

## A THEORY OF SITUATION ROLES

By

**K. B. Kiingi, Institute of Languages, Makerere University**

In order to state the problem to be tackled in this paper, I propose to make contact with four texts on English Language and linguistics. The intended contact pertains to their treatment of role theory.

In their influential grammar of the English language Quirk et al (1985) duly remind us that

analysis of participant roles has not achieved a general consensus, nor has it fully explored all distinctions ... [their] description must therefore be considered tentative. p. 741

On the other hand, Brown and Miller (1991: 308) justify their description of role theory by “its offering a degree of both generality and particularity [although] it has no easily defended validity ... [and] there seems to be no alternative in the current state of knowledge.”

While Fromkin et al (2003: 192) prefix their list of roles with a reassurance to the effect that “the list is not complete”, Larson and Segal’s (1995: 489) considered stance on the nature and number of semantic roles is the most pessimistic, for they write:

The upshot is that we regard the question of which thematic roles there are and how they are defined as empirical ones, to be resolved in the usual way: by investigations that construct specific theories making detailed and specific predictions. Preliminary theories of this kind have been proposed; however, it is likely that resolving thematic roles precisely will require a great deal of investigation, involving domains beyond linguistics. It is worth remembering that fully 22 centuries elapsed between the first suggestion of the atomic theory of matter, in which all substances were factored into earth, water, air, and fire, and the elaboration of atomic theory by John Dalton, in which a more complete and satisfactory set of atomic constituents was proposed. Finding elementary constituents can evidently be a long-term project.

Admittedly, the development of atomic theory was tortuous; but we need not resign ourselves to a similar state-of-affairs with regard to role theory. The objective I am poised to pursue in this paper is to bring the problem of determination of semantic roles closer to its solution by enunciating a theory of role theory.

As roles I posit: nonselfchanger Q, selfchanger B, reference L, wholeness base H, superordination base O, representation base F, similarity base N, direction base D, source S, mediator M, goal G, stimulus P, augmentation base R; interactor I, interaction base A, causer C, and causee E. As to entities which play roles in situations of change and nonchange, let it be posited: space l, matter m, material object r, biotic matter b, plant f, animal z, human h, temporary state v, emotional state e, mental state o, biotic group g, biotic abstract j, time t, assemblage a, situation s, change c, state q, physical abstract i, quantity u, number n, proposition p, and nonphysical abstraction k. If  $\varepsilon$  and  $\acute{\varepsilon}$  are entities, the following is the list of elementary formulae in the situation role theory under construction:

- Q $\varepsilon$ L $\acute{\varepsilon}$        $\varepsilon$  is located with reference to  $\acute{\varepsilon}$ .
- B $\varepsilon$ L $\acute{\varepsilon}$        $\varepsilon$  changes or moves itself with reference to  $\acute{\varepsilon}$ .
- Q $\varepsilon$ H $\acute{\varepsilon}$        $\varepsilon$  is part of  $\acute{\varepsilon}$ .
- B $\varepsilon$ H $\acute{\varepsilon}$        $\varepsilon$  becomes part of  $\acute{\varepsilon}$ .
- Q $\varepsilon$ F $\acute{\varepsilon}$        $\varepsilon$  represents  $\acute{\varepsilon}$ .
- B $\varepsilon$ F $\acute{\varepsilon}$        $\varepsilon$  becomes a representative of  $\acute{\varepsilon}$ .
- Q $\varepsilon$ N $\acute{\varepsilon}$        $\varepsilon$  is similar to  $\acute{\varepsilon}$ .
- B $\varepsilon$ N $\acute{\varepsilon}$        $\varepsilon$  becomes similar to  $\acute{\varepsilon}$ .
- Q $\varepsilon$ O $\acute{\varepsilon}$        $\varepsilon$  is greater than  $\acute{\varepsilon}$ .
- B $\varepsilon$ O $\acute{\varepsilon}$        $\varepsilon$  becomes greater than  $\acute{\varepsilon}$ .
- Q $\varepsilon$ D $\acute{\varepsilon}$        $\varepsilon$  faces  $\acute{\varepsilon}$ .
- B $\varepsilon$ D $\acute{\varepsilon}$        $\varepsilon$  changes or moves itself towards  $\acute{\varepsilon}$ .
- Q $\varepsilon$ S $\acute{\varepsilon}$        $\varepsilon$  ranges from  $\acute{\varepsilon}$ .
- B $\varepsilon$ S $\acute{\varepsilon}$        $\varepsilon$  changes or moves itself from  $\acute{\varepsilon}$ .
- Q $\varepsilon$ M $\acute{\varepsilon}$        $\varepsilon$  ranges over  $\acute{\varepsilon}$ .

BεMέ	ε changes or moves itself via or over έ.
QεG έ	ε ranges to έ.
BεG έ	ε changes or moves itself to έ.
QεP έ	ε is responsive to έ.
BεP έ	ε responds to έ.
QεR έ	ε is augmented to έ.
BεRέ	ε augments itself to έ.
IεAέ	ε impacts on έ.
CεEέ	ε causes or generates έ.

With  $\Phi = \text{df } L, H, F, N, O, D, S, M, G, P, R$ ;  $\Sigma$  is a situation-role formula and entities  $\varepsilon$ ,  $\varepsilon^o$  and  $\acute{\varepsilon}$ , an inventory of situation-role formulae is generisable as:

SRF1:  $Q\varepsilon\Phi\acute{\varepsilon}$

SRF2:  $B\varepsilon\Phi\acute{\varepsilon}$

SRF3:  $I\varepsilon A\acute{\varepsilon}$

SRF4:  $C\varepsilon E\acute{\varepsilon}$

SRF5:  $ChE[Q\varepsilon\Phi\acute{\varepsilon}]$

SRF6:  $ChE[B\varepsilon\Phi\acute{\varepsilon}]$

SRF7:  $ChE[I\varepsilon A\acute{\varepsilon}]$

SRF8:  $ChE[C\varepsilon E\acute{\varepsilon}]$

SRF9:  $ChE[M\varepsilon\Phi\acute{\varepsilon}]$

SRF10:  $ChE[M\varepsilon A\acute{\varepsilon}]$

SRF11:  $ChE[M\varepsilon E\acute{\varepsilon}]$

SRF12: ChE[Me°E[Σ]]

SRF13: QεΦ[Σ]

SRF14: BεΦ[Σ]

SRF15: IεA[Σ]

SRF16: CεE[Σ]

SRF17: [Σ]Φέ

SRF18: [Σ]Aέ

SRF19: [Σ]Eέ

I now turn to the task of exemplifying SRF1 – 19 as far as data from Quirk et al (1985: 754) sentences (1) – (39), Brown and Miller (1991: 309) sentences (40) – (57) and Fromkin et al (2003: 192 – 3) sentences (58) – (66) allow. For each example sentence I shall reproduce the role analysis of the respective authors, and at once formalize it in the situation-role theory. For instance sentence (33) below will be treated as:

33(a) He [**agent**] (h) placed it [**aff**] (r) on the shelf [**loc**] (l).

(b) ChE[BrG[QrLI]]

In the square brackets above I indicate the analysis of Quirk et al while my entity analysis is in round brackets. The whole sentence is then formalized as shown in 33(b). The abbreviations adopted in Quirk et al (1985: 754) are as follows:

<b>aff(ected)</b>	<b>ext(ernal causer)</b>	<b>pos(itioner)</b>
<b>agent(ive)</b>	<b>instr(ument)</b>	<b>recip(ient)</b>
<b>attrib(ute)</b>	<b>(prop) it</b>	<b>result(ant)</b>
<b>cog(nate)</b>	<b>loc(ative)</b>	<b>temp(oral)</b>
<b>event(ive)</b>		

1(a) She [**aff**] (h) is happy [**attrib**] (e).

(b) QhHe

- 2(a) He [**agent**] (h) turned traitor [**attrib**] (v).  
(b) BhG[QhHv]
- 3(a) The Sahara [**loc**] (l) is hot [**attrib**] (q).  
(b) QlHq
- 4(a) Last night [**temp**] (t) was warm [**attrib**] (q).  
(b) QtHq
- 5(a) The show [**event**] (c) was interesting [**attrib**] (v).  
(b) QcHv
- 6(a) It [**it**] (s) is windy [**attrib**] (v).  
(b) QsHv
- 7(a) He [**aff**] (h) was at school [**loc**] (l).  
(b) QhLl
- 8(a) She [**agent**] (h) got into the car [**loc**] (l).  
(b) BhG[QhLl]
- 9(a) He [**pos**] (h) is lying on the floor [**loc**] (l).  
(b) ChE[QhLl]
- 10(a) The meeting [**event**] (c) is at eight [**temp**] (t).  
(b) QcLt
- 11(a) He [**agent**] (h) was working.  
(b) ChEc
- 12(a) She [**pos**] (h) is standing.  
(b) ChE[QhHv]
- 13(a) The curtains [**aff**] (r) disappeared.  
(b) BrG[QhPr]
- 14(a) The wind [**ext**] (i) is blowing.  
(b) BiMl
- 15(a) It [**it**] (s) raining.  
(b) BsLt
- 16(a) He [**agent**] (h) threw the ball [**aff**] (r).  
(b) ChE[[BrSh]Ml]
- 17(a) Lightning [**ext**] (i) struck the house [**aff**] (l).

- (b) liAl
- 18(a) He [**pos**] (h) is holding a knife [**aff**] (r).  
 (b) ChE[BrSh]
- 19(a) The stone [**instr**] (r<sub>1</sub>) broke the window [**aff**] (r<sub>2</sub>).  
 (b) Mr<sub>1</sub>E[Br<sub>2</sub>G[Qr<sub>2</sub>Hq]]
- 20(a) She [**recip**] (h) has a car [**aff**] (r).  
 (b) QrRh
- 21(a) We [**agent**] (h<sub>1</sub>) paid the bus driver [**recip**] (h<sub>2</sub>).  
 (b) Ch<sub>1</sub>E[BεRh<sub>2</sub>]
- 22(a) The will [**instr**] (i) benefits us [**recip**] (h) all.  
 (b) MiRh
- 23(a) They [**agent**] (h) climbed the mountain [**loc**] (l).  
 (b) lhAl
- 24(a) The bus [**loc**] (r) seats thirty [**aff**] (h).  
 (b) QhLr
- 25(a) They [**agent**] (h) fought a clean fight [**cog**] (c).  
 (b) ChEc
- 26(a) I [**agent**] (h) wrote a letter [**result**] (r).  
 (b) ChEr
- 27(a) They [**agent**] (h) had an argument [**event**] (c).  
 (b) ChEc
- 28(a) He [agent] (h) nodded his head [instr] (r).  
 (b) ChE[MrEc]
- 29(a) He [**agent**] (h<sub>1</sub>) declared her [**aff**] (h<sub>2</sub>) the winner [**attrib**] (v).  
 (b) Ch<sub>1</sub>E[Bh<sub>2</sub>G[Qh<sub>2</sub>Hv]]
- 30(a) The sun [**ext**] (r<sub>1</sub>) turned it [**aff**] (r<sub>2</sub>) yellow [**attrib**] (v).  
 (b) Cr<sub>1</sub>E[Br<sub>2</sub>G[Qr<sub>2</sub>Hv]]
- 31(a) The revolver [**instr**] (r) made him [**aff**] (h) afraid [**attrib**] (e).  
 (b) MrE[BhG[QhHe]]
- 32(a) I [**recip**] (h) found it [**aff**] (r) strange [**attrib**] (q).  
 (b) BhP[QrHq]

- 33(a) He [**agent**] (h) placed it [**aff**] (r) on the shelf [**loc**] (l).  
 (b) ChE[BrG[QrLl]]
- 34(a) The storm [**ext**] (it) drove the ship [**aff**] (r) ashore [**loc**] (l).  
 (b) CiE[BrG[QrLl]]
- 35(a) A car [**instr**] (r<sub>1</sub>) knocked it [**aff**] (r<sub>2</sub>).  
 (b) Mr<sub>1</sub>E[Br<sub>2</sub>G[QrLl]]
- 36(a) I [**recip**] (h) prefer them [**aff**] (r<sub>1</sub>) on toast [**loc**] (r<sub>2</sub>).  
 (b) QhP[Qr<sub>1</sub>Lr<sub>2</sub>] or QhPq
- 37(a) I [**agent**] (h<sub>1</sub>) bought her [**recip**] (h<sub>2</sub>) a gift [**aff**] (r).  
 (b) Ch<sub>1</sub>E[[BrRh<sub>1</sub>]Rh<sub>2</sub>]
- 38(a) She [**agent**] (h) gave the door [**aff**] (r) a kick [**event**] (c).  
 (b) ChE[BcRr]
- 39(a) She [**agent**] (h<sub>1</sub>) knitted me [**recip**] (h<sub>2</sub>) a sweater [**result**] (r).  
 (b) [Ch<sub>1</sub>Er]Rh<sub>2</sub>
- 40(a) She [**Agent**] (h) was singing.  
 (b) ChEj
- 41(a) The string [**Patient**] (r) broke.  
 (b) BrGq
- 42(a) John [**Agent**] (h) sharpened the knife [**Patient**] (r).  
 (b) ChE[BrG[QrHq]]
- 43(a) The dog [**Agent**] (z) is digging a hole [**Result**] (l).  
 (b) CzEl
- 44(a) Harold [**Agent**] (h) ran a mile [**Range**] (l).  
 (b) BhMl
- 45(a) Susan [**Agent**] (h) went to Denmark [**Locative Goal**] (l).  
 (b) BhGl
- 46(a) Yasuko [**Agent**] (h) is arriving from Kyoto [**Locative Source**] (l).  
 (b) BhSl
- 47(a) Helen [**Agent**] (h) traveled via Samarkand [**Locative Path**] (l).  
 (b) BhMl

- 48(a) She [**Agent**] (h<sub>1</sub>) gave the book to Bill [**Patient Goal**] (h<sub>2</sub>).  
 (b) Ch<sub>1</sub>E[BrRh<sub>2</sub>]
- 49(a) I [**Agent**] (h<sub>2</sub>) got the cassette (r) from David [**Patient Source**] (h<sub>1</sub>).  
 (b) Ch<sub>2</sub>E[BrRh<sub>1</sub>]
- 50(a) I [**Agent**] (h<sub>1</sub>) contacted Jane (h<sub>3</sub>) via her sister [**Patient Path**] (h<sub>2</sub>).  
 (b) Ch<sub>1</sub>E[Mh<sub>2</sub>E[Ih<sub>1</sub>Ah<sub>3</sub>]]
- 51(a) The painting [**Neutral**] (r) cost £5,000 [**Range**] (i).  
 (b) QrMi
- 52(a) Miranda [**Dative**] (h) knew all the answers [**Neutral**] (i).  
 (b) QiRh
- 53(a) Harriet [**Dative**] (h) owns a cat [**Neutral**] (z).  
 (b) QzRh
- 54(a) Celia [**Dative**] (h) is cold/sad.  
 (b) QhPe
- 55 (a) The child [**Neutral**] (h) is sleeping.  
 (b) QhHv
- 56(a) The town [**Neutral**] (l) is dirty [**Attribute**] (q).  
 (b) QlHq
- 57(a) Fiona [**Neutral**] (h) is the convener [**Role**] (q).  
 (b) QhHq
- 58(a) Joyce [**Agent**] (h) ran.  
 (b) BhMl
- 59(a) Mary found the puppy [**Theme**] (z).  
 (b) BhPz
- 60(a) It rains in Spain [**Location**] (l).  
 (b) BsLl
- 61(a) Put the cat on the porch [**Goal**] (l).  
 (b) ChE[BzG[QzLl]]
- 62(a) He flew from Iowa [**Source**] (l<sub>1</sub>) to Idaho (l<sub>2</sub>).  
 (b) [BhSl<sub>1</sub>]G[QhLl<sub>2</sub>]
- 63(a) Jo cuts hair with a razor [**Instrument**] (r<sub>1</sub>)

(b) ChE[Mr<sub>1</sub>E[Br<sub>2</sub>G[Qr<sub>2</sub>Hq]]]

64(a) Helen [**Experiencer**] (h<sub>1</sub>) heard Robert playing the piano.

(b) Bh<sub>1</sub>P[Ch<sub>2</sub>E[MrEi]]

65(a) The wind [**Causative**] (i) damaged the roof.

(b) CiE[BrG[QrHq]]

66(a) The tail of the dog [**Possessor**] (z) wagged furiously.

(aa) The tail is part of the dog.

(b) B[QrHz]Mq

Quirk et al (1985: 741 – 752) define their posited participants as follows:

- AGENTIVE: “the animate being instigating or causing the happening denoted by the verb”
- AFFECTED: “animate or inanimate which does not cause the happening denoted by the verb, but is directly involved in some other way”
- RECIPIENT: “the animate being that is passively implicated by the happening or state”
- ATTRIBUTE: “the typical semantic role of a subject complement and an object complement”
- EXTERNAL CAUSER: “the unwitting (generally inanimate) cause of an event”
- INSTRUMENT: “the entity (generally inanimate) which an agent uses to perform an action or instigate a process”
- POSITIONER: “the subject may have the role of POSITIONER with intransitive stance verbs ... and with transitive verbs related to stance verbs ... The transitive verbs are causative and the direct objects that follow them have an affected role. In this positioner role the participant is in control, but the situation is not resultative in that no change is indicated in the positioner during the period in which the situation lasts.”
- LOCATIVE: “the place of the state or action”
- TEMPORAL: “[the] time [of the state or action]”
- EVENTIVE: “the noun at the head of the noun phrase (of a subject) is commonly deverbal ... or a nominalization”
- PROP *IT*: “[time, atmospheric, and distance *it*] has little or no semantic content

- RESULTANT: “is an object whose referent exists only by virtue of the activity indicated by the verb”
- COGNATE: “is similar to a resultant object in that it refers to an event indicated by the verb”

Fromkin et al (2003: 192 – 3) define their stipulated roles as follows:

- AGENT: “the one who performs an action”
- THEME: “the one or thing that undergoes an action”
- LOCATION: “the place where an action happens”
- GOAL: “the place to which an action is directed”
- SOURCE: “the place from which an action originates”
- INSTRUMENT: “the means by which an action is performed”
- EXPERIENCER: “one who perceives something”
- CAUSATIVE: “a natural force that causes a change”
- POSSESSOR: “one who has something”

On comparing Quirk et al’s and Fromkin et al’s versions with the one under development the following picture emerges.

**(a) Quirk et al’s version compared with the situation-role theory:**

agent:	Bh, Ch, Ih
aff:	Qh, Br, Bh, Pq, Rr, Al, Qr
recip:	Rh, Bh, Qh
attrib:	Hq, He, Hv
ext:	Bi, Ii, Ci, Cr
instr:	Mi, Mr
pos:	Ch
loc:	Ql, Gl, Sl, Al, Lr
temp:	Qt, Lt
event:	Qc, Ec, Bc
<i>it</i> :	Qs, Bs
result:	Er

cog: Ec

**(b) Fromkin et al's version compared with the situation – role theory:**

agent: Bh  
theme: Pz  
location: Ll  
goal: Gl  
source: Sl  
instrument: Mr  
experiencer: Bh  
causative: Ci  
possessor: Hz

**(c) Fromkin et al's and Quirk et al's versions:**

agent: agent  
theme: aff  
location: loc  
goal: loc  
source: loc  
instrument: instr  
experiencer: recip  
causative: ext  
possessor: recip

Taken as representative of the many versions of semantic role theory including those not discussed here, the Quirkian and Fromkinian versions are defective in three main ways:

- (a) The prop *it* and **cognate** are not language-universal.
- (b) If we take conceptual meaning as a combination of categorial (i.e. entity) and relational (i.e. role) meanings, then **event**, **temporal**, **attribute**, and *it* are not roles but rather entities.
- (c) The dichotomy *animate vs inanimate entities* is an irrelevant criterion for defining roles.

Before concluding the paper let some more example propositions be formalized.

67(a) Susan ( $h_1$ ) resembles her mother ( $h_2$ ). [Kroeger (2004: 10)]  
(b)  $Qh_1Nh_2$

68(a) John jumped into the well. [Kroeger (2004: 10)]  
(b)  $BhDI$

69(a) Fatuma ( $h_1$ ) is Ali's boss ( $h_2$ ).  
(b)  $Qh_1Oh_2$

70(a) The rat died.  
(b)  $BzG[QzHq]$

71(a) The cat ( $z_1$ ) caused the rat ( $z_2$ ) to die.  
(b)  $Cz_1E[McE[Bz_2G[Qz_2Hq]]]$

72(a) The cat ( $z_1$ ) killed the rat ( $z_2$ ).  
(b)  $Cz_1E[Bz_2G[Qz_2Hq]]$

73(a) Ali ( $h_1$ ) showed Fatuma ( $h_2$ ) a book ( $r$ ).  
(b)  $Ch_1E[Bh_2Pr]$

74(a) The teacher ( $h_3$ ) made Ali ( $h_1$ ) show Fatuma ( $h_2$ ) a book ( $r$ ).  
(b)  $Ch_3E[Ch_1E[Bh_2Pr]]$

75(a) Through Ali ( $h_1$ ) the teacher ( $h_3$ ) showed Fatuma ( $h_2$ ) a book ( $r$ ).  
(b)  $Ch_3E[Mh_1E[Bh_2Pr]]$

76(a) Ali ( $h_1$ ) made Fatuma ( $h_2$ ) open the door ( $r$ ).  
(b)  $Ch_1E[Ch_2E[BrG[QrHq]]]$

77(a) The headteacher ( $h_1$ ) got the parent ( $h_2$ ) to sign the report ( $r$ ).  
(b)  $Ch_1E[Ih_2Ar]$

78(a) The bone was given to the dog by the man.  
(b)  $ChE[BrG[QrRz]]$

79(a) 7 is an odd number.  
(b)  $QnHq$

80(a) Ali ( $h$ ) knows the theorem ( $k$ ).  
(b)  $QkRh$

81(a) Latex ( $b$ ) oozed out of the rubber tree ( $f$ ).

(b) BbSf

82(a) The potter (h) made a pot (r) out of clay (m).

(b) ChE[BmG[QrHq]]

83(a) 7 is an element of the set of odd numbers.

(b) QnHu

84(a) Ali (h<sub>1</sub>) made his daughter (h<sub>2</sub>) go home (l).

(b) Ch<sub>1</sub>E[Bh<sub>2</sub>G[Qh<sub>2</sub>Ll]]

85(a) Ali (h<sub>1</sub>) allowed his daughter (h<sub>2</sub>) to go home (l).

(b) Ch<sub>1</sub>E[McE[Bh<sub>2</sub>G[Qh<sub>2</sub>Ll]]]

86(a) The computer solves the problem.

(b) MaE[BkG[QkHq]]

87(a) Mass is equivalent to energy.

(b) QmFi

88(a) Fatuma is intelligent.

(b) QhHo

89(a) Ali owns an investment bank.

(b) QgRh

90(a) The lawyer drafts a constitution.

(b) ChEj

91(a) Fatuma represents the bank.

(b) QhFg

It will be recalled that the main problem of semantic role theory has been all along a bifurcate one: how roles are determined in a generalized way; and what they are in a generalized way, too. I propose to resort to the basic taxonomy of human knowledge for a solution to the problem. I

find l, s, c, q, p, n, k, and u in the logico-mathematical domain which is nonphysical. The physico-chemical domain is populated by m, t, r, v, i and a in addition to those populating the non-physical domain. The biotic domain is an extension of the physical one through f, z, h, b, e, o, j and g. For the choice of roles I proceed as follows: reference L (coordinate geometry, and physics); wholeness base H (set theory); direction D, source S, mediator M, and goal G (vector algebra); similarity N, representation F, superordination O, and augmentation R bases (algebra); stimulus P (biology); nonselfchanger Q, selfchanger B, noncausative interaction roles I and A; causative interaction roles C and E.

## References

Brown, Keith and Jim Miller (1991) *Syntax: A Linguistic Introduction to Sentence Structure*, 2<sup>nd</sup> edn, London and New York: Routledge.

Fromkin, Victoria, Robert Rodman and Nina Hyams (2003) *An Introduction to Language*, 7<sup>th</sup> edn; Boston, Massachusetts: Wadsworth Thomson.

Kroeger, Paul R. (2004) *Analyzing Syntax: A Lexical – Functional Approach*; Cambridge: Cambridge University Press.

Larson, Richard and Gabriel Segal (1995) *Knowledge of Meaning*; Cambridge, MA: MIT Press.

Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech and Jan Svartvik (1985) *A Comprehensive Grammar of the English Language*; London: Longman.