Constraints on the co-occurrence of spatial and non-spatial paths in English: A closer look at the Unique Path Constraint

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1. Introduction
Path -- spatial and nonspatial

(1) Intransitive Motion and Caused Motion Constructions
   a. Susan ran into the forest.
   b. Bill kicked the ball out the window.

(2) Intransitive and Transitive Resultative Constructions
   a. Susan ran himself to exhaustion.
   b. Bill kicked John black and blue.

(3) Spatial paths
   *Bill sent his book to Sarah to Susan.

(4) Non-spatial paths
   *He wiped the table dry clean.

(5) Mixture of spatial and nonspatial paths
   a. *The vegetables went from crunchy into the soup.
   b. *Joe kicked the suitcase open to Bill.
   c. *I kicked him out of the room black and blue.
   d. *That got him out of jail out of solitude.
Unique Path Constraint (UP)

(6) **Unique Path Constraint** (Goldberg 1991: 368-369)

If an argument X refers to a physical object, then more than one distinct path cannot be predicated of X within a single clause. The notion of a single path entails two things.

1) X cannot be predicated to move to two distinct locations at any give time t.

2) The motion must trace a path within a single landscape.

Apparent counterexamples: multiple (further) specification

(7) Goldberg 1991
   a. She kicked him out of the house through the back door.
   b. The liquid froze solid into a crusty mass.

(8) Gruber 1976
   a. John sent the letter to New York to Bill.
   b. Bill received it from New York from Bill.
Single Delimiting Constraint
(Tenny 1994)

(8) **Single Delimiting Constraint:** The event described by a verb may only have one measuring-out and be delimited only once.

Evidence in favor of Unique Path over Single Delimiting

(9) a. *She kicked him black and blue to the door.
   b. *She kicked him black and blue toward the door.
      (Goldberg 1991)

(10) a. He stirred up the mixture smooth. (Bolinger 1971)
   b. I wadded up the paper loose.
2. A Closer Look

2.1 Counterexamples to Original UP

(11) a. **Change of location + change of state**
    I sliced the cheese *into thick pieces into the bowl*.
    
b. **Change of location + “event participation”**
    He came *home to a family dinner*.

(12) change of location vs. event participation
    a. A guest came to {our dinner table / dinner}.
    b. A gentle breeze came to {our dinner table / *dinner}.
Counterexamples in COBUILD Corpus

location + state (simultaneous)

(13)

a. He had been sentenced to death, spared at the last minute, and then sent far away into exile. (ukb)

b. Cut white meat off chicken into small pieces ... (tim)

c. that was the moment a leg became detached and a small spring-loaded contrivance rolled out of sight into the gutter. (ukm)
location + state (simultaneous), cont.

d. So a day later I was whisked out of isolation into the main ward where I was able to watch Dempsey and Makepeace. (sun)

e. ... it is almost natural that a young woman is frozen solid into the ice. (ukb)

f. the tide turned and swept the car back into shore to safety (sun)

    g. And just six minutes later, Hopkin grabbed the second when he worked himself free into space just inside the Borobox and drilled home a 16-yard rocket. (tod)
location + event (simultaneous)

(14)

a. It took poor Kawaguchi three hours to cover those two miles, and he staggered into camp to a festive meal of rice with butter and raisins. (usb)

b. Alex slowly falls down to the ground to his death.
location + state (successive)

(15)

a. Their mother jumped to safety from a bedroom window at the back of the house. (sun)

b. they can heat the Earth's upper atmosphere, causing it to expand and slowly drag satellites out of orbit and down to their obliteration. (ukb)

c. My entire defense papers and files have been confiscated and have gone out of my control and into somewhere where any of the authorities have access to them. (ukm)
location + event (successive)

(16)

a. Basketball star Michael Jordan is sucked down a golf hole into Toon Town ... and into a crazy game with cartoon characters like Bugs Bunny and Goofy. (sun)

b. Stephen Bayley gets out of his car and into the buzz of riding around on a scooter. (ukm)

c. when his girlfriend jumped to her death from the roof of a London psychiatric hospital ... (tim)
How frequent are these examples?

out of phrase + into phrase
9 out of 272 (3%) combinations have mixed phrases

to safety 50 out of 285 (18%) occur with a spatial path phrase
out of sight 13 out of 193 (7%) occur with a spatial path phrase
2.2 UP reformulated

In those examples, a change of location and a change of state occur *as a set, in a single course of development*

1. simultaneous; e.g., *sent far away into exile*  
   (one goes into a state$_2$ as s/he goes to a location$_2$)
2. successive; e.g., *jumped to safety from a bedroom window*

being in a location$_1$ or a state$_1$ is a prior stage leading to the stage of being in a location$_2$ or a state$_2$
A New Formulation

(17) **Revised Unique Path Constraint** *(Single Development Constraint)*: Within a single clause, spatial and nonspatial path phrases describing the location or state of an entity must refer to aspects of a single line of development that the entity follows.
Some notion of “unique path” is retained in the phrase “a single line of development.” It is still true that you can have only one path (i.e., only one endpoint).

However, “a single line of development” can be specified in terms of a change of location and that of state at the same time (plus event participation).
Evidence for “a single line of development”

(18)  a. *Joe kicked a suitcase open to Bob,
   b. Joe flung the door open right into Bob’s face.

(19)  a. *John kicked Bill black and blue out of the room
   b. (?)John kicked Bill black and blue and {ultimately/
      eventually} into a hospital room.
2.3 alternative analysis

Are these “nonspatial” path phrases really nonspatial?

Case study 1: *to one’s death* (event participation)

(20) He threw himself through the window to his death.

Goldberg 1991  *to one’s death*: an idiom which metonymically stands for ‘the place where one dies’.
schematization of an alternative analysis
Tsuzuki’s (2003) findings

The majority of to one’s death phrases occur with verbs of motion in COBUILD corpus.

The incompatibility with a fake reflexive suggests a pattern allegedly different from resultatives.

(21) a. He ate *(himself) to death.
    b. He jumped (*himself) to his death.
to one’s death is not a result phrase
(22) a. She continued to visit the inmate, Patrick Sonnier, as his spiritual advisor and accompanied him to his death by lethal injection. (http://eny.dioceseny.org/1102/prejean.html)
   b. he came to his death from a depressed fracture of the skull. (http://www.dcnhistory.org/coroners2.html)

to one’s death is not a pure goal phrase, either
(23) a. He threw himself from the balcony to his death, a death that was sad to everyone.
   b. *He threw himself from the balcony to his death, the place later visited by many of his followers.
(24) *Mary threw herself to his death.
(25) a. A guest came to {our dinner table / dinner}.
    b. A gentle breeze came to {our dinner table / *dinner}.

Conclusion: *to one’s death* represents “participation in death”

(26) a. He threw himself from the balcony to a miserable death.
    b. A soldier returned from the war in the Persian Gulf to a violent death outside his home in Detroit. (COBUILD npr)
Case study 2: *out of sight*

change of location vs. change of state

Change of state must be predicated of an argument of a verb, while change of location does not have to.

**change of state**

(27) a. The river froze **solid**. internal
    b. He broke **the vase** into pieces. internal
    c. Bill walked **himself** to exhaustion. fake
    d. Susan ran **her feet** sore. fake
    e. Bill ran **out of sight**. external

cf. discussion of Direct Object Restriction (Levin & Rappaport Hovav 1995, Rappaport Hovav & Levin 2001)
change of location vs. change of state

change of location

(28)

a. They threw the rope out the window.  
   internal

b. **They** followed the star to Bethlehem.  
   external

c. Cathie {spat/shot} into the hole.  
   unexpressed (incorporated?)

d. Bill {looked/nodded} across the table.  
   unexpressed (fictive)

e. They hit me from behind.  
   unexpressed (source of action)

f. Cut the meat across the grain.  
   unexpressed (direction)
into the air vs. out of sight

(29) moving entity expressed
   a. The archer shot an arrow into the air.
   b. The archer shot an arrow out of sight.

(30) moving entity unexpressed
   a. The archer shot into the air. (in the sense of (29a))
   b. *The archer shot out of sight. (in the sense of (29b))

(31) a. The archer shot an arrow out of sight into the air.
   b. ??The archer shot out of sight into the air.
      (in the sense of (31a))
into the air vs. out of sight, cont.

(32) moving entity expressed
   a. They fired a cannon ball into the sky.
   b. They fired a cannon ball out of sight.

(33) moving entity unexpressed
   a. They fired a cannon into the sky.
   b. *They fired a cannon out of sight. (in the reading of (32b))

(34) a. They fired a cannon ball out of sight into the sky.
   b. ??They fired a cannon out of sight into the sky. (=34a)
2.4 Note on “no two goals”

Ditransitive and caused motion

(35) a. Hey, toss me that wrench up, will you? (Oehrle 1976, den Dikken 1995)

b. Throw me up a ham sandwich. (Keyser & Roeper 1992)

c. Can you pass me that big folder off the floor?

d. We will send every stockholder a paycheck off to his holiday resort. (Haider 1992)
Dative NP as intended recipient
(36) a. I threw you the ball, but it was intercepted by an opponent. (cf. Kay MS)
   b. *Joe threw the right fielder the ball he had intended the first baseman to catch. (Goldberg 1995: 143)

Incompatibility of actual recipient and intended recipient
(37) a. Joe threw Jerry a long pass into the end zone.
   b. Joe threw a long pass into the end zone to Jerry.
   c. *Joe threw Jerry a long pass into the interceptor’s hands.
(38) *He wiped the table dry clean.  
    (Tenny 1994, Goldberg 1991)

(39) “further specification” (Goldberg 1991)  
    a. washed his face shiny clean  
    b. nailed the door closed shut  
    c. made her worried sick
acceptable sequence as a compound

(40) Adjective+adjective compounds (Adams 2001)
icy-cold, silky-soft, snowy white, etc.

(41) a. They were {shiny clean/closed shut/worried sick}.
   b. *They were {dry clean/bloody dead/tall beautiful}.

(42) a. They are (even) more shiny clean.
   b. *They are shinier cleaner.
3. Previous examples reexamined

3.1 Coordination issue

    b. That got him out of jail and out of solitude.

(43) a. *They drove out of California out of the US (and entered Mexico).
    b. They drove out of California and out of the US.

(45) a. I was whisked out of isolation into the main ward...
    b. They drove out of California into Mexico.
3.2 Properties of a specific construction

(46) *The vegetables went from crunchy into the soup.

The state-change *from-to* construction

(47) The boy can switch *from nice to nasty* in seconds.

\[ \text{go, change, turn, transform, etc.} \]

The complements of *from* and *to* 1) must represent a state (semantic requirement) and 2) must be a syntactically matching pair (grammatical requirement).
state-change *from-to* construction

(46)  
a. Ken went from poor to rich.  
   b. Ken went from a poor man to a wealthy man. 
   c. Ken went from poverty to wealth.
   
   AP-CC
   NP-CC
   NP-NCC

(47)  
a. Ken went from being poor to (being) rich. 
   b. Ken went from being a poor man to (being) a wealthy man. 
   c. *Ken went from being poverty to (being) wealth.*
co-occurrence restrictions on complement types

(48) a. *He went from poor to wealth.  
   AP-CC + NP-NCC
b. *He went from a poor man to wealth.  
   NP-CC + NP-NCC
c. %He went from poor to a wealthy man.  
   AP-CC + NP-CC
d. He went from being poor to (being) a wealthy man.
state change *from-into* construction

(49)  
  a. He went from a nice guy into a nasty guy.
  b. He went from the state of poverty into the state of wealthiness.

Preference for nominal for both complements

(50)  
  a. ?He went from nice into nasty.
  b. ?He went from nice into a nasty guy.
  c. ?He went from poor into the state of wealthiness.

*from crunchy into a soup* violates both 1) state requirement and 2) matching pair requirement
3.3 mixture of more than one verb sense

(51) a. All the ingredients went into the soup, and the vegetables went from crunchy to soft.
   b. *All the ingredients went into the soup, and the vegetables, from crunchy to soft.

(52) a. The students went into the crowd, and some of them went out of sight.
   b. The students went into the crowd, and some of them, out of sight.

gapping assumes the identity of verb sense

(51) involves two different senses of go.
4. Unique Path-theme Constraint

Question: How many entities can a clause have with respect to which path phrases are interpreted?

cf. Unique Path
Single Delimiting
change of state

(53) a. **The river** froze solid. internal
    b. He broke **the vase** into pieces. internal
    c. Bill walked **himself** to exhaustion. internal (fake)
    d. **Bill** walked out of sight. external
change of location

(54)

a. They threw **the rope** out the window. internal

b. **They** followed the star to **Bethlehem**. external

c. Cathie {looked/nodded/spat/shot} **out the window**.
   unexpressed (fictive/incorporated)

d. He hit me **from behind**. unexpressed (source of action)

e. Cut the meat **across the grain**. unexpressed (direction)
initial hypothesis

Hypothesis I: A clause can have only one entity (syntactically expressed or unexpressed) with respect to which path phrases are interpreted.

Counterexamples
(55) *from*-phrase representing the source of action
   a. The two men knocked Tom down from behind.
   b. From there can you reach me the flour down off the shelf?
   c. From here they shot the bird down from the tree.
(56) fictive path
The door of the elevator slid open into the Tascosa Room.

(57) unexpressed entity (that exists in the event frame activated)
Now he poured a Coca-Cola glass half full from a bottle of Jack Daniel's ...

(58) a. banged the cans out empty  (Bolinger 1971)
b. pour the glass out dry
c. drain the tank out empty
cf. *drain the water out empty
Hypothesis II (Unique Path-Theme): A clause can have only one “path-theme,” or syntactically expressed argument associated with path phrases.

Two theme arguments

(59) a. John chased the man out of the garden

b. John chased the man as far as the gate (and stopped the chase there.)

c. ??John chased the man out of the garden as far as the gate.
apparent counterexamples

(60) a. **Jonathan** ran **his legs off** to the goal.  (cf. Lupsa 2003)
   b. **Susan** ran **her heart out** to the finish line.

(61) a. Jonathan ran his legs off from the bridge to the finish line.
   b. Susan ran her heart out from the start line to the finish line.
   c. Jonathan ran his legs off for the full 30 minutes.

intensifier reading (Jackendoff 1997, Sawada 2000, Boas 2006 (yesterday))
(62) Tenny 1994
   a. % Jonathan ran himself exhausted to the end of the track.
   b. % Sarah pounded the pavement flat to Bloomingdale’s.

Individual variation in the judgement of these sentences

Processing source of Unique Path-theme Constraint?
5. Unique Path and Theories of Grammar/Semantics

5.1 UP as a reflection of semantic structure well-formedness?

GO and related PATH functions must match in their semantic feature subscripts (cf. Gruber 1976)

(62)  a. *The vegetables went from crunchy into the soup.

b. \([\text{Event } \text{GO}_{\text{Spat}} ([\text{VEGIE}], \text{FROM}_{\text{Ident}} \text{[Property CRUNCHY]}], \text{TO}_{\text{Spat}} \text{[Place IN}_{\text{Spat}} \text{[Thing SOUP]})] \)
(63) a. He was sent far away into exile.
b. It rolled out of sight into the gutter.

Some verbs are neutral with respect to spatial/nonspatial distinction of the path phrases, and co-occur with both.

Identity of the type of path is not required. Only the lack of incompatibility is required.
Can the (Revised) Unique Path (Single Development) be stated in terms of feature values in semantic structure if properly formulated in terms of the lack of inconsistency?

---> No. The notion of well-formed “single development” is not just an issue of path types.

(64) a. *Joe kicked a suitcase open to Bob,
    b. Joe flung the door open right into Bob’s face.

A theory of semantics that considers seriously the knowledge of the world is needed.
(65)  a. The students went out of sight into the crowd.
    b. The students went out of sight.
    c. The students went into the crowd.

Questions: 1) Does went in (65b) and (65c) have an identical meaning?
          2) Are (65b) and (65c) the same construction?
5.2 Implications for Construction Grammar

5.2.1 Polysemy in verbs?

Goldberg 1995 reduction of verbal polysemy
Boas 2003, Iwata 2005ab more cases of polysemy in the lexicon

Some verbs occur with spatial and nonspatial path phrases at the same time. Does that mean that those verbs have an identical meaning across the boundary of the motion/caused motion constructions and the resultative constructions?
--- Yes!

(65)  a. The students *went* into the crowd.
    b. The students *went* out of sight.

(66)  a. The students *went* out of sight into the crowd.
    b. The students *went* into the crowd, and some, out of sight.
(67) a. (?)John **kicked** Bill **black and blue** and {ultimately/ eventually} **into a hospital room**.

b. They can slowly **drag** satellites **out of orbit** and **down to their obliteration**.

c. His queer behavior **drove** her **mad** and eventually **out of his house**.
caution

But this cannot be generalized too far.

(68) a. Bill went crazy, and eventually he went out of the house.
    b. *Bill went crazy and eventually out of the house.
    c. *Bill went crazy, and Susan, out of the house.

(69) a. Someone threw a bomb into the street, and threw the crowd into chaos.
    b. *Someone threw a bomb into the street, and the crowd into chaos.
5.2.2 Identity of constructions?

Some verbs occur with spatial and nonspatial path phrases at the same time. Does this mean that the motion construction and the intransitive resultative construction are in fact (not just related but) an identical construction?

No. The two differ crucially in their capability of allowing path phrases to be interpreted with respect to unexpressed entities.

(70)  
  a. SUBJ$_i$ V OBL$_i$
  b. SUBJ$_i$ V OBJ$_j$ OBL$_i$,j

(71)  
  a. SUBJ$_i$ V OBL$_i$, k
  b. SUBJ$_i$ V OBJ$_j$ OBL$_i$,j,k
Then, what construction is this?

(70) Bill went out of sight into the crowd.

Perhaps a blend of the motion construction and the intransitive resultative?
Summary

UP must be reformulated in terms of “a single development” that allows a mixture of spatial and nonspatial path phrases in a blended construction.

Some of the previously explained unacceptable examples are ruled out for some other reasons.

There is evidence for both reduction and recognition of polysemy in lexical meanings.
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