

Linguistic safety and syntactic patterns in Spanish pilot/controller radiotelephony*

Segurança linguística e padrões sintáticos em radiotelefonia piloto/controlador em espanhol

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ABSTRACT: *Drawing on interactional sociolinguistics and institutional discourse analysis, we analyze the ellipsis in Spanish in the pilot/controller (P/C) interaction in Argentina. We aim to demonstrate how it contributes to the achievement of the institutional communicative goal of brevity, but how it can affect another premise of radiotelephony in aviation: clarity. The speakers' choice of syntactical structures takes place in a highly regulated socio-technical setting, with a strong linguistic policy they are obligated to respect. Still, the analysis of the ellipsis proves that speakers react to contextual information, adjusting their use of this resource to particular interactional needs and prioritizing clarity to shape a linguistically safe operational context while preserving institutional identities. Within human factors training, linguistic awareness programs that include P/C syntax would enhance professional communicative competence as a non-technical skill in the aviation context.*

KEYWORDS: *institutional discourse; aviation; linguistic safety; P/C interaction; ellipsis.*

RESUMO: *Fazendo uso da sociolinguística interacional e da análise do discurso institucional, analisamos a elipse na interação em espanhol entre piloto e controlador (P/C) na Argentina. Tentamos demonstrar como tal recurso contribui para alcançar a meta comunicativa institucional de brevidade, mas como pode afetar outra premissa da radiotelefonia na aviação: a clareza. A escolha das estruturas sintáticas feita pelos falantes se dá em um ambiente sociotécnico altamente regulado, com uma forte política linguística que eles têm obrigação de respeitar. Ainda assim, a análise da elipse prova que os falantes reagem à informação contextual, ajustando o uso deste recurso a necessidades interacionais específicas e priorizando a clareza de modo a criar um contexto operacional linguisticamente seguro e, ao mesmo tempo, preservar identidades institucionais. No treinamento de Fatores Humanos, programas de consciência linguística que incluam sintaxe P/C melhorariam a competência comunicativa profissional enquanto habilidade não técnica no contexto da aviação.*

PALAVRAS-CHAVE: *discurso institucional; aviação; segurança linguística; interação P/C; elipse.*

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1 Introduction

Aviation safety stands as one of the main goals of every aeronautical system. Taking into account that flight operations revolve mainly around two privileged actors, i.e. pilots and air traffic controllers, it becomes clear their communicative skills and knowledge of aviation phraseology (AP) play a most significant part in achieving *aviation safety*. The institutional relevance of pilot/controller interaction (P/C interaction) has been demonstrated more than once by worldwide accidentology (Tenerife 1977, Cove Neck 1990, Cali 1995, Amazonia 2006) and is also corroborated by the amount of linguistic literature concerned with its different features since the '80s, the vast majority in English and about English P/C interactions (Goguen & Linde, 1983; Linde, 1988; Cushing, 1994, etc.).

While in the aviation world the term *aviation safety* stands for a state characterized by the absence of unacceptable risks for persons, aircraft and property (ICAO 2001),¹ and *aviation security* denotes all methods for the protection from crime within the aviation environment, the nouns *safety* and *security* have not been distinguished in linguistic studies. *Security* and, even more frequently, *insecurity* have been used in the terminological unit *linguistic (in)security* to denote the subjective experience of evaluating a linguistic performance in relation with a specific norm or expected behavior (Richards & Schmidt 2002, 310-311). The literature has focused particularly on the definition and study of *linguistic insecurity*, since this condition often arises in contact situations and entails social sanctions to the individuals (see Labov, 1983; Bretegnier & Ledegen, 2002) but it can be argued that certain linguistic features and communicative conditions define an objective notion of *linguistic security* or – better – *safety* in specific and well defined institutional contexts.

As a precedent, Philps has used the french terms *insécurité linguistique* in a traditional sense and its positive counterpart, *sécurité linguistique*, with a new emphasis as “*le degree d’ambiguïté afférent à un énoncé, d’où sa capacité à provoquer l’incompréhension*” (1992: 22) in reference to aviation phraseology. In this last sense, the author proposes that linguistic security can be compared with other operational aspects of aviation safety when he states the complexity of this notion: “Dans le cadre de l’aviation civile, le concept de sécurité donne lieu, bien évidemment, à des ramifications aussi nombreuses qu’elles sont complexes: sécurité électrique, sécurité en vol, sécurité incendie, sécurité intrinsèque, etc., mais aussi *sécurité linguistique*” (Philps, 1992: 20).

In order to avoid a misunderstanding, in this work we propose the alternative English term *linguistic safety* to denote all objective conditions that context, speakers and utterances need to present to consider a specific operational context as linguistically safe (de-Matteis, 2010).² In particular, this notion applies to the study of interaction in socio-technical settings like aviation, railways, maritime navigation, medicine and certain high-risk industries where unambiguous, timely and effective communications are crucial for preserving human life and in which clear communicative protocols have, therefore, been established. These protocols can be used as a comparison reference point to evaluate communicative practices. However, as we understand it, *linguistic safety* encompasses not

only specific linguistic features, but also *linguistic security*³ in the traditional sense – i. e., as a subjective experience – in as much as speakers who feel linguistically insecure can be thought (at least in general) to be more prone to make more communicative “mistakes”. On the other hand, it can be the case they are also more attentive to linguistic clues of potential misunderstandings. In any case, because coping with linguistic insecurity requires different resources, individual strategies need to be reinforced with communicative knowledge and training.⁴

Since P/C interaction takes place over the radio (section 2.2), contextual conditions for aviation linguistic safety include some evident factors, such as good working radio equipment, effective language competence assessments –particularly for international aviation –, etc. Also a significant aspect of these contextual conditions, the expected features of aviation interaction that can make it safe have been formally established in regulation (section 2.4), and speakers should adjust their utterances to the institutionally expected syntax and terminology. Interpersonal features that involve the speakers – like the projection of institutional identities, status and power relations management, assertiveness and other communicative concerns included among human factors – influence a linguistically safe operational environment. In this sense, linguistic (in)security in the classical sense relates to the notion of *identity*, in many ways constructed through linguistic uses and evaluated through linguistic cues (Benwell & Stokoe, 2006; De Fina, Schiffrin & Bamberg, 2006; Edwards, 2009).

Within this general framework, syntactic patterns in P/C interaction play a major role in shaping a safe operational context and, particularly ellipsis, the main resource which gives P/C discourse its characteristic and somehow paradoxical “brachylogic” appearance (Philps, 1992), has been pointed out as a feature of interest because it relates to the two main communicative goals in aviation: *brevity* and *clarity*. In other words, ellipsis satisfies the need for brevity but, on the other hand, it has the disadvantage of sometimes disserving clarity. In terms of the Gricean pragmatics (Grice, 1975), it maximizes the benefits of the *brevity maxim* but can violate the *modality* and *quantity maxims* (de-Matteis, 2009). For all these reasons, it is interesting to study how speakers manage these resources to achieve linguistic safety in their interactions.

1.1 Objectives

Although AP proposes elliptical schemes as recommended examples for P/C utterances, observation of natural occurring exchanges suggests that speakers vary the extent of ellipsis, a significant phenomenon since it takes place in a socio-technical setting where communicative practices are strongly regulated by national and international organizations. In this article we aim to consider how speakers adjust their use of ellipsis, seemingly in response to contextual factors, and we try to exemplify some of the ones that seem to contribute the most to this variation.

1.2 Theoretical background

Our theoretical background integrates interactional sociolinguistics (Gumperz, 1982a; Gumperz, 1982b, among others) and institutional discourse analysis (Drew & Heritage, 1998; Renkema, 1999; Drew & Sorjonen, 2000, etc.). As any other institutional discourse, characterized primarily by speakers' orientations towards institutional tasks and identities, special constraints on contributions and inferences particular to specific contexts (Heritage & Clayman, 2010), aviation P/C discourse exhibits an array of features that are a reflection of specific communicative needs and, at the same time, have become a key factor of how pilots and controllers project an image of themselves through a very laconic speech style (Helmreich & Merritt 1998: 28). One of these features, ellipsis, has been studied as the set of transformation rules shaping AP (Philps, 1992). But this approach, as insightful as it is, is not useful when considering natural occurring P/C interactions. Therefore we resort to functional linguistics as a general framework to analyse our data.

From this perspective, ellipsis is a cohesive device and works as substitution by zero (Halliday & Hasan, 1994: 143). In this sense, while speakers make use of it to avoid repeating things and to achieve textual cohesion, listeners resort to previous discourse or to the situation to supply the missing words. In the first case, if ellipsis is *cotextual*⁵, the elements to be supplied are somewhere in the preceding text. Instead, when situation is the key to understanding an elliptical utterance, it is called *contextual* or *situational*. In either case, interpretation effort is higher than with explicit wording. A common feature in daily conversation, ellipsis essentially functions as an economical device (Vigara Tauste, 1992: 104–105). As for the aviation setting, ellipsis is the most salient syntactic feature of P/C interaction as suggested via AP examples. It textualizes the participants' orientation towards institutional communicative goals affecting the greatest number of elements and reducing message length and, hence, use of radio frequencies. As a result, ellipsis plays a central role in professional communicative competence, the knowledge and skills pilots and controllers resort to when engaging in radio exchanges, with AP standing as its core component.

1.3 Methodological precisions

The corpus of P/C interactions was recorded between 2001 and 2012 at airports situated in the province of Buenos Aires (Aeroparque Jorge Newbery, in Buenos Aires; the Instituto Nacional de Aviación Civil [INAC] aerodrome, in Morón; and the civil aerostation located next to the Base Aeronaval Comandante Espora, near Bahía Blanca). As part of the flight protection services, all these facilities manage civilian taxiing, departure, final approach and landing procedures — as well as some occasional military aircraft —, leaving out data from en route flights. P/C exchanges from Aeroparque Jorge Newbery have also been periodically observed via the website www.liveatc.net.

Interactions were transcribed following Sacks and Jefferson's conventions (2000),⁶ organized in a database and then syntactically analyzed. Although our analysis is primarily qualitative, we use some basic quantitative techniques in order to better assess the differences between pilots and controllers' use of ellipsis. To that end, statistical descriptors were obtained for two random subsets of data, a sample of 1000 speech turns, 470 from controllers and 530 from pilots and a wider sample of 5041 speech turns, 2381 from controllers and 2660 from pilots. Finally, examples in this article have been selected to account for a wide range of operational circumstances within a very repetitive and routinized set of operations.

As in any functional study of ellipsis, the methodological problem of avoiding arbitrariness when reconstructing elliptical items arises (Kovacci, 1986; Tesak, 1994; Brucart, 2000). In order to solve this hindrance, as analysts without direct aviation experience we combine three different sources to determine occurrences and reconstruct the missing item(s):

- cotext: the missing element can be present in preceding exchanges, sometimes within the same P/C interaction while only occasionally in other interactions in the same frequency;
- context: situational information surrounding natural occurring P/C interactions, operational documentation (charts, procedures, etc.) and also AP examples can help to identify elided items;
- reference turns: refers to actual utterances from speech turns that, in other P/C interactions, make explicit use of the missing element in a similar context. Sometimes, the explicit element can differ from the one provided in the AP example expression. In these cases we consider frequency of use to decide which one is more likely.

2 The context of P/C interaction

As previously noted, aviation radiotelephony takes place in a highly technologized setting. To account for all its complexity, its description must comprise a number of different aspects such as institutional goals, socio-technical aspects, speakers' relationship and underlying linguistic policy.

2.1 Institutional goals

Aviation main institutional goals are *safe* and *efficient* flight operations. But efficiency ranks second to safety. As already mentioned, *aviation safety* comprises all practices tending to warrant a low – risk environment. Communicating with one another is, in this sense, one of the multiple tasks performed by air traffic controllers and pilots and it is crucial to organize traffic, to obtain meteorological information, to negotiate changes in flight plans, to request assistance, etc. Sometimes, when controllers have no radar consoles at their disposal (something that happens at some small airports in Argentina), they depend on verbal exchanges to maintain safe separation between the aircraft under their control.

2.2 Speakers' relative coordinates and radio use

The natural environment for a pilot is the airplane cockpit, while controllers operate in a ground facility (a control tower or an area control center). As a consequence, the use of radio frequencies as the channel of communication is the main feature that defines the technical aspect of P/C interaction and it has a direct effect on how it develops at the linguistic level. Occasional noise⁷ and lack of paralinguistic information are constraints speakers have to deal with by complying with standard communicative practices and regulated patterns of speech (section 2.4) to avoid misunderstandings and interpersonal conflicts, but the most important aspects to be considered here are the major features of P/C exchanges determined by radio use:

- *Sequentiality*: Speakers use different radio frequencies in each phase of flight and each of these frequencies is used, alternatively, by every pilot in the same area and/or flight phase and, in the event of overlapping, utterances become incomprehensible. Therefore, the use of a certain frequency by a large number of speakers emphasizes the fact that P/C interaction needs to be *sequential* and organized to allow every participant the possibility of communicating.

- *Predictability/task relatedness*: Aside from the standardized nature of most expressions that make utterances predictable in form, verbal exchanges will always be related to a certain task and aviation tasks are sequentially organized, thus rendering institutional P/C interaction as a whole quite predictable also in content and time of occurrence.⁸ Also, restrictions to acceptable contributions are another key component of institutional discourse (Drew & Heritage, 1998) and, as can be observed in aviation, non-operational remarks are both formally discouraged by regulations and informally by speakers' attitudes and real practice.

- *Discontinuity*: Communication about a certain topic or task takes place at the appropriate time and therefore the speakers' speech turns will occur at varying periods and each topic will be covered in interactional fragments separated, sometimes, by several minutes. Discontinuity does not prevent a certain P/C interaction to be analyzed in terms of interactional sequences, only the time lapses need to be taken into account, as well as any contextual development with a possible effect upon the progression of that interaction.

- *Public character*: Another consequence of the use of a certain radio frequency is that although all users will be able to listen to interactions that do not concern them directly – and discontinuity is a key factor here because time lapses between exchanges of a certain P/C interaction are filled with other interactions' transmissions – , other pilots' exchanges will provide key information to create the mental representation of the traffic conditions around known as *situational awareness*. It can be understood as the process of maintaining an accurate perception of evolving events, comprehending their meaning and projecting their status into the near future (Endsley, 1988, 2001). At the same time, this *public* character of P/C exchanges is an important conditioner, because in each utterance speakers

expose their professional communicative competence, thus interactionally constructing their institutional identities (Prego Vásquez, 2007).

2.3 P/C relationship

Although pilots and controllers have not usually met in person, their interaction is always polite. However, pilots' status and power is greater within the institution, something that can be observed in the prevalence of the respectful treatments of *señor* ('sir') or *caballero* ('gentleman') in C→P direction, formulae not reciprocated with equal frequency by pilots. But, despite their higher status, pilots need air traffic controllers and share with them legal responsibility when a flight proceeds in controlled air space. Lack of knowledge of each other, status differences and the fact that both institutional roles entail a specific set of rights and obligations may lead to conflict in P/C interaction, but although speakers have disparate perspectives, priorities and manage sometimes diverse types of information, interactions demonstrate a mutual dependence (Nevile, 2004). In the scope of this paper, these remarks only attempt to emphasize the need to communicate properly in order to maintain linguistically safe operations.

2.4 Linguistic policies

The difficulties radiotelephony entails, the need to preserve efficient and safe operations and the particularities of the interpersonal relationship between pilots and air traffic specialists have brought about, during the last seventy years or so, a comprehensive set of communicative regulations by the International Civil Aviation Organization, which is endorsed by the Argentine authorities. In this sense, institutional linguistic policies are a main feature underlying the complex context in which pilots and controllers talk. As part of the professional background, knowledge of communication procedures becomes a major constituent of professional communicative competence and its emergence in actual utterances, by "correctly" speaking and communicating, is considered by participants as an indicator of professionalism.

As stated before, the two main objectives that arise from regulatory sources are *clarity* and *brevity*. Within this framework, communications need to avoid the possibility of ambiguity in order to maintain safe operations and, according to communication procedures, clarity is achieved through the standardization of:

- *aircraft and ground station call signs*;
- *pronunciation of numbers through individual digits*;
- *a recommended speech rate* (100 words per minute under normal circumstances — unless the message needs to be written down by the listener);
- *a 'radiotelephony alphabet'* to clarify words when necessary; and finally

- an ‘aviation phraseology’ that provides a set of ‘phraseological schemas’ (Ruiz Gurillo, 1997; de-Matteis, 2005) and approved terminology as a model of the most frequent phrases speakers need to use in different situations.

Since a limited number of aeronautical radio frequencies is available and a large number of pilots and ground stations are in need of them, speech turns have to be brief. Conciseness is also encouraged to free the radio waves for the use of those who might be in need of assistance. Brevity, then, is achieved through syntactic patterns tacitly offered by example in the AP. In fact, data shows ellipsis is the most extended syntactic feature but in the phraseology sections of regulations, texts with an elliptical syntax are used as models of correct and expected form of messages without specifically naming the resource or making any specific reference to grammar.

3 Analysis

In what follows we will use a functional approach since our interest falls mostly on contextual ellipsis which, though to a lesser extent than cotextual ellipsis, has been successfully considered from this perspective in daily conversation (Contino, 1996; Poblete, 2002) as well as in aviation (Vatnsdal, 1987; Ragan, 1998).⁹ Therefore, as stated in the preceding section, we will understand that context encompasses not only the speakers and the particularities of their institutional setting, but in particular *a*) situational awareness –as an operational constraint that allows to retrieve the elliptic words– and *b*) professional communicative competence –in as much as knowledge of AP and communication procedures allows the participants to both produce and understand elliptical utterances correctly.

3.1 Ellipsis in P/C interaction: general description

In our corpus of P/C interaction, utterances in speech turns present numerous elliptical items affecting different word types with diverse syntactic functions. Quantitative analysis of a sample of 1000 P/C speech turns shows that, although grammatical words are the most frequently omitted, both main and subordinate verbs (even the main verbs in instructions) and numerous nouns are also affected (see table 4). Let’s consider first some examples of ellipsis in routine P/C exchanges and the different sources we employ in each case to reconstruct the missing items. Due to space constraints, we cannot reproduce entire interactions but we provide the operational phase of each example.¹⁰

3.1.1 Cotext

Although cotext plays a less significant role than context, it works as a main source to retrieve missing elements in the examples shown in *I*. In scenario *Ia*, a question/answer adjacency pair uses ellipsis to avoid repetition following a common pattern of syntax in daily conversations.

More interesting cases, however, are based on the co-occurrence of certain words, such as in example *1b* (see Table 1). As in any other discursive practice, certain words have a tendency to appear close to each other, and when this happens they allow a “compensatory” mechanism for the elided items of semantic nature. For instance, if numeric information about flight level is accompanied by the word *nivel (de vuelo)* (‘flight level’) and the rest of the numeric information is not explicitly attributed to other aeronautical parameters, the close association of flight level and heading information allows the participants to retrieve the missing item as *radial* (‘heading’), just like the pilot in *1b* does. The word recuperated by the pilot corroborates our analytical hypothesis because it is cohesive although it appears in the cataphoric cotext. But reconstruction without considering the pilot’s answer is also possible taking into account the lexical relationship between “radial” and “nivel de vuelo” and its meaning in this context.

In other examples, related words that can also act as cotext for recovering missing items are the measurement units of aviation parameters which allow the main noun to be absent, such as *pies* (‘feet’) in relation to flight level, *nudos* (‘knots’) when talking about airspeed or wind velocity, etc. This is not retrieval from cotext in the traditional sense, since missing words are not actually present. It is the likely co-occurrence of the missing words with others that are explicit in previous or following utterances what allows these to work as semantically related cotext.

EXAMPLE 1 ¹¹	RECONSTRUCTED ITEMS	SOURCES
<p>a) <i>Context: Before flight.</i> <i>Female Controller:</i> me recuerda su posición? <i>Airline pilot:</i> uno cinco. <i>C:</i> recibido.</p>	<p>C: me recuerda su posición [*de estacionamiento]? P: [*nuestra posición (de estacionamiento) es] uno cinco. C: recibido.</p>	<p><i>Context-Terminology:</i> “posición” replaces the AP-expression “puesto de estacionamiento” (‘parking position’) <i>Cotext:</i> anaphoric reference to parking position by controller in question/answer adjacency pair.</p>
<p><i>Example translation:</i> C: can you remind me your position? P: one five. C: roger.</p>		
<p>b) <i>Context: After takeoff.</i> <i>Controller:</i> tres cero su despegue, dos cero cero seis, por el uno ocho cero hasta nivel ahora uno dos cero, uno dos cero. Bahía le va a confirmar mayor. <i>Airline pilot:</i> recibido. el despegue fue tres cero, <i>radial</i> uno ocho cero hasta nivel uno dos cero y mantener. (01/32-33)</p>	<p>C: tres cero [*fue] su despegue, dos cero cero seis, [*proceda] por el [*radial] uno ocho cero hasta nivel ahora uno dos cero, uno dos cero. Bahía le va a confirmar mayor [*nivel]. P: recibido. el despegue fue tres cero, <i>radial</i> uno ocho cero hasta nivel uno dos cero y mantener.</p>	<p><i>Related cotext:</i> if the information 120 refers to a flight level (“nivel (de vuelo)”), then 180 refers to heading (“radial” or, less frequently, “rumbo”). Use of the comparative “mayor” (‘higher’), relates the two flight levels. Pilot retrieves “heading” (“radial”) using also semantically related cotext as a disambiguation device. <i>Reference turn:</i> ehm, le voy a solicitar que <i>proceda</i> directo a la vertical. (04/735)</p>
<p><i>Translation:</i> C: three zero your takeoff, two zero zero six, through one eight zero until level now one two zero, one two zero. Bahía will confirm you higher. P: roger. takeoff was three zero, heading one eight zero until level one two zero and maintain.</p>		

Table 1: Examples 1a and 1b.

Technical accident and incident reports in Argentina recognize this use of ellipsis (naming it as “sacando palabras imprescindibles”, ‘omitting essential words’):¹²

Disposición 53/01

Recomendaciones al piloto:

(...) Utilizar la fraseología aeronáutica reglamentaria, (...) *no abreviar sacando palabras imprescindibles para evitar confusiones. No se debe decir “abandono 80”, sino “abandono nivel de vuelo cero ocho cero” para no confundir, por ejemplo, con radial 080°.* (Recommendations to the pilot: Use regulatory aviation phraseology. Do not abbreviate taking out indispensable words to avoid confusion. Do not say “leaving 80” but “leaving flight level zero eight zero” in order to avoid confusing, for example, with heading 080°). (JIAAC, 2002:110).

This type of cotextual ellipsis has frequently been identified in the bibliography as an ambiguity source to be avoided (see Cushing, 1994, for example) and the solution proposed is a conscious effort to use of the words for each numeric parameter or, at least, their measurement units.

3.1.2 Context

As already stated, discontinuity makes it extremely difficult to sustain the claim that speakers can always supply the missing elements from earlier utterances. As examples in Table 2 show, many times situational awareness and knowledge of the operational context (flight plan, standard approach procedures, aeronautical and airport charts, etc.) contribute to the retrieval of key words in P/C interaction and to our analytic reconstruction.

Also as a key part of context, familiarity with aviation terminology and phraseology allows speakers to produce/interpret elliptic structures. The missing items can sometimes be retrieved with reference to the phraseology regulations that characterize the aviation institutional context. In a sense, AP can even be thought of as a form of “virtual cotext” (and, of course, cotext constitutes context too), because its textual nature pre-exists actual utterances and, when using it, speakers implicitly presume a common ground with other participants and, hence, its usefulness as a disambiguation resource.

EXAMPLE 2	RECONSTRUCTED ITEMS	SOURCES
<p>a)</p> <p><i>Context: After landing.</i></p> <p><i>Airline pilot:</i> Superficie, compañía dos cero cero seis, liberando pista, buenas tardes.</p> <p><i>Controller:</i> buenas tardes, charli y a la siete.</p> <p><i>P:</i> charli, siete, gracias. (08/223-225).</p>	<p><i>P:</i> Superficie, compañía dos cero cero seis, [*estamos] liberando [*la] pista, buenas tardes.</p> <p><i>C:</i> buenas tardes, [*salga por calle] charli y [*vaya] a la [*posición] siete.</p> <p><i>P:</i> [*salimos por] charli [*y] [*vamos a la posición] siete, gracias. (08/223-225).</p>	<p><i>Related cotext:</i> presence of a gerund requires in Spanish an auxiliary verb (“estamos”), nouns are usually preceded by a definite article (“la”).</p> <p><i>Context-operational:</i> task in progress demands that the plane leaves the runway and parks. Airport has a taxiway coded as “charlie” and a parking position numbered as “seven”.</p> <p><i>Context-AP:</i> RUEDE VIA (identificación de calle de rodaje) (DTA 2007: 3.4.7)</p> <p>RUEDE A TERMINAL (u otro emplazamiento, por ejemplo, ZONA DE AVIACION GENERAL) [PUESTO DE ESTACIONAMIENTO (<i>número</i>)] (DTA 2007: 3.4.7)</p> <p><i>Reference turns:</i></p> <p><i>Controller:</i> <i>Salgan por alfa</i>, por favor (06/662)</p> <p><i>Airline pilot:</i> Parque, el compañía echo charli delta estacionado <i>en posición diecisiete</i>. (06/35)</p> <p><i>Military pilot:</i> Buenos días, señor, estamos en [*sector] militar para ser remolcados <i>a la posición veinticuatro</i>. (06/463).</p>
<p><i>Translation: P: surface, airline two zero zero six, exiting runway, good afternoon. C: good afternoon, charlie and to seven. P: charlie, seven, thank you.</i></p>		
<p>b) <i>Context: After takeoff.</i></p> <p><i>Controller:</i> delta, cero uno y veinte seis, hasta la vuelta.</p> <p><i>Private pilot:</i> hasta la vuelta, buen turno.</p> <p><i>C:</i> lo mismo, buen vuelo. (08/57-59)</p>	<p><i>C:</i> delta, [*su despegue fue a las] cero uno y [*comunique con aproximación en ciento] veinte [*decimal] seis, hasta la vuelta.</p> <p><i>P:</i> hasta la vuelta, buen turno.</p> <p><i>C:</i> lo mismo, buen vuelo.</p>	<p>Although AP uses the verb “llamar” (‘to call’) to transfer the pilot to the following control frequency, reference turns show a preference for the verb “comunicar” (‘to communicate’):</p> <p><i>Context-AP:</i> A LAS (o SOBRE) (<i>hora o lugar</i>) [o CUANDO] [PASANDO / ABANDONANDO / ALCANZANDO] (<i>nivel</i>) LLAME A (<i>distintivo de llamada de la dependencia</i>) (<i>frecuencia</i>) (DTA 2007: 3.1.3)</p> <p>DESPEGO A LAS (<i>hora</i>) (CRA 1981: 42)</p> <p>EN EL AIRE (<i>hora</i>) (DTA 2007: 3.4.12)</p> <p>Also, regulatory AP states that decimals in the frequencies must be preceded by the word “decimal” (CRA 1981).</p> <p><i>Reference turns:</i></p> <p><i>C:</i> Recibido, [*a las] dos dos <i>fue su despegue</i>, hasta luego. (04/289)</p> <p><i>Female C:</i> eco charli delta, Bahía, <i>comunique con Espora torre en diecinueve quince</i>, lo están llamando. (04/238)</p>
<p><i>Translation: C: delta, zero one and twenty six, until your return. P: until we return, good shift. C: the same, good flight.</i></p>		

Table 2: Examples 2a and 2b.

While in example 2a, the auxiliary verb “estamos” (‘to be’) and the definite article “la” can be retrieved from cotext because there are explicit elements that in Spanish grammar presuppose them, the main verbs and nouns of the controllers’ instruction to exit the runway and park can be recovered from AP and preferred words in its real use, and also from airport familiarity. In this sense, although AP introduces the verb “ruede” (‘to taxi’), explicit uses of a verb in the same instruction show a preference for the verb “salir” (‘to exit’) in reference turns. Similarly, where AP proposes the noun “puesto de estacionamiento” (‘parking slot’), the majority of explicit uses in reference turns present

the wording “posición” (‘position’) instead of “puesto” and the systematic omission of the complement “de estacionamiento” (‘parking’). Situational awareness allows the pilot to understand what is expected from him in the absence of these keywords, while as analysts we resort to both contextual knowledge of the airport and to AP phraseology examples to reconstruct the items. It is clear, however, that the omission of main imperative verbs is not a linguistically safe expression for instructions, and speakers should be also made aware of the implications of their omission.

In example 2*b*, on the other hand, AP proposed expressions differ from the controller’s utterance. First of all, for the expression of the takeoff time, the suggested wording in AP is explicit and of verbal nature (“despegó a las”, ‘you took off at’), but the only realization we have observed in our corpus is the nominalised form “su despegue” (‘your takeoff’), sometimes accompanied in reference turns by the verb “fue” (‘was’) before the digits of the minutes and, in other occasions, even without the copulative verb. What is interesting here is the extreme elliptical character of the expression used by the controller “cero uno y veinte seis”, to express takeoff time and next contact frequency (approach). With regard to the change in frequency, the verb suggested in AP to a change of frequency is “llame” (‘to call’), but the most frequent selection in actual interactions is “comunique” (‘to communicate’), as the indicated reference turn shows. Also, while AP regulations establish the need to clearly identify the next control facility, in the interaction it is not mentioned by its designation, and only the frequency appears. Finally, the frequency is expressed in a deviated form, because the regulatory indication for centennial and decimal numbers is not made.

Besides the problem of AP deviations in itself, turns analyzed in 2 clearly raise the question of the appropriate level of ellipsis in P/C interaction. A more detailed analysis of examples in section 3.2 will show how this issue is not uniformly addressed by speakers, and how contextual factors appear to influence their grammatical choices.

3.1.3 Ellipsis and subordination

As a related matter, explicit subordination is not a frequent feature in P/C interaction. In a wider subset of data, a small number and diversity of complete subordinate clauses in P/C interaction was identified (see Table 5), for a total of only 218 subordinate clauses. When it occurs, subordination tends to contribute to clarity, establishing conditions that need to be met before a certain action (conditional and temporal clauses) or specifying referents (relative clauses). However, use of hypotactic structures not only increases message complexity but also message length. Therefore, when subordination is necessary, subordinating elements can be sometimes omitted, as well as subordinated verbs, thus contributing to the elliptical syntax prevalent in P/C interactions. This situation frequently occurs when temporal specifications need to be established. Subordination can be reconstructed by considering relational meanings of space and time coordinates and using reference turns as the necessary comparison source, like the example in Table 3 shows.

EXAMPLE 3	RECONSTRUCTED ITEMS	SOURCE
<p><i>Context: In flight.</i></p> <p><i>Controller:</i> mantenga esta frecuencia. ((pause)) <una vez que regrese>, después, lo voy a pasar con- a la frecuencia del helicóptero. notifique Cerri.</p> <p><i>Private pilot:</i> recibido, notifico Cerri con mil pies, eco charli delta. (02/489-490).</p>	<p><i>Controller:</i> mantenga esta frecuencia. ((pause)) <una vez que regrese>, después, lo voy a pasar con- a la frecuencia del helicóptero. notifique [*cuando esté sobre] Cerri.</p> <p><i>Private pilot:</i> recibido, notifico [*cuando esté sobre] Cerri con mil pies, eco charli delta.</p>	<p><i>Reference turns:</i> C: Bien, vuelva [*cuando esté] a cinco millas o <i>cuando tenga a la vista.</i> (1/111)</p> <p><i>Context-AP:</i> A LAS (o SOBRE) (<i>hora o lugar</i>) [o CUANDO] [PASANDO/ABANDONANDO/ ALCANZANDO] (<i>nivel</i>) LLAME A (<i>distintivo de llamada de la dependencia</i>) (<i>frecuencia</i>) (DTA 2007: 3.1.3)</p> <p>NOTIFIQUE AL PASAR (<i>tres cifras</i>) RADIAL (<i>nombre del VOR</i>) VOR (DTA 2007: 3.1.9)</p>
<p><i>Translation:</i> C: maintain this frequency. once you return, later, I will transfer you with- to the helicopter frequency. notify Cerri. P: roger, notify Cerri with one thousand feet, eco charlie delta.</p>		

Table 3: Example 3.

The explicit temporal clause in the example (“una vez que regrese”, ‘once you return’), determines the time when the flight will be allowed to contact another aircraft and leave the current control frequency. This temporal condition is emphasized by the Spanish adverb “después” (‘later’), showing the controller’s interest in achieving clarity. In the instruction to contact again when the pilot reaches the town known as Cerri (“notifique Cerri”, ‘notify Cerri’) this city is not to be understood as a direct complement for the imperative verb. It could be argued that the clause should be a relative one of objective nature (“que está sobre Cerri”, ‘that you are over Cerri’), but the close interrelation between space and time coordinates in the organization of aviation tasks, particularly in their future projection, supports the interpretation as a temporal clause or construction.¹³ Reference turns indicate an elliptical temporal clause: “cuando esté sobre Cerri” (‘when you are over Cerri’). This reconstruction differs from AP expressions where the temporal gerund or the infinitive are used (“pasando”, ‘passing’ and “al pasar”, ‘when passing’), but in both cases the town reference functions as a locative.

3.2 Strategic variations in the use of ellipsis

Data shows that pilots and controllers vary the extent to which they resort to ellipsis: sometimes they use it even more than AP predicts, sometimes less. This section introduces examples from different scenarios to illustrate P/C exchanges with some explicit syntactic choices which contrast with ellipsis. Such patterns give these P/C interactions a distinctive appearance and appear to be explained by contextual factors that warrant a priority of clarity over brevity.

Element type	Grammatical function	P → C	C → P	Total
Verb (913)	Copul. <i>ser</i>	51	158	209
	Copul. <i>ser</i> (sub.clause)	-	3	3
	Copul. <i>estar</i>	79	90	169
	Copul. <i>estar</i> (sub.clause)	3	3	6
	Mainverb	133	78	211
	Subordinate verb	40	77	117
	Aux. <i>estar</i> + gerund	18	3	21
	Aux. <i>estar</i> + participle	15	114	129
	Aux. <i>estar</i> + ger. (sub.clause)	5	9	14
	Aux. <i>estar</i> + pple. (sub.clause)	2	-	2
	Aux. <i>haber/ser</i>	6	6	12
	Aux. <i>haber/ser</i> (sub.clause)	-	1	1
Non finite forms	10	9	19	
Noun (592)	Noun complement	175	166	341
	Main subject	36	140	176
	Direct object	27	10	37
	Subject predicative	13	23	36
	Object predicative	1	-	1
	Sub. clause subject	1	-	1
Gramm. word (1240)	Definite article	197	398	595
	Preposition	182	283	465
	Subordinator	52	98	151
	Undefined pronoun	8	4	12
	Possessive pronoun	2	9	11
	Subject pronoun (3sg./pl.)	-	2	2
	Personal pronoun (DO/IO)	1	1	2
	Subj.pronoun (3sg./pl.; sub.cl.)	1	-	1
	Interrogative pronoun	-	1	1
	Coordinator	1	-	1
Other	<i>Reception discourse markers</i>	40	80	120
Total		1099	1766	2865

Table 4: Ellipsis type and syntactic function ($n_{P \rightarrow C} = 530$; $n_{C \rightarrow P} = 470$; $n_{total} = 1000$).

3.2.1 Case 1

The following interaction deals with a private pilot's request to fly over a highly populated city below the approved height limit. The tower controller infers from message contents that the pilot is not familiar with the area flying rules and this circumstance sets the tone of the interaction:

Subordinate clause	P → C	C → P	Total
Conditional (adverbial)	50	13	63
Relative (adjective)	7	42	49
Relative (objective)	15	24	39
Temporal (adverbial)	1	23	24
Causal (adverbial)	10	10	20
Consecutive (adverbial)	5	3	8
Relative (subjective)	3	1	4
Relative (obligatory predicative)	1	3	4
Noun complement	-	3	3
Final (adverbial)	-	3	3
Modal (adverbial)	1	-	1
Total	91	127	218

Table 5: Type of subordinate clauses ($n_{P \rightarrow C} = 2660$; $n_{C \rightarrow P} = 2381$; $n_{total} = 5041$).

EXAMPLE 4	TRANSLATION
<p><i>Context: In flight.</i></p> <p>1) <i>Private pilot:</i> el eco charli delta, estoy a siete [*millas] de La Plata a Don Torcuato, <si me autorizaría cruce por el oeste del suyo>, [*el] transponder [*está] en standby, señor.</p> <p>2) <i>Controller:</i> okey, usted quería cruzar por el oeste de Aeroparque o por el este?</p> <p>3) <i>P:</i> por el oeste (de ser posible), señor.</p> <p>4) <i>C:</i> okey, recibido, bueno, cambie con aproximación en ciento veinte [*decimal] seis, caballero.</p> <p>5) <i>P:</i> aproximación me pasó con usted, señor.</p> <p>6) <i>C:</i> bueno, <lo que pasa> [*es] <que para cruzar por la capital tiene que ser con tres mil [*pies] o superior> y ese es un espacio aéreo <que no es mío>. y con dos mil [*pies] no lo puedo autorizar, yo le puedo autorizar por el río, <si usted quiere>.</p> <p>7) <i>P:</i> con dos mil [*pies], bajo mil [*pies], no hay problema, señor.</p> <p>8) <i>C:</i> con dos mil [*pies] no hay problema, y por el río, buEno, no hay problema, active [*transponder] uno dos tres cuatro <así lo identifico> y por ahora [*proceda a] Quilmes. (Silence)</p> <p>9) <i>C:</i> recibió, el eco charli delta?</p> <p>10) <i>P:</i> activando uno dos- uno dos tres cuatro y el descenso para mil [*pies] entiendo.</p> <p>11) <i>C:</i> no, no, no, mantenga dos mil [*pies], DOS mil [*pies], [*proceda a] Quilmes.</p> <p>12) <i>P:</i> dos mil [*pies] para Quilmes. (06/1960-1971)</p>	<p>P: the eco charlie delta, I am at seven [*miles] from La Plata to Don Torcuato, <if you would authorize crossing over your west>, [*the] transponder [*is] on standby, sir.</p> <p>C: okay, you wanted to cross over the west of the Aeroparque or over the east?</p> <p>P: over the west (if possible), sir.</p> <p>C: okay, roger, well, change with approach at hundred twenty [*decimal] six, gentleman.</p> <p>P: approach transferred me to you, sir.</p> <p>C: well, <what happens> [*is] that <in order to cross over the capital it has to be with three thousand [*feet] or higher> and that is an airspace <that is not mine>. and with two thousand [*feet] I cannot authorize you, I can authorize over the river, <if you want>.</p> <p>P: with two thousand [*feet], under one thousand [*feet], there is no problem, sir.</p> <p>C: with two thousand [*feet] there is no problem, and over the river, wEll, no problem, activate [*trasponder] one two three four <so I identify you> and for now [*proceed to] Quilmes. (Silence)</p> <p>C: did you copy, the echo charlie delta?</p> <p>P: activating one two- one two three four and descent for one thousand [*feet] I understand.</p> <p>C: no, no, no, maintain two thousand [*feet], TWO thousand [*feet], [*proceed to] Quilmes.</p> <p>P: two thousand [*feet] to Quilmes.</p>

Table 6: Example 4.

In his first speech turn, although the pilot omits the measurement unit (“millas”, ‘miles’), he explicitly uses the Spanish verb “estoy” (‘to be’) to report his position, in a structure where the verb is usually not explicit. His next utterance introduces an indirect speech act to request clearance for continuing his flight over the city adjacent to the airfield known as Aeroparque. The selected grammar, with the omission of a main verb and a conditional subordinated clause with a verb also in conditional mood (“si me autorizaría cruce”, ‘if you would authorize crossing over your west’) doesn’t follow the regulatory suggested indicative form of “solicito + noun” (‘request + noun’). These uncommon grammar choices can alert the controller of a not so experienced pilot. The first controller’s speech turn attempts to confirm the pilot’s intentions with a very explicit syntax and, when he receives confirmation that the pilot wants to fly over the city, he transfers the flight to the approach frequency. The pilot’s answer in turn 3 introduces cotextual ellipsis, favoured by the question/answer adjacency pair, but the controller’s turns in 2 and 4 include few ellipsis. He focuses on the pilot using the respect pronoun “usted” (‘you’) in explicit form with an also explicit imperative verb (“cambie”, ‘to change’, instead of the more commonly used “comunique”, ‘to communicate’). The pronoun is unnecessary in Spanish grammar, but its presence highlights the explicitness of the grammar choices made by the controller. After the pilot’s response in 5, an indirect way of stating that

the pilot refuses for the moment the frequency change and will continue the interaction with the present controller, the controller's answer and explanation is atypical as P/C exchanges go because it includes several subordinate clauses (indicated between < > in the transcription) in order to explain the situation to the pilot and what can be authorized and what not.

Noteworthy in turn 6, then, are the subordinate clauses "lo que pasa" ('what happens'), common in Spanish daily conversation but not in aviation standardized P/C interaction, and the corresponding predicative clause "que para cruzar por la capital tiene que ser con tres mil [*pies] o superior" ('in order to cross over the capital it has to be with three thousand [*feet] or higher'). This utterance functions pragmatically as an explanation but the controller justifies the refusal further by claiming the airspace below 3000 feet is not under his control, something he states with an adjective clause ("que no es mío", 'that is not mine'). Finally, he uses a last clause, conditioning his clearance to fly over the river if that is what the pilot wants to do ("si usted quiere", 'if you want').

Turns 7 and 8 introduce an ambiguity situation, because what the pilot wants (to fly with 1000 feet) and what the controller authorizes (2000 feet, always over the river) differ. The controller only omits the main imperative verb "proceda a" ('proceed to') in his instructions and he is quite explicit, for example, by stating the reasons of his instruction to activate the transponder code "así lo identifico" ('so I identify you') when that is its main function. He is also reiterative, for instance, by duplicating the expression "no hay problema" ('no problem'). But, since there is no readback from the pilot, the controller asks again if the authorization and instructions were received. The pilot's answer in 9 makes the misunderstanding evident, because he even hedges his readback using the verb form "entiendo" ('I understand'), usually employed to indirectly indicate the speaker is not sure and there might be a difference between what was understood and what has been approved or instructed. Again in 11, the controller is reiterative and forceful because he denies the readback information three times and repeats the approved altitude twice, with an emphatic pronunciation until the pilot finally understands, although he omits again the main verb that instructs the pilot to fly to Quilmes, which can be reconstructed as "proceed" by reference turns in our corpus.

Example 4 suggests that pilot or controller operational experience in general or at a particular setting (for example, at a non-familiar airspace or airport) can influence grammar choices. Experience can be inferred from speakers' messages, both at the content and at the form level. If questions or requests make evident a lack of knowledge of a particular area flying rules, for instance, controllers can assume a low familiarity with the operations and, as a consequence, tend to be more explicit without directly assessing the possible pilot doubts or questions thus protecting both a safe operational environment and institutional identities. In the example, the controller seems to adjust his talk to ensure the pilot understands what can be or not approved and why. Although he resorts to some uses of ellipsis, his utterances are better characterized by explicitness, reiteration and emphasis.

3.2.2 Case 2

Although P/C interaction is very routinized and AP covers most of the usual operational circumstances, when certain particular needs or intentions arise, pilots also tend to be more explicit, as the exchange reproduced in the example of Table 7 exemplifies.

EXAMPLE 5	TRANSLATION
<p><i>Context: In flight.</i> <i>Private pilot:</i> volveremos bloqueando la vertical con [*nivel] ocho cero y la intención, <si usted no tiene inconveniente>, después de bloquear el vor, sería alejar por [*el] radial uno ocho uno, eh <porque queríamos volar un rato sobre la zona de:: Bahía San Blas> y mmh: estaríamos aPENas tangenciando la [*zona] restringida que- <si está sin actividad>, le agradeceríamos <si nos autoriza> un [*rumbo] directo a la punta de la Bahía. <i>Controller:</i> okey, sí, [*el área está] sin actividad, sin entrar en la zona restringida [*está] autorizado. <i>P:</i> agradecido. (05/16-17)</p>	<p>P: we will return blocking the vertical with [*flight level] eight zero and the intention, <if you don't have any inconvenient>, after blocking the vor, would be to fly away through [*the] heading one eight one, eh <because we wanted to fly for a while over the area o::f Bahía San Blas> and mmh: we would be Barely touching the restricted [*area] that- <if it has no activity> we would thank you <if you authorize us> a direct [*heading] to the tip of the bay. C: okay, yes, [*the area is] without activity, without entering the restricted area [*you are] authorized. P: agradecido.</p>

Table 7: Example 5.

The pilot in this exchange uses the common pattern of omitting a keyword when another is present, either before or after. Since he first omits “nivel (de vuelo)” (‘flight level’), then he explicitly uses “radial” (‘heading’) in the first speech turn of the exchange. He also omits determinants but, in general, his speech turn is long (cf. section 3.2.5) and explicit with three redundant conditional clauses: “si usted no tiene inconveniente” (‘if you don’t have any inconvenient’), “si está sin actividad” (‘if it has no activity’) and “si nos autoriza” (‘if you authorize us’). The pilot also minimizes emphatically the risk of flying over the restricted area (“estaríamos aPENas tangenciando la [*zona* restringida”, ‘we would be Barely touching the restricted [*area]’). All of these explicit wordings can be explained by the need to negotiate a special authorization to fly near a restricted airspace.

3.2.3 Case 3

Although examples in scenarios 1 and 2 involve private pilots, explicitness appears as a clarity resource in P/C interactions involving airline and military pilots too. For instance, busy airports require brief communications but, sometimes, speakers need to identify precisely other aircraft on the ground and in the air. Sometimes this is achieved by relative clauses with explicit subordinating markers and even verbs, as the utterances in the example 6 reproduced in Table 8 show.

In the three speech turns, isolated from their respective P/C exchanges on the ground and in the air, certain words are systematically omitted (such as “calle (de rodaje)” (‘taxiway’), “posición (de

estacionamiento)” (‘parking position’) just like in main clauses, but verbs in the subordinate clauses (“va”, ‘is going to’; “está ingresando”, ‘is returning’; “está”, ‘is’) as well as the subordinating markers (“que” ‘that’) are also present.

EXAMPLE 6	TRANSLATION
<p><i>Controller</i> → <i>airline pilot</i>: uno cero uno cuatro, hay un siete treinta y siete <que tiene ahí a su izquierda por [*calle] alfa y va a la [*posición] quince.> (06/207)</p> <p><i>C</i> → <i>military pilot</i>: eh:: una vez que:: quede liberada:: la trayectoria del super <que está ingresando de vuelta: a plataforma::>, autorizado [*a rodar a] posición. (03/96)</p> <p><i>Airline pilot</i> → <i>C</i>: sí, la única aeronave <que está en el sector>. la tengo en el ticas a (dos mil- tres) mil doscientos pies abajo. (01/54)</p>	<p><i>C</i>: one zero one four, there is a seven thirty seven <that you have there at your left through [*taxiway] alfa and it is going to [(parking) position] fifteen>.</p> <p><i>C</i>: eh:: once the super’s trajectory is liberated <that is returning to platform>, cleared for [*line up to] position.</p> <p><i>P</i>: yes, the only aircraft <that is in the area>. I have it in ticas two thousand- three thousand feet below.</p>

Table 8: Example 6.

Subordination is useful to precise meanings and although these utterances do not account for all types of possible subordinated clauses, it is interesting to note that their syntactic structure is explicit. With the conjunction of subordination and explicitness, speakers prioritize clarity when exchanging referential information.

3.2.4 Case 4

When some measure of interactional conflict arises, this also reflects upon syntactical choices. Sometimes pilots cannot comply with a certain instruction or controllers are not capable of satisfying specific needs. Although they cannot be regulated in the AP, explanations and justifications are frequent under these circumstances as they work as rhetorical devices to protect professional identities. Syntactically, they tend to be explicit in form as the following two interactions will show:

EXAMPLE 7	TRANSLATION
<p><i>Context: Preflight.</i></p> <p><i>Female controller</i>: cero uno cuatro, Parque.</p> <p><i>Airline pilot</i>: adelante.</p> <p><i>C</i>: ya estaban autorizados para iniciar pushback. eh, van a iniciarlo? tienen que despegar y veinte.</p> <p><i>P</i>: sí, señorita, disculpe, ya esta:mos- tuvimos una pequeña complicación de último segundo, ya estamos iniciando [*pushback].</p> <p><i>C</i>: recibido. (Online recording, 201207)</p>	<p><i>C</i>: zero one four, Parque.</p> <p><i>P</i>: go ahead.</p> <p><i>C</i>: you were already cleared to start pushback, eh, are you starting? you have to take off at twenty.</p> <p><i>P</i>: yes, miss, excuse us, we a:re- we had a small last second complication, we are now starting [*pushback].</p> <p><i>C</i>: roger.</p>

Table 9: Example 7.

In example 7 reproduced in Table 9, the controller questions the pilots as they have not started to pushback and their takeoff time is near. The pilot answers with a justification that only omits the word “pushback” because it is present in the previous speech turn. But the explanation is completely explicit. The same can be said from the controller’s explanation in example 8, where she explains that all services are operating at the same frequency for the moment. Her only use of ellipsis appears when

she establishes the predicted takeoff time, a context which, with flight clearances and meteorological reports where copulative verbs and definite articles are systematically omitted, is one of the most elliptic of all communicative contexts in P/C interaction.

EXAMPLE 8	TRANSLATION
<p><i>Context: Preflight.</i> <i>Airline pilot:</i> (Aeroparque, dos cero cero seis). <i>Female controller:</i> dos cero cero seis, adelante. <i>P:</i> eh- señorita, estamos en la [*posición] nueve, no nos atiende nadie en superficie, para pedir [*permiso] a Córdoba [*con nivel de vuelo] tres cuatro cero. <i>C:</i> sí, porque:: estamos saliendo aquí el servicio de control de rodaje, autorizaciones y aproximación. a Córdoba- buE:no. hora [*prevista] de despegue [*es] cero uno dos cero. <i>P:</i> cero uno dos cero [*será] el despegue, gracias y mantenemos entonces esta frecuencia. <i>C:</i> correcto. (Online recording, 201207)</p>	<p><i>P:</i> (Aeroparque, two zero zero six). <i>C:</i> two zero zero six, go ahead. <i>P:</i> eh-, miss, we are in the [*parking position] nine, nobody answers in ground, to request [*clearance] to Córdoba [*with flight level] three four zero. <i>C:</i> yes, becau::se we are transmitting here ground control service, clearances and approach. to Córdoba- wE:l. [*expected] takeoff time [*is] zero one two zero. <i>P:</i> zero one two zero [*will be] the takeoff, thank you and we maintain this frequency then. <i>C:</i> correct.</p>

Table 10: Example 8.

3.2.5 Speech turn informativeness

From a broader perspective, the amount of information included in P/C utterances within a speech turn appears to be another factor affecting the extent of ellipsis as a brevity resource. In order to assess this hypothesis, 1000 P/C speech turns were randomly selected for detailed quantitative analysis. Since informativeness in P/C interaction can be readily evaluated through the number of aviation topics in each speech turn, for each one we registered the value for the following variables:

- *length of speech turn [LST]:* total extension of each speech turn, in words.
- *ellipsis [E]:* total elliptical elements in each speech turn, as classified in Table 4 and reconstructed with reference to the different sources already explained.
- *aviation topic [AT]:* total aviation topics in each speech turn, following mainly Prinzo and Britton's (2005) taxonomy.¹⁴

Media differences between pilots and controllers for each of these three variables, show that controllers are the speakers who produce the longest speech turns ($\bar{X}_{LST} C \rightarrow P = 9.58$, while $\bar{X}_{LST} P \rightarrow C = 7.22$) and, as this first result would suggest, they also use more ellipsis than pilots per speech turn ($\bar{X}_E C \rightarrow P = 3.77$, while $\bar{X}_E P \rightarrow C = 2.07$). Likewise, controllers include a greater number of aviation topics in each speech turn ($\bar{X}_{AT} C \rightarrow P = 2.38$ in comparison to $\bar{X}_E P \rightarrow C = 1.96$). In all cases, a *T de Student* test shows that media differences are small but statistically significant with $p < 0.05$, thus establishing that pilots and controllers exhibit different syntactic patterns and average speech turns length.

If correlated, the variables AT and E yield a positive correlation coefficient: the higher the number of aviation topics in a speech turn, the higher the number of elliptical elements (see Figure 1).

This tendency is corroborated in both directions of talk, but again it is greater among air traffic specialists with a Pearson coefficient of $r_{C \rightarrow P} = .795$ while the correlation is slightly weaker among pilots who show a coefficient of $r_{P \rightarrow C} = .640$ (both values significant at the 0.01 level).¹⁵

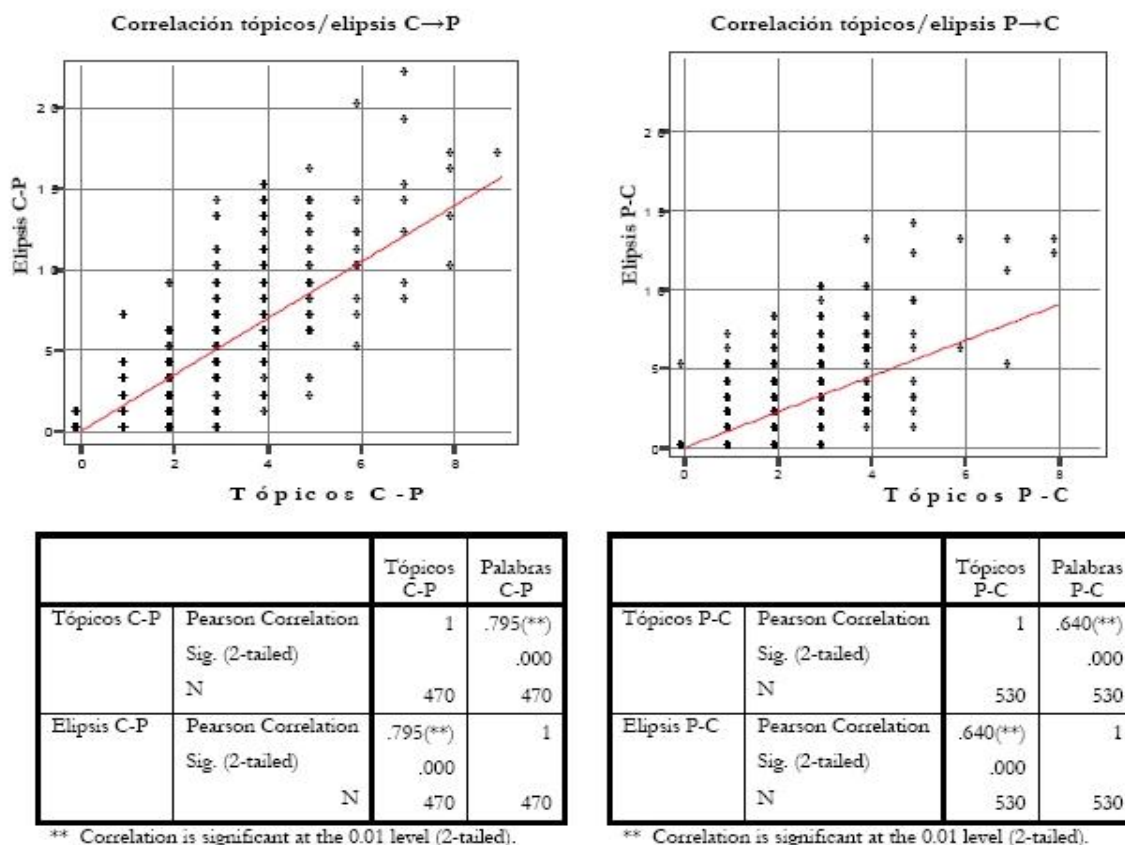


Figure 1: Ellipsis and aviation topic correlation (de-Matteis 2009)

4 Discussion

Although the vast majority of P/C speech turns observes a general tendency towards ellipsis, consistent with the institutional communicative goal of brevity, others exhibit a more explicit syntactical pattern. In this sense, while the examples in section 3.1 have shown some of the various types and functions of ellipsis, as well as some of the risks it poses for clarity in P/C interaction, data from section 3.2 indicates situational factors favour the explicitness of elements that in most P/C interactions are normally omitted.

Explicitness can take the form of fewer elliptical items, more subordinate clauses and even repetition, all of these contrary to linguistic economy. Reduced ellipsis appears to be related with variations in communicative context. Thus, when speakers exhibit unfamiliarity with flight procedures (example 4), explicitness can be a resource to clarify circumstances without openly addressing subjacent doubts. The negotiation of special needs (example 5) and referential precisions (example 6)

also justify the presence of elements that are otherwise generally omitted and of subordinate clauses, often with explicit subordinating markers and verbs. Finally, interactions requiring non-standard AP (examples 7 and 8) also prompt more explicit utterances. The exchanges analyzed do not cover all the possibilities but since elliptical utterances are a key marker of pilots and controllers' institutional communicative competence and contribute to interactionally build and maintain their professional identity, deviation from this linguistic behavior must be assessed in terms of the communicative goals within the aviation environment. In this sense, data analysis corroborates the hypothesis proposed in 3.2 stating that, in selecting an appropriate level of ellipsis, both at the main clause and at the subordinate clause level, speakers do indeed prioritize clarity over brevity. More explicit –and thus clear– utterances allow speakers to keep up their effort in constructing a linguistically safe operational context while, at the same time, protecting their respective institutional identities.

Results from a quantitative perspective, on the other hand, show that the degree of informativeness can also be a factor influencing the amount of elliptical items for a particular speech turn. Although it can be argued that the positive correlation found between E and AT is an obvious one – the more aviation topics, the longer the speech turn and hence the higher the probability of ellipsis –, a few observations are in order: the impossibility of a reference (1:1) corpus of *non-elliptical* P/C interactions makes it impossible to confidently assess the real impact of ellipsis. Using reference turns with the intention of performing a quantitative comparison is also difficult: even when some of the elements appear in explicit form, others don't, so these turns cannot confidently be used to test ellipsis effect. However, the meaning of the correlation found is that speakers indeed respond to the informativeness of their speech turns at a microlinguistic level and that a particular syntactic feature is exploited with the intent to achieve brevity. In other words, if speakers did not utilize ellipsis, it would mean this feature is not considered an effective means of achieving conciseness.

Quantitative tests indicate contrasts between both groups of professionals: media differences of the three variables and distinct correlation coefficients between E and AT for pilots and controllers suggest differences in syntactic choices. Controllers seem to exhibit a higher sensitivity to subtle changes within the communicative context, showing more extended use of ellipsis patterns as well as a tendency towards explicit indication of subordinate clauses when needed. It could be argued that their institutional role as main information and instruction providers makes them manage syntactical resources with more care, preserving the official linguistic policy objective of clarity.

Finally, quantitative data summarized in tables 4 and 5 show that the ellipsis types prevalent in each direction of P/C interaction are also somehow different. This result further suggests that, although the resource is available for all professionals, their use is not uniform and certain communicative tasks favour certain types of ellipsis more than others. Although for lack of space we don't analyse these differences, their existence is further proof of variation in the use of ellipsis within the aviation context.

5 Conclusions and implications

Communication is one of the most subtle and dangerous complexities a pilot may face. Indeed, this could be the toughest system he has to master. But how much training do pilots [and we might add, air traffic controllers] get in interpersonal communication. Unfortunately, not enough. (Wilson, 1989: 5).

This claim dates from more than twenty years ago. Since then, things have been changing, although in our interviews with aviation professionals we still get responses that demonstrate not all speakers are aware of what communication entails and of how they actually negotiate meanings when engaging in institutional communicative practices. In fact, some professionals we interviewed believe institutional meanings are not negotiated at all. Also, not many speakers recognize the role institutional identities play in how they talk, how they are both a conditioner for what they say and an emergence of how they say it. Wilson suggests that language can be thought of as an important “system”, exactly like hydraulic systems or computers. As a part of this system, syntactic patterns are indeed managed by speakers although, most times, they are not aware of what they do or, at least, cannot put a name to it. Even without the need for labels, however, there is no reason why syntax could not be varied on a more conscious basis, as there is no reason why it could not be taught as a linguistic resource to enhance linguistic safety. The JIAAC’s recommendations quoted in section 3.1.1 make it clear certain uses of ellipsis are a preoccupation for aviation authorities, particularly when they go beyond the scope of what is considered acceptable in AP. Even without judging AP deviations *per se*, it is up to linguists and aviation language specialists to make a point of demonstrating to aviation professionals how the syntactic patterns identified in natural occurring P/C exchanges can have a significant effect in aviation safety.

In this sense, since the analysis of ellipsis in Spanish P/C exchanges has proven this resource is not homogeneously seized by all speakers and that certain differences can be identified between both professional groups, as well as a general interest in prioritizing clarity over brevity, it is justified to claim that linguistic awareness programs regarding the impact of ellipsis in P/C communication could be useful not only for situations in international aviation involving linguistic contact and the use of Aviation English but also in the native language of speakers.

Emphasis should also be given to the relevance of ellipsis for the projection of a professional identity because in aviation speakers are expected to use and understand it without question. Ellipsis extent not only can define a linguistically safe operational context in terms of avoiding ambiguity but can also impact upon their public image and also the subjective experience of linguistic insecurity if speakers feel they are not proficient with elliptical patterns. The attitudinal and operational implications of this fact are evident and this is why P/C syntax relates to *human factors*. In sum, professional communicative competence as one of the non-technical skills pilots and controllers must acquire in their native languages and in Aviation English would possibly benefit from the consideration of prevalent syntactical patterns within aviation.

Notes

¹ICAO (2009, 2-2) clarified this meaning as “The state in which the possibility of harm to persons or of property damage is reduced to, and maintained at or below, an acceptable level through a continuing process of hazard identification and safety risk management”.

²Spanish lacks of an equivalent distinction between *security* and *safety*, since the only possible word is “seguridad” (Kessler, 2009).

³We prefer the positive term because it corresponds with aviation institutional objectives.

⁴Situations have been documented in aviation, however, in which linguistic insecurity in the classical sense of the term has prevented speakers to even try to communicate critical information due to an extreme manifestation called “communication apprehension”. (Mathews, 2011).

⁵*Cotext* is conceived as the “verbal environment immediate to a certain discursive unit” (Maingueneau, 1999: 34).

⁶Since we deal mainly with syntax and P/C exchanges which are somewhat obscure in nature, the level of detail in the transcription of our examples has been reduced to gain in readability.

⁷Frequency noise is always a potential risk factor and is one of the main reasons an aviation phraseology has been established in every language, as well as the rationale behind aviation linguistic policies (de- Matteis, forthcoming).

⁸In fact, lack of expected communications can even alert of an abnormal situation.

⁹Ragan summarizes how ellipsis defines P/C interaction:

Language use is characterized by disjunctive and abbreviated wording, with an extensive use of ellipsis, or the leaving out of single words and phrases from the text, (...) The wording is exophoric, that is, it refers to many objects, events, places, and people not directly mentioned in the text, yet which are still known to the communicators. He shows how the cohesion, or logical connections between text parts normally found in general English, are lacking in this register, with the result that the language use appears cryptic and clipped. (Ragan, 1998: 9, following Vantsdal (1987).

¹⁰If not otherwise indicated, speakers’ gender is masculine in most examples.

¹¹In all the examples we have masked the true call signs of each airplane and all information that could identify the speakers. We use only two flight numbers (1014 and 2006) and we maintain the identification of ground facilities. Capitalization indicates emphasis, except in geographical names or facilities identification. Numbers in parenthesis indicate observational session and speech turn, except in the case of online observations made via LiveATC.net, where only the year and month are indicated as a reference. This online observations have not been fully transcribed because they are used to trace only P/C exchanges dealing with negotiations particular in content/form.

¹²These observations are almost the only ones of explicit linguistic nature in accident and incident reports from Argentina we are aware of.

¹³Philps (1992: 99) has pointed out the ambiguity posed by the general omission of the subordinating “when” in English AP, although his interpretation is similar to ours when reconstructing a temporal circumstantial:

L’effacement de “WHEN” juxtaposant un impératif et une forme en -ING engendre un phénomène d’ambiguïté, car la relation véhiculée para la conjonction temporelle est celle de la concomitance de deux actions.

La suppression de cette relation, alliée à d’autres effacements (notamment du pronom sujet et de l’auxiliaire) aboutit, grâce à la juxtaposition que nous venons d’évoquer, à une autre relation, qui est celle de la postériorité de la deuxième action par arapport à la première (= REPORT THAT YOU HAVE PASSED/LEFT): le pilote rend compte d’un fait qui vient de se produire.

¹⁴Although we introduced a few differences with Prinzo and Britton’s (1995) aviation topics and speech act taxonomy, the basic classification was preserved.

¹⁵Linguistic criteria for the evaluation of Pearson coefficients were taken from Hernández Campoy and Almeida (2005).

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