
19. تتويض كردن = vervangen
1
$\qquad$ 234567 8
20. مشُاهده كردن = opmerken
12345678
21. جستجو كردن = zoeken

12345678
22. آزمايش كردن = onderzoeken
12345678
23. اعتر اف كردن = toegeven
12345678
24. ششكايت كردن = klagen
1 O 2 $\square$ 345678
25. فر اموش كردن = vergeten
12345678
26. شنا كردن = zWemmen

1 $\qquad$ 2345678
27. بالا رفنت = klimmen
12345678

28. تتجربه كردن = meemaken
12345678
29. ارجاع دادن = verwijzen
1
2345678
30. بازی كردن = spellen
12345678
31. . = begrijpen
12 34 $\qquad$

678
32. دفن كردن = begraven
1234678
33. توضيح دادن = uitleggen
12
345678
34. بيرون بردن) (سگّ) = uitlaten
12345678
35. در بافت كردن = ontvangen
1
2345678
36. تائبي كردن = bevestigen
1 $\qquad$ 234
O678
37. بـ بـاد آوردن = herinneren
1234 567 8
38. السنفاده كردن = gebruiken

$$
1
$$2 3 45 67 8

39. تُحوبل دادن = bezorgen
12345678
40. سعى كردن = proberen
12345678
41. سفارش دادن = bestellen
12345678
42. غافلگبر كردن = verassen
1234578
43. اعتماد كردن = vertrouwen
12345678
44. التخاب كردن = kiezen
12345678
45. تمدبد كردن = verlengen
123
45
678
46. $=$ verwachten
1234
$\bigcirc 5$
$\bigcirc$
678
47. حل كردن = oplossen

$$
1
$$2 $\square$ 34

 5
678
48. تصنيم گرفتن = beslissen
123 4 5678
49. نظافت كردن = schoonmaken
$1 \bigcirc$
2
3
45678
50. سفر كردن = reizen
1
$\bigcirc$ 2 $\bigcirc$
34568

## Appendix Cb. Translation accuracy questionnaires

Utrecht University

Beoordeel de vertaalnauwkeurigheid van de woordparen (de hoogste score 8)

Beoordeel de vertaalnauwkeurigheid van de woordparen (de hoogste score 8)

1. bekendmaken = اعلام كردن

12 $\qquad$ 345 67 $\qquad$ 8
2. dienstdoen = خدمت كردن
12
$\qquad$ 34567 $\qquad$ 8
3. آكاه كردن = kennisgeven

12345678
4. gelijkmaken = بر ابر كردن
12 $\qquad$ 345678
5. kapotmaken =خراب كردن
12345678
6. kennismaken $=$ آشنا شُدن
12

34567 8
7. klaarmaken = آماده كردن
12345678
8. leegmaken = خالى كرن
1234567 8
9. lesgeven = درس دادن
12345
)78
10. opendoen = باز كردن
12345678
11. schoonmaken =تميز كردن

12345678
12. waarmaken = اقعيت دادن2345678

1
13. plaatsvinden = اتفاق افتنادن
12345
678
14. stofzuigen $=$ جارو كردن2345
678

1
15. teleurstellen $=$ نااميد كردن
12345678
16. loslaten =رها كردن
$\qquad$ 2

1 $\qquad$ 345 678
17. deelnemen =شركت كردن
12345 678
18. weggooien = دور انداختن
12345
678
19. waarschuwen = هشدار دادن
12345678
20. voltooien = كامل كردن
1 2345678
21. voldoen = برآورده كردن
12345678
22. handtekenen $=$ امضا كردن
12345678
23. beeldhouwen = مجسمه ساختن
123 45678
24. raadplegen $=$ ششورت كردن
1234678
25. wedijveren $=$ رقابت كردن
12345678
26. wijsmaken =فريب دادن
12345678
27. losmaken = شل كردن
1 $\square$ 2345678
28. vormgeven =شكل دادن
12345678
29. vrijmaken =آزاد كرن
12345678
30. zwartmaken = سياه كردن
12345678
31. rechtvaardigen $=$ توجيه كردن
12345678
32. ronddwalen $=$ برسه زدن
12345
O8
33. waarborgen $=$ ضمانت كرن
1234578
34. stierenvechten = گاو بازى كرن
12345
O78
35. redetwisten $=$ بحث كردن
12345
$\bigcirc$
678
36. zakkenrollen = جيب برى كرن، جيب زن
1 2345
O78
37. rangordenen = رتبه بندى كردن
12345678
38. natmaken =خيس كردن
12 O 3 34567 8
39. goedkeuren = تاييد كرن
12
)
$\bigcirc$5678
40. waarnemen = درك كردن
1
23 45678 $\square$

## Appendix D. Dutch short stories

## Efteling

Morgen gaan we naar de Efteling. Wat kunnen we daar verwachten?
Als eerste, proberen we de kaartjes te bevestigen. Die we kunnen gebruiken voor de entrée. En daarna zullen we zien wat we nog kunnen besteden voor eten, drinken en eventueel aan souvenirs. Vervolgens gaan we beslissen of we meer shows dan attracties of visa versa willen doen, en dat gaan we meemaken.

## Ziektestress

Helaas moest ik eraan toegeven dat ik mij moest ziekmelden van mijn werk voor een gedurende tijd. Maar ik zit erover in dat ik daarvan niet kan rondkomen. Mijn werkgever zei dat ik daarin vertrouwen moest hebben en dat gevoel moest loslaten, en dat ik niet hoeft uit te leggen.

Stage
Ik ga proefdraaien bij een bedrijf, waar ik ga waarnemen of dit mij ligt voor de toekomst. De stage gaat over een week plaatsvinden, waar ik ga kennismaken met mijn nieuwe collega's. Ik vind het een leuk idee om een taart klaar te maken. Ik hoop dat mijn werkgever bekendmaakt dat mijn stage verlengt kan worden.


[^0]:    ${ }^{1}$ For the ease of reading, I will refer to the verbal base form as "verb" throughout this study.

[^1]:    ${ }^{2}$ A converb is defined here as a nonfinite verb form whose main function is to mark adverbial subordination (Haspelmath, 1995: 3).

[^2]:    ${ }^{3}$ Morph-syntactic information of verbs such as syntactic category (e.g. noun, adjective, verb), information needed for lexical syntactical encoding (e.g. number, aspect, mood, tense, case), and grammatical functions (e.g. passive, active, transitive, intransitive).

[^3]:    ${ }^{4}$ The questionnaire is available on http://www.bilingualism.northwestern.edu/leapq/.

[^4]:    ${ }^{5}$ The data analysis for the 8-scale judgment tasks for this paper was generated using Qualtrics software, Version 2018 of Qualtrics. Copyright © 2020 Qualtrics. Qualtrics and all other Qualtrics product or service names are registered trademarks or trademarks of Qualtrics, Provo, UT, USA. https://www.qualtrics.com. Available through https://survey.uu.nl/homepage/ui

[^5]:    ${ }^{6}$ The critical value of the Pearson correlation here is $\pm 0.561$.

[^6]:    ${ }^{7}$ In this figure CV Related represents condition 1, N Related condition 2, CV Unrelated condition 3 and N Unrelated condition 4.

[^7]:    ${ }^{8}$ As a reminder: CV and N are the linguistic units representing Compound verbs and Nominal constituent. And related and unrelated represents the relation, meaning in related conditions the distractor verb is semantically related and in unrelated conditions the distractor verb is semantically unrelated.

[^8]:    ${ }^{9}$ The data analysis for the 8 -scale judgment tasks for this paper was generated using Qualtrics software, Version 2018 of Qualtrics. Copyright © 2020 Qualtrics. Qualtrics and all other Qualtrics product or service names are registered trademarks or trademarks of Qualtrics, Provo, UT, USA. https://www.qualtrics.com. Available through https://survey.uu.nl/homepage/ui

