

Force Dynamics in Language and Cognition

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1. Introduction

1.1 Force dynamics: A previously neglected semantic category

force dynamics: how entities interact with respect to force, including:

the exertion of force, resistance to such a force, the overcoming of such a resistance,
blockage of the expression of force, removal of such blockage, etc.

1.2 A generalization over the traditional linguistic notion of "causative"

it analyzes 'causing' into finer primitives and sets it within a framework that also includes

'letting', 'hindering', 'helping', and further notions not normally considered in the same context

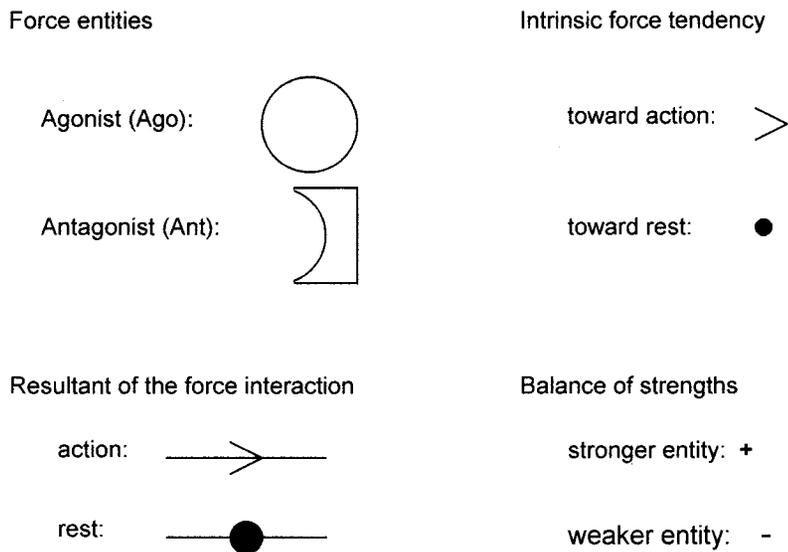
1.3 Illustrating the category

- (1) A. be VPing / keep VPing -- physical
 - a. The ball was rolling along the green.
 - b. The ball kept (on) rolling along the green.
- B. not VP / can not VP -- physical/psychological
 - a. John doesn't go out of the house.
 - b. John can't go out of the house.
- C. not VP / refrain from VPing -- intra-psychological
 - a. He didn't close the door.
 - b. He refrained from closing the door.
- D. polite / civil -- intra-psychological: lexicalized
 - a. She's polite to him.
 - b. She's civil to him.
- E. have (got) to VP / get to VP -- socio-psychological
 - a. She's got to go to the park.
 - b. She gets to go to the park.

2. Basic force-dynamic distinctions

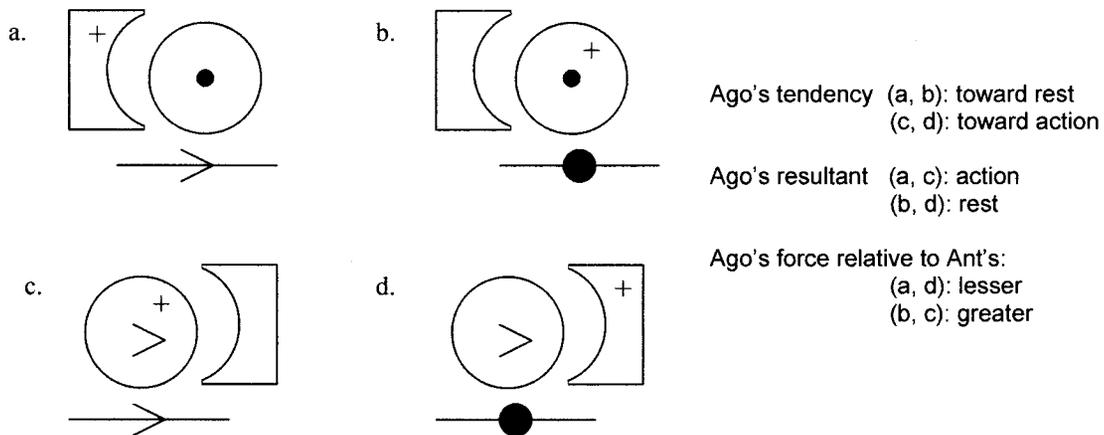
2.1 Components of force dynamic patterns and their diagrammatic representation

(2)



2.2 Steady-state force-dynamic patterns

(3) the basic steady-state force-dynamic patterns



(a) extended causing of action

The ball kept rolling because of the wind blowing on it.

(b) first "despite" pattern

The shed kept standing despite the gale wind blowing against it.

(c) second "despite" pattern = hindrance

The ball kept rolling despite the stiff grass.

(d) extended causing of rest = blockage

The log kept lying on the incline because of the ridge there.

commonalities across the basic FD patterns in the diagram:

top row: Agonist's intrinsic tendency is toward rest / bottom row: toward action

left column: resultant of force opposition on the Agonist is action / right column: rest

diagonal starting at top left: stronger Antagonist / diagonal starting at top right: stronger Agonist

the stronger-Antagonist diagonal = extended causation: the resultant state --

is *contrary* to the Agonist's intrinsic tendency

results *because of* the presence of the Antagonist

and would otherwise *not occur*

the stronger-Agonist diagonal = "despite / although": the resultant state --

is *the same* as that toward which the Agonist tends

results *despite* the presence of the Antagonist

and would otherwise *also occur*

in pattern (c), the Antagonist *hinders* the Agonist

in pattern (d), the Antagonist *blocks* the Agonist

Thus, force dynamics so far counterposes causative `because of' and `despite'

and brings these notions together with `hindrance' and `blockage' into a single system.

2.3 Shifting force-dynamic patterns

The preceding four patterns were steady-state,

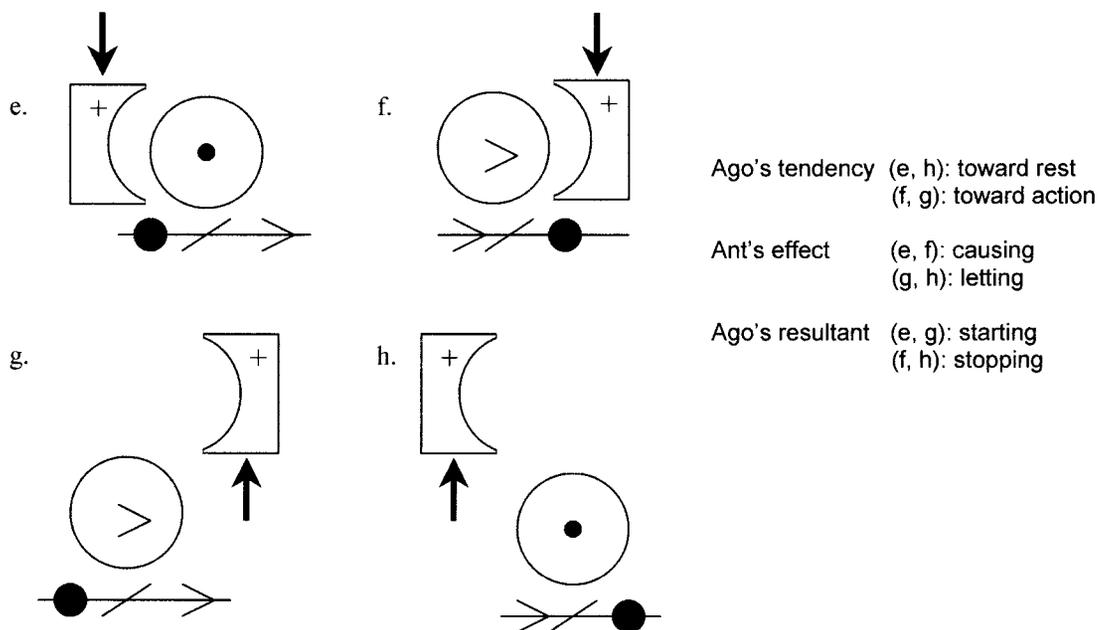
with the Antagonist in continuing impingement with the Agonist.

For each of these, there are two associated patterns in which

the Antagonist comes into or leaves impingement with the Agonist.

The following four patterns show these shifts for a stronger Antagonist.

(4)



(e) onset causing of action = prototype causation

The ball's hitting it made the lamp topple from the table.

(f) onset causing of rest

The water's dripping on it made the fire die down.

(g) onset letting of action = prototype letting

The plug's coming loose let the water flow from the tank.

(h) onset letting of rest

The stirring rod's breaking let the particles settle to the bottom.

A. a single causation category for the four causing types

The two onset causing patterns here join with the earlier two extended causing patterns to form the linguistic category of "causation". In all 4 patterns:

the Agonist's resultant state of activity is the opposite of its intrinsic actional tendency, whereas in the remaining patterns, these two activity values are the same.

Reason: an object has a natural force tendency and will manifest it

unless overcome by either steady or onset impingement with a more forceful object from outside.

B. the four types of impingement of an Antagonist with an Agonist

The types of impingement that a stronger Antagonist has on an Agonist forms a taxonomy:

continuation of impingement = extended causing

start of impingement = onset causing

cessation of impingement = onset letting = the above diagram's bottom two patterns

absence of impingement = extended letting = the next two patterns

Hence, "positive" impingement = causing / "negative" impingement = letting

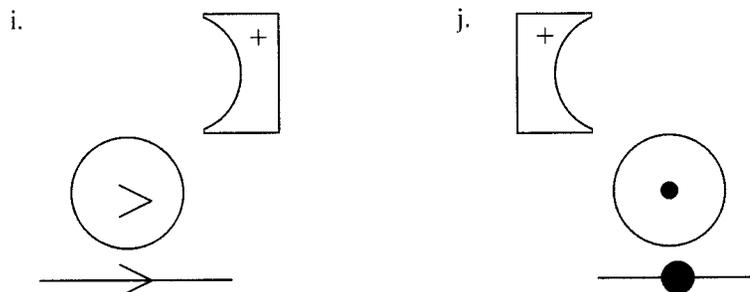
2.4 Secondary steady-state force-dynamic patterns

The last two stronger-Antagonist patterns = extended letting.

Here, the Antagonist remains out of impingement with the Agonist.

This is also "steady-state", but it is "secondary" since it is based on a negation of impingement.

(5)



(i) extended letting of action:

The plug's staying loose let the water drain from the tank.

(j) extended letting of rest:

The fan's being broken let the smoke hang still in the chamber.

The two extended letting patterns here join with the earlier two onset letting patterns to form the linguistic category of "letting".

2.5 Force-dynamic patterns with a weaker Antagonist

Two such patterns already seen: steady-state (b) and (c) = the "despite" patterns

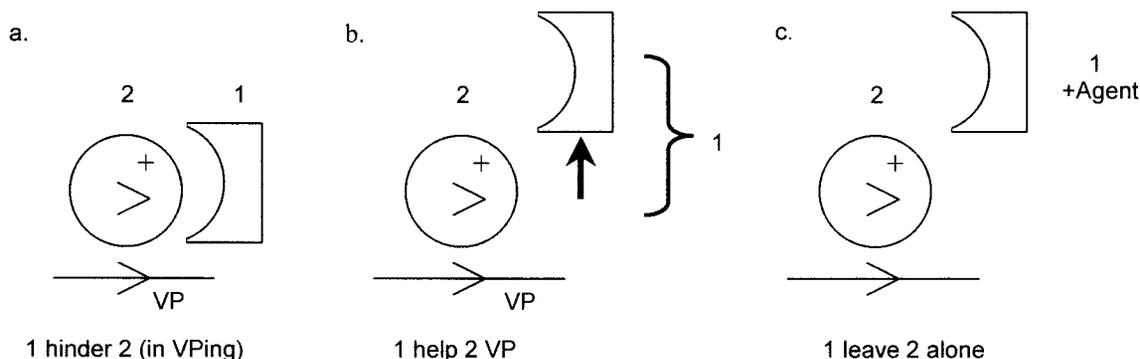
Their weaker Antagonist remains in impingement with the Agonist.

For other pairs of patterns, the weaker Antagonist--

comes into impingement / leaves impingement / remains away from impingement

Three of these eight are diagramed here, with examples representing the Antagonist as subject.

(6)



(a) weaker Antagonist remains in impingement = hindrance

Mounds of earth hindered the logs in rolling down the slope.

The benches hindered the children in crossing the schoolyard.

(b) weaker Antagonist leaves impingement = one type of helping

Smoothing the earth helped the logs roll down the slope.

Removing the benches helped the children cross the schoolyard.

(c) weaker Antagonist remains out of impingement = leaving alone

I left the rolling logs alone.

The teachers left the children alone in their exit from the schoolyard.

3. Force dynamics as a generalization over "causative"

McCawley's (1968) CAUSE was atomic and uniform.

Shibatani (1973), Jackendoff (1976), and Talmy (1976 = 2000, ch. 8)

distinguished different types of causing, but all still assumed a primitive 'cause' concept.

But force dynamics breaks the concept of causing into finer primitives,

sees causing as just one pattern -- or family of patterns -- of those new primitives

and sets causing within a framework of all the patterns of the new primitives.

(7) Force dynamics provides a framework in which can be placed:
 not only 'causing', but also 'letting'
 not only the prototypical cases of 'causing/letting', but also non-prototypical:
 prototypical causing: 'onset causing of action' (e)
 seldom considered: 'onset causing of rest' (f)
 sometimes considered: 'extended causing of action' (a)
 seldom considered: 'extended causing of rest' (d)
 prototypical letting, sometimes considered: 'onset letting of action' (g)
 seldom considered: other three 'letting' types (h, i, j)
 not only the stronger-Antagonist types ('causing/letting'),
 but also the weaker-Antagonist types
 ('despite/although', 'hindering/helping/leaving alone', 'trying...')
 not only cases with the result named, but also cases with the tendency named
 ('causing' vs. 'preventing')
 as in: The ridge kept the log lying on the incline.
 versus: The ridge prevented the log from rolling down the incline.
 not only the affecting entity (Antagonist) as subject,
 but also the affected entity (Agonist) as subject
 e.g., The wind kept the ball rolling. / The ball kept rolling because of the wind.

4. Extension of force dynamics to psychological reference

The physical application of force dynamics seen so far generalizes to the psychological realm.

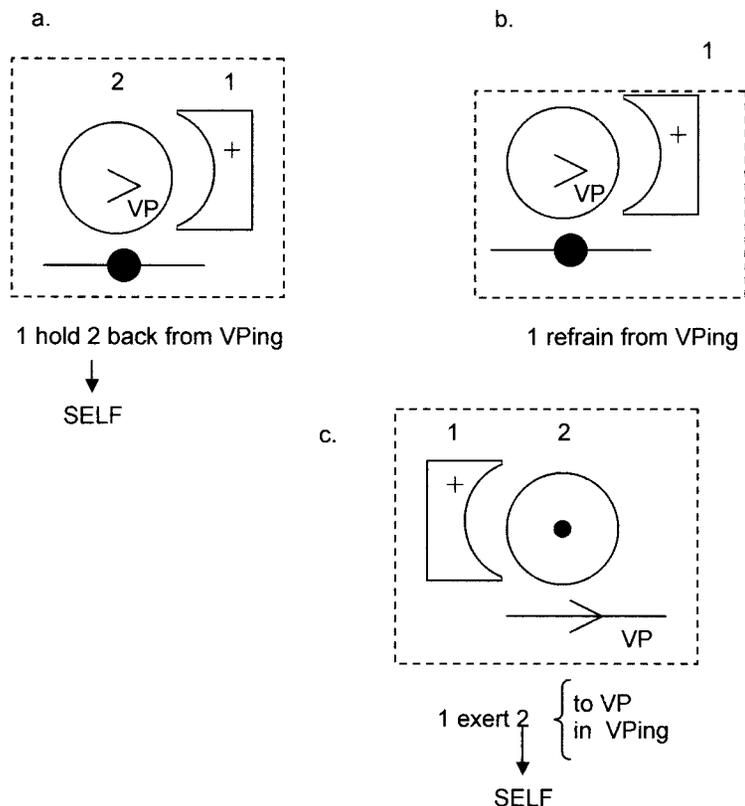
A want / urge -- as in *He wants to open the window* --
 can be conceptualized as pressure toward the realization of some act or state
 and represented by the arrowhead ">" in an Agonist diagram indicating a tendency toward action.

A person's mind can be conceptualized as having two opposing parts -- a divided self --
 which can be treated as Agonist and Antagonist in force dynamic patterns:

a central part = Agonist, with a desire = tendency, one toward either rest or a particular action
 a peripheral part = Antagonist, understandable as a sense of responsibility or propriety
 appearing as an internalization of external social values.

A stronger Antagonist/periphery with an Agonist/center tending toward action
 = self-inhibition/suppression = force dynamic blocking pattern (d): extended causing of rest
 A stronger Antagonist/periphery with an Agonist/center tending toward rest or "repose"
 = self-exertion = force dynamic pattern (a): extended causing of action

(8)



- (a) stronger Antagonist = suppressing self / Agonist = self's wish to act; both appear: He/himself
He held himself back from responding.
- (b) same as for (a), but without the two components of the self separately marked
He refrained from responding.
- (c) stronger Antagonist = exerting self / Agonist = self's wish to rest; both appear
He exerted himself in pressing against the jammed door.

In (a), the subject can be identified with the blocking part of the psyche, acting as Antagonist and the reflexive direct object with the desiring part, acting as Agonist.

4.1 Psychological origin of force properties in sentient entities

Non-sentient entities have their force properties through their own physical character as seen above for wind, a rolling log, etc., and here for a dam.

But the overt force properties of sentient entities are taken not as native to the physical body but as arising from psychological force dynamics, specifically, from exertion.

- (9) a. The new dam resisted the pressure of the water behind it.
b. The man resisted the pressure of the crowd against him.

The dam is conceptualized to stay in place due to its physical solidity and rootedness.

The man, if only a physical body, would be a weaker Agonist swept along by the crowd.

His psychological exertion is understood to render his body a stronger Agonist.

5. Extension of force dynamics to social reference

Force dynamics applies not just to the INTRA-personal or psychological = psychodynamics, as just seen but also to the INTER-personal or social = sociodynamics.

A possibly universal metaphor from a physical source domain to a social target domain:

Source: one material object directly imposes physical force on another material object towards the latter's manifesting a certain action

target: one sentient entity produces stimuli (e.g., communication) reaching another sentient entity that the latter perceives and interprets as reason for voluntarily performing a certain action

The linguistic constructions for physical force dynamics

can all also apply interpersonally, like *let* in (a)

and further constructions with words like *push* / *pressure* can be used, as in (b).

(10) a. He (finally) let her present her opinion.

b. The gang pushed / pressured him to do things he didn't really want to.

5.1 Interpersonal patterns based on a certain force dynamic sequence

A particular Antagonist-Agonist pair can shift in time force dynamically through three phases:

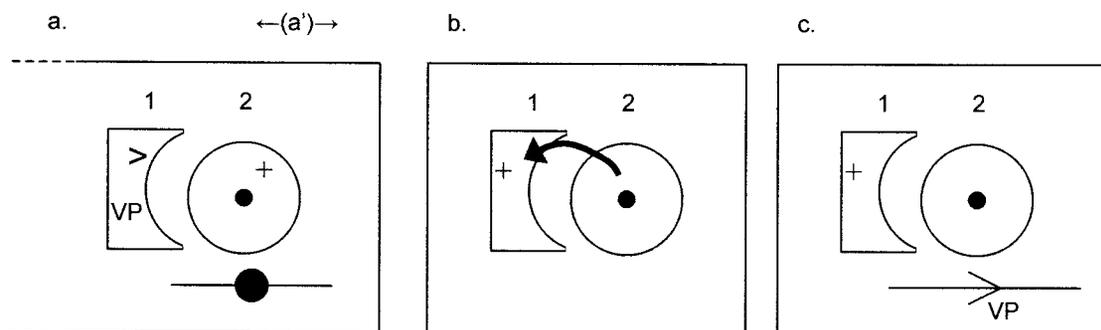
phase a: over an extent of time, a weaker Antagonist ineffectively impinges on an Agonist with a tendency toward rest

phase b: at some point, the balance of strength can shift

either because the Antagonist gets stronger or because the Agonist gets weaker

phase c: if (b) occurs, the now stronger Antagonist overcomes the Agonist's tendency toward rest and gets it to undergo a certain action

(11)



Interpersonal force dynamic lexical forms and constructions based on this sequence:

With attention on phase a, and the outcome at phase c unknown:

with Antagonist as subject:

She urged him to leave.

with Agonist as subject:

He was reluctant to leave.

With attention at phase c, and a positive outcome at c:

with Antagonist as subject:

She persuaded him to leave.

with Agonist as subject:

He relented. / He gave in to her on leaving.

With attention at phase c, and a negative outcome at c:

with Antagonist as subject:

She struck out with him on his leaving.

with Agonist as subject:

He refused to leave. / He wouldn't leave.

6. Modals as a syntactic category for the expression of force dynamics

English modals form a graduated grammatical category, from more core to more peripheral members, based on the degree to which they show certain morphosyntactic properties, including:

- (a) no *to* for the following verb / (b) no *-s* for the 3rd person singular /
 (c) postposed *not* / (d) inversion with the subject, as in questions

(12) can may must shall will need dare had-better
 could might --- ought should would dared (durst)

"honorary modals": have to / be supposed to / be to / get to

Force dynamic opposition is the common semantic factor running through the modals, as in:

(13) John can/may/must/should/ought/would/need/dare/had better not leave the house.

The subject represents the Agonist. The Antagonist is usually implicit.

can not: The subject has a tendency toward performing the indicated action,

some factor opposes that tendency, and the latter is stronger, blocking the action.

may not: In an interpersonal context, the subject has desire to perform the indicated action,

and the opposing factor is an authority's denied permission.

must not / had better not: like *may not* but, instead of merely blocking the subject's tendency,

the authority actively exerts social pressure against the subject to maintain him in place.

should not / ought not: The speaker's values as to what is good and beliefs as to what is beneficial

oppose the contrary behavior of the subject.

will not / would not: The subject refuses to yield to external pressure to perform the indicated action.

need not: The subject is released from a socially based obligation to perform the indicated action, imposed from outside against the subject's desires.

dare not: The subject's courage or nerve is opposed to an external threat, and proves weaker.

6.1 The force dynamics of *should*

The English modal *should* typically appears in a construction of the form:

X should VP

Examples:

She should lock her door when she leaves.

He should spend more time with his children.

but, semantically, *should* is better represented (and can generally also appear in form) as:

(Y holds that) X should VP

Here, X and Y are both sentient entities.

X, the Agonist, is the subject of *should*.

Y, the Antagonist, refers to the speaker, "I",

or perhaps to some concept of generalized societal authority.

Thus, the first example above more closely means, and can in fact be expressed as:

I think she should lock her door when she leaves.

(14) components in the meaning of: (Y holds that) X should VP

- a. X does not VP.
- b. In Y's belief system, X's VPing would benefit X or others.
- c. In Y's value system, X would be a better person if s/he VPed.
- d. Because of (b-c), Y wants X to VP.

Note: components (b) and (c) alone are not enough. Their import can be captured by:

(15) I think that she would be benefited and would be a better person
if she locked her door when she leaves.

But this formulation lacks the force impact of the original sentence.

The (d) component adds the crucial force dynamic factor,

turning Y into an Antagonist that exerts pressure on X as an Agonist.

6.1.1 Whether X is aware of Y's view affects the force dynamic pattern

Where X knows about Y's view, the arena of force dynamic opposition is within X's psyche.

Here, X experiences the opposition between his own wish to VP and Y's wish for him not to.

Y is typically a different entity from X, as in:

You should return the money. = I think you should return the money.

But Y can be the same entity as X, as in a divided self:

I should return the money.

= I (the responsible part) think I (the desiring part) should return the money.

The peculiar case: where X does not know of Y's view, as in:

(I think) she should lock her door when she leaves.

Here, the psyche of Y, the Antagonist, is the arena of force dynamic opposition between Y's desire and Y's awareness of the contrary actuality.

Sentence (b) = another example of this opposition between desire and actuality.

(16) a. John finally agreed. b. The lizard finally moved.

In sentence (a), the *finally* indicates that John relents after some time

as an outcome of continued outside psychosocial pressure, already described in 5.1

Hence, John's psyche is the arena of force dynamic opposition.

But in sentence (b), the lizard knows of no pressure and does no relenting.

Rather, the speaker's psyche hosts the opposition: the speaker had wanted the lizard to move, this wish was frustrated and built up in tension

until finally relieved by the occurrence of the lizard's motion.

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