

USC Ground Truth

April 29, 2019

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1 Background

We use influence diagrams as the underlying graph structure for our ground truth. Here is a simple influence diagram for a simulation of two actors, showing the three types of nodes and some possible links (always directed) among them:

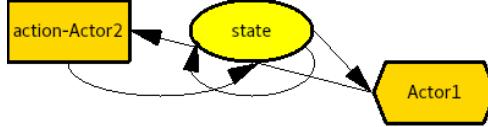


Figure 1: Simple influence diagram

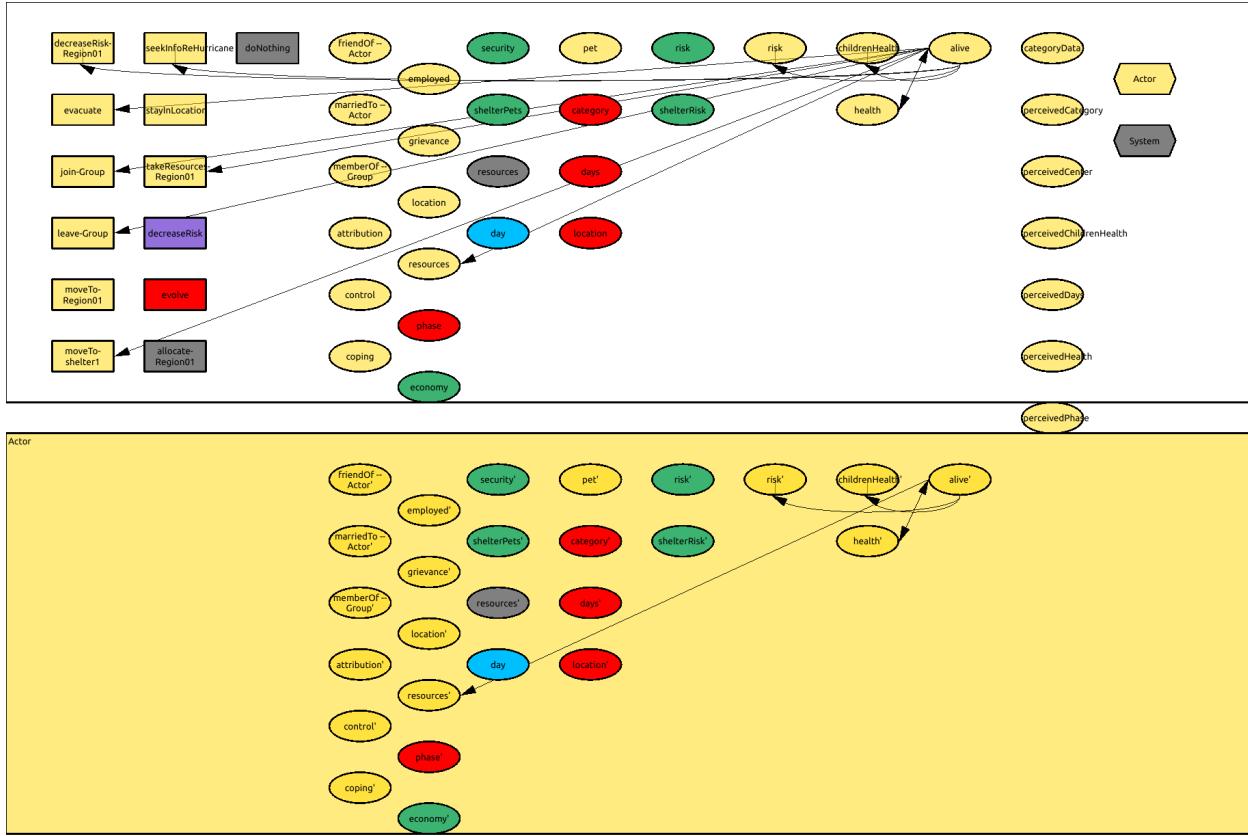
- Rectangular nodes are possible actions for a particular agent (“Actor 1”, indicated by color) representing a potential behavior. They are labeled with a verb (“action”) and an optional object of the verb (“Actor2”). An action node has a binary value, indicating whether or not the action was chosen.
- Oval nodes are state variables. Their value is potentially a probability distribution over a domain of possible values. All true state variables will be certain (i.e., 100% probability for a single value), but agents’ perceptions of the true state will often be uncertain.
- Hexagonal nodes are utility or reward nodes. They represent an expected value computation by the agent (“Actor1”). The node’s value is a table with each row corresponding to a possible action choice and its expected utility.
- Links from action nodes to state nodes specify an effect that the action has on the value of the state. In the following specifications of these effects, a variable name followed by a ‘ $_will$ ’ denote the value of the variable after the action is performed.
- Links from one state node to another specify an influence that the value of the first state node has on the effect of at least one action on the second state node.
- Links from a state node to an agent’s utility node specify that the state node is an input to the expected value calculation performed by that agent. There is a real-valued weight from \$(0,1]\$ on each link specifying the priority of that variable’s influence on that agent’s reward calculation (higher values mean higher priority).
- Links from utility nodes to action nodes indicate that the expected value calculation then determines whether or not that action is chosen. In the simulations described here, we use a strict maximization, so that the action choice is deterministic (i.e., the action with the highest expected value is performed, with ties broken by a pre-determined fixed order).
- Therefore, in the above simple ground truth, whether or not “Actor1” chooses to do “action” to “Actor2” influences the subsequent value of the variable “state” (link from rectangle to oval). The subsequent value of “state” also depends on its prior value (link from oval to itself). “Actor1”’s expected value of doing “action” to “Actor2” is a function of the value of “state” (link from oval to hexagon), and this expected value influences whether or not “Actor1” chooses to do so (link from hexagon to rectangle).

Any real values (e.g., initial values of variables, conditional probability table values, reward weights) will be drawn from either a set {0, 0.5, 1} or {0, 0.2, 0.4, 0.6, 0.8, 1}, depending on the appropriate granularity needed.

2 State

2.1 Actor’s alive

Type: Boolean



psychsim/domains/groundtruth/simulation/actor.py:221

2.1.1 Default change in Actor's alive

psychsim/domains/groundtruth/simulation/actor.py:507
IF Actor's alive

```
THEN : IF Actor's health'>0.01
      THEN : Actor's alive'←true
      ELSE : Actor's alive'←false
ELSE : Actor's alive'←Actor's alive
```

2.2 Actor's attribution

Causal attribution style, whether attributing events to internal or external causes

Type: String

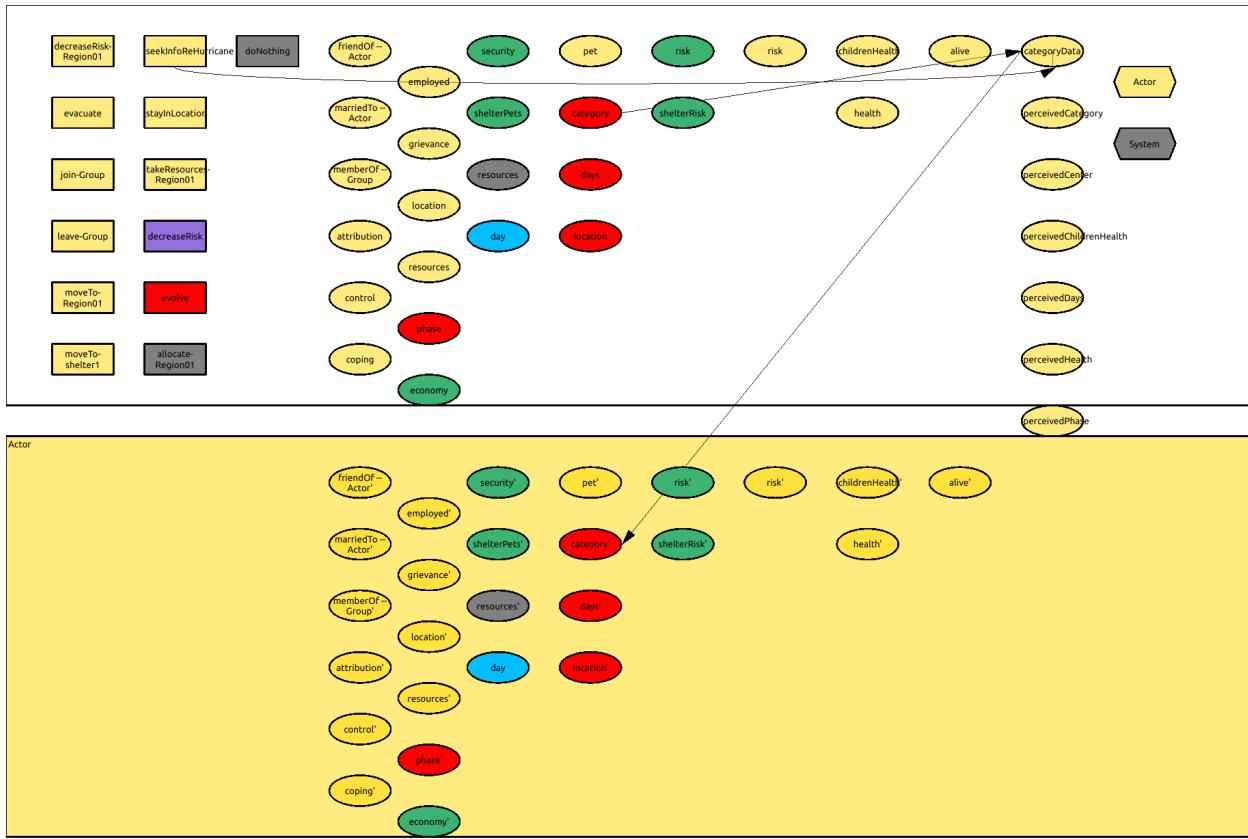
Values: external, internal, none

psychsim/domains/groundtruth/simulation/actor.py:172

2.3 Actor's categoryData

Information received from explicit seeking

Type: Integer



psychsim/domains/groundtruth/simulation/actor.py:743

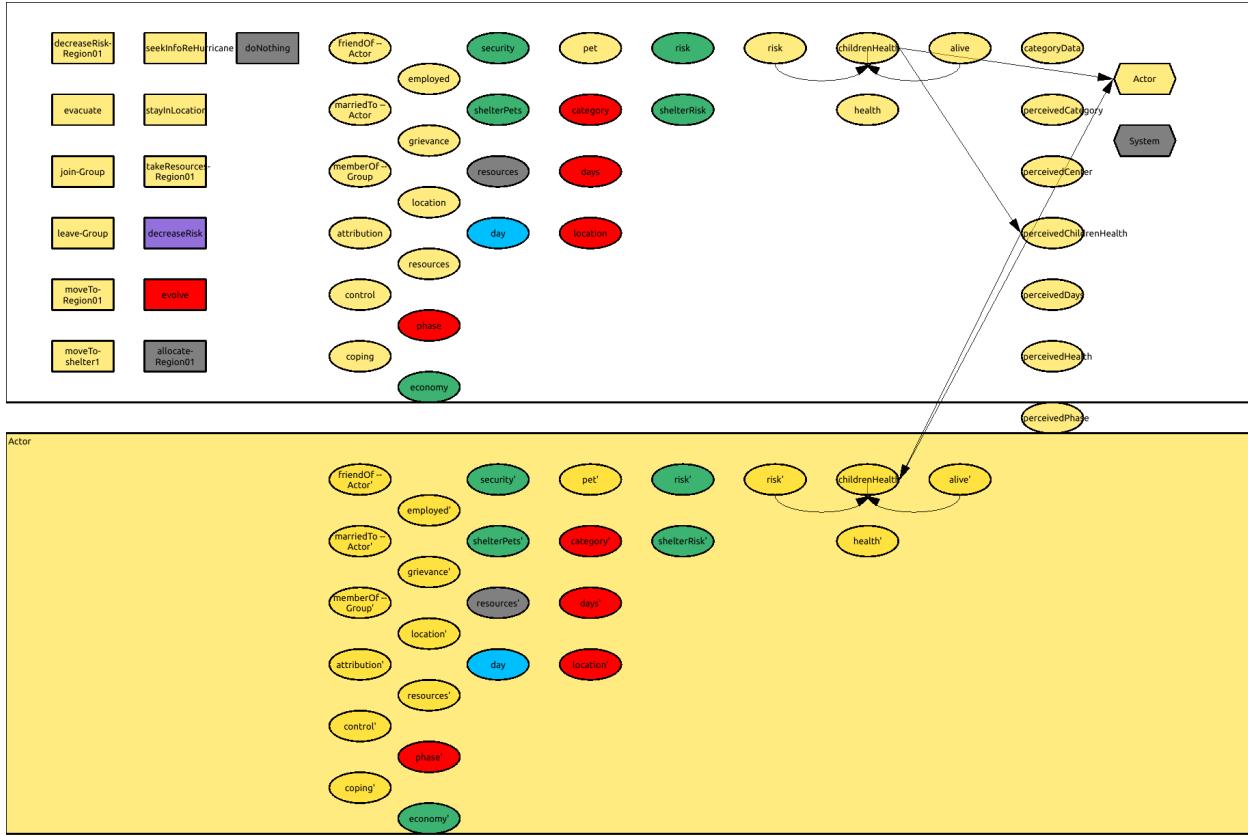
2.3.1 Observation function of Actor's categoryData when Actor-seekInfoReHurricane

Actor's $\text{categoryData}' \leftarrow$ Nature's category

2.4 Actor's childrenHealth

Current level of children's physical wellbeing

Type: Real



psychsim/domains/groundtruth/simulation/actor.py:246

2.4.1 Effect of Actor on Actor's childrenHealth

psychsim/domains/groundtruth/simulation/actor.py:496

IF Actor's alive

THEN : IF Actor's risk' ∈

[0,0.2]: Actor's childrenHealth' ← 60% · Actor's childrenHealth + 0.24

(0.2,0.4]:

20%: Actor's childrenHealth' ← 60% · Actor's childrenHealth

80%: Actor's childrenHealth' ← 60% · Actor's childrenHealth + 0.24

(0.4,0.6]:

40%: Actor's childrenHealth' ← 60% · Actor's childrenHealth

60%: Actor's childrenHealth' ← 60% · Actor's childrenHealth + 0.24

(0.6,0.8]:

60%: Actor's childrenHealth' ← 60% · Actor's childrenHealth

40%: Actor's childrenHealth' ← 60% · Actor's childrenHealth + 0.24

(0.8,1.0]:

80%: Actor's childrenHealth' ← 60% · Actor's childrenHealth

19%: Actor's childrenHealth' ← 60% · Actor's childrenHealth + 0.24

(1.0,1]:

100%: Actor's childrenHealth' ← 60% · Actor's childrenHealth

0%: Actor's childrenHealth' ← 60% · Actor's childrenHealth + 0.24

ELSE : Actor's childrenHealth' ← 0.00

2.5 Actor's control

Control style, whether low or high self-efficacy

Type: String

Values: hiEfficacy, loEfficacy, none

psychsim/domains/groundtruth/simulation/actor.py:157

2.6 Actor's coping

Coping style, whether biased toward emotion- or problem-directed decision-making

Type: String

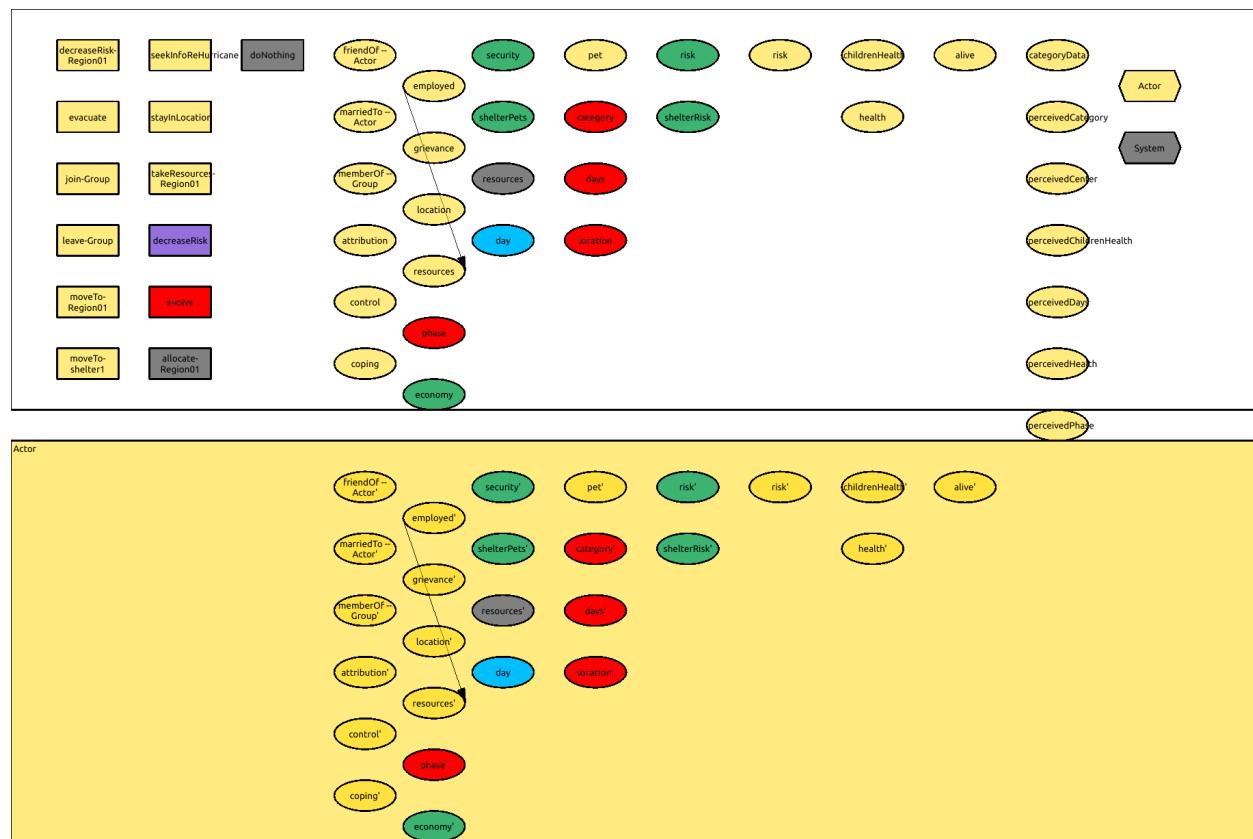
Values: emotion, none, problem

psychsim/domains/groundtruth/simulation/actor.py:143

2.7 Actor's employed

Has a full-time job

Type: Boolean

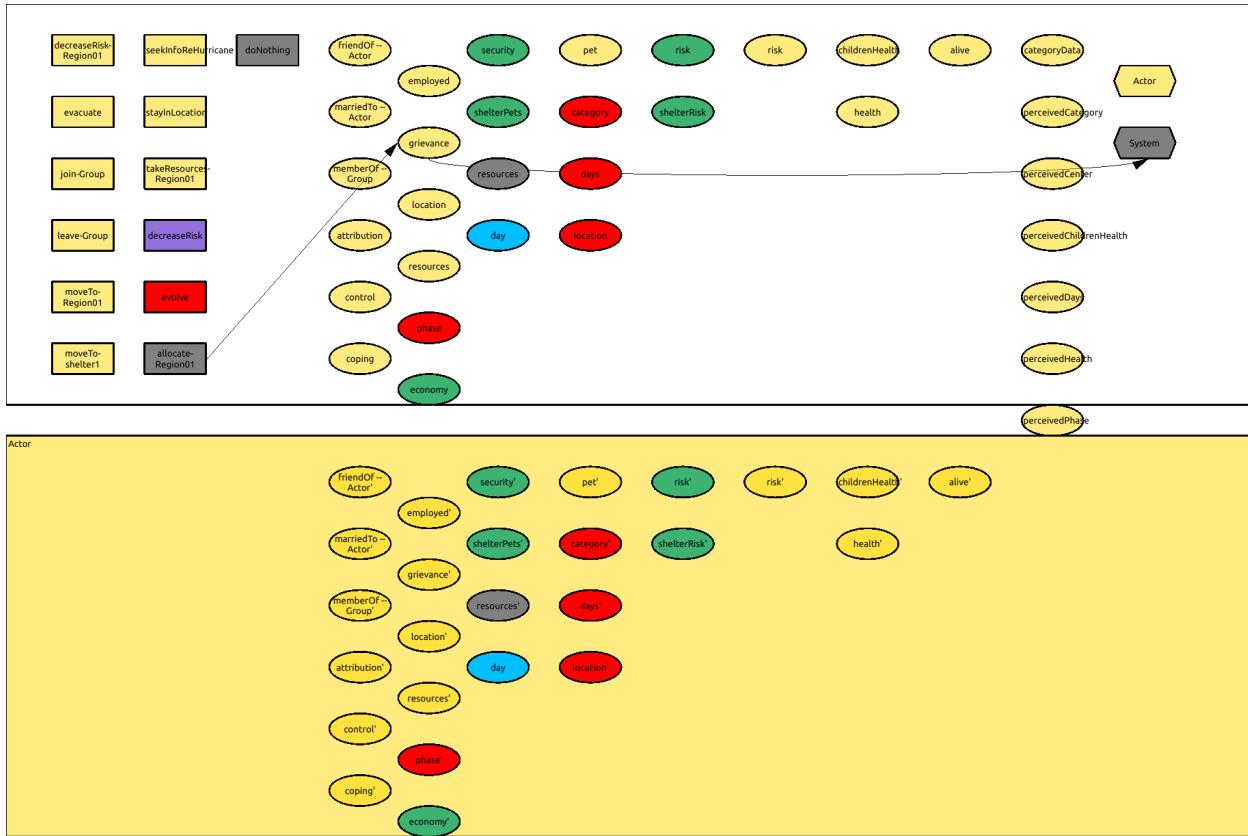


psychsim/domains/groundtruth/simulation/actor.py:105

2.8 Actor's grievance

Current level of grievance felt toward system

Type: Real



psychsim/domains/groundtruth/simulation/actor.py:282

2.8.1 Effect of System-allocate-Region01 on Actor's grievance

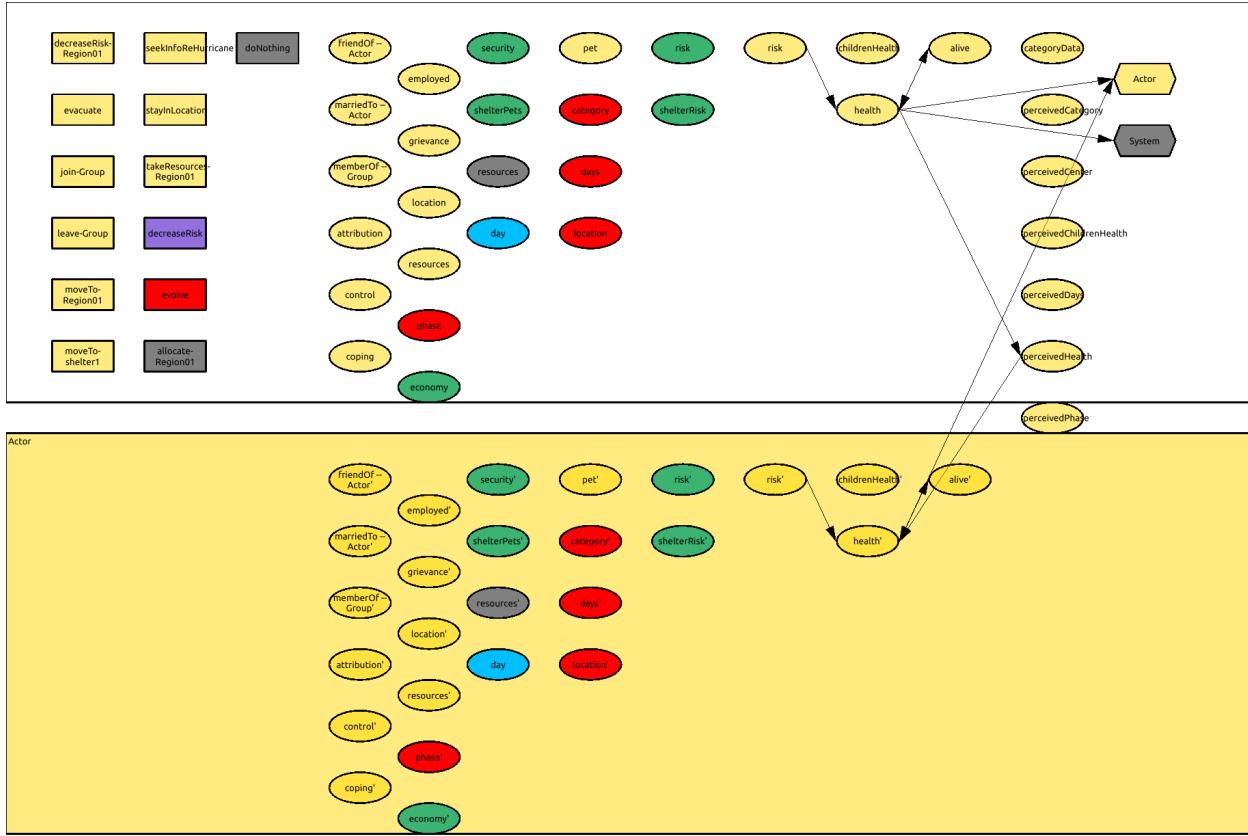
psychsim/domains/groundtruth/simulation/system.py:55

Actor's grievance' \leftarrow 80% · **Actor's grievance**

2.9 Actor's health

Current level of physical wellbeing

Type: Real



psychsim/domains/groundtruth/simulation/actor.py:225

2.9.1 Effect of Actor on Actor's health

psychsim/domains/groundtruth/simulation/actor.py:480
IF Actor's alive

THEN : IF Actor's risk' ∈
 $[0,0.2]$: Actor's health' \leftarrow 60% · Actor's health + 0.24
 $(0.2,0.4]$:
 20%: Actor's health' \leftarrow 60% · Actor's health
 80%: Actor's health' \leftarrow 60% · Actor's health + 0.24
 $(0.4,0.6]$:
 40%: Actor's health' \leftarrow 60% · Actor's health
 60%: Actor's health' \leftarrow 60% · Actor's health + 0.24
 $(0.6,0.8]$:
 60%: Actor's health' \leftarrow 60% · Actor's health
 40%: Actor's health' \leftarrow 60% · Actor's health + 0.24
 $(0.8,1.0]$:
 80%: Actor's health' \leftarrow 60% · Actor's health
 19%: Actor's health' \leftarrow 60% · Actor's health + 0.24
 $(1.0,1]$:
 100%: Actor's health' \leftarrow 60% · Actor's health
 0%: Actor's health' \leftarrow 60% · Actor's health + 0.24

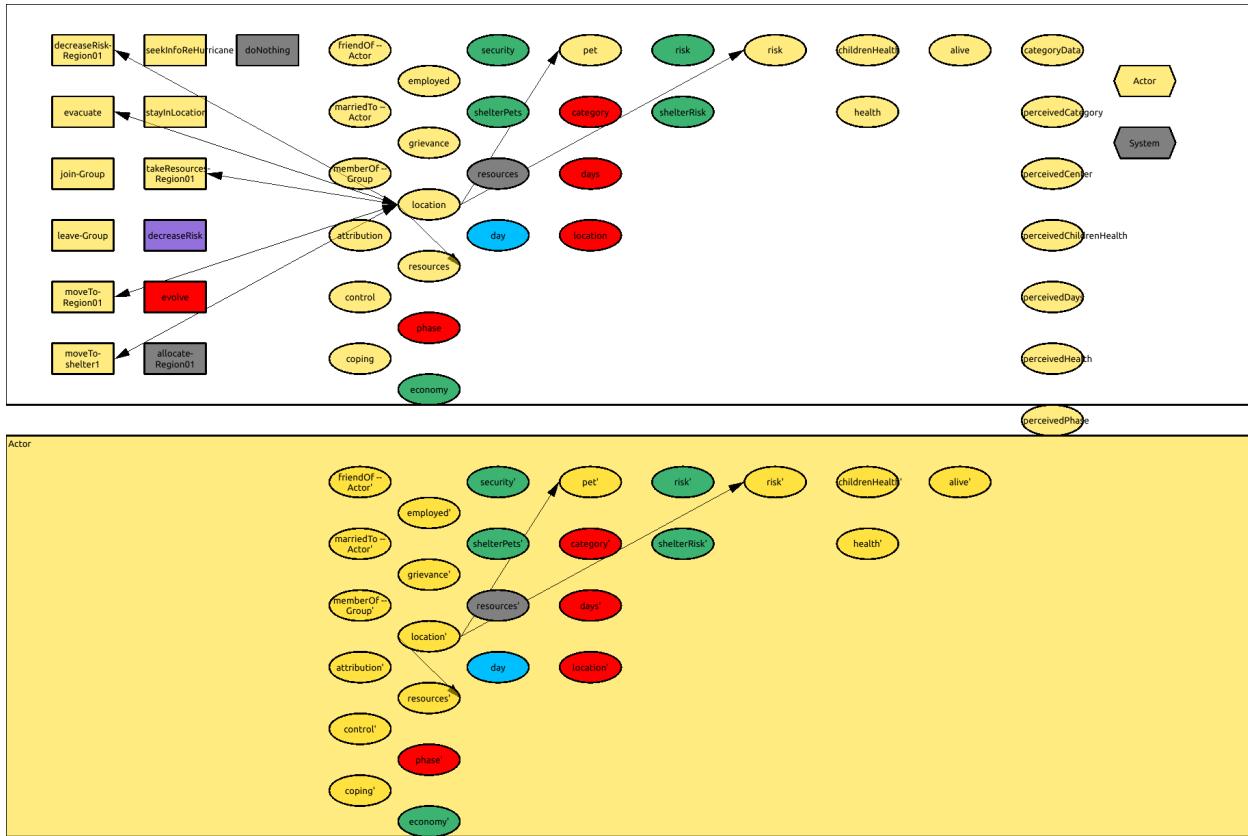
ELSE : Actor's health' \leftarrow 0.00

2.10 Actor's location

Current location

Type: String

Values: Region01, evacuated, shelter1



psychsim/domains/groundtruth/simulation/actor.py:218

2.10.1 Effect of Actor-evacuate on Actor's location

psychsim/domains/groundtruth/simulation/actor.py:436
Actor's location'←evacuated

2.10.2 Effect of Actor-moveTo-Region01 on Actor's location

psychsim/domains/groundtruth/simulation/actor.py:443
Actor's location'←Region01

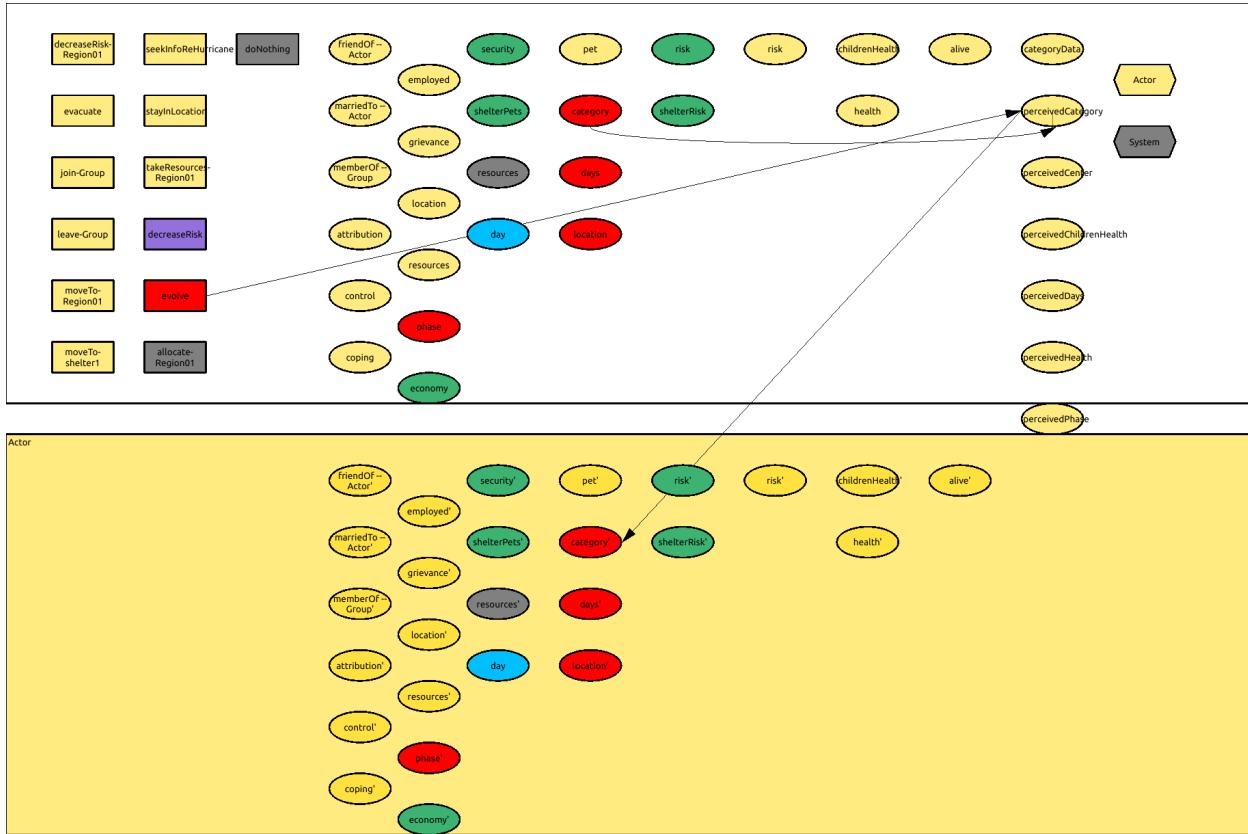
2.10.3 Effect of Actor-moveTo-shelter1 on Actor's location

psychsim/domains/groundtruth/simulation/actor.py:433
Actor's location'←shelter1

2.11 Actor's perceivedCategory

Perception of Nature's category

Type: Integer



psychsim/domains/groundtruth/simulation/actor.py:703

2.11.1 Observation function of Actor's perceivedCategory when Nature-evolve

IF Nature's category $\in \{0,5\}$

THEN : Actor's perceivedCategory' \leftarrow Nature's category

ELSE :

80%: Actor's perceivedCategory' \leftarrow Nature's category

19%: Actor's perceivedCategory' \leftarrow Nature's category + 1

2.11.2 Default observation of Actor's perceivedCategory

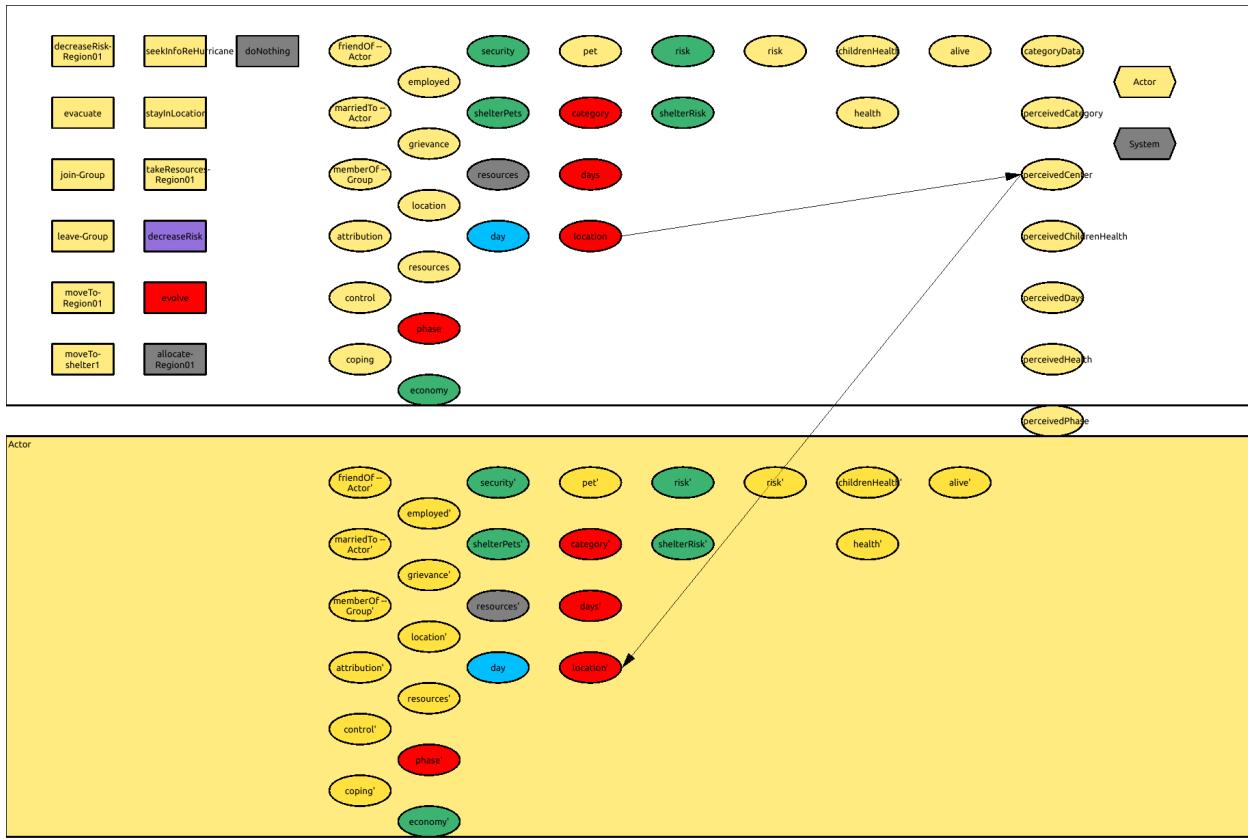
Actor's perceivedCategory' \leftarrow 0

2.12 Actor's perceivedCenter

Perception of Nature's location

Type: String

Values: Region01, none



psychsim/domains/groundtruth/simulation/actor.py:697

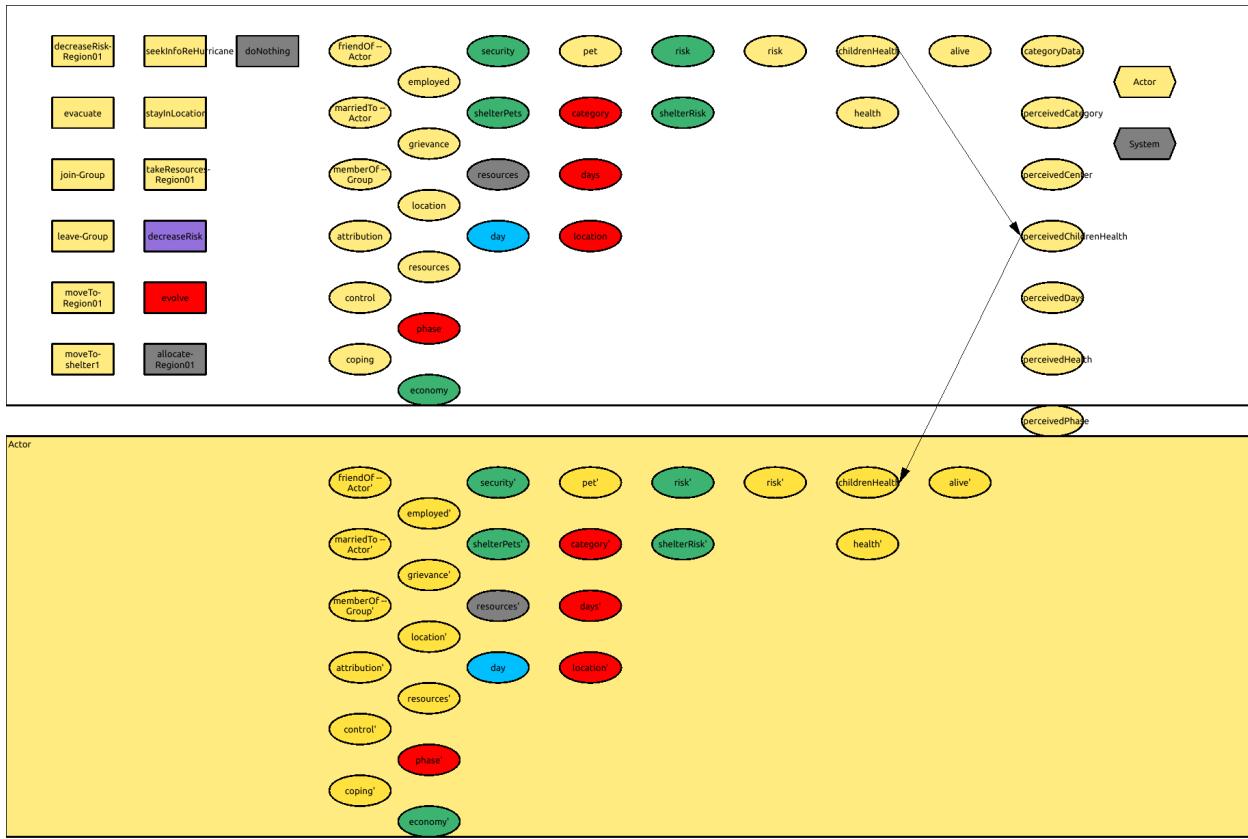
2.12.1 Default observation of Actor's perceivedCenter

Actor's perceivedCenter'←Nature's location

2.13 Actor's perceivedChildrenHealth

Perception of Actor's childrenHealth

Type: Real



`psychsim/domains/groundtruth/simulation/actor.py:737`

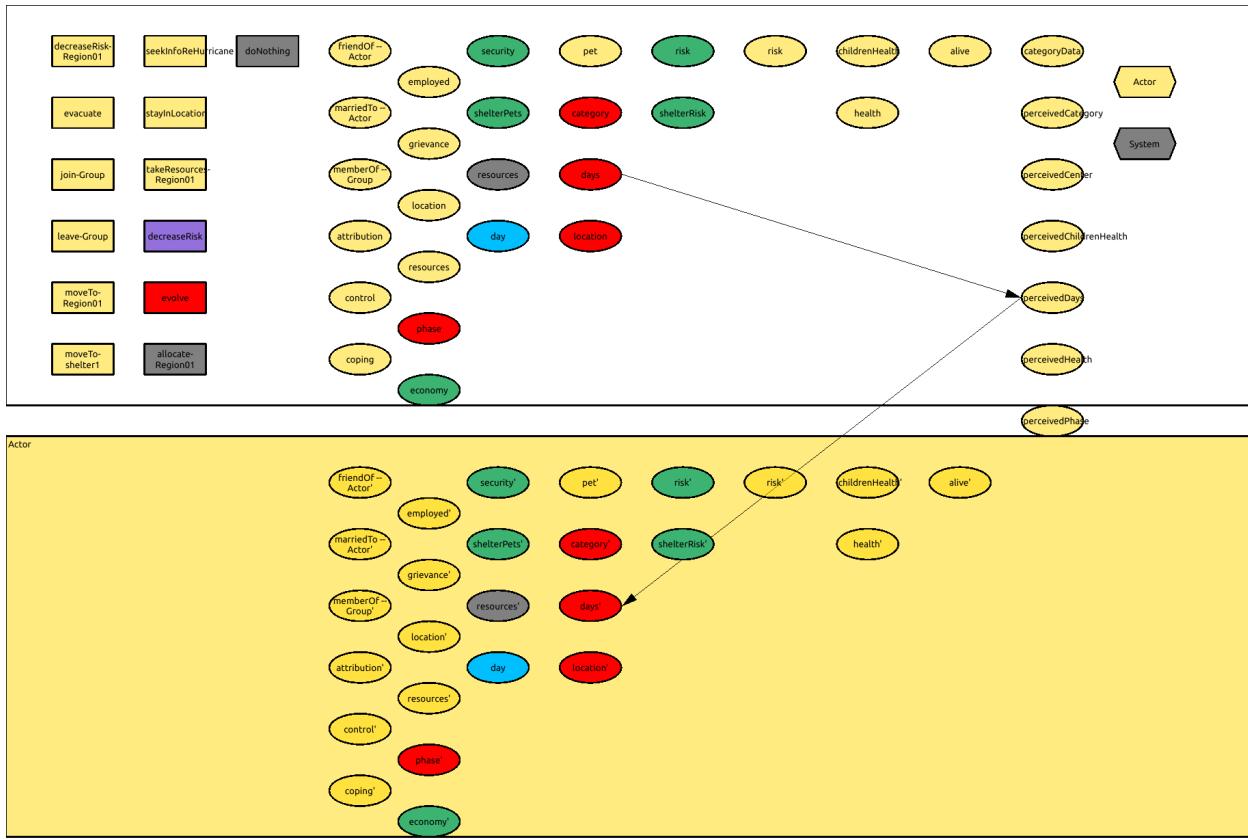
2.13.1 Default observation of Actor's perceivedChildrenHealth

`Actor's perceivedChildrenHealth' ← Actor's childrenHealth`

2.14 Actor's perceivedDays

Perception of Nature's days

Type: Integer



psychsim/domains/groundtruth/simulation/actor.py:690

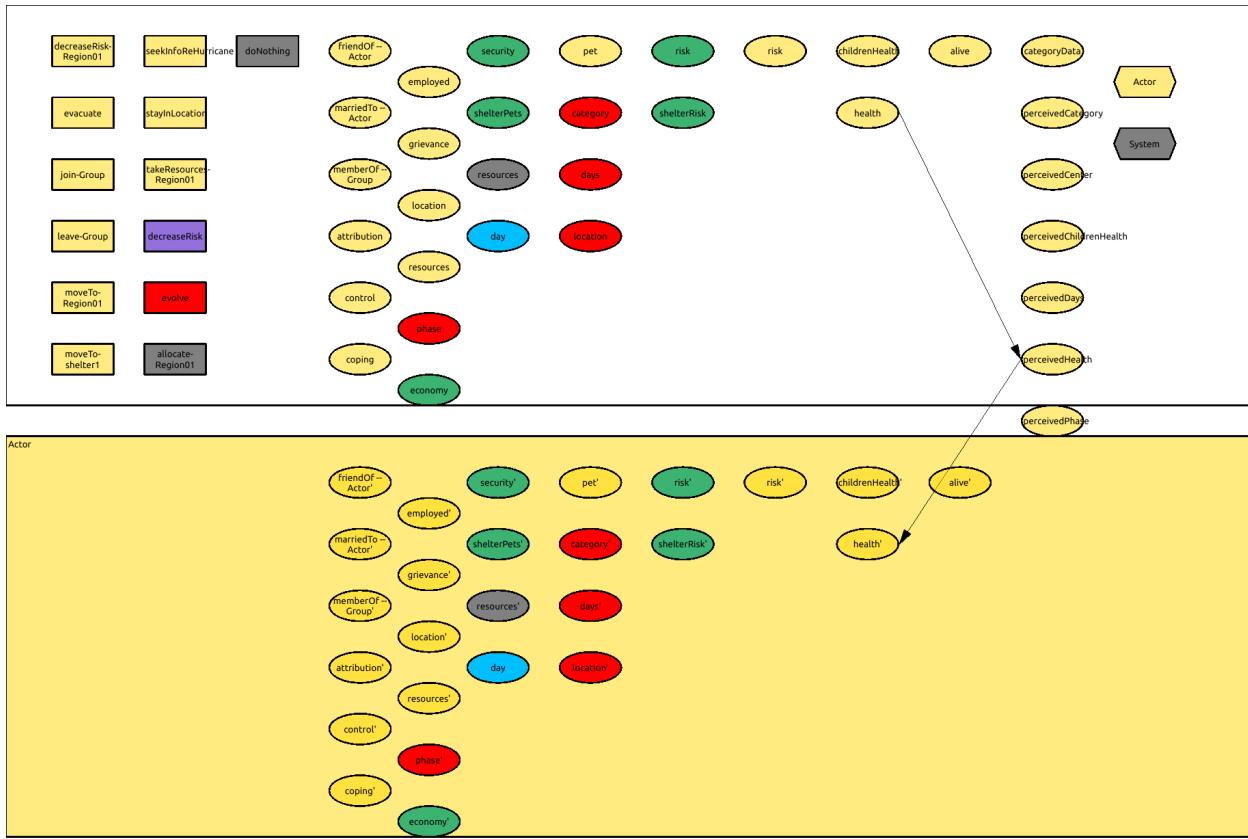
2.14.1 Default observation of Actor's perceivedDays

Actor's $\text{perceivedDays}' \leftarrow$ Nature's days

2.15 Actor's perceivedHealth

Perception of Actor's health

Type: Real



`psychsim/domains/groundtruth/simulation/actor.py:731`

2.15.1 Default observation of Actor's perceivedHealth

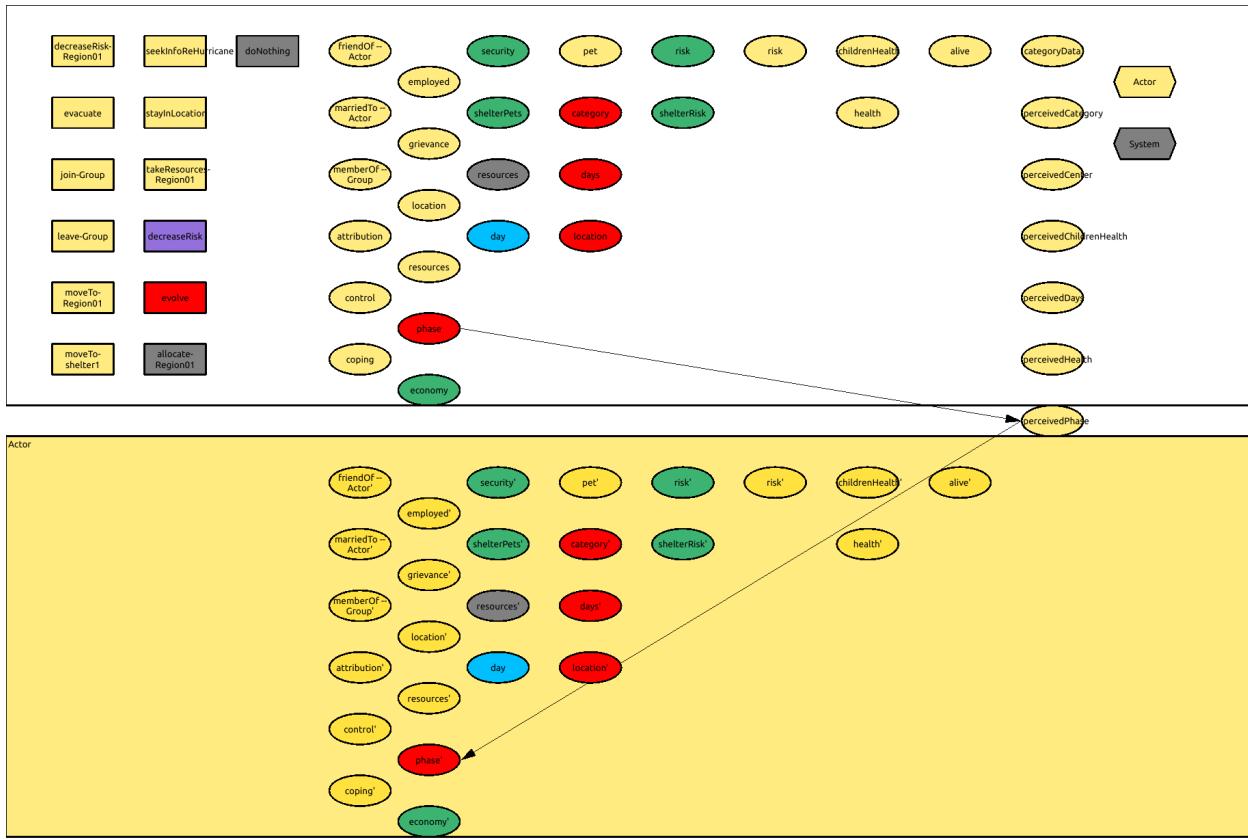
`Actor's perceivedHealth' ← Actor's health`

2.16 Actor's perceivedPhase

Perception of Nature's phase

Type: String

Values: active, approaching, none



`psychsim/domains/groundtruth/simulation/actor.py:685`

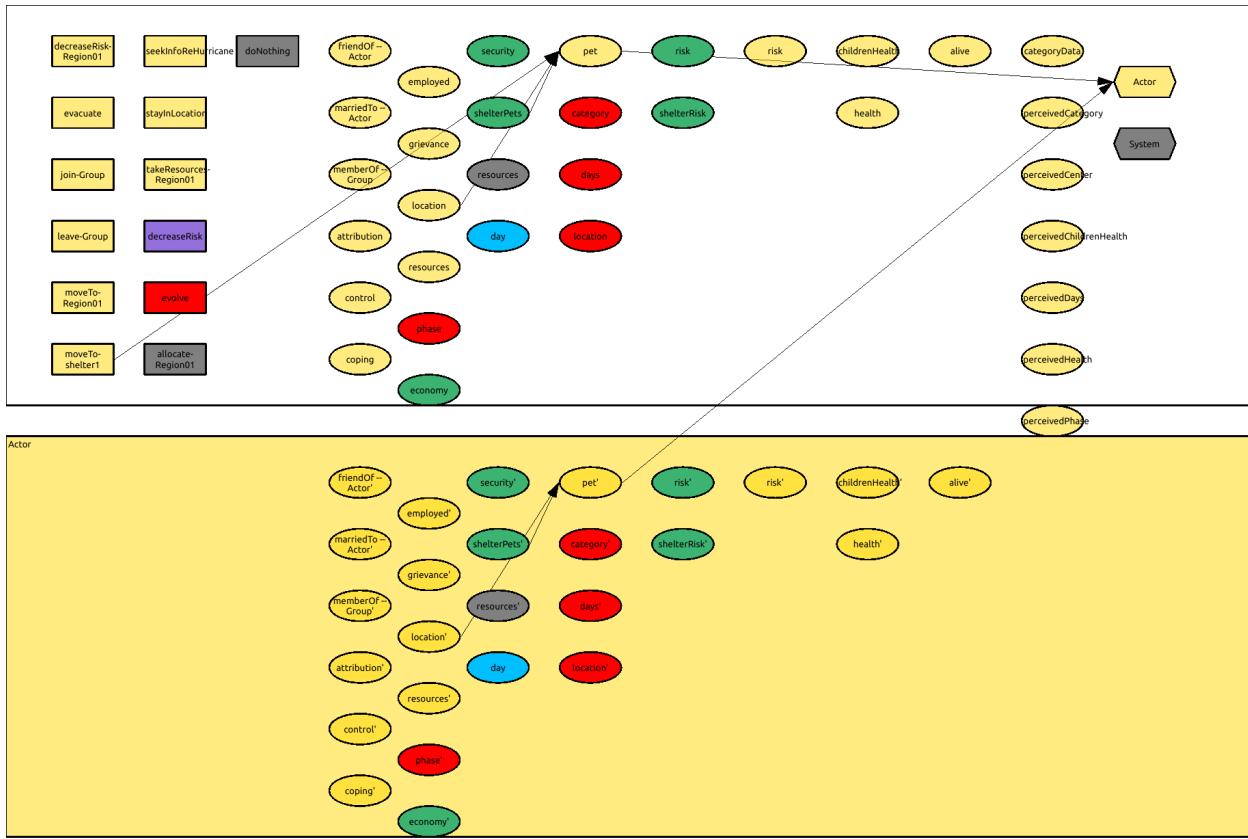
2.16.1 Default observation of Actor's perceivedPhase

Actor's `perceivedPhase'` ← Nature's phase

2.17 Actor's pet

Owns a pet

Type: Boolean



psychsim/domains/groundtruth/simulation/actor.py:110

2.17.1 Effect of Actor-moveTo-shelter1 on Actor's pet

psychsim/domains/groundtruth/simulation/actor.py:626
IF Actor's location'=shelter1

```

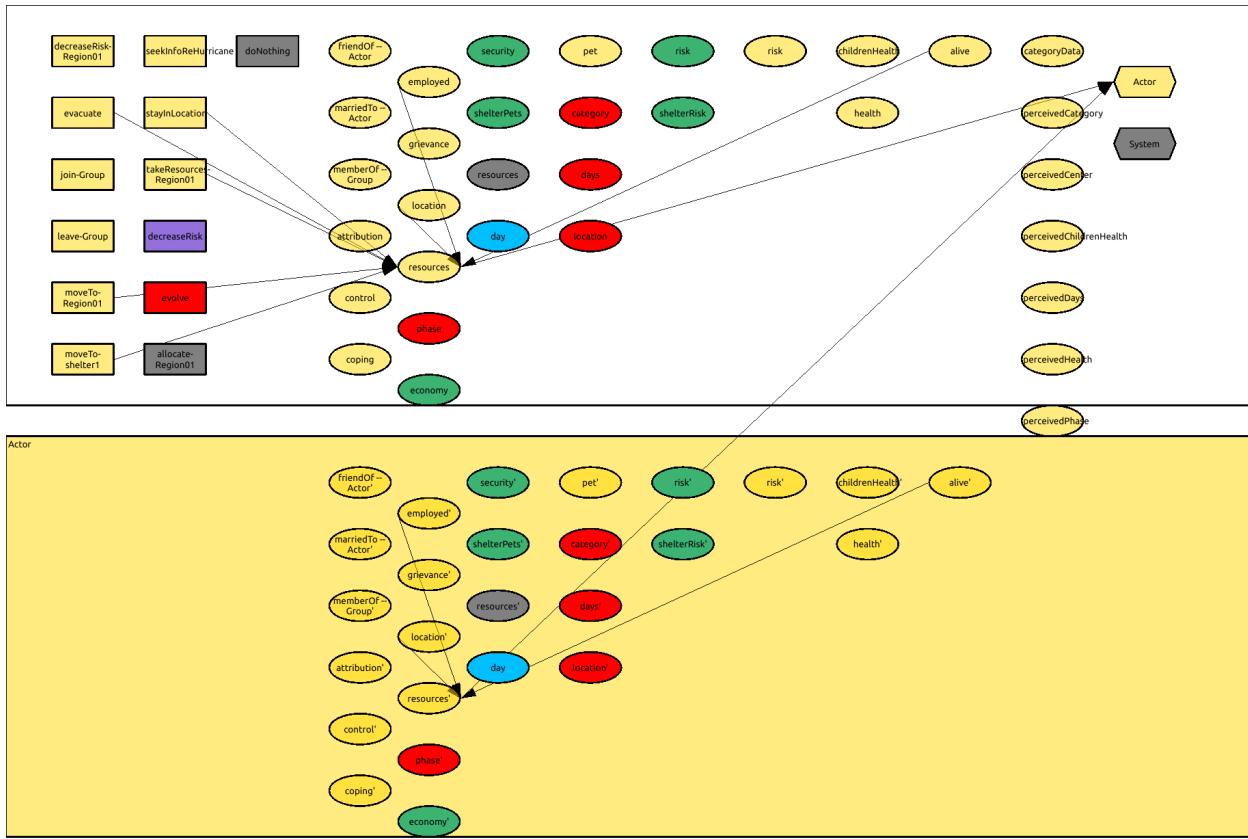
THEN : IF Region01's shelterPets
      THEN : Actor's pet'←Actor's pet
      ELSE : Actor's pet'←false
ELSE : Actor's pet'←Actor's pet

```

2.18 Actor's resources

Material resources (wealth) currently owned

Type: Real



psychsim/domains/groundtruth/simulation/actor.py:250

2.18.1 Effect of Actor-evacuate on Actor's resources

psychsim/domains/groundtruth/simulation/actor.py:550

IF Actor's resources > 0.40

THEN : Actor's resources' ← Actor's resources - 0.40

ELSE : Actor's resources' ← 0.00

2.18.2 Effect of Actor-moveTo-Region01 on Actor's resources

psychsim/domains/groundtruth/simulation/actor.py:537

IF Actor's alive

THEN : IF Actor's employed

THEN : Actor's resources' ← 60% · Actor's resources + 0.40

ELSE : Actor's resources' ← Actor's resources

ELSE : Actor's resources' ← Actor's resources

2.18.3 Effect of Actor-moveTo-shelter1 on Actor's resources

psychsim/domains/groundtruth/simulation/actor.py:542

Actor's resources' ← 0% · Actor's resources

2.18.4 Effect of Actor-stayInLocation on Actor's resources

psychsim/domains/groundtruth/simulation/actor.py:526

IF Actor's alive

```

THEN : IF Actor's employed
THEN : IF Actor's location={Region01', 'evacuated'}
    THEN : Actor's resources'←60%·Actor's resources+0.40
    ELSE : Actor's resources'←Actor's resources
ELSE : Actor's resources'←Actor's resources
ELSE : Actor's resources'←Actor's resources

```

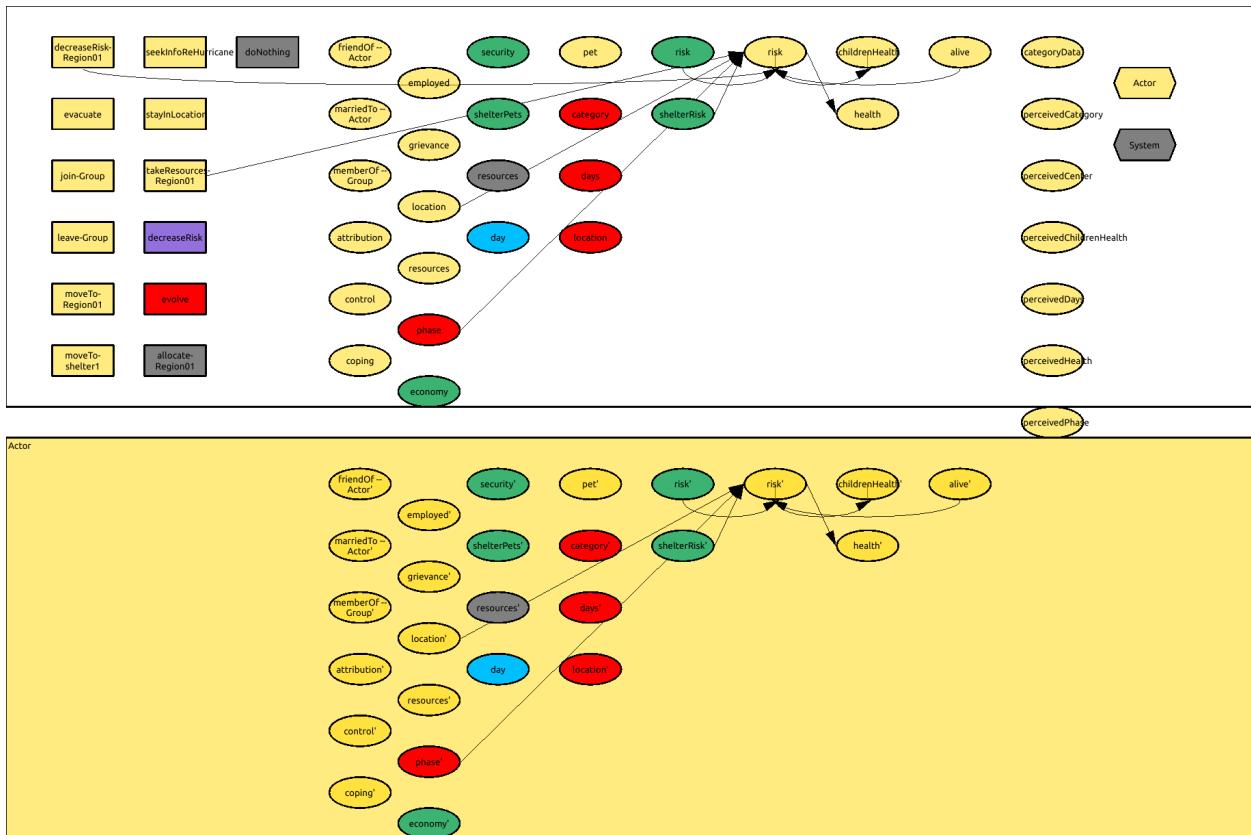
2.18.5 Effect of Actor-takeResources-Region01 on Actor's resources

psychsim/domains/groundtruth/simulation/actor.py:593
Actor's resources'←80%·Actor's resources+0.20

2.19 Actor's risk

Current level of risk from hurricane

Type: Real



psychsim/domains/groundtruth/simulation/actor.py:270

2.19.1 Effect of Actor-decreaseRisk-Region01 on Actor's risk

psychsim/domains/groundtruth/simulation/actor.py:575
IF Actor memberOf Group

```

THEN : IF Group's __ACTION__=Group-decreaseRisk
    THEN : Actor's risk'←92%·Actor's risk+0.08

```

```

ELSE : Actor's risk' ← 80% · Actor's risk + 0.20
ELSE : Actor's risk' ← 80% · Actor's risk + 0.20

```

2.19.2 Effect of Actor-takeResources-Region01 on Actor's risk

psychsim/domains/groundtruth/simulation/actor.py:600

IF Nature's phase=none

```

THEN : Actor's risk' ← 19% · Actor's risk + 0.80
ELSE : Actor's risk' ← 40% · Actor's risk + 0.60

```

2.19.3 Default change in Actor's risk

psychsim/domains/groundtruth/simulation/actor.py:466

IF Actor's alive

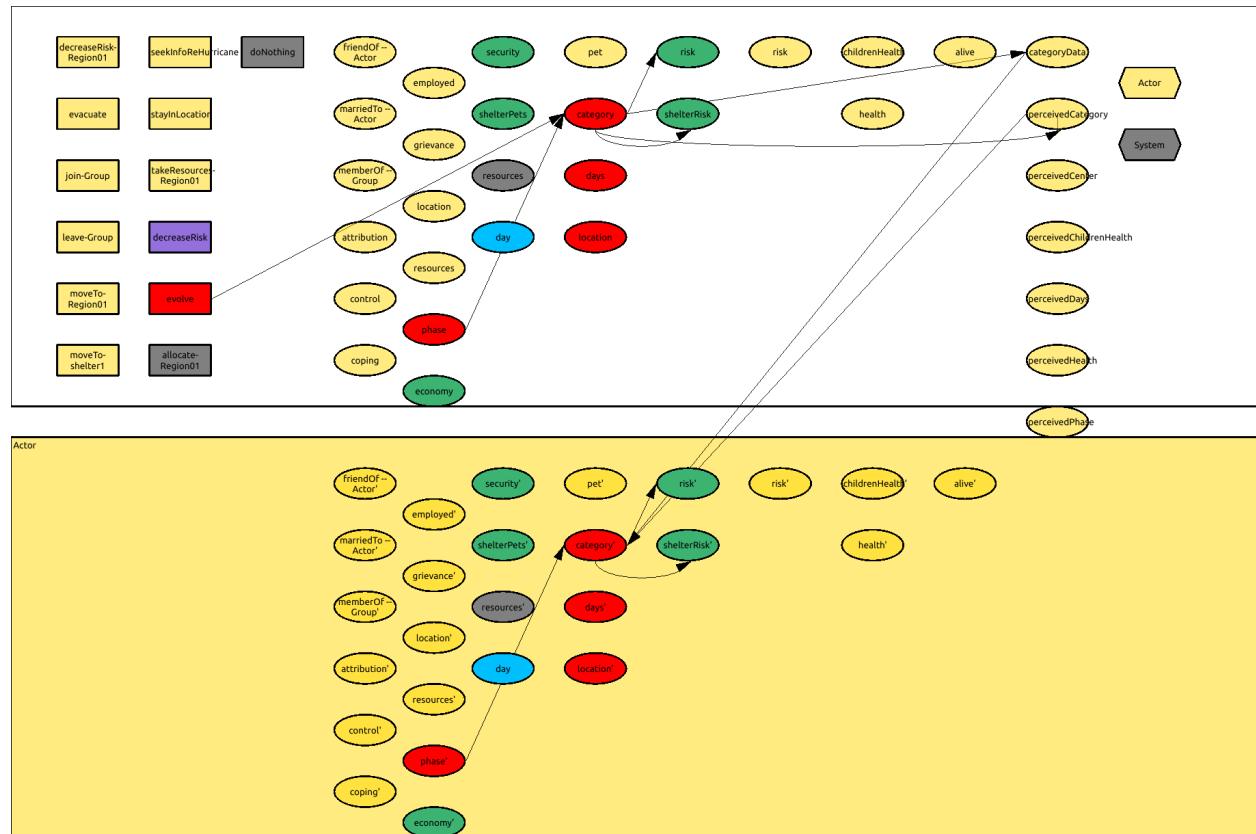
```

THEN : IF Actor's location'=shelter1
      THEN : Actor's risk' ← Region01's shelterRisk
      ELSE : IF Actor's location'=evacuated
              THEN : Actor's risk' ← 9% · Actor's risk
              ELSE : Actor's risk' ← Region01's risk'
      ELSE : Actor's risk' ← 0.00

```

2.20 Nature's category

Type: Integer



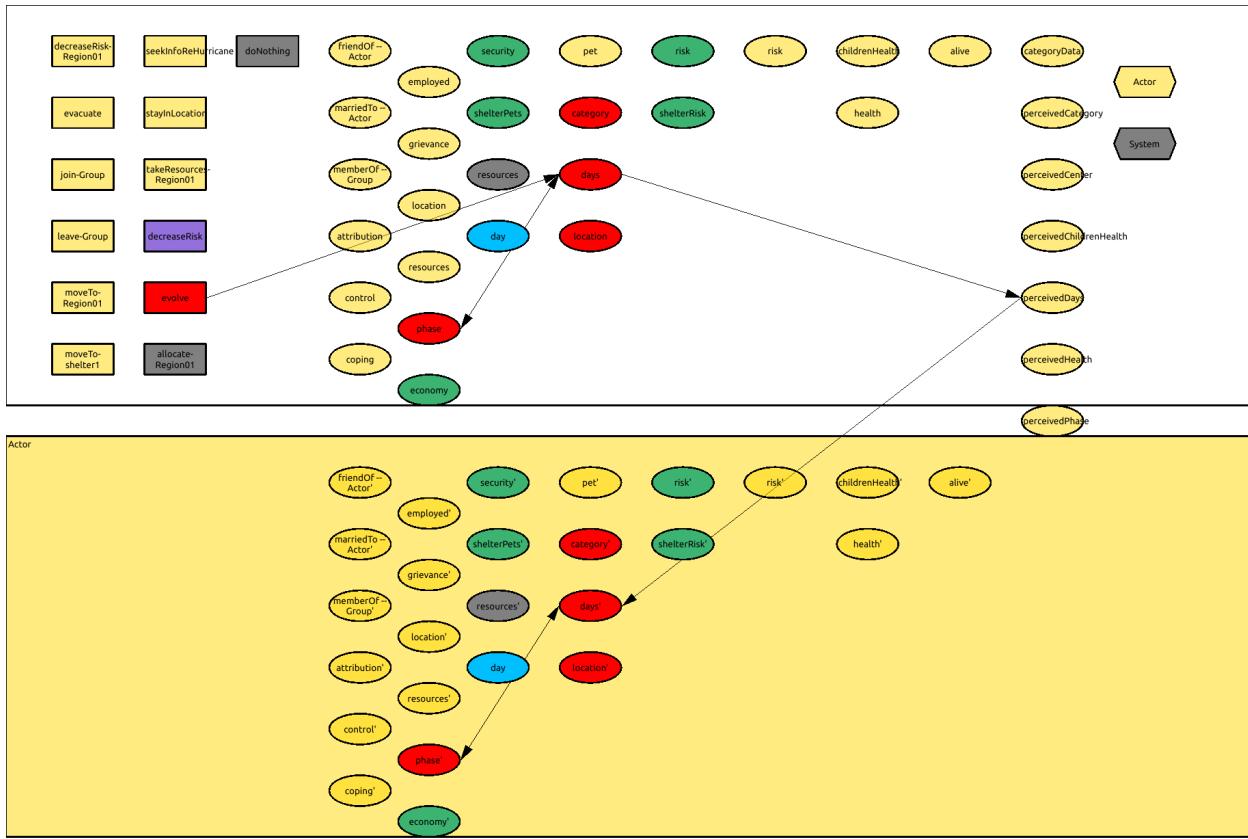
psychsim/domains/groundtruth/simulation/nature.py:25

2.20.1 Effect of Nature-evolve on Nature's category

```
psychsim/domains/groundtruth/simulation/nature.py:79
IF Nature's phase'
    = approaching: IF Nature's category=0
        THEN :
            20%: Nature's category'←1
            20%: Nature's category'←2
            20%: Nature's category'←3
            20%: Nature's category'←4
            20%: Nature's category'←5
    ELSE : IF Nature's category=1
        THEN :
            60%: Nature's category'←Nature's category
            40%: Nature's category'←2
    ELSE : IF Nature's category=5
        THEN :
            40%: Nature's category'←4
            60%: Nature's category'←Nature's category
    ELSE :
        20%: Nature's category'←Nature's category−1
        60%: Nature's category'←Nature's category
        20%: Nature's category'←Nature's category+1
= active: Nature's category'←Nature's category
= none: Nature's category'←0
```

2.21 Nature's days

Type: Integer



psychsim/domains/groundtruth/simulation/nature.py:17

2.21.1 Effect of Nature-evolve on Nature's days

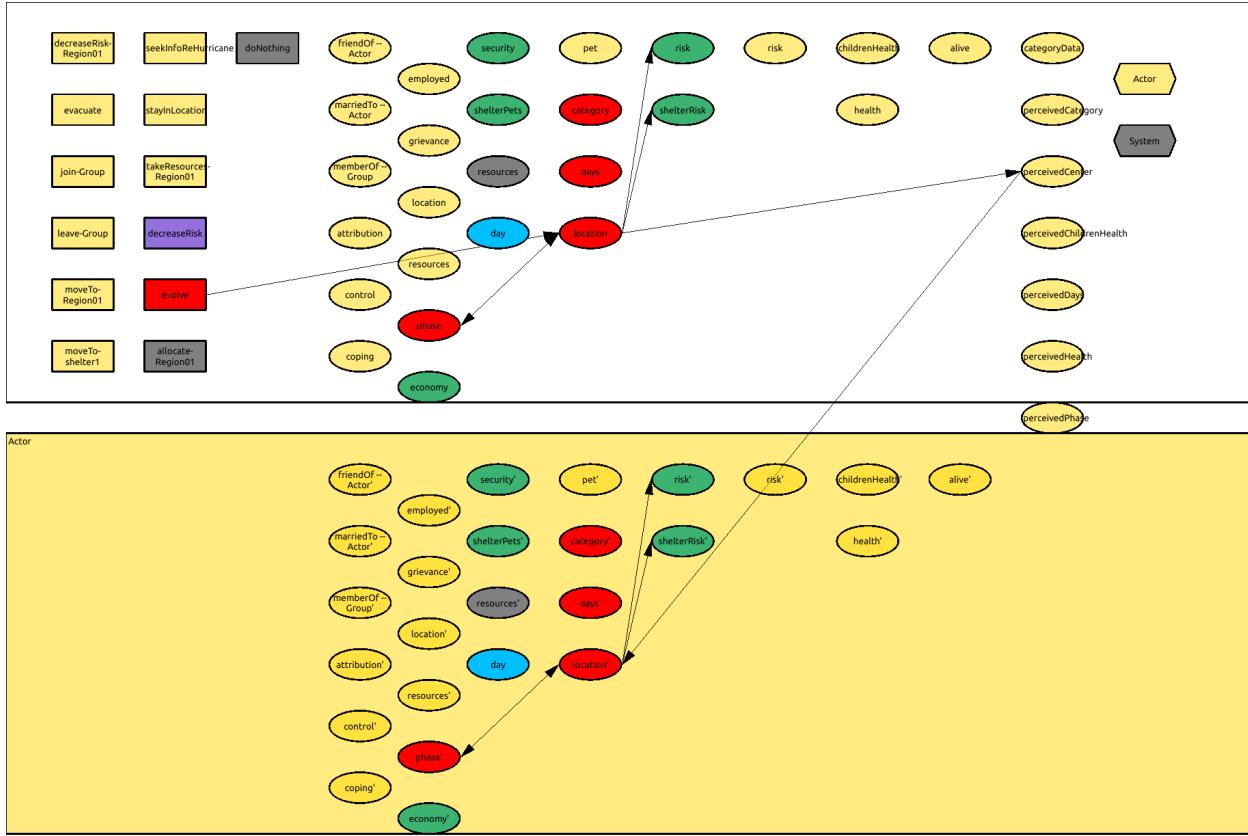
psychsim/domains/groundtruth/simulation/nature.py:53
IF Nature's phase=Nature's phase'

THEN : Nature's days' \leftarrow Nature's days+1
ELSE : Nature's days' \leftarrow 0

2.22 Nature's location

Type: String

Values: Region01, none



psychsim/domains/groundtruth/simulation/nature.py:22

2.22.1 Effect of Nature-evolve on Nature's location

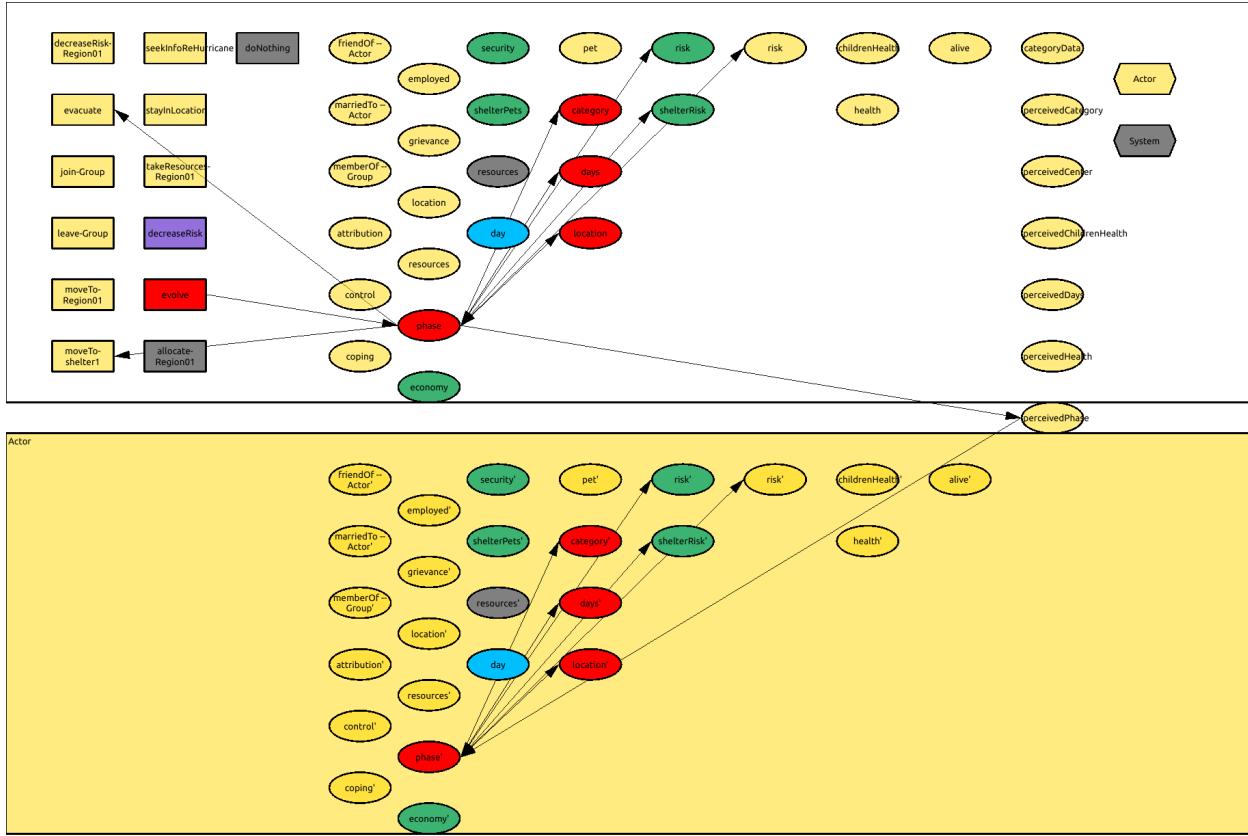
psychsim/domains/groundtruth/simulation/nature.py:112
IF Nature's phase'

- = **approaching:** IF Nature's location=none
 - THEN : Nature's location'←Region01
 - ELSE : Nature's location'←Nature's location
- = **active:** IF Nature's phase=approaching
 - THEN : Nature's location'←Nature's location
 - ELSE : IF Nature's location
 - OTHERWISE : Nature's location'←Nature's location
- = **Region01:**
 - 20%: Nature's location'←Region01
 - 48%: Nature's location'←none
- = **none:** Nature's location'←none

2.23 Nature's phase

Type: String

Values: active, approaching, none



psychsim/domains/groundtruth/simulation/nature.py:15

2.23.1 Effect of Nature-evolve on Nature's phase

psychsim/domains/groundtruth/simulation/nature.py:48

IF Nature's phase

= **none**: IF Nature's days>2

THEN :

60%: Nature's phase'←approaching

40%: Nature's phase'←none

ELSE : Nature's phase'←none

= **approaching**: IF Nature's days>2

THEN :

60%: Nature's phase'←active

40%: Nature's phase'←approaching

ELSE : Nature's phase'←approaching

OTHERWISE : IF Nature's location=none

THEN : Nature's phase'←none

ELSE : Nature's phase'←active

2.24 Region01's economy

Current economic level of region

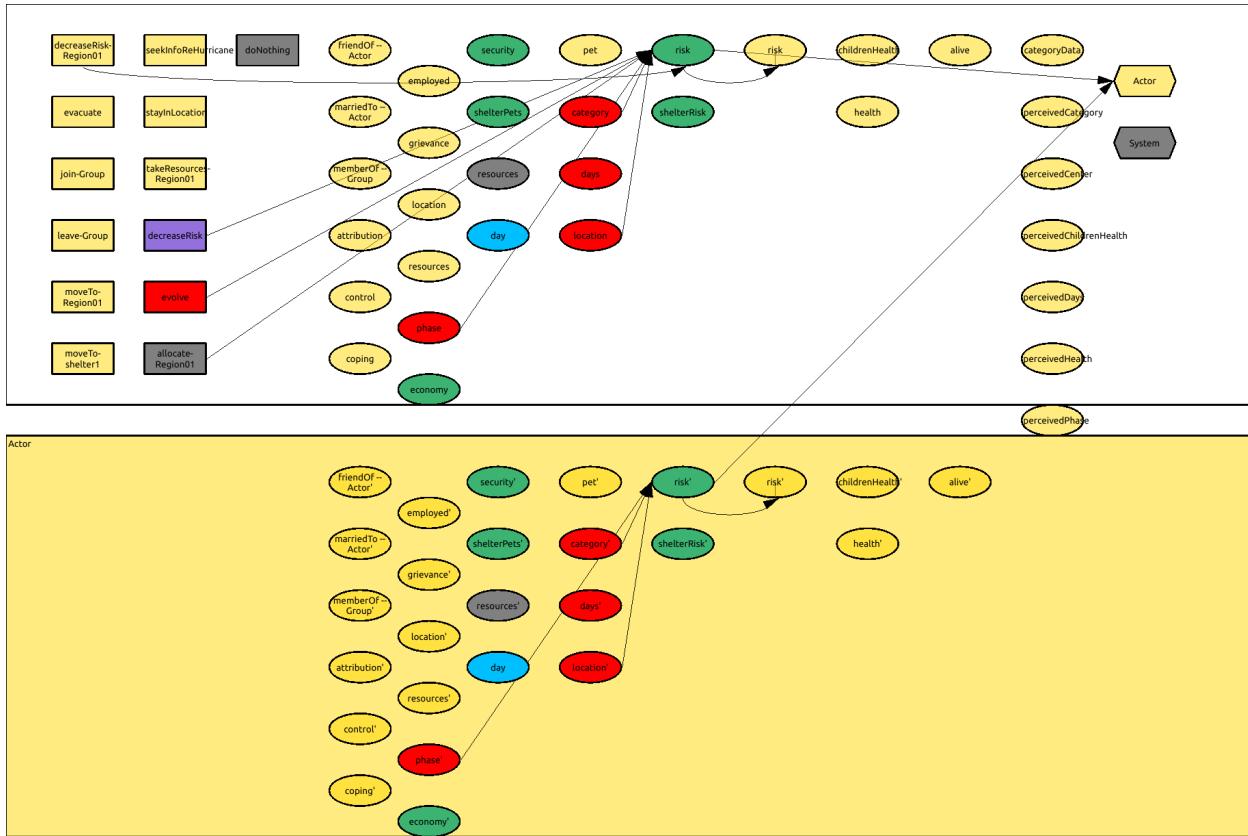
Type: Real

psychsim/domains/groundtruth/simulation/region.py:83

2.25 Region01's risk

Level of risk from hurricane

Type: Real



psychsim/domains/groundtruth/simulation/region.py:51

2.25.1 Effect of Actor-decreaseRisk-Region01 on Region01's risk

psychsim/domains/groundtruth/simulation/actor.py:570

IF Group's __ACTION__=Group-decreaseRisk

THEN : Region01's risk' \leftarrow 68% · Region01's risk + 31% · Region01's riskMin

ELSE : Region01's risk' \leftarrow 80% · Region01's risk

2.25.2 Effect of Group-decreaseRisk on Region01's risk

psychsim/domains/groundtruth/simulation/group.py:37

Region01's risk' \leftarrow 80% · Region01's risk

2.25.3 Effect of Nature-evolve on Region01's risk

psychsim/domains/groundtruth/simulation/nature.py:131

IF Nature's phase'=active

THEN : IF Nature's location'

OTHERWISE : Region01's risk' \leftarrow 80% · Region01's risk

= Region01: IF Nature's category'

```

= 1: Region01's risk' ← 80% · Region01's risk + 0.20
= 2: Region01's risk' ← 60% · Region01's risk + 0.40
= 3: Region01's risk' ← 39% · Region01's risk + 0.60
= 4: Region01's risk' ← 19% · Region01's risk + 0.80
= 5: Region01's risk' ← 0% · Region01's risk + 1.00
ELSE : Region01's risk' ← 80% · Region01's risk

```

2.25.4 Effect of System-allocate-Region01 on Region01's risk

psychsim/domains/groundtruth/simulation/system.py:42
Region01's risk' ← 80% · Region01's risk

2.26 Region01's security

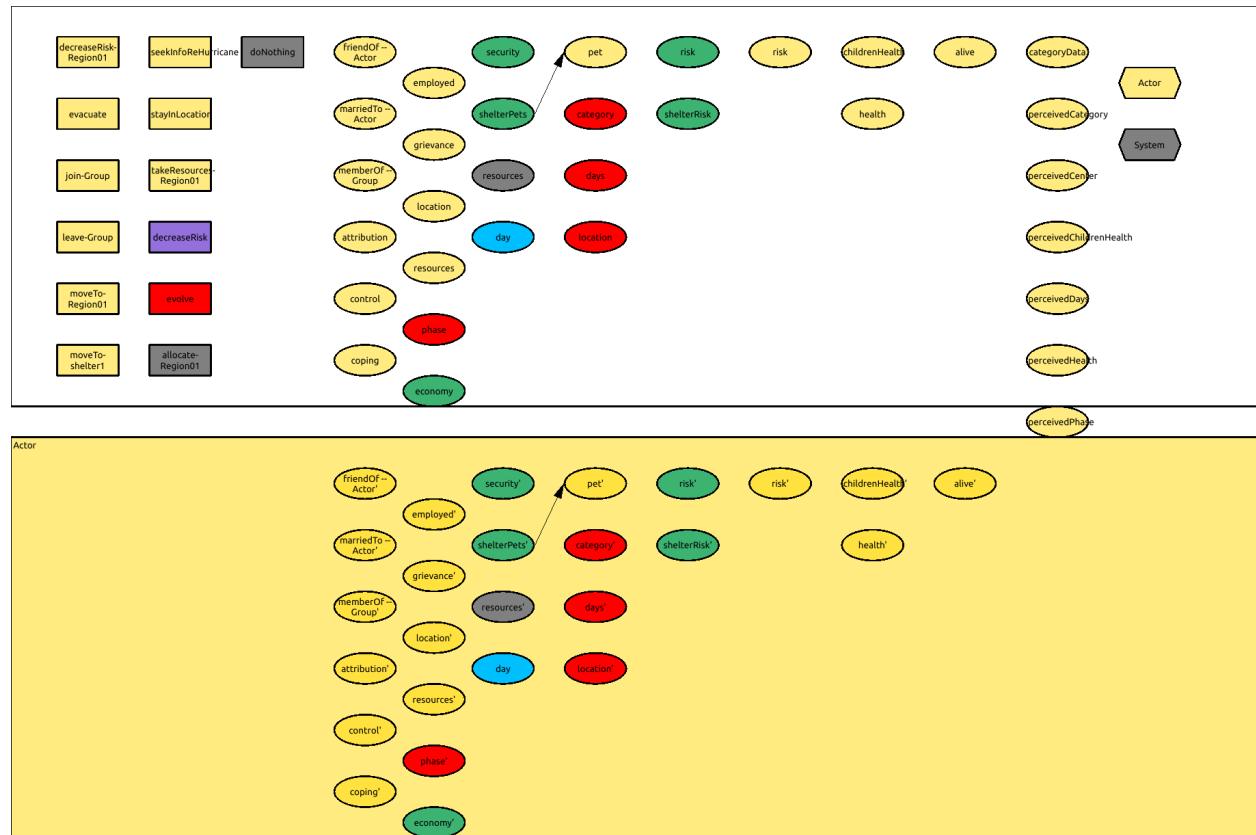
Level of law enforcement in region

Type: Real

psychsim/domains/groundtruth/simulation/region.py:70

2.27 Region01's shelterPets

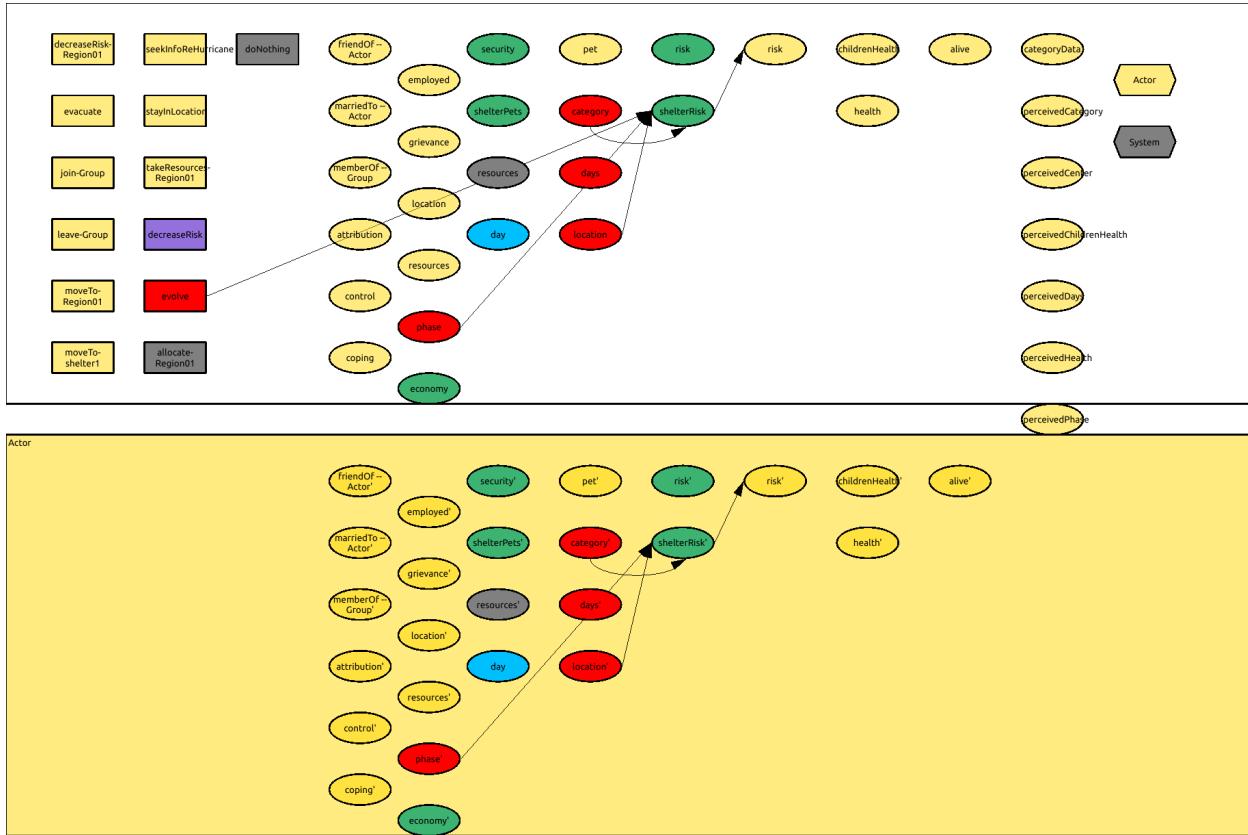
Type: Boolean



psychsim/domains/groundtruth/simulation/region.py:94

2.28 Region01's shelterRisk

Type: Real



psychsim/domains/groundtruth/simulation/region.py:88

2.28.1 Effect of Nature-evolve on Region01's shelterRisk

psychsim/domains/groundtruth/simulation/nature.py:146

IF Nature's phase'=active

THEN : IF Nature's location'=Region01

THEN : IF Nature's category'

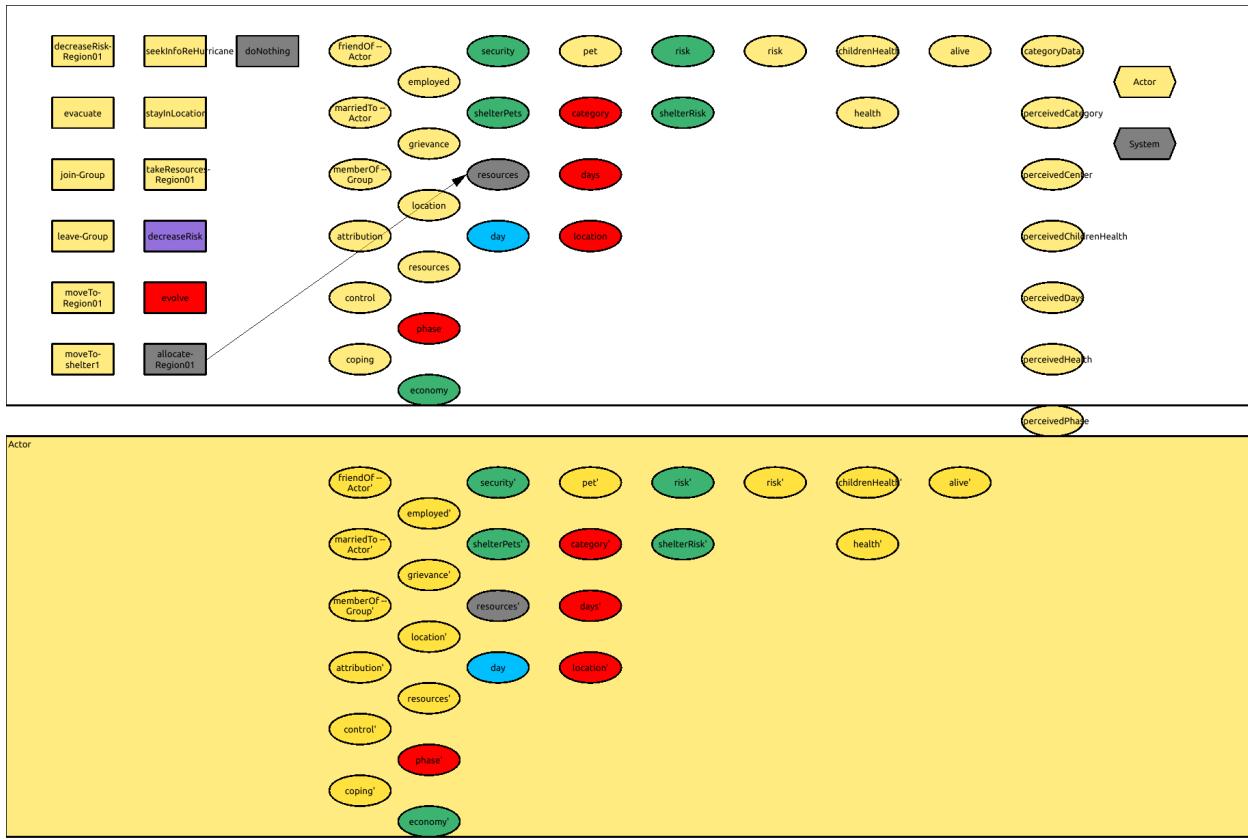
- = 1: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 2: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 3: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 4: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 5: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20

ELSE : Region01's shelterRisk' \leftarrow Region01's shelterRisk

ELSE : Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk

2.29 System's resources

Type: Integer



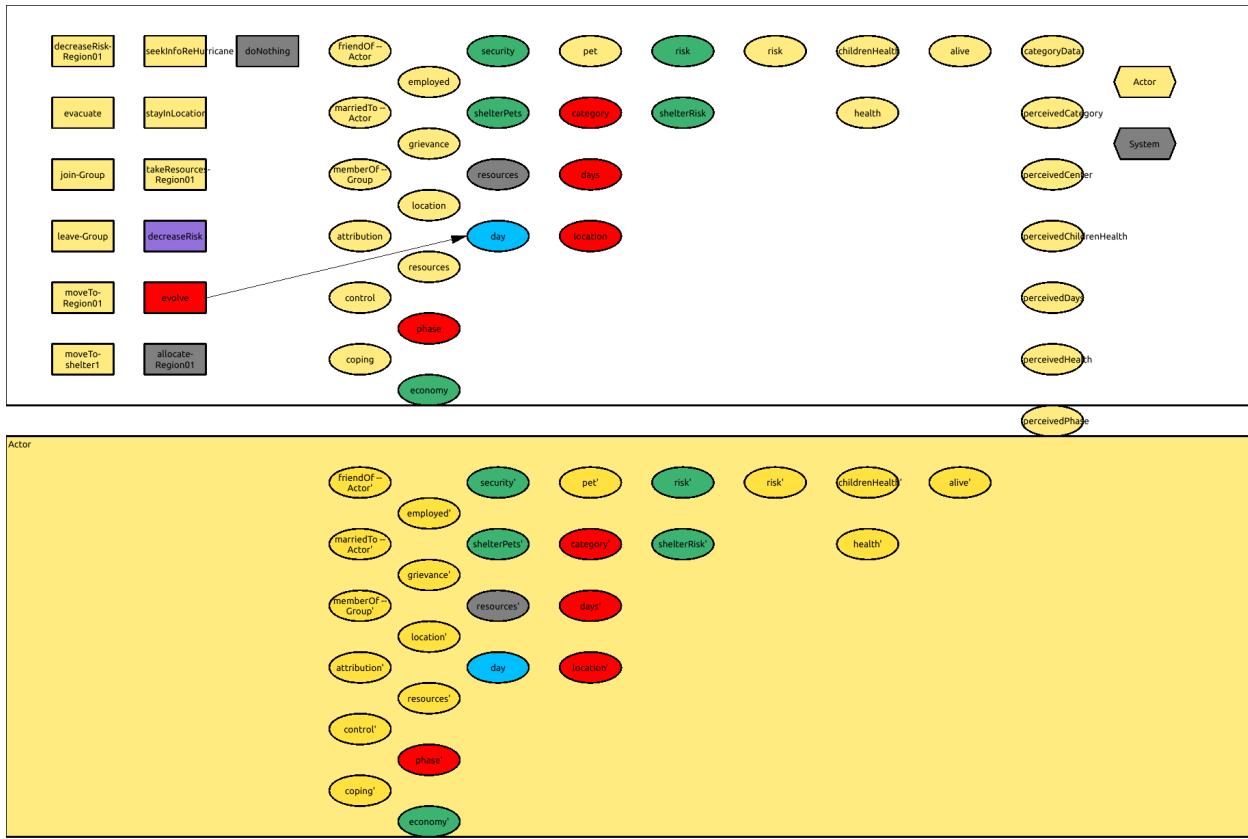
psychsim/domains/groundtruth/simulation/system.py:20

2.29.1 Effect of System-allocate-Region01 on System's resources

psychsim/domains/groundtruth/simulation/system.py:44
System's resources' ← System's resources

2.30 day

Type: Integer



psychsim/domains/groundtruth/simulation/create.py:48

2.30.1 Effect of Nature-evolve on day

psychsim/domains/groundtruth/simulation/nature.py:152
 $\text{day}' \leftarrow \text{day} + 1$

3 Relations

3.1 Actor friendOf Actor

Type: Boolean

psychsim/domains/groundtruth/simulation/actor.py:769

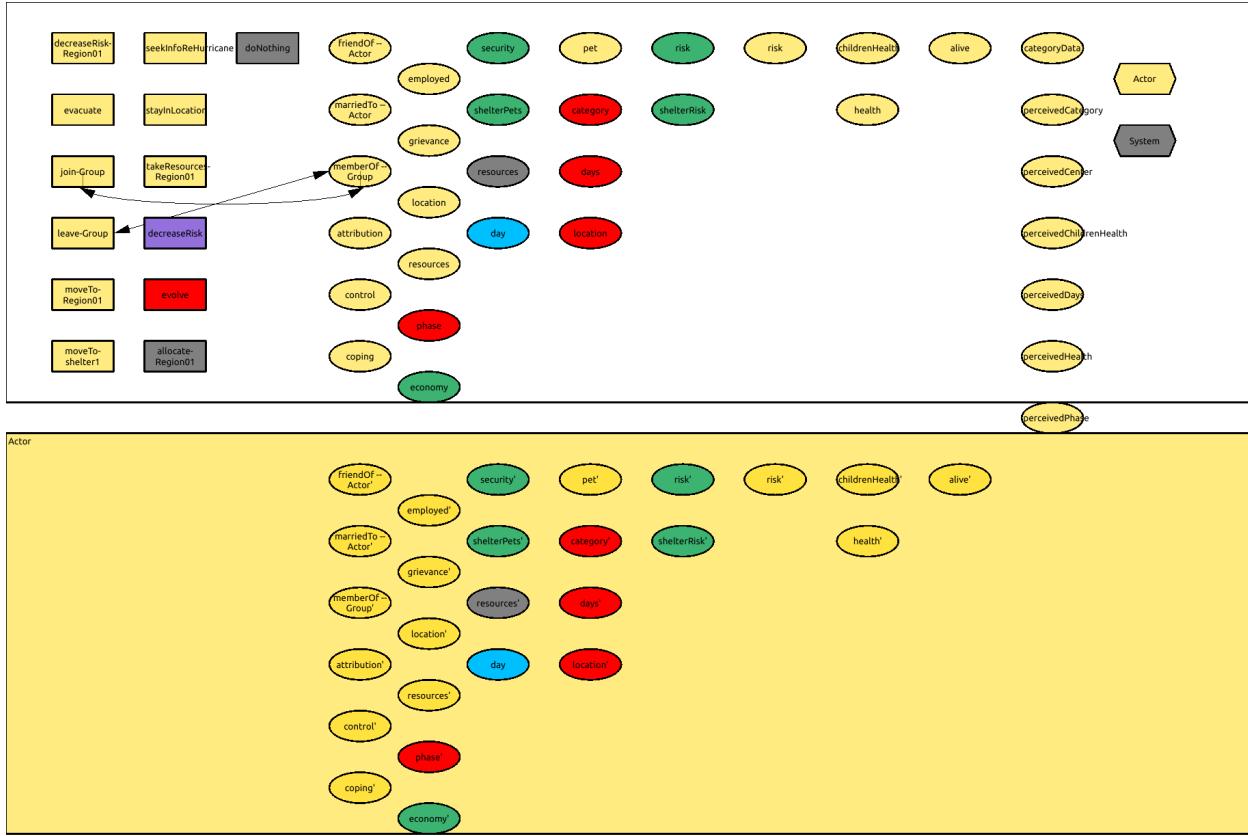
3.2 Actor marriedTo Actor

Type: Boolean

psychsim/domains/groundtruth/simulation/actor.py:119

3.3 Actor memberOf Group

Type: Boolean



psychsim/domains/groundtruth/simulation/group.py:94

3.3.1 Effect of Actor-join-Group on Actor memberOf Group

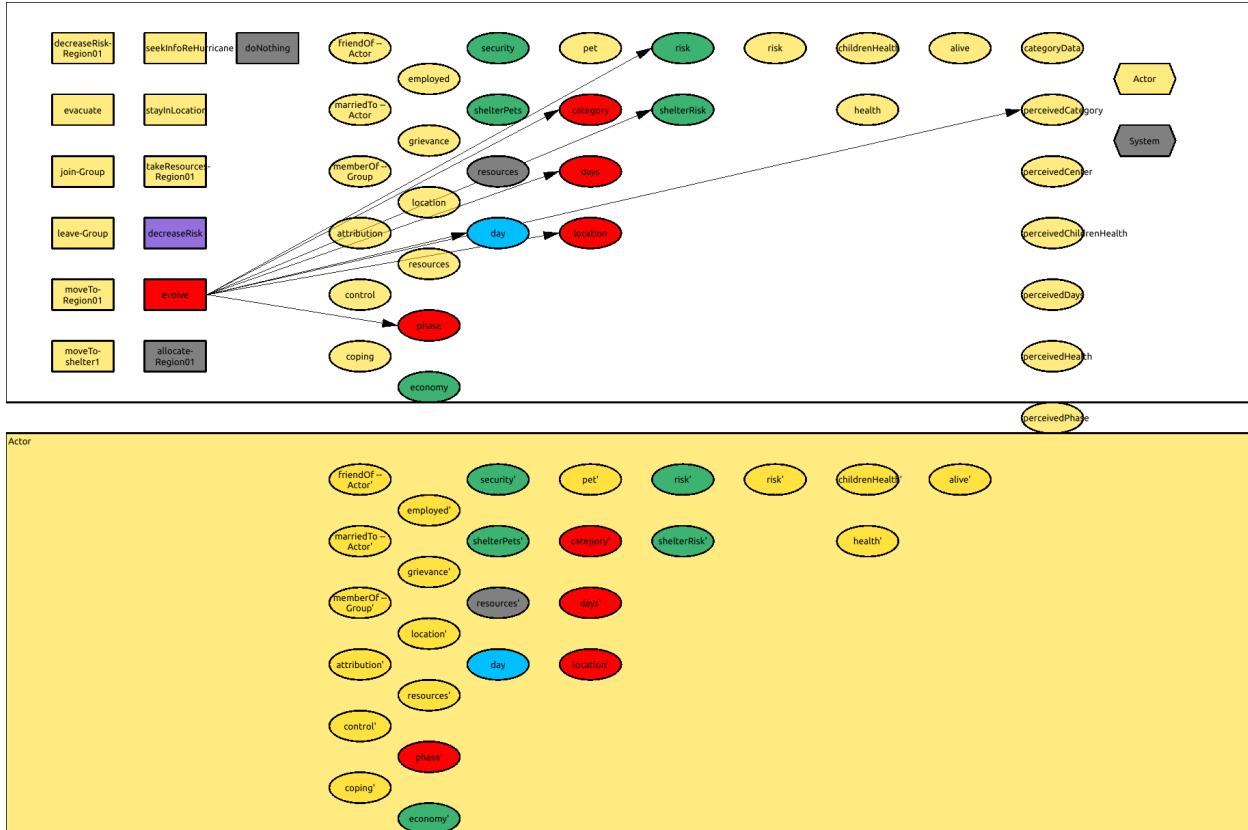
Actor memberOf Group'←true

3.3.2 Effect of Actor-leave-Group on Actor memberOf Group

Actor memberOf Group'←false

4 Actions

4.1 Nature evolve None



psychsim/domains/groundtruth/simulation/nature.py:13

4.1.1 Effect on Nature's category of Nature evolve None

IF Nature's phase'

= approaching: IF Nature's category=0

THEN :

20%: Nature's category' \leftarrow 1

20%: Nature's category' \leftarrow 2

20%: Nature's category' \leftarrow 3

20%: Nature's category' \leftarrow 4

20%: Nature's category' \leftarrow 5

ELSE : IF Nature's category=1

THEN :

60%: Nature's category' \leftarrow Nature's category

40%: Nature's category' \leftarrow 2

ELSE : IF Nature's category=5

THEN :

40%: Nature's category' \leftarrow 4

60%: Nature's category' \leftarrow Nature's category

ELSE :

20%: Nature's category' \leftarrow Nature's category-1

60%: Nature's category'←Nature's category
 20%: Nature's category'←Nature's category+1
 = active: Nature's category'←Nature's category
 = none: Nature's category'←0

4.1.2 Effect on Nature's days of Nature evolve None

IF Nature's phase=Nature's phase'
 THEN : Nature's days'←Nature's days+1
 ELSE : Nature's days'←0

4.1.3 Effect on Nature's location of Nature evolve None

IF Nature's phase'
 = approaching: IF Nature's location=none
 THEN : Nature's location'←Region01
 ELSE : Nature's location'←Nature's location
 = active: IF Nature's phase=approaching
 THEN : Nature's location'←Nature's location
 ELSE : IF Nature's location
 OTHERWISE : Nature's location'←Nature's location
 = Region01:
 20%: Nature's location'←Region01
 48%: Nature's location'←none
 = none: Nature's location'←none

4.1.4 Effect on Nature's phase of Nature evolve None

IF Nature's phase
 = none: IF Nature's days>2
 THEN :
 60%: Nature's phase'←approaching
 40%: Nature's phase'←none
 ELSE : Nature's phase'←none
 = approaching: IF Nature's days>2
 THEN :
 60%: Nature's phase'←active
 40%: Nature's phase'←approaching
 ELSE : Nature's phase'←approaching
 OTHERWISE : IF Nature's location=none
 THEN : Nature's phase'←none
 ELSE : Nature's phase'←active

4.1.5 Effect on Region01's risk of Nature evolve None

IF Nature's phase'=active
 THEN : IF Nature's location'
 OTHERWISE : Region01's risk'←80%·Region01's risk
 = Region01: IF Nature's category
 = 1: Region01's risk'←80%·Region01's risk+0.20
 = 2: Region01's risk'←60%·Region01's risk+0.40
 = 3: Region01's risk'←39%·Region01's risk+0.60
 = 4: Region01's risk'←19%·Region01's risk+0.80
 = 5: Region01's risk'←0%·Region01's risk+1.00
 ELSE : Region01's risk'←80%·Region01's risk

4.1.6 Effect on Region01's shelterRisk of Nature evolve None

IF Nature's phase' = active

THEN : IF Nature's location' = Region01

THEN : IF Nature's category

- = 1: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 2: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 3: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 4: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20
- = 5: Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk + 0.20

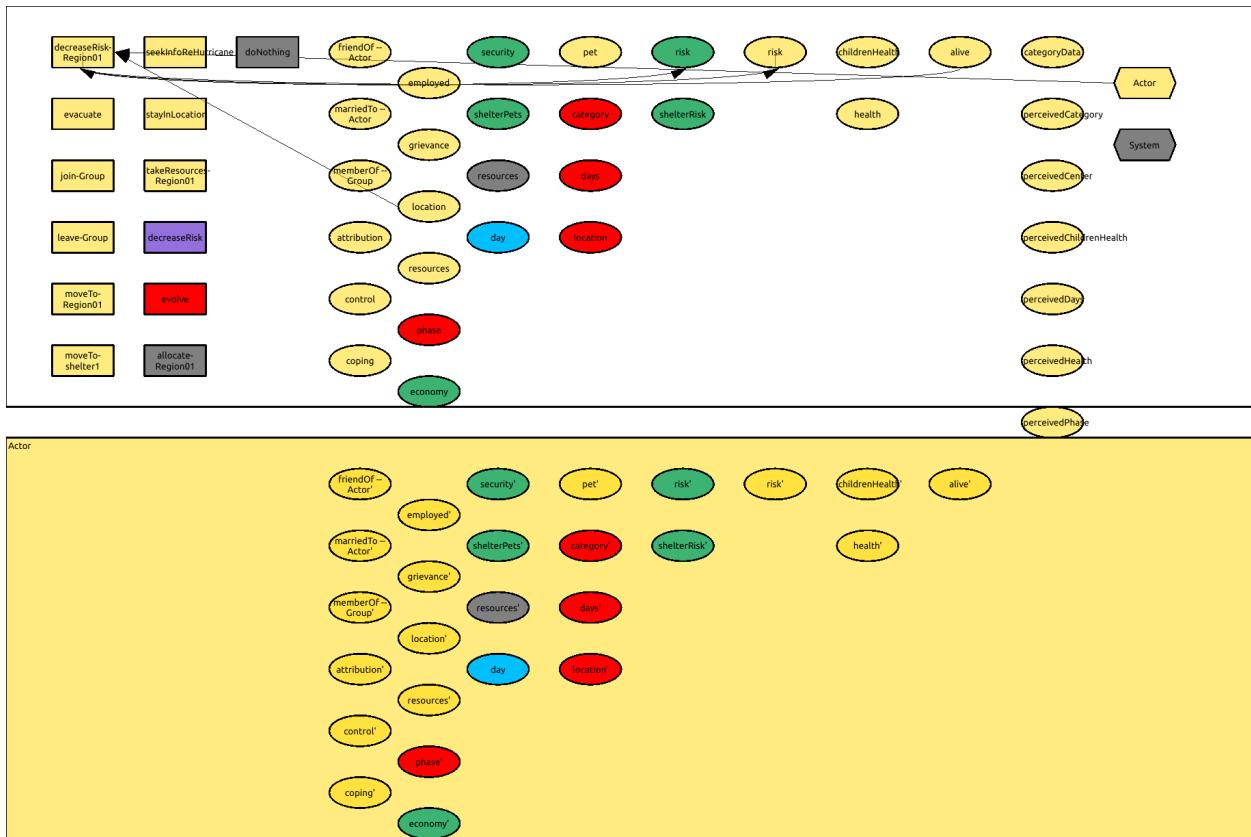
ELSE : Region01's shelterRisk' \leftarrow Region01's shelterRisk

ELSE : Region01's shelterRisk' \leftarrow 80% · Region01's shelterRisk

4.1.7 Effect on day of Nature evolve None

day' \leftarrow day + 1

4.2 Actor decreaseRisk Region01



psychsim/domains/groundtruth/simulation/actor.py:361

4.2.1 Applicability of Actor decreaseRisk Region01

IF Actor's location = Region01

THEN : IF Actor's alive

THEN : true

```

    ELSE : false
ELSE : false

```

4.2.2 Effect on Actor's risk of Actor decreaseRisk Region01

```

IF Actor memberOf Group
THEN : IF Group's __ACTION__=Group-decreaseRisk
    THEN : Actor's risk'←92%·Actor's risk+0.08
    ELSE : Actor's risk'←80%·Actor's risk+0.20
ELSE : Actor's risk'←80%·Actor's risk+0.20

```

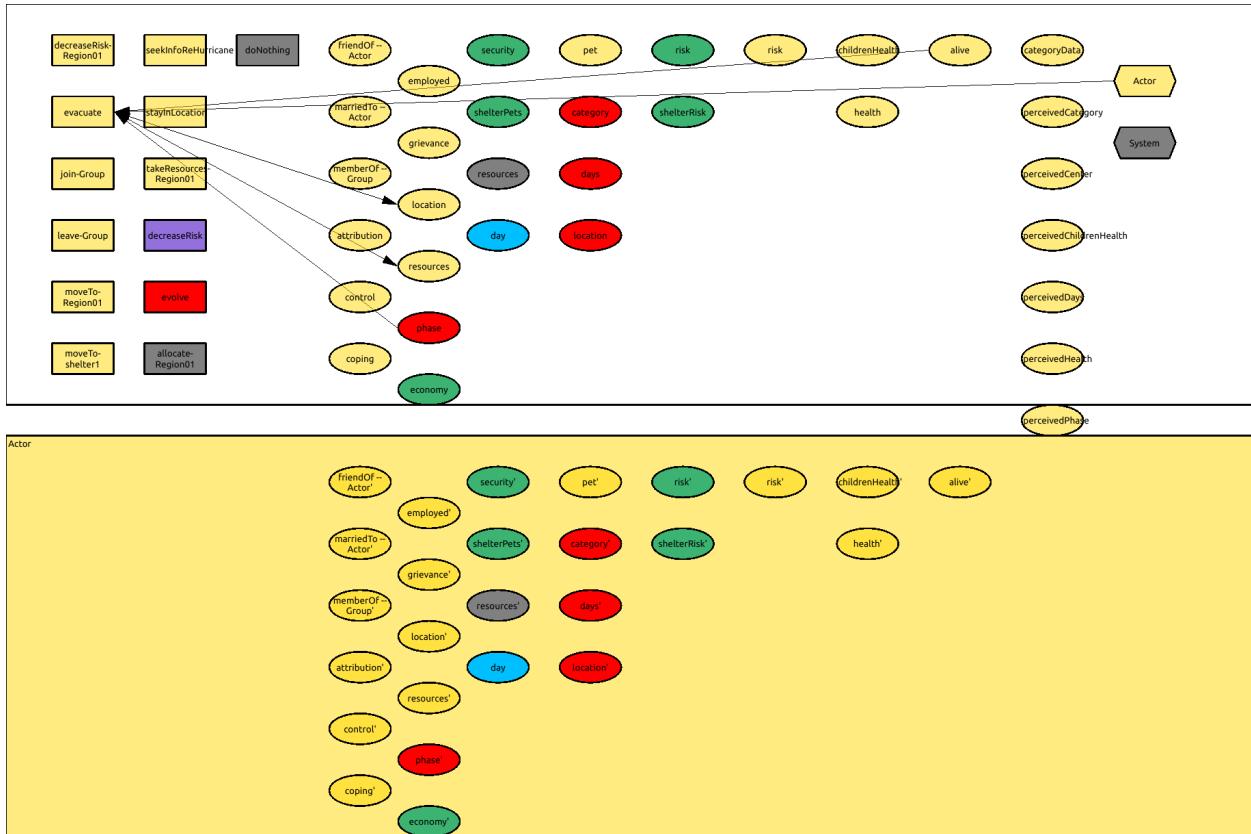
4.2.3 Effect on Region01's risk of Actor decreaseRisk Region01

```

IF Group's __ACTION__=Group-decreaseRisk
THEN : Region01's risk'←68%·Region01's risk+31%·Region01's riskMin
ELSE : Region01's risk'←80%·Region01's risk

```

4.3 Actor evacuate None



psychsim/domains/groundtruth/simulation/actor.py:343

4.3.1 Applicability of Actor evacuate None

```

IF Nature's phase=none
THEN : false
ELSE : IF Actor's location=evacuated

```

```

THEN : false
ELSE : IF Actor's alive
    THEN : true
    ELSE : false

```

4.3.2 Effect on Actor's location of Actor evacuate None

Actor's location' \leftarrow evacuated

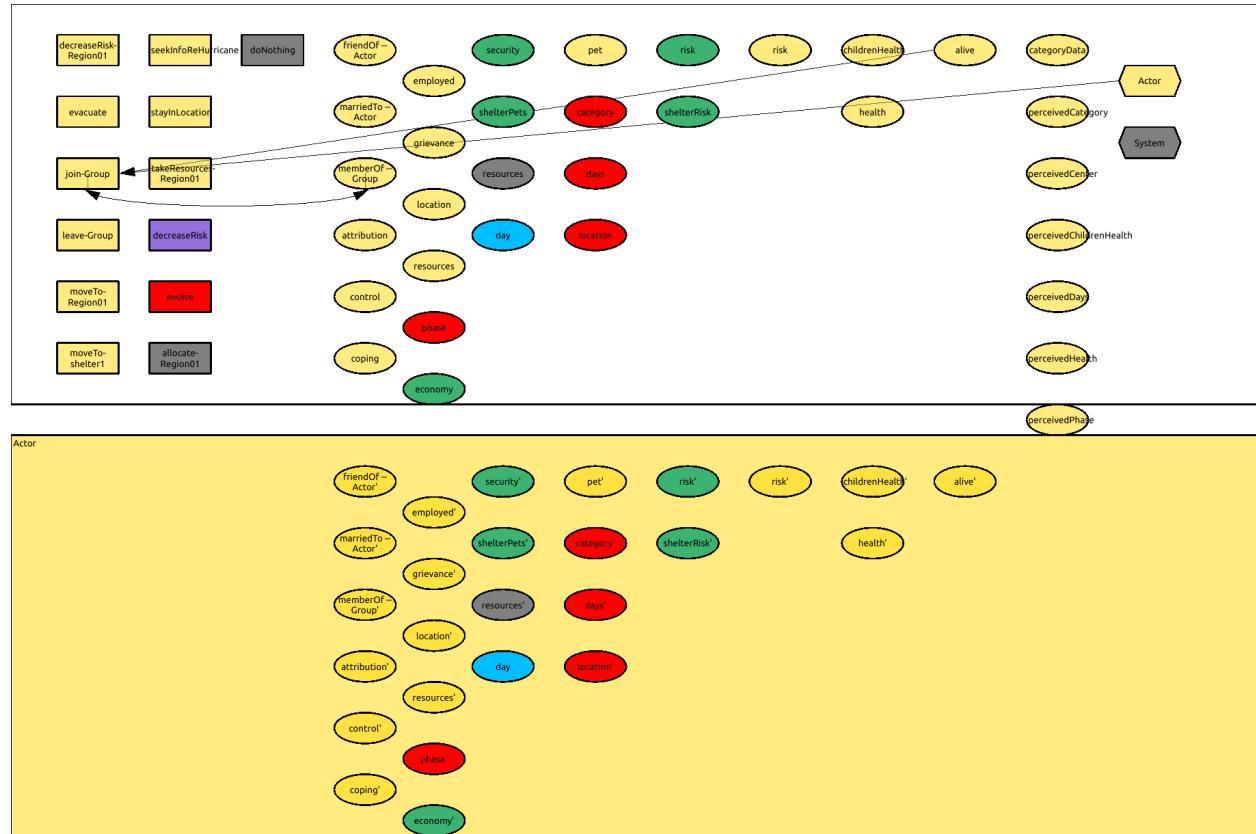
4.3.3 Effect on Actor's resources of Actor evacuate None

IF Actor's resources > 0.40

THEN : Actor's resources' \leftarrow Actor's resources - 0.40

ELSE : Actor's resources' \leftarrow 0.00

4.4 Actor join Group



psychsim/domains/groundtruth/simulation/group.py:109

4.4.1 Applicability of Actor join Group

IF Actor's alive

THEN : IF Actor memberOf Group

THEN : false

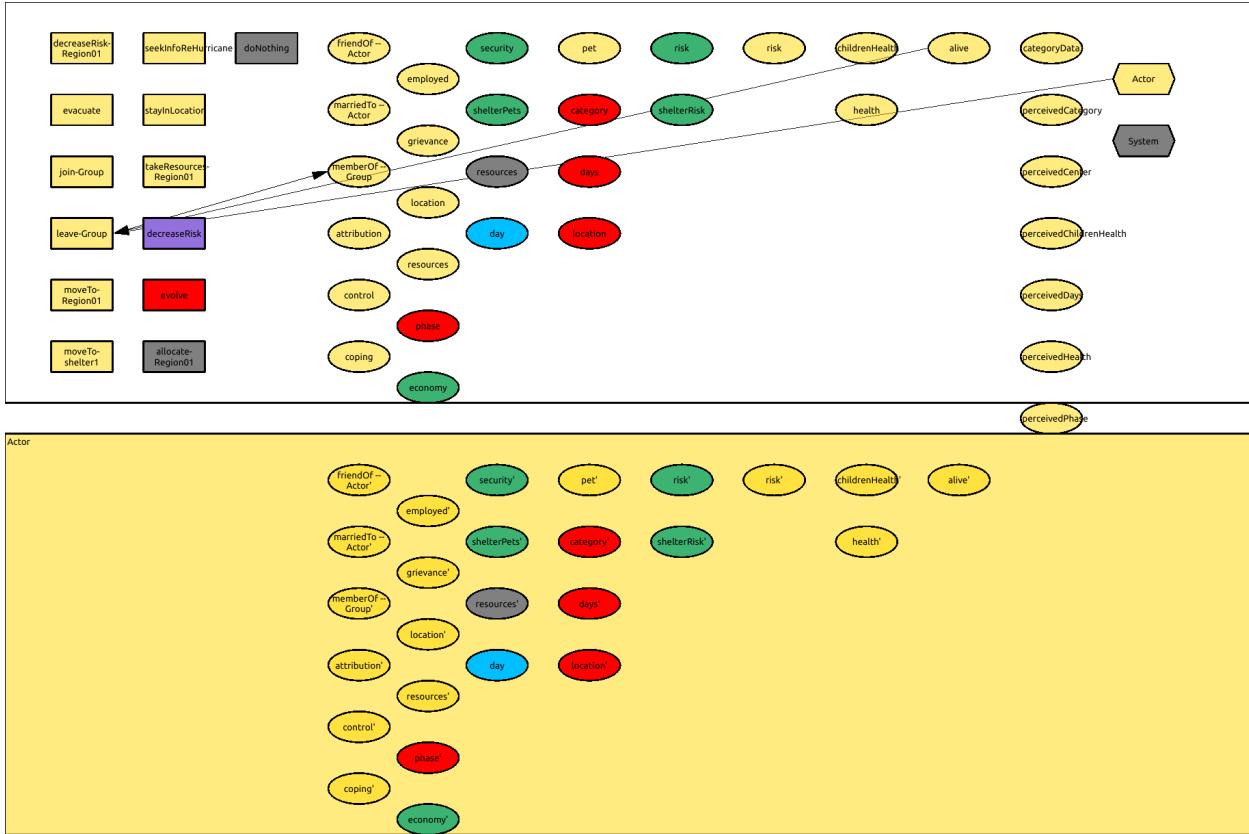
ELSE : true

ELSE : false

4.4.2 Effect on Actor memberOf Group of Actor join Group

Actor memberOf Group' \leftarrow true

4.5 Actor leave Group



psychsim/domains/groundtruth/simulation/group.py:120

4.5.1 Applicability of Actor leave Group

IF Actor's alive

THEN : IF Actor memberOf Group

THEN : true

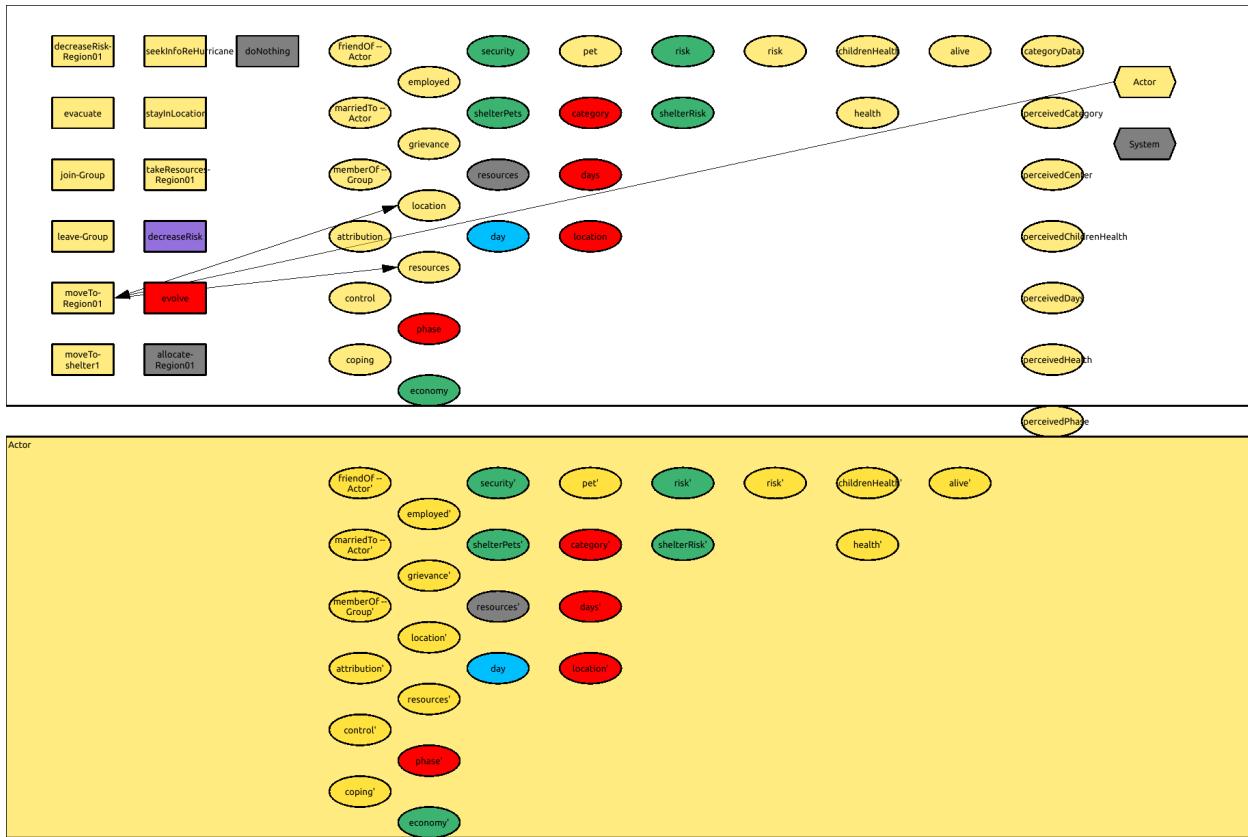
ELSE : false

ELSE : false

4.5.2 Effect on Actor memberOf Group of Actor leave Group

Actor memberOf Group' \leftarrow false

4.6 Actor moveTo Region01



psychsim/domains/groundtruth/simulation/actor.py:350

4.6.1 Applicability of Actor moveTo Region01

IF Actor's location={‘evacuated’, ‘shelter1’}
 THEN : true
 ELSE : false

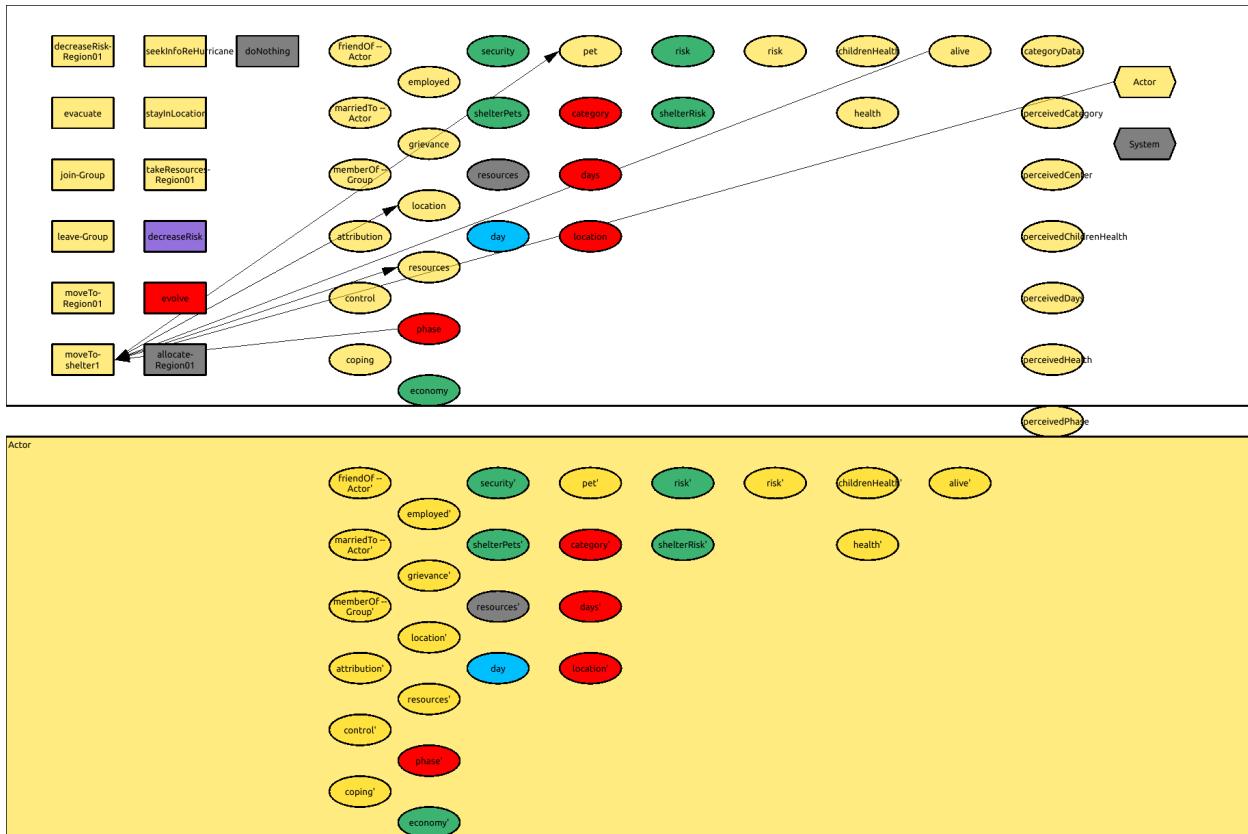
4.6.2 Effect on Actor's location of Actor moveTo Region01

Actor's location'←Region01

4.6.3 Effect on Actor's resources of Actor moveTo Region01

IF Actor's alive
 THEN : IF Actor's employed
 THEN : Actor's resources'←60%·Actor's resources+0.40
 ELSE : Actor's resources'←Actor's resources
 ELSE : Actor's resources'←Actor's resources

4.7 Actor moveTo shelter1



psychsim/domains/groundtruth/simulation/actor.py:333

4.7.1 Applicability of Actor moveTo shelter1

IF Nature's phase=none

THEN : false

ELSE : IF Actor's alive

THEN : IF Actor's location=shelter1

THEN : false

ELSE : true

ELSE : false

4.7.2 Effect on Actor's location of Actor moveTo shelter1

Actor's location'←shelter1

4.7.3 Effect on Actor's pet of Actor moveTo shelter1

IF Actor's location'=shelter1

THEN : IF Region01's shelterPets

THEN : Actor's pet'←Actor's pet

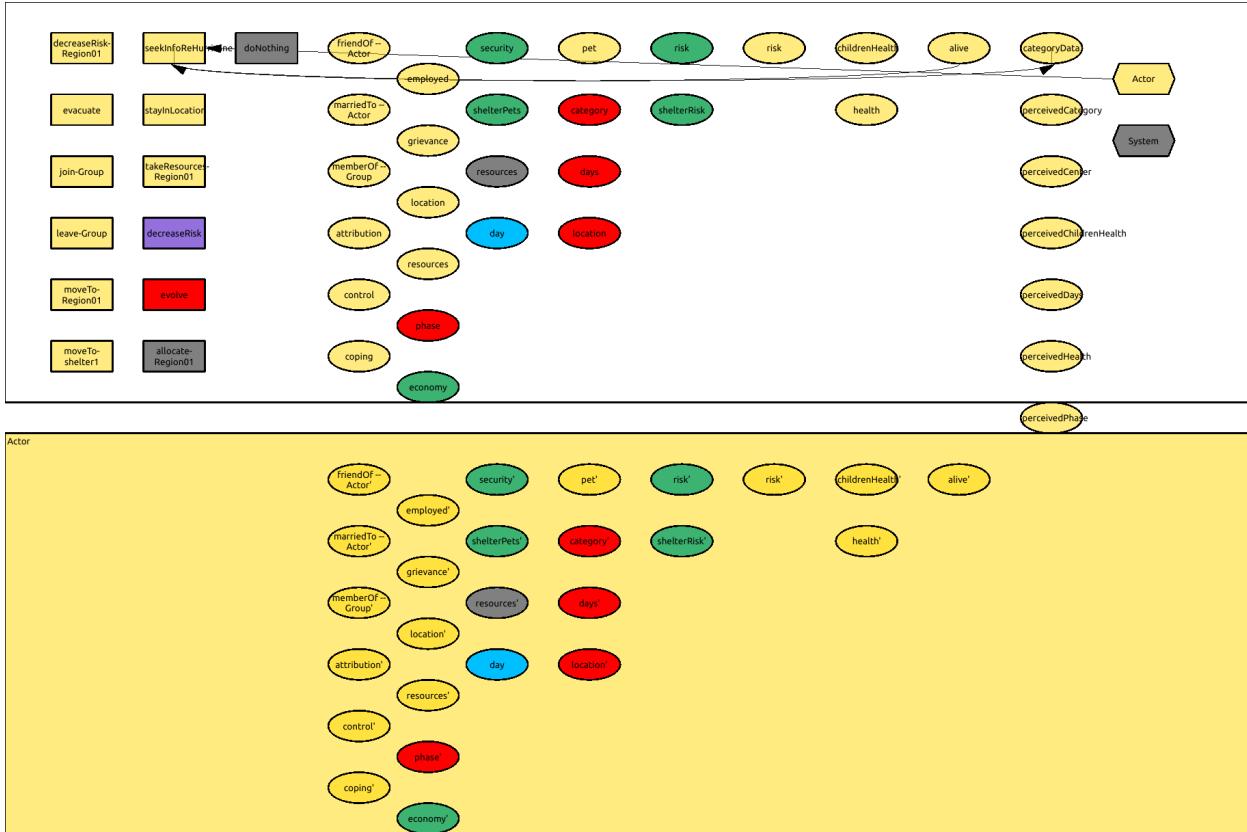
ELSE : Actor's pet'←false

ELSE : Actor's pet'←Actor's pet

4.7.4 Effect on Actor's resources of Actor moveTo shelter1

$\text{Actor's resources}' \leftarrow 0\% \cdot \text{Actor's resources}$

4.8 Actor seekInfoReHurricane None



psychsim/domains/groundtruth/simulation/actor.py:427

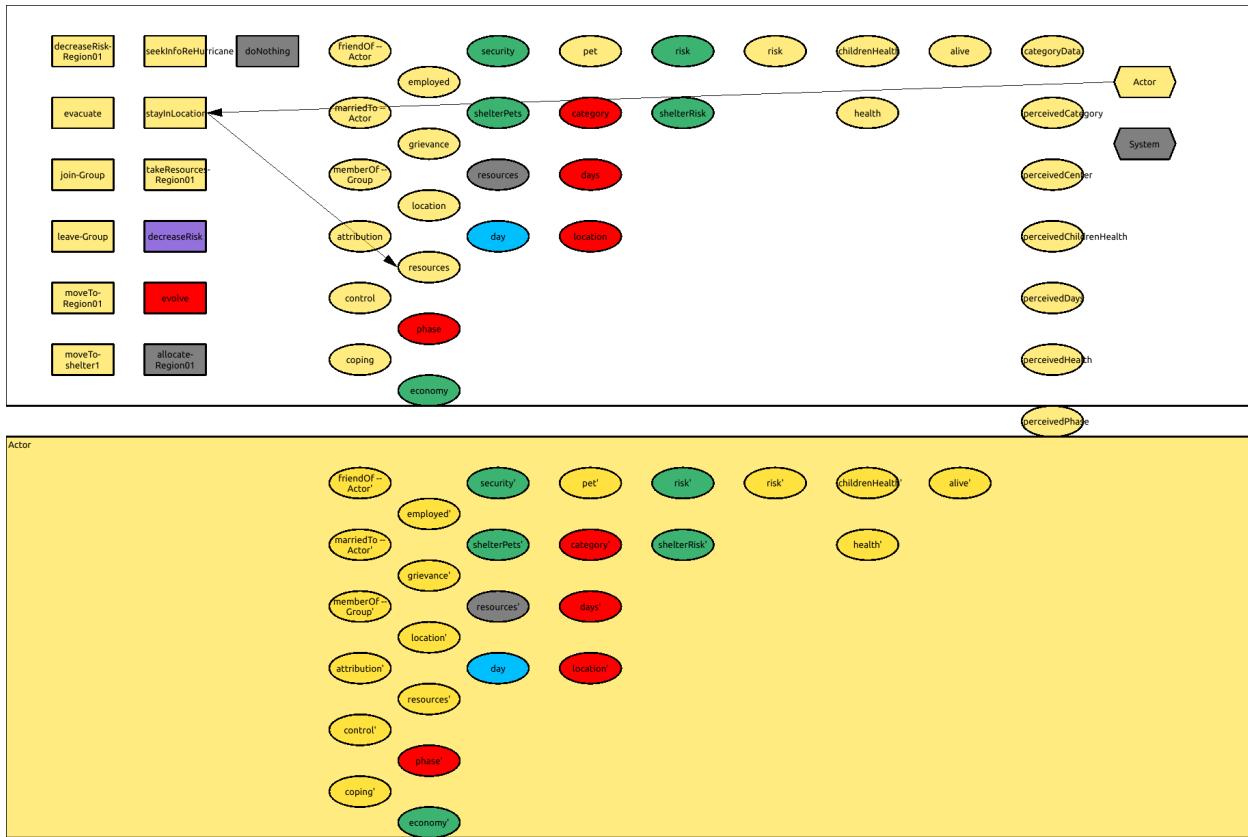
4.8.1 Applicability of Actor seekInfoReHurricane None

IF Actor's alive

THEN : true

ELSE : false

4.9 Actor stayInLocation None



psychsim/domains/groundtruth/simulation/actor.py:293

4.9.1 Effect on Actor's resources of Actor stayInLocation None

IF Actor's alive

THEN : IF Actor's employed

THEN : IF Actor's location={Region01', 'evacuated'}

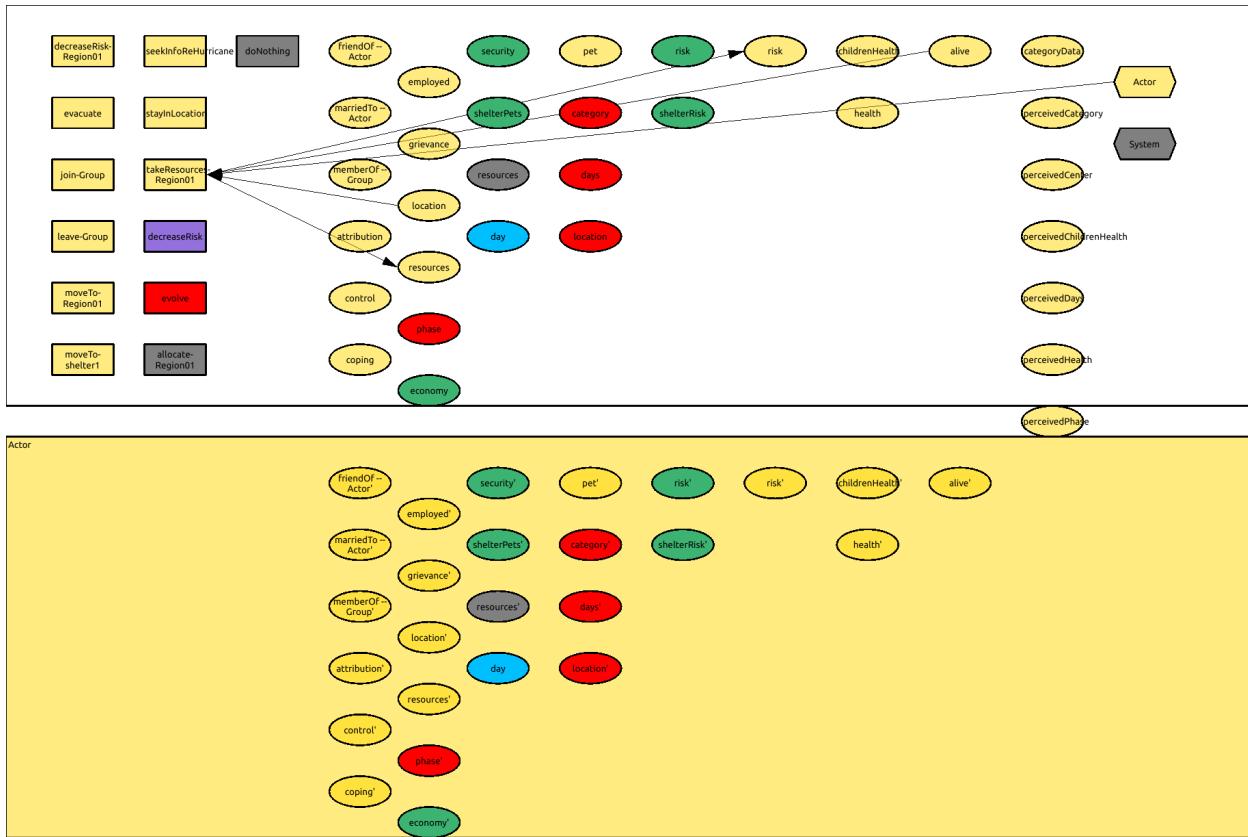
THEN : Actor's resources' \leftarrow 60% · Actor's resources + 0.40

ELSE : Actor's resources' \leftarrow Actor's resources

ELSE : Actor's resources' \leftarrow Actor's resources

ELSE : Actor's resources' \leftarrow Actor's resources

4.10 Actor takeResources Region01



psychsim/domains/groundtruth/simulation/actor.py:396

4.10.1 Applicability of Actor takeResources Region01

IF Actor's location=Region01

THEN : IF Actor's alive

THEN : true

ELSE : false

ELSE : false

4.10.2 Effect on Actor's resources of Actor takeResources Region01

$\text{Actor's resources}' \leftarrow 80\% \cdot \text{Actor's resources} + 0.20$

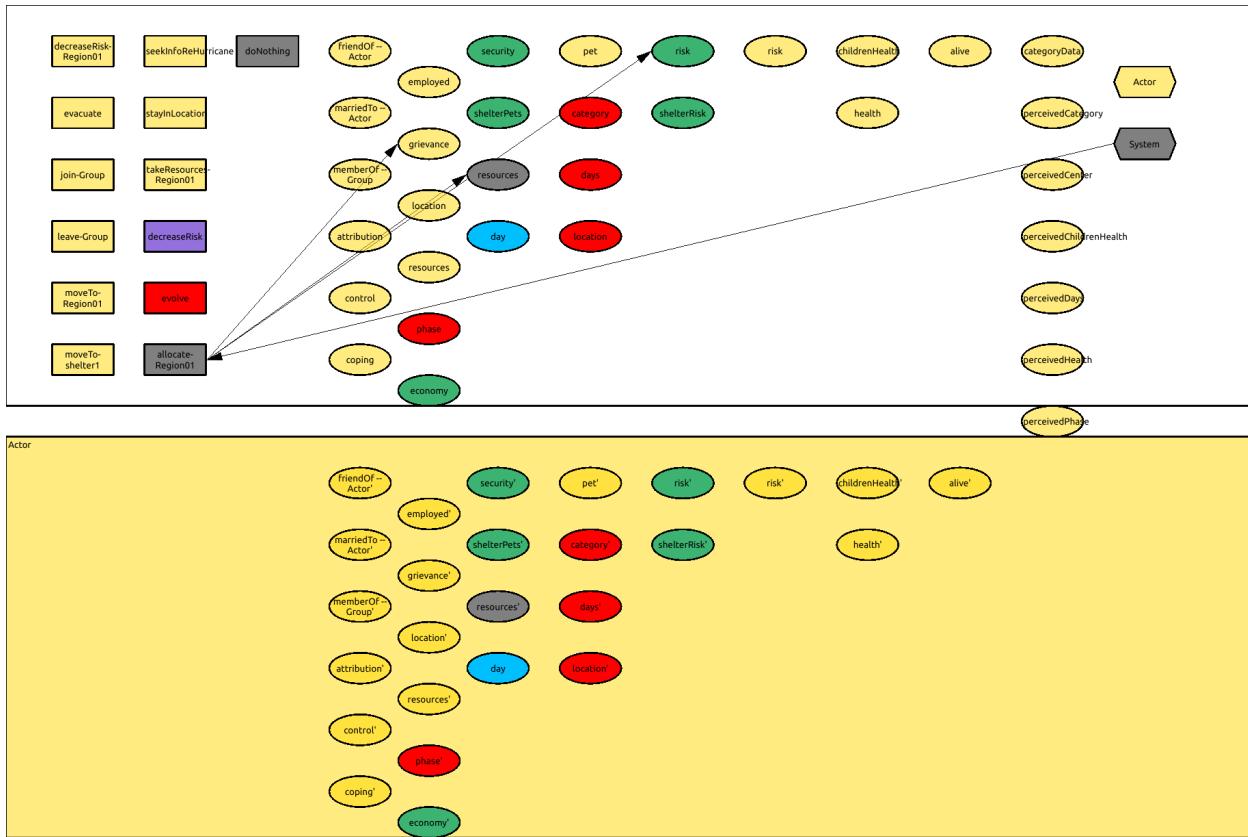
4.10.3 Effect on Actor's risk of Actor takeResources Region01

IF Nature's phase=none

THEN : $\text{Actor's risk}' \leftarrow 19\% \cdot \text{Actor's risk} + 0.80$

ELSE : $\text{Actor's risk}' \leftarrow 40\% \cdot \text{Actor's risk} + 0.60$

4.11 System allocate Region01



psychsim/domains/groundtruth/simulation/system.py:38

4.11.1 Effect on Actor's grievance of System allocate Region01

Actor's grievance' \leftarrow 80% · Actor's grievance

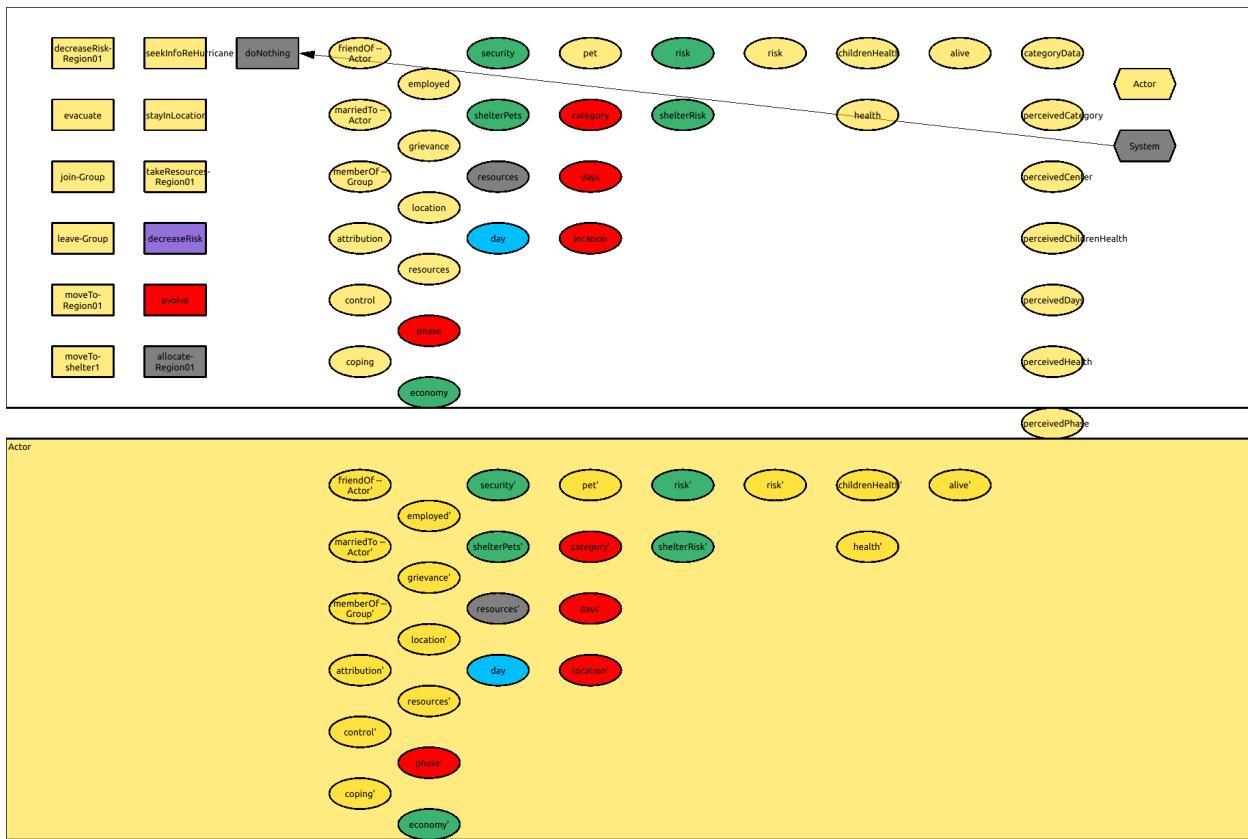
4.11.2 Effect on Region01's risk of System allocate Region01

Region01's risk' \leftarrow 80% · Region01's risk

4.11.3 Effect on System's resources of System allocate Region01

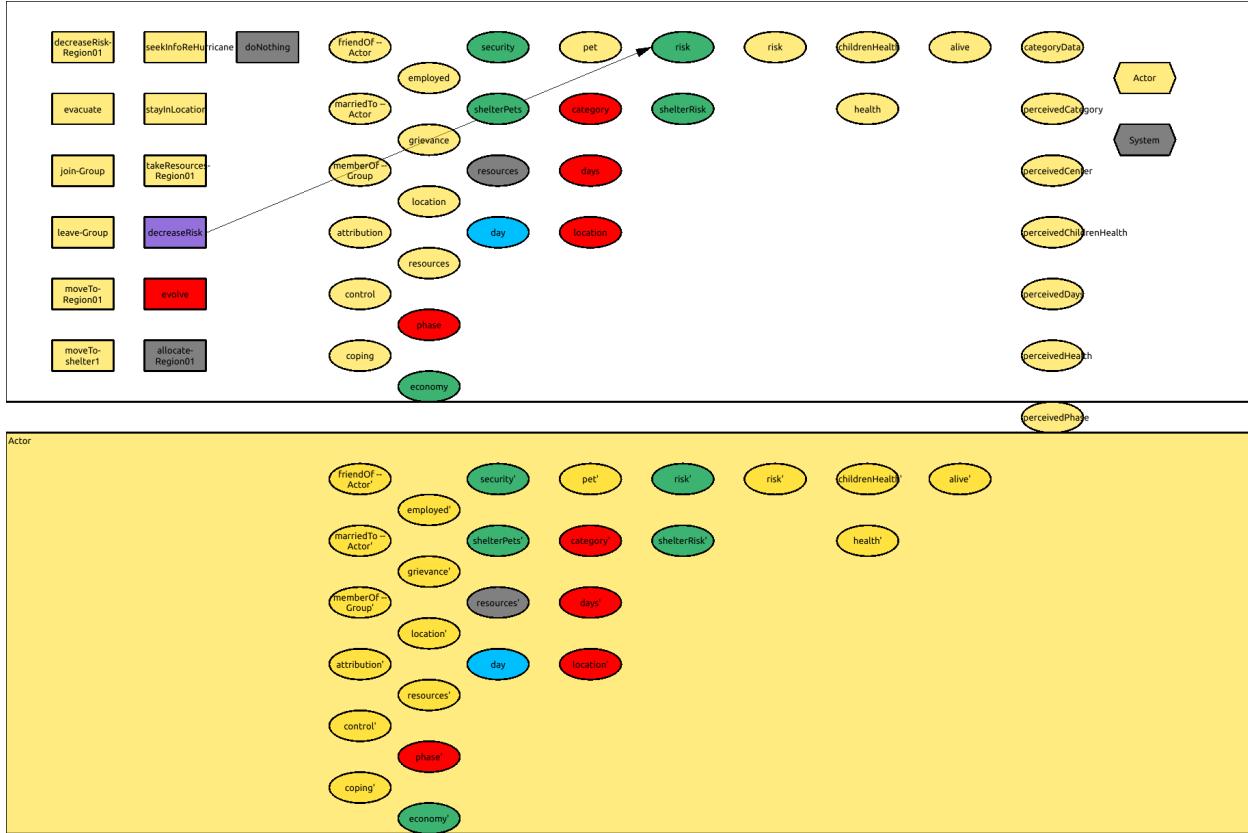
System's resources' \leftarrow System's resources

4.12 System doNothing None



psychsim/domains/groundtruth/simulation/system.py:35

4.13 Group decreaseRisk None



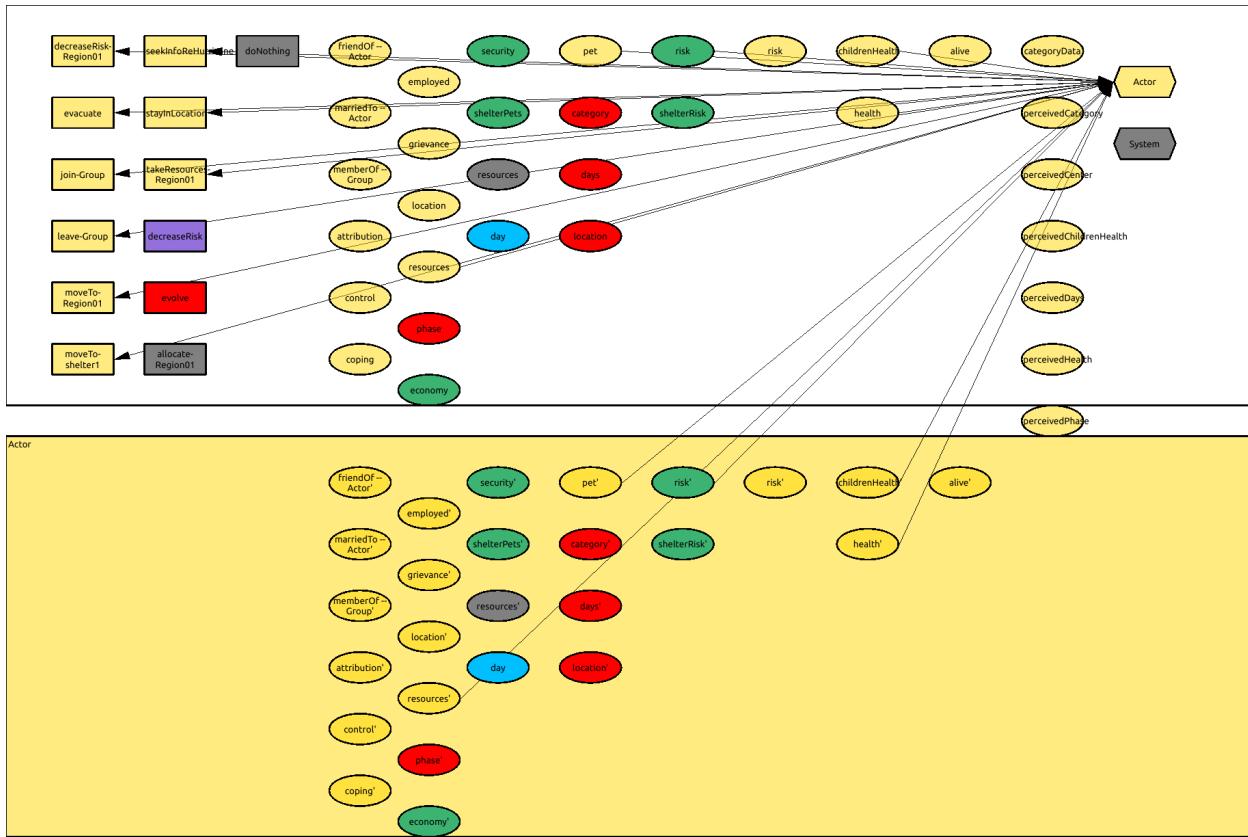
psychsim/domains/groundtruth/simulation/group.py:31

4.13.1 Effect on Region01's risk of Group decreaseRisk None

Region01's risk' \leftarrow 80% · Region01's risk

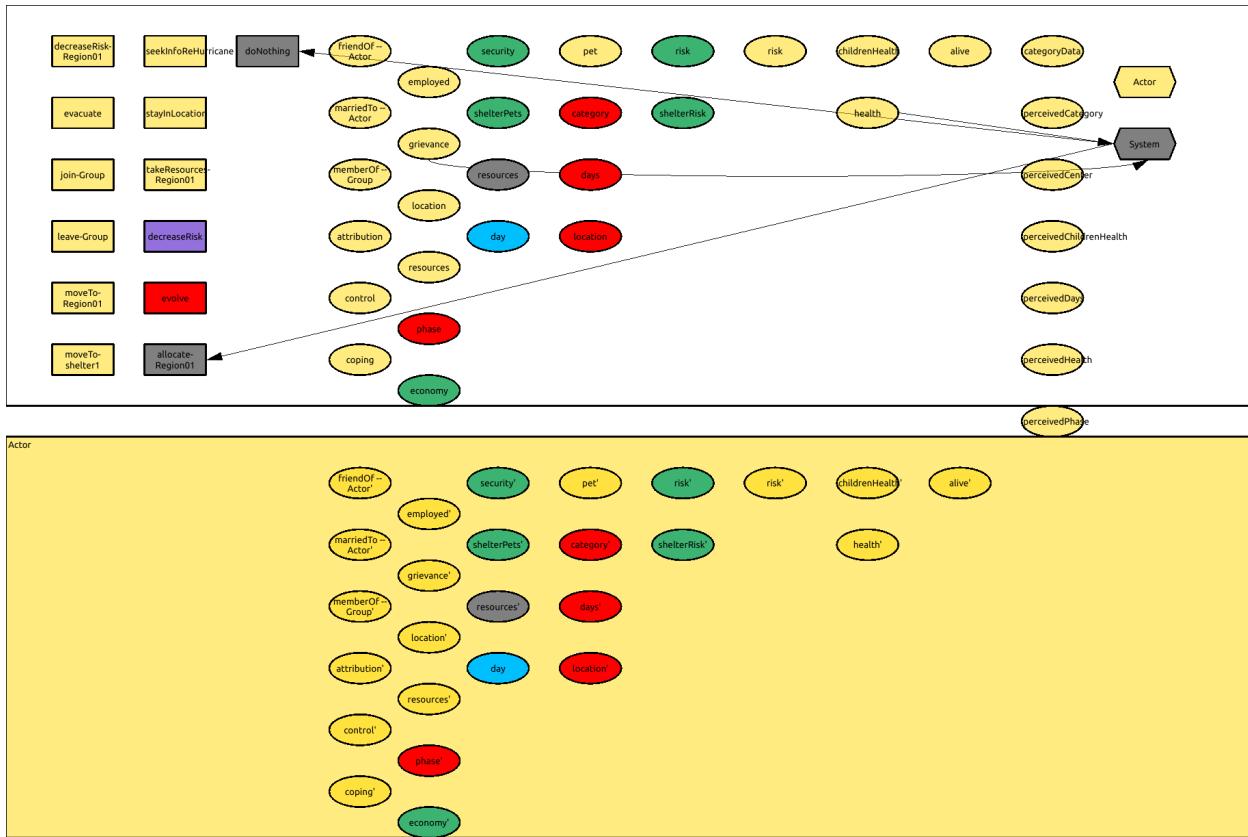
5 Expected Reward

5.1 Actor's Reward



$$R \leftarrow 20\% \cdot \text{Actor's childrenHealth} + 40\% \cdot \text{Actor's health} + 80\% \cdot \text{Actor's pet} + 40\% \cdot \text{Actor's resources} - 100\% \cdot \text{Region01's risk}$$

5.2 System's Reward



$$R \leftarrow -20\% \cdot \text{Actor's grievance} + 60\% \cdot \text{Actor's health}$$