

Rooted motion events in a distributed model of the Arabic Lexicon

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Abstract

The article presents a study of Arabic motion events based on *root* classes, which contrasts with more common analyses found in the literature, phrased in terms of *category* or ‘verb’ classes (Levin 1993). The analysis is implemented in a generative distributed model of grammar and lexicon, along the lines of Halle and Marantz (1993), Marantz (1997, 2001), Harley (2014), among various other contributions on roots, as well as insights about the syntax of the lexicon in Hale and Keyser (2002), or Fassi Fehri, Saeed, & Alotaibi (2021). It is argued that ‘words’ as lexical items start their derivation as abstract syntactic roots, which merge with functional heads to be categorized; they then get interpreted as vocabulary items in the dictionary at the PF interface, or as semantic entities or eventualities at the LF interface, in line with Chomsky’s (1995, 2019) minimalist design. Roots of motion events are associated with simple or complex eventualities (e.g., \sqrt{HRK} ‘ \sqrt{MOVE} ’ represents a simple root MOTION component, while $\sqrt{JRY}\sqrt{RUN}$ represents a complex root component, resulting from merging the overt MANNER modifier to a silent MOTION root. We present evidence that roots are not distributively *free* (contra Borer 2005, 2014), but rather *ontologically* construed in composing with other roots, patterns, categories, and structures (Harley 2014, Marantz 1997, Levin & Rappaport 2010, 2017). Limitations on motion event/verb meanings then depend first on root classes. Traditional Manner/Path Typology (Talmy 2000) is reconsidered, and an alternative analysis to the complexity of traditionally directed motion verbs like *daxala* ‘enter’ and *xaraja* ‘go out’ is motivated, in addition to other subclasses of motion events.

Keywords: motion events; event classes; root syntax; category syntax; distributed morphology; path; manner; Arabic lexicon; English

1 Introduction

In available traditional Arabic dictionaries, forms, structures, and meanings of motion verbs like *daxal* ‘enter’ or *xaraj* ‘exit’, and their synonyms, are poorly characterized. It is stated that they are ‘opposites’ to each other (see e.g., *Lisān al-Arab*, *al-Muġam al-wasīṭ*, etc.). Furthermore, derived forms like the causative *ʔadxala* ‘caused X to enter’, the intensive *daxxala* ‘made X enter forcefully/repeatedly’, the participative *daaxala* ‘became inside one

another', the beneficiary causative *stadxala* 'caused X to enter to the benefit of oneself', or the reflexive intensive *tadaxxala* 'entered himself, interfered', are rarely treated systematically, or their fine sense distinctions accounted for in a principled way. Other flaws include lack of definitions, and inappropriate uses of synonyms as definitions. In this article, we present a systematic and motivated treatment of these events, based on typological and comparative results. We build on our original root-based analysis of *daxal* 'enter' and *xaraj* 'exit' specifically (Fassi Fehri, Saeed, & Alotaibi 2021). The analysis diverges from those in other models or typologies such as Talmy (1985, 2000), Jackendoff (2002), Levin (1993), Goldberg & Jackendoff (2004), Beavers, Levin, & Tham (2010), Verkerk (2015), to cite a few. For example, *enter* and *exit* in English are already categorized as directed motion verbs that involve Path in their semantic make-up (see e.g., Talmy 1991, 2000; Levin 1993; and Jackendoff 2002). Moreover, these analyses which are mostly based on Talmy's (1985, 1991, and 2000) limit the typology of languages to verb-framed and satellite-framed, depending on Path or Manner encoding. Fassi Fehri, Saeed, & Alotaibi (2021) provide evidence, however, that Path is not encoded in the semantic make-up of these events. More specifically, it is proposed that the roots of *daxal* 'enter' and *xaraj* 'exit' primarily involve a locative component of the 'nominal' form *daaxil* 'inside' and *xaarij* 'outside', respectively, which denotes only location. As for the motion component, it is assumed to be a light event MOVE, only present in the root structure of *daxal* 'enter' and *xaraj* 'exit' when used as events that denote motion. A similar locative and motional lexical segregation is morphologically attested in other languages such as Kurdish, where *enter* is expressed separately by a nominal element meaning 'inside', or 'outside' and an event similar to 'go' and 'come', for a verb similar to *exit*. The other components involved in motion verbs and event structures, such as Path and Manner, are proven not to be incorporated into the basic roots of the two motion events, but rather expressed by adjuncts, such as preposition phrases and adverbs. In the current paper, we argue for the decomposition of motion events into complex roots that include an eventive motion root merged with another root indicating a motion's location, direction, path, manner or deixis. The decomposition of events into root and template structure is not new; however, we argue for a complex root construction, rootP, which may contain more than one root. This view of roots, we argue, can account more appropriately for the data found in Arabic motion events.

Before we proceed, it is necessary to explain our view of roots. A wide-spread model of roots is found in Distributed Morphology, which holds that roots are basic syntactic units that merge with categorizers in the grammar (Halle & Marantz 1993; Marantz 1997; Harley & Noyer 1999; Harley 2014; Embick 2010; among others). Merge is the simplest computational operation; it takes two objects X, Y already constructed and forms a new object Z in its simplest form, that is, $\text{Merge}(X, Y) = \{X, Y\}$ (Chomsky 1995). Chomsky (2013) argues that it creates the relation 'member of' for X and Y (see also Collins, 2017). As in Chomsky (2019), we assume that Merge associates Root (a lexical 'word') and f (a functional word) to form a complex word. The 'single engine hypothesis, a key assumption in Marantz (1997), unifies the computational generation for both words and larger phrases. Words are then built not in the 'lexicon', but in syntax (a sort of L-syntax; see Hale and Keyser 1997, 2002); they are born as roots, the atomic syntactic units which provide the 'lexical' content. Roots are acategorical, and category features (like 'verb' or 'noun') become parts of 'words' only when they combine with

category specific heads in category syntax. Borer (2014: 343) observes that a “central role is played not by a ‘word’ or a ‘lexeme’ ..., but rather by a ‘root’ [... and] there is a general understanding that roots are at the very least devoid of syntactic category...Beyond that, what exactly ‘roots’ are, exactly, is by no means agreed upon ...”. In the approach we adopt, roots are inserted early in the derivation, and they project a syntactic node, a rootP. When a root later merges with *n*, it becomes a noun, with *v*, it becomes a verb, etc.

Furthermore, our roots are associated with semantic or ontological content. As Levinson (2014: 209) put it: “roots must be specified for semantic type (in the sense of formal type theory) in order to compose with other syntactic constituents. The type of the root has apparently syntactic ramifications, as it determines the arguments the root combines with, and the combinatorial possibilities in semantic composition”.

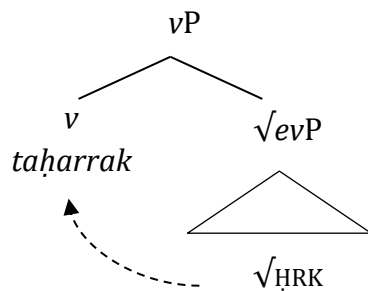
In this paper, we argue that motion events are classified as simple or complex, depending on their root structure, and the subevents involved in the motion ‘configuration’: path, location, direction, manner, deixis, etc. In the case where the motion event indicates motion only, the motion event root ($\sqrt{\text{ev}}$) will have the phonological representation $\sqrt{\text{HRK}}$ ‘ $\sqrt{\text{MOVE}}$ ’ (see (3) below). On the other hand, when the motion event is specified for one of the elements of the configuration of motion, it becomes phonologically silent, and the root it merges with carries the burden of phonological representation.

As an illustration, consider the difference in structures between the two motion constructions in (1) and (2):

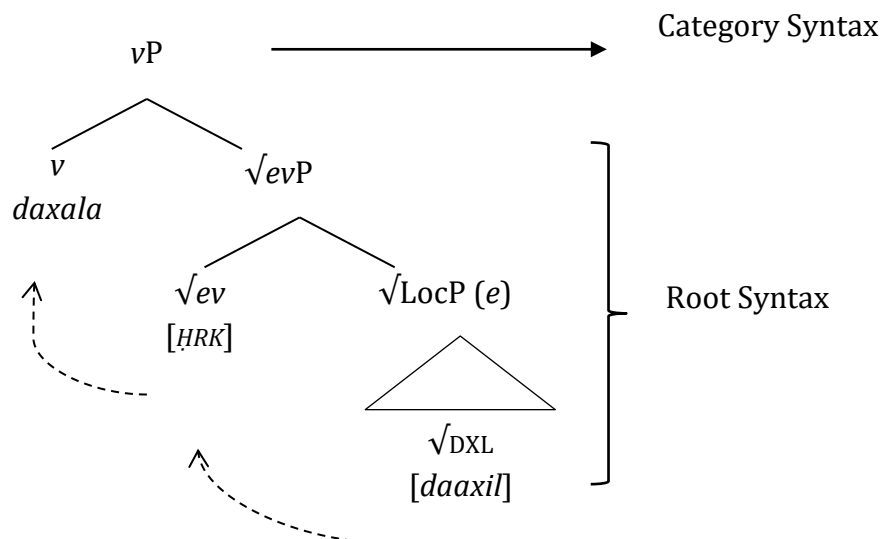
- (1) *ta-ḥarraka* *al-qīṭaar-u*
 INC-move.PST.3M DEF-train-NOM
 ‘The train moved.’
- (2) *daxala* *r-rajul-u* *l-qaṣṣat-a*
 enter.PST.3SG DEF-man-NOM DEF-hall-ACC
 ‘The man entered the hall.’

It is reasonable to think their derivation proceeds as in (3) and (4), respectively:

(3)



(4)

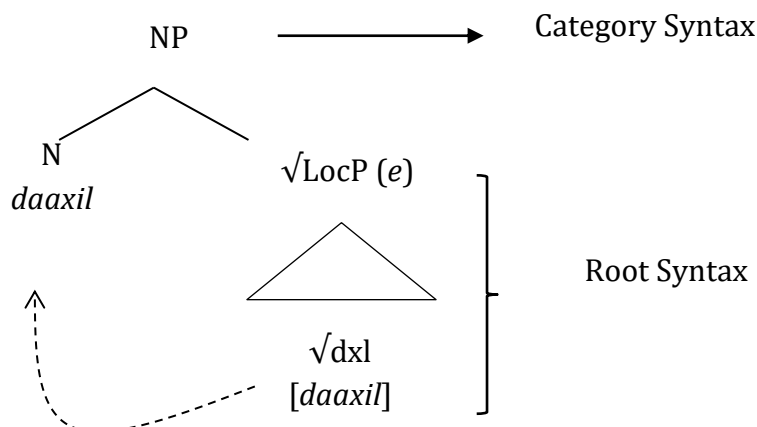


In (1), the motion event is simply ‘move’; the verb does not indicate the motion’s path, location, manner, or deixis etc. On the other hand, a motion event verb like *daxala* ‘enter’ in (2) expresses motion in relation to a location entity *daaxil* ‘inside’, which marks the endpoint of a Figure. We propose that it is built as a complex root, one that consists of an event motion root merged with a location entity root. In this case, only the second root will have phonological representation, while the motion event root is phonologically silent in (2). Why is it so? Why is the basic root construed as a ‘locative’, rather than a motion root?

In Fassi Fehri, Saeed, & Alotaibi (2021), it is proposed that the root of *daxala* ‘enter’ is primarily a locative component in the form of a spatial ‘nominal’ location, i.e. the abstract counterpart of the spatial locative entity (*e*) *daaxil* ‘inside’. To see how a Locative Phrase (LocP) gives source to a *daaxil* ‘inside’ component in (2), consider the sentence in (5), where it is used as an autonomous predicate, with essentially the structure in (6):

- (5) *al-qalam-u* *daaxil-a* *al-fulbat-i*
 DEF-pen-NOM inside-ACC DEF-box-GEN
 ‘The pen is inside the box.’

(6)



The verbless ‘copulative’ sentence in (5) is locative. The locative NP (or PP) headed by *daaxil* has the essential structure in (6), which derives from a root structure headed by LocP or PlaceP root. We assume that it is this meaning and structure which is essential and common to both nominal and verbal projections constructed from the root $\sqrt{\text{DXL}}$, or similarly $\sqrt{\text{XRJ}}$.

If this analysis is correct, it is important to realize that the overt component of the root is a ‘nominal’ entity *e*, or location LOC, rather than an event *ev*; it has no GO or MOVE base, unlike what most analyses of ‘enter’ across languages have proposed (as discussed in more detail in sections 3 and 4). Of the two potential abstract components $\sqrt{\text{DXL}}$ and $\sqrt{\text{HRK}}$, it looks as if the morphological root superficially realizes only the locative entity, while the event of motion is phonologically silent.

There are other components which can be involved in motion event/verb structures, other than location, such as path, manner, deixis, or direction, which are constitutive of some roots of motion events, but not others. They may be expressed as roots merged with the initial motion event root at *root syntax*, or as adjuncts in *category syntax*, etc. This decompositional analysis will be extended to significant cases, giving room to the emergence of fine-grained typology.

The paper is organized as follows; section 2 presents details of the root-based classification of motion events, and its theoretical implications; section 3 provides further evidence for appropriate decomposition from a semantic and structural perspective, based on the analysis of motion events *daxala* ‘enter’ and *xaraja* ‘exit’ specifically; section 4 compares the root-based typology proposed with other existing typologies in the literature. Section 5 concludes the paper.

2 A root-based classification of motion events

As stated earlier, we propose a new classification of motion events. Its salient characteristic is that it is root-based, instead of being category-based. That is, words are born as roots that have their own semantics and (morphosyntactic) structure, and they are classified as such, depending on their root syntax, and regardless of their (late) categorial specifications. Framed as such, motion events are analysed as consisting of a number of elements that constitute the configuration of motion. Chiefly among those are: the motion event, path, manner, direction, deixis, and location. The motion event may be expressed morphologically by the verb alone in Arabic. The verb may indicate an event of motion only, or a motion with a specific manner, or a motion with a specific path, or a motion described in terms of a location, or a motion anchored deictically as seen in the following list respectively:

- (7) a. *taḥarraka* ‘move’ (motion event)
 b. *jaraa* ‘run’ (manner)
 c. *daara* ‘circulate’ (path)
 d. *daxala* ‘enter’ (location)
 e. *jaaʔa* ‘come’ (deixis)

We propose that all these verbs can be analysed as motion events that include a motion eventive root. The verb that indicates only motion (7a) has a root that expresses a motion event alone. The other verbs (7b-e) are more complex, they would have at least one or more additional elements from the configuration of motion, to be incorporated into the motion event.

Specifically, a motion event, in its simplest form, is instantiated by the Arabic event/verb *taḥarraka* ‘move’, which expresses only motion, the simple root of which is \sqrt{HRK} ‘ \sqrt{MOVE} ’, without any reference to manner, path or location. Consider the following examples:

- (8)
- | | | | |
|----|--|---|--|
| a. | <i>ta-ḥarraka</i>
INC-move.PST.3SG
‘The door moved.’ | <i>l-baab-u</i>
DEF-door-NOM | |
| b. | <i>ḥarakat-u</i>
movement-NOM | <i>s-sulḥufaat-I</i>
DEF-turtle- GEN | <i>raaʔiʕat-un</i>
amazing-NOM
‘The turtle’s movement is amazing.’ |

The verb *taḥarraka* ‘move’ in (8a) and the noun *ḥarakat* ‘movement’ in (8b), which designate only motion, are fundamentally built from the trilateral root \sqrt{HRK} ‘ \sqrt{MOVE} ’. By contrast, a motion event which denotes more than motion must be a complex event. For example, the motion event *jaraa* ‘run’ expresses a MANNER (of motion), and the motion event *daara* ‘circulate’ induces a PATH of motion, as exemplified in the following constructions:

- (9) *jaraa* *al-walad-u*
run.PST.3SG DEF-boy-NOM
‘The boy ran.’
- (10) *daara* *al-walad-u*
circulate. PST.3SG DEF-boy-NOM
‘The boy moved around.’

In (9) and (10), the root \sqrt{JRY} represents only the MANNER component, while \sqrt{DWR} represents only the PATH component. If true, that suggests that MOVE, or the motion event, is hidden (or silent) there, accounting for the paraphrase of (9) as ‘The boy was moving by running’, and (10) as ‘the boy moved following a circle path’. Following are subsections in which we give a rationale for proposing the \sqrt{HRK} ‘ \sqrt{MOVE} ’ as the simplest motion root, and there follows a decomposition of several motion events in Arabic.

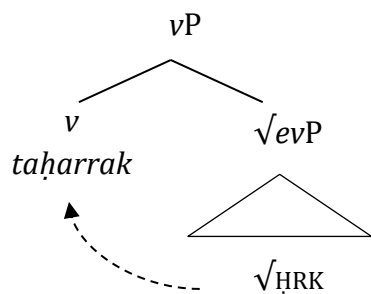
2.1 The simple motion root

In Arabic, we argue that *taḥarraka* ‘move’ involves an eventive root that indicates a simple motion event without reference to other components that may be associated with it. That is, *taḥarraka* denotes a neutral motion without any extra or additional meaning. Consider the following paradigms:

- (11)
- a. *ta-ḥarraka-t* *aṭ-ṭaaʔirat-u*
INC-move.PST-3F DEF-plane-NOM
‘The plane moved.’
- b. *ta-ḥarrak-a* *al-qīṭaar-u*
INC-move-PST.3M DEF-train-NOM
‘The train moved.’

In (11a), *taḥarrakat* ‘move’ denotes a neutral movement of the Figure *aṭṭaaʔiratu* ‘the plane’; it does not tell whether the plane moved quickly, upward, forward, backward, straight, left, or right. Similarly, *taḥarraka* ‘move’ in (11b) describes a neutral movement of the Figure *alqīṭaar-u* ‘the train’ without any further denotations. Accordingly, *taḥarraka* ‘move’ is constructed from a root that denotes a motion event directly, hence it involves the simple motion root \sqrt{HRK} ‘ \sqrt{MOVE} ’, which can structurally be represented as in (12).

(12)



The root \sqrt{HRK} is identified as an *event*, hence the inclusion of *evP* to clarify its ontological status (which we assume to be associated with such root freely).

In *Al-Ṣayn* dictionary, (ḥ r k) ‘move’ is defined as “*ḥaraka yaḥruku ḥarkan wa ḥarakatan wa kaḍaalika yataḥarraku*” [moved moves a movement and motion and also moves]. It appears that *ḥaraka* (based on the bare verbal form faʿala; Form I) and *taḥarraka* (based on the inchoative verbal form tafaʿʿala; Form V) both mean ‘move’, and indicate the simplest notion of movement of a Figure without reference to transitivity, causation, location, manner, or direction as seen in the following examples:

(13)

- | | | | |
|----|----------------------------|-------------------|---------------------|
| a. | <i>ḥarak-a</i> | <i>ar-rajul-u</i> | |
| | move-PST.3SG | DEF-man-NOM | |
| | ‘The man moved.’ | | |
| b. | <i>taḥarrak-a</i> | <i>ar-rajul-u</i> | |
| | INC.move-PST.3SG | DEF-man-u | |
| | ‘The man moved.’ | | |
| c. | <i>harrak-a</i> | <i>ar-rajul-u</i> | <i>al-kursiyy-a</i> |
| | CAUS.move-PST.3SG | DEF-man-NOM | DEF-chair-ACC |
| | ‘The man moved the chair.’ | | |

Examples (13a) and (13b) have basically the same reading in the simple cases, although we note that the first form *ḥaraka* is a more archaic form which has dropped out of use in Modern Standard Arabic (MSA) and been replaced by the fifth form *taḥarraka*. Observe further that in example (13c), the form *harraka* (the causative-intensive Form II) is the transitive source of the intransitive more complex anti-causative in (13b).

Fassi Fehri, Saeed, & Alotaibi (2021) argue that a verb such as *daxala* ‘enter’ or *xaraja* ‘exit’ can be decomposed into a motion event and a location entity (arguments for this decomposition are given in 3.1). The motion event must be MOVE (and no other motion component), the most neutral motion event. This analysis can be established by comparing with other motion constructions like *ḍahaba* ‘go’, *jaaʿa* ‘come’, *ntaqala* ‘transferred’, *ṣaara* ‘become’ and *taḥarraka* ‘move’, as in the following examples:

(14)

- | | | | | |
|----|----------------------------------|--------------|------------------|-------------------|
| a. | <i>ḡahaba</i> | <i>ʔilaa</i> | <i>daaxil-I</i> | <i>l-manzil-i</i> |
| | go.PST.3SG | | to inside-GEN | DEF-house-GEN |
| | 'He went into the house.' | | | |
| b. | <i>jaaʔa</i> | <i>ʔilaa</i> | <i>daaxil-i</i> | <i>l-manzil-i</i> |
| | come.PST.3SG | to | inside-GEN | DEF-house-GEN |
| | 'He came into the house.' | | | |
| c. | <i>ntaqala</i> | <i>ʔilaa</i> | <i>daaxil-i</i> | <i>l-manzil-i</i> |
| | transfer.PST.3SG | to | inside-GEN | DEF-house-GEN |
| | 'He transferred into the house.' | | | |
| d. | <i>ṣaara</i> | <i>ʔilaa</i> | <i>daaxil-i</i> | <i>l-manzil-i</i> |
| | become.PST.3SG | to | inside-GEN | DEF-house-GEN |
| | 'He became into the house.' | | | |
| e. | <i>taḥarraka</i> | <i>ʔilaa</i> | <i>daaxil -i</i> | <i>l-manzil-i</i> |
| | move.PST.3SG | to | inside-GEN | DEF-house-GEN |
| | 'He moved into the house.' | | | |

Events like *ḡahaba* 'go' or *jaaʔa* 'come' are presumably associated with a deictic component in their structure, which indicates movement away from or toward the speaker, respectively. In (14a), for instance, the Figure 'he' is moving away from the speaker whose location is understood to be outside the house. In contrast, in (14b) the Figure is moving toward the speaker located inside the house. Involvement of the speaker's position with reference to the Figure as brought up by *ḡahaba* 'go' and *jaaʔa* 'come' is not supported by the semantics of *daxala* 'enter' or *xaraja* 'exit'. In (14a-b), the speaker can be inside or outside the house; replacing MOVE with light events such as GO *ḡahaba* or COME *jaaʔa* 'come' adds up a meaning which is not a part of *daxala* 'enter' or *xaraja* 'exit'. As for *ntaqala* 'transferred' or *ṣaara* 'become' in (14c) and (14d), they seem to involve a change of place of the Figure, but not necessarily movement from one Ground to another. But for a Figure to enter a Ground, it must move in order to get or become within the space of the Ground, a process not available in the case of TRANSFER *ntaqala* or BECOME *ṣaara*.¹

MOVE is a neutral process that denotes any type of movement, be it horizontal (as in *daxala* 'enter', *xaraja* 'exit', or *jaraa* 'run'), upward (*ṣaʕada* 'rise, go up') or downward (*nazala* 'descended'). To be more specific, when a Figure enters or leaves a specific Ground, it moves inside or outside it without denoting any further specification. Accordingly, *daxala* can be defined as minimally as 'move inside' and *xaraja* as 'move outside'. Thus, the two components composed of the nominal locative entity (*e*) and the event of motion represented as MOVE (*ev*)

¹ Let us imagine a cat in a box. In scenario (a), the cat has moved to enter the box (by itself), or (b) the box has moved to be placed on the cat. In such a scenario, the Ground has been transferred, and the cat has become inside the Ground. The event *taḥarraka* 'move' in (14e) indicates a general motion meaning of a Figure moving inside the Ground (or outside the Ground).

provide the minimal structure of the root syntax of *daxala* and *xaraja* (as discussed further in section 3).

In the next subsection, we present some classes of verbs which involve complex root structures where abstract ‘ $\sqrt{\text{MOVE}}$ ’ can be thought of as incorporating into their root construction.²

2.2 Complex motion roots

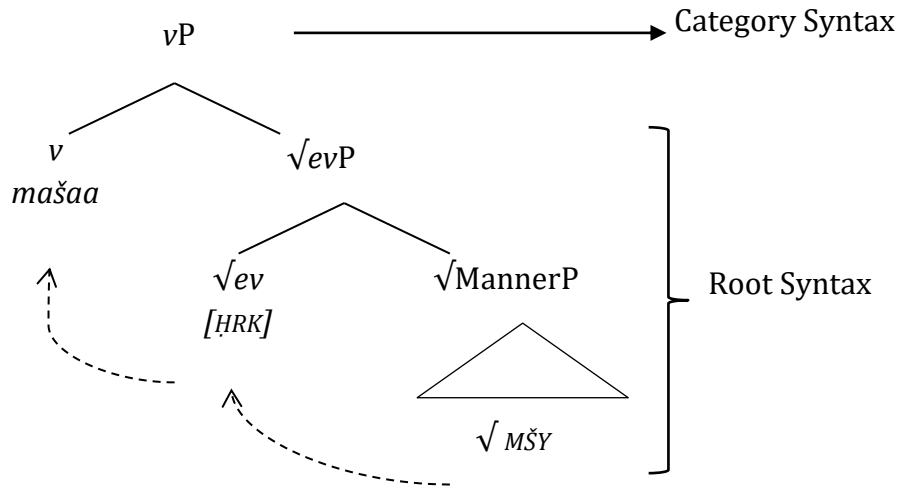
We demonstrate, in this section, how verbs such as *mašaa* ‘walk’, *jaraa* ‘run’, *daara* ‘circulate’, *šašada* ‘rise, go up’, and *ʔataa* ‘come’ differ from *taḥarraka* ‘move’, in addition to *daxala* ‘enter’. In fact, each of these verbs denotes a particular type of movement which is more complex than *taḥarraka* ‘move’. We claim that the root syntax of these events does not involve a single lexical element; rather, it involves the basic motion event $\sqrt{\text{HRK}}$ ‘ $\sqrt{\text{MOVE}}$ ’ in addition to a specific event or property, such as manner, path, place, direction, or deixis. For instance, *mašaa* ‘walk’ and *jaraa* ‘run’ refer to two different manners of moving: *mašaa* ‘walk’ denotes a movement at a regular pace while *jaraa* ‘run’ denotes a movement at a faster pace. Thus, the semantics of these two verbs include two components: MOTION and MANNER. In using a typology of motion events such as Talmy (1985, 1991), it is unclear how these two components could be incorporated into the semantics of these verbs at the same time (see section 4.2.1). In our approach, roots of some events (rather than verbs) involve a manner merged with a motion. Thus, *mašaa* ‘walk’ is built around a manner root $\sqrt{\text{MŠY}}$ ‘WALK’, overtly expressed, and a silent abstract motion root $\sqrt{\text{HRK}}$ ‘ $\sqrt{\text{MOVE}}$ ’. This is illustrated in the structure below:

(15)

- | | |
|-------------------|------------------|
| a. <i>mašaa</i> | <i>l-walad-u</i> |
| walk. PST.3SG | DEF-boy-NOM |
| ‘The boy walked.’ | |

² One may wonder whether there are other roots that express simple motion events, for example transitive form I $\sqrt{\text{NQL}}$ ‘TRANSFER’, or its more complex intransitive form III $\sqrt{\text{NTQL}}$ ‘GOT TRANSFERRED’, or the simple form I intransitive $\sqrt{\text{RHL}}$ ‘LEAVE’. An event such as *naqala* ‘transfer’ indicates a type of transitive motion that involves an Agent and a Figure, which appears to be more complex than the simple $\sqrt{\text{HRK}}$ ‘ $\sqrt{\text{MOVE}}$ ’. Likewise, the synonymous $\sqrt{\text{RHL}}$ ‘LEAVE’ has some specifics in its meaning that might suggest that the root expresses a Means or Manner, rather than movement itself. Further research is needed to sort out idiosyncrasies of roots, as against patterns.

b.

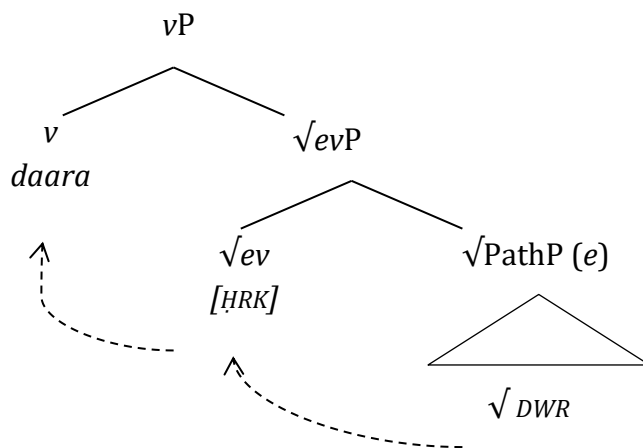


The two roots \sqrt{ev} $[\text{HRK}]$ and $\sqrt{M\check{S}Y}$ 'WALK' incorporate at the root syntax before they are categorized as *v* at the category syntax level. As for *daara* 'circulate', it signifies the movement of a Figure in a circle round a central point. Thus, its root syntax consists of a path root and a motion root, as shown below:

(16)

- a. *daara* *l-qamar-u* *š-šinaaḥyy-u* *ḥawla* *l-ʔarḍ-i*
 circulate. PST.3SG DEF-moon-NOM DEF-satellite-NOM around DEF-earth-GEN
 'The satellite circulated around the earth.'

b.

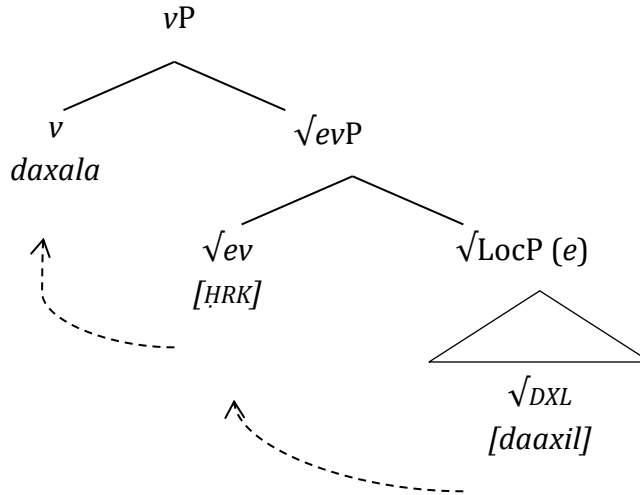


On the other hand, the syntax of *daxala* 'enter' and *xaraja* 'exit' consists of a locative component represented as *daaxil* 'inside' which marks the endpoint of the path traversed in the

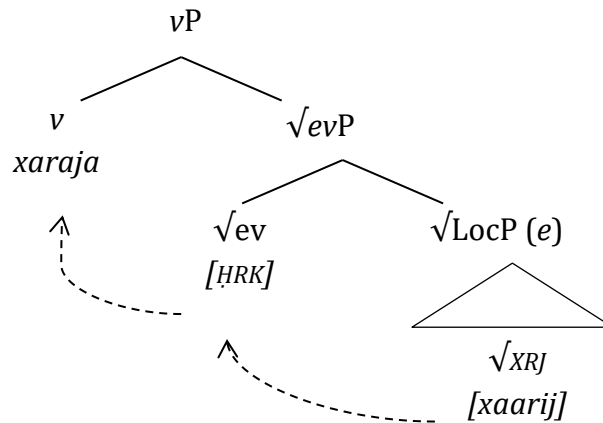
MOVE event and *xaarij* ‘outside’ which again marks the endpoint of the path traversed in the MOVE event, and an abstract motion event, as represented in (17):

(17)

- a. *daxala* *r-rajul-u*
 enter.PST.3SG DEF-man-NOM
 ‘The man entered.’
 b.



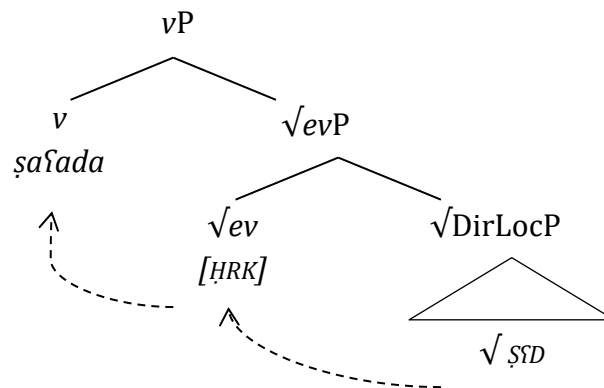
- c. *xaraja* *r-rajul-u*
 exit.PST.3SG DEF-man-NOM
 ‘The man exited’ or ‘the man left.’
 d.



Furthermore, the event *šašada* ‘rise, go up’ expresses the movement of a Figure from a lower to a higher position. Its root syntax is characterized by a root expressing a directional location represented by $\sqrt{šD}$, and the abstract motion root \sqrt{HKK} , as in (18):

(18)

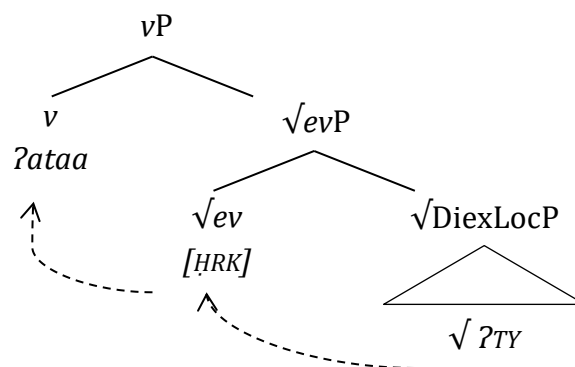
- a. *šaḥad-tu* *l-jabal-a*
go up.PST.3SG-1S DEF-man-ACC
'I went up the mountain.'
- b.



Consider now *?ataa* 'come'. It is characteristically associated with a deictic component. It implies the movement of a Figure toward the speaker. Its structure can be simply schematized as follows (for details about the specifics of this type of motion events, see Fassi Fehri, Saeed, & Alotaibi 2021):

(19)

- a. *?ataa* *r-rajul-u*
came.PST.3SG DEF-man-NOM
'The man came.'
- b.



Supportive evidence for similar decompositions comes from Jakaltek Popti, a Mayan language of Guatemala. It can be shown that in Jakaltek Popti, the counterpart pair of *dafaṣa* and *saḥaba* is expressed by directional suffixes and a 'move' element, (examples from Grinevald 2006: 55):

(20)

- a. *xkin hateniktoj* *yul karo*
 xk-in ha-ten-ik-toj y-ul karo
 ASP-me you-move-DIR2-DIR3 its-in truck
 Lit: you moved me in+away in the truck
 'You pushed me into the truck.'
- b. *xkin hateniltij* *yul karo*
 xk-in ha-ten-il-tij y-ul karo
 ASP-me you-move-DIR2-DIR3 its-in truck
 Lit: you moved me out+toward in the truck
 'You pulled me out of the truck.'

In these constructions, the meaning of 'push' is denoted by the motion verb 'move' expressed by the infix *-ten-* and the goal directional element *-ik-toj* 'into', which denotes a movement away from the speaker, while 'pull' is expressed by *-ten-* 'move' and the source directional element *-il-tij* 'out of', which implies movement toward the speaker. Despite the fact that motion events *push* and *pull* are examples of a more complex transitive type of motion event, involving force, an agent, and transitivity, these examples show that the decomposition is on the right track. The Mayan examples involve the simple motion event 'move' and at least a deictic component.

Thus far, we have identified five classes of events with complex motion roots. The following table summarizes the classes with examples.

Table 1: Classes of complex motion events according to ACVL

Class	Roots involved	Examples
Manner of motion	√manner + √motion	<i>mašaa</i> ‘walk’, <i>jaraa</i> ‘run’, <i>ṭaara</i> ‘fly’
Path of motion	√path + √motion	<i>daara</i> ‘circulate’, <i>ḥaffa</i> ‘edge’, and <i>ḥaama</i> ‘hover, fly around X’
Place of motion	√location + √motion	<i>daxala</i> ‘enter’, <i>xaraja</i> ‘exit’
Directed motion	√direction + √motion	<i>šaṣada</i> ‘rise, go up’, <i>naḥala</i> ‘come down’, <i>tayaamana</i> ‘go right’
Deictic motion	√deixis + √motion	<i>ṭataa</i> ‘come’, <i>ḍahaba</i> ‘go’, <i>rajaṣa</i> ‘return’, <i>laqbala</i> ‘come to’, <i>waṣala</i> ‘arrive’, <i>gaadara</i> ‘leave’. ³

³ Additional complex events can be investigated. Thus, *waḍaṣa* 'put' refers to the notion of locating an entity; more specifically, locating a figure with reference to a specific ground, such as *wadaṣa l-kitaaba ṣalaa l-mindadati* 'he

What is important to note is that the complexity of the lexical item is first dealt with through roots, which are category neutral. All these roots incorporate or merge in root syntax before they get category specifications in category syntax. In other words, our approach posits that motion-denoting words are composed of underlying root elements that are associated with a primary semantic content, before they are categorized with specific syntactic categories such as verbs. In the following section, we provide further evidence for the decomposition proposed above from semantics and structure, supported by Kurdish, Persian, and Pashto data.

3 Further evidence for appropriate decomposition

It has been argued above, that the various interpretations of verbs such as *daxala* and *xaraja* are driven from a basic invariant locative component, the counterpart of the spatial adverbial *daaxil* ‘inside’, and *xaarij* ‘outside’, plus a variable light event that may eventually be a motional component, \sqrt{HRK} ‘ \sqrt{MOVE} ’, depending on whether the selected matrix event is interpreted as motional or not. In this section, we provide further motivation and clarification of this decomposition, which attributes primacy to the locative component as being expressed by the overt root. Subsection 3.1 starts with motivation for the essential semantic component of the roots \sqrt{DXL} and \sqrt{XRJ} which we argue to be a locative entity. In subsection 3.2, we elaborate on the Path component. In subsection 3.3, we discuss Manner and show how this component is not part of the root construction of *daxala* and *xaraja* but may be so with other motion events. The section concludes with the deictic component, which appears to have a significant role in expressing the meanings of ‘enter’ and ‘exit’ in other languages such as Kurdish, and the construction of other motion events in Arabic, such as *jaaʔa* ‘come’ and *ḡahaba* ‘go’, but not *daxala* or *xaraja*.

3.1 Root syntax, spatial *n*, and the locative

Assuming roots are associated with meanings, it is important to identify the meanings a root brings to the construction. One possible way of identifying a root’s meaning is to “look at its uses across a range of distinct grammatical contexts assumed to correspond to distinct templates, any meaning common across all such usages must come from the root...” (Beavers & Koontz-Garboden, 2020: 24). In what follows, we apply the same method to induce the semantic meanings of roots \sqrt{DXL} and \sqrt{XRJ} .

put the book on the table’. The motion of cutting expressed by *qaṭaʔa* in Arabic denotes a motion that involves contact and effect (see Levin 1993: 157); to cut a cake requires one to move a sharp item such as a knife through the cake. The verbs *fataḥa* ‘opened’ and *ḡalaqa* ‘closed’ suggest two opposite motions that involve change of state; *fataḥa* ‘opened’ refers to the process of moving a figure such as a door and changing its state from being closed to opened. The opposite is true with *ḡalaqa* ‘closed’; one moves a figure and changes its state from opened to closed. Also, the events *dafaʔa* ‘push’ and *saḡaba* ‘pull’ which involve movement to opposite directions of the deictic center. However, these motion events involve an agent and include force. They appear to be of a more complex type, which we do not include in our current analysis.

Locative *daaxil* ‘inside’, or *xaarij* ‘outside’, which share the same root with the verbal eventive *daxala* and *xaraja*, respectively, can be used as adverbial nominal categories, as in the following verbless (copulative) sentences:

(21)

- a. *?anaa daaxil-a l-manzil-i*
 I inside-ACC DEF-house-GEN
 'I am inside the house.'
- b. *?anaa xaarij-a s-sayyaarat-i*
 I outside-ACC DEF-car-GEN
 'I am outside the car.'

In (21a-b), *daaxil* and *xaarij* are categorized as nouns that denote the location of a Figure with reference to a Ground; *?anaa* 'I' is in *l-manzil* 'the house', (21a), and *?anaa* is out of *s-sayyaarat* 'the car', (21b). In both examples, no motion is expressed or implied. In fact, the sentence is interpreted as stative locative. As explained above and in Fassi Fehri, Saeed, & Alotaibi 2021, we conjecture that this locative component is an essential part of the meaning composition of the event/verb *daxala* and *xaraja*, whatever its complex meaning.

In (22), *daxala* can be seen as a complex motional event, composed of the Loc component *daaxil* 'inside' which marks the endpoint of a Figure traversing a path in the MOVE event and a light motion component as shown in section 2.2. Such a motion component can be described by a manner adverb such as *bi-surʕat-in* ‘rapidly’ introduced in the example:

- (22) *daxala r-rajul-u l-qaaʕat-a bi-surʕat-in*
 enter.PST.3SG DEF-man-NOM DEF-hall-ACC in-hurry-GEN
 ‘The man entered the hall in a hurry.’

The adverbial modifier here is only compatible with an eventive (motional) interpretation of *daxala*, since such a modifier cannot be introduced in a locative stative sentence such as (21).

Consider now a sentence like (23):

- (23) *kaana r-rajul-u qad daxala s-sijn-a*
 be.PST.3SG DEF-man-NOM MOD enter.PST.3SG DEF-prison-ACC
sabʕ-a sanawaat-in
 seven-ACC years-GEN
 ‘The man had entered the prison for seven years.’

There is probably a sense of (23) in which it can be compared to the eventive (22). But we think that there is also a sense in which it is rather stative, closer to the meaning of (24):

- (24) *kaana* *r-rajul-u* *sajiin-an* *sabŧ-a* *sanawaat-in*
 be.PST.3SG DEF-man-NOMprisoner.ACC seven-ACC years-GEN

‘The man was a prisoner for seven years.’

So, a verb like *daxala* consists of two components, one is the locative which describes the state of being inside a place, and two is the motion component expressing the motion event. This is evident from the fact that each component can be modified separately as seen in the following examples:

- (25)
- a. *l-walad-u* *daxal-a* *s-suuq-a* *li-ŧaŧr-i* *daqaaʔiq-a*
 DEF-boy-NOM enter-PST.3SG DEF-mall-ACC for-ten-GEN minutes-GEN
 ‘The boy entered the mall for ten minutes.’
- b. *l-walad-u* *daxala* *s-suuq-a* *fi-ŧaŧr-i* *daqaaʔiq-a*
 DEF-boy-NOM enter-PST.3SG DEF-mall-ACC in-ten-GEN minutes-GEN
 ‘The boy entered the mall in ten minutes.’

The modifier in the first example modifies the state of the boy being inside the mall, that he was inside for about ten minutes. While the modifier in the second example modifies the movement, that it took the boy ten minutes moving toward the inside of the mall, or to get inside the mall. These are two different aspects of the event *daxala*.

Additionally, parallel elements in Kurdish, Persian and Pashto support the inclusion of the locatives *daaxil* ‘inside’ and *xaarij* ‘outside’ as primary components of the root syntax of *daxala* and *xaraja*. For example, in Kurdish, *daxala* ‘enter’ and *xaraja* ‘exit’ are expressed by the deictic motion verbs *chun* ‘to go’ or *haatin* ‘to come’ and the nominal elements *zhurawa* ‘inside’ and *darawa* ‘outside’, as illustrated in (26a-b). Consider:

- (26)
- a. *mindal-aka-an* *chu-n-a/haat-n-a* *zhurawa*
 child-DEF-PL go.PST-3PL-to/come.PST-3PL-to inside
 ‘The children went/came inside.’
- b. *mindal-aka-an* *chu-n-a/haat-n-a* *darawa*
 child-DEF-PL go.PST-3PL-to/come.PST-3PL-to outside
 ‘The children went/came outside.’

Also, in Persian ‘enter’ and ‘exit’ are expressed by the nominal elements *daaxil* ‘inside’ and *xaarij* ‘outside’, respectively, and a light verb, as shown in (27a-b). In Pashto, ‘enter’ is composed of *daaxil* ‘inside’ and *shwa* ‘do’, while ‘exit’ is expressed by the single-morpheme *wowathala*, (28a-b):⁴

⁴ The Persian and Pashto data are provided by native speakers of these languages.

(27)

- a. *khalid ba otagh daxil-shod*
 Khalid into room inside-be.PST.3SG
 ‘Khalid entered the room.’
- b. *khalid az otagh xarij-shod*
 Khalid from room outside-be.PST.3SG
 ‘Khalid exited the room.’

(28)

- a. *hagha kamraytha dakhela shwa*
 she room to inside do.PST
 ‘She entered the room.’
- b. *hagha kamrayna wowathala*
 she room from exit.PST
 ‘She exited the room.’

These crosslinguistic data show that the locatives ‘inside’ and ‘outside’ are contributed in the spell out of the motion verbs ‘enter’ and ‘exit’ through separate nominal elements. Thus, it can be concluded that *daaxil* ‘inside’ and *xaarij* ‘outside’ are primary to the semantics of such events.

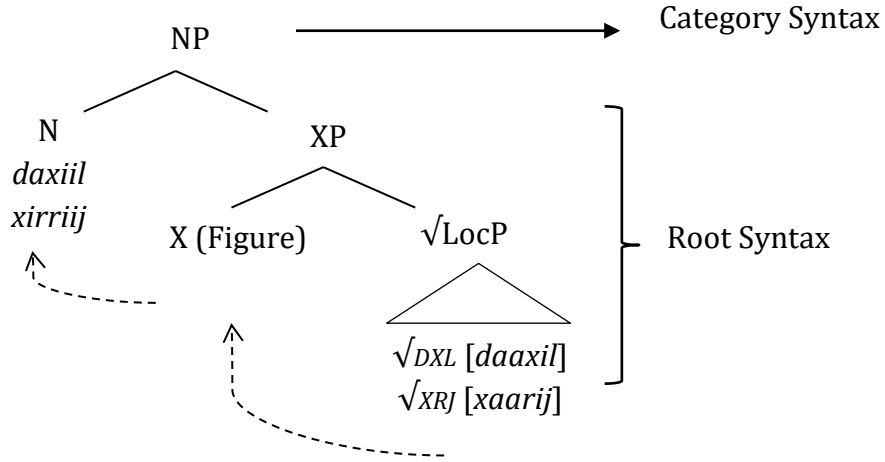
The locative components *daaxil* and *xaarij* are also available in the root syntax of other derivations such as *daxiil* ‘intruder’ and *xirriij* ‘graduate’; however, other operators would be existing along with *daaxil* ‘inside’ and *xaarij* ‘outside’ to be projected into categories with distinct meanings rather than the nouns *daaxil* ‘inside’ and *xaarij* ‘outside’. For example, *daxiil* ‘foreign, alien, obtrusive’ denotes an intruder, a person who interferes in, for example, a subject or issue. And *xirriij* ‘graduate’ is someone who has finished a level of study and thus has become outside that studying level. These are exemplified below:

(29)

- a. *r-rajul-u daxiil-un falaa l-mawduʿ-i*
 DEF-man-NOM intruder-NOM on DEF-subject-GEN
 Lit: ‘The man is an intruder on the subject matter.’
- b. *aḥmad-u xirriij-u jaamiʿat-in ʔajnabiyyat-in*
 Ahmed-NOM graduate-NOM university.FEM-GEN foreign.FEM-GEN
 ‘Ahmed is a graduate of a foreign university.’

Literally, *daxiil* is the description of someone who has become inside a conceptual entity, while *xirriij* is the description of someone who has become outside a conceptual entity. Accordingly, the locative component *daaxil* ‘inside’ is incorporated in the root syntax of *daxiil* ‘intruder’, while *xaarij* ‘outside’ is incorporated in the root syntax of *xirriij* ‘graduate’. Then, for locatives *daaxil* and *xaarij* to be projected as *daxiil* and *xirriij*, we propose that there is an operator related to Figure. Without such operator, the locatives *daaxil* and *xaarij* would project as the spatial nouns *daaxil* and *xaarij*. In the root syntax, this operator is represented as XP, pending future research. The following structure illustrates this:

(30)



In sum, we have shown that the roots $\sqrt{\text{DXL}}$ and $\sqrt{\text{XRJ}}$ have the locatives *daaxil* ‘inside’ and *xaarij* ‘outside’ as primary components of their root syntax and can preliminary be projected as the nominal elements *daaxil* ‘inside’ and *xaarij* ‘outside’ at category syntax level. In cases where the roots $\sqrt{\text{DXL}}$ and $\sqrt{\text{XRJ}}$ are used in other derivations, such as *daxala* ‘enter’, *daxiil* ‘intruder’, *xaraja* ‘exit’, and *xirriij* ‘graduate’, other operators are incorporated into the root syntax of these roots. In the next section, we explore the origins of motion in the events described by *daxala* ‘enter’ and *xaraja* ‘exit’.

3.2 Path

In the study of motion events, Path has been recognized as a basic component determining a trajectory taken by a Figure with reference to a Ground. In Talmy (1991), Path has been used as a basis to divide up languages into those where Path is lexicalized by a verbal category (in verb-framed languages) and those whereby Path is lexicalized by a satellite (in satellite-framed languages; see subsection 4.2.1 for further detail). In our approach to motion verbs of the type *daxala* ‘enter’ and *xaraja* ‘exit’, we do not assume that Path is lexicalized internally as part of the root, but rather expressed by external grammatical components such as the prepositions *?ilaa* ‘to’ and *min* ‘from’. In Svenonius work, Path and Place are not only semantic (as in Landau and Jackendoff 1993), but also syntactic and ‘cartographic’, a view that we adopt here, taking them to be ‘flavors’ of P. Place and Path can also be roots, providing content to ‘where’ essentially, as we will see below. There is a general consensus that directional PPs are PathP that embeds a PlaceP. The Place head is either empty/silent (with simple Ps) as in (a) or filled with a locative P (with complex Ps) as in (b) (see Jackendoff 1983; Wunderlich 1991; Zwarts 1997; Zwarts and Winter 2000; Kracht 2002; Koopman 2000; Svenonius 2010; den Dikken 2010; Gehrke 2008, Saeed 2014, Fassi Fehri & Alrawi 2023, among others).

- (31) a. [PathP *from* [PlaceP \emptyset [NP the gate]]]
 b. [PathP *from* [PlaceP *behind* [NP the gate]]]

In addition, *daxala* or *xaraja* do not manifest any path-denoting preferences. Consider:

(32)

- | | | | | | |
|----|--|---------------------------------|--------------------|---------------------------------------|--|
| a. | <i>daxala</i>
enter.PST.3SG | <i>r-rajul-u</i>
DEF-man-NOM | <i>min</i>
from | <i>l-baab-i</i>
DEF-door-GEN | <i>l-?amaam-i-i</i>
DEF-front-REL-GEN |
| | 'The man entered from the front door.' | | | | |
| b. | <i>daxala</i>
enter.PST.3SG | <i>r-rajul-u</i>
DEF-man-NOM | <i>?ilaa</i>
to | <i>l-ḥadiiqat-i</i>
DEF-garden-GEN | |
| | 'The man entered into the garden.' | | | | |

(33)

- | | | | | | |
|----|---------------------------------------|---------------------------------|--------------------|---------------------------------------|--|
| a. | <i>xaraja</i>
exit.PST.3SG | <i>r-rajul-u</i>
DEF-man-NOM | <i>min</i>
from | <i>l-baab-i</i>
DEF-door-GEN | <i>l-?amaam-i-i</i>
DEF-front-REL-GEN |
| | 'The man exited from the front door.' | | | | |
| b. | <i>xaraja</i>
exit.PST.3SG | <i>r-rajul-u</i>
DEF-man-NOM | <i>?ilaa</i>
to | <i>l-ḥadiiqat-i</i>
DEF-garden-GEN | |
| | 'The man exited into the garden.' | | | | |

In (32a), *daxala* is followed by the *min* 'from' PP to indicate the entrance of the man into a non-defined Ground through the door. Although *min* functions as a source-denoting P, it serves also to indicate the trajectory through which the Figure has passed. Similarly, in (33a), the *min* PP defines the route through which the Figure exits the undefined Ground. In (32b) and (33b), the two verbs are followed by *?ilaa* which defines the Ground in which the Figure ends up. In such examples, *min* and *?ilaa* PPs are adjuncts, rather than complements. We think that neither goal- nor source-denoting elements are lexically present in the entries of *daxala* or *xaraja*, or their root syntax. Consequently, they cannot be classified mechanically as basic directed motion verbs.

More arguments in support of the non-existence of a path component in the root syntax of *daxala* or *xaraja* can be gained from parallel elements in English and Kurdish. Consider the following examples:

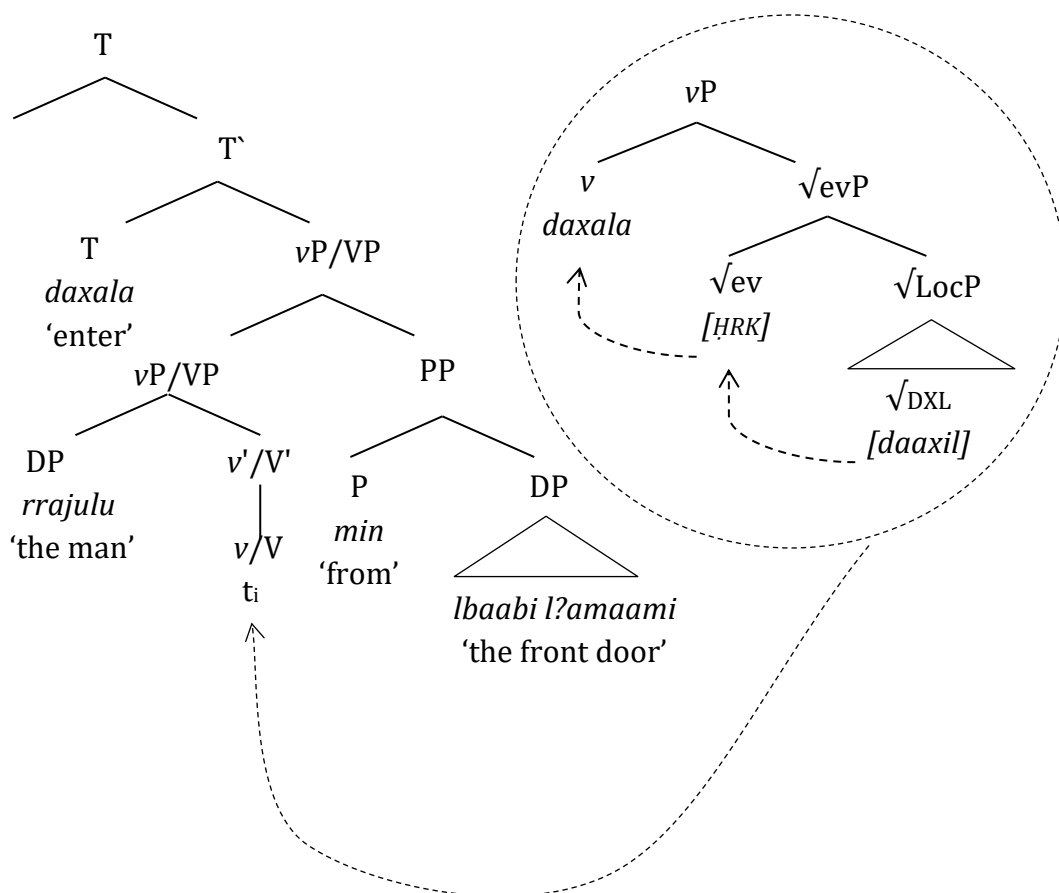
(34) *John entered into the house.*

(35)

- | | | | |
|----|--------------------------------------|--|--------------------------|
| a. | <i>mindal-aka-an</i>
child-DEF-PL | <i>chu-n-a/haat-n-a</i>
go.PST-3PL-to/come.PST-3PL-to | <i>zhurawa</i>
inside |
| | 'The children went/came inside.' | | |
| b. | <i>mindal-aka-an</i>
child-DEF-PL | <i>chu-n-a/haat-n-a</i>
go.PST-3PL-to/come.PST-3PL-to | <i>darawa</i>
outside |
| | 'The children went/came outside.' | | |

In (34), the English verb *entered* is followed by the goal-denoting preposition *into* showing path-motion segregation; each component of the event is lexicalized by a distinct grammatical category. The motion is lexicalized as part of the verb and the path by the adjunct prepositional phrase. Similarly, in the Kurdish examples (35a-b), Path is lexicalized by the suffix *-a* 'to' attached to the end of the verb *chu* 'went' or *hat* 'came'. The structure of (32a), can be represented as in (36):

(36)



As can be seen, the root syntax of *daxala*, represented as a dotted circle, does not involve any path component; rather, it is added in category syntax through a separate constituent.

However, Path can form the basic component in the root of other verbs such as *daara* 'circulate', *ħaffa* 'edge', and *ħaama* 'hover, fly around something'. The event expressed by these verbs involves a circular motion whereby a Figure moves following a circle path. Consider below examples:

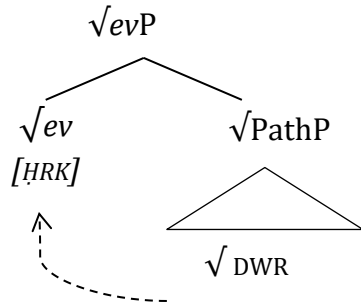
(37)

- a. *daara-t* *ṭ-ṭaaṣrat-u* *ħawla* *l-binaayat-i*
 circulate.PST-F3SG DEF-plane-NOM around DEF-building-GEN
 'The plane circulated around the building.'
- b. *ħaffa* *ħawla* *l-bayt-i*
 edge.PST.M3SG around DEF-house-GEN
 'It edged around the house.'

- c. *ḥaam-a* *ṣ-ṣaqr-u* *ḥalaa* *l-jabal-i*
 hover-PST.3SG DEF-hawk-NOM on DEF-mountain-GEN
 ‘The hawk hovered around the mountain.’

In (37a), the Figure *ṭṭaaṭrat-u* ‘the plane’ moves using a circle path. It is reasonable to think that this path is part of the semantic composition of the event. While the spatial preposition *ḥawla* ‘around’ drives a route path, it is wrong to assume that *daara* ‘circulate’ denotes a circle motion due to the existence of *ḥawla* ‘around’. To put it differently, *daara* ‘circulate’ suggests movement in a circle path even if the route-PP *ḥawla lbinaayat-i* ‘around the building’ is deleted. In fact, the PP forms an adjunct in the category syntax of the event structure. The same is true for (37b-c). As such, Path constitutes an integral part in the root syntax of these verbs in addition to the event component expressed by MOVE. Below is the root syntax of *daara* ‘circulate’ mentioned in example (37a) above:

(38)



That Path is a component in the root syntax of motion verbs contrasts with Levin's (1993) classification of verbs. In the latter, no classes of verbs are categorized as path-verbs. Actually, Levin takes the Path of motion to be expressed by prepositional phrases that denote goal, source or trajectory of Path only. In our typology of motion events, we distinguish verbs that denote Path at the level of category syntax (as with *daxala* ‘enter’ and *xaraja* ‘exit’) and verbs denoting Path at the level of their *roots* (as with *daara* ‘circulate’, *ḥaffa* ‘edge’, and *ḥaama* ‘fly around something, hover’).

3.3 Manner and Result

Manner is an essential component in the structure of motion events. It can be lexicalized by verbs such as *run*, *jog*, *jump*, *limp*, *float*, or gerundive constituents such as *running*, *jogging*, *flying*, *jumping*, or adverbials like *quickly*, *forcefully*, *clumsily* (see e.g. Talmy 1985, 1991, 2000a,b; Slobin 2006; Beavers, Levin and Wei Tham 2010). As opposed to result events, manner events refer to the way an action is carried out, and they specify non-scalar changes (Rappaport Hovav 2008, Rappaport Hovav and Levin 2010). A non-scalar change is “any change that cannot be characterized in terms of an ordered set of a single attribute”;—more specifically, events of non-scalar changes “involve complex changes—that is, a combination of multiple changes—and this complexity means that there is no single, privileged scale of

change" (Rappaport Hovav and Levin 2010: 32). By contrast, a result event does not specify a specific pattern of action, but rather the coming about of a result state, such as *enter*, *exit*, *arrive*, *depart*, *reach* and *return*. Additionally, result events refer to scalar change, and they include events expressing directed motion and state change (Rappaport Hovav and Levin 2010: 28-29).

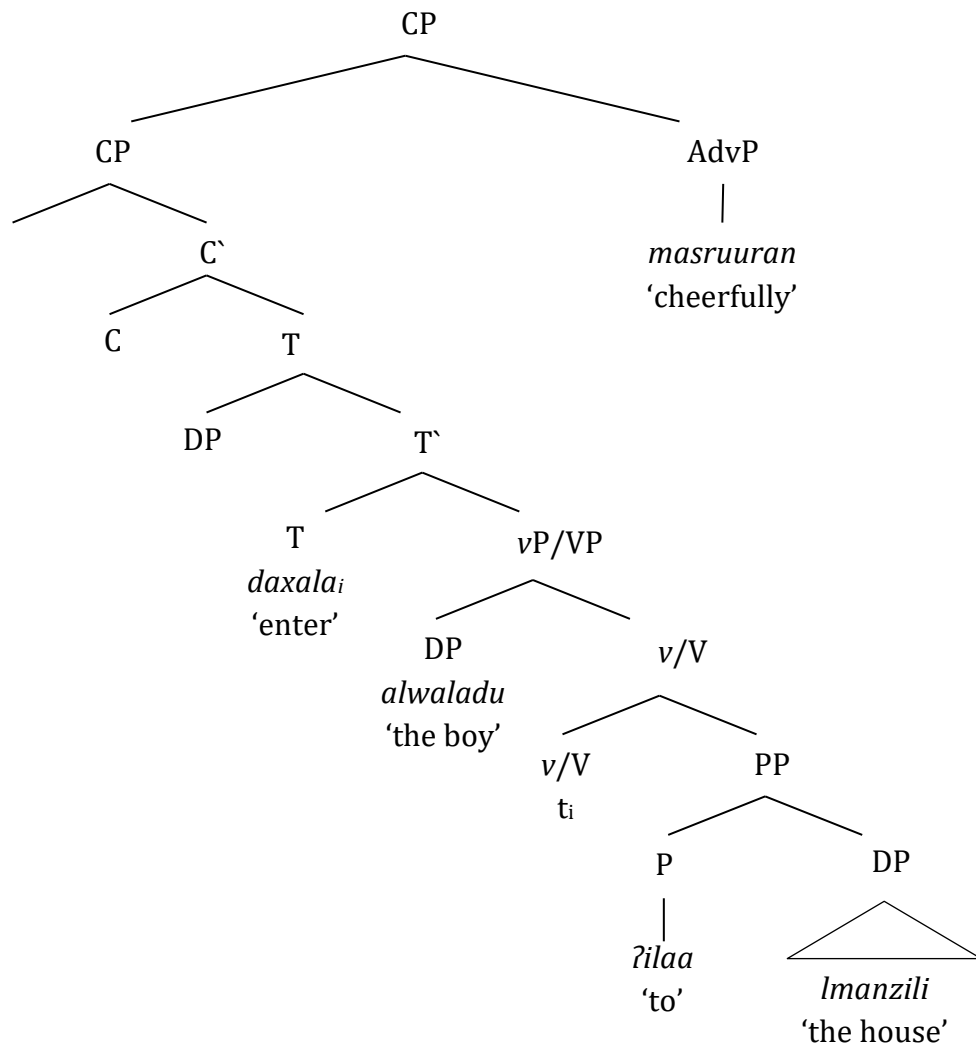
It can be noted that *daxala* and *xaraja* do not express specific patterns of movement. In the following examples, manner is added by external constituents to *daxala*:

(39)

- a. *daxala* *l-walad-u* *ʔilaa* *l-manzil-i* *masruur-an*
 enter.PST.3SG DEF-boy-NOM to DEF-house-GEN cheerful-ACC
 'The boy entered the house cheerfully.'
- b. *daxala* *l-walad-u* *wa* *huwa* *yaqfiz-u*
 enter-PST.3SG DEF-boy-NOM and he jump.PRS.3SG-IND
 'The boy entered while jumping.'
- c. *daxala* *bi-surʕat-in* *ʔilaa* *l-manzil-i*
 enter.PST.3SG with-speed-GEN to DEF-house-GEN
 'He entered the house quickly.'

In each of these examples, the manner of entry is expressed through separate adjuncts, such as *masruuran* 'cheerfully', *wa huwa yaqfiz-u* 'while jumping' and *bisurʕatin* 'quickly'. The syntactic representation of (39a), for example, is given in (40):

(40)



Thus, while manner does not conflate into the root of *daxala* or *xaraja*, it can be involved in the root structure of other events that express the meaning of 'enter', such as *walaja* 'got in', *indassa* 'snuggled', *inḍamma* 'conjoined', or *nafaḍa* 'penetrated', *tasallala* 'crept', and *taḡalḡala* 'permeated'. Such verbs differ from *daxala* 'enter' and *xaraja* 'exit' in that they involve a specific pattern of movement, select Figures and Grounds of specific characteristics, or involve other components such as Path.

3.4 The deictic component in Kurdish

The linguistic evidence of Indo-Iranian languages, such as Kurdish, supports the root-based analysis presented for the events reported as *daxala* and *xaraja* in Arabic (see also section 4.1). More specifically, the morphological structure of parallel verbs in Kurdish reflects the division between the motion and locative components. For instance, the counterparts of *daxala* and

xaraja are expressed by a motion-denoting verb and a locative entity. Examples can be found in (41), repeated from (26a-b):

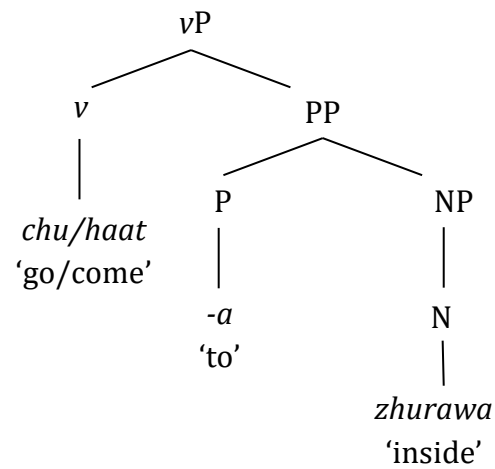
(41)

- | | | | |
|----|---|--|--------------------------|
| a. | <i>mindal-aka-an</i>
child-DEF-PL
'The children went/came inside.' | <i>chu-n-a/haat-n-a</i>
go.PST-3PL-to/come.PST-3PL-to | <i>zhurawa</i>
inside |
| b. | <i>mindal-aka-an</i>
child-DEF-PL
'The children went/came outside.' | <i>chu-n-a/haat-n-a</i>
go.PST-3PL-to/come.PST-3PL-to | <i>darawa</i>
outside |

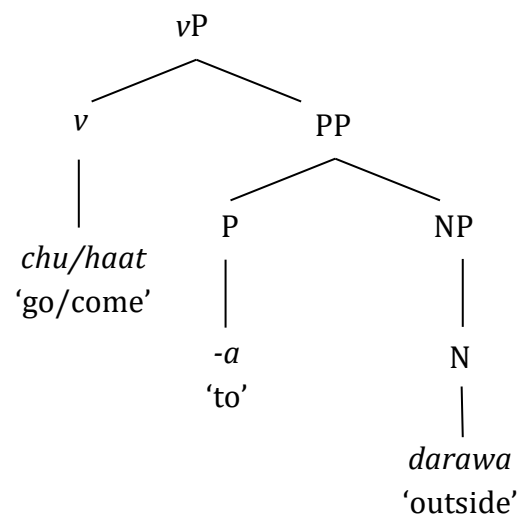
As can be seen, the *daxala* Kurdish counterpart is expressed by the combination of *chun* 'to go' or *haatn* 'to come' and the nominal locative component *zhurawa* 'inside', and that of *xaraja* is expressed by blending *chu* or *haat* and the nominal locative component *darawa* 'outside'. The use of either *chu* or *haat* is determined by the Figure's motion toward or away from the deictic center (by default, the speaker). In case of *chu*, the Figure moves away from the speaker, while with *haat* the Figure moves toward the speaker. Therefore, in (41a-b) the use of *chu* or *haat* is determined by the location of the speaker, that is, whether s/he is inside or outside the Ground. In (41a), when the speaker is outside the Ground the verb *chu* 'went' is used, whereas if the speaker is inside the Ground the verb *haat* 'came' is used. Conversely, in (41b), if the speaker is inside the Ground, the verb *chu* 'went' is used, while if the speaker is outside the Ground, the verb *haat* 'came' is used. On the whole, the deictic event *chu* or *haat* incorporates into the light motion event ' $\sqrt{\text{MOVE}}$ ', to get the composition of motion and deixis. In addition, Kurdish data present morpho-syntactic evidence that Path is expressed separately by the locative PP headed by the suffix *-a* 'to' (later attached at the end of the verbs *chu* or *haat*). The syntactic structure of (41a-b) can be represented as in (42a-b), respectively:

(42)

a.



b.



In brief, Kurdish presents data that manifests the verbal-nominal segregation established in Arabic for the expression of 'enter' and 'exit'; the representation of Path by a separate linguistic element not implied by the verb or noun; and the involvement of the deictic component as part of the verbs *chu* and *haat*. Accordingly, 'enter' and 'exit' in Kurdish can be expressed as follows:

(43)

- a. 'enter': *chua/haata zhurawa* [go/come to inside]
- b. 'exit': *chua/haata darawa* [go/come to outside] or *dar chu/haat* [outside go/come]

Finally, despite the fact that *daxala* and *xaraja* in Arabic do not have a deictic component, there are verbs in Arabic that do, such as *jaaʔa* 'come', *dahaba* 'go' and *rajaʔa* 'returned'.⁵

4 Lexical and syntactic accounts in existing typologies

In the literature on verb meanings and structures, there has been considerable attention paid to what constitutes their semantic composition, as well as their morphosyntactic classes. An event structure has been argued to underlie verb meaning from both lexicalist and syntactic perspectives; for a lexical-based approach, (see e.g. Dowty 1979; Jackendoff 1990; Hale and Keyser 1997; Levin and Rappaport Hovav 1995; Rappaport Hovav and Levin 1998); and for a syntactic or constructional-based approach, (see e.g. Borer 2005; Marantz 1997; Baker 1997; Ritter and Rosen 1998; Travis 2000; Folli and Ramchand 2002; Folli and Harley 2004; Ramchand 2008; Alexiadou et al. 2015; Beavers and Koontz-Garboden 2020). For the purpose of this study, we will review those accounts that replicate the latest analyses and those that relate to the main arguments outlined in Fassi Fehri, Saeed, & Alotaibi (2021). Our analysis of motion verbs in Arabic goes in line with the general syntactic baseline of event structures; however, it will be shown that these analyses cannot fully account for the complexities of Arabic motion verbs and cannot predict the natural classes of Arabic motion verbs. These complexities might include unique semantic nuances, morphosyntactic patterns, or other linguistic phenomena specific to Arabic. For instance, it is known that Arabic has a rich and intricate verbal morphology, which encompasses patterns of derivation, conjugation, and inflection. These morphological features may further contribute to the nuanced meanings and classifications of motion verbs. The section begins with a review of verb meaning in subsection 4.1 and ends with a review of motion events in subsection 4.2.

4.1 Literature on verb meaning

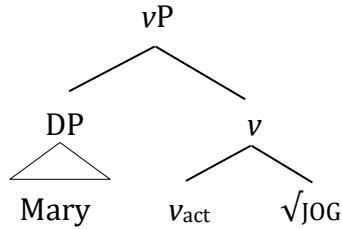
On both approaches to event structure, event structure is viewed as a structured representation, whether dependent or independent of syntax. Event structure is often argued to decompose into two components, the root and the template, which combine to determine and constrain verb meaning. According to Beavers and Koontz-Garboden (2020: 22), the template describes the temporal and causal structure of an event in terms of grammatical primitives such as ACT, CAUSE, and BECOME as well as the verb's grammatical properties, while the root describes the real-world details of the event, such as action or state. There are two types of ontological roots commonly recognized in literature: manner and result. The first specifies how an action will take place, such as $\sqrt{\text{JOG}}$, and the second specifies the result or location of that action, such

⁵ For details about deixis, interested readers are referred to work by e.g., Oshima (2006), and Barlew (2014).

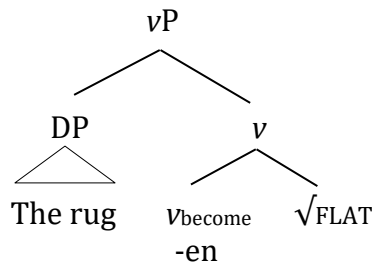
as $\sqrt{\text{BLOSSOM}}$ (see Beavers, Levin, and Wei Tham 2010: 28; and Beavers and Koontz-Garboden 2020: 227-228). In keeping with Beavers and Koontz-Garboden (2020: 12), the following structures illustrate the two components of the given verbs:

(44)

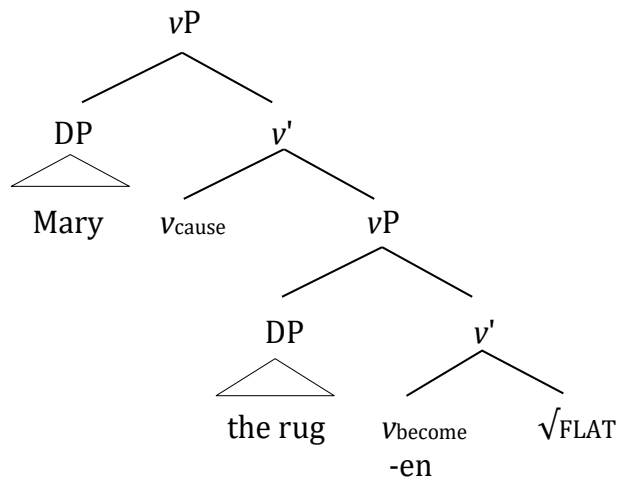
a. Mary jogged.



b. The rug flattened.



c. Mary flattened the rug.



Thus, the verbs *jog* and *flatten* are syntactically represented as phrasal structures in which the template is represented by the light verbs (ν_{act} , ν_{become} and ν_{cause}), and the roots $\sqrt{\text{JOG}}$ and $\sqrt{\text{FLAT}}$ are idiosyncratic morphological elements which either modify or act as arguments to the event templates. In this regard, a verb meaning consists of a surface morphological form in addition to an event structure denoted by a template and an idiosyncratic root (Beavers and Koontz-

Garboden 2020: 9-13). Beavers and Koontz-Garboden also suggest that "template meanings consist of general eventive lexical entailments, while root meanings include idiosyncratic entailments" and that the root may sometimes entail the template meaning or entail other root meanings (2020: 224).

For Levinson (2007), the lexical root of a verb is the part that contributes the conceptual idiosyncratic meaning of the verb. Hence, it is the root that determines whether a verb such as *braid* has a different meaning than, for example, *tie*. In particular, she contends that the semantics of the root determines its argument structure, resulting in different syntactic implications. Additionally, Levinson identifies three types of roots: predicates of individuals $\langle e, t \rangle$ (e.g. *blanketed*, *summered*, *butchered*, *worded* – such verbs are derived from roots that denote entities or individuals), predicates of states $\langle s, t \rangle$ (e.g. *opened*, *cleared*, *flattened* – such verbs are derived from roots that denote states), and predicates of events $\langle s_e, t \rangle$ (e.g. *braided*, *danced*, *hopped* – such verbs are derived from eventive roots) (see Levinson 2007: 22-23).⁶

We draw from these studies on roots and motion verbs in assuming that roots are associated with semantic content, and they contribute to the syntactic structure of motion events. However, while we agree there are several components contributing to the verb meaning, we hold a different perspective on the claims presented in Beavers and Koontz-Garboden's work (2020) and Levinson (2007), particularly concerning the consolidation of distinct sets of ontological characterizations under a single root. We have demonstrated this dissimilarity through our examination of *daxala* and *xaraja*, both of which involve a locative component that is not determined idiosyncratically.⁷ Indeed, roots can exhibit complexity and may include affixes that contribute to temporal or causal structure. For example, in Arabic, there are almost eight verbal forms out of ten possible forms attested in MSA that can be created using \sqrt{DXL} . Furthermore, they all share the essential meaning represented by the root, which is the locative sense *daaxil* 'inside'. However, each verb has slightly different semantics which is reflected in their different morphological form as can be seen in the following list:

(45) *Verbs formed from the root \sqrt{dxl}*

- a. *Form I (Bare form): daxala* 'enter'
- b. *Form II: daxxala* 'cause to enter – forcefully or repeatedly'

⁶ The abbreviations used are: e = entities, individuals, t = truth values, s = eventualities (states and events), the subscript s = states, and the subscript e = event.

⁷ This is in line with assumptions made in Rappaport Hovav and Levin (2010), who assume that a given root is associated with a single ontological characterization, and put forward the following lexicalization constraint on verb roots:

- (i) The lexicalization constraint: A root can only be associated with one primitive predicate in an event schema, as either an argument or a modifier.

(Rappaport-Hovav and Levin 2010: 25)

A constraint along similar lines has been previously proposed by Kiparsky (1997):

- (ii) The lexicalization constraint: A verb can inherently express at most one semantic role (theme, instrument, direction, manner, path ...)

(Kiparsky 1997: 30)

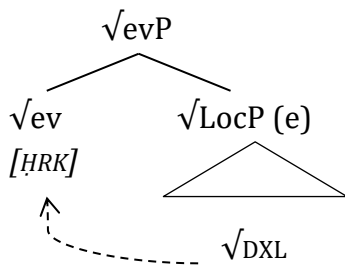
It can be noted that these constraints may be applicable to simple roots only, not to complex roots.

- c. *Form III: daaxala* ‘to enter within’ or ‘participated entry’
- d. *Form IV: ʔadxala* ‘cause to enter’
- e. *Form V: tadaxxala* ‘interfere’
- f. *Form VI: tdaaxala* ‘to be within’ or ‘to have participated entry’
- g. *Form VII: *ndaxala* ‘got entered’
- h. *Form VIII: ʔddaxala* ‘make X to become in or part of X’
- i. *Form X: stadxala* ‘to cause X to be inside, unexpectedly of X’

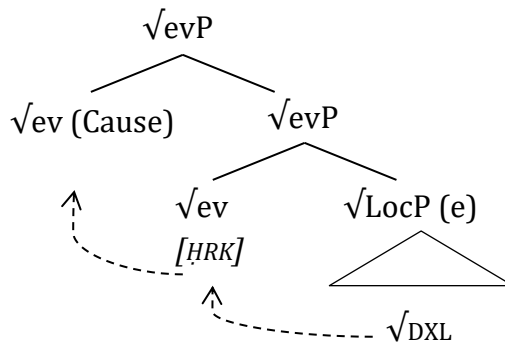
In our current approach, we consider that each verb in (45) is derived from a slightly different root-syntax. They all consist of the essential root structure composed of a LocP and an evP but have additional heads representing specific functional meanings. So, the difference between the verb *daxala* ‘enter’, for example, and verb *ʔadxala* ‘caused to enter’ is represented in root syntax as follows:

(46)

a. *daxala* (basic pattern)



b. *ʔadxala* (non-basic pattern)



According to this analysis, a causation event can be part of the complex root construction of the motion event. This applies to other functional co-events that can be part of the complex motion event such as participation or reflexivity. Positing that a co-event such as causation, for example, is part of root syntax instead of a verbal template is supported by data from the formation of Arabic *masdar* nouns. These nouns appear to have similar eventual meanings and appear to have some shared morphemes with the corresponding verb forms (as shown in 47). The fact that *masdars* have the same eventive meanings may be explained by suggesting that eventualities are part of root syntax prior to categorization. Moreover, it solves the complexity of deciding which form is derivable from the other, which is a problem faced by approaches suggesting that Masdar nouns are derived from verbs or the other way around.

(47) *Verbs and their corresponding masdar nouns formed from the root √dxl*

- a. (V) *daxala* ‘enter’ / (N) *duxuul-un* ‘entry’.
- b. (V) *daxxala* ‘cause to enter forcefully or repeatedly’ / (N) *tadxiil-un* ‘forceful or repeated entry’.
- c. (V) *daaxala* ‘to enter within’ / (N) ‘*mudaaxala-tun* ‘an interruption.’
- d. (V) *ʔadxala* ‘cause to enter’ / (N) *ʔdxaal-un* ‘a caused entry’
- e. (V) *tadaxxala* ‘intervene’ / (N) *tadaxxul-un* ‘intervention’
- f. (V) *tdaaxala* ‘to be within’ / (N) *tadaaxul-un* ‘interference’

- g. (V) *stadxala* ‘to cause X to be inside, unexpectedly of X’ /(N) *stidxaal-un* ‘unexpectedly making X inside Y’

In Arabic, these functional meanings representing co-events appear both as verbal morphemes and nominal morphemes when processed in category syntax, as is evident in the different forms available to Arabic verbs and *masdar* nouns that share the same core meanings, suggesting that these morphemes originate from roots (for details about *masdar* derivations, see Fasi Fehri 1993, pp. 232-257).

Hence, in comparison to Beavers and Koontz-Garboden (2020) and Levinson (2007), we find that a verb such as *daxal* consists of a spatial entity, and a light event that denotes movement incorporated into the root syntax of the verb *daxal*. Moreover, we have shown that roots are not idiosyncratic elements. Rather we claim that roots have a systematic inherent structure that is enhanced morphologically, lexically, and syntactically. The spatial locative entities (e) *daaxil* ‘inside’ and *xaarij* ‘outside’, for example, are determined in a systematic manner which is morphologically relevant to the verbs *daxala* ‘enter’ and *xaraja* ‘exit’ (see sections 2.2 and 3.1). This implies that there are systematic rules or principles governing how these locative entities are combined with other linguistic elements to form coherent expressions.

4.2 Literature on motion events

In the domain of motion event encodings and typologies, extensive research contributions have emerged in the literature over the last three decades, including Talmy (1985, 1991, 2000a &b), Jackendoff (2002), Slobin (2004), and Verkerk (2015). However, it is worth noting that these analyses may not fully capture the intricate nuances of the lexicalization of motion events, particularly concerning the aspects of motion, path, and manner. As we proceed, we revisit the tenets of Talmy's binary typology and Jackendoff's decomposition of motion verbs, as well as how they differ from our approach to the typology and decomposition of motion events in Arabic.

4.2.1 Talmy's binary typology of motion events

Talmy conceives of a motion event as “an event of motion or location together with a "co-event" that relates to it as its manner or cause, all within a larger "motion situation"” (2000a: 8). More specifically, he identifies four internal components of motion events (Figure, Ground, Motion, and Path), and two external ones (Manner and Cause). Figure is the object that moves or is located with respect to another object, the Ground. Motion can involve a MOVE state or a BELOC (for ‘be located’) state. Path refers to “the path followed or site occupied by the Figure object with respect to the Ground object” (Talmy 2000b: 25). Manner and Cause are external co-events with which a Motion event can be associated.

As part of his study of verbs, Talmy (2000b) examines the verb root alone, by which he refers to single-morpheme words, demonstrating the relation between semantic elements and surface elements. Based on the way words encode path and manner, he divides up languages into two classes: verb-framed languages and satellite-framed languages. More specifically, he claims

that world's languages "seem to divide into a two-category typology on the basis of the characteristic pattern in which the conceptual structure of the macro-event is mapped onto syntactic structure" (Talmy 2000b: 221). Languages that encode the path of motion on the verb (and manner of motion in satellites) are referred to as verb-framed languages and those that encode manner as part of the verb (and path on satellite elements) belong to the so-called satellite-framed languages. Representative examples are given in (48a-b):

(48)

- | | | | | |
|----|--------------------|----------|------------|-----------|
| a. | The bottle floated | into | the cave | (English) |
| | Motion+Manner | Path | | |
| b. | La botella entró | flotando | a la cueva | (Spanish) |
| | Motion+Path | Manner | | |

(48a) is an example of a satellite-framed language because manner of motion is encoded on the verb *floated* and path of motion is encoded on the preposition *into*. In (48b), the path of motion is encoded on the verb while manner of motion is encoded on the participle *flotando* 'floating', thus it is a verb-framed language. Hence, in Talmy's analysis of motion events, the motion verb can encode either path or manner, not both though.

Talmy's two-way typology then selects Path (and if not Manner) as the decisive component on which the divide is established. Verbs encoding only 'motion' (or only 'location') are not prioritized. Moreover, other components like Deixis or Direction are not criterial either, nor is the complexity of events. The binary divide has been examined against a large number of languages (see e.g., Narasimhan, 2003; Slobin, 1996, 2004; Cifuentes Férez, 2010; Al-Qarny, 2010; Ibarretxe-Anuñano & Hijazo-Gascón, 2012; Ibarretxe-Anuñano, 2015; Alhamdan, Alenazi & Maalej, 2018), and it was found that the typology does not seem to accommodate the various lexical and morphological patterns of world's languages leading to several censures and suggestions. One of further improvements suggested as a way to capture more languages was the introduction of a third class of languages referred to as equipollent-framed languages by Slobin (2004) and Zlatev and Yangklang (2004), where both manner and path are encoded on equivalent grammatical forms such as verbs. This class is typical to languages with serial-verb constructions, such as Mandarin, Niger-Congo, Hmong-Mien, Sino-Tibetan and Austronesian; and bipartite-verb languages such as Hoka, Athabaskan and Klamath-Takelman (see Slobin 2004: 249). A representative example of Mandarin is given in (49), cited from Slobin (2004: 228):

(49) *Fēi chū lāi*

Fly exit toward.speaker

Moreover, Beavers, Levin & Wei Tham (2010) have shown that languages may show data of all three classes because, as they propose, "crosslinguistic variation falls out of a series of MOTION-INDEPENDENT properties of languages which govern the morphological, lexical, and syntactic resources that are in principle available to encode motion" (p. 2). That is, languages make use of a variety of grammatical devices and processes to encode manner and path, examples of which are "manner and result verb roots/stems/affixes, spatial adpositions and particles and boundary markers" (lexical resources), "case markers, applicatives, affixes,

aspectual affixes and compounding" (morphological resources), and "adjunction, verb serialization and subordination" (syntactic) (see Beavers, Levin & Wei Tham 2010: 4).

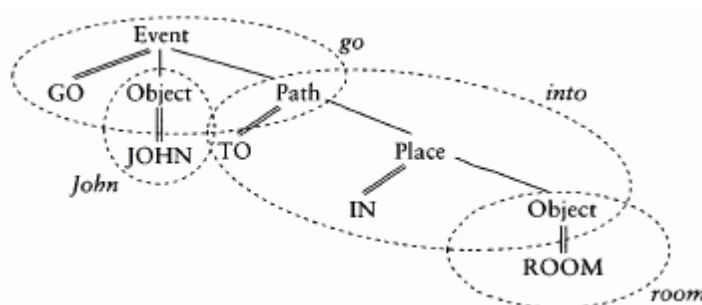
Talmy's typology, which is mainly binary, gives path a central role in the division; path is either conflated in the main verb or is in a satellite. This approach does not explain how some verbs can simply indicate motion alone without path, such as the Arabic verb *taḥarraka* 'move'. Furthermore, it does not show how the remaining components of the configuration of motion apply to the construction. We have shown that each component may or may not be conflated in the root construction and that a dynamic motion event necessarily consists of a motion event root merged with another root representing the other components. Furthermore, our analysis provides a clear account of how co-events such as manner or direction are combined in the construction of a motion event, at the root syntax level.

4.2.2 Jackendoff's (2002) decomposition of motion events.

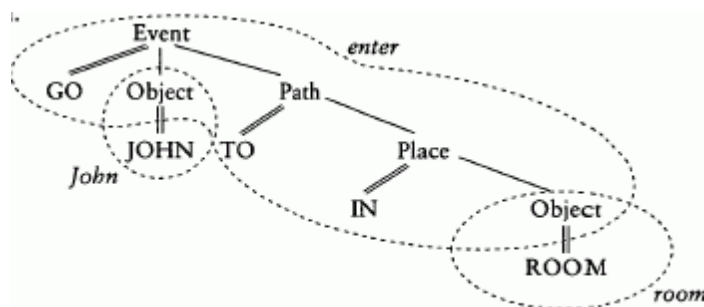
Turning to Jackendoff's (2002) view of verb meaning, he adopts two-place functions such as BE (X,Y), STAY (X,Y) and GO (X,Y). In GO (X,Y), which is "a conceptualization of the Event of X traversing Y", X is an object and Y is a Path or a Trajectory (Jackendoff 2002: 361). In his analysis of simple sentences that denote motion, such as *John went into the room* and *John entered the room*, he proposes the tree notations given in (50a-b), copied from Jackendoff (2002: 365-366):

(50)

a.



b.



In (50a), he takes *went* to express the function GO(X,Y), and *into* a Path-function. In (50b), he takes *enter* as a transitive verb that incorporates the GO event and the Path-function. In other

words, *enter* is decomposed into 'go into'. Similarly, he decomposes the transitive verbs *approach*, *leave* and *pass* into 'go toward', 'go from' and 'go past', respectively.

Jackendoff's decomposition of the verb *enter* based on a GO component is not applicable to Arabic *daxal* 'enter'. First, GO suggests that 'enter' is necessarily dynamic, which is not the case for *daxala* at least, which can be ambiguous between a dynamic or stative reading (recall the examples in (22) and (23). Furthermore, his analysis does not account for combinations of *enter into*, *approach toward*, *leave from* and *pass past* that are attested in English in corpora such as the British National Corpora (BNC) or English manuscripts, as shown below (the sentences are cited from BNC and English published manuscripts):

- (51) a. the lord marquis had enter into the Tower of London.
b. the bottles are not enter into the till consecutively.
- (52) a. Now, as they approached toward the Union group.
b. Rather, you have approached toward Mount Zion.
- (53) a. all my stock which is left from my home.
b. There was another boat-train service that left from Liverpool Street station.
- (54) a. He had passed past the snake.
b. I'll tell you how we will pass past of our time.

In brief, the approaches put forth by Talmy (1985, 1991, 2000a,b), and Jackendoff (2002) focus on the way lexical items lexicalize or incorporate the components of motion events, mainly motion and path. In our approach, we have argued that motion events can be classified according to whether their root syntax represents one or more of the following components: the motion event, its manner, its path, its location, or its deictic component. Through the utilization of this classification, we strive to offer a more comprehensive understanding and explanation of the fundamental components inherent in Arabic motion events.

5 Summary and conclusion

Within the Arabic Constructional and Variational Lexicon (ACVL), a generative cognitive model of lexical competence with a distributive morphology designed lexicon, in line with Fassi Fehri, Saeed, & Alotaibi (2021), we have presented a basic typology of motion events in Arabic, exploring the root/category divide in structure. We have shown that motion events can be associated with simple or complex roots. The first case is found with \sqrt{HRK} ' \sqrt{MOVE} '. It represents the simplest motion event which indicates motion alone. This root is ontologically eventive. The second case is represented by events constructed from non-eventive roots. For example, *daxala* and *xaraja* are events constructed from the combination of two roots, one encodes location while the other encodes motion. The root that contributes information of location is the one used for phonological spell-out, while the motion event root becomes silent. Furthermore, a typology of motion events can be generated, based on the types of roots they incorporate, with complex motion events appearing to be composed of five components in the motion configuration, including the simplest – but silent - motion root as well as manner, path, place, direction, or deixis.

This original root-based approach to the classification of motion events provides a more accurate picture of the lexicon's organization, especially in the Arabic language. As a result, the approach is free of restrictions and limitations associated with category syntax and language externalization, since it focuses on a more abstract representation which is closer to the nature of the internal language. In the root-based approach, roots have essential meanings, and more complex roots drive more structure and more semantic composition. This approach provides a quite original perspective to the organization of motion events in the mental lexicon, and may reveal universal generalizations if applied cross-linguistically.

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