

# Force Dynamics in Language and Cognition: An Empirical Evaluation

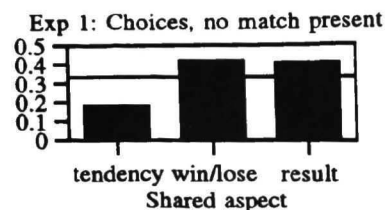
David A. Robertson (darobert@students.wisc.edu)  
 Arthur M. Glenberg (glenberg@facstaff.wisc.edu)  
 Department of Psychology; 1202 W. Johnson Street  
 Madison, WI 53706 USA

“Why?” is often the hardest question to answer, but at the same time it is often the most interesting because its answer reveals causes. Talmy (1988) proposes that language has a *force dynamic* (FD) system for encoding how we think about causes. A strength of Talmy’s framework is that it explains that our understanding of complex situations by way of simpler situations, and it extends the analysis to cover social situations, approach/avoidance situations, etc. For example, according to the framework, our understanding of the Persian gulf conflict (e.g. *Hussein finally agreed to permit inspections to avoid the sanctions.*) is based on the same processes as our understanding of sentence (a) in Table 1 below.

In Talmy’s framework, four basic syntactic structures exist to convey four archetypal FD situations. FD situations include two entities, an agonist and an antagonist. The agonist’s tendency is either toward rest or action. The antagonist opposes the agonist. The agonist either succeeds in its tendency or fails, with some resultant action. Note that in the examples, the agonists and antagonists are inanimate. In other situations one or both might be animate. Also, the forces involved may be physical or social forces. This flexibility permits categorization of all types of FD situations.

**Experiment 1 (Similarity Judgment):** Participants (N=40) viewed a target sentence along with a set of three force-dynamic sentences on a computer screen. The sentences were constructed to include a variety of FD situations, including concrete physical settings, social settings, and abstract settings, and were constructed so that surface features alone could not be used reliably to distinguish the types. Participants indicated by mouse click the sentence most similar to the target. Half of the time, a sentence matching in FD category (but not in topic) was presented. The other half of the trials presented one of each of the other FD types. Sentence combinations were counter-balanced so each sentences and comparison sets were equally likely across participants. Each participant made one judgment for each sentence, for a total of 40 trials.

Participants most frequently selected matching FD sentences when a matching type was present in the comparison set. When no match was present, they chose situations matching in resultant action or win/loss equally frequently,

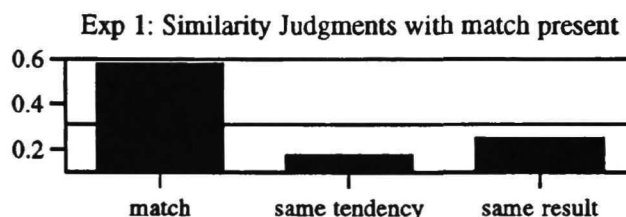


**Table 1:**

Examples of the 4 Force Dynamic Types (Talmy 1988, p. 55)

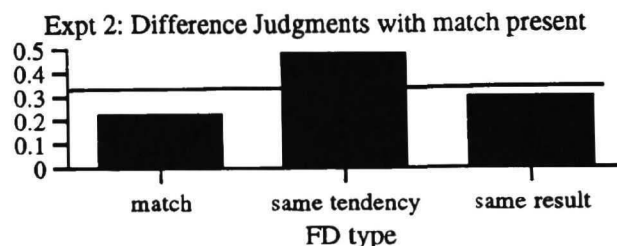
	tendency	win/loss	resultant:
a) The ball kept rolling because of the wind blowing on it.	rest	fails	moves
b) The shed kept standing despite the gale wind blowing against it.	rest	wins	static
c) The ball kept rolling despite the stiff grass.	action	wins	moves
d) The log kept lying on the incline because of the ridge there.	action	fails	static

and both more than twice as often as choosing a matching tendency for the agonist.



**Experiment 2 (Difference Judgment):** This experiment followed the same design as Experiment 1, but participants were instructed to indicate the sentence that was most different from the target.

When a matching type was presented, participants most frequently selected sentence types with different win/loss and resultant action, but matching tendencies. When no match was presented, participants selected all types equally often.



## Discussion

The results demonstrate that people can make distinctions based on the types in Talmy’s (1988) force dynamic framework. The results further suggest that the resultant actions in the situation being described, and whether the agonist was successful or not are more salient to readers than the agonist’s original tendency. In conclusion, it appears that the FD framework provides at least a partial analysis of what it means to understand “Why?”

## Reference

Talmy, L. (1988). Force dynamics in language and cognition. *Cognitive Science*, 12, 49-100.