



# Profiling maritime communication by non-native speakers: A quantitative comparison between the baseline and standard marine communication phraseology



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## ABSTRACT

This paper compares ESP communication by non-native speakers of Maritime English with communication outside a nautical setting in order to profile its structural idiosyncrasy. Vocabulary growth, word frequencies, lexical and key word densities, and grammar diversity as dependent linguistic variables observed in transcribed full-mission simulation exercises are contrasted to the Brown Corpus, the Vienna-Oxford International Corpus of English and the Standard Marine Communication Phrases (SMCP). Using quantitative linguistics, inherent structural patterns of nautical team communication are identified and similarities and variations highlighted. Significant differences found in all linguistic features are gauged by means of the Probability of Superiority (PS) effect size. A *linguistic profile* is created which quantifies the observed language patterns and provides a quantitative model for the linguistic genre of this particular discourse community. The model fills the gap of quantitative research on empirical bridge team communication samples and delivers a valid tool for estimating the magnitude of observed linguistic effects.

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## 1. Introduction

Communication on board ships has long been identified as a decisive factor for safe navigation. This importance becomes especially evident whenever a ship accident occurs, as in the disastrous evacuation procedures of passenger ships Costa Concordia and Sewol, to state two recent examples. Research has found that communication problems alone cause almost half of all marine accidents whilst miscommunication is a contributory factor in nearly all shipping accidents (for an overview, cf. John, Brooks, Wand, & Schriefer, 2013; Möckel, Brenker, & Strohschneider, 2014). Most communication on board ships is verbal, but although Voyage Data Recorders (VDR) are installed on modern ships to record, amongst other information, all utterances made by navigational officers, a very limited number of authentic bridge team communication samples is available for linguistic research. This notorious scarcity of empirical information has been highlighted by Dževerdanović-Pejović (2013).

Linguistic research relies on observations on how people communicate. However, given the limited scope of authentic speech samples little quantitative research has been conducted in the domain of the bridge team communication

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discourse community in order to determine which speech patterns are actually used by seafarers to assess situations, carry out navigational tasks and avoid dangerous situations, and to what extent these speech acts differ from spontaneous verbal communication outside the maritime world (Cole & Trenkner, 2012; Pritchard, 2003; Trenkner, 1996; Weeks, 1997).

While it is true that authentic communication from a ship's bridge is not available in an annotated corpus for quantitative research purposes, future nautical officers are trained in full-mission ship handling simulators which replicate the navigational tasks carried out on board ship. The research presented in this paper makes use of these simulation exercises to overcome the scarcity of available on-board speech by using audio-recorded maritime simulation sessions. A verbatim transcript of the recorded communication allows corpus linguistics techniques to be used with the aim to discriminate idiosyncratic language patterns of seafarers.

### 1.1. Bridge team communication

Bridge team communication is a generic term for spontaneous speech acts by nautical officers who navigate the ship as a team. It shares most of the characteristics of team communication outside a nautical setting. However, given the very specific work environment in which it takes place, bridge team communication also differs regarding the team's composition, communication channels and the scope of its content. Teams on board sea-going ships are nearly always multinational and multicultural, with a substantial number of nationalities and ethnicities working very closely together and sharing one environment in which they work and live (cf. Deboo, 2004; Horck, 2005; Noble, Vangehuchten, & Van Parys, 2011). On merchant vessels, bridge teams are usually composed of the captain or shipmaster, the first, second and third navigational officer and a helmsman. Crew members work in shifts covering the ship operation twenty-four hours a day, seven days a week (cf. Jensen et al., 2006). Depending on the ship type and deployment area work shifts of four or six hours are customary. Due to this organisational scheme two to three people usually work together during their shift after which the team composition changes. One officer, who need not be the highest ranked, has the Command of Navigation (CoN) and is therefore responsible for all decisions made and actions taken during each watch.

While bridge team members engage in direct, face-to-face communication in order to assess situations and make decisions, they also communicate via UHF radio with other crew members located in different areas of the ship, e.g. in the engine room, on deck, etc., which extends the bridge team to a distributed team. Communication is also undertaken by VHF radio with the shore-based Vessel Traffic Service (VTS), tugs and other ships, and sometimes via satellite or mobile phone with the shipping company, the charterer's agents and other people ashore, so that a virtual team environment is created (for an overview on virtual team communication cf. Potter & Balthazard, 2002). If no other common language is available, the International Maritime Organisation (IMO) stipulates that crew members shall communicate in English as a lingua franca.

Given the importance of bridge team communication for the safe operation of a ship, the scarcity of publications of quantitative research in this specific discourse domain is rather surprising.

### 1.2. Research question and hypotheses

Observing bridge team communication in full-mission simulation opens up possibilities to gain an insight into the structure of naturally occurring language in a unique English for Specific Purposes (ESP) environment. Different speech patterns can be analysed and inferences made on their effectiveness in given situations. By contrasting maritime with non-maritime communication, similarities and differences can be singled out, and the appropriateness or idiomaticity of the language use is discernible.

The adopted research approach aims to contribute to a quantitative model of the language variety or *genre* of Bridge Team Communication as a *sub-genre* (cf. Baker & Ellece, 2011, p53) of Maritime English. By analysing a series of linguistic variables it sets out to identify and define this specific ESP variety using a descriptive approach.

These objectives lead to the following research question:

To what extent do the speech patterns of bridge team communication by non-native speakers of English in full-mission simulation differ lexically and grammatically from other, non-nautical communication?

In order to answer this general research question the following null hypotheses are formulated:

H<sub>01</sub>: The inter-textual vocabulary growth does not differ significantly between bridge team and other, non-nautical communication.

H<sub>02</sub>: The relative word frequency distribution does not differ significantly between bridge team and other, non-nautical communication.

H<sub>03</sub>: The distribution of content words does not differ significantly between bridge team and other, non-nautical communication.

H<sub>04</sub>: The distribution of nautical key words does not differ significantly between bridge team and other, non-nautical communication.

H<sub>05</sub>: The part-of-speech diversity distribution observed in bridge team communication does not differ significantly from other, non-nautical verbal communication.

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