

Force Dynamics, Image Schemas, and Constructional Polysemy in Prepositions

ἐπί and κατά in Postclassical Greek

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Force is ubiquitous in daily life. We act and are acted upon by causal sequences that require the exertion of force. Typical force interactions shape our inferences about the world and how we communicate in language.

You may not be cognizant of gravity, but you need only pick up an object and drop it to note its effects.

As a semantic category, *force dynamics* refers to the interaction of forces, counterforces, and causal relations. In this paper, we explore the force-dynamic aspects of Greek prepositions ἐπί and κατά.

ἐπί and κατά

1. καὶ ἔλαβεν Σαοῦλ [TR] τὴν ῥομφαίαν καὶ ἐπέπεσεν **ἐπ’ αὐτήν** [LM].
Saul [TR] took his sword and fell **on it** [LM] (LXX 1 Chronicles 10:4).
2. φοβούμενοί τε μή που **κατὰ τραχεῖς τόπους** [LM] ἐκπέσωμεν [TR] ἐκ πρύμνης ῥίψαντες ἀγκύρας τέσσαρας.
Fearing that we [TR] might run aground **against the rocks** [LM], they dropped four anchors from the stern (Acts 27:29).

Consider the following examples, one for ἐπί and one for κατά.

In (1), Saul is in a position over his sword and falls in the direction of the sword from above.

In (2), Paul and his fellow travelers are on a ship in the Mediterranean when they are caught in a storm. Their ship could run aground along the rocks, so they drop anchors to hold their location steady.

These examples are about force, not just space.

Saul in (1) relies on gravity to fall downward on his sword. His sword provides a counterforce that when pressed against pierces him through. The opposing forces, body against sword, cause his death.

In (2), the force of the storm compels the ship toward the rocks. Paul and his compatriots know this path could splinter the ship. The rocks supply a counterforce to the storm. They oppose the sweep of the waves as they crash against the land. Where these opposing forces meet, the ship becomes compromised.

Force Dynamics

ἐπί



κατά



The study of force dynamics seeks to understand how causal concepts that involve force are represented in language and cognition. The force domain captures a naïve metaphysics of how we experience everyday forces through embodied interactions, including applying, resisting, overcoming, and removing forces, as well as the source, direction, and magnitude of forces present in a scene.

Investigations into grammatical constructions illustrate the ways in which force is fundamental to language and cognition because it is fundamental to our lives. Prepositional phrases are implicated in force dynamics by nature of their function of locating a TR entity relative to a LM entity. The way 2 entities interact whether in terms of motion, location, or other arrangements, may naturally be motivated by force dynamics because of our embodied experiences.

We suggest that force dynamics represents an unexplored, but essential element by which the diversity of these 2 prepositions may be accounted for in a cognitively plausible manner.

Force Dynamics with ἐπί

What do we when we don't want something to fall down? We put it somewhere stable, right? Our experience of living in the world tells us we can counteract the downward pull of gravity with stable surfaces. These experiences help us create and talk about an equilibrium of forces.

Putting things on other things

3. Πᾶς οὖν ὅστις ἀκούει μου τοὺς λόγους τούτους καὶ ποιεῖ αὐτούς
ὁμοιωθήσεται ἀνδρὶ φρονίμῳ ὅστις ὠκοδόμησεν αὐτοῦ τὴν οἰκίαν [TR] **ἐπὶ τὴν
πέτραν** [LM]
Therefore, everyone who hears these words of mine and does them will
be like a wise man who built his house [TR] **on the rock** [LM] (Mt 7:24).
4. καὶ πᾶς ὁ ἀκούων μου τοὺς λόγους τούτους καὶ μὴ ποιῶν αὐτούς
ὁμοιωθήσεται ἀνδρὶ μωρῷ ὅστις ὠκοδόμησεν αὐτοῦ τὴν οἰκίαν [TR] **ἐπὶ τὴν
ἄμμον** [LM].
And everyone who hears these words of mine and does not do them will
be like a foolish man who built his house [TR] **on the sand** [LM] (Mt 7:26).

Think about Jesus's story of the wise and foolish men. The wise man built his house ἐπὶ the rock. The foolish man built his house ἐπὶ the sand.

The effectiveness of the *rock* and *sand* to counteract the destructive force of the storm are central to the parable. High quality foundations counteract the storm. Low quality foundations succumb to the storm. The capacity of rock vs. sand as counterforces against the storm motivates Jesus's teaching, not spatial orientation.

The STACK ἐπί construction

- The STACK ἐπί construction occurs within the physical realm.
- It highlights a stabilizing upward force exerted from the LM entity to the TR entity, counterbalancing the downward force of gravity or other destabilizing forces.
- This construction is grounded in our embodied experience of placing one object on another.

Let's call this the STACK construction:

- The Stack ἐπί construction occurs within the physical realm.
- It highlights a stabilizing upward force exerted from the LM entity to the TR entity, counterbalancing the downward force of gravity or other destabilizing forces.
- This construction is grounded in our embodied experience of placing one object on another.

The STACK ἐπί construction

5. ...καὶ πᾶς ὁ ὄχλος [TR] ἐπὶ τὸν αἰγιαλὸν [LM] εἰστήκει
...and the whole crowd [TR] was standing **on the shore** [LM] (Matt 13:2).
6. θεωροῦσιν τὸν Ἰησοῦν [TR] περιπατοῦντα ἐπὶ τῆς θαλάσσης [LM] ... καὶ ἐφοβήθησαν.
They saw Jesus [TR] walking **on the sea** [LM] ... and they were terrified (John 6:19).

What about examples like (5)? Is this still the stack construction? Sometimes, it can be tempting to take the LANDMARK force for granted and treat the LM as merely a location vertically oriented on a surface in space. This has an appeal. It seems trivial to say the surface LM of the shore counteracts gravity. Surely, that's merely a location for the crowd.

Stable surfaces are taken as given, unmarked defaults. But the disciples' fear, in (6) only makes sense if the forces assumed by the preposition ἐπί are usurped. The configuration of Jesus (TR) on the sea (LM) undermines everything they know about how the world works. Example (6) helps make explicit the forces taken for granted in (5).

WEATHER ἐπί construction

7. προσδοκάσθω ὡς ὑετὸς τὸ ἀπόφθεγμά μου, καὶ καταβήτω ὡς δρόσος τὰ ῥήματά μου· ὥσει ὄμβρος [TR] **ἐπ’ ἄγρωστιν** [LM], καὶ ὥσει νιφετὸς [TR] **ἐπὶ χόρτον** [LM].

Let my hymn be anticipated like rain and may my words come down like dew, like a rainstorm [TR] **upon the grass** [LM] and a snowstorm [TR] **upon the grasslands** [LM] (LXX Deut 32:2).

Though the stabilizing force of the LM functions as the central prototype, speakers can use ἐπί in force-dynamic contexts where resistance is not the goal.

In (7), the downward force of the TR is profiled in the scene along with its effects on the LM. Moses hopes his hymn will have the same positive effects that rain and snow have on the grass and grasslands where precipitation is scarce and always welcome.

Forces are fundamental constructs for causality. They produce causal chains between the TR and LM with the resulting effect of the land being nourished.

CRUSH ἐπί construction

8. ἐκεῖνοι οἱ δεκαοκτὼ **ἐφ' οὓς** [LM] ἔπεσεν ὁ πύργος [TR] ἐν τῷ Σιλωὰμ
καὶ ἀπέκτεινεν αὐτούς
those eighteen people **on whom** [LM] the tower [TR] in Siloam fell
and killed them (Luke 13:4)
9. Ὁ τρώγων μου τὸν ἄρτον ἐπῆρεν **ἐπ' ἐμέ** [LM] τὴν πτέρναν αὐτοῦ [TR].
The one who eats my bread has lifted up his heel [TR] **upon me** [LM]
(John 13:18).

Example 8 represents the same causal structure. The downward force of the TR has an effect on the LM. But in (8), the sheer power of the TR force overwhelms the LM and crushes it. The downward force is the impetus for the mass of the tower to kill the people below.

Even the potential of exerting force is itself sufficient for activating force in a scene.

Example (9) extends the construction metaphorically to Judas's betrayal of Jesus. Jesus portrays Judas lifting his foot (TR) above Jesus (LM) ready to stomp downward. The force of the stomp is anticipatory. It has not yet taken place and at speech time, it is only potential.

ATTACH ἐπί construction

10. καὶ προδραμὼν εἰς τὸ ἔμπροσθεν ἀνέβη ἐπὶ συκομορέαν [LM] ἵνα ἴδῃ αὐτόν ὅτι ἐκείνης ἡμελλεν διέρχεσθαι
And he [TR] ran on ahead and climbed up **on a sycamore tree** [LM] so that he could see him, because he was going to go through that way (Luke 19:4).
11. ἔγραψεν δὲ καὶ τίτλον [TR] ὁ Πιλᾶτος καὶ ἔθηκεν ἐπὶ τοῦ σταυροῦ [LM] ἣν δὲ γεγραμμένον Ἰησοῦς ὁ Ναζωραῖος ὁ βασιλεὺς τῶν Ἰουδαίων
And Pilate also wrote a notice [TR] and placed it **on the cross** [LM] and it was written: “Jesus the Nazarene, the king of the Jews” (Acts 21:5).

Spatial explanations of ἐπί in (10)–(11) cause difficulty. Are they distinct, alternative senses? Semantic extensions?

When we integrate force-dynamics, more complex analyses become unnecessary. The same downward force and stabilizing counterforce are at play. In (10), Zaccheus counteracts gravity with the tree. He grips the tree’s trunk and branches as he climbs. We can label this the ATTACH construction. The force dynamics are effectively the same as the STACK construction.

The same in true in (11). As a stabilizing surface, the cross (LM) holds the notice (TR) in position. Where the forces of adherence and stabilization meet is where the note is held in place.

Predicate semantics in constructions

12. πίστει Ἰακώβ [TR] ἀποθνήσκων ἕκαστον τῶν υἱῶν Ἰωσήφ εὐλόγησεν καὶ προσεκύνησεν ἐπὶ τὸ ἄκρον τῆς ῥάβδου αὐτοῦ [LM]
By faith Jacob [TR], as he was dying, blessed each of the sons of Joseph and worshiped, leaning **on the top of his staff** [LM] (Heb 11:21).

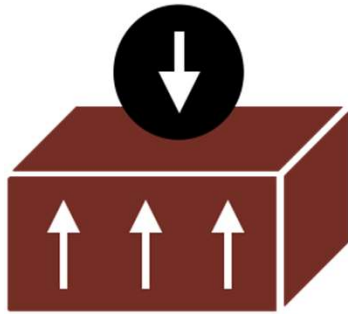
13. καὶ καταγαγόντες τὰ πλοῖα [TR] ἐπὶ τὴν γῆν [LM] ἀφέντες πάντα ἡκολούθησαν αὐτῷ.
When they had brought their boats [TR] **onto shore** [LM], they left everything and followed him (Luke 5:11).

Here, *ἐπὶ* supplies the force-dynamic pattern and the predicate supplies the spatial relationship, whether horizontal or vertical.

In (12), the predicate ‘lean’ implicates a vertical relationship. This LEAN construction, has Jacob balancing the force of gravity against the stabilizing counterforce of his staff to keep himself up.

In (13) the boats come ashore via force-dynamic impetus of intentional agents traveling a horizontal path with a cause-motion predicate. The STACK construction supplies the GOAL. The shore is a stabilizing counterforce for the final location of the boats.

Image Schematic Structure for ἐπί



Constituent Parts

- **Force:** Directed toward the landmark
- **Landmark:** Stabilizing surface
- **Trajector:** Figure directed at landmark surface

We can posit this image schema for ἐπί with a basic vertical configuration of TR and LM. Transformations of this vertical position toward horizontal rotation in space only reinforce the necessity of considering the force-dynamic components of preposition meaning. The spatial configuration may rotate but the forces remain constant.

In the basic schema, the force vector of the TR brings it in contact with the LM. The counterforce from the LM balances the force vector from the TR. We use the term *force vector* here to indicate that the force from the TR has a magnitude and a direction toward the LM. This vector is typically generated by gravity, but it can also be the impetus of an agent or an instrument of adherence.

This schema serves as a central prototype, which can then be adapted by transformations.

What does this mean?

- **Image schemas** are mental patterns that arise from sensorimotor activity as we manipulate objects and interact with forces in the world.
- **Image schema transformations** are cognitive operations that allow us to alter and elaborate basic schemas, providing for our understanding of a variety of cognitive domains.

Together, they are used in everyday experience to organize language, thought, and conceptual structure.

Let's consider how this image schema motivates ἐπί in more abstract domains.

EXPERIENCER-STIMULUS ἐπί constructions

14. Ὁ κύριος ὁ θεὸς ἐφορᾷ, καὶ ταῖς ἀληθείαις ἐφ’ ἡμῶν [LM] παρακαλεῖται [TR]
The Lord God is watching and truly is compassionate [TR] **on us** [LM]”
(LXX 2 Macc 7:6).
15. ἐπιβλέψετε [TR] δὲ ἐπὶ τὸν φοροῦντα τὴν ἐσθῆτα τὴν λαμπρὰν [LM] καὶ
εἴπητε Σὺ κάθου ὧδε καλῶς
and you look favorably [TR] **on the one wearing the fine clothing** [LM]
and you say, “Be seated here in a good place” (James 2:3).
16. ἐνύπνιον, ἢ ἐν μελέτῃ νυκτερινῇ, ὡς ὅταν ἐπιπίπτῃ δεινὸς φόβος [TR] **ἐπ’**
ἀνθρώπους [LM], **ἐπὶ νυσταγμάτων** [LM] **ἐπὶ κοίτης** [LM].
A dream, or in a vision at night, as when a terrible fear [TR] falls **upon**
people [LM], **upon their sleep** [LM], **upon their bed** [LM] (LXX Job 33:15).

Segment profiling focuses on a single segment of the schema. If we focus on the downward force the TR, we can note its effects on the LM. Downward forces play a role in the expression of emotions outside the control of the animate LM.

For DOWNWARD EXPERIENCER-STIMULUS constructions in (14) and (15), the benefit of an agent’s attention (by compassion or looking favorably) is construed as a downward force that produces a positive effects on the animate LM. In (16), Job’s friend construes the emotion of fear as vertical force coming down upon the people who experience it.

This construction extends WEATHER & CRUSH constructions to emotions and creates an abstract experience of weight for such emotions.

EXPERIENCER-STIMULUS ἐπί constructions

17. νῦν ἰδοὺ πέποιθας σαυτῷ [TR] ἐπὶ τὴν ῥάβδον τὴν καλαμίνην τὴν **τεθλασμένην ταύτην** [LM], **ἐπ’ Αἴγυπτον** [LM]. ὃς ἂν στηριχθῇ ἀνὴρ **ἐπ’ αὐτήν** [LM], καὶ εἰσελεύσεται εἰς τὴν χεῖρα αὐτοῦ, καὶ τρήσει αὐτήν· οὕτως Φαραὼ βασιλεὺς Αἰγύπτου πᾶσιν τοῖς πεποιθόσιν **ἐπ’ αὐτόν** [LM].

Now look, you trust yourself [TR] **upon this bruised reed rod** [LM]—**on Egypt** [LM]. Whatever man is supported **upon it** [LM], it will go into his hand, and it will pierce it. This how Pharaoh, king of Egypt, is to all who trust **on him** [LM] (LXX 4 Kingdoms 18:21).

With other cognition events, the STACK construction is leveraged.

In UPWARD EXPERIENCER-STIMULUS constructions, the upward, stabilizing force associated with the LM is the profiled segment of the schema.

Just like a house built on rock or sand, good foundations are reliable. Bad foundations are not. This experience is extended to expressions of confidence, trust, and belief.

The Assyrian King in (17) warns King Hezekiah not to trust Egypt as an ally. It might appear to offer support, but it will instead weaken him. Egypt is not a trustworthy support.

REASON ἐπί construction

18. ὥσπερ γὰρ ἐχάρη [TR] ἐπὶ τῇ σῇ πτώσει [LM] καὶ εὐφράνθη [TR] ἐπὶ τῷ πτώματί σου [LM], οὕτως λυπηθήσεται [TR] ἐπὶ τῇ ἐαυτῆς ἐρημίᾳ [LM].
Just as she rejoiced [TR] at your fall [LM] and was cheerful [TR] in your calamity [LM], so will she grieve [TR] at her own desolation [LM] (LXX Baruch 4:33).
19. ὁ δὲ στυγνάσας [TR] ἐπὶ τῷ λόγῳ [LM] ἀπῆλθεν λυπούμενος ἦν γὰρ ἔχων κτήματα πολλά. Καὶ περιβλεψάμενος ὁ Ἰησοῦς λέγει τοῖς μαθηταῖς αὐτοῦ· Πῶς δυσκόλως οἱ τὰ χρήματα ἔχοντες εἰς τὴν βασιλείαν τοῦ θεοῦ εἰσελεύσονται. οἱ δὲ μαθηταὶ ἐθαμβοῦντο [TR] ἐπὶ τοῖς λόγοις αὐτοῦ [LM].
But he became gloomy [TR] upon the statement [LM] and went away sorrowful, because he had many possessions. Then Jesus looked around and said to his disciples, “How hard it will be for those who have wealth to enter the kingdom of God!” And the disciples grew amazed [TR] upon these words [LM] (Mark 10:22–24).

Built structures are caused structures, with causal chains that move upward from the foundation, each block functions as a cause for the one above.

The status of the TR on the LM is causally dependent on that LM. Causal interactions requires the interaction of force.

Reason constructions are construed as foundations for people's actions.

In (18) and (19), the stabilizing upward force from the LM serves as a foundation on which emotional responses are built: rejoicing on your fall, cheer on your calamity, grief on desolation, gloomy on a statement, and amazement upon these words.

RULE ἐπί construction

20. δὲ ἀδικῶν τὸν πλησίον ἀπώσατο αὐτὸν εἰπὼν Τίς σε κατέστησεν
ἄρχοντα [TR] καὶ δικαστὴν [TR] ἐφ' ἡμῶν [LM]
But the one who was doing wrong to his neighbor pushed him aside,
saying, 'Who appointed you ruler [TR] and judge [TR] **over us** [LM]?
(Acts 7:27).

In RULE constructions, the forces of control and authority come from positions of social hierarchy. Social structures, as downward forces, burden the people in (20). They question Moses's authority over them. He is not a ruler (TR) who can put his authority on them (LM).

CONFLICT ἐπί construction

21. ἢ τίς βασιλεὺς πορευόμενος ἐτέρῳ βασιλεῖ συμβαλεῖν εἰς πόλεμον οὐχὶ καθίσας πρῶτον βουλεύσεται εἰ δυνατός ἐστιν ἐν δέκα χιλιάσιν ὑπαντῆσαι τῷ μετὰ εἴκοσι χιλιάδων ἐρχομένῳ [TR] ἐπ' αὐτόν [LM];
Or what king, going out to engage another king in battle, will not sit down first and consider whether he is able with ten thousand to oppose the one who comes [TR] against him [LM] with twenty thousand? (Luke 14:31).
22. καὶ ἀνέστη Καὶν [TR] ἐπὶ Ἄβελ τὸν ἀδελφὸν αὐτοῦ [LM] καὶ ἀπέκτεινεν αὐτόν.
And Cain [TR] rose on Abel, his brother [LM], and he killed him (LXX Gen 4:8).

In conflict frames, 2 opposing forces are pitted against one another, profiling the force of the TR and the counterforce of the LM in the scene.

In (21), a king weighs the prospect of war against an enemy of great numbers who comes against him.

In (22), Cain acts as the aggressor against Abel.

Constructions with the preposition ἐπί

STACK ἐπί construction	→ Physical domain: Profiles stabilizing upward force from the LANDMARK entity to the TRAJECTOR entity. Can join SPG construction with an ἐπί GOAL.
CRUSH ἐπί construction	→ Physical domain: Profiles downward force of gravity of the TRAJECTOR entity against the LANDMARK entity below.
ATTACH ἐπί construction	→ Physical domain: Profiles downward force of gravity against TRAJECTOR entity; TRAJECTOR entity attaches to/hangs on LANDMARK entity; spatial orientation varies
LEAN ἐπί construction	→ Physical domain: Profiles downward force of gravity against vertically oriented TRAJECTOR; TRAJECTOR supports its orientation by adjusting its weight against LANDMARK that provides a stable counterforce.
WEATHER ἐπί construction	→ Physical domain: Profiles downward force from meteorological/astronomical STIMULUS TRAJECTOR that causes an effect on EXPERIENCER LANDMARK entity; naïve physics.
EXPERIENCER-STIMULUS ἐπί construction	→ Cognitive domain: Two construal patterns. <ul style="list-style-type: none"> • Downward force: Emotion or perception TRAJECTOR functions as STIMULUS for animate EXPERIENCER LANDMARK. • Upward force: Animate TRAJECTOR is an EXPERIENCER for STIMULUS LANDMARK.
REASON ἐπί construction	→ Cognitive domain: Profiles LANDMARK stabilizing upward force; metaphorical extension of STACK construction: Built structures are caused structures, wherein their causal chain moves from the foundation upward; a TRAJECTOR's status on a LANDMARK is causally dependent on that LANDMARK. Events or states replace objects as TRAJECTOR and LANDMARK.
RULE ἐπί constructions	→ Social domain: TRAJECTOR participant is construed as socially higher than LANDMARK participant; AGENT TRAJECTOR exerts social control downward on PATIENT LANDMARK.
CONFLICT ἐπί construction	→ Physical and social domains: Profiles TRAJECTOR downward force and LANDMARK upward force equally; both participants are volitional agents; TRAJECTOR is construed as aggressor and LANDMARK as defender.

Understanding ἐπί requires understanding the interaction of forces, the downward force of the TR against a stabilizing LM.

This image schema motivates the constructional polysemy summarized here.

Force Dynamics with *κατά*

Force Dynamics with *κατά*

FALL κατά construction

25. δύο γὰρ γυναῖκες [TR] ἀνήχθησαν περιτετμηκυῖαι τὰ τέκνα· ... **κατὰ τοῦ τείχους** [LM] ἐκρήμνισαν.

For two women [TR] were brought forth because they circumcised their children. ... They hurled them **down the wall** [LM] (LXX 2 Macc 6:10).

Remember our first *κατά* example ‘run aground against the rocks’? Force implications are explicit. But it’s more difficult to ascertain how spatial and geometric glosses like ‘down’ implicate force dynamics. “Down” is the original sense in grammars and dictionaries.

‘Down’ is not wrong. But it’s more than just geometry and direction. Downward motion—in human embodied experience—consistently results from the downward force of gravity (as with *ἐπί*).

In (25): Jewish women who circumcise their children are hurled *κατά* the wall.

The external force of gravity on the TR is profiled. The wall exerts no overt force, but gravity shares its vertical orientation. The wall defines the path of the TR. We call this the FALL *κατά* construction.

DOWN ALONG κατά construction

26. φέρει **κατ' ἀνάγκην** [LM] ὁ ῥοῦς
The river carries [them (TR)] **down current** [LM] (Polybius, Histories 4.44.2).
27. ἐντιθέασι τὸ παιδίον καὶ **κατὰ τοῦ ποταμοῦ** [LM] βαλόντες εἶασαν ἐπὶ τῷ θεῷ τὴν σωτηρίαν αὐτοῦ.
They put the child in [the basket (TR)] and casting it **down the river** [LM] they left his welfare in God's hands (Josephus, Antiquities 2.221).

Rivers, as LANDMARKS, are a helpful a case study for *κατά*. They realize force dynamic patterns that motivate its usage.

Like women falling down the wall, water flows by the pull gravity.

The current of the river is made tangible in (26) and (27) by the forces visible to the eye, especially if we watch a drifting basket in (27). Rivers are path LMs with banks on each side.

They exert force on the TR to conform its movement to the shape and contour of the path.

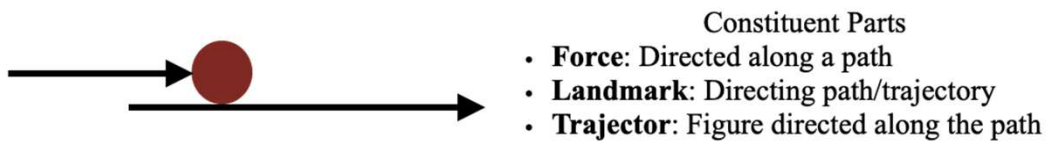
The force of the LM represents the primary profiled force. We label this the DOWN ALONG construction.

DOWN ALONG κατά construction

29. Μανίλιος [TR] μὲν ἀπὸ τῆς ἡπείρου **κατὰ τὸν αὐχένα** [LM]
Manilius [TR] advanced from the mainland **by way of the isthmus**
[LM] (Appian, *The Punic Wars* 97).
30. ταύτην τὴν ἄκρην ὡς κατεῖδον Ὀνησίκριτος μὲν ἐπέχοντας ἐπ’ αὐτὴν
πλώειν ἐκέλευεν μὴ **κατὰ τὸν κόλπον** [LM] ἐλαστρούντας
ταλαιπωρέεσθαι [TR].
When they sighted this cape, Onesicritus urged them to make for it
in their voyage, to avoid the hardship of rowing [TR] **along the bay**
[LM] (Arrian, *Historia Indica* 32.9).

Gravity is not always profiled. Sometimes, the LM path imposes conformity on the TR by itself. This is where *κατά* diverges from expectations of the conceptual space for English ‘down’. This is kind of like English speakers saying “down the road” regardless of spatial orientation. In these examples, the LM path defines or determines the motion of the TR. In (29), the army advances along a narrow strip of land that connects the mainland to the peninsula. In (30) rowers avoid the tides along the bay that would require extra force effort.

Image Schematic Structure: *κατά*



In our schema for *κατά*, the force vector aligned with the TR propels it by a continuous force that enables its movement, either parallel to or coincident with, the LM path.

The LANDMARK directs the trajectory that it follows. The schema may rotate vertically or horizontally in space, but the forces remain constant.

Transformations allow for elaborations that follow the inferences natural to our experience.

PATH-TO-ENDPOINT focus is one type. This is the difference between: “They hurled them *κατά* the wall” and “the ship ran *κατά* the rocks.”

In the first, *κατά* profiles the extended trajectory that the women follow as they fall. The force of gravity propels them along the extension of the path. In contrast, “the ship ran *κατά* the rocks” profiles the endpoint of an extended path. The ship is propelled by the storm along the water. The logical endpoint of that path takes the ship in contact with the rocks, as a final constraining counterforce to the motion of the TR.

Further transformations extend the use of *κατά* from physical to abstract expressions.

DISTRIBUTIVE κατά construction

32. ὥς οὐδὲν ὑπεστειλάμην τῶν συμφερόντων τοῦ μὴ ἀναγγεῖλαι ὑμῖν καὶ διδάξαι [TR] ὑμᾶς δημοσίᾳ καὶ **κατ' οἴκους** [LM].

You know that I have not hesitated to preach anything that would be helpful to you but have taught [TR] you publicly and **from house to house** [LM] (Acts 20:20).

33. καὶ ἔσται κραυγὴ μεγάλη [TR] **κατὰ πᾶσαν γῆν Αἰγύπτου** [LM], ἥτις τοιαύτη οὐ γέγονεν καὶ τοιαύτη οὐκέτι προστεθήσεται.

And there will be a great outcry [TR] **throughout the whole land of Egypt** [LM], such as has never happened, and such as will never happen again (LXX Exod 11:6).

DISTRIBUTIVE constructions profile TR and LM forces equally. The TR has a force-dynamic impetus that moves it along a path specified by the LM.

The LM force constrains the TRAJECTOR's path.

With multiplex LMs like in (32) from house to house, *κατά* defines the path that Paul's teaching travels. Distributives with *κατά* provide an alternative means for expressing the source-path-goal construction we talked about in our 2023 presentation. With uniplex LMs in (33), "the whole land of Egypt" is a bounded region that defines the expansiveness of the path where the TR is expressed.

CONFORMITY κατά construction

34.ὁ δ' ἐστὶν ὑπερμεγέθης δοκὸς ἰστῶ νηὸς παραπλήσιος ἐστόμωται δὲ
παχεῖ σιδήρῳ [TR] **κατ' ἄκρον [LM]** εἰς κριοῦ προτομήν ἀφ' οὔ καὶ
καλεῖται τετυπωμένῳ

This [siege ram] is an immense beam, like the mast of a ship,
reinforced with a mass of iron [TR] **against one end [LM]** in the
form of a ram's head, which is where the machine gets its name
(Josephus, *Wars* 3.214).

CONFORMITY constructions profile the LM force which imposes a shape, behavior, or category structure onto the TR.

In physical space, motion along a path is constrained by the contours of that path. Physical coercion produces conformity to a shape.

Example (34) describes a beam where one end is reinforced with a mass of iron. The iron must conform to the contours of the beam.

CONFORMITY κατά construction

35. καὶ ἐποίησαν οἱ υἱοὶ Ἰσραὴλ [TR] **κατὰ πάντα ἃ ἐνετείλατο Κύριος τῷ Μωυσῇ καὶ Ἀαρών** [LM], οὕτως ἐποίησαν.

And **the sons of Israel** [TR] acted **according to everything which the Lord had commanded Moses and Aaron** [LM]; so they did (LXX Num 1:54).

36. οὗτοί εἰσιν **γογγυσταὶ μεμψίμοιροι** [TR] **κατὰ τὰς ἐπιθυμίας αὐτῶν πορευόμενοι** [LM] καὶ τὸ στόμα αὐτῶν λαλεῖ ὑπέρογκα θαυμάζοντες πρόσωπα ὠφελείας χάριν

These people are **grumblers and faultfinders** [TR] they indulge **according to their own evil desires** [LM]; their mouths speak pompous words, flatter others for their own advantage (Jude 16).

Social forces are understood metaphorically through our experience with physical forces.

A TRAJECTOR behaves in accordance with a trajectory. The LANDMARK idea compels or directs the TRAJECTOR in some way.

In (35), the Israelites behavior must conform to the path that the Lord lays out for them.

In (36), Jude rebukes those who behave in conformity with their own selfish desires rather than behaving in accordance with the social forces of the Christian community.

CONFORMITY κατά construction

37. καὶ ἐποίησεν ὁ θεὸς τὰ θηρία τῆς γῆς [TR] **κατὰ γένος** [LM] καὶ τὰ κτ[ήνη] **κατὰ γέ]νος** καὶ πάντα τὰ ἐρπετὰ τῆς γῆς [TR] **κατὰ γένος αὐτῶν** [LM].
And God made the wild animals of the earth [TR] **according to type** [LM] and the livestock according to kind and all the creeping things of the earth [TR] **according to their type** [LM] (LXX Gen 1:25).
38. ἦσαν δὲ ἐκεῖ λίθιναι ὑδρίαι ἕξ [TR] **κατὰ τὸν καθαρισμὸν τῶν Ἰουδαίων** [LM] **κείμεναι χωροῦσαι ἀνά μετρητὰς δύο ἢ τρεῖς**
Nearby stood six stone water jars [TR], **the kind used by the Jews for ceremonial washing** [LM], each holding from twenty to thirty gallons (John 2:6).

Category structures are configurations of culture-based, conventionalized knowledge.

They impose scripts upon the world of linguistic communities.

In (37) and (38), items are grouped together relative to shared characteristics. If they conform to the expectations of the requisite category, they are associated with that category – according to type. Their conformity determines how they are categorized, either for animals in (37) or jars in (38).

MANNER/MEANS κατά constructions

39. εἰ' δὲ περὶ τῶν μνημονευομένων, οὐκ ἂν ὀκνήσαι τις εἰπεῖν ὥς οἱ παλαιοὶ μακροτέρας ὁδοὺς [TR] φανοῦνται καὶ κατὰ γῆν καὶ κατὰ θάλατταν [LM] τελέσαντες τῶν ὕστερον, εἰ' χρή προσέχειν τοῖς λεγομένοις· everyone will admit that the ancients appear to have made longer journeys [TR] both by sea and by land [LM] than their successors (Strabo, *Geography* 1.3.2).
40. κατὰ πίστιν [LM] ἀπέθανον [TR] οὗτοι πάντες μὴ λαβόντες τὰς ἐπαγγελίας All these people died [TR] by faith [LM] without receiving what was promised (Heb 11:13).

MANNER/MEANS constructions follow from CONFORMITY constructions.

The conforming LM path is treated as the thing that enables an action. The LM imposes a particular procedural manner.

In both examples, the manner or means by which something is accomplished constrains the journey that the TR travels.

In (39), by sea or by land. In (40), living and dying by faith. The LM path characterizes the TR's activity.

OPPOSITION κατά constructions

41. ἦλθον γὰρ διχάσαι ἄνθρωπον [TR] κατὰ τοῦ πατρὸς αὐτοῦ [LM] καὶ θυγατέρα [TR] κατὰ τῆς μητρὸς αὐτῆς [LM] καὶ νύμφην [TR] κατὰ τῆς πενθερᾶς αὐτῆς [LM], καὶ ἐχθροὶ τοῦ ἀνθρώπου οἱ οἰκιακοὶ αὐτοῦ.

For I have come to divide a man [TR] **against his father** [LM], a daughter [TR] **against her mother** [LM], a daughter-in-law [TR] **against her mother-in-law** [LM]—and a person’s enemies will be members of their own household (Matt 10:35–36).

Motivated by our experience of physical forces in space, OPPOSITION constructions occur in frames of conflict, judgment, speech, and cognition. An intentional agent TR instigates a hostile action toward an opposing animate LM. Jesus describes the impact and radical nature of his teaching as one that pits familial relationships against each other.

OPPOSITION κατά constructions

42. οἱ δὲ ἀρχιερεῖς καὶ τὸ συνέδριον ὅλον ἐζήτουν ψευδομαρτυρίαν [TR] κατὰ τοῦ Ἰησοῦ [LM] ὅπως αὐτὸν θανατώσωσιν
The chief priests and the whole Sanhedrin were looking for false evidence [TR] **against Jesus** [LM] so that they could put him to death (Matt 26:59).
43. ἐψιθύριζον [TR] πάντες οἱ ἐχθροί μου κατ' ἐμοῦ [LM]· ἐλογίζοντο [TR] κακά μοι [LM]·
All my enemies whisper [TR] **against me** [LM]. They plot [TR] **against me** [LM] (LXX Ps 40:8).

In judgment frames, the LM of *κατά* refers to the defendant being charged or accused, that is Jesus in (42) and the Psalmist in (43). The TR with *κατά* is negative evidence or negative action against the LM because the OPPOSITION construction implicates opposing forces. In (42), false evidence is a hostile instrument used against Jesus. In (43), speech acts constitute a means of exerting force against an enemy. Whispers and plots shape the audience's perceptions inimical to the Psalmist.

Constructions with the preposition κατά

FALL κατά construction	→ Physical domain: Force of gravity is profiled, exerted on TRAJECTOR; LANDMARK provides PATH of movement with a downward trajectory in accordance with gravity; also with sinking events.
DOWN ALONG κατά construction	→ Physical domain: TRAJECTOR motion directed by gravitational force; LANDMARK exerts force on TRAJECTOR in the form of the boundaries of the LANDMARK path. LANDMARK path exerts conforming force regardless of the status of motion.
DISTRIBUTIVE κατά constructions	→ Physical domain: Profiles TRAJECTOR and LANDMARK forces equally; the TRAJECTOR has force-dynamic impetus that moves it along a path via the trajectory specified by the LANDMARK. The LANDMARK force constrains and places limits on the TRAJECTOR's path.
CONFORMITY κατά constructions	→ Physical and social domains: Profiles LANDMARK force as a shape, behavior, or category structure imposed on the TRAJECTOR.
MANNER/MEANS κατά constructions	→ Physical and non-physical domains: Derived from CONFORMITY κατά constructions; LANDMARK imposes a particular procedural manner or means for TRAJECTOR event.
OPPOSITION κατά constructions	→ Physical and social domains: Profiles TRAJECTOR and LANDMARK forces equally; an intentional agent TRAJECTOR instigates an action hostile to an opposing animate LANDMARK.

When we pay attention to the interaction of forces associated with the schematic structure of *κατά*, we gain valuable insight into its usage. Its schema structure provides the cognitive foundation for constructional polysemy.

Final thoughts

Research, pedagogy, & translation

We examined how human experience of force structures the meaning of prepositions *ἐπί* and *κατά* and how force-dynamic patterns motivate usage in psychosocial domains.

We posited a force-dynamic image schema for each and explored transformations that implicate patterns of constructional polysemy.

Senses and glosses enumerated in dictionaries and grammars may seem arbitrary, but usage patterns with *ἐπί* and *κατά* emanate from embodied experience and the cognitive operations that help us organize our conception of the world around us.

Research & Pedagogy

- ✓ Is there one force that is profiled or highlighted over another?
- ↔ What is the direction and magnitude of the force?
- »» What is the source of the force? Does it originate with the trajector or landmark or is it external to both?
- ↔ If two forces are profiled, how do they interact or conflict?
- ✓ What kind of verb is used with the preposition (motion, cognition, etc.)?
- 👤 What embodied scene is created by the preposition in use? One entity (trajector) is related in some way to a second entity (landmark).

Grammars of Ancient Greek typically operate under the rubric: *Grammar is form; words are meaning*.

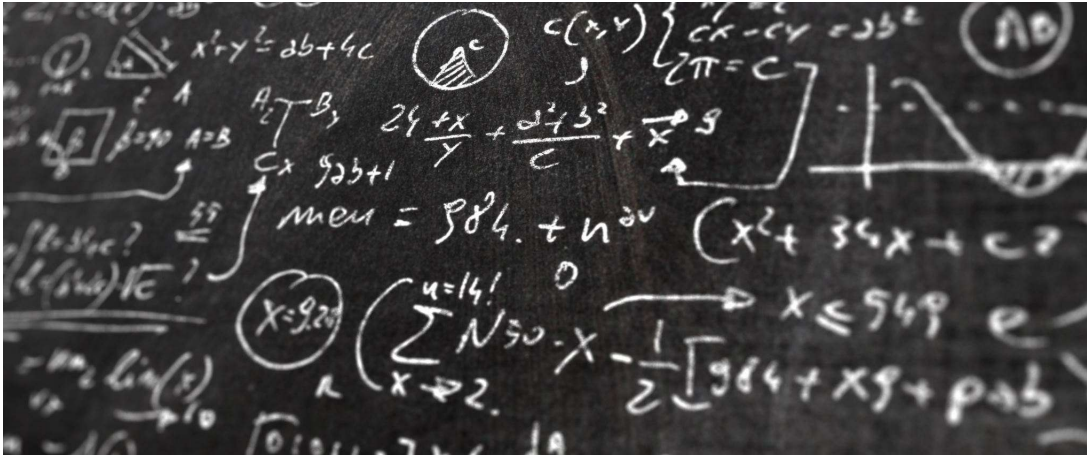
Despite their high frequency as a class, prepositions are given short shrift. Few grammars connect embodied experience to preposition meaning, nor do they describe how interactions with space and force motivate usage in abstract domains.

We propose some guidance for asking questions when encountering *ἐπί* or *κατά*.

- Is there one force that is highlighted over another?
- What is the direction and magnitude of the force?
- What is the source of the force? Does it originate with the TR or LM or is it external?
- If two forces are profiled, how do they interact?
- What kind of verb is used with the preposition?
- What embodied scene is created? One entity (TRAJECTOR) is related to another(LANDMARK). What does that relation look like?

Together, we can become versed in asking image-schematic questions about preposition meaning. This helps us become better equipped to understand Ancient Greek without increased confusion from reliance on English glosses. Let's draw out the shared human experience that motivates meaning.

Translation



We acknowledge that translating clauses with $\epsilon\pi\acute{\iota}$ and $\kappa\alpha\tau\acute{\alpha}$ can be tricky because of the grammatical differences between source and target languages. Very few expressions have one-to-one correspondence from one language to the next.

But when we consider the image schematic scenes that are communicated with $\epsilon\pi\acute{\iota}$ and $\kappa\alpha\tau\acute{\alpha}$, then we can move beyond attempts to translate a single word at a time with individual glosses and instead free our translations to engage with larger meaning units at the construction level. The meanings of $\epsilon\pi\acute{\iota}$ or $\kappa\alpha\tau\acute{\alpha}$ are not a single word or English gloss, but a structured scene organized by our understanding of force interactions.

Thank you.