# Assessing the Literal Force Hypothesis in Unconstrained Conversation

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## Abstract

Speech acts are the social acts we perform with our linguistic utterances. Identifying the speech act of an utterance, however, has always been an elusive challenge. But linguistic theory does provide us with the well-defined concept of sentence type. The widely criticized *Literal Force Hypothesis* (LFH) states that the speech act of a sentence can be derived from its sentence type. In this paper, we test the Literal Force Hypothesis in unconstrained conversation. We conclude that while it is far from perfect, there is substantial empirical support for using it as a heuristic.

## 1 Introduction

Speech acts are critical to understanding language. A speech act describes "the sense in which utterances are not mere meaning-bearers, but rather in a very real sense do things, that is perform actions (Levinson, 2016)." The Literal Force Hypothesis states that (performatives aside) sentences have one-to-one correspondence between sentence type and speech act (Gazdar, 1981). A modern assessment can be found in (Meibauer, 2019).

Sentence types are well-defined linguistic structures, and the three major types listed in the LFH—declaratives, interrogatives, and imperatives—are present in most or all languages (Sadock and Zwicky, 1985). However, the LFH has many detractors. Searle's formulation of speech acts includes a chapter on indirect speech acts — utterances whose function differs from appearance based on the context (Searle, 1975). Levinson (1983) notes that the LFH causes strange semantic and syntactic problems in standard theory. Cummins and de Ruiter (2014) state that utterances have a many-to-many mapping to speech act, a strong refutation of the LFH.

Speech act practice has moved beyond the LFH with detailed dialogue act schemas that move well beyond sentence type, such as DAMSL (Core and Allen, 1997) or the ISO 246172 standard (Bunt et al., 2016). These schemas have furthered the field but are not without their detractors. Traum (2000) examines questions that schemas must answer, and how different answers will provide different lenses for different questions. Bunt et al. (2017) shows that standards must be revised as the science evolves.

Assigning speech acts to utterances in sentences is also fraught. Cordon and Lakoff (1975) suggest re-appraisal if literal interpretations are problematic. Searle (1975) suggests a selection process based on context. Prosody (Shriberg et al., 1998) and dialogue structure (Schegloff and Sacks, 1973; Clark, 1996) also offer clues. Anomalous utterances are detected in planning models for speech act attribution (Cohen and Perrault, 1979; Brenner and Kruijff-Korbayová, 2008; Engesser et al., 2017).

All of this work makes it clear that the LFH is not sufficient for a robust analysis of all language use, but we are not aware of any work directly testing the LFH in open conversation. Other studies look at information-seeking contexts (Beun, 1990), such as the TRAINS corpus (Heeman and Allen, 1995). Indirect speech acts are as high as 50% in these contexts, showing that the LFH is extremely inappropriate. In this work, we seek similar metrics for open conversation to learn if these low numbers of direct speech acts are pervasive or context-dependent.

## 2 Methods

To test the LFH, we are limiting ourselves to an analysis of sentences of the three major types—declarative, interrogative, and imperative—each of which has well-defined syntactic properties in English (Sadock and Zwicky, 1985). Following

Sadock (2012), tag-questions are included as interrogatives.

Following the LFH predictions, we are limiting ourselves to the speech acts listed—statement, question, and request. We recognize that this is an impoverished list, especially compared to the work referenced in the introduction, but this allows for a clean interpretation of the LFH.

We use the *next-turn proof procedure* from Conversation Analysis for labeling speech acts (Hutchby and Wooffitt, 2008). The next-turn proof procedure defines the speech act of an utterance according to how it was received. A question gets an answer (or further interrogation) (Stivers and Rossano, 2010); a request gets fulfilled or rejected (Searle and Sadock, 1976); and a statement lacks either of these qualities. This approach may not be suitable for all speech act work, but it does provide a clean distinction between form and function for labeling sentence type and speech act. This is particularly important for work looking at indirect speech acts, where we need a well-defined notion of directness, which is explicated here by the LFH.

Previous work has shown that utterances may have more than one speech act (Grice, 1975; Bunt, 2011). However, if an interrogative goes unanswered or an imperative ignored, and it is not *marked* in the dialogue, we can only speculate that the direct speech act was intended. Therefore, we have simplified our schema to a forced-choice methodology.

For an open dialogue corpus, we have chosen to use the Conversation Analysis British National Corpus (CABNC) (Albert et al., 2015), which is a set of transcriptions and linked audio recordings of open British conversation. Our intention is to find a representative sample of unconstrained, conversation dialogue—the setting in which language evolved (Enfield and Levinson, 2006). We used the audio recordings in tandem with the transcriptions for annotating, so prosody and intonation were available to the transcribers. We tagged 1002 utterances in eight conversations. Inter-rater reliability was 92% accurate ($\kappa = 0.89$).

## 3 Results

In our sample, we found that the LFH held for 92% of sentences, substantially higher than previous work in constrained contexts. This may be in part due to our small set of speech acts, but we believe it is in large part due to the unconstrained context of the dialogue studied. In constrained context, the speech act can be inferred regardless of syntactic structure, but we find here that syntactic structure is often a good guide to speech act interpretation in open dialogue.

| | Declarative | Interrogative | Imperative | Fragment | Total |
|---|---|---|---|---|---|
| Statement | **450** | 8 | 3 | 0 | 461 |
| Question | 22 | **89** | 0 | 1 | 112 |
| Request | 4 | 3 | **15** | 2 | 24 |
| Other | 0 | 8 | 0 | 397 | 405 |
| Total | 476 | 108 | 18 | 400 | 1002 |

Figure 1: **Sentence type/speech act pairs as raw count of all utterances**. Sentence type is by column and speech act by row. Numbers in bold are predicted by the LFH. Of 602 sentences, 554 speech acts are correctly predicted by the LFH and the remaining 48 are not.

If the high number of direct speech acts found in our sample indicates that indirect speech acts are more likely in certain contexts, we can use our indirect speech act findings as exploratory research what these contexts are likely to be. We found that declarative questions were Labov B-events (Labov and Fanshel, 1977), in which the speaker lacked epistemic authority over the statement. Declarative requests were found in ritualized contexts like shopping or eating. Interrogative statements were often exclamations, tag questions, or rhetorical questions. Interrogative requests were rare, despite their prominence in robotics work (e.g., (Williams et al., 2018)), but their context was similar—sales situations. We also found interrogatives in self-talk which did not fit anywhere in our schema. Finally, we found imperatives used as exhortations like "let's hope so!"

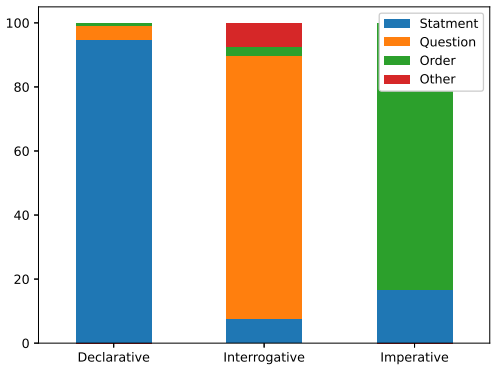


Figure 2: **Speech act as portion of sentence type**. The LFH predicts three solid columns of blue orange and green.

## References


Saul Albert, LE De Ruiter, and JP De Ruiter. 2015. Cabnc: the jeffersonian transcription of the spoken british national corpus.

Robbert-Jan Beun. 1990. The recognition of dutch declarative questions. *Journal of Pragmatics*, 14(1):39–56.

Michael Brenner and Ivana Kruijff-Korbayová. 2008. A continual multiagent planning approach to situated dialogue. *Proceedings of LONDIAL-2008*, pages 67–74.

Harry Bunt. 2011. Multifunctionality in dialogue. *Computer Speech & Language*, 25(2):222–245.

Harry Bunt, Volha Petukhova, and Alex Chengyu Fang. 2017. Revisiting the iso standard for dialogue act annotation. In *Proceedings of the 13th Joint ISO-ACL Workshop on Interoperable Semantic Annotation (ISA-13)*.

Harry Bunt, Volha Petukhova, David Traum, and Jan Alexandersson. 2016. Dialogue act annotation with the iso 24617-2 standard. *Multimodal Interaction with W3C Standards*, page 109–135.

H.H. Clark. 1996. *Using Language*. Cambridge University Press.

Philip R Cohen and C Raymond Perrault. 1979. Elements of a plan-based theory of speech acts. *Cognitive science*, 3(3):177–212.

David Cordon and George Lakoff. 1975. Conversational postulates. In *Speech acts*, page 83–106. BRILL.

Mark G Core and James Allen. 1997. Coding dialogs with the damsl annotation scheme. In *AAAI fall symposium on communicative action in humans and machines*, volume 56. Boston, MA.

Chris Cummins and Jan P de Ruiter. 2014. Computational approaches to the pragmatics problem. *Language and Linguistics Compass*, 8(4):133–143.

Nicholas J Enfield and Stephen C Levinson. 2006. *Roots of Human Sociality: Culture, Cognition and Interaction*. Berg Publishers, New York, NY.

Thorsten Engesser, Thomas Bolander, Robert Mattmüller, and Bernhard Nebel. 2017. Cooperative epistemic multi-agent planning for implicit coordination. *arXiv preprint arXiv:1703.02196*.

Gerald Gazdar. 1981. Speech act assignment. In A. Joshi, Bruce H. Weber, and Ivan A. Sag, editors, *Elements of Discourse Understanding*, pages 64–83. Cambridge University Press.

H.P. Grice. 1975. Logic and convesation. *Syntax and Semantics*, 3:41–58.

Peter A Heeman and James F Allen. 1995. The trains 93 dialogues. Technical report, ROCHESTER UNIV NY DEPT OF COMPUTER SCIENCE.

Ian Hutchby and Robin Wooffitt. 2008. *Conversation Analysis*. Polity.

William Labov and David Fanshel. 1977. *Therapeutic discourse: Psychotherapy as conversation*. Academic Press.

Stephen C. Levinson. 1983. *Pragmatics. Cambridge textbooks in linguistics*. Cambridge University Press, Shaftesbury Road Cambridge CB2 8BS UK.

Stephen C. Levinson. 2016. Speech acts. *Oxford Handbooks Online*.

Jörg Meibauer. 2019. What is an indirect speech act?: Reconsidering the literal force hypothesis. *Pragmatics & Cognition*, 26(1):61–84.

Jerrold M Sadock and Arnold M Zwicky. 1985. Speech act distinctions in syntax. *Language typology and syntactic description*, 1:155–196.

Jerry Sadock. 2012. Formal features of questions. *Questions*, page 103–122.

Emanuel A. Schegloff and Harvey Sacks. 1973. Opening up closings. *Semiotica*, 8(4).

John R Searle. 1975. Indirect speech acts. In *Speech acts*, page 59–82. BRILL.

John R. Searle and Jerrold M. Sadock. 1976. Toward a linguistic theory of speech acts. *Language*, 52(4):966.

Elizabeth Shriberg, Andreas Stolcke, Daniel Jurafsky, Noah Coccaro, Marie Meteer, Rebecca Bates, Paul Taylor, Klaus Ries, Rachel Martin, and Carol van Ess-Dykema. 1998. Can prosody aid the automatic classification of dialog acts in conversational speech? *Language and Speech*, 41(3-4):443–492.

Tanya Stivers and Federico Rossano. 2010. Mobilizing response. *Research on Language and Social Interaction*.

David R Traum. 2000. 20 questions on dialogue act taxonomies. *Journal of semantics*, 17(1):7–30.

Tom Williams, Daria Thames, Julia Novakoff, and Matthias Scheutz. 2018. "thank you for sharing that interesting fact!". *Proceedings of the 2018 ACM/IEEE International Conference on Human-Robot Interaction*.

# A Appendix

## A.1 Tagging Replication

The author tagged the entire corpus, and their tags were used for the analyses shown in this paper. A subset of the data was also tagged by a colleague who is an expert in speech acts. The table shown here shows the agreement between the author and their colleague. From this table, we calculate a $92\%$ agreement and $\kappa = 0.89$.

| | Statement | Question | Request | Fragment |
|---|---|---|---|---|
| Statement | 124 | 1 | 0 | 3 |
| Question | 5 | 20 | 0 | 0 |
| Request | 2 | 1 | 5 | 0 |

Table 1: This table shows the speech act tagging by the author (rows) and replicator (columns).