The Frame Semantics of 'Self-Motion' Frame in Arabic and English

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Abstract

This research makes use of Fillmore's Frame Semantics Approach (Fillmore, 1976) in order to survey Arabic and English corpus data pertaining to events of 'Self-Motion'. The purpose of the study is to examine the notion that English semantic frames identically exist in other languages. The study tests this notion through a comparative analysis which takes into account the type of semantic roles in the data and the frequency of their appearance as well as the type of fillers of the self-mover role. The main findings of the study are: (1) the already-built English frame does a good job of capturing the semantic roles that we see in the Arabic verbs of self-propelled motion; (2) Even though the fillers of the different semantic roles are overall the same, there are different restrictions on what can fill certain semantic roles depending on the verb in Arabic and English; (3) Arabic does not fill all the possible semantic roles in the English frame. As a result, I maintain that the description of the semantic frames need to include more information specifically about the frequency of semantic role occurrence and the types of their fillers.

1. Introduction

There has been much interest in Fillmore's Theory of Frame Semantics (Fillmore, 1976) in recent years. A great body of research has been carried out on cross-linguistic analysis of semantic frames. As a part of the research, there is a recent move to the idea of looking at whether semantic frames that have been built in English exist in other languages, and whether they capture the event participant structure exhibited in other languages. Similarly, there is the question of whether speakers of different languages perceive events in the same way or differently as a result of differences in the speakers' mother tongues. For example, Boas (2001) claims that matching semantic frames – vis-à-vis his research on the caused-motion frame – exist in English and German. He asserts that Frame Semantics can be useful in accounting for differences in lexicalization patterns and polysemy between the two languages.

This study, too, addresses the notion that identical semantic frames exist cross-linguistically. I specifically test whether a specific English frames from the frame database, FrameNet, exists in the Arabic language. I specifically test the 'Self-motion' frame in order to explore whether speakers of Arabic and English conceptualize the self-propelled motion event similarly or differently and to what extent. To do so, I analyze corpus data of five English verbs that evoke the 'Self-Motion' frame and their equivalent verbs in the Arabic language.

My study yields the following findings: (1) The existing English frame does a good job of capturing the semantic roles that we see in the Arabic verbs of self-propelled motion; (2) There are different restrictions on what can fill certain semantic roles depending on the verb in Arabic and English, even though the fillers of the different semantic roles are overall the same; (3) The two languages do not equally fill all the possible semantic roles in the hypothesized frame.

The organization of the paper is as follows: In Section 2, I review the relevant literature; in Section 3, I describe my methodology in collecting, coding, and analyzing the data; in Section 4, I present my data and analysis; and in Section 5, I discuss the findings of my analysis.

2. Background

2.1. Frame Semantics Theory

Charles Fillmore developed the Theory of Frame Semantics through starting in the 1970's. Fillmore defines Frame Semantics as an approach to the study of lexical meanings (Fillmore et al. 2003). The theory stresses the continuity between language and real world experience (Petruck, 1997). The core idea of the theory is that "word meanings must be described in relation to *semantic frames* – schematic representations of the conceptual structures and patterns of beliefs, practices, institutions, images, etc. that provide a foundation for meaningful interaction in a given speech community" (Fillmore et al. 2003:235). Petruck (1997) defines a *frame* as any system of concepts related in such a way that; in order to understand any one concept, it is important to understand the whole system.

We can take the cognitive 'commercial event' frame as an example. This frame in English contains main roles as BUYER (someone who has money and want to exchange it with goods), BUYER (someone who has goods and want to exchanged with money), GOODS (the item that is exchanged for money), and MONEY (any circulating medium of exchange, including coins, paper money[1]). The buyer yields the money and takes the goods and the seller yields the goods and takes the money. Any lexical units that relate to this frame, such as *sell, buy, cost,* and *spend* can activate the whole frame in the mind of anyone who comes across any of these lexical units; however each of them foregrounds only one part of the

[1] as defined by dictionary.com at: http://dictionary.reference.com/browse/money

frame. For example, the verb *buy* foregrounds the *buyer* role and backgrounds the *seller* role, while the verb *sell* does the opposite (Fillmore, 1976)

The roles (BUYER, BUYER, GOODS, and MONEY) above are part of participants and props that each semantic frame has, which are called Frame Elements (henceforth FE). These FEs are classified into *core* and *peripheral* FEs in terms of their centrality to the frame. "A core frame element is one that instantiates a conceptually necessary component of a frame, while making the frame unique and different from other frames" (Ruppenhofer et al., 2010:19). A peripheral frame element, on the other hand, "do not introduce additional, independent or distinct events from the main reported event" (Ruppenhofer et al., 2010:20). For example, in the 'commercial event' frame, BUYER, BUYER, GOODS, and MONEY are all core elements of the frame because a commercial event necessarily involves all these participants. The 'commercial event' cannot be perceived without a buyer or a seller. However, notions such as TIME, PLACE, and DEGREE are peripheral elements because they do not uniquely distinguish the frame. They merely add more information to the event. For example, when and where a commercial event takes place are only extra information that the frame can be still understandable without knowing them.

2.2. FrameNet

Fillmore's characterization of the frame as the core domain structure leads to a frame-based organization of the lexicon. In this way of organizing the lexicon, the frame supplies the "conceptual underpinnings for related senses of a single word and semantically related words" (Petruck 1997:2). From this way of organization came the idea of building FrameNet, an English corpus database developed at the International Computer Science Institute at the University of California, Berkeley. Researcher at FrameNet are mostly cataloging different types of events and actions, verbs for the most part. Similar lexicographic databases inspired by FrameNet are being built in other languages like Spanish FrameNet (constructed at the University of Barcelona), Japanese FrameNet (constructed at Keio University), German FrameNet (constructed at the University of Texas, Austin) (Fillmore et al., 2003).

For each frame, FrameNet provides a definition, a list of the frame's FEs (their

description and corpus examples), and lexical units that evoke a given frame. For example, FrameNet contains a frame called the 'Caused-Motion' frame. This frame is defined as "An Agent causes a Theme to undergo translational motion. Although different [different lexical items that evoke the frame] have different degrees of profiling of the trajectory, the motion may always be described with respect to a Source, Path and/or Goal"[2]. The semantic roles in this frame includes *Agent* (e.g. Pat threw the china at the wall), *Area* (e.g. Kim pushed the lawnmower around the garden), *Cause* (e.g. The storm tossed the sailor from the boat), *Goal* (e.g. Kim threw the cat into the garden), *Path* (e.g. I pushed the trolley along the street), and others. Lexical units that evoke this frame are: *attract, cast, catapult, chuck, drag, draw, drive,* among others. In this study, I am analyzing Arabic and English data pertaining the 'Self-Motion' frame as built in FrameNet. My focus is on the semantic roles that are active in the frame.

3. Methodology

In order to accumulate sentences that evoke events of 'Self-Motion' in English and Arabic, I decided to search for five English verbs as research terms. The English verbs are: *walk, run, fly, climb,* and *crawl.* The verbs are among over 140 lexical units (LUs) that evoke the 'Self-Motion' frame in English according to FrameNet[3]. I chose these five verbs because of their frequent use as well as their tendency to have monomorphemic Arabic counterparts. Their equivalent Arabic verbs are: مشى *maʃa* [=walk], جرى *ʒara* [=run], طار *tˁara* [=fly], تسلق *tʰasalʲqa* [=climb], and زحف *zaħəfa* [=crawl]. I have searched and translated the Arabic data myself and also consulted three different online Arabic-English dictionaries[4].

Talmy's (1985) theoretical work on expressions of motion in space proposes that languages divide into two distinct groups in their encoding of *manner* and *path* in the verb root. Languages either encode **motion+manner** or **motion+path**. He calls languages in which their verbs' root encode *manner* while *path* is expressed by a satellites (verb particles, prefixes) as satellite-frame languages (S-languages, e.g. Indo-European languages except

[2] see this link of more information: https://framenet2.icsi.berkeley.edu/fnReports/data/frameIndex.xml?frame=Cause_motion
[3] https://framenet2.icsi.berkeley.edu/fnReports/data/frameIndex.xml?frame=Self_motion
[4] 1. bab.la Dictionary (http://en.bab.la/dictionary/arabic-english/), 2. The Free Arabic dictionary (http://freeArabicdictionary.com/), and 3. Al-Maany Dictionary (http://www.almaany.com/).

romance languages, Chinese). For example, the verb *roll* in English encodes **motion** and its **manner**. On the other hand, Talmy calls languages that typically encode *path* in the verb root as verb-framed languages (V-language, e.g. Spanish and Arabic) (Talmy, 1991). For example, the Spanish verb *entrar* encodes **motion** and its **path**, while the **manner** is not encoded.

According to Ozcaliskan & Slobin (2000), Arabic is a verb-framed language that tends to conflate *motion* and *path* in the verb root. For example, the root verb *ɣadarə* غادر means to *go out.* However, English is a satellite-language that conflates *motion* and *manner* in the verb root such as the verb *scramble* while *path* is mapped onto a satellite (e.g. *out, in, up, etc.*). All the five English verbs above and their Arabic counterparts are verbs that conflate *motion* and *manner*.

3.1. Data Search and Selection

I collected my data using English and Arabic corpora. For the English Data, I used the the Corpus of Contemporary American English (COCA)[5]. I searched "verb*" (e.g. climb*) to include all forms of the verb (verb+ø, verb+s, verb+ed, verb+ing). I carried the search to include all five registers in COCA: spoken, fiction, magazine, newspapers, and academic. For Arabic data, I used the Online Arabic Corpus (OAC)[6]. The search tools in the Online Arabic Corpus are different from that of COCA. The past tense in the 3rd person singular form is used in order to search for all forms of verbs. I searched all registers in the corpus: newspapers, modern Arabic literature, nonfiction, colloquial Egyptian, and premodern literature.

I manually delimited my data to instances of actual motion that includes the movement of an entity as a whole from one location to another in time and space, as displayed in example (1) below.

(1) [w.ar.57]

باب زويلة	إلى	**خان مسرور**	من	هشيت
bab zuelah	ela	χan masrur	men	**ma**/*eɪt*
Bab Zwelah	to	Khan Masror	from	I walked

[**I** *walked* from **Khan Masror** to **Bab Zwelah**]

For this reason I excluded from my data all metaphorical uses of verbs as in examples (2) and

[5] available at http://corpus.byu.edu/coca/
[6] available at: http://Arabicorpus.byu.edu/.

(3) below:

(2) الحصن تجاه **الجيش** زحف
alħəsˤn teʒahə **alʒeɪʃ** *zaħəfa*
the fortress towards the army crawl
[**the army** *crawled* towards the fortress]

(3) He will *run* for president, and even win.

In sentence (2) above, even of the army is moving, the **manner** of the movement is different from that of crawling. Thus this metaphorical use is excluded. Additionally, the use of *run* in sentence (3) does not necessarily encode movement from one location to another. Instead, the verb is metaphorically used to mean *try to get elected* to be president.

Metonymic uses (e.g. where the part stands for the whole) were not excluded as in example (4) below:

(4) [w.a.23] السطح فوق تمشى **أقدام**
asatˤħ foʊq *təmʃi* **aqdam**
the roof over walk feet
[**feet** *are walking* on the roof]

Additionally, the transitive use of the motion verbs as in example (5) below was excluded:

(5) she *walks* her dog around the park

Finally, uses of the 'Self-Motion' verbs that did not denote a sense of motion that depends on the movement of the entity's body and its physical components were excluded as in example (6) below:

(6) **She** will *fly* to New York tomorrow

I randomly collected between 50 and 62 instances for each Arabic and English verb shown in Table 1 below. All verbs have at least 51 instances in both Arabic and English[7].

	walk	**run**	**fly**	**climb**	**crawl**	total
English	58	57	53	56	56	280
Arabic	62	61	55	51	51	280
					total:	560

Table 1: number of instances for each English and Arabic verb.

[7] For the Arabic verbs *tʰasaĺqa* [=climb], I used Google search to add 6 more instances of the verb use due to the lack of more instances in the Arabic Corpus that fit my criteria. However, all other examples are taken from the mentioned corpora.

3.2. Data Coding

I limited the coding of the data to the Core FEs of the English 'Self-Motion' frame as represented in FrameNet, which are Self-Mover, Direction, Source, Path, Goal and Area. I limit coding to these roles for two reasons: First, they are central components of the Self-Motion frame (at least according to FrameNet); Second, the scope of the paper does not allow to include peripheral FEs suchs as Distance, Duration, and Time[8]. Additionally, I further encode for the several types of fillers of the Self-Mover FE. The fillers are: *Animates* (characterized by animacy and intentionality, and further classified as *human* or *animal*), *Vehicles* (including all means of transportations), and *Inanimates* (defined as items that lack animacy, have fixed shape, and are not a means of transportation). For the other Core FEs, no further classification of their fillers was done.

4. Analysis

In this section, I first introduce the 'Self-Motion' frame as presented in FrameNet. I then move to the analysis of my data.

4.1. Self-Motion Frame

In this section, I present a description of the 'Self-Motion' frame. This frame is based on the English 'Self-Motion' frame as represented in FrameNet. The frame describes the movement of an entity that moves independently without direct external influence. The entity starts the movement from a source point, goes through a trajectory visible or invisible and ends up in at a *goal* location. The movement takes place within a bounded area and has a specified direction.

Below I define the Core FEs in this frame along with examples from the data:

a. Self-mover: is an entity that moves by itself using its own body.

(7) (c.e.58) **He** climbs out of the pool.

(8) (w.e.29) **The ghosts** walked towards the big house.

b. Source: is the starting point of the movement or the location where the entity starts its movement from.

(9) (c.e.36) They climb down from **the bread truck.**

(10) (cr.e.26) Whoever was next to the fire crawled **away from it.**

[8] More infomation: https://framenet2.icsi.berkeley.edu/fnReports/data/frameIndex.xml?frame=Self_motion

c. Path: is the trajectory the entity is taking towards its goal.

(11) (w.e.22) walk right **through the basement kitchen.**

(12) (f.e.49) The birds still fly **across.**

d. Gaol: is the location where the entity ends its movement.

(13) (f.e.3) and it flew to **its home**.

(14) (r.e.50) we ran to **the car.**

e. Area: is the expression that describe a general bounded area where the action of the movement is taking place.

(15) (r.e.21) Athletes ran in **Olympia**, Greece.

(16) (c.e.51) A small car had climbed **the hill**.

f. Direction: is the direction towards which the self-mover is heading during the motion.

(17) (f.e.8) The planes flew **west** toward China.

The Self-Mover role is distinct from that the other roles in that it is the main verbal argument of the 'Self-Motion' verb (subject NP). Thus, it is always specified in the data. The other roles (Source, Path, Goal, Area, and Direction) are directional adverbial and/or PP adjunct of the motion verb.

4.2. The Self-motion Verbs

In this section, I present the data by analyzing, first, the verbs *walk* and run and their Arabic counterparts, *maʃa* and *ʒara*. I then move to present analysis of *fly* & *tˁara* and then *climb & tʰasaĺqa*. Finally, I present analysis of *crawl* & *zaħəfa*. For each of these groups, I focus analysis on the types of fillers of the *self-mover* role and the frequency of the specification of the other core FEs, which are *direction, source, path, goal* and *area.*

Walk & maʃa* and *Run & ʒara

Both verbs, *walk* and *run,* and their Arabic counterpart, *maʃa* and *ʒara,* encode *motion* and *manner*. The *manner* that they encode is related to the rate of speed of the motion (Slobin, D. 2006). The speed of *walk* and *məʃa* is understood to be of normal walking speed unless specified as in example (18) and (19) below:

(18) (w.ar.11)

البلاد	فى	**بسرعة**	رشدى	مشى
belad	fi	besrʕa	rushdi	məʃa
country	in	fast	Rushdi	walked

[Rushdi walked **fast** in the country]

(19) (w.ar.12) البيت ناحية **بيطء** مشى

albeɪt naħjat bebetˁ məʃa

the house towards slowly walked

[He walked **slowly** towards the house]

This specification of the rate of the motion is found only in 5 instances in the Arabic data. Even though, the English data is empty of any specification of the speed rate, it is possible to say "*walk fast* or *quickly*"[9].

The verbs *run* and *ʒara* also encode *motion* and *manner*. We understand the manner of motion of *run* and *ʒara* to be similar to that of *walk* and *maʃa* except that the motion is faster as in example (20) and (21) below:

(20) (r.a.54) لبيبة خالتي بيت إلى جريت

labiba xalət-i beɪt ɪla ʒareɪ-t

Labibah aunt-1st.poss house to run-1st

[I *ran* to the house of my aunt Labibah]

(21) (r.e.51) we *ran* to the car

In the two examples above, the two verbs *run* and *ʒara* could be substituted with *walk* and *maʃa.* However, *run* and *ʒara* add to the meaning the sense of urgency due to the difference in the rate of motion specified by the two groups of verbs.

Generally, the encoding of the core FEs of *walk* and *run* and their Arabic equivalents, *məʃa* and *ʒara*, are similar. Their *self-mover* is filled with an animate (*human* or an *animal*) or inanimate entity. The frequency of the occurrence of the animates entities are very similar (90% in Arabic and 100% in English) as in Table1 shows below:

Self-Mover	**Arabic (məʃa)**	**English (walk)**	**Arabic (ʒara)**	**English (Run)**
1. ani. human	53 (1 ghost) (85%)	56 (97%)	47 (84%)	50 (93%)
2. ani. animal	3 (5%)	2 (3%)	5 (9%)	4 (7%)
3. vehicle	6 (10%)	0	3 (7%)	0

Table 1 Fillers and frequency of the self-mover role of the verbs *walk* and *run* and their Arabic counterparts.

However, the verbs differ in that *vehicles* can fill the *self-mover* role in Arabic but not in English. In Arabic vehicles like trams , stagecoaches , cars (occurred once) and trains, and

[9] there are many instances of "*walk fast*" in COCA.

ships can *walk*[10] and *run* as in examples (22-24) below:

(22) (w.a.33) دائرى خط فى يمشى **الترام** هذا

daʔri χatˁ fi yamʃi atraːm haða

round road in walk the tram this

[this **tram** walks in a circle]

(23) (w.a.4) القتيل حاملة **الإسعاف** سيارة مشت

alqatil ħamilatən alʔsʕaf sayarat maʃat

the murdered carrying ambulance car walked

[The **ambulance** walked carrying the murdered man]

(24)(r.a.34) الأشجار تحت بجانبه تجري **الحنطور** عربات

alʔʃʒar taħt bʒanebeh tʒri alħntˁur ʕarabat

the trees under next to him ran stagecoaches

[The **stagecoaches** is running next to him under the trees]

In the examples above, the motion of trams, cars, and stagecoaches is described using the 'self-motion' verbs *məʃa* and *ʒara* in Arabic. *Vehicles* are understood to be able to *walk* and *run* by itself.

The specification of the *Direction, Source, Path, Goal, Area* roles in the 'self-motion' event of walking and running is quite similar in Arabic and English as shown in Table 2 below. The *direction* is not usually specified in either language (only once in Arabic). The *source* role is specified in both languages. However, the *source* of motion is specified slightly less in Arabic than in English.

The *path* role exhibits an opposite pattern. Arabic speakers specify it slightly more in Arabic than in English. The frequency of specification of the *goal* role differ in both motion events. While, it is specified somewhat more in English in the walking event, it is specified more in Arabic in the running event. The reason of this discrepancy is unclear. The *area* role is specified faintly more Arabic than in English.

The implication of differences between Arabic and English of the frequency of the specification of the spatial role is that generally in the self-motion events of *walk* and *run*, English speakers pay more attention to the beginning and end of the motion more than Arabic speaker. However, Arabic speakers seem to pay slightly more attention to the trajectory and

[10] In Arabic, *maʃa* describes slow motion of *vehicles* as in the sentences above. There is another verb in Arabic that typically used to describe motion of vehicles, which is *sara*. Unlike *maʃa*, *sara* is neutral, it denotes the motion but not the speed.

area of the motion events. This difference highlights that *walk* and *run* and their Arabic counterparts have some semantic differences. Even though, the specification of core FEs exists in both languages, there is a difference in the frequency of specifying them.

FEs	**Arabic (məʃa)**	**English (walk)**	**Arabic (ʒara)**	**English (Run)**
Direction	0	0	1 (1%)	0
source	3 (5%)	14 (24%)	4 (7%)	25 (44%)
Path	13 (26%)	5 (9%)	10 (16%)	4 (7%)
Goal	24 (38%)	32 (55%)	25 (41%)	15 (26%)
Area	11 (18%)	8 (14%)	11 (18%)	5 (9%)

Table 2 Frequency of the specification of the spatial roles the self-motion event of walking and running.

Fly & tˁara

The English verb *fly* and its Arabic counterpart *tˁara* encode *motion* and *manner*. The manner is a motion of an entity through air typically using some sort of wings as in example (25) below:

(25) (f.a.11) قصير **بجناح** تطير جبانة ذبابة

qasir	b-ʒnaħ	tɛtˁir	ʒabanah	ðʊbabah
short	by-wing	fly	coward	fly

[A coward fly is flying with a short **wing**]

Fly and *tˁara* seem to allow more fillers of the *self-mover* role than the previous verbs. *Animates* (*human* and *animal*), *vehicles*, and *Inanimates* objects are found to fill the *self-mover* role, as in Table 3 below:

Self-Mover (Fly)	**Arabic (total of 55)**	**English (total of 53)**
1. ani. human	4 (7%)	1 (2%)
2. ani. animal	41 (75%)	41 (77%)
3. vehicle	4 (7%)	6 (11%)
6. Inanimate	5 (9%)	5 (10%)

Table 3: Fillers and frequency of the self-mover role of the verbs

The table above shows that *animates* in both languages constitute most of the *self-mover* fillers (82% in Arabic and 79% in English). Unlike the previous verbs (*walk*, *məʃa, run*, and *ʒara*), humans do not seem to be the prototypical entities that fly. Humans are filler of the *self-mover* role less than 7% of the time in both languages[11] as in example (26) below from

[11] In the English data, there is only one sentence of an entity that is *animate* but not an animal that fill the *self-mover* role of fly. The entity is a vampire as in this sentence: They (vampires) fly through the dematerialization fold.

the Arabic data:

(26) (f.a.22) كرة لمتابعة **سوبيس** طار

kurah	lɪ-mutabʕt	subis	tˁara
ball	to-follow	Subis	flew

[**Subis** flew to receive the ball]

The prototypical *self-mover* is *animals*, specifically birds. As shown in the table above, animals constitute 75% of the fillers the *self-mover* role in Arabic and 77% in English. *Vehicles* also show up similarly in both languages (7% in Arabic and 11% in English). In the Arabic data, airplanes and cars can fly while in English data only airplanes can fly. Example (27) below is an example of cars as filler of the *self-mover* role of *tˁara*:

(27) (f.a.34) بالهواء **السيارة** كيف طارت انظروا

belhwa	asʃarah	tˁarət	keɪf	endru
in the air	the car	flew	how	look

[look how the **car** flew in the air]

Unlike the previous verbs, *fly* and *tˁara* allow inanimate objects to fill the *self-mover* role similarly in Arabic and English (9% on the time in Arabic and 10% of the time in English). Debris, fur, balloons, and missiles fill the *self-mover* role in both languages as in examples (28)-(29) below:

(28) (f.a.18) ضخمة **بالونات** موسكو سماء في تطير

dˁxməh	balunat	musko	smaʔ	fi	təˈtˁir
huge	balloons	Moscow	sky	in	flies

[huge **balloons** fly in the sky of Moscow]

(29) (f.e.18) wet **fur** fly

From the examples above, we understands that objects such as cars, balloons, and fur have the ability to fly as a result of physical components. Fur, for instance, can fly and float in the air when the wind blow as a results of its form and lightness. However, the intentionality of the motion of these objects is different from that of *animates* as will be discussed in the discussion section.

Direction, *path* and *goal* roles of the verbs *fly* and *tˁara* are specified very similarly in Arabic and English as shown in Table 4 below. Direction continues to be rarely specified in self-moving verbs. The path role also, was only specified 3 and 4 times, in Arabic and English data respectively. A possible explanation of such phenomena is that the path of the

flying motion is not as salient as in motions that requires touching the ground like walking and running. The path of the flying event is usually specified in relation to locations or object on the ground as opposed to the typical path fillers (e.g. street) as in examples (30) and (31) below:

(30) (f.a.9) **المدينة** **وسط** عبر تطير قذائف

mədina wasatˤn ʕbr tətˤir qəðaʔf

the city center through fly missiles

[missiles fly through **the center of the city**]

(31) (f.e.4) They (insects) flew **past our faces**.

The highest discrepancy between *fly* and *tˤara* is in the specification of the source role (Arabic 11%, English 26%) and the Area role (Arabic 29%, English 9%). This suggests that English speakers pay more attention to the beginning of the flying motion while Arabic speakers pay more attention to the motion as a whole.

Roles (Fly)	**Arabic**	**English**
Direction	1 (2%)	1 (2%)
source	6 (11%)	14 (26%)
Path	2 (4%)	4 (8%)
Goal	12 (22%)	10 (19%)
Area	16 (29%)	5 (9%)

Table 4: Frequency of the specification of the spatial roles of *fly* & *tˤara*

Climb* and *tʰasalʲqa

Climb and *tʰasalʲqa* typically encode *manner* of motion on an inclined surface. Typically the motion is directed toward the top of an inclined surface unless the path is expressed by a satellite (verb particle, prefixe. etc...) (Ozcaliskan & Slobin, 2000).

(32) (c.e.24) I climb the stairs to my apartment

(33) (c.e.52) he climbs ***down*** the ladder.

In sentence (32) above, we understand the climbing to be going up however the verb itself does not encode the path. While in sentence (33) the speaker uses "*down"* to specify that the motion is directed to the bottom of the ladder. In all the data of the verb *tʰasalʲqa*, the motion of climbing is going up. I argue that Arabic speakers understand the motion of climbing as ascending not descending.

The fillers of the *self-mover* of *tʰasaĺqa* is always *animates* (*humans* and *animals*). However, *animates* and *vehicles* can fill the self-mover role of *climb* as in Table 5 below:

Self-Mover (Climb)	Arabic	English
1. Human	44 (86%)	50 (89%)
2. Animal	6 (12%)	2 (4%)
3. vehicle	0	4 (7%)

Table 5: Fillers and frequency of the self-mover role of *Climb* and *tʰasaĺqa*

Animates are almost always the fillers of the *self-mover* for both *Climb* and *tʰasaĺqa.* Humans are the prototypical *self-mover* with 86% of the Arabic examples and 89% of those in English. Animals come second as fillers of the *self-mover* of the climbing motion in Arabic (12% on the time). However, in English vehicles seem to fill the *self-mover* role of climbing more than animals (7% and 4% respectively). The fact that *vehicles* can climb in English but not in Arabic suggest that the manner of the climbing motion is de-profiled and the vertical direction is profiled in English as opposed to Arabic where the manner of motion seems to be profiled more. Below are examples of *vehicles* such as **bikes**, **planes** and **cars** that show up as self-movers in the climbing event:

(34) (c.e.20) The **bikes** also had to climb
(35) (c.e.46) The **plane** had climbed to forty-one thousand feet
(36) (c.e.51) A small **car** had climbed the hill

There is a discrepancy in the specification of the FEs of the climbing event in Arabic and English. There is no specification of the direction role at all in either language. The *source*, *path* and *goal* roles are more weighted in English that in Arabic. As the *source* and *path* roles are never specified in Arabic, the *goal* role also is specified only 4% of the time. However these roles are specified more frequently in English (see Table 6 below).

The *area* role shows opposite patterns. However it is specified frequently in the event of climbing in both languages, it is specified considerably more in Arabic that in English (98% and 45% of the time respectively). The lack of specification of the *source, path* and *goal* roles indicate that the lexical semantics of the verb *tʰasaĺqa* is profiling more the manner of motion than the path of motion from point A to point B. On the other hand, the frequent specification of these roles in English indicate that *climb* is profiling more the trajectory of the motion. This suggest that English speakers pay more attention to the beginning, path and

end of the climbing motion, while Arabic speakers pay more attention to the location of the motion.

FEs (Climb)	Arabic	English
Direction	0	0
source	0	6 (11%)
Path	0	12 (21%)
Goal	2 (4%)	19 (34%)
Area	50 (98%)	25 (45%)

Table 6: Frequency of the specification of the spatial roles *Climb* and *tʰasalʃqa*

Crawl* and *zaħəfa

Crawl and *zaħəfa* encode motion and manner. The two verbs have similar meanings but are not exactly the same. Three English dictionaries[12] define crawl as to move forward on the hands and knees or by dragging the body close to the ground or to move slowly or laboriously. On the other hand, Arabic dictionaries[13] define *zaħəfa* as to move on the hands and knees or to drag oneself on his/her buttocks. It is also defined as to move while the belly is touching or close to the ground. Examples (37) - (40) show different senses of the two verbs:

(37) (cr.a.10) قوسه ومعه **بطنه** على زحف

qoʊsəh wamaʕhu batˁneh ʕla zaħafa

his bow with him his belly on crawl

[He crawled on his **belly** with his bow]

(38) (cr.a.20) **أستاههم** على يزحفون الباب فدخلوا

estahehem ʕla ʃazħəfun albab dəχalu

their buttocks on crawl.3p the door enter.3p

[They entered the door crawling on their **buttocks**]

(39) (cr.e.11) I crawl out from under the front of the porch.

(40) (cr.e.36) Last night a bug crawled into my husband's ear.

Sentences (37) and (38) shows that *zaħafa* refers to motion where the weight is resting either on the abdomen or buttocks of the self-mover. Similarly, sentences (39) and (40) show that *climb* refers to a motion by hands and knees (or legs) while the abdomen is close to the ground.

The *self-mover* of the crawling event in English is always *animates.* Similarly

[12] Oxford Dictionary, Dictionary.com, and Merriam-Webster Dictionary.

[13] http://www.almaany.com/

animates are mostly the *self-mover* in Arabic. However, *vehicles* show up as fillers in the crawling event in Arabic in 2 sentence (see Table 7 below)

Self-Mover (Crawl)	Arabic (total of 51)	English (total of 53)
1. ani. human	36 (71%)	44 (83%)
2. ani. animal	13 (25%)	9 (17%)
3. vehicle	2 (4%)	0

Table 7: Fillers and frequency of the self-mover role of *crawl* and *zaħəfa.*

Humans are the prototypical *self-mover* of the crawling event in both languages. They fill the *self-mover* role similarly in both languages (71% & 83% of the time in Arabic and English respectively). *Animals* also comparably specified in Arabic and English. *Animals* like cats, goats, and rats, reptiles like crocodiles and snakes and insects like geotrupidae, wasps, and beetles can crawl as in examples (41) and (42) below:

(41) (cr.a.40) سيارة زجاج على يزحف **ثعبان**
sʃarah zuʒaʒ ʕla jɛzħəf θuʕban
car glass on crawl snake
[A **snake** crawls on a car windshield]

(42) (cr.e.36) Last night a **bug** crawled into my husbands ear

Vehicles are found to fill the *self-mover* role of the crawling event twice in the Arabic data, but never in the English data. The only *vehicle* in the two crawling events is **airplane** as in example (43) below:

(43)(cr.a.46) طويلة مسافة مقدمتها على تزحف **طائرة**
tˁawila masafat muqədmatɛha ʕla tezħəf tˁaʔrəh
long distance its front on crawl airplane
[An **airplane** is crawling on its front for a long distance]

The motion of the airplane described above is not referring to an usual motion of an airplane on its tires rolling down a runway. Instead, it is referring only to the specific case of when an airplane lands on its bottom, instead of its tires, such as in the event of a crash landing. Thus the motion is referring to the movement of the airplane from the instant that the bottom of the plane begins to impact the earth until the plane comes to a stop.

The *direction* semantic role continues to be unspecified in either Arabic or English data of the crawling event as shown in Table 8 below:

Roles (crawl)	Arabic (total of 51)	English (total of 56)
Direction	0	0
source	3 (6%)	11 (20%)
Path	4 (9%)	16 (29%)
Goal	16 (31%)	27 (48%)
Area	6 (12%)	11 (20%)

Table 8: Frequency of the specification of the spatial roles *crawl* and *zaħəfa.*

We see in the table above that the *source*, *path*, *goal* and *area* roles are specified considerably more in English that in Arabic. These differences in the frequency of specification of the spatial roles predicts that English speakers pay more attention not only to the *source, path* and *goal* of the motion (as in the 'Self-Motion' events above) but also the *area* the crawling events. This suggests that the verb *crawl* de-profiles the manner of the crawling motion and profiles its trajectory and location. Conversely, the verb *zaħəfa* seems to profile more the manner of the motion. Thus, Arabic speakers appear to be more attentive to actual manner of crawling than to the trajectory and area of the motion.

5. Discusion

One of the main differences between the 'Self-Motion' event in the two languages is the frequency of encoding of the semantic roles. In my data count (see Tables 9 & 10 in Appendix 1), the fillers of the *self-mover* role are overall quite similar. Humans are the most frequent fillers with 64% of the time in Arabic and 72% of the time in English. Animals come next with 24% and 21% of the time in Arabic and English, respectively. *Vehicles* and *Inanimate* objects are found to be fillers 5% of the times or less in both language. Talmy (1985) classifies *self-movers* to two categories: (1) "self-agentive" entities like humans and animals, and (2) "non-agentive" entities like rocks or water (e.g. the rock sIid down the hill). Clearly, self-agentive entities are conceived to be the prototypical *self-movers* in the 'Self-Motion' events as shown in the data. However, the data also shows that non-agentive entities such as *vehicles* and *inanimates* are understood to be *self-movers*.

The frequency of the linguistic encoding of the semantic roles does not seem differ in events involving self-agentive actors and events involving non-agentive entities. The study of Luo & Baillargeon (2005) and Premack (1990) attest that humans do not think differently of the two events. For example, Luo and Baillargeon (2005) give orientation trials to enfants in

which a box moves repeatedly to a cylinder and then to a cone across an apparatus floor. They reasoned that if the infants recognize the box as an agent then they would look longer at the new goal than at the old goal. They found that infants looked longer at the new- than at the old-goal event. This finding explains the fact that the frequency of the linguistic encoding of FEs does not seem differ in events involving self-agentive actors and events involving non-agentive entities in my data.

Additionally, the two language are similar in the encoding the direction role. The direction role is only specified 2% of the time in both languages. Clearly the direction role is rarely encoded. Speakers of both languages do not seem to pay much attention to what the direction the motion is taking. As shown in section 4.1, FrameNet classifies the direction role as one of the core semantic elements in the 'Self-Motion' event. A question to be raised here is whether the direction role is a core element in the motion event. I would argue that speakers do not conceive the motion as taking a specific direction as much as they think of it as going from point A to point B. The direction role is not as salient as other roles like the goal and the source of the motion.

The *source* and the *goal* roles are encoded at least 10-19% less in the Arabic data than English data. Additionally, The *path* role is specified 5% less in Arabic than in English . However, the *area* role is considerably specified more in than English speakers (14% more in Arabic than in English). Arabic speakers pay more attention to the area where the event as a whole is taking place, whereas English speakers pay more attention to the start and end points of the motion as well as the trajectory of the motion. These differences suggest that Arabic speakers and English speakers pay different level of attention to different semantic roles in the motion event. Thus the 'Self-Motion' frame is not exactly the same in the two languages.

The difference above probes the Whorfian hypothesis. A body of psycholinguistics research has been done regarding whether the differences between the language we speak influence the way we conceive the world around us, specifically here the way we process the motion event (Ozcaliskan et al. 2000, Slobin, 2006; Fausey & Boroditsky, 2008; Lakusta & Landau, 2012). Fausey & Boroditsky's (2008) study on English and Spanish speakers' eye-witness memory of agentive and non-agentive events shows that speakers of English

exhibit a higher ability to remember agents of the non-agentive events than do Spanish speakers as a result of the different structure of English and Spanish (Both intentional and non-intentional events tend to be expressed using agentive language in English, while passive structure tends to be used to describe non-intentional events in Spanish). This notion could explain the subtle difference in the frequency of encoding of FEs of the 'Self-Motion' frame in English and Arabic. However, Oh (2003) in his study on Korean (a verb-based language like Arabic) speakers' and English (a satellite-frame language) speakers' memory on details of visually experienced motion events, found that speakers of both languages did not display a difference in remembering the directionality of the motion event. Slobin (2006) argues that this lack of difference demonstrates that path is the center "of the motion event in all types of languages, therefore the salience of directionality should not be sensitive to typology"(p. 16). In my data, the *path* role is specified similarly in both languages, which confirms Slobin's argument.

Looking at the number of specifications of the *source* role and the *goal* role in both languages, we find that the *goal* role is specified more than the *source* role in both languages, as mentioned above. This bias to encode the goal role more than the source has also been noticed by Lakusta and Landau (2005). Lakusta and Landau conducted a study where they showed participants events of motion including a *source* and a *goal* (e.g. the bird flew from the bucket into the pitcher) and later asked them what happened in the event. The researchers found that participants showed strong tendency to include the *goal* while often left the *source* role unspecified. Additionally, they found that the goal bias is also found in other event such as attachment/detachment, transfer of possession, and change of state (Lakusta & landau, 2005). This tendency is evident in my data where the *goal* role is specified at least 18% more than the *source* role in both languages.

While my study confirms the notion that semantic frames exist across languages (Boas, 2005), it points out that there are subtle differences in the salience of spatial information: *source*, *goal*, and *area* between Arabic and English. Therefore I believe that FrameNet needs to include more details about different aspects of the frames such as the degree of the tendency to encode different semantic roles. That is to say that some semantic

roles are more weighted than others in the semantic frames. For example, we have seen in this study that the *direction* role is almost never specified unlike spatial information of the 'Self-Motion' frame such as the *goal* and the *area* role, however the *direction* role is a core FE of the 'Self-Motion' frame. The difference in the salience of the spatial information could influence the memory retrieval of the FEs in the frame across of the two languages. The need for a more detailed frame is increasing especially as new projects of FrameNet are being built in other languages as mentioned in section 2.2.

6. Conclusion

The purpose of this paper is to carry out a comparative study on Arabic and English data in order to determine whether identical semantic frames exist across languages. In order to do so, I have collected English and Arabic corpus data relating to the event of 'Self-Motion' frame as built in FrameNet using fine English verbs: *walk, run, fly, climb* and *crawl* and their Arabic equivalents: مشى *maʃa* [=walk], جرى *ʒara* [=run], طار *tˁara* [=fly], تسلق *tʰasalʲqa* [=climb], and زحف *zaħəfa* [=crawl]. I limited the coding to core semantic elements of the 'Self-Motion' frame which are: *the self-mover, direction, source, path, goal* and *area.*

The main finding of the study is that the English frame is generally successful at capturing the semantic roles that we see in the Arabic verbs of self-propelled motion. I have also found that though fillers of the different semantic roles are overall the same, there are different restrictions on what can fill certain semantic roles depending on the semantics of the verb itself. For example, *Vehicle* in Arabic can fill the role of the *self-mover* with the verbs *walk, run and crawl* in Arabic while it can not in English. Another finding is that the two languages do not equally fill all of the possible semantic roles in the English frame. For example, the path, source and goal roles are encoded less often in Arabic than in English. That means that verbs which we currently think of as equivalents are in fact not. The verbs in English and their counterparts in Arabic have different semantic specifications and semantic foci. Arabic verbs seems to be profiling the manner of motion more than English verbs. However, English verbs seem to be profiling the path of motion more than Arabic verbs. As a result, I maintain that the description of the semantic frames needs to include more information regarding the frequency of semantic roles' occurrences and the types of their fillers.

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Appendix 1

Semantic role	Fillers	Arabic (total: 280)	English (total: 280)
Self-Mover	1. Human	180 (64%)	201 (72%)
	2. Animal	68 (24%)	58 (21%)
	3. vehicle	15 (5%)	10 (4%)
	4. Inanimate	5 (2%)	5 (2%)

Table 9: The types of fillers of the self-mover role in all the data

Semantic Roles	Arabic (total of 280)	English (total of 280)
Direction	5 (2%)	6 (2%)
source	16 (6%)	70 (25%)
Path	29 (10%)	41 (15%)
Goal	79 (28%)	107 (38%)
Area	92 (33%)	54 (19%)

Table 10: The frequency of the specification of the spatial roles in all the data