



Analyzing the use of personal pronouns in aeronautical communications through CORPAC (Corpus of Pilot and Air Traffic Controller Communications)

O uso de pronomes pessoais em comunicações aeronáuticas: uma análise através do CORPAC (Corpus of Pilot and Air Traffic Controller Communications)

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Abstract: This article aims to analyze the use of personal pronouns in aeronautical communications based on CORPAC, a specialized corpus. Pronouns can play an important role in multitasking communicative scenarios such as the one featured in aviation and therefore it is of paramount importance that identities be clearly set in operations. In light of Neville's (2004) study about cockpit's identities, this investigation addresses the frequency and patterns of usage of personal pronouns – especially I, we and you, using corpus linguistic tools. The corpus exploration provides evidence that such pronouns are indeed very frequently used, despite official orientations that do not recommend their use in order to avoid problems such as ambiguity. The examination reveals consistent and interpretable patterns associated to Neville's (2004) assumptions and has significant implications for training and testing purposes in the field of Aeronautical English.

Keywords: aeronautical communications; personal pronouns; corpus linguistics.

Resumo: Este artigo tem como objetivo analisar o uso de pronomes pessoais na comunicação aeronáutica a partir do CORPAC, um corpus especializado. Pronomes podem desempenhar um papel de destaque em cenários comunicativos multitarefa, tais como observados na aviação. Nesse sentido, faz-se importante que as identidades

sejam claramente definidas nas operações. À luz do estudo de Neville (2004) sobre identidades no cockpit, esta investigação aborda a frequência e os padrões de uso de pronomes pessoais – especialmente “I”, “we” e “you”, por meio do uso de ferramentas linguísticas de corpus. A exploração do corpus fornece evidências de que tais pronomes são de fato usados com muita frequência, apesar de orientações oficiais que não recomendam seu uso, a fim de evitar problemas como a ambiguidade. A análise revela padrões consistentes e interpretáveis associados às suposições de Neville (2004) e tem implicações significativas para fins de treinamento e teste na área de Inglês Aeronáutico.

Palavras-chave: comunicação aeronáutica; pronomes pessoais; linguística de corpus.

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1 Introduction

Communication is a critical human factor in aviation operations and the effects of poor communications are acknowledged to have highly impacted aviation safety (CUSHING, 1997; DIETRICH; MELTZER, 2002; MATHEWS, 2019; NEVILLE, 2004). Sexton and Helmreich (2000, p. 63) say that “The role of language has been neglected and researchers have recognized the need for a deeper understanding of its roles, characteristics and how it impacts in aviation.” More recent research has shown that language specialists have been trying to widen the scope of studies in the field and have successfully managed to shed light on topics which need to be tackled. (SILVA; TOSQUI-LUCKS, 2020; PACHECO, 2019).

Corpus-based research on Aviation English (AE) has become of increasing interest as it enables the researcher to analyze real language occurrences from a variety of tools (BOCORNY, 2011; PRADO, 2019; SARMENTO, 2008; TOSQUI-LUCKS, 2018). It is known that the dialogues between pilots and air traffic controllers (ATCOs) are recorded and available from the Cockpit Voice Recorder (CVR) whenever there is the need for that and especially when there is an event with negative outcomes. Nevertheless, this material is not easily made available for research by airline companies or governmental institutions, and informal or non-authorized recordings can be a problem or can compromise data reliability.

Albeit the challenges posed by this methodology are particularly hard when it comes to corpus compilation in such a high-stakes domain as aviation, the results are very positive and the prospects quite promising. As an example, the International Civil Aviation English Association (ICAEA) has included Corpus Linguistics (CL) as one of the areas of study by its research group,¹ an initiative that will certainly contribute to spread the interest for studies that join together the language of aviation and the wide array of research possibilities offered by CL. We have known about the compilation of some corpora for aviation purposes, such as Corpus da Aviação (CAVI) (BOCORNÝ, 2008; SARMENTO, 2008), Radiotelephony Plain English Corpus (RTPEC) (PRADO, 2019), OSU Aviation Corpus (MODER, 2013) as well as other corpora mentioned in Lopeç (2013), Swinehart (2013), Hinrich (2008).

In order to be able to analyze the language of aviation through a corpus, CORPAC (Corpus of Pilot and ATCO Communications) has been created. It is still in its preliminary stages of compilation and is totally based on open-access information from VASAVIATION,² which features emergency situations extracted from Live ATC.³ The purpose is to explore the tools of analysis offered by CL and to be able to do research from real, spontaneous language use in aviation, covering a range of linguistic features.

It is known that pilots have to work cooperatively in highly coordinated activities throughout the stages of operations, both in the air and on the ground. To perform these tasks successfully, it is of paramount importance that identities be perceived as clearly as possible. In “Beyond the Black Box”, Maurice Neville (2004) analyzes how pilots accomplish identities using pronominal forms. According to him, “Pronominal choices are an important aspect of pilots’ habitual communicative practice contributing to their awareness of who is doing what and what is going on.” (NEVILLE, 2004, p. 33). To coordinate their work, each pilot must be familiar with the duties and responsibilities associated with his/her own identities as well as with the tasks assigned to the other pilot. This will be linguistically performed, mostly, through the use of personal pronouns.

¹ <https://www.icaea.aero/about/icaea-research-group/>.

² https://www.youtube.com/channel/UCuedf_fJVrOppky5gl3U6QQ, a You Tube channel with available information.

³ <https://www.liveatc.net/>, a paid service which offers access to aeronautical communications in aviation, live or recorded.

Based on Conversation Analysis and data collected in real flights, he explores the use of personal pronouns (subject and object) and possessive adjectives (for him, analyzed as a same category), mainly first person singular (I/me/my), second person (you/your) and first person plural (we/us/our). In his study, he describes “prescribed” and “non-prescribed” pronouns –the former referring to pronouns that are part of wordings spelled out for pilots in official operations manuals and the latter to those not part of the official wording expected to be used. The outcomes of this study show that pronominal choices are related to the creation and presentation of identities and relevant selves in order to comply with the tasks demands through coordinated teamwork.

In this line, this article proposes the investigation of personal pronouns by using CORPAC – a specialized corpus. It aims to analyze the use of some personal pronouns explored by Neville (2004) in aeronautical communications – namely, I, you and we, through tools used in CL research to check aspects regarding their frequency and their clusters. It starts by a brief review on the topics that most closely associate to the ideas approached in our study, such as language as a human factor in aviation, and some previous studies with the use of pronouns in aviation. Next, a section about the method precedes the description of the results obtained by our corpus research. The results are expected to add to the information presented by Neville (2004) and to offer relevant contribution to aeronautical English training, curriculum and test design regarding language in aviation.

2 Language as a factor in aviation communications

The International Civil Aviation Association (ICAO), the United Nations specialized agency for aviation, mandates, as of 2011, that all pilots flying in international airspace have a minimum operational English language proficiency. This is done by tests enforced by the Aviation Authority of each of its member states. Naturally, from this demand, there was an increase in interest about the language of aviation, being referred to as Aviation English, English for Aviation, Aeronautical English, Airpeak, AeroEnglish, Aeroese, Plane English, among others (BIESWANGER, 2016; BOROWSKA, 2017; ESTIVAL *et al.*, 2016; MODER, 2013; SILVA; TOSQUI-LUCKS, 2020).

Moder (2013, p. 227) seems to prefer the use of a more general concept: “Aviation English describes the language used by pilots, air traffic controllers, and other personnel associated with the aviation industry”, using “radiotelephony” to comprehend the more specialized communication which occurs between pilots and ATCOs. According to her, AE is made of Phraseology – the prescribed vocabulary and syntax which are part of these highly specialized exchanges, and Plain English, the non-prescribed uses of more common English vocabulary and syntax.

Borowska (2017) understands that AE is an overarching term and that Aeronautical English is more suitable to designate communications solely between pilots and ATCOs (not with mechanic, flight attendants, dispatchers or aviation personnel in general), a distinctive concept which has also been adopted by Silva and Tosqui-Lucks (2020).

The effects of poor communication in aviation can be tragic. The accident of Tenerife, in 1977 is accounted for a miscommunication problem. The phrase “at take-off” ultimately triggered the crash. The KLM pilot uttered it meaning “taking off”, using the structure from Dutch, his mother language, to designate continuous activity. The controller understood it as he was supposed to according to standard phraseology – referring to a specific place, waiting for an authorization. It is the deadliest crash in aviation history, killing 583 people. Cushing (1997), in *Fatal Words – Communication Clashes and Aircraft Crashes*, examines several aeronautical events that had communication issues as a factor, establishing categories of analysis such as problems of reference, inference, compliance; problems with numbers and radios. This manual is taken as a reference for studies of how language is involved and can impact aviation.

In line with this urge for more information about how language can impact safety in aviation, there is the LHUFT (Language as a Human Factor in Aviation) Center, at Embry-Riddle Aeronautical University. The center fosters research that aims to pinpoint linguistic factors involved in aviation communications, in order to have a better perspective of language in communication along with other human factors, so that it can be addressed more properly by the industry and other parts involved. “When accident investigators miss the more subtle effects of language use or language proficiency, the industry underestimates the possible impact and contributory effects of language problems in the accidents being investigated” (MATHEWS, 2019, p. 53). The LHUFT perspective

seeks to “a broad and more accurate understanding role of language in aviation safety, how language, language use, language proficiency, and culture affect aviation safety”.⁴

Mathews, Pacheco and Albrighton (2019) discuss the factors that can account for miscommunication in aviation, based on a Taxonomy originally proposed by Mathews in 2013. The taxonomy considers technical, procedural, cultural and language factors in communication and has been very a valuable tool not only for proposing the analysis of specific language problems (as regards phonetics, syntax, semantics or pragmatics), but also for establishing an interface with other aspects that cannot be dissociated from language analyses. Additionally, Pacheco and Souza (2018) conduct a study in an attempt to illustrate the use of this taxonomy as a successful method to investigate aeronautical events that have language as a causal or contributing factor.

Sexton and Helmreich (2000, p. 66) also advocate for a more thorough examination of language use in aviation, stating that “Understanding variations in the language use is important to the extent that language use is related to flight safety”. Their study approaches the need for more specific language research in aeronautical communications over the analysis of the occurrences of categories such as pronouns, which we will discuss further in the next section.

3 Pronouns in Aeronautical Communications

Communication in aviation is guided by a series of documents, such as the Manual of Language Proficiency Requirements (ICAO DOC 9835, 2010), the Manual of Radiotelephony (ICAO Doc 9432, 2007), ICAO DOC 4444 Air traffic Management (2016) and Annex 10 to the Convention on International Civil Aviation: Aeronautical Telecommunications (ICAO, 2001).

ICAO Doc 9835 (2010) makes the following reference to pronouns:

3.3.10 The principal linguistic characteristics of standardized phraseology (Philps, 1991) are a reduced vocabulary (around 400 words) in which each word has a precise meaning, often exclusive to the aviation domain, and short sentences resulting from the

⁴ <https://commons.erau.edu/db-lhuf/>

deletion of “function words” such as determiners (the, your, etc.), auxiliary and link verbs (is/are), subject pronouns (I, you, we) and many prepositions. (ICAO, 2010, p. 3-4)

From this perspective, it is understood that the elimination of certain words that are not considered relevant in terms of meaning is supposed to reduce the occurrence of miscommunication through ambiguity (ESTIVAL *et al.*, 2016; MODER, 2013; PHILPS, 1991). The use of call signs (information of the flight, with letters and number pronounced according to what is prescribed) would establish the identification for operations.

ICAO Doc Annex 10 about Aeronautical Telecommunications (2001) does not make specific mention to the use of pronouns, neither does DOC 9432, the Manual of Radiotelephony or ICAO Doc 4444 about Phraseology, even though featuring several instances of “we” and “you” in the example sentences.

Estival *et al.* (2016) present full lexical and functional grammatical categories in a linguistic description of AE. They say that only first and second personal pronouns “I, we, you” are used, and that there is rarely, if ever, a third person pronoun (because a noun phrase is reported in full, assumedly to avoid ambiguity).

According to Borowska (2017), personal, reflexive and possessive pronouns are not generally used in standard phraseology, being “I” an exception in “I say again”, “you” in “How do you read?; Are you ready for pushback?; Do you want vectors?; Say your position”.

Despite the orientations that discourage the use of pronouns and the conclusions from Estival *et al.* (2016) and Borowska (2017) regarding the non-outstanding use of pronouns in AE and phraseology, other studies show that the use of personal pronouns such as “we”, “you”, or “it” reveal interesting information for analysis.

Moder and Halleck (2012) claim that AE is a specialized language register through a corpus-based study. In the aviation corpus from Ohio State University, the 20 most frequent words were, in order, “the, to, one, two zero, you, three, five, and, of, four, seven, is, on, six, we, at, it, eight, and right” (p. 144), which differs from the ones in a corpus of general English (Corpus of Contemporary American English was the one she used). In COCA,⁵ the most frequent 20 words are” the, is, and, of, a, in,

⁵ <https://www.english-corpora.org/coca/>

to, have, it, I, that, for, you, he, with, on, do, say, this, and they”. Among the differences, they highlight the appearance of numbers in the aviation corpus (a peculiar trait of aeronautical communications, to inform flight level, heading, runways and taxiways, call signs, procedures etc.), only three prepositions – “of”, “on”, and “at”, the appearance of only three pronouns – “you”, “it” and “we”, not “he”, “they”, and “I”, as in the general Corpus.

Prado (2010) also presents a list of the ten most frequent words in a corpus based on aeronautical communications, which are “you”, “the”, “to”, “I”, “and”, “we”, “a”, “on”, “it”, “that”. Her list displays three personal pronouns at the top, two articles and a preposition.

Sexton and Helmreich (2000) discuss the relationship of language use and flight outcome measures through the application of a “new” computer-based linguistic method for text analysis, a program called LIWC (Linguistic Inquiry and Word Count). Eighty-five language dimensions were analyzed, including personal pronouns, we, our, us, I, among others. One of their research questions was “how does language use vary across position and or level of workload?”. The data were from a NASA study involving a three-person crew: a captain (C), a first officer (FO) and a flight engineer (FE), flying a simulated aircraft for a period of three days.

The conclusions point to the fact that individuals tend to communicate more along periods of high workload, much probably due to the multi-tasking involved in flight deck management. Specifically on the use of pronouns, some of their conclusions were that captains tend to use “we” (the first person plural) more often than FO’s and FE’s, especially in stressful situations, which could be due to the status and role of the captain. “This role requires more than active team building, and the status affords the right to use the first-person plural (‘we need to..., our problem..., let’s get out ...’) when briefing, planning or addressing the crew in conversation” (SEXTON; HELMREICH, 2000, p. 66). Additionally, there was an increase in the use of this pronoun by the three crew members as the familiarity increased along the three days. The use of the first-person plural was highly correlated with performance and could be a marker of familiarity or a more collective orientation towards the crew. Language use of pilots varies as a function of who is talking (C, FO or FE) and as a function of workload (SEXTON; HELMREICH, 2000, p. 66).

In a study dating back to 1994, an NTSB investigation covered flight-crew involved major incidents in U.S. carriers and acknowledged that “we” could be an important marker in that crew familiarity has been implicated as a moderating variable of aviation accidents (NTSB, 1994).

Cushing (1997), in a chapter entitled “Problems of Reference”, offers an example of a specific case of confusion that the use of pronoun “we” led to. Two fighters were flying on instrument route and one developed mechanical problem and stated, “We need clearance back to base” (CUSHING, 1997, p. 18). The controller issued an IFR clearance and the aircraft replied, “We are in a left turn and we are climbing to 17,000ft” (CUSHING, 1997, p. 18). From this, the controller interpreted “we” as meaning that both aircraft were returning to home station. However, only the leading aircraft – the one that made the contact, was. The other continued on the original route. The pilot used “we” meaning the crew in that aircraft and the controller understood “we” as the two fighter aircraft flying together and this could have had negative consequences.

4 Pronominal choice in accomplishing cockpit identities

In “Beyond the Black Box”, Maurice Neville (2004) analyzes how pilots accomplish identities using prescribed and non-prescribed pronominal forms. There are two formal identities which are assumed for pilots. The first one is automatically given according to their status as professionals, either as a Captain or as a First Officer. The other is related to the functions that they perform in operations, as the Pilot Flying (PF) – the pilot who is actually in charge of the maneuvers to make the aircraft fly, or as the Pilot Not-Flying (PNF or Pilot Monitoring (PM), – the who is in charge of tasks to assist the pilot flying.⁶ Pilots have to be clearly aware of who is in charge of what and, in order to share this identity, they make use of pronouns.

⁶ “Pilot Monitoring” has been used more recently because it seems to be more appropriate in describing the actual function of the pilot when not performing the actual tasks to fly the plane – as described by the Federal Aviation Administration (FAA), the US Aviation Agency. (https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/safo/all_safos/media/2015/SAFO15011.pdf) In this article, PNF (pilot not-flying) will be used in accordance with what is used by Neville (2004).

Pronominal choices allow participants to establish how they are related to each other within the interaction and are important for pilots' communicative practice contributing to their awareness of who is doing what and what is going on. So that duties and responsibilities are clearly assigned to identities, pilots have to coordinate their work together.

Through their pronominal choices pilots develop and demonstrate to one another their evolving understandings of these cockpit identities, from the engine start up and takeoff through to the landing and engine shut down. Pronominal choices indicate which identity pilots are occupying, at any given moment, in a setting where more than one identity may be available and legitimate. Pronominal choices help to allow pilots to make visible and be accountable for their moment-to-moment understanding of the identities they each occupy (NEVILLE, 2004, p. 34).

Crystal (1995, p. 201), in a traditional perspective, defines pronouns as “words that stand for a noun, a whole noun phrase or several noun phrases and a personal pronoun as the main means of identifying speakers, addressees and others”. Neville (2004) adopts a different perspective, in accordance with Sacks (1992), who, in Chapters 011 and 11 of his Lectures, respectively, addresses Pronouns and tying Techniques: “The need to tie one’s talk to another’s preceding talk is a motivation to listen: tying properly shows that one has understood” (SACKS, 1992, p. 716).

In relation to the pronoun “we”, Sacks says that it can be used to represent organizational status or capacity – when the speaker talks as an agent, and that a speaker may use “we” for category bound activities, as an indicator of the speaker’s category membership”. (SACKS, 1992, p. 333).

Neville (2004, p. 36) refers to a research by Malone (1997 *apud* NEVILLE, 2004) who puts that “the first person plural provides ‘a powerful resource for calling up involvement obligations that require hearers to interpret who ‘we’ are at any moment and hence how and where the interaction is proceeding’.”

Field (2020) states that the interactive listener retains certain aspects of form in his short-term memory in order to use them in the upcoming responses and is not just concerned with the speakers’ meaning. From that, one could assume that personal pronouns seem to be relevant

in assigning references in exchanges and should be given attention in the communication dynamics in order to avoid problems such as ambiguity.

Additionally, the choices of pronouns can be affected by the characteristics of the setting or occasion of an interaction, which can be associated to specific patterns that may be developed over time related to organizational identities.

In order to check pronominal choices that enable pilots to establish who they are talking and listening to one another, Neville (2004) looks at numerous examples of personal pronouns which occur as part of the officially prescribed wording for pilots (in manuals of operating procedures and company policies) and at those which are not in a non-prescribed context.

The example below focuses on “your go” and “my go”, part of prescribed words pilots are required to produce.

- 1 (0.9)
- 2 C/PNF: I have three three five(.) course bar three five five heading bug,
- 3 (0.7) A:SEL ADF, (0.2) it's your go.
- 4 (0.8)
- 5 FO/PF: my go.
- 6 (0.5)
- 7 FO/PF: go-around(.) flight level one eight zero (0.4) with ASEL (0.5)
- 8 right (of the) the pilot in command info: briefing as discussed.
- 9 (0.3) (NEVILLE, 2004, p. 40).⁷

This dialogue is said to have happened in the briefing moment before the flight, as the pilots prepare for takeoff. Through their pronominal choices, the pilots explicitly assign their identities as PF and PNF. Other similar examples given by the author are “your departure”, “your power levers” and “my yoke”, to determine who is in charge of a specific operational task.

The next example features a non-prescribed form:

⁷ The reader can refer to the original source for further understanding of the symbols used to transcribe the conversations.

1 (13.4)
 2 FO/PF:okay we need to plan hh- so the plan shall be:::, (3.4) go downhill
 3 at (0.2) f::orty: (0.3) eight (0.4) mi::les:: er::: (0.4) south of
 4 Destination (0.3) on DME on the GPS, (1.6) we'll expect to be
 5 visual within twentyfive miles make a visual approach:, (1.7) to
 6 join left downwind for left circuit landing runway one ei::ght::.
 7 (0.3) the airfield elevation is eighteen (.) circuit height a thousand
 8 feet is bugged on the altimeter. (0.9) visual procedures left circuit:
 9 (1.9) we'll be landing flap twentyfi::ve with a:: ah
 10 (2.2) Vref of ninety:ni:ne and (0.2) seventeen point seven (ton),
 11 (1.2) carry ten for a hundred and ni::ne (0.9) and Vfr Vel's a
 12 hundred and nine and fourtee:n. (1.3) <and they're all se:t:.>
 13 (0.8)
 14 C/PNF:0 Set" ecrosschecked).
 15 (0.8)
 16 FO/PF:the fuel on board'll be: six forty, (1.2) it's about an hour and a
 17 quarter's holding, (1.3) not really enough to go anywhere but er
 18 we shouldn't have a problem getting on the ground in an hour.
 19 (3.4)
 20 FO/PF:and ah radio aids we got both the NAYs on Destination no::w we
 21 might as well stick both the AD er ADFs up to Destination too.
 22 (0.7)
 23 ((repeating alert tone))
 24 FO/PF:number one ADF identified on Destination now as well.0
 25 (4.3)
 26 C/PNF:that's all understood (NEVILLE, 2004, p. 53).

Although the FO is the one performing the operations – the PF, he makes use of “we” instead of “I” in sentences such as ‘we need to plan’ (line 2), ‘we’ll expect to be visual’ (line 4), ‘we’ll be landing flap twentyfi::ve’ (line 9), ‘we shouldn’t have a problem’ (line 18), ‘we got both the NAVs’ (line 20), and ‘we might as well’ (line 20) in order to make it evident that the activities – the planning, expecting, landing, etc.,

involve both pilots, in a shared identity as crew. Considering the fact that “we” can be interpreted as inclusive or exclusive, the meaning of the pronoun can be often vague and highly context dependent. (BIBER *et al.*, 1999; VAUGHAN; CLANCY, 2013).

Further examples featuring the use of “we” are provided: “we’re clear to start”, “we’re estimating”, “we’re still traffic to you”, “we’ve got traffic in sight”, “we have that”, “we don’t require it”, “we need to plan”, “what we’ll do”, “let’s get out of here”, among others. They seem to set clear that the activities being performed are being taken as a jointly controlled task. That is, the use of the pronoun ‘we’ seems to be inclusive of the operational crew members.

The choices for “I”, “my”, “me”, “you” and “your” were analyzed and interpreted as markers to invoke or make salient an individual identity for the other pilot, as shown in the below example:

- 1 (3.5)
- 2 FO/PF: take vertical speed and I’ll just slow it down a bit more.
- 3 C/PNF: okay.
- 4 (4.0) (NEVILLE, 2004, p. 60).

By saying “I’ll slow it down”, the pilot wants to inform action taken and control of the plane. Other examples – “I’m going to let it run”, “I’ll take the autopilot’s in”, “I’ll take runway two two”, “I’ve had enough”, “I’ll have the heading” show that, by choosing one possible pronominal form, pilots are able to adopt for themselves, or assign to another, one of the possible cockpit identities.

The author also mentions that in naturally occurring cockpit talk-in-interaction pronominal choices can be a flexible interactional resource which allow pilots to move in and out of relevant cockpit identities, as shown in the next example:

- 1 (0.2)
- 2 C/PF: okay and I’ll ah wait until we get the lineup(.) before I take the
- 3 locks off.
- 4 FO/PNF:yeah (.)transponders on(.) check’s to flight controls.
- 5 C/PF: and you can tell him we’re ready (yeah).
- 6 (0.2)

- 7 FO/PNF: yep.
 8 (1.4)
 9 FO/PNF:>bravojul<iet:: ()tango ready.
 10 (1.6)
 11 FO/PNF:[((coughs))
 12 Tower: [bravo juliet tango.
 13 (1.2) (NEVILLE, 2004, p. 73).

Here, the choices for “I”, “we” and “you” seem to portray each one’s identities and tasks in the procedure.

Neville (2004) also analyzes what he calls impromptu pronouns, a category that refers to forms that are also non-prescribed, but which occur as “embellishments of prescribed wordings. That is, pilots’ talk may include personal pronouns where there are none in the officially prescribed wordings. The personal pronouns are not in the script but are impromptu” (NEVILLE, 2004, p. 76).

For instance, when pilots are running checklists, the prescribed wording would be only “set”, or “selected” or “received”. Instead, in his data, pilots responded like “we’ve got that”, or “you’ve got flaps ten”. To the author, these pronouns do important interactional work as they emerge as part of pilots’ accomplishment of their work and “help pilots to make explicit distribution of duties and responsibilities, and the control of various cockpit technologies” (NEVILLE, 2004, p. 77).

As we can see, the investigation proposed by Neville (2004) is significantly contributing insofar it explores a more social aspect comprehended by the use of certain personal pronouns in aeronautical communications. Nevertheless, it does not bring information about the frequency of those structures or a more in-depth exploration of other elements such as lexical items that accompany specific pronoun choices. Our study, then, intends to bridge this gap.

5 Method

CL is an empirical research approach to language use from the exploration of a corpus (a collection of texts as database) through computer-based tools. Our study aims to investigate the use of pronominal forms in a specialized corpus, CORPAC, presented below.

5.1 CORPAC

CORPAC (Corpus of Pilot and Air Traffic Controller Communication) is a corpus that I started to compile in 2017 with the help of two monitor students (not simultaneously) in the Aeronautical Science Program of the Pontifical Catholic University of Rio Grande do Sul. The project originally intended to be a joint work with monitor students in the Letters Program, so that we could have the collaboration of different perspectives in the compilation and analysis of the material – a more technical view on behalf of student pilots and a specialized linguistic contribution from the Letters Program students.⁸ A minimum of 100000 words is the target.

This paper is based on a preliminary version of the corpus, from its first stages of compilation – with around 35000 words.

The corpus has been entirely built from emergency situations in aviation extracted from the videos freely made available by VASAviation, which is a Youtube channel that features selected situations from live ATC Emergency Situations/LiveATC). The videos are animations and contain the transcription of the audio. The criteria for the selection are basically about the emergency degree of the event and the availability of the transcription. That is, the video is watched by a student pilot, who then verifies if it actually portrays an emergency situation in aviation and if the transcription corresponds to what is being said.

Student-monitors were briefed about corpus research – its assumptions, entailments and impact and were instructed to:

1. Choose an episode featured on the channel, watch it and check if it actually presented an emergency situation.
2. Fill out a short form in the file “CORPAC INFO” with information about the episode, such as URL, title/ nature of the problem, date, flight/company/ aircraft, where (from/ to), English as a first/ foreign language, phase of flight, duration of transcripts, and summary of the event.
3. This information can be essential to account for a number of variables in the analysis, such as the nature of the problem, the phase of the flight or if English is being used as a first or foreign language.⁹

⁸ Currently, the project is on hold due to a number of reasons, but I expect to restart it as soon as possible.

⁹ As information about the professionals is not disclosed in the source, it is not possible to accurately claim if the subject is a native speaker of English or not. Student-monitors

4. Write the transcription of the exchange in the same file, between “ATC-Pilot Transcripts and “End of transcript –”, as shown above.
5. Transfer ONLY the transcripts to another Word File, “CORPAC”, adding just the corresponding number of the event in the INFO file so that we can have access to background information about the event.

Accordingly, CORPAC has (so far) forty-three transcripts of emergency situations (123 pages in a Word file), based on videos which range from three to fifteen minutes and have been produced since 2008. The transcription procedures usually last long, and they also require two computers in order to facilitate the process— one to watch the animation and see the transcript and the other two write the transcription. As for the time spent in the process, student-pilots usually estimate one hour of writing for each minute of recording, altogether.

Despite the limitations of the database so far, the corpus already offers material for us to conduct preliminary linguistic analysis, such as the one presented in this study.

5.2 Software data analysis

With the view to obtain specific data from CORPAC, a popular and freely available software for corpus analysis was used: WordSmith tools.¹⁰ The tools used were Concord, WordList and KeyWords.

The corpus was uploaded and required to generate:

1. A wordlist with the most frequent words
2. Concordance associations, with the most frequent collocate elements of a given pronoun.
3. Keywords showing their keyness value.

The proposed analysis ranges from a general picture of the use of personal pronouns in CORPAC to a more detailed look at the pronouns “we”, “you” and “I”, given their role in aeronautical communications as shown in Neville (2004).

were asked to fill out the form based on the company and other factors such as language proficiency and accent. As I evolve with the project and counting on the help of Student-monitors from the Letters program, I intend to conduct a more detailed categorization of this feature considering other factors and sources.

¹⁰ <https://lexically.net/wordsmith/>

6 Results and Discussion

CORPAC totaled 36846 tokens and 1794 types. Table 1 below shows the twenty most frequent words:

TABLE 1 – The twenty most frequent words in CORPAC

Rank	Word	Frequency
1	THE	873
2	YOU	784
3	TO	764
4	AND	638
5	WE	611
6	TWR	537
7	ONE	496
8	TWO	456
9	UH	435
10	RUNWAY	419
11	ON	408
12	FOR	368
13	A	347
14	APP	306
15	AT	283
16	I	273
17	THREE	272
18	RIGHT	271
19	OF	255
20	IS	245

Source: Produced by the author.

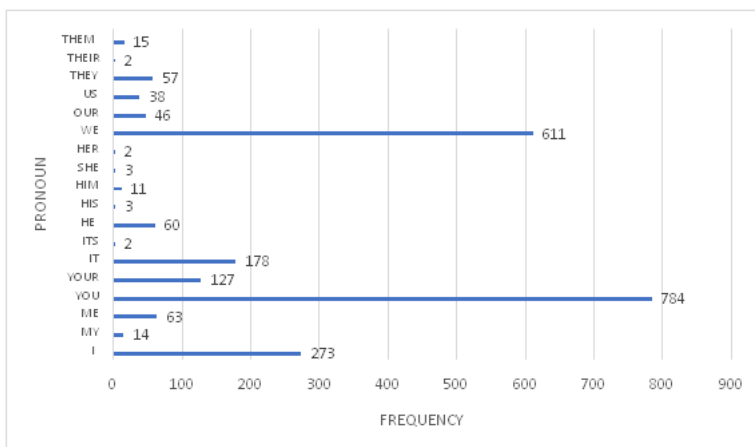
Results show two pronouns topping the list: “You”, in second, with 784 occurrences and “we”, coming in fifth, with 611. “I” occupied the 16th position in the rank, occurring 273 times. This is similar to what was found in Moder and Halleck (2012): “you ” and “we” in the top positions, as well as other word categories: numbers are indeed frequent,

the article “the” tops the rank in both corpora and preposition “to” is also commonly frequent. Our results also resemble Prado’s (2010) – her top ten list features the same pronouns in CORPAC, and article “the”.

Most are closed class words – determiners, prepositions, pronouns, conjunctions. Open class words are represented by items such as “runway”, “twr” (tower), “right”, and “app”.¹¹

The following graph presents an overall picture of pronominal occurrences in our corpus, taking into account first, second and third person pronouns.

GRAPH 1 – Pronominal Occurrence in CORPAC

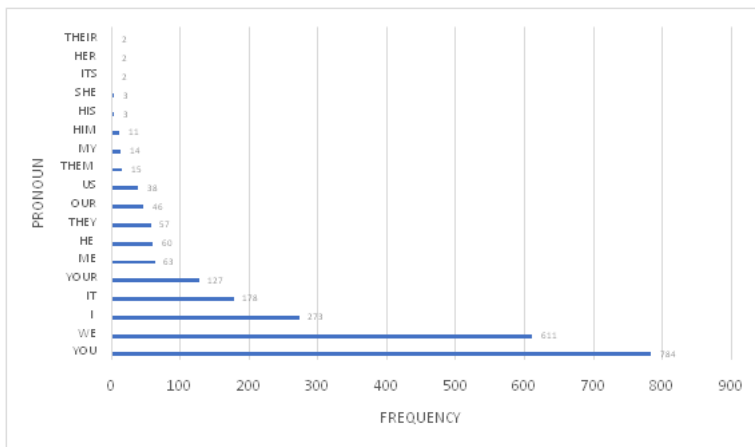


Source: Produced by the author.

We present the same graph featuring all the pronouns differently organized – ranked by their frequency as follows.

¹¹ Additional analyses combining the most frequent open and closed class words would be interesting insofar it could determine more precisely the association between the most frequent pronouns and nouns in the corpus. Although this proposal goes beyond the scope of this article, it should be considered as forthcoming research following this investigation.

GRAPH 2 – Personal Pronouns organized by Frequency



Source: Produced by the author.

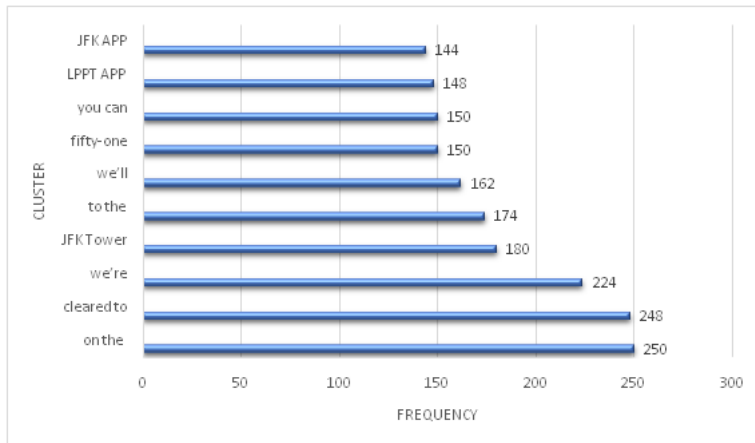
“You”, “we” and “I” top the rank of frequency. They correspond, respectively, to 2,13%, 1,66% and 0,74% of the words in CORPAC. “You” had a +365.69 keyness¹² value and “we”, a +282.17, coming in second and third position, only behind the article “the”, with a value of +399,13, which is significant compared to all the other words in the corpus.

Having in mind the orientations not to use pronouns in aeronautical communications (as seen previously), we could say these numbers can be considered representative. Especially acknowledging Neville’s (2004) assumptions that analyze the importance of these personal pronouns in assigning identities. In other words, the use of personal pronouns is not encouraged in aeronautical communications to avoid ambiguity and still “we”, which is more likely to cause ambiguity than “I”, is used almost three times more. Pilots seem to need to resort to it to optimize communication.

A further analysis of the two-word clusters in CORPAC show pronouns and prepositions topping the occurrences.

¹² The “keyness” value of a word can be obtained through the tool Keyword, uploading the target corpus and another reference corpus for comparison. In this study, the reference corpus used was BNC Spoken corpus, retrieved from <http://www.natcorp.ox.ac.uk/using/index.xml?ID=freq>

GRAPH 3 – 10 most frequent two-word Clusters in CORPAC



Source: Produced by the author.

“We’re” is in third, “we’ll” in sixth and “you can” in eighth. This appears to reveal significant information about aeronautical communications: despite having their use discouraged, pronouns seem to have a degree of importance in aviation exchanges given their high frequency, analyzed as a one-word or as a cluster.

A more detailed examination of the three-word clusters with the personal pronouns “I”, “you” and “we” demonstrate that these elements seem to play a relevant role in Pilot-ATCO or Pilot – Pilot communication.

The most frequent clusters that feature “I” are “I don’t” (10); And “I’ll” (9); “I mean I” (7); “I’ll get” (6) and “I’m just” (6). The most frequent three-word groups of words with “you” are “If you can” (15); “Do you have” (14); “Do you want” (13); “You have the” (13) and “Thank you very...” (11). The clusters that display “we” the most are “We’re gonna” (15); “We’ll” (14); “We’re” (13); “We’re going” (12) and “We’ll be” (12).

The data show that three pronouns are associated with auxiliaries or modal verbs. Revising the instances in numbers, we verify that clusters with “we” happen more frequently than those with “I”. The top five occurrences of “We” in clusters show the use of “will” or “be going to”, which can be interpreted as a manifestation of plans, intentions or future actions. As pointed out by Neville (2004), “we” is a linguistic element that pilots resort to in order to establish shared identity. Sexton and Helmreich

(2000) have also mentioned that the use of “we” seems to reinforce the idea of “team-building” and that this use may be increased along the time shared in the cockpit by a sense of familiarity of the crew members.

As for the pronoun “you”, data from CORPAC show that they are significantly frequent and used to assign clear identity in terms of pilots performance in operations, as in “If you can”, “Do you want” and “you have the” – the last one associated with examples provided by Neville (2004) mentioned previously. The form “you” can be a singular or a plural pronoun and this flexibility probably accounts for its high occurrence and for possible ambiguities as well. An ATCO can use “you” addressing a pilot of a specific flight or and, depending on the content of the utterance, such as weather warning, other pilots can interpret it as a general remark. This is why other indications, such as the call sign (the identification of the flight) have to be used in order to mitigate possible ambiguities.

The following examples are extracted from CORPAC and illustrate the use of “we” in real emergency situations. Example (1) below features communicative strategies used in order to clarify the identity of “we”:

- (1) “We are not clear of the runway, we are on the runway. Cathay Zero-Seven-One is on the runway, crossing.”

The pilot uses “we” twice, and the call sign right after it to make sure that the ATCO understands “we” as the crew in that specific flight, not another aircraft. A similar strategy can be observed in the next example.

- (2) “(JFK APP) \x96 Delta 1888, it seems like the rate of turn is a little bit slower. Am I right to assume it\x92s gonna take you longer to turn?
(DAL 1888) \x96 We\x92re working on it, Delta 1888, we can tighten it up.
(JFK APP) \x96 Endeavour 3323, turn right heading 130, vectors for an emergency aircraft inbound.”

The repetition of the callsign, that is, the code that identifies the flight – in this case, “Delta 1888”, appears to confirm information about who “we” is referring to.

Example (3), on the other hand, brings an instance of “we” being used in a context where it could cause ambiguity.

- (3) “GYI TWR – Seneca three-seven-Tango, right closed traffic; report midfield downwind runway one-seven left.
 N5337T – Left closed traffic and report midfield right downwind. Three-seven-Tango.
 PR-ITB – (...) Runway one-seven left. India-Tango-Bravo.
 GYI TWR – Three-seven-Tango, I need you right traffic and report midfield right downwind.
 N5337T – Right traffic and report right downwind. Three-seven-Tango.
 GYI TWR – Papa-Romeo-India-Tango-Bravo, that was stepped on. Say your position from the airport.
 PR-ITB – Radial one-three-zero. Now four miles.
 GYI TWR – Papa-Romeo-India-Tango-Bravo, thank you. And make left traffic runway one-seven left. Report midfield left downwind.
 PR-ITB – OK I understand we are cleared to land runway one-seven left.
 N478BK – North Tex Tower- North Texas Tower, Cessna eight-Bravo-Kilo; three miles final.”

When the pilot of the flight PR-ITB utters the sentence “I understand we are cleared to land runway one-seven left”, he is not following communication rules stated by aeronautical phraseology which require the repetition of the call sign when reading back an instruction in order to avoid miscommunication. He seems to be unaware of the possibility of ambiguity, reinforced by the fact that, previously in the conversation, it is clear that the controller had to call his attention by saying “Papa-Romeo-India-Tango-Bravo, that was stepped on” when he readback an instruction meant to be directed to flight Seneca three-seven-Tango. The controller successfully detected that the pilot read back an instruction which was not assigned for him and was probably monitoring the phraseology deviations from this pilot in a way that, when he used “we” without clearly saying who “we” was referring to, he managed to

understand. Still, it is a potential example of how pronouns can cause ambiguity if identities are not clearly assigned.

Therefore, considering that the use of pronouns is not encouraged in aeronautical communications balanced against the fact that the results found in CORPAC suggest that they are more used than what would be expected, one would think about more risks for ambiguity. Even bearing in mind that pronominal choices seem to be justified by a reason such as identity assignment (NEVILLE, 2004; SEXTON; HELMREICH, 2000), in an ideal training context, learners should be made aware of the orientations from the official documents that regulate communications in a prescribed way, and should also be informed of the actual language occurrences in order to be better prepared to interact.

In other words, learners can benefit a lot from this non-prescriptive research perspective offered by CL. Real examples can be used, discussed and explored in class. Ambiguity is a problem in aviation exchanges which should definitely be mitigated, and corpus-based investigation seems to be a helpful tool.

7 Final Considerations

The aim of the study presented in this article was to analyze the use of personal pronouns in aeronautical communication based on CORPAC, a specialized corpus which is under compilation. To accomplish this goal, some concepts involved in the discussion were reviewed as were some studies that address the use of pronouns in exchanges in aviation, which appear to be significant despite orientations to avoid their use due to possible ambiguity.

Results from CORPAC about information regarding frequency and clusters associated with “I”, “you”, and “we” demonstrate that personal pronouns are frequent and seem to appear in constructions that are relevant for identities to be clearly assigned in such a high-stakes domain as aviation operations. After our preliminary analysis, the actual use of pronouns appears to mirror this communicative necessity.

It should be noted that, in accordance with the non-prescriptive approach of CL, this study is not meant to investigate the use of pronouns to assign rules in which they have to be employed in aviation. It is intended to describe the occurrence of some pronouns in real, spontaneous source of aviation language use. On that matter, CL showed to be a

fundamental tool to raise quantitative and qualitative data from such specific language domain. Likewise, the research also contributed to CL in that it reinforced the importance of empirical investigation to be confronted against formal orientations.

I understand that such information should be taken into account in aviation language training, not only in the level of the teaching practice of pronominal structures, but also in the metalinguistic level – pilots and ATCOs would profit from learning about how much their behavior in operations can be associated with the use of a pronoun. If there is orientation to avoid their use and if the findings from CORPAC show that they are frequently employed, learners should be made aware of the entailments and implications of their pronominal choices. Furthermore, testing practices could also benefit from this information, inasmuch task management can be reflected by the proper and clear use of pronouns.

This study is a preliminary examination on the use of pronouns in aeronautical communications. The limitations do not allow for a further analysis on a more detailed look at the actual occurrences of “I”, “you” and “we” in longer sentences and in their context of utterances so to check possible deviations from Standard Phraseology. It would be interesting to go beyond frequency and cluster analysis and extend the information provided so far to compare it with the prescribed standard language to be used in aviation and to envision possible problems of ambiguity.

Additionally, further analyses of the occurrences of “I”, “you” and “we” regarding a more thorough examination of the linguistic context, as well as a more particular investigation of the other pronouns, are necessary if we want to understand better and better the issues of aeronautical communications in order to promote aviation safety.

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