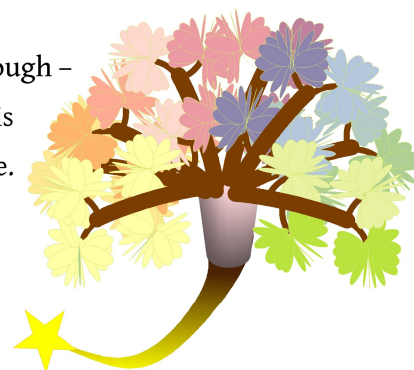


# Chapter 14. Representing Space and Time

(Latest revision: 2024-07-16)

We humans conceive of ourselves as beings located in – and moving through – space and time, so it’s not surprising how much human communication is concerned with the space around us and the time through which we move. Most of the Nwehu Nuswei (NN) words representing these concepts are located in the  $\lambda$ --- S--- FAMILY.



## 14.1. Basic Space and Time Terminology

Words beginning with  $\lambda$  S are used to refer to some type of relationship: either in space, in time, or in discourse. (Family and interpersonal relations are represented in FAMILY  $\lambda$ --- M---.) This chapter serves as a background and introduction to NN's expression of relations between entities in space and time.<sup>12</sup>

Five aspects of spatial relationships form the basis for NN terminology:

**DIMENSION:** the spatial dimension as it pertains to the discourse. This concept is somewhat related to “dimension” in physics and mathematics, but is limited to perceptual aspects with a focus on the expressive and communicative needs of humans.

**STATE:** STATIC or DYNAMIC, where STATIC refers to a position, and DYNAMIC to a direction of movement;

**DISTANCE:** How far an object or motion is from the speaker<sup>13</sup> or discourse focus;

**DIRECTION:** the which way an action takes place (GENERAL, TO, FROM, TO-AND-FROM) in relation to something being discussed; and

**FRAME of reference:** how a spatial relationship is perceived by the speaker.

Each aspect is described below, supplemented by diagrams to illustrate Dimension and Mode, using the primary frame of reference.

<sup>12</sup> Words in the GENUS *Su-* are not included in this chapter. SPECIES *Suh-* is discussed in the chapter, “Language, cognition, and Logic”; SPECIES *Sun-*, *Sum-*, *Suk-*, *Sut-*, and *Sup-* are explained in the chapter on “Functional Words”.

<sup>13</sup> “Speaker” is used throughout as shorthand for the SENDER, the *communication initiator*, the “first person” of discourse, regardless of whether the transmission channel is spoken or other. Similarly, “Hearer” is shorthand for the *communication RECEIVER*, the “second person” of discourse.

## 14.2. How NN Organizes Space and Time Concepts

NN expresses space and time in terms of DIMENSIONS, each of which has parallel sets of words expressing STATIC and DYNAMIC concepts.

### 14.2.1. Primary Concepts

#### 14.2.1.1. Dimensions

NN provides 8 quasi-physical DIMENSIONS, clustered in four groups. Each is identified by the 2nd consonant of the word, with the DIMENSION identified by position of articulation and voicing, while the STATIC concepts have stop consonants and dynamic concepts have continuants. (Dp 14.1)

*Dp 14.1 : Static and Dynamic Dimensions*

Group	Dimension	Static Consonant		Dynamic Consonant	
<b>Cartesian Space</b>	Vertical (Up-Down)	ʌ	c	l	x
	Progressional (Front-Back)	ʎ	t	ʎ	s
	Lateral (Right-Left)	ʌ	p	ʌ	f
<b>Spherical Space</b>	Latitude (North-South)	ʎ	t	ʎ	s
	Longitude (East-West)	ʌ	b	ʌ	m
	Radial (Centering)	ʎ	g	ʎ	r
<b>Enclosure</b>	Enclosure or Circle	ʌ	k	ʌ	h
<b>Time</b>	Time	ʎ	d	ʎ	n

**Non-dimensional** space concepts can be expressed using *Swd-* and *Swn-* SPECIES (§14.6), and complex spaces can be described using **coordinate-system words** beginning with *Sw-* (§14.7).

#### 14.2.1.2. Static and Dynamic

In general terms, STATIC **refers to location** and DYNAMIC **refers to movement**. So using the words shown in Dp 14.1 above, STATIC *sege* refers to a location close to the speaker – usually the speaker’s location, ‘here’;

DYNAMIC *serē* refers to movement toward the speaker – archaic English ‘hither’ or ‘toward, approach’. Likewise, *sego* is a location ‘there, yonder’ or dynamic *sero* ‘move away from, go away’.

### 14.2.1.3. Distance and Associated Meanings

Of course, within each DIMENSION there are degrees of distance and various associated concepts. These are represented by the second vowel (Dp 14.2).

#### *Dp 14.2 : Meanings of the Final Vowel in Spacial Words*

Numeric	Roman	Definition	Note
0	u	The Dimension	The name of the dimension. Thus <i>sebu</i> is ‘spherical longitude, the East-West dimension’
1	i	Positive direction: up, front, right, north, east, in, future	Within each dimension, a positive and negative direction is defined. For example, in the vertical dimension, positive is defined as ‘up’ and negative as ‘down’. Thus <i>seci</i> is ‘up’ and <i>secw</i> is ‘down’.
2	e	My <sup>14</sup> sides in the dimension	“Side” refers to the physical side or sides of the foreground entity.
3	ei	My positive side	For example, <i>sepei</i> ‘the right side of my body’.
4	a	My side in the dimension	“Area” is the space extending outward from “me” in a specific direction; or, with <i>-a</i> and <i>-wei</i> , in both directions. Example: <i>setai</i> ‘in front of me’, <i>setwa</i> ‘behind me’.
5	ai	My positive area in the dimension	For example, <i>secai</i> ‘overhead’
6	o	Limits of the dimension	“Limits” and “boundaries” may refer either to a specific limit ( <i>setoi</i> could refer to ‘the end of the road’), or generally far-distant ( <i>seboi</i> ‘out west’).
7	oi	Positive dimension boundary	<i>secoi</i> ‘ceiling’
8	w	Negative direction: down, back, left, south, west, out, past	(By definition)
9	wi	Line (axis) or path in the dimension	“Line”, “axis”, or “path”: Each dimension is conceptualized as having a straight line running through “me” in either direction to infinity or to some

14 In this list, “my” is used as a convenient abbreviation for “the speaker or whatever other entity or object (the FOCUS of the sentence) is under discussion”. Speaker is the default, but context is expected to make the focus clear.

Numeric	Roman	Definition	Note
			cotextually understood limit. This is the “line” or “axis”. But we often want to refer to physical “paths” (which may be roads, tracks, or routes) which run generally in the direction of a particular dimension. Context should make this clear.
10	we	My negative side	<i>sebwe</i> ‘the west wall (e.g. of a house)’
11	wei	Area immediately adjacent to me in the dimension	<i>sebwei</i> ‘the area (e.g. yard) east and west (e.g. of a house)’ <i>secwei</i> ‘the seat (or cushion) I’m sitting on’
12	wa	Area on my negative side	<i>sebwa</i> ‘the neighboring (e.g. property) west (of a property)’
13	wai	Mid-distance in the dimension	<i>secwai</i> ‘under my chair’
14	wo	Dimension boundary on negative side	<i>setwo</i> ‘the south pole’
15	woi	Total space within dimension	<i>sekwoi</i> ‘volume of space of a sphere’

### 14.2.2. Modes

The first vowel of most words in the  $\lambda$ ---  $S$ --- family have the option of indicating MODE. The exceptions are words in geni  $\lambda$ ---  $Su$ ---,  $\lambda$ ---  $Si$ ---, and  $\lambda$ ---  $Sw$ ---. The semantics of MODE is closely related to the STATE expressed in the word – STATIC or DYNAMIC.

#### 14.2.2.1. Dynamic Modes = Direction of Motion

Words expressing DYNAMIC STATE indicate movement. The first vowel of a word with  $\lambda$ - $\rho$ - $\lambda$   $e$ - $a$ - $o$  combined with  $\lambda$ - $\nu$ - $\nu$   $i$ - $wi$ - $w$  indicates the DIRECTION of motion:

- $\lambda$ ---  $sei$ ---       $\lambda$ ---  $sai$ ---      or  $\lambda$ ---  $soi$ ---      :    motion TO
- $\lambda$ ---  $swe$ ---       $\lambda$ ---  $swa$ ---      or  $\lambda$ ---  $swo$ ---      :    motion FROM
- $\lambda$ ---  $swei$ ---       $\lambda$ ---  $swai$ ---      or  $\lambda$ ---  $swoi$ ---      :    motion TO-AND-FROM
- $\lambda$ ---  $se$ ---       $\lambda$ ---  $sa$ ---      or  $\lambda$ ---  $so$ ---      :    motion in general, without regard to DIRECTION

What each of these means:



- Motion TO: spacial words refer to locations within the various DIMENSIONS (including time). **Motion to indicates movement is toward the indicated location, without regard to where the movement started.**
- Motion FROM: **movement is from the indicated location, without regard to any ending point.**
- Motion TO-AND-FROM: **repeated or oscilating movement with respect to the indicated location**

Here are some examples. (Recall that STATIC location words have stop-consonants at the start of the second syllable, while DYNAMIC location words have continuants with the same place and manner of articulation in that position. Dp 14.1)

- *seki* – ENCLOSURE DIMENSION – ‘in’ (inner part of an enclosure)
  - *sehi* ‘movement within’ (within an enclosure)
  - *seihi* ‘into’ (movement into an enclosure)
  - *swehi* ‘out from’ (movement out from an enclosure)
  - *sweihi* ‘entering and leaving’ (coming and going from an enclosure)
- *secei* – VERTICAL DIMENSION – ‘top’ (in the VERTICAL DIMENSION, the area immediately above the focal entity)
  - *sexei* ‘on the top’ (walking around on a roof; an insect walking on the top of someone’s head)
  - *sexei* ‘to the top’ (cup filled to the top; climbing to the top of a mountain)
  - *swexei* ‘from the top’ (a light fell from the ceiling; climbing down from the top of a mountain)
  - *sweixei* ‘movement to and from the top’ (repeatedly bouncing a ball off the ceiling; chairlift to and from the top of a ski run)
- *sepw* – LATERAL DIMENSION – ‘left’ (the left side of a person or object)
  - *sefw* ‘toward the left’ (moving around on the left side of a vehicle; pointing to the left)
  - *seifw* ‘to the left’ (make a left turn; move a painting to the left on a wall)
  - *sefw* ‘from the left’ (take the apple from the left; my car was T-boned from the left)
  - *sweifw* ‘movement to the left and back’ (dance to the left and back again; a left-right vibration)

#### 14.2.2.2. Static Modes = Nature of Placement

Static space and time words indicate the nature of places. The first vowel of a word with  $\text{ɛ-ɪ-ɛ}$  *e-a-o* combined with  $\text{ɪ-wi-w}$  indicates the mode of placement:

- $\text{ɛ-ɪ-ɛ}$  *sei--*                       $\text{ɛ-ɪ-ɛ}$  *sai--*    or  $\text{ɛ-ɪ-ɛ}$  *soi--*    : PERMANENT placement
- $\text{ɛ-ɪ-ɛ}$  *swe--*                       $\text{ɛ-ɪ-ɛ}$  *swa--*    or  $\text{ɛ-ɪ-ɛ}$  *swo--*    : PARTIAL placement
- $\text{ɛ-ɪ-ɛ}$  *swei--*                       $\text{ɛ-ɪ-ɛ}$  *swai--*    or  $\text{ɛ-ɪ-ɛ}$  *swoi--*    : TEMPORARY placement
- $\text{ɛ-ɪ-ɛ}$  *se--*                           $\text{ɛ-ɪ-ɛ}$  *sa--*        or  $\text{ɛ-ɪ-ɛ}$  *so--*        : location without regard to placement MODE

What static MODES mean:

- **PERMANENT placement:** **The location of something is fixed to and cannot be changed**
- **PARTIAL placement:** **The position of something is approximate or doesn't fit neatly into one dimension**
- **TEMPORARY placement:** **The entity described can easily move, or is currently moving**

#### Examples:

- *sego* – RADIAL DIMENSION – ‘center of a spheroid; at the center of a sphere; deep within the Earth’
  - *seigo* ‘a sphere’s center; inner core of the Earth’
  - *swego* ‘material surrounding the center of a sphere; outer core of the Earth’
  - *sweigo* ‘the center (eye) of a hurricane; the blastocoele, temporary cavity in early embryonic development’
- *sebi* – LONGITUDE DIMENSION – ‘east; area to the east’
  - *seibi* ‘the east wall (of a building); the eastern provinces’
  - *swebi* ‘the sun rises in the east (but precise direction varies seasonally)’
  - *sweibi* ‘the enemy force is (currently) east of the city’
- *sekwe* – ENCLOSURE DIMENSION – ‘outer perimeter of a land area; outside wall of a building’
  - *seikwe* ‘the house wall is faced with brick; the island is bounded by the Pacific Ocean’
  - *swekwe* ‘the weeds need to be removed around much of the property; paint on most of the house walls has faded’
  - *sweikwe* ‘the house wall has been prepped for painting; the perimeter is being patrolled’

We turn now to a discussion of each dimension.

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### 14.3. Enclosure

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Most humans create or occupy enclosed spaces in which to operate. Thus ENCLOSURE is one of the primary means we have for locating ourselves in space. At any given time, many people don't know which way is “north”, but practically everybody knows whether they are “inside” or “outside”. An “enclosure” can be physical or conceptual: a building, a clearing in a forest, a state or country, or a set of principles within which the speaker and hearer operate. Metaphors using enclosure are common in many languages to express more abstract concepts, such as English “out of touch”, “in the know”, “insider”, and many more. Recognizing the importance of the enclosure concept, NN treats it as a separate dimension.

Physical enclosures come in all shapes and sizes, but the NN ENCLOSURE invokes a 2-dimensional space, of no particular shape, with an imprecise conceptual center and circumference, and an axis which is simply “in-out”. As such, it is similar to the Spherical group's RADIAL (Axial) dimension. There are two important differences: first, the RADIAL dimension is explicitly part of a three-dimensional group, whereas the

ENCLOSURE dimension is not contextualized with other dimensions; and second, the starting part of the RADIAL axis is the surface of a sphere, and that of the Enclosure dimension is the perceived center of an enclosure, the “hearth” of the home.

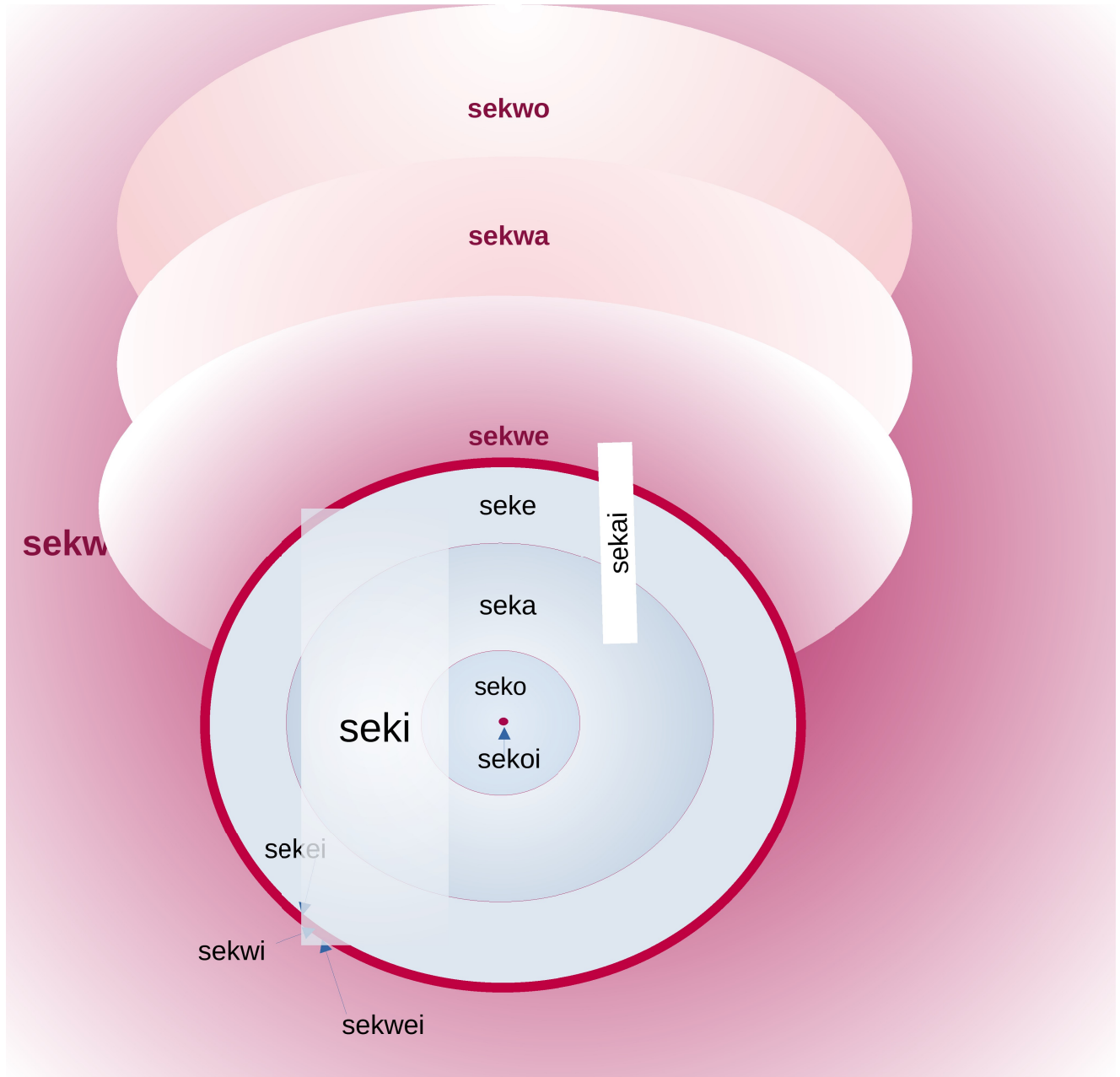
Enclosure is illustrated with three displays:

- Dp 14.3 lists the vocabulary of STATIC and DYNAMIC enclosure
- Dp 14.4 illustrates STATIC ENCLOSURE SPECIES *Seku Seku*
- Dp 14.5 illustrates DYNAMIC ENCLOSURE SPECIES *Sehu Sehu*

	Static		Dynamic	
0	<i>Seku</i>	Enclosure	<i>Sehu</i>	Movement relative to an enclosure
1	<i>Seki</i>	In	<i>Sehi</i>	Inward motion
2	<i>Seke</i>	Enclosing structure, wall	<i>Sehe</i>	Movement within an enclosure
3	<i>Sekei</i>	Inner side of enclosing structure	<i>Sehei</i>	Movement inside toward enclosing structure
4	<i>Seka</i>	In-out direction	<i>Seha</i>	Entering or leaving an enclosure
5	<i>Sekai</i>	Within	<i>Sehai</i>	Entering an enclosure, into
6	<i>Seko</i>	Inner and outer limits	<i>Seho</i>	Movement outside periphery of enclosure
7	<i>Sekoi</i>	Center of circle; inmost part of enclosure	<i>Sehoi</i>	Movement inside enclosure toward center
8	<i>Sekw</i>	Out	<i>Sehw</i>	Outward motion
9	<i>Sekwi</i>	Radius; exit path from enclosure	<i>Sehwi</i>	Movement along entry/exit path of enclosure
10	<i>Sekwe</i>	Outer side of enclosure	<i>Sehwe</i>	Movement inside toward boundary
11	<i>Sekwei</i>	Circumference of circle; Outer wall of enclosure	<i>Sehwei</i>	Movement along a boundary
12	<i>Sekwa</i>	Outside the circle or enclosure	<i>Sehwa</i>	Outward motion, leaving
13	<i>Sekwai</i>	Area of circle; area of enclosure	<i>Sehwai</i>	Movement relative to center vs circumference
14	<i>Sekwo</i>	Far outside	<i>Sehwo</i>	Movement away from an enclosure
15	<i>Sekwoi</i>	Total space inside and out, the enclosure in its context	<i>Sehwoi</i>	Orbiting, circling

*Dp 14.3: Enclosure Vocabulary*

## Seku 'Enclosure'



### *D<sub>p</sub>* 14.4: Static Enclosure Dimension, Seku

The primary directions are Seki 'in' and Sekw 'out'.

The concentric circles filled with shades of blue represent an enclosure or circle showing three degrees of "in-ness"; the magenta areas represent "out", with three degrees of "out-ness" stacked (due to space constraints) above the enclosure.

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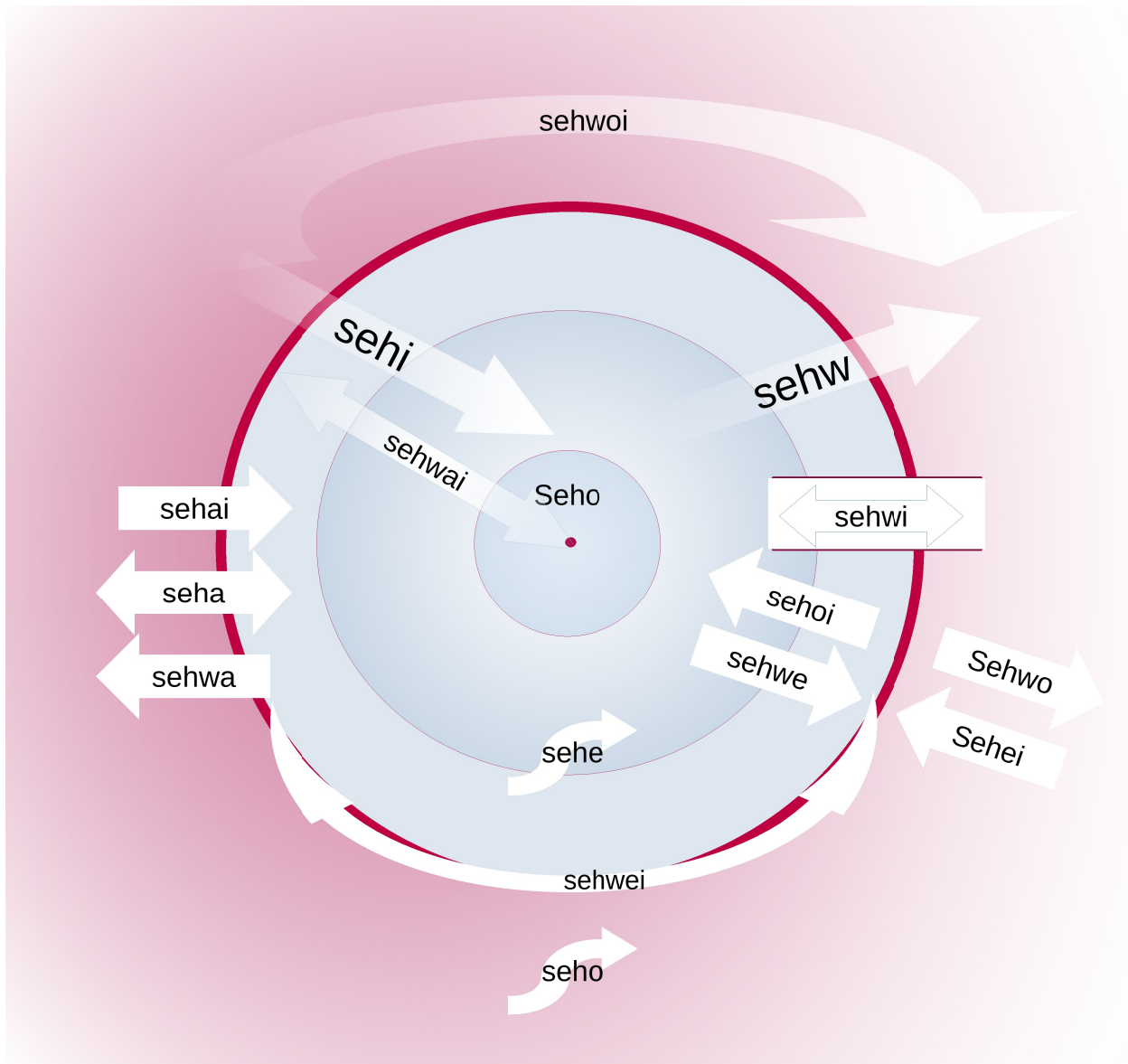
### *D<sub>p</sub>* 14.5: Dynamic Enclosure Dimension Illustration, *Sehu*

The primary directions are *Sehi* ‘inward’ and *Sehw* ‘outward’.

The concentric circles filled with shades of blue represent an enclosure or circle showing three degrees of “in-ness”; the magenta areas represent “out”.

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## 14.4. Cartesian Dimensions

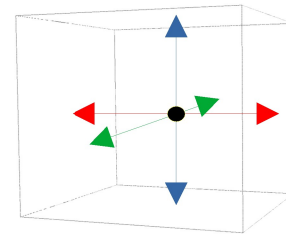
The “Cartesian” dimensions are those most people think of when we say “the three dimensions”. In NN they are represented by:

ᐱᐱᐱᐱ ᐱᐱᐱ *Secu* VERTICAL – up-down

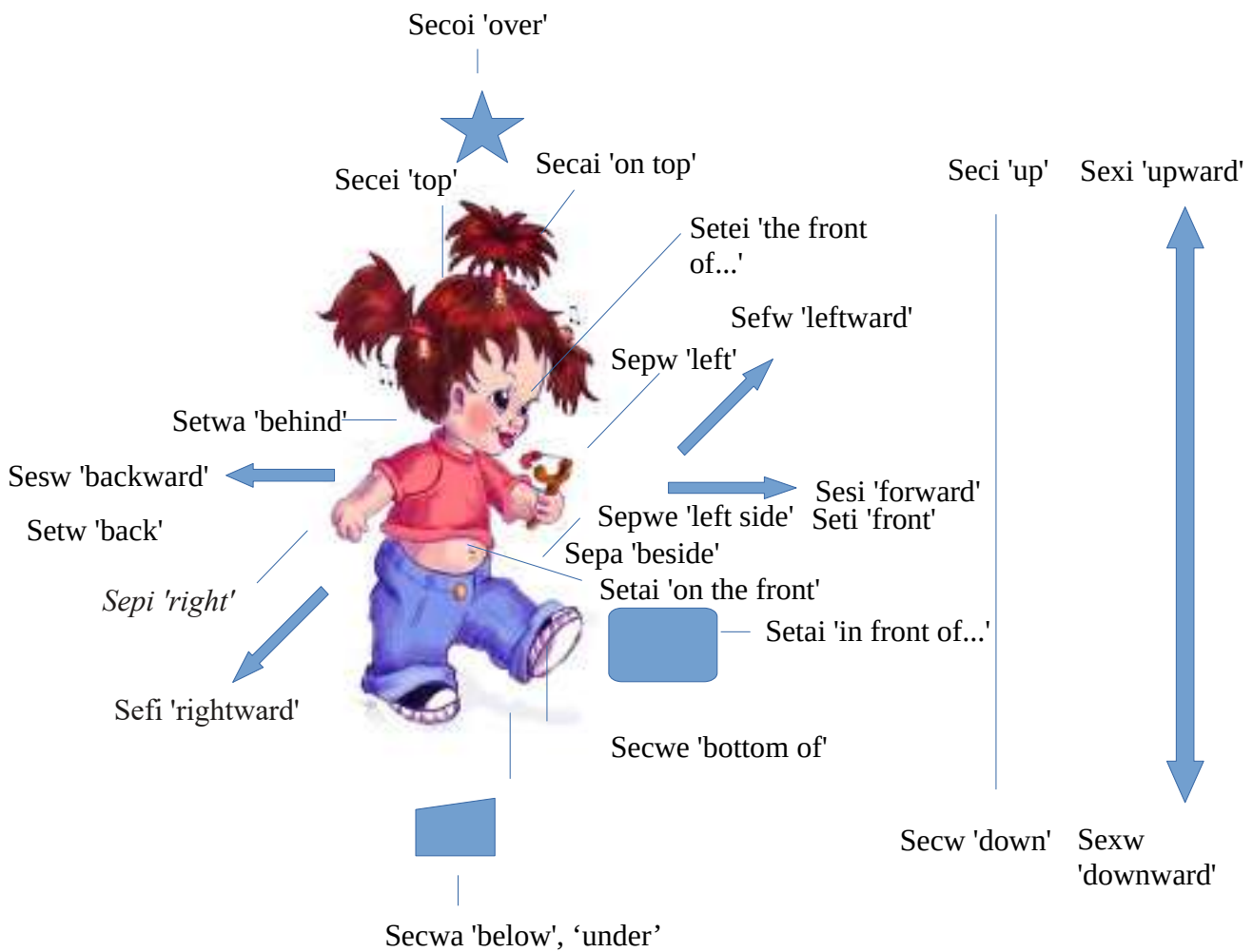
ᐱᐱᐱᐱ ᐱᐱᐱ *Setu* PROGRESSIONAL – front-back

ᐱᐱᐱᐱ ᐱᐱᐱ *Sepu* LATERAL – left-right

After ENCLOSURE, these are likely the most familiar and widely used dimensional representations. (ᐱᐱ 14.6-7)



ᐱᐱ 14.6 : Cartesian Dimensions



ᐱᐱ 14.7: Cartesian Vocabulary Illustrated

### 14.4.1. Vertical

The first of the Cartesian DIMENSIONS is VERTICAL. This represents space and movement above and below the speaker or focal entity.

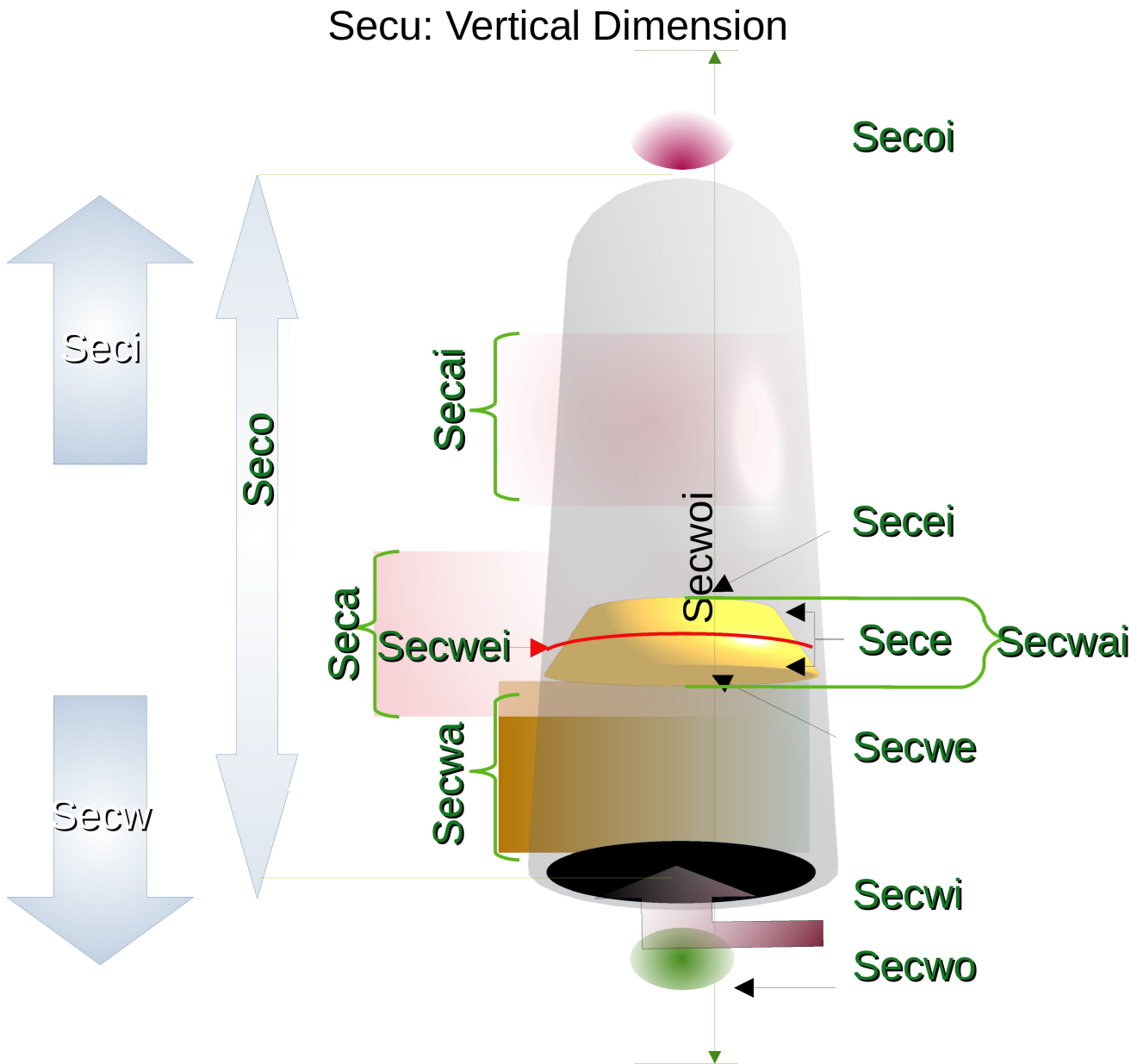
- Dp 14.8 lists the vocabulary representing VERTICAL space and movement.
- Dp 14.9 illustrates STATIC vertical space terms.

	Static		Dynamic	
0	<i>Secu</i>	Vertical Dimension	<i>Sexu</i>	Vertical Movement
1	<i>Seci</i>	Up	<i>Sexi</i>	Upward motion, climbing
2	<i>Sece</i>	Top or bottom of focal object	<i>Sexe</i>	Oscillation up and down
3	<i>Secei</i>	Top of focal object	<i>Sexei</i>	Movement up to the top of focal object
4	<i>Seca</i>	Vertical area	<i>Sexa</i>	Climbing up or down from focal object
5	<i>Secai</i>	Above	<i>Sexai</i>	Short upward move
6	<i>Seco</i>	Upper and lower limits	<i>Sexo</i>	Moving above and/or below focal object
7	<i>Secoi</i>	Far above	<i>Sexoi</i>	Ascent to the heights
8	<i>Secw</i>	Down	<i>Sexw</i>	Downward motion, descending
9	<i>Secwi</i>	Vertical line or way	<i>Sexwi</i>	Ascending and descending
10	<i>Secwe</i>	Bottom of something	<i>Sexwe</i>	Movement down to the bottom of focal object
11	<i>Secwei</i>	Area immediately above and below	<i>Sexwei</i>	Moving along a vertical line
12	<i>Secwa</i>	Below	<i>Sexwa</i>	Short downward move
13	<i>Secwai</i>	Vertical mid-distance	<i>Sexwai</i>	Changing vertical position, altitude
14	<i>Secwo</i>	Deep below	<i>Sexwo</i>	Descent to the depths
15	<i>Secwoi</i>	Vertical space, top to bottom	<i>Sexwoi</i>	Movement below something

#### *Dp 14.8: Vertical Vocabulary*

- Dp 14.10 illustrates DYNAMIC vertical space words.



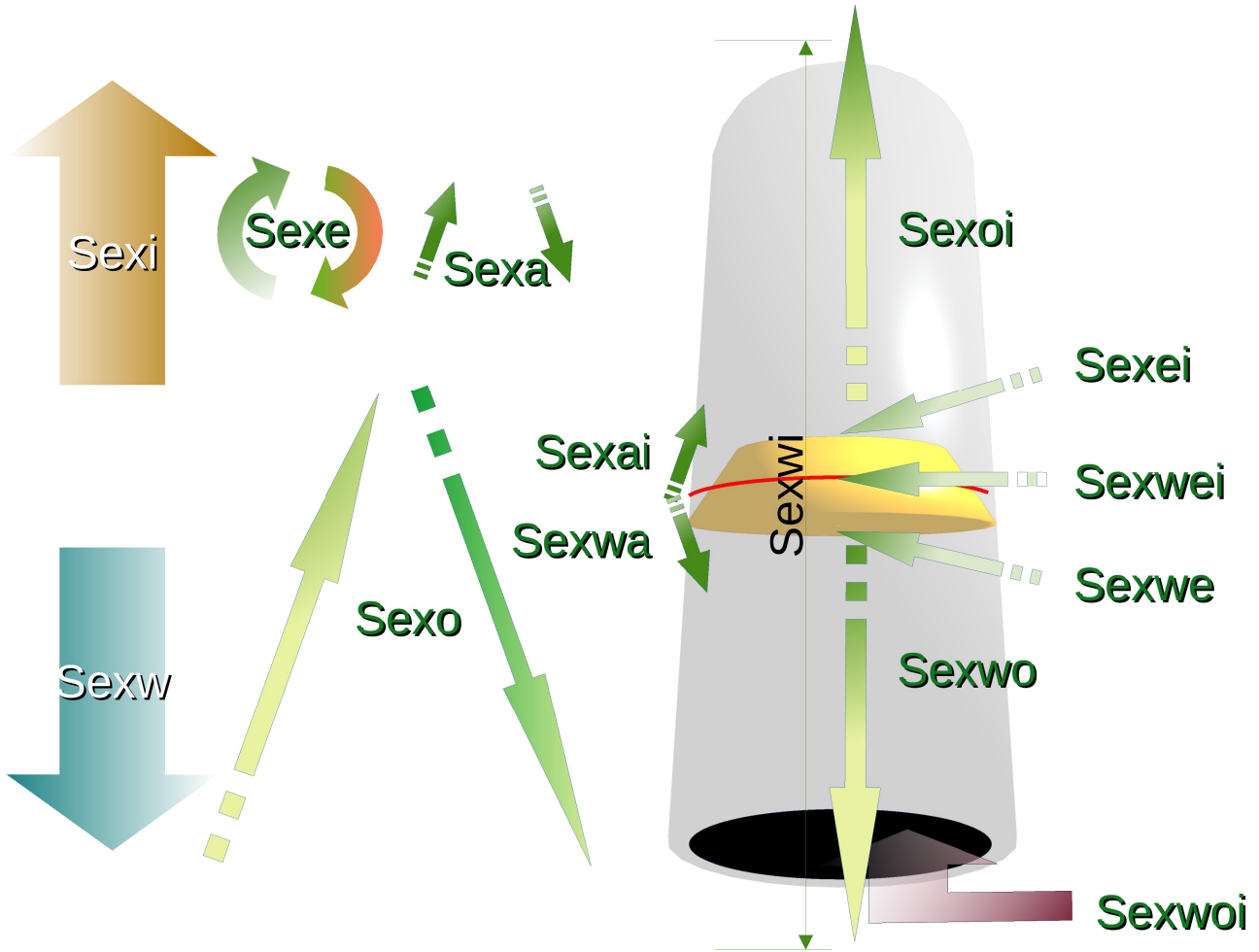


$\mathcal{D}_p$  14.9: Static Vertical Dimension Illustration

The primary directions are *seci* ‘up’ and *Secw* ‘down’.

The gray cylinder illustrates a vertical tube or shaft, within which the yellow shape represents the focal object, or “me” (intended to represent an elevator or platform in the shaft).

## Sexu: Vertical Movement



### $\mathcal{D}_p$ 14.10: Dynamic Vertical Dimension Illustration

The primary directions are *Sexi* 'upward' and *Sexw* 'downward'.

The gray cylinder illustrates a vertical tube or shaft, within which the yellow shape represents the focal object, or "me" (intended to represent an elevator or platform in the shaft).

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2021-06-14

### 14.4.2. Progressional

The second of the Cartesian DIMENSIONS is PROGRESSIONAL. This represents space and movement to ahead and behind the speaker or focal entity.

- Dp 14.11 lists the vocabulary representing PROGRESSIONAL space and movement.
- Dp 14.12 illustrates STATIC PROGRESSIONAL space terms.
- Dp 14.13 illustrates DYNAMIC PROGRESSIONAL space words.

	Static		Dynamic	
0	Setu	Progressional (Front-Back) Dimension	Sesu	Progressional movement (forward or backward)
1	Seti	Front	Sesi	Forward movement
2	Sete	My Front or back	Sese	Front-back oscilation
3	Setei	My Front	Sesei	Move to my front
4	Seta	Front-back area	Sesa	Short move forward or backward, hop
5	Setai	In front, ahead	Sesai	Short forward move, local
6	Seto	Forward-backward limits	Seso	Long route or road
7	Setoi	Far ahead	Sesoi	Long forward move, journey
8	Setw	Back	Sesw	Backward or return move
9	Setwi	Path, way, route	Seswi	Moving back and forth on a route
10	Setwe	My Back	Seswe	Move to my back
11	Setwei	Area immediately before and behind	Seswei	Short go and return
12	Setwa	Behind	Seswa	Short rearward move, retreat
13	Setwai	Forward-backward mid-distance	Seswai	Change position en route
14	Setwo	Far behind	Seswo	Long backward or return move

Dp 14.11: Progressional Vocabulary

# Setu: Progressional Dimension

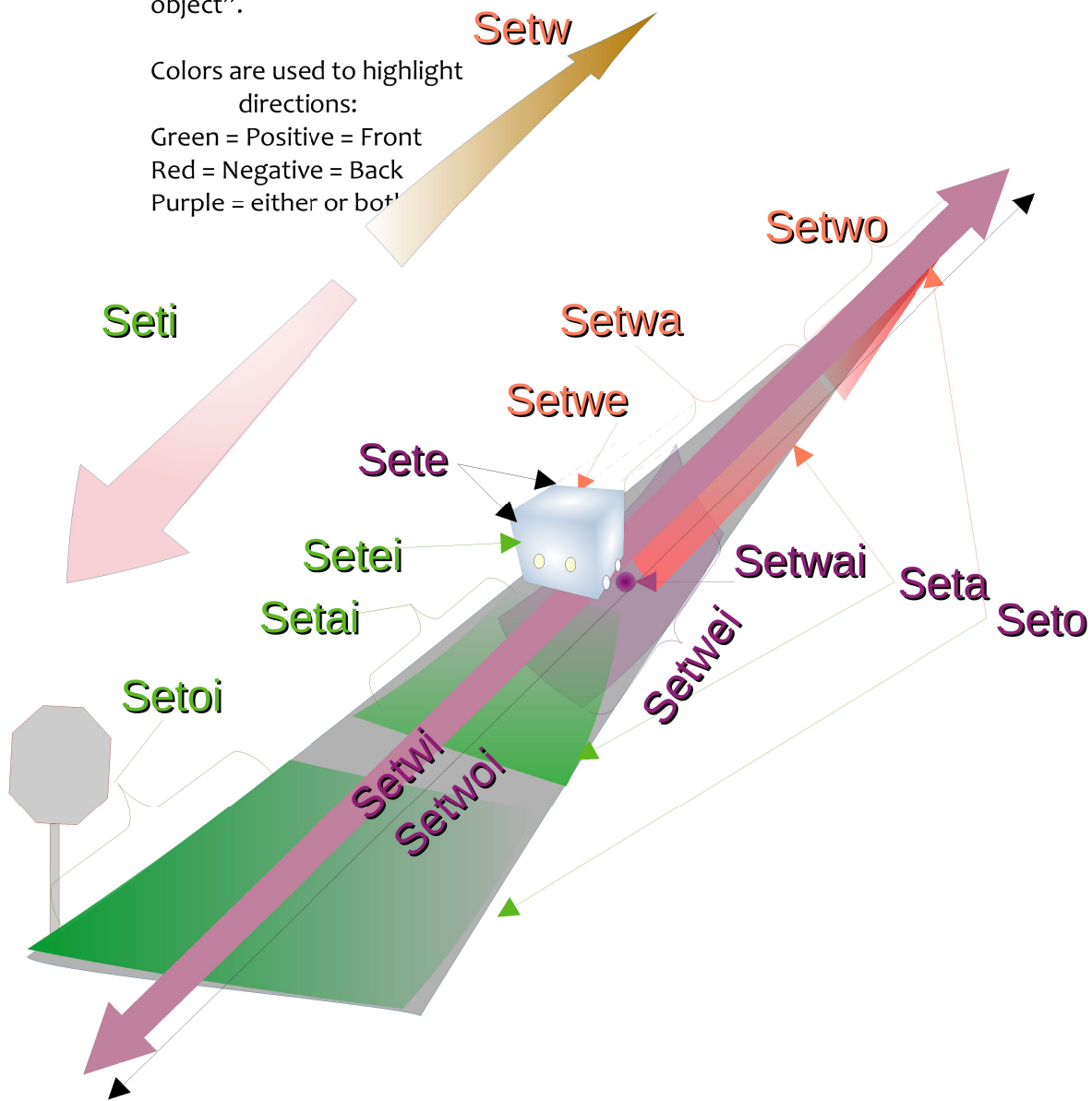
## Ɖp 14.12: Static Progressional Dimension Illustration

The Progressional “front-back” dimension represents directions in relation to gaze or travel.

The primary directions are Seti ‘front, ahead’ and Setw ‘back, behind’.

In this illustration, the Progressional axis runs from upper right to lower left, shown as a “road” with a small, purple object running roughly toward the viewer. This object represents a vehicle, which in this illustration is the “focal object”.

Colors are used to highlight directions:  
Green = Positive = Front  
Red = Negative = Back  
Purple = either or both



### Sesu: Progressional Movement

#### Ɖp 14.13: Dynamic Progressional Dimension Illustration

The Progressional “front-back” dimension represents directions in relation to travel or gaze.

The primary directions are Sesi ‘forward’ and Sesw ‘backward’.

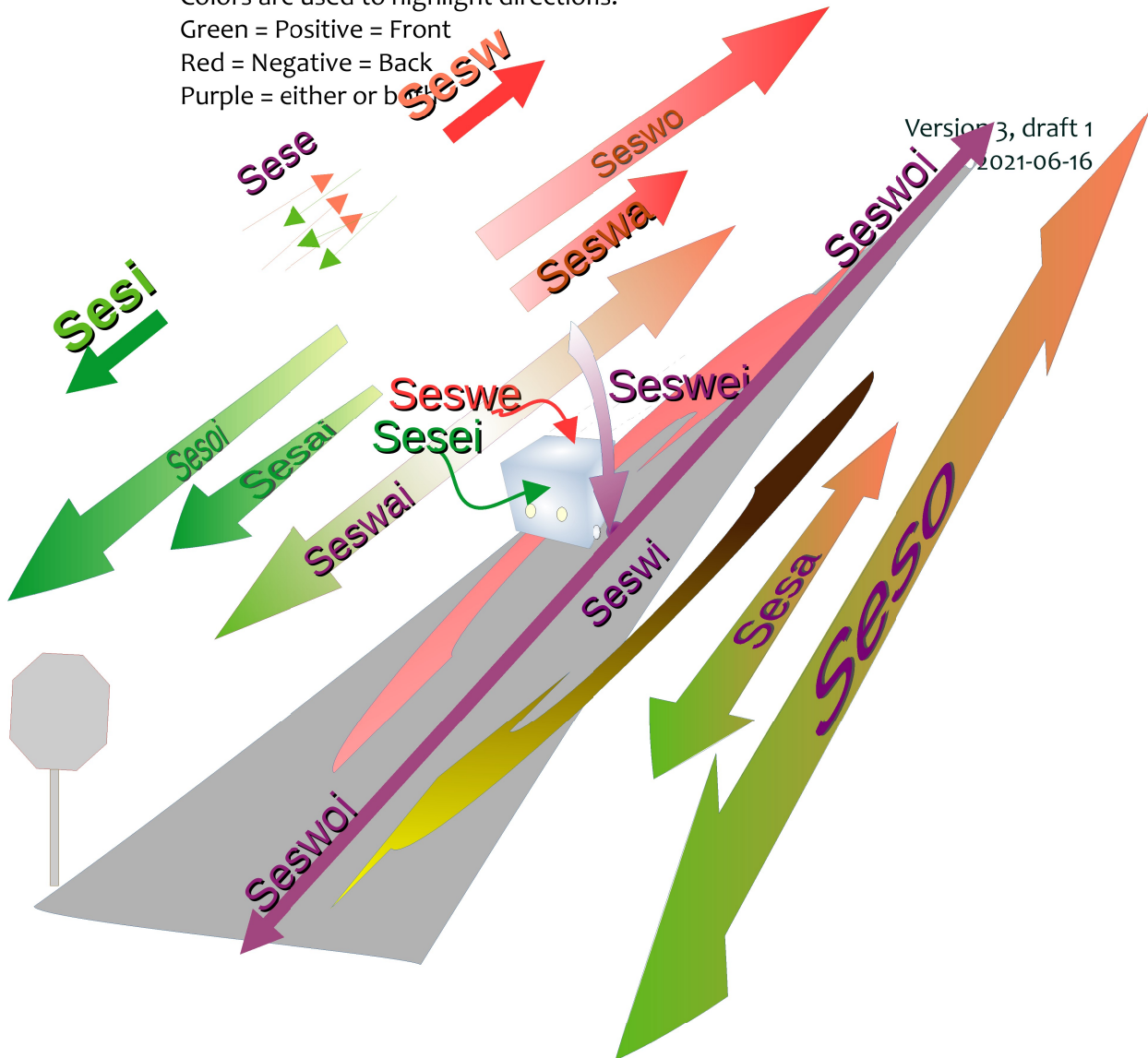
In this illustration, the Progressional axis runs from upper right to lower left, shown as a “road” with a small, purple object running roughly toward the viewer. This object represents a vehicle, which in this illustration is the “focal object”.

Colors are used to highlight directions:

Green = Positive = Front

Red = Negative = Back

Purple = either or both



### 14.4.3. Lateral

The third of the Cartesian DIMENSIONS is LATERAL. This represents space and movement to the sides (left and right) the speaker or focal entity.

- Dp 14.14 lists the vocabulary representing LATERAL space and movement.
- Dp 14.15 illustrates STATIC LATERAL space terms.
- Dp 14.16 illustrates DYNAMIC LATERAL space words.

	Static		Dynamic	
0	<i>Sepu</i>	Lateral (Left-Right) Dimension	<i>Sefu</i>	Lateral (Left-Right) Movement
1	<i>Sepi</i>	Right	<i>Sefi</i>	Movement rightward
2	<i>Sepe</i>	My Sides	<i>Sefe</i>	Side-to-side oscilation
3	<i>Sepei</i>	My Right side	<i>Sefei</i>	Move to my right side
4	<i>Sepa</i>	Side-to-side area	<i>Sefa</i>	Side-to-side short Movement
5	<i>Sepai</i>	Area to the right	<i>Sefai</i>	Short rightward Movement
6	<i>Sepo</i>	Left-right limits	<i>Sefo</i>	Long sideways Movement
7	<i>Sepoi</i>	Far to the right	<i>Sefoi</i>	Long rightward Movement
8	<i>Sepw</i>	Left	<i>Sefw</i>	Movement leftward
9	<i>Sepwi</i>	Line or route crossing speakers' route	<i>Sefwi</i>	To my sides
10	<i>Sepwe</i>	My Left side	<i>Sefwe</i>	Move to left side
11	<i>Sepwei</i>	Area immediately beside me	<i>Sefwei</i>	Short move side to side
12	<i>Sepwa</i>	Area to my left	<i>Sefwa</i>	Short Leftward Movement
13	<i>Sepwai</i>	Right-Left mid-distance	<i>Sefwai</i>	Change side-to-side position
14	<i>Sepwo</i>	Far to the left	<i>Sefwo</i>	Long leftward Movement
15	<i>Sepwoi</i>	Right-Left Horizon	<i>Sefwoi</i>	Move to left or right limit

Dp 14.14: Lateral Vocabulary

# Sepu: Lateral Dimension

## Ɖp 14.15: Static Lateral Dimension Illustration

The Lateral “left-right” dimension represents directions to the sides of the reference object (“me”). The primary directions are *Sepi* ‘right’ and *Sepw* ‘left’.

Directions are shown in relation to the DaVinci man (his right is your left).

Colors clarify directions:

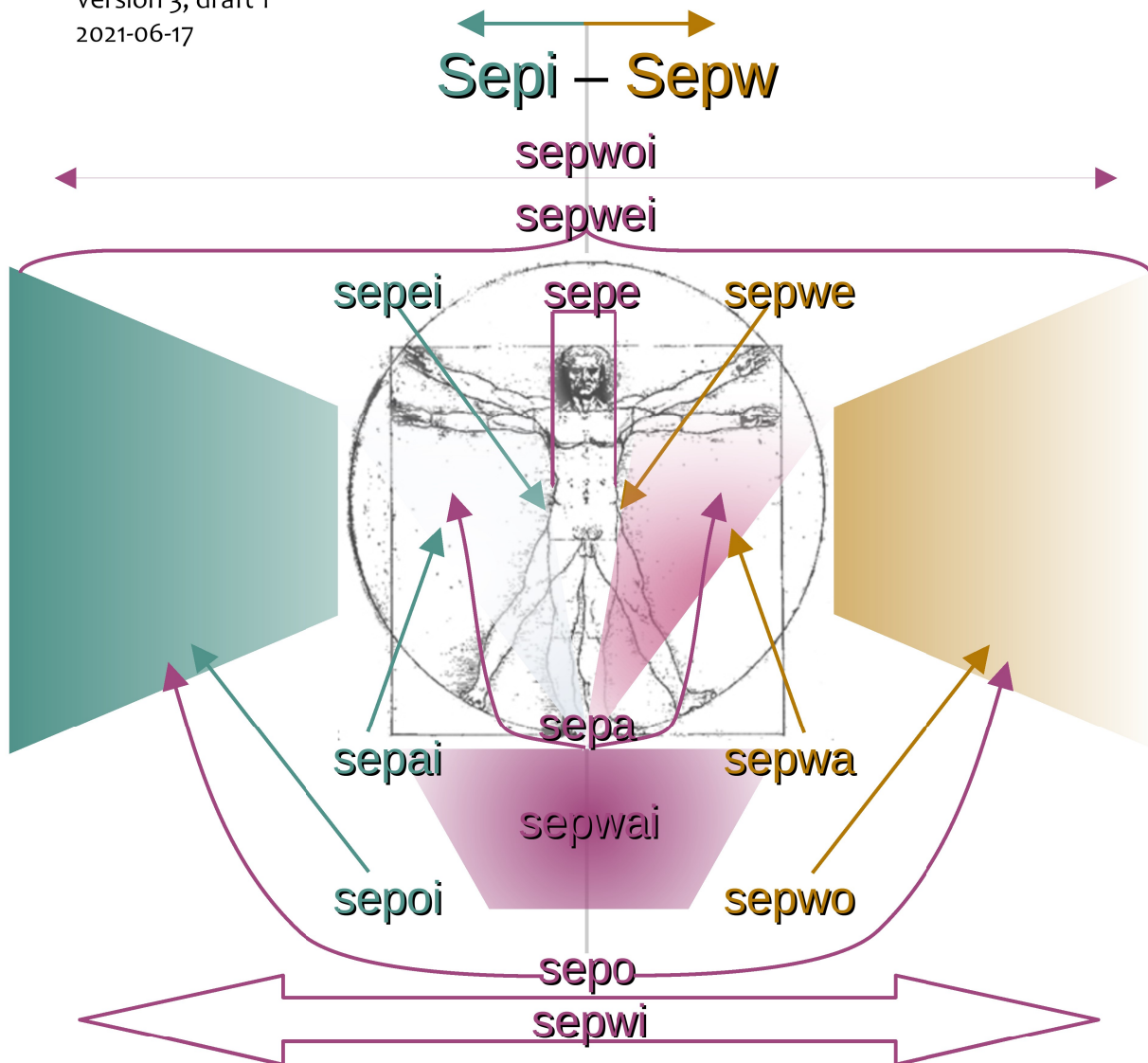
*Sepi* = right = teal

*Sepw* = left = gold

*Sepwi* = either or both = purple **Right – Left**

Version 3, draft 1

2021-06-17





# Sefu: Lateral Movement

## Ɖp 14.16: Dynamic Lateral Movement Illustration

The Lateral “left-right” dimension represents directions to the sides of the reference object (“me”). The primary directions are *Sepi* ‘right’ and *Sepw* ‘left’.

Directions are shown in relation to the DaVinci man (his right is your left).

Colors clarify directions:

*Sefi* = right = teal

*Sefw* = left = gold

*Sefwi* = either or both = purple

Version 3, draft 1

2021-06-18

Rightward – Leftward

*Sefi* – *Sefw*

*sefe*

*sefa*

*sefai*

*sefwa*

*sefwei*

*sefei*

*sefwe*

*sefwai*

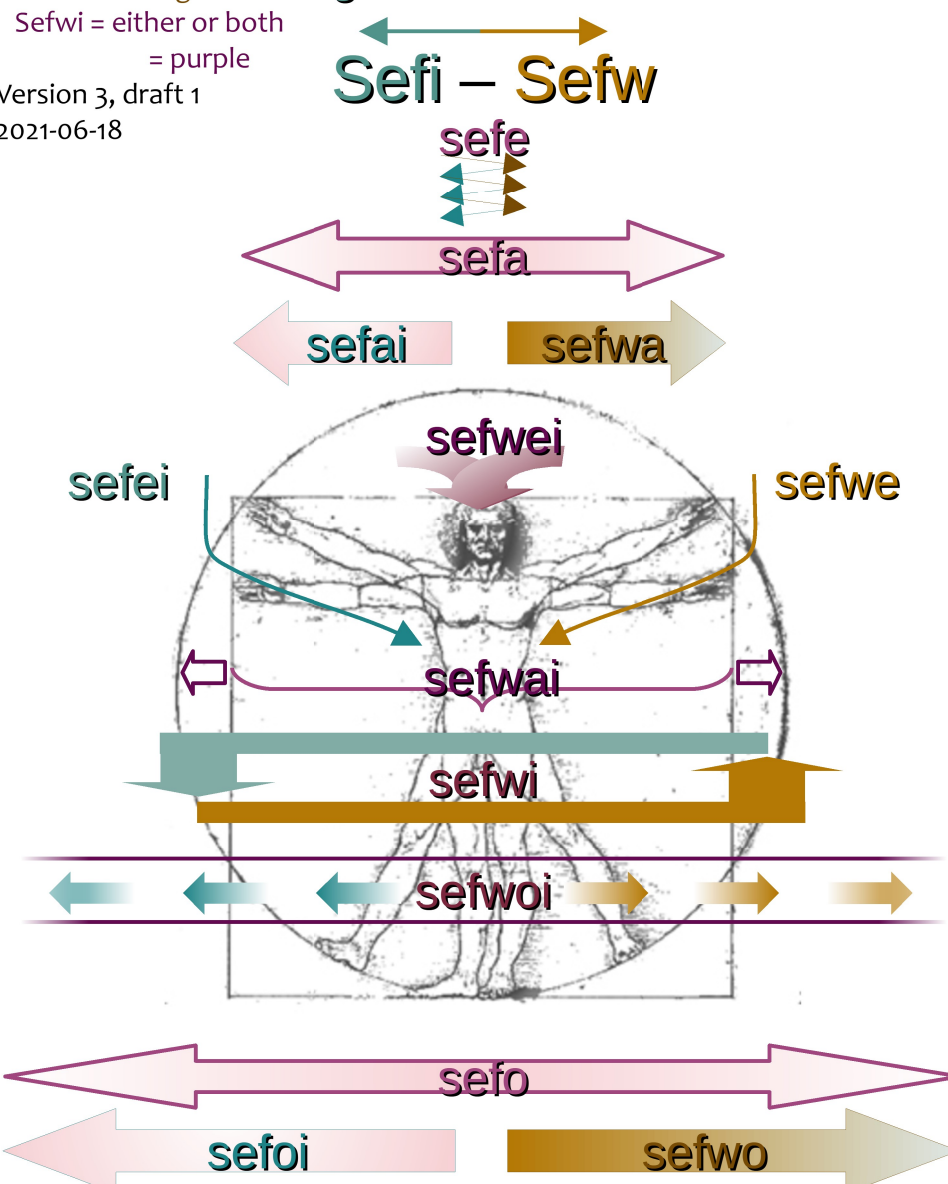
*sefwi*

*sefwoi*

*sefo*

*sefoi*

*sefwo*





## 14.5. Spherical Dimensions

The SPHERICAL DIMENSIONS describe space related to spherical objects. Most prominent is the earth on which we live, and of course other celestial bodies. Not so immediately obvious, spherical dimensions are useful in describing the anatomy of living creatures in a consistent manner. For although these are called “spherical” dimensions, they are intended to be flexible enough to describe elongated and somewhat distorted spheres.

The spherical dimensions are:

$\lambda_{\text{A}}\text{Seju}$  – AXIAL (North-South)

$\lambda_{\text{R}}\text{Sebu}$  – ROTATIONAL (East-West)

$\lambda_{\text{I}}\text{Segu}$  – RADIAL (In-Out)

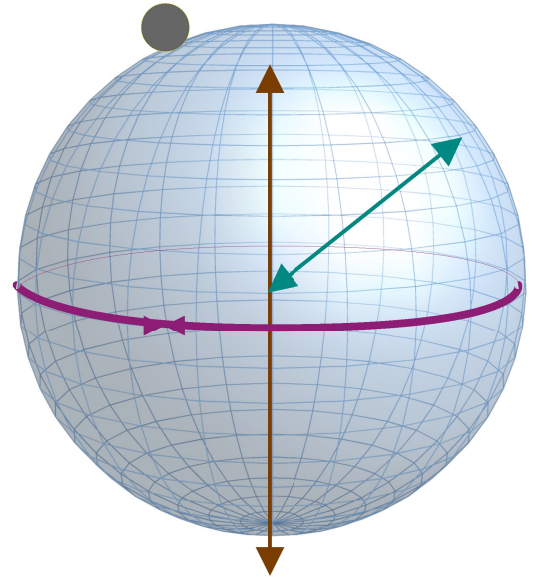


Fig 14.17: Spherical Dimensions

### 14.5.1. Axial (North-South) Vocabulary

“North” is determined by rotation and/or magnetism of celestial bodies; in other bodies, some other (logical or arbitrary) factor determines *Seji* ‘North’.

	Static		Dynamic	
0	<i>Seju</i>	Spherical Latitude	<i>Seyu</i>	Movement on a spherical surface
1	<i>Seji</i>	North	<i>Seyi</i>	Northward movement
2	<i>Seje</i>	My North or South side	<i>Seye</i>	North-south oscillation
3	<i>Sejei</i>	My North Side	<i>Seyei</i>	Move to north side
4	<i>Seja</i>	North-South area	<i>Seya</i>	Short move to north or south
5	<i>Sejai</i>	Northward	<i>Seyai</i>	Short northward move
6	<i>Sejo</i>	North and South limits	<i>Seyo</i>	Long move north or south
7	<i>Sejoi</i>	Far North	<i>Seyoi</i>	Long northward move
8	<i>Sejw</i>	South	<i>Seyw</i>	Southward movement
9	<i>Sejwi</i>	Latitudinal line	<i>Seywi</i>	Move along north-south line
10	<i>Sejwe</i>	My South side	<i>Seywe</i>	Move to south side
11	<i>Sejwei</i>	Area immediately North and South	<i>Seywei</i>	North-south movement
12	<i>Sejwa</i>	Southward	<i>Seywa</i>	Short southward move
13	<i>Sejwai</i>	Equator; between North and South	<i>Seywai</i>	Move toward equator
14	<i>Sejwo</i>	Far South	<i>Seywo</i>	Long southward move
15	<i>Sejwoi</i>	North-South space, horizon	<i>Seywoi</i>	Move to(ward) north or south pole

*dp 14.18: Axial Vocabulary*

### 14.5.2. Rotational (East-West) Vocabulary

	Static		Dynamic	
0	<i>Sebu</i>	Spherical Longitude	<i>Semu</i>	Spherical rotation
1	<i>Sebi</i>	East	<i>Semi</i>	Movement Eastward
2	<i>Sebe</i>	My East or West side	<i>Seme</i>	East-West oscilation
3	<i>Sebei</i>	My East Side	<i>Semei</i>	Move to my East side
4	<i>Seba</i>	East-West area	<i>Sema</i>	East-West short Movement
5	<i>Sebai</i>	Eastward	<i>Semai</i>	Short Eastward Movement
6	<i>Sebo</i>	East-West limit, meridian	<i>Semo</i>	Long East-West Movement
7	<i>Seboi</i>	Far to the East	<i>Semoi</i>	Long Eastward Movement
8	<i>Sebw</i>	West	<i>Semw</i>	Movement Westward
9	<i>Sebwi</i>	Line of longitude	<i>Semwi</i>	East-West movement
10	<i>Sebwe</i>	My West side	<i>Semwe</i>	Move to West Side
11	<i>Sebwei</i>	Area beside East and West sides	<i>Semwei</i>	Short move East-West
12	<i>Sebwa</i>	Westward	<i>Semwa</i>	Short Westward Movement
13	<i>Sebwai</i>	East-West mid-distance	<i>Semwai</i>	Change East-West position
14	<i>Sebwo</i>	Far to the West	<i>Semwo</i>	Long Westward Movement
15	<i>Sebwoi</i>	East-West space, horizon	<i>Semwoi</i>	Move to East or West limit

*dp 14.19: Rotational Vocabulary*

*Sebo* ‘prime meridian’ is determined logically if possible, or arbitrarily if not.

### 14.5.3. Radial (Spherical In-Out) Vocabulary

*Segoi* ‘positive extreme’ is the center of the sphere (which may be pragmatically determined in irregular bodies); the zero-point of the radius is the (mean) surface of the sphere. RADIAL *segi* ‘in’ is POSITIVE, following the force of gravity and similar to *seki* ‘in’ of the ENCLOSURE DIMENSION; however, for those of us living on a sphere, *segw* ‘out’ is our ‘up’ – the NEGATIVE direction – while CARTESIAN VERTICAL *seci* ‘up’ is the POSITIVE direction.

*Segwo* ‘negative extreme’ could logically be either infinity or the same distance above the surface as the positive extreme is below the surface; however, other pragmatic considerations may be used on a case-by-case basis – for example, the upper extreme of a planet’s atmosphere (as determined by practical measures).

	Static		Dynamic	
0	<i>Segu</i>	Spherical distance from surface	<i>Seru</i>	Movement relative to surface of sphere
1	<i>Segi</i>	In, surface to center	<i>Seri</i>	Inward / Downward movement
2	<i>Sege</i>	Surface of sphere	<i>Sere</i>	In-Out / Up-down oscilation
3	<i>Segei</i>	Inner side of surface	<i>Serei</i>	Move to center of sphere
4	<i>Sega</i>	Radial direction	<i>Sera</i>	Short in-out movement
5	<i>Segai</i>	Inward	<i>Serai</i>	Short inward movement
6	<i>Sego</i>	Far toward surface or toward center	<i>Sero</i>	Long in-out movement
7	<i>Segoi</i>	Center of sphere	<i>Seroi</i>	Long inward movement
8	<i>Segw</i>	Out, away from surface	<i>Serw</i>	Movement outward
9	<i>Segwi</i>	Radius or diameter line	<i>Serwi</i>	Movement along radius of sphere
10	<i>Segwe</i>	Area immediately above surface	<i>Serwe</i>	Move away from center of sphere
11	<i>Segwei</i>	On the surface	<i>Serwei</i>	Short up-down movement
12	<i>Segwa</i>	Above the surface	<i>Serwa</i>	Intermediate outward movement
13	<i>Segwai</i>	Position along radius	<i>Serwai</i>	Short outward movement
14	<i>Segwo</i>	Far beyond surface of sphere	<i>Serwo</i>	Intermediate outward movement
15	<i>Segwoi</i>	Total area inside and out, in context of sphere; the environment	<i>Serwoi</i>	Movement far away from surface of sphere

dp 14.20: Radial Vocabulary

## 14.6. Non-directional Space-words

There are two groups of words related to space and time that parallel those described in previous sections of this chapter:

- GENUS  $\mathcal{A}_L$ -- *Si*--: Words relating to spaces, as contrasted to directions

- Within GENUS  $\lambda_{4--}$   $Sw--$ : non-dimensional spaces and movements

These are described in the following sections.

### 14.6.1. Spaces and Time-Periods

The  $\lambda_{L--}$   $Si--$  GENUS describes “areas” or “spaces” in the sense of places used or occupied by humans or other entities. The general organization is based on the spacial definitions used elsewhere throughout the  $\lambda_{---}$   $S---$  FAMILY. This GENUS describes the spaces themselves, as opposed to locations or motions within the spaces.

Most words in the  $\lambda_{L--}$   $Si--$  GENUS are for describing land areas, atmospheric and geological zones, structures, and spaces within structures. SPECIES  $\lambda_{L\lambda-}$   $Sin-$  and  $\lambda_{L\lambda-}$   $Sid-$  describe periods of time; the rest describe spaces.

*Ꮝ 14.21: Genus  $\lambda_{L--}$   $Si--$  Allocation of Dimensions*

$\lambda$ $\lambda$ $-$ $-$	Indefinite, unbounded (Continuant)				Bounded, enclosed (Obstruant)			
	Cartesian (Voiceless)		Spherical, Time (Voiced)		Cartesian (Voiceless)		Spherical, Time (Voiced)	
velar	<b>h</b>	Area, Space	<b>r</b>	Three-dimensional Space	<b>k</b>	Enclosed Space	<b>g</b>	Enclosed three-dimensional Space
palatal	Vertical Space		Planetary Axial Space		Enclosed Vertical Space		Enclosed Planetary Axial Space	
	<b>x</b>		<b>y</b>		<b>c</b>		<b>j</b>	
apical	Fore-Aft Space		Periods of Time		Enclosed Fore-Aft Space		Bounded Periods of Time	
	<b>s</b>		<b>n</b>		<b>t</b>		<b>d</b>	
labial	Side-to-Side Space		Planetary Rotational Space		Enclosed Side-to-Side Space		Enclosed Planetary Rotational Space	
	<b>f</b>		<b>m</b>		<b>p</b>		<b>b</b>	

#### 14.6.1.1. Enclosed, Bounded

A distinction is made in all SPECIES between ENCLOSED and BOUNDED space.

Space is considered ENCLOSED if it is **physically enclosed with walls or partations; and also if it is defined by law or custom as having boundaries, whether physical or not.**

Time is BOUNDED when referring to **predefined measures like hours and minutes, as well as class-periods, terms-of-office, or other scheduled stretches of time.**

Space and time words that are not defined as BOUNDED are used when describing spaces and times that are not pre-defined or whose extent is vague; also when the focus of the discourse is not on the boundaries of the space or time, but on its nature, essence, or internal characteristics as opposed to its limits.

Space: The GENI  $\mathcal{L}_I$ - *Sih*- ‘Space’ and  $\mathcal{L}_N$ - *Sik*- ‘Enclosed Space’ refer to spaces without reference to their orientation or dimensionality. These are the most generally useful.

### 14.6.1.2. Dimensional vs Non-dimensional space

More precise definitions of spaces are available for specifying technical or legal distinctions. These correspond directly to the dimensions described in the  $\mathcal{L}---$   $S---$  file, which may be consulted for details.

Dimensionality  $\mathcal{L}_I$ - *Sih*- and  $\mathcal{L}_N$ - *Sik*- are the most general terms and can refer to two- or three-dimensional space according to context.

$\mathcal{L}_T$ - *Sin*- and  $\mathcal{L}_X$ - *Sid*-, since they refer to time, are (primarily) one-dimensional.

SPECIES  $\mathcal{L}_I$ - *Sih*- ‘Space (unbounded)’ is shown in  $\mathcal{D}_p$  14.22 to illustrate this GENUS. (Note that  $\mathcal{L}_{IT}$  *sihu* ‘space’ is not used in NN to refer to extra-terrestrial space as it is in English.)

$\mathcal{D}_p$  14.22: Species  $\mathcal{L}_I$ - *Sih*- Unbounded Space Vocabulary

$\mathcal{L}_I$ -	General	Positive	Negative, diminished	Complex
		<i>i</i>	<i>w</i>	<i>w-i</i>
Core value	Space	Filled	Empty	Partially Filled
small	<i>u sihu</i> Space	<i>sihi</i> Filled space	<i>sihw</i> Empty space	<i>sihwi</i> Partially Filled space
medium	<i>e sihe</i> Space, small	<i>sihei</i> Filled, small	<i>sihwe</i> Empty, small	<i>sihwei</i> Partially Filled, small
large	<i>a siha</i> Space, medium	<i>sihai</i> Filled, medium	<i>sihwa</i> Empty, medium	<i>sihwai</i> Partially Filled, medium
	<i>o siho</i> Space, large	<i>sihoi</i> Filled, large	<i>sihwo</i> Empty, large	<i>sihwoi</i> Partially Filled, large

### 14.6.2. Non-Dimensional Space Concepts

The original purpose of these words was to provide a quick, easy way to indicate general location and movement ideas without being more specific than necessary. The majority of space-time relational words are fairly precise, but people often have only a vague, general notion of where something is or where things are going. To use a precise word to refer to a vague idea can be misleading to the hearer. Words which are more general are also easier to recall and use when one is in a hurry, tired, or distracted.

In addition, location-words are useful in metaphorical speech. Common expressions in many languages are based on the human propensity to use spacial analogies to clarify more abstract concepts. In English, expressions like “finish up”, “inside information”, and “downright disgusting” illustrate the use of spacial concepts to illuminate non-spacial situations. Since the “space” referred to is other than physical, the precise spacial terms of NN don’t lend themselves well to this purpose; hence, non-specific *Swn*- and *Swd*-space-words.

To visualize non-specific locations and motions, imagine a person in total darkness or thick fog. Unable to see locations, they refer to space according to their body. The “positive” direction is generally the direction in which the person is facing; or if they are moving, in the direction they are going. Distances are very personal: “near”, “mid”, and “far” are determined by what can be touched, what seems an easy distance away, or what is unreachable. Of course, this is not the only way to conceptualize non-specific space, but it provides a useful analogy.

Op 14.23-24 are tables of the *STATIC Swd*- and *DYNAMIC Swn*- SPECIES, with notes about possible application of the words.

Roman	IPA	NN	Semantics	Notes
swdu	su'də	┘ᵛᵛᵛ	Location	<i>Somewhere, anywhere</i>
swdi	su'di	┘ᵛᵛᵛ	Direction positive	<i>Generally, the positive direction is ahead; could be in the direction of motion</i>
swde	su'de	┘ᵛᵛᵛ	Distance: near	<i>Close</i>
swdei	su'dɛj	┘ᵛᵛᵛ	My positive surface	<i>Upper or forward side of skin or body shell</i>
swda	su'da	┘ᵛᵛᵛ	Space extending a moderate distance from my surface	<i>Within easy reach</i>
swdai	su'daj	┘ᵛᵛᵛ	Space extending a moderate distance from my positive surface	<i>Just ahead or above</i>
swdo	su'dɔ	┘ᵛᵛᵛ	Far	<i>Far in any direction</i>
swdoi	su'dɔj	┘ᵛᵛᵛ	Far in a positive direction; positive boundary if there is one	<i>“boundary” could be abstract or physical</i>
swdw	su'du	┘ᵛᵛᵛ	Direction negative	<i>Generally, the negative direction is behind</i>
swdwi	su'dwi	┘ᵛᵛᵛ	A path, route, way, or channel	<i>A space through which to move</i>
swdwe	su'dwe	┘ᵛᵛᵛ	My negative surface	<i>A person’s back; on object’s rear end</i>
swdwei	su'dwɛj	┘ᵛᵛᵛ	Space close around me	<i>within reach</i>
swdwa	su'dwa	┘ᵛᵛᵛ	Space moderately close around me	<i>Short movement involved to reach it</i>
swdwai	su'dwaj	┘ᵛᵛᵛ	Space occupied or required by me	<i>My personal space; a vehicle’s safety zone</i>
swdwo	su'dwɔ	┘ᵛᵛᵛ	Far in a negative direction; negative boundary if there is one	
swdwoi	su'dwɔj	┘ᵛᵛᵛ	Line indicated by me	<i>Indicated by pointing, gazing, going, or context</i>

ᵛᵛ 14.23: Non-Specific Static Locations



Roman	IPA	NN	Semantics	Notes
swnu	su'nə	ꠄꠄꠄ	Movement	<i>Movement in any direction</i>
swni	su'ni	ꠄꠄꠄ	Positive movement	<i>Go (forward or upward)</i>
swne	su'ne	ꠄꠄꠄ	Moving a very short distance; oscilation or vibration	<i>General vibration; indecisive movement</i>
swnei	su'nej	ꠄꠄꠄ	Movement to my positive side	<i>Generally toward my front</i>
swna	su'na	ꠄꠄꠄ	Short or mid movement in any direction	<i>Go</i>
swnai	su'naj	ꠄꠄꠄ	Short or mid positive movement	<i>A step forward</i>
swno	su'no	ꠄꠄꠄ	Long movement in any direction	<i>Going far away</i>
swnoi	su'noj	ꠄꠄꠄ	Long positive move	<i>Going far in a planned direction</i>
swnw	su'nu	ꠄꠄꠄ	Negative movement	<i>Return (go back)</i>
swnwi	su'nwi	ꠄꠄꠄ	Movement along a line; shuttling	<i>Shuttling; traveling a route back and forth; line need not be straight</i>
swnwe	su'nwe	ꠄꠄꠄ	Movement to my negative side	<i>Generally toward my back; go behind</i>
swnwei	su'nwej	ꠄꠄꠄ	Movement toward me from any direction	<i>Come</i>
swnwa	su'nwa	ꠄꠄꠄ	Short-Mid distance negative move	<i>Backward or downward</i>
swnwai	su'nwaj	ꠄꠄꠄ	Movement of the area occupied or required by me	<i>My personal space changes position</i>
swnwo	su'nwo	ꠄꠄꠄ	Long negative move	<i>Far backward or downward</i>
swnwoi	su'nwoj	ꠄꠄꠄ	Moving in a channel or predefined route	<i>Following a route, either direction</i>

#### ꠄꠄ 14.24 Non-Specific Dynamic Movements

## 14.7. Coordinate-System Words

Another kind of special location word is the set that provides a way to quickly refer to specific locations in a defined area of two- or three-dimensional space. These can be applied to any type of space where locational zones would be useful, such as:

- Planets or other celestial bodies
- Anatomy of living things
- Geographical subdivision of areas
- Air or sea traffic control
- A game board with up to 16×16 squares, or three-dimensional game space up to 16×16×16

It must be noted that the locations are relative to the size of the space; they do not represent specific measurements. They are roughly proportioned to the area of the defined space. Like many NN word-systems, they divide space into 16<sup>th</sup>s. When applied to an entire planet, each 16<sup>th</sup> zone is vastly larger than when applied to a basketball.

### 14.7.1. Modes of Reference

As discussed in previous sections, NN provides three MODES for referring to spaces, each with its own DIMENSIONS. Each MODE provides words for STATIC locations and DYNAMIC movement.

dp 14.25: Modes of Spatial Reference

Mode	Dimensions		
ENCLOSURE <i>2-syllable words</i>	DEPTH <i>In-Out</i>		
CARTESIAN <i>4-syllable words</i>	LATERAL <i>“X”, left-right</i>	PROGRESSIONAL <i>“Z”, front-back</i>	VERTICAL <i>“Y”, up-down</i>
SPHERICAL <i>4-syllable words</i>	ROTATIONAL <i>East-West</i>	AXIAL <i>North-South</i>	RADIAL <i>Core-Sky</i>

### 14.7.2. Coordinate Word Pattern

Notice that CARTESIAN and SPHERICAL words require four syllables. This is unusual within the NN word system. The usual two-syllable limit is broken here in order to provide relatively compact expression of three-dimensional spaces. The ENCLOSURE mode, having only one dimension, does not break the usual pattern of words. The CARTESIAN and SPHERICAL modes follow this pattern:

dp 14.26: Coordinate Word Pattern

Syllable 1	2	3	4
ID syllable	DIMENSION 1	DIMENSION 2	DIMENSION 3
Sw	CV	CV	CV

The first syllable of coordinate words is always  $\lambda_4$  Sw to identify them as special location-words. In the following syllables, the consonant (C) identifies the DIMENSION and whether STATIC or DYNAMIC. The vowels (V) indicate distances from a point of origin, which is defined as either the center or one end, depending on the DIMENSION (see below).

Normal NN words are stressed on the second syllable, while FUNCTIONALS appended to them receive secondary stress. It is suggested that coordinate words receive primary stress on the second syllable with secondary stress on both the third and fourth syllables for clarity.

Initial consonants for each syllable are the same as the consonants used for the same dimension in other S--- words.

⌘ 14.27: Coordinate words' syllable-initial consonants

			Voiceless		Voiced	
			STATIC	DYNAMIC	STATIC	DYNAMIC
			Obstruant	Continuant	Obstruant	Continuant
<i>Velar</i>	ENCLOSURE	DEPTH	k-	h-		
	SPHERICAL	RADIAL			g-	r-
<i>Palatal</i>	CARTESIAN	VERTICAL	c-	x-		
	SPHERICAL	AXIAL			j-	y-
<i>Alveolar</i>	CARTESIAN	PROGRESIONAL	t-	s-		
	TEMPORAL (see note)	Time			d-	n-
<i>Labial</i>	CARTESIAN	LATERAL	p-	f-		
	SPHERICAL	ROTATIONAL			b-	m-

**Note:** NN does not have a coordinate system for time, because time is treated as one-dimensional. Instead, the vocabulary words beginning *Swn-* and *Swd-* that would have been used for time-coordinates are used, as described in §14.6 (this chapter), for non-specific spacial reference, and consist of only two syllables, like most other NN words. ENCLOSURE also has only 1 dimension, so its words require only 2 syllables. Words beginning with *Sw* + any consonant other than *h, k, n* or *d* are expected to be four-syllable coordinate-system words.

⌘ 14.28 sets out the meaning and initial consonant of each syllable in coordinate words. (Vowels follow the same pattern as all other spacial reference words.)

dp 14.28: Coordinate words: meanings of syllable-initial consonants

MODE	Syllable 1	Syllable 2			Syllable 3			Syllable 4		
		DIMENSION	STATIC / DYNAMIC	C2	DIMENSION	STATIC / DYNAMIC	C2	DIMENSION	STATIC / DYNAMIC	C2
ENCLOSURE	sw-	DEPTH	STATIC DYNAMIC	<b>k-</b> <b>h-</b>						
CARTESIAN	sw-	LATERAL	STATIC DYNAMIC	<b>p-</b> <b>f-</b>	VERTICAL	STATIC DYNAMIC	<b>c-</b> <b>x-</b>	PROGRESSIONAL	STATIC DYNAMIC	<b>t-</b> <b>s-</b>
SPHERICAL	sw-	AXIAL	STATIC DYNAMIC	<b>j-</b> <b>y-</b>	ROTATIONAL	STATIC DYNAMIC	<b>b-</b> <b>m-</b>	RADIAL	STATIC DYNAMIC	<b>g-</b> <b>r-</b>

### 14.7.3. Coordinate Words

#### 14.7.3.1. Enclosure Coordinate Words

Enclosure is a one-dimensional, In-Out space, so the coordinates consist of only two syllables (ḍp 14.29-31).

##### 14.7.3.1.1

Roman	IPA	NN	Semantics
swku	su'kə	ጎጎጎጎ	In 0
swki	su'ki	ጎጎጎጎ	In 1
swke	su'ke	ጎጎጎጎ	In 2
swkei	su'kej	ጎጎጎጎ	In 3
swka	su'ka	ጎጎጎጎ	In 4
swkai	su'kaj	ጎጎጎጎ	In 5
swko	su'kə	ጎጎጎጎ	In 6
swkoi	su'kəj	ጎጎጎጎ	In 7
swkw	su'ku	ጎጎጎጎ	Out 0
swkwi	su'kwi	ጎጎጎጎ	Out 1
swkwe	su'kwe	ጎጎጎጎ	Out 2
swkwei	su'kwej	ጎጎጎጎ	Out 3
swkwa	su'kwa	ጎጎጎጎ	Out 4
swkwai	su'kwaj	ጎጎጎጎ	Out 5
swkwo	su'kwə	ጎጎጎጎ	Out 6
swkwoi	su'kwəj	ጎጎጎጎ	Out 7

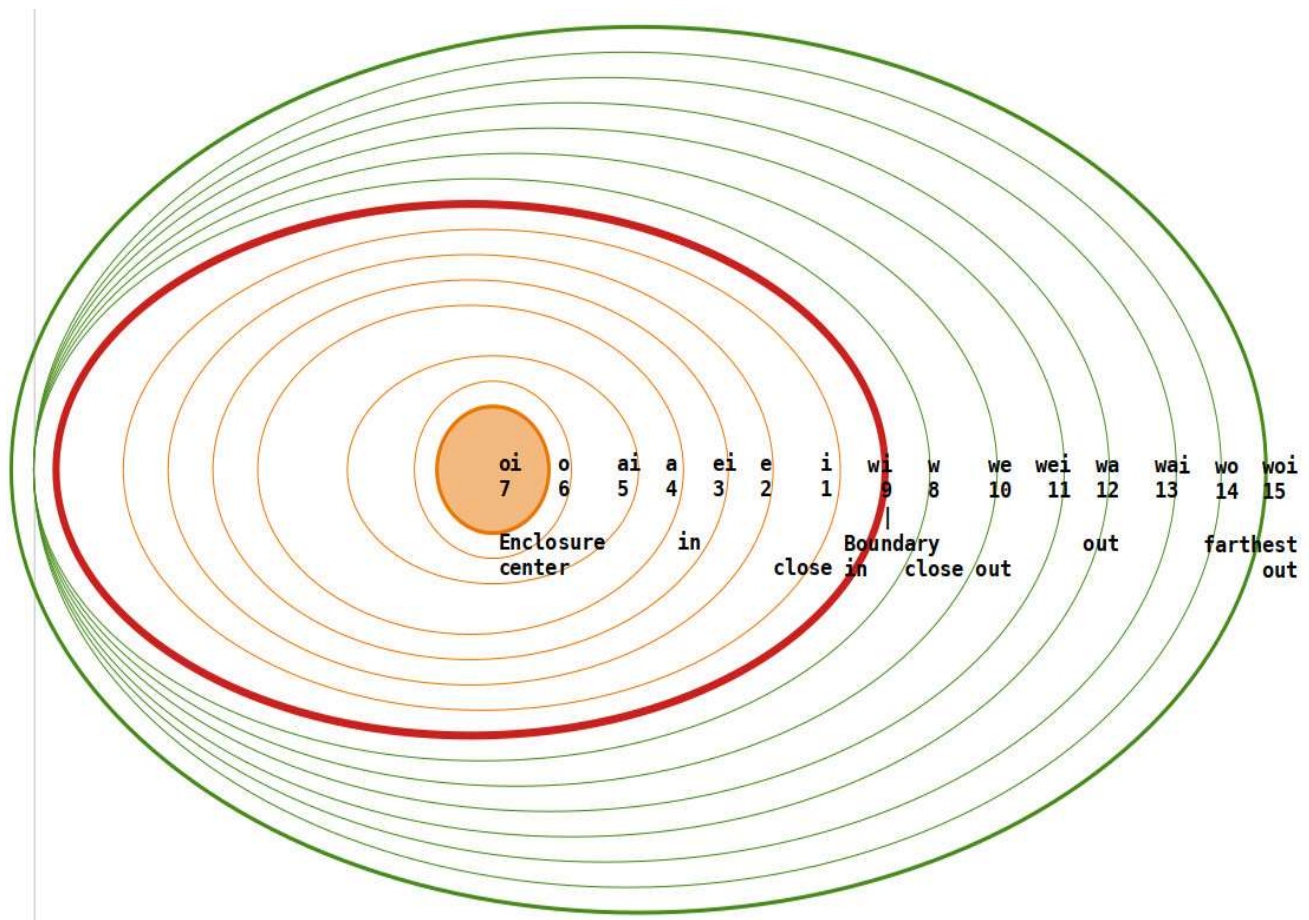
ḍp 14.29: Static  
Enclosure  
Coordinate Words

##### Static Enclosure      Dynamic Enclosure

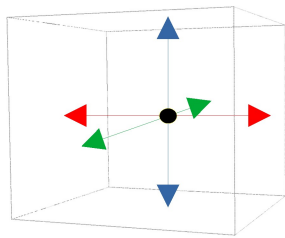
Roman	IPA	NN	Semantics
swhu	su'hə	ጎጎጎጎ	Inward 0
swhi	su'hi	ጎጎጎጎ	Inward 1
swhe	su'he	ጎጎጎጎ	Inward 2
swhei	su'hej	ጎጎጎጎ	Inward 3
swha	su'ha	ጎጎጎጎ	Inward 4
swhai	su'haj	ጎጎጎጎ	Inward 5
swho	su'hə	ጎጎጎጎ	Inward 6
swhoi	su'həj	ጎጎጎጎ	Inward 7
swhw	su'hu	ጎጎጎጎ	Outward 0
swhwi	su'hwi	ጎጎጎጎ	Outward 1
swhwe	su'hwe	ጎጎጎጎ	Outward 2
swhwei	su'hwej	ጎጎጎጎ	Outward 3
swhwa	su'hwa	ጎጎጎጎ	Outward 4
swhwai	su'hwaj	ጎጎጎጎ	Outward 5
swhwo	su'hwə	ጎጎጎጎ	Outward 6
swhwoi	su'hwəj	ጎጎጎጎ	Outward 7

ḍp 14.30: Dynamic  
Enclosure Coordinate  
Words

*Dp 14.31: Enclosure Zones*



14.7.3.2. Cartesian Coordinate Words



*Dp 14.32: Cartesian Coordinates*

CARTESIAN space is visualized as a cube centered on a focal object or location (*Dp 14.32*). The FOCUS is assumed to be the speaker unless some other object is specified.

The size of the cubic space depends entirely on the context, and may be precisely defined in advance, or roughly

approximated according to context.

	Positive	Origin	Negative	
		wi		9
1	i		w	8
2	e		we	10
3	ei		wei	11
4	a		wa	12
5	ai		wai	13
6	o		wo	14
7	oi		woi	15
0		u	unspecified	

*Dp 14.33: Coordinate Distance Vowels*

With the FOCUS as the center, 8 POSITIVE and 8 NEGATIVE distances can be indicated in each of the three dimensions ( $\mathcal{D}_p$  14.33). In effect, this divides the original cubic space into 512 smaller cubic areas.

In DYNAMIC coordinates, movement is assumed to originate in the center unless a previously defined location is specified, or the FOCUS itself is the destination.

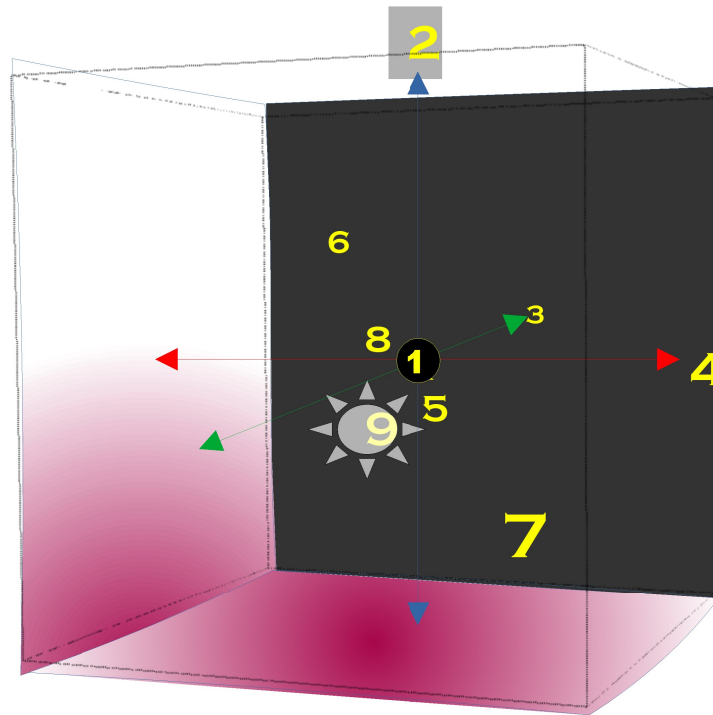
Each of the three DIMENSIONS uses an ORDINAL representation of distances ( $\mathcal{D}_p$  14.33).

*$\mathcal{D}_p$  14.34: Coordinate Consonants*

	Syllable 1	2	3	4
	ID	Lateral	Vertical	Progressional
Static	Sw	p-	c-	t-
Dynamic	Sw	f-	x-	s-

Each static and dynamic set of coordinates consists of 8,192 four-syllable words. These are all listed in spreadsheet “28 Sw-” sheets “--k-” (STATIC) and “--h-” (DYNAMIC). Examples of each are listed and illustrated in  $\mathcal{D}_p$  14.35-38 (next pages).

14.7.3.2.1 Cartesian Coordinates: static example



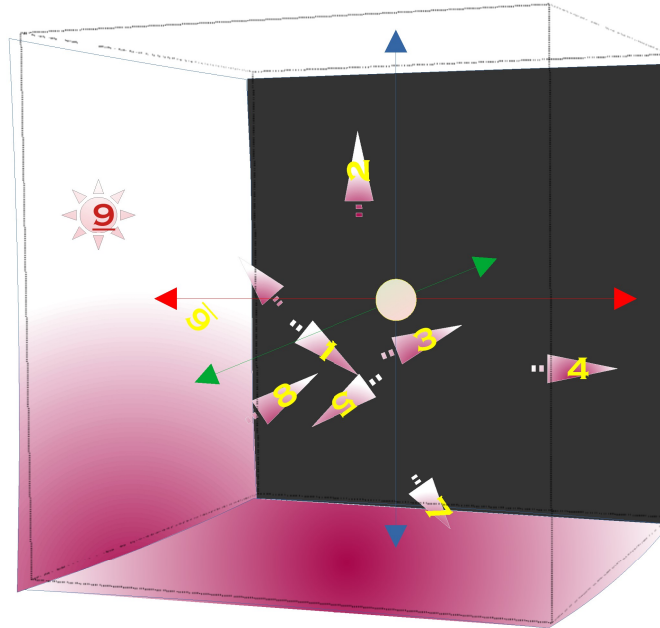
*Ꮝ 14.35: Cartesian Coordinates: Static*

NN (latin)	NN (IPA)	Position	Ref #
Swpwicwitwi	su'pwi,tʃwi,twi	Location of focus	1
Swpoicwitwi	su'poi,tʃwi,twi	Farthest above focus	2
Swpwicoitwi	su'pwi,tʃwɔi,twi	Farthest ahead of focus	3
Swpwicwitoi	su'pwi,tʃwi,twɔi	Farthest to right of focus	4
Swpwcwtw	su'pu,tʃu,tu	Closest to left, down, ahead	5
Swpwacata	su'pwa,tʃa,ta	Midway upper left ahead	6
Swpacwatwa	su'pa,tʃwa,twa	Midway lower right behind	7
Swpwocwetei	su'pwo,tʃwe,tej	Left 6 down 2 ahead 3	8
Swpucutu	su'pətʃə,tə	Location unspecified	9

*Ꮝ 14.36: Cartesian Static*



14.7.3.2.2 Cartesian Coordinates: dynamic example



*D<sub>p</sub> 14.37: Cartesian Coordinates: Dynamic Example*

NN (latin)	NN (IPA)	Move to Position	Ref #
Swfwixwiswi	su'fwi <sub>i</sub> fwi <sub>i</sub> swi	Location of focus	1
Swfoixwiswi	su'foi <sub>i</sub> fwi <sub>i</sub> swi	Farthest above focus	2
Swfwixoiswi	su'fwi <sub>i</sub> fwoi <sub>i</sub> swi	Farthest ahead of focus	3
Swfwixwisoi	su'fwi <sub>i</sub> fwi <sub>i</sub> swoi	Farthest to right of focus	4
Swfwxwtw	su'fu <sub>i</sub> fu <sub>i</sub> su	Closest to left,down,ahead	5
Swfwaxasa	su'fwa <sub>i</sub> fa <sub>i</sub> sa	Midway upper left ahead	6
Swfaxwatwa	su'fa <sub>i</sub> fwa <sub>i</sub> swa	Midway lower right behind	7
Swfwoxwesei	su'fwo <sub>i</sub> fwe <sub>i</sub> sej	Left 6 down 2 ahead 3	8
Swfuxusu	su'fə <sub>i</sub> fə <sub>i</sub> sə	Location unspecified	9

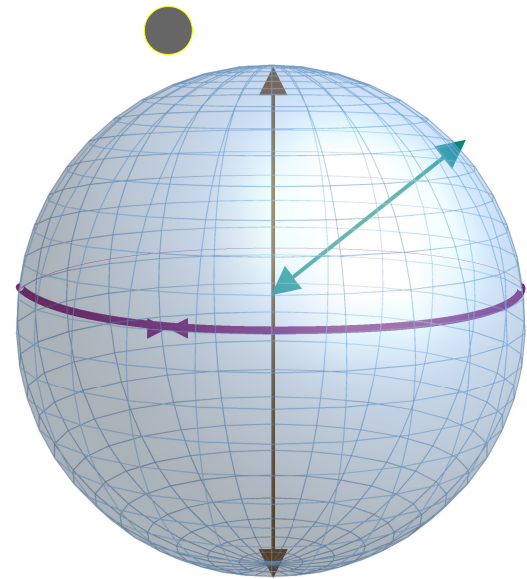
*D<sub>p</sub> 14.38: Cartesian Dynamic*

14.7.3.3. Spherical Coordinate Words

Spherical descriptor words are based on a variant to “Local Tangent Plane Coordinates”

The most similar variant is that used in avionics, sometimes known as “NED” (North-East-Down); see [https://en.wikipedia.org/wiki/Local\\_tangent\\_plane\\_coordinates](https://en.wikipedia.org/wiki/Local_tangent_plane_coordinates)

Like Cartesian space, Spherical space is divided into 512 three-dimensional spaces based on the center of a sphere (Dp 14.36). As with Cartesian coordinates, the spaces are not of a fixed size, particularly since they are tapered and are naturally smaller close to the center. Each axis is numbered differently, and is discussed below.



Dp 14.39: Spherical Space

Syllable pattern is shown in Dp 14.40:

Dp 14.40: Spherical space syllable-initial consonants

	Syllable 1	2	3	4
	ID	AXIAL	ROTATIONAL	RADIAL
STATIC	Sw	j-	g-	b-
DYNAMIC	Sw	y-	r-	m-

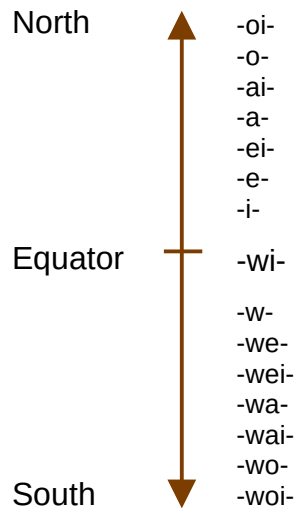
**14.7.3.3.1 Ordinal Representation of Axial (North-South) Dimension**

With zero fixed with *wi* at the equator, numbers run upward to *oi* at the North Pole, while southward numbers run up to *woi* at the South Pole ( $\mathcal{D}_p$  14.41-42).

$\mathcal{D}_p$  14.41: Vowels of Axial Dimension

	North	Center	South	
0		wi		0
1	i		w	8
2	e		we	10
3	ei		wei	11
4	a		wa	12
5	ai		wai	13
6	o		wo	14
7	oi		woi	15
unspecified		u		

$\mathcal{D}_p$  14.42: Vowels of Axial Dimension



**14.7.3.3.2 Ordinal Representation of Rotational (East-West) Dimension**

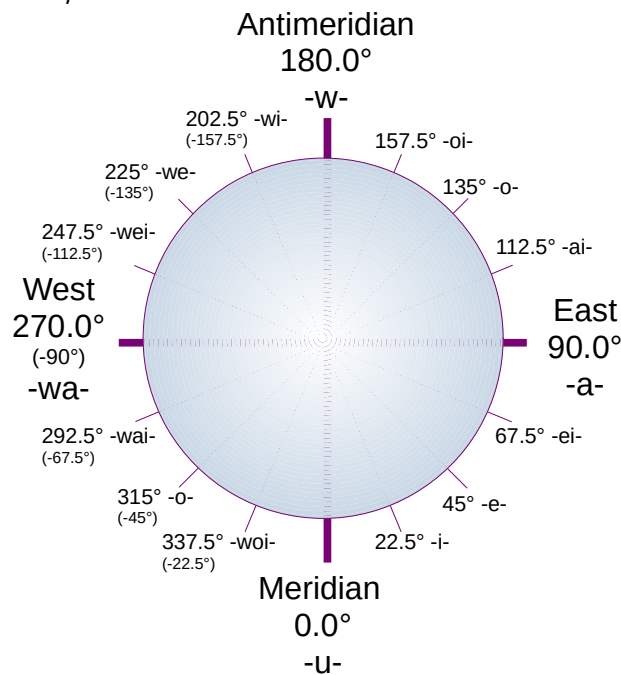
East is positive, west is negative . The base-meridian is arbitrarily defined on a case-by-case basis. Each gradation is 22.5 degrees of arc (360 / 16).

Gradations of RADIAL and AXIAL distances depend on the size and physical characteristics of the spherical object; they need not be uniform sizes, but can represent layers or arbitrary zones.

*D<sub>p</sub> 14.43: Vowels of Rotational Dimension*

Degrees	East	West	Degrees
0.0	u 0	8 w	180.0
22.5	i 1	9 wi	202.5
45.0	e 2	10 we	225.0
67.5	ei 3	11 wei	247.5
90.0	a 4	12 wa	270.0
112.5	ai 5	13 wai	292.5
135.0	o 6	14 wo	315.0
157.5	oi 7	15 woi	337.5

*D<sub>p</sub> 14.44: Vowels of Rotational Dimension*

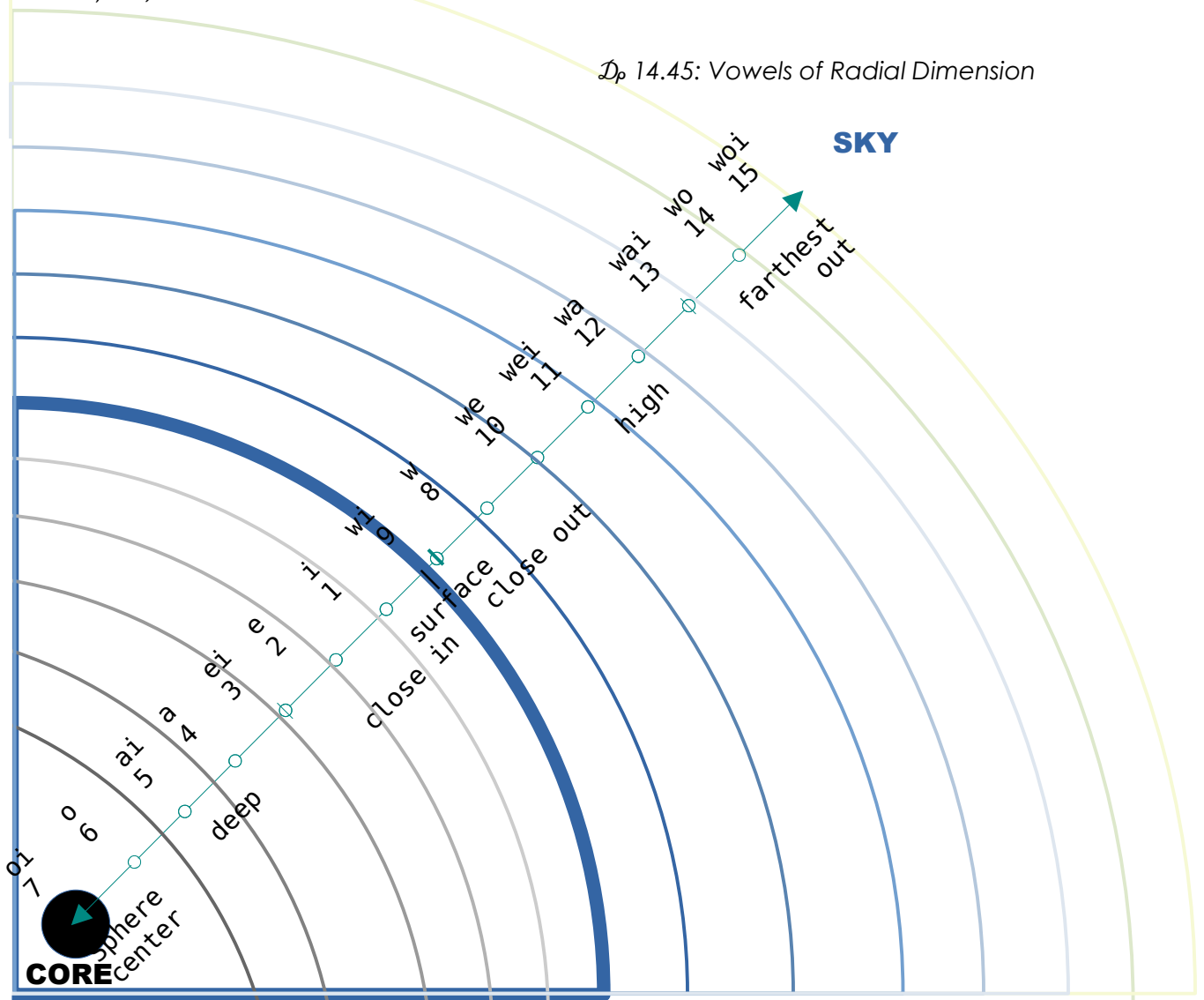


**14.7.3.3 Ordinal Representation of Radial (Core-Sky) Dimension**

RADIAL is the direction from the surface to the center of a sphere; in large spheres (planets) it is the direction of the force of gravity. Though radial measures are anchored at the sphere’s center, the surface of the sphere is the zero-point.

Numbers following the force of gravity (toward the center) are positive in a positive sequence; those against the force of gravity (toward the sky) are considered negative and begin with w-.

Spheres with irregular surfaces, like planets, need to define an arbitrary, consistent “surface level”. By custom on Earth, that is “sea level” (acknowledging that “sea level” changes with tides, climate fluctuations, etc.).

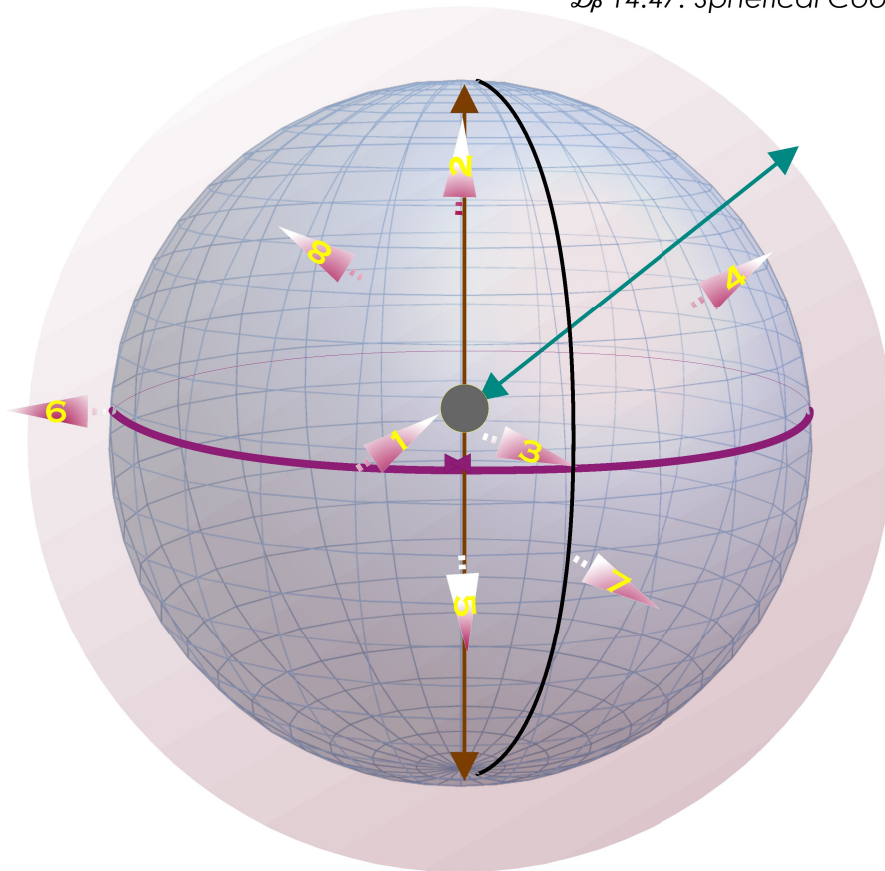


14.7.3.3.4 Spherical Coordinates: dynamic example

*D<sub>p</sub> 14.46: Spherical Coordinates, Dynamic Example*

Swyamwiroi	su' ʒa, mwi, ʋoi	Base meridian (arbitrarily defined) at surface	3
Swyamari	su' ʒa, ma, ʋi	Northeastern hemisphere just above surface	4
Swywamwiroi	su' ʒwa, mwi, ʋoi	Central axis half way to south end centered inside	5
Swywimwarwoi	su' ʒwi, mwi, ʋwoi	Far above equator over longitude -90 (west)	6
Swywamiri	su' ʒwa, mi, ʋi	South -45 east 22.5 close below surface	7
Swyomwairi	su' ʒo, mwai, ʋi	North 6 points west -67.5 low altitude above surface	8
Swyumuru	su' ʒə, mə, ʋə	Location unspecified (not shown)	

*D<sub>p</sub> 14.47: Spherical Coordinates, Dynamic Example*



## 14.8. Time

Within the S--- FAMILY of 4,096 words, 512 express TEMPORAL relations. These words enable speakes to express several aspects of time relations:

- **Simple time:** past, present and future;
- **Distance in time:** NEAR, MID, and FAR;
- **STATIC and DYNAMIC aspects:** a point in time versus a movement through time;
- **FRAMES of reference:** whether the temporal relationship is based on the time at which the speaker is speaking, or some other reference-point.

### 14.8.1. Word Identification

TEMPORAL words are distinguished from other relationals by having a voiced apical consonant as the third letter – the consonants *n* or *d* starting the second syllable. The voiced apical stop  $\chi$  *d* signals STATIC mode, and the voiced apical nasal continuant  $\jmath$  *n* marks DYNAMIC mode words.

### 14.8.2. Simple Time

The simplest expression of time is the three “tenses”:

- past:  $\jmath d \chi \tau$  *sedw*
- present:  $\jmath d \chi \tau$  *seda*
- future:  $\jmath d \chi \iota$  *sedi*

In these words, here's what the letters indicate:

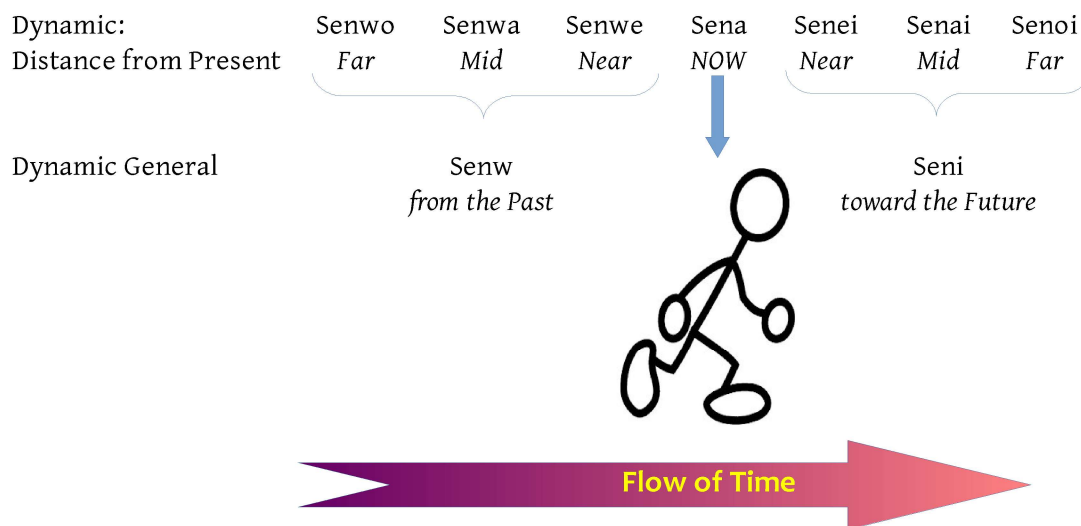
- $\jmath$  *s* : this is a relational word;
- $\jmath$  *e* : this is the default FRAME (§4.10 below) indicating that "now" is the speaker's present;
- $\chi$  *d* : this is a STATIC temporal word;
- $\iota$  *i* : indicates POSITIVE direction from the present, defined as future.
- if neither *i* nor *w* is included in the second vowel, the present (now) is indicated;

- ɥ w : in SPATIAL and TEMPORAL relationals, an w in the final vowel indicates NEGATIVE direction; in TEMPORAL words, that is defined as the past;
- ɾ a in the final vowel : the present is indicated by leaving out any indicator of direction (w for past and i for future) while a refers to the present in general.
- if both w and i are included, a time period encompassing past, present, and future is meant.

### 14.8.3. Temporal Distance

As in SPATIAL relation words, NN allows (but does not require) the speaker to indicate three DEGREES of distance in each direction: NEAR, MID, and FAR. The central vowels e-a-o indicate relative (not measured) distance from the speaker:

- e : near the speaker's "now";
- a : a moderate distance from the speaker's "now", often within the context of the narration;
- o : distant from the speaker's "now";
- if none of these vowels is used, the distance is indeterminate.



*D<sub>p</sub> 14.48: Simple Time*



In past and future usage, DISTANCE refers to the speaker's perception of how far an event or situation is from the present, the time at which he or she is speaking. Context and usage will determine how they are employed. Because they are options, speakers may elect to use simple time relations whenever they prefer.

#### 14.8.3.1. Time Distance in the Present

A reasonable question: how can the present be distant? “The present” is sometimes defined as “the point in time dividing the past from the future”. While discussing the present, a speaker may refer to that point as near-present, *sede* – the instant “now”. In everyday speech, however, the “present” is used more broadly. NN allows clarification by using the MID-present form, *se<sub>da</sub>* – the general context of the narration; or the FAR-present, *se<sub>do</sub>* – beyond the narrative, a larger general present. In addition, a timeless process or situation may be expressed using *w<sub>i</sub>* – past+future, in NEAR – *wei*, MID – *wai*, FAR – *woi*, or indeterminate distance – *wi*. And finally, the zero-vowel *u* can be used to refer to time in general – *se<sub>du</sub>*, or process through time in general – *se<sub>nu</sub>*.

#### 14.8.3.2. Time Distance examples

These sentences illustrate how DISTANCE can be used in various temporal contexts. The speaker may choose either to use a time-indicator in the verb, or a verb without time indicator plus a RELATIONAL for more precision (see §4.9). The final vowel means the same in both the verb and the RELATIONAL word.

##### 14.8.3.2.1 Time Distance Example 1

The Gospel of John opens with this sweeping vision of the beginning of all things, and continues to describe the mission of John the Baptist and his encounter with Jesus (all in Chapter 1).

- Far: "In the beginning was the Word, and the Word was with God, and the Word was God."  
was : far past *sedwo* (RELATIONAL) or *xofwo* (Verb) if the narrator's focus is on the origin of all things; *sedwoi* or *xofwoi* if the focus is on the eternal nature of God and the Word. (The verb's first vowel *o* is the EVIDENTIAL aspect indicating the writer's certainty of what he is telling.)
- Mid: "There was a man sent from God, whose name was John."  
was (1) : (STATIC) *sedwa* or *xokwa*  
sent : (DYNAMIC) *senwa* or *xobwa*  
was (2) : (past+future) *sedwai* or *xohwai* – because his name continued being John throughout the narrative; however, another optional NN usage would be to omit a time-reference altogether and use the verb in the STATIVE IMPERFECT without temporal indication, *xohu*.

- Near: "The next day, he saw Jesus coming toward him..."  
saw, coming : *senwe* or *xojwe* – near-past because the seeing and coming occurred immediately before the events related in the subsequent narrative (even though the narrative itself was written in the distant past, from the contemporary readers' view).

#### 14.8.3.2.2 Time Distance Example 2

- Cosmologists have evidence to believe that the universe was created in a "big bang", has expanded, and will continue expanding indefinitely.  
Have evidence : *seda* or *xora* – present mid-distance stative – this belief has been current for several decades, but not throughout the history of science. The Verb's first vowel *o* indicates the certain existence of evidence.  
believe : *sena* or *xara* – mid-present. The Verb's first vowel *a* indicates REASONABLE BELIEF as opposed to CERTAINTY (*o*) or UNCERTAINTY (*e*).  
was created : *senwo* or *xajwo* – far-past DYNAMIC  
has expanded: *senwoi* or *xamwoi* – far-past+future DYNAMIC  
will continue: *senoi* or *xamoi* – far-future DYNAMIC

## 14.9. Using Time Relationals with the Verb

The verb in NN is a FAMILY (X---) of 4,096 words expressing many shades of meaning, similar in concept to a very rich verb "to be" + "to do". It is discussed in detail in its own chapter (6). The verb includes tense (time) indicators, so there is overlap with temporal RELATIONALS.

The verb expresses the following time-related concepts that are also expressed in relationals:

- Past, present, future, timeless, and unspecified time
- NEAR, MID, FAR, and unspecified distance in time
- STATIC (FIELD) and DYNAMIC (WAVE)

Additionally, the verb expresses many concepts that are not included in the TEMPORAL RELATIONALS. The verb can be used to express many time-related concepts without falling back on the RELATIONALS. The same vowel combinations in the last syllable are used to express time in both verbs and RELATIONALS, so learning their use and interpretation is relatively easy.

A complete discussion of the use of TEMPORAL RELATIONALS with the verb is included at the end of the chapter on the Verb (§6.6).

Time measurements, days, dates, seasons, clock and calendar are expressed in FAMILY *T---*, along with other numbers and measurements (§12.5).

#### 14.9.1.1. *Dynamic time vocabulary:*

Normally, people don't have control over movement through time; we move through time together at a speed of 24 hours per day. Whether time travel is actually possible or not, it is a subject of speculation and fiction for which NN provides vocabulary fairly consistent with movement in other DIMENSIONS.

The most common use of DYNAMIC time vocabulary is expected to be “looking” toward different periods in time. Looking at the recent past or the distant future is a reasonable application of dynamic time vocabulary.

### 14.9.2. Time Vocabulary

Static		Dynamic	
<i>Sedu</i>	Temporal Dimension	<i>Senu</i>	Progression of time
<i>Sedi</i>	Future	<i>Seni</i>	Movement toward the future
<i>Sede</i>	Immediate present	<i>Sene</i>	Toward the Immediate present
<i>Sedei</i>	Near Future	<i>Senei</i>	Toward the Near Future
<i>Seda</i>	Present in general	<i>Sena</i>	Toward the Present in general
<i>Sedai</i>	Mid Future	<i>Senai</i>	Toward the Mid Future
<i>Sedo</i>	Present broadly	<i>Seno</i>	Toward the Present broadly
<i>Sedoi</i>	Distant Future	<i>Senoi</i>	Toward the Distant Future
<i>Sedw</i>	Past	<i>Senw</i>	From the Past
<i>Sedwi</i>	Sometime	<i>Senwi</i>	To/From Sometime
<i>Sedwe</i>	Recent past	<i>Senwe</i>	From the Recent past
<i>Sedwei</i>	Short time	<i>Senwei</i>	To/From a Short time
<i>Sedwa</i>	Mid Past	<i>Senwa</i>	From the Mid Past
<i>Sedwai</i>	Moderate time	<i>Senwai</i>	To/From a Moderate time
<i>Sedwo</i>	Distant Past	<i>Senwo</i>	From the Distant Past
<i>Sedwoi</i>	Long time	<i>Senwoi</i>	To/From Eternity

*D<sub>p</sub> 14.49: Time Vocabulary*

## 14.10. FRAMES

Nwehu Nuswei acknowledges that the space-time continuum is perceived and discussed from a variety of perspectives, often in the same discourse. To provide clarity, three sets of reference FRAMES are allocated by assigning different vowels in the first syllable of RELATIONALS which are otherwise the same.

FRAME 1, denoted by  $\text{ɔ}e$  in the first vowel, is oriented to a “close” position, most often the speaker. This is

the default FRAME. If speakers wish to clarify the reference, FRAME 2, denoted by  $\text{p} a$  can be introduced as a “MID” orientation, and FRAME 3 with  $\text{p} o$  for the most general or broadest. (However, leaving the center vowel out of the first syllable does not result in a “frameless” word because those words represent discourse semantics; for details, refer to Chapter 8, “Functional Words”.)

Here are some examples of possible uses for FRAMES of reference in spatial relationships. (Time relations are discussed in the following section.)

Actual usage: FRAMES are not pre-defined in the language for any specific situation. In actual usage, context and custom would determine which FRAME to use.

For a Mechanic, FRAME 1 could relate to him or her;  
FRAME 2 could relate to the vehicle on which he or she is working;  
FRAME 3 could relate to the garage building

On a river boat, FRAME 1 could relate to the speaker  
FRAME 2 could relate to the vessel (cf. 'port' and 'starboard')  
FRAME 3 could relate to the river

In a space ship, FRAME 1 could related to the speaker  
FRAME 2 could relate to the ship  
FRAME 3 could relate to the nearest gravity field

## MODES and FRAMES

MODES and FRAMES are differentiated by the vowel of the first syllable. The center vowel,  $e$  or  $o$ , identifies the three FRAMES, while the  $i$ - and  $w$ - distinguish the four MODES. Note that  $Su$ ,  $Si$ ,  $Sw$ , and  $Swi$  are not part of this group; they are relational words of discourse, discussed in their own chapter.

Frame	Mode			
	General	Complete	Incomplete	Continual
Frame 1:	Se-	Sei-	Swe-	Swei-
Frame 2:	Sa-	Sai-	Swa-	Swai-
Frame 3:	So-	Soi-	Swo-	Swoi-

*D<sub>p</sub> 14.50: Modes and Frames*

### 14.10.1. Time FRAMES

Time FRAMES allow a speaker to clarify relative time relations. In simple time references, the "now" is usually assumed to be the time at which the speaker is speaking or the writer is writing. In other words, past and future are presumed to be relative to the speech or writing itself.

This is not universally true, however. In some languages and traditions, story-telling uses the present tense, so that "now" follows the protagonist of the story or the thread of the narrative. This is often the case in French narrative style, for example. For those not accustomed to the style, it can cause confusion or a sense of mild disorientation.

Nwehu Nuswei **FRAMES** are used to distinguish the use of past, present, and future in different contexts. Three **FRAMES** are available. The first, or default **FRAME**, is always used relative to the speaker's "now". The other two can be used flexibly according to the context of the discourse.

#### 14.10.1.1. Time-Frame Words

The "central" vowel – *e*, *a*, or *o* – of the first syllable of a temporal word indicates the **FRAME**. *Dp* 14.51 charts this out:

*Dp* 14.51: Time-Frame words in simple past, present, and future

FRAME	Simple Past	Simple Present	Simple Future
1	ḷḷḷḷ Sedw	ḷḷḷḷ Sede	ḷḷḷḷ Sedi
2	ḷḷḷḷ Sadw	ḷḷḷḷ Sade	ḷḷḷḷ Sadi
3	ḷḷḷḷ Sodw	ḷḷḷḷ Sode	ḷḷḷḷ Sodw

In each **FRAME**, distance indication can be added as desired in the same way – by adding a “central” vowel to the final syllable: ḷ *e* for near, ḷ *a* for mid, and ḷ *o* for far.

#### 14.10.1.2. Time-FRAME Uses

As mentioned above, "narrative present" is a fairly common instance where a **FRAME** can clarify relative time.

##### 14.10.1.2.1 Frame Example 1: Narrative style

1. **FRAME** 1 is the speaker's "now". 'I will tell you a story.'  
will tell: ḷḷḷḷ seni
2. **FRAME** 2 is relative to "now" in the thread of the narrative. 'Sir Lancelot rides forth to rescue the maiden.'  
rides forth: ḷḷḷḷ sane
3. **FRAME** 3 is relative to another narrative thread – a story within a story, for example. 'My Lord Lancelot, I will tell you the tragic story of the maiden. It is a dark night as I stand watch on the castle wall. I see a glow as of fire in the distance. The Black Dragon comes, breathing smoke and

flame! ...'

will tell: 𐌸𐌹𐌺𐌾 *sani*

is a dark night : 𐌸𐌹𐌺𐌾 *sode*

see a glow: 𐌸𐌹𐌺𐌾 *sone*

comes, breathing smoke: 𐌸𐌹𐌺𐌾 *sone*

(These examples also illustrate the use of STATIC and DYNAMIC aspects of time, discussed below.)

#### 14.10.1.2.2 Frame Example 2: Literary history

In relating the history of a literary work's development, FRAMES can be used to distinguish between time in the author's life and time in the narrative he or she is developing. The development of J. R. R. Tolkien's Middle-earth took place over some sixty years, during which, as Christopher Tolkien writes in *The History of Middle-earth* series, the characters and story lines change frequently as they are developed. The anonymous authors of the Tolkiengateway wiki ([http://tolkiengateway.net/wiki/The\\_Silmarillion](http://tolkiengateway.net/wiki/The_Silmarillion)) explain: "Due to Christopher's extensive explanations (in *The History of Middle-earth*) of how he compiled the published work, much of *The Silmarillion* has been debated by the hardcore fans. Christopher's task is generally accepted as very difficult given the state of his father's texts at the time of his death: some critical texts were no longer in the Tolkien family's possession, and Christopher's task compelled him to rush through much of the material. Christopher reveals in later volumes of *The History of Middle-earth* many divergent ideas which do not agree with the published version."

As he discusses the complex interrelations between versions of his father's story, the use of FRAMES would have been helpful to clarify the difference between:

1. Christopher's changing understanding of the development process;
2. The actual process by which the senior Tolkien developed the world of Middle-earth in 20<sup>th</sup> century chronology;
3. Events related in various versions of Tolkien's history of Middle Earth.

#### 14.10.1.2.3 Frame Example 3: Time-travel

A popular theme in science fiction and fantasy is travel to different periods of time. In fact, travel through time has been a feature of literature as early as the ancient *Mahabharata* of India. In NN, FRAME 1 can be used for the time-period in which the narrative begins or is primarily based. Activities within other time-periods visited by the characters can be told using FRAMES 2 and 3, as seems best to the author.

In one contemporary example, Ann and Todd McCaffrey's tales of the Dragonriders of Pern – a total of more than twenty-three novels – deals throughout with time-travel in complex and interesting ways. The first story published, *Dragon Flight* (1968, Ann McCaffrey), tells of Lessa's return through time to call dragon riders from the past to fight a deadly menace. This relatively simple time-excursion requires only two FRAMES for clarification.

By 2008, when Todd McCaffrey's *Dragonheart* was published, the time -travel narrative had become much more complex, with dragons and their riders hopping backward and forward in ways that bewildered the characters of the story and its readers equally, and put the characters in peril because, in this literary universe, people who encounter themselves in the same time-period are drained of their life-force energy. Here, full use of NN FRAMES would have helped all involved understand what was transpiring and – perhaps – avoid the perils of self-encounter.

#### 14.10.1.2.4 Frame Example 4: Special Relativity

The Theory of Special Relativity shows that the measurement time differs according to the speed at which the observer is moving. For observers traveling at speeds which are close to the speed of light, measured time passes at a significantly different rate than those moving at smaller fractions of the speed of light. Such observers are said to be in different time frames. NN's three time FRAMES can be used to clarify discussion of this phenomenon, assigning a different FRAME to explaining how time flows for each observer.

Suppose a starship carrying people at nearly light-speed travels to a destination ten light-years away, then returns to its point of origin. Special Relativity says this trip would seem to the travelers to have taken only a few hours, depending on how close to light-speed the ship traveled. A narrative from their perspective could use FRAME 1 to describe their past, present, and future. Meanwhile, ten or more years have passed from the perspective of any people they encounter at their first destination. From their perspective, past, present, and future can be described in NN using FRAME 2. Meanwhile, the travelers' families at their point of origin have experienced twenty or more years, and their story could be told using FRAME 3.

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## 14.11. Syntax of Spatial Relations

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There are no special rules for putting spacial and temporal references into sentences. Often, times and places are treated as physical PARTICLES (entities), and behave like nouns.

In some contexts, dynamic space and time words can be used as WAVES (verbs), when doing so is made clear by context.

In other cases, times and locations are treated as FIELDS (descriptions) of objects or spaces, so would be put either:

- after the PARTICLE (noun) being described, like normal adjectives , as in  
 “upper floor”  
 ᠮᠠᠸᠠ ᠰᠡᠴᠠᠢ  
*rosu~ secai*  
 (lit. *floor upper*)
- if the entire message is simply attributing a location or time to something, a STATIC verb may optionally be placed between the object and its location:  
 “It is below”  
 ᠬᠢᠰᠢ ᠬᠣᠬᠤ ᠰᠡᠴᠠᠢ  
*hisi xohu secwo*

If two or more words are used to describe a location, it is recommended (not required) to state them in the following order: LATERAL, VERTICAL, PROGRESSIONAL; or AXIAL, ROTATIONAL,RADIAL. For example, ‘left upper front’ rather than ‘front left upper’, etc. This matches with the order in which COORDINATE WORDS organize multidimentsional space.

## 14.12. Bit map

᠘ᠫ 14.52 is a summary of correspondence between the semantics and the bit-pattern of S---words.

᠘ᠫ 14.52: Correspondence between semantics and bit-patterns of S--- words in Nwehu Nuswei (next page)

			V1				C2				V2			
			8	4	2	1	8	4	2	1	8	4	2	1
V1: 8	Grammatical Relations: General		○											
	Completeness <sup>1</sup>	Incomplete <sup>1</sup>	w	●										
V1: 4-2	Frame	Unspecified		○	○									
	1. Close		e	○	●									
	2. Mid-distance		a	●	○									
	3. Far		o	●	●									
V1: 1	Unspecified									○				
	Completeness <sup>2</sup>	Complete <sup>1</sup>	i							●				



V1: 8 & 1		Continual <sup>1</sup>	w-i	●	●		
C2: 8	Space-time only (non-grammatical) <sup>2</sup>	spatial	voiceless			○	
		Planetary/Time	voiced			●	
C2: 4	Energy	Dynamic	continuant			○ ○	
		Static	stop			●	
C2: 2-1	Dimension <sup>3</sup>	Centering/Radial	velar			○ ○	
		Vertical/North-South	palatal			○ ●	
		Progressional/Future-Past	apical			● ○	
		Rotational/East/West	labial			● ●	
V2: 8	Negative direction	Unspecified <sup>2</sup>					○
		out, south, down, left, back <sup>2</sup>	w				●
V2: 4-2	Distance from	Any <sup>2</sup>					○ ○
	head or reference	Here <sup>2</sup>	e				○ ●
		There <sup>2</sup>	a				● ○
		Yon <sup>2</sup>	o				● ●
V2: 1	Positive direction	Unspecified <sup>2</sup>					○
		in, north, up, right, forward <sup>2</sup>	i				●

w\_i Positive and Negative together = oscillating, back-and-forth

Note 1: Cells highlighted in yellow are used in more than one way:  
 w- with e, a, and o is “incomplete”  
 w-i is “continual”  
 w and wi are grammatical particles  
 u, and i by itself, are grammatical particles

Note 2: In grammatical genres, C2 and V2 are assigned quasi-arbitrarily;  
 In space-time genres, C2 and V2 are assigned fairly systematically as documented in this bitmap, but some flexibility is built in to avoid semantic overlap, especially in forms with a single final vowel (indicating non-directionality) and forms with w\_i (indicating polydirectionality).

Note 3: For unspecified dimensionality use a combination of centering = velar and non-directionality = no w or i  
 Spaces and time periods can be described using the Si-- GENUS

This concludes the discussion of space and time in Nwehu Nuswei.