

# The Goal bias effects on frequencies of different path types and the (ir)relevance of animacy and literalness

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Humans have a bias towards the Goal (endpoint) of a motion event, known as the Goal bias (e.g. Papafragou 2010). This manifests in, for example, better ability to visually detect changes of Goal than Source objects (Lakusta 2005). Experiments suggested that in non-linguistic cognition, the bias is present only when the Figure is animate thanks to its roots in intentionality, while in language, the bias is absolute, with Goal paths (*to the moon*) being produced more frequently than Source paths (*from the earth*) regardless of Figure animacy (Lakusta & Landau 2012). Corpus analyses appear to contradict this result, however, showing that the bias varies according to the orientation of each verb. For example, Goal-oriented verbs (*go*) attracts Goal paths, while Source-oriented verbs (*escape*) attracts Source paths (Stefanowitsch & Rohde 2004; Stefanowitsch 2018; henceforth S&R and S).

However, since S&R and S did not explore the effects of Figure animacy in detail, the present study performed three corpus analyses that aimed to examine the relationship between Figure animacy and the Goal bias more thoroughly. The role of literalness (whether the motion event is literal), also unexplored, was examined as well. Using a list of all English intransitive motion verbs compiled from FrameNet, the three analyses examined the effects of Figure animacy and event literalness on the frequency distribution of types of path arguments/adjuncts (Source, Trajectory, Goal) at three levels: overall (all verbs), specific verbs (ten most frequent from the Overall analysis), and the *way* construction (e.g. Goldberg 1995). The Overall analysis used data from five English Universal Dependencies Treebanks, while the latter two drew data from the British National Corpus.

The key results are as follows: 1) Goal paths are more frequent than Source/Trajectory paths among motion verbs in general (Source 10.3% Trajectory 5.2% Goal 35.8% Others 48.6%) and in 9/10 most frequent motion verbs, but not with the *way* construction; 2) Figure animacy significantly affects path frequency distribution across all levels (all  $p < 0.05$ ); 3) Figure animacy effects cut across literalness categories, boosting path types (not necessarily Goal) associated with particular verb frames; and 4) literalness appears to have a bias-strengthening effect only in some cases. Moreover, these effects can be attributed to different frames of literal/figurative senses and to Figure animacy in those frames.

The results show that although choice of path biases depends on particular frames, the overall linguistic bias towards Goal exists (in line with S&R and S). It is also clear that in language, Figure animacy has a general role and strengthens path biases overall and across frames, while literalness as a category in itself has virtually no effect. Interestingly, when considered together with the concept of Goal in psychology, both previous and current findings suggest that the homology between non-linguistic and linguistic Goal bias may be stronger than previously thought (contra Lakusta & Landau 2012): frame-specific biases correspond to psychological goals, i.e. loci of intention (Lakusta 2005: 13) and the bias-strengthening effect of linguistic Figure animacy corresponds to that of animacy/agentivity in memory and perception (Lakusta & Landau 2012; Lakusta & DiFabrizio 2016).

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