Quantificational variability in imperatives and nonveridicality

1 author:

Eleni Staraki
University of Chicago

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estaraki@yahoo.com

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Abstract
This paper discusses nonveridicality as a way of analyzing quantifier variability of imperatives in Greek and English. I argue that the quantifier variability in imperatives is due to an non-homogenous modal base (quantificational domain), and that the logical form of imperatives features a quantifier placeholder (underquantified) that obtains its interpretation as a universal or an existential quantifier via a *Selection* function. The *Selection*, a partition-function, represents an individual's ranked preferences and goals and determines the type of quantifier in imperatives. The formal model I propose does not introduce ambiguity or inherent properties into the logical form of imperatives; rather, it implies a meaning of imperatives beyond merely ORDER and, by capitalizing on non-veridicality and ranked preferences of an individual, enables a principled analysis of the quantifier variability of imperatives.

1. Introduction

There are a few assumptions about the quantifier variability of imperatives that current theories tend to accept as valid. One such assumption is that the semantic import of imperatives is either universal

by default (Han 1998, 1999a-c, 2001; Kaufmann 2012) and existential readings can be accounted for pragmatically (Schwager 2005a, 2005b, 2006, and as Kaufmann 2012) or ambiguous between an existential and a universal reading (Platzack and Rosengren 1997; Grosz 2008, 2011). In the same spirit, one finds arguments that imperatives have the prototypical function of ORDER being reduced to a *should-clause* (Hamblin 1987 and Kaufmann 2012, Hypothesis 2.4 *you should-reduction*). Another assumption is that imperatives feature a totally realistic modal base and an impersonal ordering source (*deontic*: a set of laws, *bouletic*: the set of desires, *teleological*: the set of tasks). This means that the quantifier variability is attributed to a lexically determined quantifier ($\forall_{default}$) and a non-varying conversational background.

Imperatives in Greek, and as I will show in English, as well, do not have a fixed universal quantifier over a modal base. In other words, imperatives in Greek do not have a lexically determined quantificational force. Observe the difference in quantifier between (1bi) and (1bii) in the example in Greek that depends on the preferences of the individual[1] within a context:

(1)   a.   Strips-**e** aristera!
              Take-**2sg.IMP** a left
              Take a left turn!

        b.   i. # Borite ($\exists$) / **Prepi** ($\forall$)   na   stripsete aristera
                 could-2pl.INP / Must-3sg.INP   SUBJ   take a left
                You # could / must take a left turn.
                           …*as a direction by your driving instructor when taking the class*

            ii. **Borite** ($\exists$) / # Prepi ($\forall$)   na   stripsete aristera
                 could-2pl.INP / Must-3sg.INP   SUBJ   take a left
                You could / # must take a left turn.
                           …*as a suggestion by a stranger on a road-trip*

It has been common to assume that the semantics of universal quantification is appropriate for imperatives (Han 1998, 1999, 2001; Schwager 2005a, 2005b, 2006a; as Kaufmann 2012; among many others). However, the interpretations in (1bi) and (1bii) indicate that an addressee faced with the task of interpreting an imperative has to understand the preferences of the speaker. This is obvious by the incompatibility in the interpretations with *borite* ($\exists$) "could" in (2bi) and *prepi* ($\forall$) "must" in (1bii). If (1a) is indented as a necessary action, compared to other actions related to the current situation, then (1a) is interpreted as direction implying that *You MUST* ($\forall$) *take a left turn*. An interpretation like (1bi) *You COULD* ($\exists$) *take a left turn* is not appropriate in that context. If, on the other hand, (1a) is indented as a weakly necessary action, compared to other actions related to the current situation, then (1a) is interpreted as suggestion implying that *You COULD* ($\exists$) *take a left turn*. An interpretation like (1bii) *You MUST* ($\forall$) *take a left turn* is not appropriate in that context. By this example, we understand there is no fixed quantification that sets the value of a quantifier over the modal base as universal, at least not in Greek, and we will see that this also holds for English. I assume, then, that imperatives express an intention on preferred actions (see also Starr 2012).

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[1] I avoid wherever possible to use the terms *speaker* or *hearer*, and instead, I use the tern *individual*. This allows me to talk about a wider range of imperatives' uses where either of both (speaker or hearer) or both (speaker and hearer) are involved. The term *individual* is, I believe, more neutral.

In this paper, I propose an alternative approach that sidesteps some of the problems associated with the literature on the quantifier variability, arguing that imperatives can be captured in a single logical form, if we analyze them as nonveridical propositional operators (see Giannakidou 1999). In support of this claim, I argue that the three parameters of interpretation namely the modal base, the ordering source and the context should be reviewed in order to predict the quantifier variability in imperatives. Below are the crucial arguments of the account offered in this paper.

First, a lexically determined universal quantification conceptualizes imperatives as deontically necessary by default, i.e. it makes an $[\![IMP]\!]^c$ true[2] in case the required action is actualized in ALL perfect obedience/adherence worlds (2a). However, as it has been observed (Iatridou 2008; Kaufmann 2012; among many others), an $[\![IMP]\!]^c$ has also to do with what might actualize occasionally, i.e. it makes $[\![IMP]\!]^c$ true in case there is SOME outcome associated with obedience/adherence to someone's intention to influence (2b). It is this quantifier variability that has prevented linguists from agreeing on a single logical form for all types of imperatives, thus deriving (2b) from (2a) via pragmatics and/or speech acts.

(2)   Quantifier variability

   a. $[\![IMP]\!]^{c,f,w} = \lambda f\, \lambda p\, \lambda w.\, (\forall w' \in \cap f(w))\, [w' \in p]$

   b. $[\![IMP]\!]^{c,f,w} = \lambda f\, \lambda p\, \lambda w.\, (\exists w' \in \cap f(w))\, [w' \in p]$

(3)   Take a left.
       a. $[\![Take\ a\ left]\!]^{c,f,w} = 1$ iff $(\forall w' \in \cap f(w))\, [w' \in p]$
       "Take a left" is true if and only if for every perfect obedience world "Take a left"

       b. $[\![Take\ a\ left]\!]^{c,f,w} = 1$ iff $(\exists w' \in \cap f(w))\, [w' \in p]$
       "Take a left" is true if and only if there is at least one perfect obedience world "Take a left"

However, imperatives that convey indifference[3] indicate that a lexically determined quantifier (universal quantifier) is not generalizable. In particular, neither the universal nor existential quantification can efficiently capture their semantic contribution (4a-b) (contra Aloni 2004; Kaufmann 2012). Indifference imperatives do not exhibit the expected characteristics of an imperative conveying obedience/adherence to someone's orders, but, an equivalence relation on preferences (4c). For example:

(4)   Indifference imperatives

       a. Each world is permissible, and it is obligatory to do one of them.
       b. All worlds are permissible, and it is obligatory to do one of them.
       c. A set of possible worlds is equivalent to an alternative set of possible worlds.

An analysis of imperatives, then, as an operator should predict the quantifier variability, keeping in mind two things. First, imperatives have a conventional (context-invariant) meaning (consider again example (1)) which can be put as: An individual A is in a certain relation to an individual B, and

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[2] I adopt the arguments of Kauffmann (2012) who argued that imperatives can be treated as propositions but not that imperatives are similar or equal to performative verbs.
[3] In the paper, I will interchangeably use the terms indifference, invariance as expressing a relation of equivalence.

the fact that A tells B to act X generates an intentional state (a set of preferences) on B to act X. Second, any quantifier that an imperative has only relative to a context (i.e. speech acts; see Portner 2004, 2007b; Kaufmann 2012;) should not be part of its conventional meaning. Thus, I propose that the logical form of imperatives should feature a quantifier placeholder Q:

(5) $[\![IMP]\!]^{c,f,w} = \lambda f \lambda p \lambda w. (\mathbf{Q}w' \in \cap f(w)) [w' \in p]$

The lexically specified quantification (universal and existential for context specific uses of imperatives) on the possible worlds of the modal base is replaced by underspecified quantification. There is not a default $\forall$ (or $\exists$) but a quantifier placeholder. The details of the quantifier resolution process are presented in detail later in our discussion.

Second, I will assume that the ordering source of imperatives is relative to an individual. Specifically, I will argue that the ordering source in imperatives is about a degree to which a preferred action is necessary or not, rather than about a set of moral laws (deontic ordering source), desires (bouletic ordering source), or tasks (teleological ordering source) or not. Since, as I assume here, imperatives generate an intentional state, an individual chooses the "best" preferred action among alternative options, and may compare plans of action X (i.e., Take a left) and ¬ X (i.e., Do not take a left) considering which one is necessary in a certain situation.

Finally, the third parameter, the context. What goes surprisingly unnoticed in formalizing the quantifier variability more precise is that imperatives emerge in a particular decision-making model involving the presence (or lack thereof) of choice (see Staraki 2015): *choice-to-authority* and *choice-to-addressee*. By this, I mean that *choice* either belongs to a speaker-authority $\mathcal{S}$ or is granted to an addressee $\mathcal{A}$ or is held by both $\mathcal{S}$ and $\mathcal{A}$. Whenever the right to choose is allocated to someone other than the speaker-authority, this is called *choice allocation*. *Choice* results in the selection of a course of action(s) among a set of alternatives ALT_{set} introduced by imperatives. The set of all relevant worlds in the modal base, that is, the value of the conversational background (deontic: *what the law says*, bouletic: *what I want*, teleological: *the tasks or goals*, etcetera) is affected, as I will show, by the relevant worlds chosen by an authority within a decision-making model. Thus, I will argue that an essential component in interpreting imperatives quantifier variability is *choice allocation*, which triggers a shift of *choice* from one to another conversational participant in a decision-making model. I would venture that this particular type of context called the decision-making model is a crosslinguistic property of imperatives, rather than an idiosyncratic property of any particular language.

The paper is organized as follows. In section 2, I lay out the main assumptions of the paper and propose some refinements on the conversational background in imperatives, arguing that the modal base is non-homogenous and the ordering source is relative to an individual. In section 3, I discuss that imperatives are expressions of relative comparativeness that rise within a decision-making context pertaining to choice. In section 4, I implement the quantifier resolution deriving the quantifier variability imperatives. In section 5, I offer a comparison with previous theories of imperatives and discuss what I consider to be the drawbacks of those accounts. I limit myself to approaches that contrast to the present account. Section 6 concludes the paper.

2.   Imperatives: nonveridicality, nonhomogeneity, preferences, indifference

In this section, I lay out my general assumptions about the kind of object that the semantic interpretation procedure assigns to imperatives (2.2). These assumptions are based on the notion of nonveridicality (e.g., Giannakidou 1998), which was employed for the analysis of polarity

phenomena, and modality (e.g., Kratzer 1977, 1881, 1991), which has contributed the framework for the interpretation of modality. I discuss a set of cases which motivate a more realistic view on what constitutes the relevant facts of a modal base (2.3) and propose that the ordering source (2.4) in imperatives is relative to an individual. Indifference (2.5), I argue, is another case indicating that default universal quantification in imperatives cannot hold. Furthermore, I propose underquantification as an essential component of the account I offer, introducing the relevant concepts. Data from Greek, English, and Japanese[4] provide preliminary evidence that the same features might be crosslinguistically present. First, some background on Greek imperatives.

2.1 Background on Imperatives in Greek

Imperatives in Greek are instantiated only in 2nd singular and plural person with the imperative verbal suffixes at the end of the verb root, for example:

(6)   Context: A command given by a superior that must be obeyed.

     a. Katev – **a**   kato   amesos!
        Get.2sg.IMP   down   right away
        Get down right away!

     Context: When giving an authorization.

     b. Fert – **e**   kanena   filo   sas
        Bring.2pl.IMP   any   friend   yours
        Bring any friend of yours.

Examples in (6) by convention (mood suffixes) are considered imperatives, prescribing an action. The fact that (6a) can be formally represented with a universal quantifier because it is an order, and (6b) with an existential quantifier because it is a permission seems to be derivable from the kind of speech act, and the fact that (6) are all imperatives. It seems that the quantifier variability is derivable from the conventions determining the making of imperatives in conjunction with a speech act. Thus, our interpretation of what kind of quantifier imperatives in (6) have derives from our understanding of their respective locutionary (mood suffix) and illocutionary (kind of speech act) dimension. However, neither the suffixes of imperative nor the speech acts associate in a straightforward manner with a quantifier in imperatives. There is no explicit grammatical indication determining or suggesting the quantifier of imperatives as either order (universal) or permission (existential). The addressee should indentify the speaker's intentions in decodifying the performative function of the imperative. However, this process would not be possible without some pre-existing semantic content.

2.2 Assumptions

A first characterization of imperatives as nonveridical operators can be found in Giannakidou (1998). There, Giannakidou mentions that: " … imperatives as nonveridical operators do not preserve the truth of p, nor do they require that p be true in c",. In this paper, I pick up the thread of this early

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[4] The Japanese examples are courtesy of [anonymous for review purposes], [anonymous for review purposes] at [anonymous for review purposes] University, [anonymous for review purposes]. This contribution is very much appreciated. All errors and possible misinterpretations are, of course, solely my responsibility.

reference to imperatives' semantic content, extending the analytical efficacy of nonveridicality to imperatives.

I assume that the imperative is a propositional operator. This assumption is consistent with Han (1999c, 2001), Kaufmann (2012) analysis of imperatives as operator, the syntactic evidence that the imperative cannot be used assertorically, and the imperative's conflict with negation for the same node namely, C^0 (Han 1998, 2001), or $Mood^0$ (Giannakidou 2009), which is the locus of illocutionary force operators.

The imperative is a nonveridical propositional operator. In particular, a propositional operator is nonveridical if and only if it does not entail nor presuppose that p is true (actual) in some individual's model M(x) (Giannakidou 1998):

(7)   (Non) veridicality for propositional operators
        i. A propositional operator *F* is veridical iff *Fp* entails or presupposes that *p* is true in some individual's model M(x); p is true in M(x), if M(x) $\subset$ p.
        ii. If (i) is not the case, *F* is nonveridical.
        iii. A nonveridical operator *F* is *anti*veridical iff *Fp* entails *not p* in some individual's model: iff M(x) $\cap$ p $=\varnothing$

The notion of nonveridicality provides an intuitive and effective way of capturing epistemic uncertainty truth-conditionally, coping with the fact that the imperative's truth-value cannot be challenged. Nonveridicality provides us, then, with a straightforward method to characterize that the truth of the imperative is not absolute but relative to an individual and a context, preserving the essence of previous analyses (Kaufmann 2012 with presuppositions as constraint to the common ground; Aloni and Ciardelli 2013 with compliance conditions; Kissine and Jary 2015 with a background information set), but without additional structure to the semantic component of the imperative. Imperatives, in other words, express a disposition for action, though a mere disposition: in the set of examples in (8) below, the imperatives do not entail or presuppose the truth of the proposition they take as input. Imperatives, thus, are nonveridical as they do not trigger *actual* truth of the proposition p (Giannakidou 1998, Staraki 2013, 2017). *Be home at 5*, for example, does not entail that the addressee is going to be home at 5.

(8)   a. Be home at 5!
        imp (be home at 5) $\nrightarrow$ You will be home at 5.
        Implied: 'The speaker does not entail or presuppose that the addressee is going to be home at five.'
        b. OK, go to the damn party!
        imp (go to the party) $\nrightarrow$ You will go to the party.
        Implied: 'The speaker does not entail or presuppose that the addressee is going to go at
         the party.'
        c. Take a look at the photos.
        imp (take a look at the photos) $\nrightarrow$ You will take a look at the photos.
        Implied: 'The speaker does not entail or presuppose that the addressee is going to take a look at the photos.'

Treating imperatives as nonveridical enables us to treat imperatives as a single category with uniform characteristics no matter specific characteristics of speech act types.

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2.3   The non-homogeneity of the modal base in imperatives

The modal base of imperatives is a non-homogenous quantificational space. In order to gain some insight into the non-homogeneity of a modal base, we need to take a look on how the relevant conversational background is established. The imperative as a nonveridical assertion creates a partitioned, reflecting their quantifier variability, as illustrated in (9) (not an exhaustive list):

(9)   a. Dhose-2sg.IMP   mu   ta   stihia.
       Give   me   the   details.
       $[\![$Give me the details$]\!]^{c,f,g} = [\![You\ MUST\ give\ me\ the\ details]\!]$
       In ALL worlds you give me the details.

       b. Stripse-2sg.IMP   aristera.
       Take   a left turn.
       $[\![$Take a left turn$]\!]^{c,f,g} = [\![You\ MAY\ take\ a\ left\ turn]\!]$
       In SOME worlds you take a left turn.

       c. Gine-2sg.IMP ethelondis   gia   to   evritero kalo.
       Volunteer   for   a   greater good.
       $[\![$Volunteer $]\!]^{c,f,g} = [\![It\ is\ an\ OPTION\ that\ you\ volunteer]\!]$
       In SOME worlds you volunteer AND in SOME worlds you do not volunteer.

       d. Prakse-2sg.IMP   opos   thes.
       Do   as   you like.
       $[\![$Do as you like$]\!]^{c,f,g} = [\![It\ is\ INDIFFERENT\ what\ you\ do]\!]$
       In ALL worlds it is INDIFFERENT what you do.

       e. Exercise once per week.
       $[\![$Exercise once per week$]\!]^{c,f,g} = [\![The\ MIN\ or\ MAX\ you\ MUST\ do\ is\ exercise\ ...]\!]$
       In ALL worlds you do the minimum/maximum is to exercise once per week.

In previous accounts (Han 1999c; Kaufmann 2012), imperatives are interpreted with respect to a modal base which comes in two types of homogenous modal bases: either the common ground (the relevant facts) or totally realistic (all the facts known to the speaker). Yet, the quantifier variability in (9) suggests that imperatives in Greek and English are sensitive, as a nonveridical operator, to the range (number of worlds) of the quantificational domain in which something is prescribed. (9a) is prescribed in ALL worlds and can be formally represented by a universal quantifier, while (9b) is prescribed in SOME worlds and can be represented by an existential quantifier. The quantifier variability in (9) also indicates the sensitivity of imperatives to the kind of the quantificational domain (the kind of the relevant background facts) used in their interpretation. For instance, (9c) does not express an unavoidable but an optional necessity: one can volunteer and one can skip volunteering. In other words, a prescribed action is optional, if neither the action nor its negation is obligatory. Moreover, (9c) means that an individual has the option to choose among alternatives, suggesting the decisive role of an individual in the interpretation of imperatives. (9d), on the other hand, conveys indifference that is, both relevant alternative options p and not p are indifferent necessities. Specifically, (9d) implies an equivalence among possible worlds: both p and not p are indifferent to

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someone to bring it about that p. By contrast, (9e) expresses a requirement involving the minimum of an obligation, indicating that a quantificational domain involves gradable necessities as parts of another necessity. The variable quantificational domains illustrated in (9) suggest that imperatives' modal base is a non-homogenous quantificational space. By this, I mean that the modal base of imperatives should be considered as a partitioned quantificational domain to p and non-p worlds. Imperatives, in other words, do not have a circumstantial (Kratzer 1991)), a deontic or totally realistic (Han 2005)) modal base, as these types of homogenous modal bases assign to every possible world a set of propositions which are true in ALL possible worlds. Let us now proceed to exemplifying cases of partitioned, non-homogenous modal bases in imperatives.

First, the content of a modal base might be absent or unknown to an individual in imperatives. This means that rules and laws are not necessary preconditions, as imperatives can be issued in the absence of a relevant background. For instance, there are situations where there is not sufficient clarity or knowledge on what we are supposed to do or not to do. Permission imperatives do not necessarily presuppose that a speaker has given an addressee permission (or prohibition) based on solid normative facts. The introduction or repeal of a norm or a law or the modifications of the existing ones is a typical example. Consider a case in which you visited a factory and you found out that the manager laid down the rule (10a) that filming in a factory is prohibited. A few years later, you and your friend visit the same factory and the sign is gone, as the manager has removed the sign. Although the manager has not created a new rule or explicitly granted permission, i.e. a sign *filming is allowed*, the repeal of the previous norm *Do not film* seems to allow filming inside factory, or at least this is the interpretation one might provide. So, when your friends asks you whether she can film and she depends on your previous experience, you answer (10) without actually violating any rule, but most importantly without being given any specific or explicit relevant facts to base your permission:

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(10)   Trava   ena   video
        Shoot.2sg.IMP one   video
        Shoot a video.

        a. Mi   videoskopite   entos   tu   ergostasiu.
           Not film.IMP.2pl   inside   the   factory
           Do not film inside the factory.

        a'. (Borite   na)   videoskopite   entos   tu   ergostasiu.
            (Can.2pl.INP SUBJ) film.2sg.INP   inside   the   factory
            (You are allowed to) film inside the factory.

Imperative in (10) implies (10a'). You inferred that one is permitted to film inside factory facilities, because no one is under no explicit obligation or prohibition whatsoever not to do so. Given that a modal base containing a set of relevant background facts *f(w)* and given an ordering source *g(w)* representing the content of an ideal (rules, laws, etc) (Kratzer 1981, 1991), an imperative's meaning should follow from every maximally consistent subset of *f(w)* ∪ *g(w)* implying that *the filming is prohibited*. However, the imperative (10) we are examining suggests that one way of looking at imperatives is in terms of a rule, law or norm subtraction (temporary or not, we will not address this issue here). That is, the removal or elimination of a certain background from the modal base one considers relevant, i.e. removal of the rule *filming is forbidden*. Then, the meaning of an imperative like (10) should follow from every maximally non-implying subset of *f(w)* ∪ *g(w)*. In other words, by removing relevant facts from the modal base the subsets of *f(w)* ∪ *g(w)* are such that they do not entail *filming is prohibited*. The modal base of the imperative in (10) is not constituted by a set of

relevant facts known (contra Han (1999, 2005) and the totally realistic modal base), but by their mere absence. Then, an implicit universal quantifier over a circumstantial or totally realistic (all facts known) modal base prove rather inefficient as the imperative implies neither that p holds true in ALL worlds nor that p holds true in SOME worlds. Instead, (10) means that, following the removal of relevant facts (laws, rules, etcetera), *not p* (not filming) is not implied in SOME worlds.

A modal base in imperatives may contain collectively exhaustive relevant facts. There are situations beyond the call of duty meaning, that what is required or prescribed to do is good to do, but at the same time, not bad if your choose not to do it. In terms of modal semantics, a modal base, then, should contain worlds where p holds in SOME worlds, but ¬ p does not hold among any of the minimum sets of worlds. However, this in the standard modal analysis is a contradiction, an indication of a non-consistent (conflicting relevant facts) modal base. For example, the imperative in (11a) is about something that is considered a good endeavor but not an obligatory one (see Chisholm 1963b), i.e. contrast with (11b) which is an explicit case of obligatory well-doing. For instance:

(11)   a. People, rescue refugees in the Aegean Sea!
        f(w) = {volunteering is a good endeavor, it is a good endeavor to rescue refugees, it is not indifferent to rescue refugees, it is not obligatory to rescue refugees, it is not forbidden to rescue refugees, it is not indifferent or obligatory to volunteer to save refugees}

        b. Keep your promises!
        f(w) = {it is good to keep your promises, it is bad not to keep your promises}

On the one hand, volunteering to rescue refugees is a necessary act, thus, not indifferent, but not obligatory or forbidden, and maybe, it is not considered an ideal action by some people. The relevant facts are not contradictory, rather, jointly exhaustive, which means that rescuing refugees is within one's own preference either to do or not to do, whatever one may choose to do. In some worlds p holds but in a minimum set of worlds ¬ p does not hold. On the other hand, imperative (11b) is something one must conform no matter what one may choose or prefer to do. (11b) conveys that not keeping your promises (¬ p) ranks lower than keeping your promises (p). Thus, the modal base is not a homogenous quantificational domain, at least not in imperatives, in terms neither of number nor of type of quantificational domain. For if the modal base featured a homogenous quantificational domain, as current accounts argue, then the implicit universal quantifier would quantify over the set of ALL possible worlds, thus rescue refugees would be obligatory and not within our preference to do or not to do whatever we choose. Examples in (11), show the modal base of (11a) is a set of worlds (provided in f(w) in (11a)) where for SOME worlds it is true that p and in SOME worlds p is precluded by doing the minimum, depending on the preferences of an individual. The prescribed action in (11a) is optional, (11a) does not imply true in ALL worlds.

The equivalence condition of the worlds in the modal base (Kratzer 1981, 1991) is very strict, because it does not allow worlds that are mutually exhaustive and gradable. We are often faced with a situation pertaining to necessity of some degree. For example, there are situations where an obligation involves a maximum or a minimum necessary action required. In modal semantics terms this means that the modal base of imperatives should be able to include acceptable alternative possible worlds (options) that outrank and possibly are not comparable with the rest of the possible worlds, i.e., a minimum (MIN) or a maximum (MAX) necessary action. Let's examine a real-life example. Imagine Tom, an engineer, who is in Dubai. Tom received a message by his boss (12) asking him to report about a project. Tom can contact his boss via email or Skype. His boss is also on a trip to Japan, and can be reached only once per week and in specific hours. Tom, then, is obligated to contact his boss

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but it is also necessary that Tom chooses one among two ways (his friends suggestions (12a-b) of surely conducting his boss and reporting about the progress of the project:

(12)   Epikinonise   mazi   mu.
            Contact.2sg.IMP   with   me
            Contact me.

        $f(w)$ = {the minimum I can do is send him an email, the maximum I can do is to Skype him after business hours}

        a. Paul: Stile   email.
               Send.2sg.IMP   email.
               Send an email.

        b. Rick: Kane   skype.
               Do.2sg.IMP   skype.
               Skype him.

In the context just set out, Tom seeks an effective way to fulfill his obligation (12) to contact his boss. There is no specified way how Tom is required to contact him. Emailing his boss is the minimum (the least) Tom can do and at the comfort of his apartment, while Skyping the boss is the maximum (the most) Tom can do in his office at a specific time after business hours. The example in (12) shows that worlds in the modal base are partitioned to mutually exclusive and gradable worlds. (12a) stands for *doing the minimum in ALL possible worlds* and (12b) stands for *doing the maximum in ALL possible worlds*. That is to say, the modal base of the imperative (11) contains a set of alternative possible worlds where p holds in ALL the lowest (minimum) ranked possible worlds. While, the modal base of the imperative (12b) contains a set of alternative possible worlds where q holds in ALL the highest (maximum) ranked possible worlds. Thus, the modal base *f(w)* contains subsets, for example, w_1 and w_2 which constitute a minimum and a maximum: $f(w_1) \leq f(w) \leq f(w_2)$. This means that worlds in the modal base are in a relation which is neither transitive (partial preordered and equivalent) nor comparable (i.e., is less than or equal to). If the modal base of (12) would not contain a minimum and a maximum point, then the action prescribed would not imply that Tom has a choice on how to bring about an obligation. Instead, (12) conveys that an obligation gets fulfilled as another necessity, minimum or maximum, gets fulfilled. Tom can opt to email and not skype the boss, and Tom can opt not to email and, instead, skype the boss. Whatever Tom chooses (email or Skype), he fulfills the obligation to contact his boss. The same observation is true for English as the counterpart translations show.

    Possible worlds in the modal base can be non-comparable. Imagine that every Thursday there is a staff meeting. Sometimes it is a waste of time. Nevertheless, in those weekly meetings one has the chance to meet his/her colleagues, exchange information and network. You ask the opinion of your friend, the following is the answer:

(13) Attend the meeting.

    $f(w)$ = {it is optional to attend the Thursday's meeting, it is not indifferent to attend the Thursday's meeting}

The action prescribed by the imperative (13) represents a quite familiar situation. An optional, but yet not an indifferent action. However, the condition of the preorder and comparable possible worlds in the modal base (Kratzer 1981) requires that a possible world $w1 \leq w2$ or $w2 \leq w1$. This would translate to: *it is not indifferent to attend the Thursday's meeting* should be ranked higher than *it is optional to attend the Thursday's meeting* or the opposite. This is certainly not the case in example (13). Not being indifferent does not imply it is a better necessity than to opt for the meeting. By the same token, having the option to skip the meeting does not imply it is a better necessity than indifference to the meeting. In other words, having an option does not contradict or outweigh the lack of indifference, and vice versa. Thus, the worlds in the modal base are non-comparable. Modal base contains subsets where there is an option that p (going to the meeting) and where p is not omissible nor insignificant that p. These finer distinctions among possible worlds are not appropriately accounted for, because current modal analyses of imperatives presuppose an ordering, reflecting ordered priorities and ideals that are comparable (Kratzer 1981; Han 2005; among others).

An underspecified modal base can also explain cases in which the interpretation of imperatives involves more than one modal base[5] in a context and suggests the association of a modal base with the preferences of more than one conversational participant. The next couple of contrasting scenarios illustrate the case of imperatives expressing alternatives or opposition between participants:

(14)   Context: You have an allergic reaction and you ask your friend to go to the drugstore and pick up an OTC drug for you. You request (13a). In case your friend does not find Claritin-D, would you want them to do (13b) or (13b')?

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         a. You: Buy Claritin-D
         b. Your friend: Buy Allegra-D
         b'. Your friend: # Buy nail polish

Intuitively, (14b) is true in the context-scenario. Although you have specifically asked your friend to buy Claritin-D (9a), the preferred goal is to have a drug to help relieve your allergic reaction, and Allegra-D, the alternate option in (14b), conforms to that goal. The choice of drug has been allocated to your friend, and your friend thinks towards a preferred goal, that is, relieving the allergic reaction. Your goal and your friend's goal are mutually consistent. Thus, your friend is free to choose if you have not specifically imposed restrictions on your part on how or what your friend may choose. Allegra-D will also help you relieve the allergic reaction. The imperative in (14) exemplifies a case in which the preference set of the addressee is consistent with the preference set of the speaker. The preferences of you and your friend have to be considered jointly. The imperatives in (14) do not conflict with each other; rather, they illustrate shared choice between participants. Consider a different context-scenario now:

(15)   Context: A lieutenant orders his soldier:

         a. Lieutenant: Fire!
         b. Soldier: # Kill the lieutenant!

A request or permission allows the preferences of two or more participants to be considered jointly. Choice is shared with the addressee or passed from the speaker to the addressee. In the

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[5] I am not referring to inconsistencies within a modal base as I argued earlier in this section, but between modal bases. This way, we can capture the conflicting, alternative, or competing preferences of different participants in a context.

imperative in (15), which features a command, (15b) contrasts the imperative in (15a). While the imperatives in (14) illustrate mutually consistent modal bases, the imperatives in (15) cannot be a union that includes both the lieutenant's and the soldier's preferences because their preferences are mutually inconsistent (the lieutenant wants the soldiers to fire, and the soldier wants to kill the lieutenant). Thus, the preferences of the lieutenant and the soldier have to be considered separately. The example in (15) lacks choice on the part of the addressee because the right to make a choice belongs only to the lieutenant. In other words, the soldier is required to comply and fire. The imperatives in (15) do not show shared choice between participants; rather, they illustrate conflict between them.

The cases we examined are useful for two reasons. First, from a modal semantics perspective, we observe that the set of relevant worlds in a modal base of imperatives is a non-homogenous set. The possible worlds need not be on a par. The modal base of imperatives is partitioned into p and ¬p worlds. Some possible worlds may outrank other possible worlds, and some worlds may vary in degree of necessity to respective upper or lower limits (maximum or minimum necessary action). Additionally, the propositions corresponding to the relevant facts or the content of the law might be absent. Hence, the set of propositions whose intersection forms the modal base can be carried out by intersecting maximally non-implying subsets. In short, the modal base of imperatives is non-homogenous, containing sets of alternative possible worlds which might be non-comparable, mutually exclusive and gradable. In other words, the modal base of imperatives does not feature an equilibrium among possible worlds:

(16)   Non-homogeneity of modal base in imperatives:

<div style="text-align: right;">12</div>

a. A modal base $f(w)$ relative to an individual is nonveridical with respect to a proposition p iff $f(w)$ is partitioned into p and ¬ p worlds
b. A modal base $f(w)$ features competing and non-equivalent possible worlds.

Second, from a pragmatic point of view, we understand that imperatives are borne out within a decision making context. In this decision making context there are problems to be solved, requirements to be determined, goals to be recognized, and alternatives to be identified and valued. Imperatives, in other words, reflect the subjective evaluation of a decision maker which identifies and chooses alternatives based on values and ranked preferences. To get a proper account of imperatives we should consider both, semantic and pragmatic, observations in a unified way.

In view, then, of the above considerations, the aim is to capture several alternative interpretations of imperatives in one single underspecified semantic representation without distinguishing a separate semantic type for every use (consider the speech acts and presuppositions) of imperatives. I assume, therefore, a modal base, rather than having an implicit universal quantifier over the set of possible worlds, has a quantifier placeholder which is replaced with the appropriate quantifier determined by a partition-function of the quantificational domain. This proposal is based on the cases we reviewed and which showed that the modal base of imperatives has to be partitioned by the preferences of an individual in order to determine the appropriate interpretation. Imperatives, both in Greek and English can be associated with a semantic representation that is underquantified (meaning that the quantifier is not determined by default):

(17) $[\![IMP]\!]^{c,f,w} = \lambda f\, \lambda p\, \lambda w.\, (\mathbf{Q}w' \in \cap f(w))\, [w' \in p]$

The definition provided in (17) represents the semantic information related to an underquantified imperative. Specifically, (17) states that an imperative is a modal operator that takes a proposition as its argument and features an underspecified modal base *f* and a quantifier placeholder *Q*. The modal base *f* is a parameter of the partition-function *Selection* (we will see this later in section 3 in detail) that assigns to a particular world the propositions that constitute the relevant background for a particular modal flavor in imperatives. The proposed logical form (17) has two immediate and evident advantages. First, by employing a quantifier placeholder *Q*, the value of the quantifier of an imperative is not stipulated. This allows us to relativize its value to a model of interpretation (Montague 1974; Giannakidou 1998) like the individual's preferences within a context, and not assign different contents in different contexts via speech acts (i.e., universal if it is an order, existential if it is a wish, etcetera). Second, we are able to paraphrase any imperative as "there is a set of relevant possible worlds X, a certain number of which is preferred to a certain degree by an individual", instead of the implicit speech act of ordering "A ORDERS B to act X". The process of providing an imperative with a quantifier, as I will show, is the *quantifier resolution*, where the quantifier placeholder *Q* obtains its interpretation as a universal or existential quantifier through *Selection*, a partition-function that feeds on the individual's preferences.

In this section, I argued that imperatives in Greek and English contain a non-homogenous modal base (16) and a quantifier placeholder in their logical form. By employing an underquantified placeholder *Q* we can explain why imperatives have such high productivity and formally represent a wide range of quantified domains, both universal and existential, and in certain cases the equivalence relation we call indifference.

2.4 The ordering source is relative to an individual

The partition of a modal base can be created by an ordering. As shown in section 2.2, the worlds in a modal base compete and conflict, but they can also be indifferent and incomparable. In other words, the imperative have no equilibrium among p and ¬ p worlds. Then, in order to analyze effectively imperatives, we should be able to distinguish between different types of ordering sources that explicitly represent the preferences and choices of an individual within a context of decision making. In other words, the ranking of worlds in a modal base has to be relative to an individual (agent-related).

In general, the ordering source for a modal contributes a set of propositions (laws, desires, tasks, etcetera) issued by the speaker (Han 1999; Portner 2005; Kaufmann 2012; among others), determines a set of most ideal worlds, and orders worlds depending on how close these worlds come to the set of the most ideal world. For instance, when one utters (18), s/he imposes a set of constraints, and the possible worlds are ordered according to their closeness to *what one wants you to do* (bouletic ordering):

(18)   Kane   peninta   epikipsis!

Do-2sg.IMP   fifty   push-ups!

Do fifty push-ups.

$g_{bouletic}(w) = \{I \text{ want you to do fifty push-ups}\}$

However, the ordering source in imperatives does not represent the preferences of an individual. Imperatives go beyond the ordering source of the type: *what the law says*, *what I want you to do*, and *what I desire*. A bouletic ordering source in (18) does not say anything about how intense an individual prescribes an action. It just states a set of constraints: rules, desires, etcetera. The kind of ordering source g(w) = {*I want* you to do fifty push-ups}does not measure up possible alternatives and does not take implication of choice into account. In other words, the ordering source in the example (18) does not express intent and the choice of a preferred planed action among alternative actions. It is, then, essential to redefine the ordering source as measure of the preferences to evaluate how well each alternative achieves a goal. As Starr (2012) also argues, imperatives offer a set of alternatives. Imperatives, as I assume, convey the preferences of an individual[6], and contribute a degree of relative necessity among alternatives. Let's consider an example in Greek (19) with a deontic ordering source. Imagine that you are driving and you suddenly spot a child in front of you. According to the classical notion of the ordering source, you are obliged not to kill people, thus, based on the moral laws, you turn left, saving the girl in that particular situation:

(19)   Stripse   aristera.
        Take.2sg.IMP   a left.

        $g_{deontic}(w)$ = {According to moral laws, you should not kill people}

        a. If *Take a left* is **strictly preferred** to *Do not take a left*

        b. If *Take a left* is **weakly preferred** to *Do not take a left*

        c. If *Take a left* is **invariant** to *Do not take a left*

However, the moral obligations, the tasks, the goals differ in degrees of necessity. A deontic ordering source as shown in the example (19) provides the set of criteria (laws, desires, tasks, etcetera) based on which the worlds in the modal base are ordered. It cannot, however, allow for a distinction of degrees of necessity (for a similar point of view, see Lassiter, forthcoming).

Let us examine how the preferences of an individual contribute a degree of relative necessity among alternatives. Imagine that one is driving on a desert road with vast wastelands in both sides when s/he spots ahead of her/him a child trying to retrieve her bouncing ball. S/he is morally obliged not to kill people. It is not dangerous to swerve to the side. Should s/he obeys the driving instructor's (19) s/he does not risk the passengers lives. In this case, her/his moral obligation is valid to a higher degree as expressed in (19a). An action is strongly preferred by an individual in all possible situations, thus, the universal reading of the imperative (19a). On the contrary, in the second example (19b) an individual conveys the intention that a certain action may or may not be preferable, but it is not undesirable. Imagine, again, that one is driving on a highway when s/he spots ahead of her/him a child trying to retrieve her bouncing ball. S/he is morally obliged not to kill people. It is dangerous to swerve to the side. Should s/he obeys the driving instructor's (19) s/he risks the passengers lives. Although, s/he is still obliged not to kill people, in this case, her/his moral obligation is valid,

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[6] Han (1998) proposes that an ordering source is the speaker's preferences, while Schwager (2006) and Kaufmann (2012) extend the ordering process even to the addressee's goals. Neither approach provides an answer to how the ordering source is built and what parameters might affect its construction. For Han (1998) and Schwager (2006), the ordering source is static. Instead, I propose a threefold ordering that qualifies some preference ordering of actions for an individual. The ordering source has an internal structure, as I show, and plays an essential role in analyzing modality in conjunction with intentionality.

however, to a lower degree (19b). A certain action is weakly preferred by an individual in some circumstances, thus, the existential reading of the imperative (19b). Generally, the degree to which p is preferred is in a gradable relation to the best accessible possible worlds in the modal base where it holds that ¬ p. A third case is when imperatives do not express either an obligation or a requirement. Consider, again, the imperative *Take a left,* but this time with the continuation *I don't care* where the speaker expresses no care or concern about one's turning on left. In this case, it is implied an equivalence relation on preferences. The individual that uttered (19) with the continuation *but I don't care* shows no care for taking a left or right turn. The universal and existential quantifiers, however, express asymmetric relations in that the order of the worlds in the modal base is significant, like the interpretations (19a) and (19b). One of the goals here, then, is to show that, at least in the case of imperatives, we should be able to distinguish between other types of ordering sources based on the gradable preferred actions of an individual's preferences and/or goals (intentional states). By introducing a degree based ordering source, we are able to capture the contribution of an individual's preferences, that is, how strictly an individual requires something to be accomplished. For example, the first interpretation (19a) captures an individual's intention that a certain action is strictly preferred under any circumstances. In other words, imperatives induce an order based on the degree to which p is preferred and which is in a gradable relation to the best accessible possible worlds in the modal base where it holds that ¬ p. A preference-based ordering source allows to assign necessity degrees. The role of the individual is essential, as the individual posits a strict or weak ordering of the worlds in the modal base based on his/her preferences. A strict ordering, for example, is defined when an individual prefers $action_1$ to $action_2$ but not $action_2$ to $action_1$ like in the example (20a):

(20) a. Kane   peninta   epikipsis!

          Do-2sg.IMP   fifty   push-ups!

Paraphrase of (20a): The action "do fifty push-ups" is a strictly preferred option to action "not doing the push-ups" and action "not doing the push-ups" is the one and only option available in all accessible worlds based on the individual's preferences.

Definition of g_{strict} (w): If A > B then B $\not\geq$ A **then** a required action A is a strictly preferred option to action B and action A is the one and only option available in all accessible worlds based on the individual's preferences.

       b. Kane   peninta   epikipsis!

          Do-2sg.IMP   fifty   push-ups!

Paraphrase of (20b): The action "do fifty push-ups" is a weakly preferred option to action "not doing the push-ups" and action "not doing the push-ups" can be an equally preferred option to action "do fifty push-ups" in some accessible worlds based on the individual's preferences.

Definition of g_{weak}(w): If A > B then A ≥ B then a required action A is a weakly preferred option to action B and action B can be an equally preferred option to action A in some accessible worlds based on the individual's preferences.

A weak ordering is defined when an individual has a preference of at least an action$_x$ like in the example (20b). Han (1998, 1999, 2001), Schwager (2006), and as Kaufmann (2012) mention the intentional component by arguing that the ordering source relates to a speaker's preferences. In fact, Kaufmann (2012) introduces, and this is relevant to what I aim to capture here, a type of ordering source named "what the speaker commands" (WTSC) and also connects it to the addressee's goals. However, Kaufmann (2012) never provides us with an explanation of how the ordering source is assigned, by whom, and if it has any internal structure, and Han (1998) and Kaufmann (2012)[7] are both unclear as to whether and how the ordering that constitutes a speaker's preferences contributes to the quantifier resolution.

In this paper, I propose exactly this: a speaker's preferences contribute to the quantifier resolution by providing a bias toward to a set of worlds in the modal base. This is reminiscent of Heim's desire reports Heim (1992) and of Giannakidou (2015) $>_{desirable}$ ordering source. The type of ranking of the worlds (preferences) in the modal base is significant because it affects the interpretation of imperatives and plays, as we saw in the above examples, an essential role in determining the quantifier resolution (universal vs. existential vs. indifference). An ordering source in imperatives is determined by the intensity of the preferences of an individual g_i (not g(w)) and can be distinguished, as in:

(21)   a. Definition of g_{strict} (w):
           An *action A* is **strictly preferred** to *an action B* iff:
           !$\forall$w (Aw > Bw): For every world w, action A holds in that world w

        b. Definition of g_{weak} (w):
           An *action A* is **weakly preferred** to *an action B* iff:
           !$\exists$w (Aw ≥ Bw): For some world w, action A holds in that world w

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In Greek and English, the comparative relations of the imperatives are implicit and require context to be revealed (20). In contrast, Japanese features a morphological distinction that conveys the ranked preferences of an individual as degrees of necessity. For example, the Japanese example (22) is appropriate only in the context of direction, for example, a direction provided by a driving instructor:

(22)   Hidari-ni maga-**tte**!   *direction*

        Left-to   turn-IMP

        Turn left!

        g_{weak}(w):
        Take a left is **weakly preferred** to *Do not take a left* iff:
        !$\exists$w (Aw ≥ Bw): For some world w, *take a left* holds in that world w

In contrast, imperatives with the suffix -e (e.g., magar-e, 'turn-IMP') express a stronger degree of requirement than those with the suffix -te; imperatives with the suffix -e feature a strict ordering with the highest value assigned to a command:

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[7] Free choice phenomena remain unexplained by a WTSC ordering source, as we do not have any parameters and/or features that would show how intentionality and indifference affect the interpretation of imperatives (however, see Staraki 2015).

Staraki_Imp.Non.17Staraki_Imp.Non.17

(23)   Hidari-ni maga-**re**!   *command*

Left-to   turn-IMP

Turn left!

g_{strict} (w):
Take a left is **strictly preferred** to *Do not take a left* iff:
!$\forall$w (Aw > Bw): For every world w, *take a left* holds in that world w

The imperative in (22) is appropriate in the context of strong authoritative direction (for example, when ordering soldiers), but it would never be used by a driving instructor, while the example in (23) features a much more moderate degree of necessity by the individual. Thus, in Japanese, one expresses the nuances of ranked preferences with the morphological distinction between -te and -e; which morpheme will be used is a matter of necessity determined by the individual according to the context in which s/he will be using it. Thus, the use of an ordering source that reflects an individual's ranked preferences and degree of necessity is not just an abstractly motivated part of the analysis presented here. Rather, it appears to be an essential component of imperatives' logical structure that is featured either implicitly (Greek, English) or explicitly (Japanese). I believe that languages in general have more or less similar ways to denote an individual's strong or weak predispositions, but that classification is a matter for future work.

In this section, based on examples from Greek, English and Japanese, I argued that the ordering source in imperatives conveys preferences and the comparative relations that hold between them. There are two advantages to this approach. First, through the ordering source, we capture in a principled and standard way the gradience in personal preferences. Second, as we will see in the next section, we predict that imperatives involve *indifference* and, in some cases, *choice allocation*, a shift in decision-making from one to another conversational participant in the context. To the best of my knowledge, this formalization of the intentional component of imperatives as the ranking of an individual's preferences has not been proposed before.

2.5   Indifference in imperatives

The problem of quantificational force of imperatives expressing indifference[8] (discussed briefly in the previous section) indicates that a lexically determined quantifier cannot be generalized. Indifference imperatives imply an equivalence relation on preferences (24):

(24)   a.   Strips-**e** aristera.   Strips-**e** deksia. De me endiaferi!
               Take-**2sg.IMP** a left.   Take-**2sg.IMP** a right. I don't care!
               Take a left. Take a right. I don't care.
               Paraphrase: *I'm indifferent* as to where you turn.
               $I_{individual(x)} = \{Left \equiv Right = 1$ iff $Left \geq Right \wedge Right \geq Left$ for $x\}$

       b.   Par-e   o,ti   thes!
               Take-**2sg.IMP**   whatever   you want
               Take whatever you want!
               Paraphrase: *I'm indifferent* as to what you will take.

---

[8] Throughout the paper, I use the terms *indifference*, *invariance*, and *invariant* to mean the same thing.

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$$I_{individual(x)} = \{take\ x \equiv take\ y = 1\ iff\ x \geq y \wedge y \geq x\ for\ x\}$$

c.   Pare   an   thes   kati
    Take-**2sg.IMP**   if   you want   something
    Take something, if you want.
    Paraphrase: *I'm indifferent* as to whether you will take something.
$$I_{individual(x)} = \{take \equiv \neg take = 1\ iff\ take \geq not\ take \wedge \neg take \geq take\ for\ x\}$$

d.   Eksafanis-**u**,   dhe me endiaferi!
    Disappear-**2sg.IMP**   not me interests!
    Get out of my sight, I don't care!
    Paraphrase: *I'm indifferent* as to whether you in fact comply with what I told you to do.
$$I_{individual(x)} = \{comply \equiv \neg comply = 1\ iff\ comply \geq \neg comply \wedge \neg comply \geq comply\ to\ x\}$$

Aloni (2004) argues that imperatives expressing indifference have an existential operator, the paraphrase of which incorporates a universal reading that translates into the following: each alternative is permissible, and it is obligatory to choose one of them. Incorporating permission into indifference lacks descriptive generality, In order to illustrate the point, consider the examples in Greek. None of the imperatives in (24) implies permission or order. Indifference imperatives seem to express something more than mere necessity. For example, the interpretation of (24b) as: all worlds are permissible, and it is obligatory to do one of them, (following Kaufmann 2012) does not correspond to the real meaning which is: *I'm indifferent as to what you will take*. The same observation applies to the rest of indifference imperatives in (24). The essential component of that kind of imperatives is indifference. Aloni (2004) and Kaufmann (2012)[9] rightly point to some sort of universality but they do not provide an interpretation for the indifference component which, although the individual requires the addressee to act somehow, at the same time, he states that he is indifferent as to whether the addressee in fact complies with the requirement issued as, for instance, in the case in (24d).

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    I treat *indifference* as a subtype of the ordering source that denotes preference equivalence on possible worlds, whatever those might be, strict or weak. In other words, I propose that *indifference* represents an ordering relation in which the corresponding outcomes (of the permutations of the required actions) are equally good or indifferent to an individual, The individual indicates the absence of an effect on him/her or the lack of will to influence the addressee, as shown by examples (24). The action(s) to be taken do not have a hierarchical/dominance relation to one another, because the individual chooses not to posit any strict or weak ordering. The individual is indifferent about certain actions because to him/her they are identical or similar situations. The following defines indifference:

(25)   Indifference (I): {action A $\equiv$ action B iff A $\geq$ B and B $\geq$ A for an individual}

---

[9] Current theories (Aloni 2004; Kaufmann 2012, among others) fail to capture the semantics of indifference because they rely on uniform possibility or necessity semantics for imperatives, relegating the various readings to pragmatics. The account I propose treats imperatives as modals with an underquantified (underspecified) domain. This way, we can paraphrase any imperative of the form *an individual orders Y* as *there is a set of things X that an individual considers, a certain number of which Y the individual prefers/requires*. From this partitive construction, we can derive all the various readings of imperatives, including the most puzzling ones, such as the indifference readings (see section 4).

$g_{invariant}$ ordering source

>An *action A* is **equivalent** to *an action B* iff:
>
>!$\forall$w (Aw $\equiv$ Bw): For every world w, action A holds in that world w is equivalent to *an action B* in that world w

Therefore, I argue that imperatives feature an ordering source that represents the ranked preferences of an individual. This type of ordering source is an argument of a partition-function, as we will see in section 3, which determines the type of quantifier an imperative acquires.

3.   Imperatives: a subjective degree of necessity

We established that the modal base in imperatives is non-homogenous, and that the ordering source partitions the modal base, pertaining to the gradable preferences of an individual. However, this revision of the conversational background (modal base and ordering source) only says something about the interpretational variation observed within imperatives and nothing about necessity, and hence, the resolution of the quantificational variability. What follows is an effort to link the modal parameters with a scale of necessity (3.1 and 3.2) which as I will show determines the quantifier resolution in imperatives (3.3).

3.1   Imperatives as degrees of necessity

In section 2.3, I argued that the interpretation of imperatives pertains to the values of the preferences of an individual. What is the value then? Imperatives express the degree of necessity (see section 2) of an action. As epistemic modals are known to carry varying possibilities and probabilities, imperatives, I assume, express actions more or less necessary. Thus, an action prescribed with an imperative can be viewed as more or less necessary just like a possible state can be considered as more or less probable.

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Kennedy (2007) argues that a scale can be formalized as a triple of $\langle D, \prec, \delta \rangle$, where D is a set of degrees, $\prec$ is an ordering on D, and δ is a dimension indicating the type of measurement the scale represents. Based on this, I introduce a scale of necessity for imperatives of the form $\langle D_{nec}, <_{nec}, \delta_{nec} \rangle$ consisting of a set of degrees D_{nec} of necessity, an ordering of these degrees $<_{nec}$, and the dimension δ_{nec} indicating a contextual or individual normative standard.

Consider the derivation of degrees. The essential idea of the proposal is to convert an individual's subjective assessments of relative necessity to a scale representing overall degrees. In particular, this process is based on pairwise comparisons. For each pair of sets of worlds, an individual has to compare in a pairwise mode the relative necessity of the two. The following scale expresses the intensity of necessity:

(26)   **Degrees of Necessity[10] (deriving the D_N)**

D_9 = extremely necessary or preferred

D_7 = very strongly necessary or preferred

D_5 = strongly necessary or preferred

D_3 = moderately necessary or preferred

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[10] The degree space is a dense and not discrete scale (for dense scales see Fox & Hackl 2006). Imperatives in natural language express subjective requirements.

D_1 = equally necessary or preferred

An imperative is therefore specifically assigned a degree of necessity, indicating the ranked preferences of an individual. In other words, the preferences (section 2.3) can be seen as degrees of necessity.

3.2   The decision-making dimension δ in imperatives

We mentioned that an imperative is also context (model) relative. I consider the *decision-making model* to be the third parameter-dimension δ in the scale $\langle D_{\text{nec}}, <_{\text{nec}}, \delta_{\text{nec}} \rangle$, and more generally, the abstract dimension δ that supplies imperatives with a rational motive for decision based on an individual's preferences. A way to implement this context dependence of authority in imperatives is through a principled notion of *choice* and *choice allocation*. Imperatives involve a wide set of speech acts: prohibitions, commands, wishes, requests, advice, instructions, warnings, orders, permissions, etcetera In spite of this, all imperatives involve the presence (or lack) of *choice* in a decision-making model, either *choice-to-authority* or *choice-to-addressee*. The interpretation of imperatives can thus be defined in the spirit of a *decision-making model*, a type of context in which an addressee is allowed or authorized to have a choice over a set of alternatives ALT_{set}, as in example (27c). *Choice* either belongs to a speaker-authority $\mathcal{S}$ or is granted to an addressee $\mathcal{A}$, as in example (27b). Whenever the right to choose is given to someone other than the speaker-authority, *choice allocation* has occurred. *Choice* results in the selection of a course of actions among alternatives from the set ALT_{set} :

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(27)   a. Do as I say
Inference: The addressee is required to act as required by the authority and not allowed to act otherwise
Choice Allocation: No choice allocated to the addressee - Restriction applies
b. Come on, take a fruit
Inference: The addressee is allowed to take a fruit and free to refuse taking a fruit
Choice Allocation: Choice allocated to the addressee - No restriction applies
c. Take an apple or a pear
Inference: You are allowed to choose between alternatives and free to refuse to do either
Choice Allocation: No restriction applies

Therefore, authority is not a presupposition but a property that shifts among participants. Also, the speaker and the addressee (the rational participants) are able to model each other's decisions and utilize an inference-making process. This multi-agent domain is contextually determined. Both the speaker $\mathcal{S}$ and the addressee $\mathcal{A}$ have active roles in a choice game of authorization and *choice allocation*. *Choice allocation* occurs in the conversational background of the decision-making model between a set of rational participants. In this decision-making model, the speaker and the addressee are able to allocate and retain choice, respectively, as well as identify, infer, and evaluate competitive alternative intentional states. Below are the concepts and principles that represent in a principled way the landscape of a *decision-making model*:

(28)   a. A set of rational participants $\mathcal{P}(\mathcal{S}, \mathcal{A})$[11]

---

[11] The *Rational Speaker $\mathcal{S}$* and the *Rational Addressee $\mathcal{A}$* sets are models of the most characteristic properties of a speaker and an addressee.

b. A set of alternative intentional states ALT_{set}

c. A process for exhausting the alternatives set depending on participants' *Choice*

(29) **Rational Participant[12]**

The *Rational Participant* principle characterizes the participants' common knowledge of the decision game. A rational participant knows the decision game's structure and is aware that all other participants know the decision game's structure as well.

(30) **Choice[13]**

Choice on a set of alternative intentional states ALT_{set} is a mapping property of a function from possible alternative choices $C_A \subseteq ALT_{set}$ for every alternative $A \subseteq ALT_{set}$. *Choice* assigns to a set ALT_{set} the subset C_A of chosen alternatives from ALT_{set}. *Choice* can be allocated to a *Rational Participant* by an *Authority*.

(31) **Authority**

$\mathcal{P}$ is considered the authority in a conversational background *f* in a context *c* in a world *w* iff:

(a) A *Rational Participant* $\mathcal{P}_1$ decides on and guides the decisions (see the function of *Choice*) of a *Rational Participant* $\mathcal{P}_2$, and

(b) a *Rational Participant* $\mathcal{P}_1$ contributes a better *Choice* to every plan of action of *Rational Participant* $\mathcal{P}_2$, formally:

Authority $(\mathcal{P}) := \{f: W \rightarrow (\mathcal{P}_1(C) > \mathcal{P}_2(C)\ (W)) \mid \mathcal{P}_1$ is considered an authority on *f* in *c* $\}$

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Choice Allocation defines the shift of *Choice* from an *Authority* to someone else in the context and the conditions that regulate it:

(32) **Choice Allocation**

There is a set of participants $\mathcal{P}(\mathcal{S}, \mathcal{A})$. If $\mathcal{S}$ and $\mathcal{A}$ are two rational participants and $\mathcal{S}$ has the right of choice, and there exists a process that allocates the choice from $\mathcal{S}$ to $\mathcal{A}$ such that $choice_S \in \mathcal{S} \setminus \mathcal{A}$, then there exists $choice_A \in \mathcal{A} \setminus \mathcal{S}$ such that $\mathcal{S} \setminus choice_S \cup choice_A \in \mathcal{A}$ This is the authority allocation from $\mathcal{S}$ to $\mathcal{A}$. *Choice Allocation* $\{ \mathcal{S} \setminus choice_S \cup choice_A \in \mathcal{A} \} = 1$ iff:

> i. The *Authority* does not possess full knowledge $\mathcal{K}$ of a set of alternatives ALT_{set}:
> Authority $(\mathcal{K}) \not\subseteq ALT_{set}$
> ii. The *Authority* is indifferent as to what choice to make in order to satisfy a decision problem:
> Authority $(\mathcal{C}) \equiv ALT_{set}$
> iii. The *Addressee* possesses better knowledge $\mathcal{K}$ of a set of alternatives ALT_{set}:
> Addressee $(\mathcal{K}) \subset ALT_{set}$

Authority and *Choice* can be properties of the same rational participant, but they can also be properties individually obtained by different rational participants. This is what *choice allocation* describes.

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[12] *Participant* and *Individual* are used interchangeably throughout the paper.

[13] *Selection* and *Choice* encompass different procedures in a context: *Selection* is a partition-function that outputs the quantificational force of an imperative, while *Choice* is a mapping property that assigns a property to a conversational participant.

When *choice allocation* is performed, an *authority* might not give up their status, but they allocate one of their properties, namely *choice*, to another rational participant in the context. The conditions in (32i–iii) describe the reasons on the basis of which *choice allocation* occurs.

The rational motive for a decision is a function δ_{appr} that represents a preference relation and maps actions A onto a standard $S^c_{g_{(i)}}$, the dimension that forms the basis for comparison in terms of degrees:

(33) $\delta_{nec}: A \to S^c_{g_{(i)}}$ where c = contextual normative standard

$\qquad\qquad\qquad\qquad\quad$ $g_{(i)}$ = individual's ordering source

An objection is possible though. As it has been argued by Kaufmann (2012: 160 (61)), imperatives cannot be considered as solutions to a decision problem, at least not always. There are contexts in which an imperative provides an answer to a decision problem, and there are contexts where an imperative's ordering source is bouletic. However, as I argue, in the current account, the decision-making context is the context where an individual identifies and chooses among alternatives based on the values of his/her preferences as a decision maker (authority). An imperative, although it can be considered as such, it does not constitute an answer to a problem. When, I argue that imperatives are borne within a decision-making context, I mean that imperatives pertain to a choice among alternatives (see also Starr 2012). This is a basic feature of the decision-making context. In other words, uttering an imperative implies that there are alternative choices to be considered, and one chooses the best fitting his/her desires, goals, objectives, values, etcetera. Imperatives involve the evaluation and the selection of various alternatives, and represent, one could say, the end-product of a decision. Even, in the case where an imperative conveys a wish the individual chooses among alternatives, i.e., *Be rich*, well-wish instead of cursing, and *Go to hell* cursing instead of well-wishing. The analysis of imperatives within a decision-making context has an immediate advantage. We are able to redefine the problem of quantifier variability as a matter of decision, choice and preferences of an individual. This, in turn, makes the argument for a personal ordering source in imperatives stronger.

In summary, I described in a principled and non-ambiguous way the *decision-making model* of imperatives. In particular, I showed that conversational participants compare and choose alternatives based on their preferences (intentional states) in one of two ways: *choice-to-authority* or *choice-to-addressee*. The following table summarizes the main arguments of the proposed account (sections 2 and 3):

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	MODAL FORCE	MODAL BASE	ORDERING SOURCE	OTHER CONDITIONS
Current accounts	∀(default)	totally realistic (Han 1999)	impersonal	presuppositions (Kaufmann 2012)
Proposed account	quantifier placeholder	non-homogenous	individual-relative	decision-making context and choice

Table 1

4 Semantics

I start with describing the internal structure of the modal base in imperatives (4.1) and the relevant ontology. In section 4.2, I present the quantifier resolution for imperatives, thereby specifying the quantifier placeholder Q and the *Selection* partition-function.

4.1 The modal base: the ontology

I adopt elements[14] of the lattice theory proposed by Link (1983) for plurals. Link (1983) argued that non-explicitly quantified noun phrases (plurals) can be represented as lattices (having a measurable internal structure), and provided an alternative theory for the treatment of the so-called ambiguity of plurals. Inspired by Link's account[15], I argue that non-explicitly quantified imperatives can be analyzed as lattices, generating a partition of the underspecified domain (the modal base). Therefore, for the purposes of partition, I assume that a modal base has an internal structure. A modal base is a set of worlds such as $\{w_1, w_2, w_3...w_n\}$ (see Kratzer 1977, 1981, 1991). These worlds, I argue, can be represented as lattices[16] (following Link[17] 1983 for plurals). Lattice Λ is a partially ordered set $(\Lambda, \leq)$ with a binary relation of its elements (possible worlds). A lattice is a discrete additive subgroup of $\cap f(w)$; for example, a subset $\Lambda \subseteq \cap f(w)$. Λ is a subgroup because it is closed under addition; the sum of any two elements (possible worlds) of the set also belongs to the set $w_1, w_2 \in \cap f(w) \Rightarrow w_1 \oplus w_2 \in \cap f(w)$. The *closed under addition* property of the lattice means that, as we consider (select) more worlds from the modal base in order to determine the quantificational domain, these worlds continue to be elements of the set of the modal base (i.e., they continue to be relevant). Λ is discrete because any two distinct points of the lattice $w_1 \neq w_2 \in \Lambda$ constitute separate entities. Therefore, a lattice Λ in $\cap f(w)$ represents the following:

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(34) $\Lambda = \left\{ \sum_{i=1}^{n} g_i w_i \,\middle|\, g_i \in Selection_{D_{(N)}}^{g(i)} \right\}$

$\{w_1, w_2...w_n\}$ are elements of $\cap f(w)$, i is the indexed variable representing each successive term (possible worlds) in the series, 1 is the lower bound of summation, and n is the upper bound of summation. Different elements (possible worlds) of $\cap f(w)$ can generate the same lattice. However, the value[18] of the ordering source g_i, which acts as the determinant of the worlds w_i, is uniquely determined by the individual $\mathcal{I}$ and is denoted by $\mathcal{I}(\Lambda)$. An individual affects the selection of the quantificational domain and the ordering of the worlds via a type of ordering source (*strict*, *weak*, *invariant*). Thus, an underquantified domain is partitioned according to a lattice Λ determined by $\mathcal{I}$'s ordering source in the $Selection_{D_{(N)}}^{g(i)}$. The star sign * generates all individual sums of worlds. If w

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[14] The ontology I present here contains both elements proposed by Link (1983) and elements of the lattice theory that Link did not include in his paper.

[15] I do not argue that plurals and imperatives are alike. However, they have certain relevant notions and underlying concepts in common, such as the lack of explicit quantification of a set.

[16] In few words, I retain the modal theory as argued by Kratzer and enrich it with a lattice structure. A lattice $(\Lambda, \leq)$ is a binary relation that allows us to model concepts like *is greater than* or *is equal to* by employing an individual's ordering source g_i via a *Selection* function.

[17] Link's (1983) ontology is used to represent the internal structure missing from the modal semantics and to help us perform the partition of the underspecified modal base of imperatives.

[18] *Value* should be understood as the special type of ordering source that will apply to worlds in $\cap f(w)$.

represents a world, then *w is a complete join-semilattice that represents all possible sums of worlds in the modal base. For example:
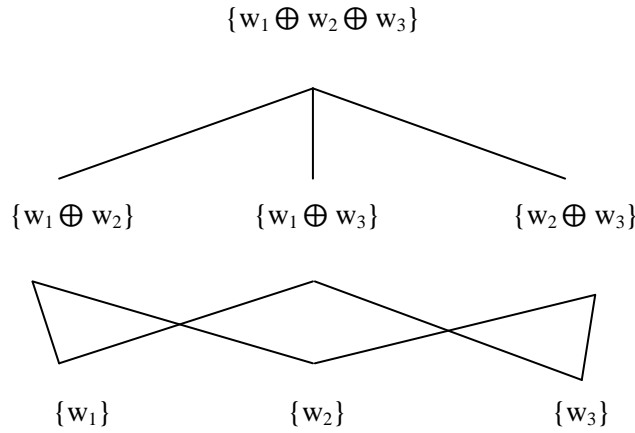

Figure 1: Complete join-semilattice in the modal base

The star sign * creates individual sums of worlds w in the modal base $\cap f(w)$. The property denoted by * allows the introduction of an algebraic structure on the quantificational domain (the modal base) of imperatives and captures both logic and set operations. The sign σ is the sum operator, and σw represents the sum of worlds that are *w. σ*w represents the proper[19] sum of w. The sum σw includes individual worlds such as w_1 and w_2. $\prod$ is the product sign that conveys an element-part relation and represents the partition of $\cap f(w)$. D_Q is the non-partitioned quantificational domain. D_{UQ} is the universal quantificational domain, D_{EQ} is the existential quantificational domain, and D_{INQ} is the universal quantificational domain in which the ordering expresses an equivalence (symmetric) relation among worlds. D_Q is endowed with a join-operator $\sqcup_D$ that makes D_Q a complete and not necessarily atomic join-semilattice.

4.2 Quantificational resolution

In this section, I implement the quantifier resolution process and show how the quantifier variability is derived, employing the partition-function *Selection*. I consider a modal base $\cap f(w)$ as the set of all relevant accessible worlds; this is the non-homogenous quantificational domain D_Q. D_Q is the set of worlds in the modal base $\cap f(w)$ from which worlds are selected by the partition-function $Selection_{D_{(N)}}^{g(i)}$. The *Selection* maps an individual's ordering source $\leq g_i$ (see section 2.3) and a degree of necessity D_N (see section 3.1) to propositions of a modal base. In few words, after the evaluations (preferences and degree of preference), *Selection* the partition function is applied to rank the alternatives or to select a subset of the most appropriate (according to an individual) alternatives. The definition in (32) represents a non-partitioned quantificational domain D_Q before the preferences (the bias toward a set of worlds) of an individual are mapped. $Selection_{D_{(N)}}^{g(i)}$ the partition-function

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[19] The term *proper* denotes the presupposition that there is at least one world.

does exactly that: it maps the preferences of an individual and determines the type of quantifier for an imperative:

(35)   **Underquantified Domain**

    (In ALL, SOME, IND) Go home!

    $D_Q = \sigma^* w \wedge \exists D_Q \, [[D_Q \prod \cap f(w) \wedge (Selection_{D_{(F)}}^{g(i)} \, (D_Q)] \wedge Q \, (\cap f(w), D_Q)]$

                                  where Q = quantifier placeholder

A quantificational domain D_Q is underquantified because the preferences of the speaker have not been mapped yet (35). Partition determines the quantificational domain and provides a value to the placeholder Q. The partition of the modal base of imperatives is formally defined as follows:

(36)   **Partition of a Modal Base $\cap f(w)$**

    A partition $\prod$ of a modal base $\cap f(w)$ is a division of worlds in $\cap f(w)$ as a union of non-overlapping, non-empty, mutually and collectively exhaustive subsets. The subsets of worlds in $\cap f(w)$ is the quantificational domain of imperatives.

$\prod$ expresses an element-part relation and represents the partition of $\cap f(w)$. If all accessible worlds are selected, the partition yields the universal quantificational domain D_{UQ} and the placeholder Q is filled by the universal quantifier $\forall$, ranging over the whole set of worlds in the modal base. If a subset of the accessible worlds is selected, the partition yields the existential quantificational domain D_{EQ} and the placeholder Q is filled by the existential quantifier $\exists$, ranging over a subset of worlds in the modal base. The three types of partition, I assume, of the quantificational domain of imperatives, associated with *universal*, *existential*, and *invariant* quantification are formally defined as follows:

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(37)   a.   **D_{UQ}:** Iff $D_Q \subseteq \cap f(w)$ and $Selection_{D_{(7\,or\,9)}}^{g\,strict}$ then $\forall(\cap f(w), D_Q)$

     b.   **D_{EQ}:** Iff $D_Q \subset \cap f(w)$ and $Selection_{D_{(3\,or\,5)}}^{g\,weak}$ then $\exists \, (\cap f(w), D_Q)$

     c.   **D_{INQ}:** Iff $D_Q \subseteq \cap f(w)$ and $Selection_{D_{(1)}}^{g\,invariant}$ then $\forall(\cap f(w), D_Q)$

An existential quantification is derived when an individual, according to his/her goals, restricts the quantificational domain to SOME relevant possible worlds, then the imperative is translated as an existential quantifier. For example, consider *pighene spiti* 'Go home' when this imperative means that you take a turn in SOME worlds. This is interpreted as, "It is true that there is at least one possible world where *pighene spiti* 'Go home' is true." The imperative in this case is analyzed (38) as:

(38)   Imperatives with **Existential Quantifier**

    Pighene   spiti.
    Go-**2sg.IMP**   home.
    Go home.
    $D_{EQ} = \sigma^*$ Go home$(w) \wedge \exists D_Q \, [[D_Q \prod \cap f(w) \wedge (Selection_{D_{(3\,or\,5)}}^{g\,weak} \, (D_Q)] \wedge (D_Q \subset \cap f(w))]$

(38) states that the partition $\prod$, based on the $Selection^{g_{weak}}_{D_{(3 or 5)}}$, yields $D_Q \subset \cap f(w)$, then D_Q is existentially quantified. If the partition picks out only a subset of the accessible worlds in the modal base, then the quantifier placeholder Q has to be filled with an existential quantifier.

Consider again *pighene spiti* 'Go home' when uttered by some sort of authority. This should be interpreted as, "It is true that *pighene spiti* 'Go home' is true in all deontically possible worlds." The imperative in this case expresses a norm or an order that should be followed strictly based on the preferences of the authority:

(39)   Imperatives with **Universal Quantifier**

Pighene   spiti.
Go-**2sg.IMP**   home.
Go home.
$D_{UQ} = \sigma^*$Go home$(w) \wedge \exists D_Q [[D_Q \prod \cap f(w) \wedge (Selection^{g_{strict}}_{D_{(F)}} (D_Q)] \wedge (D_Q \subseteq \cap f(w))]$

(39) states that the partition $\prod$, based on the $Selection^{g_{strict}}_{D_{(F)}}$, yields $D_Q \subseteq \cap f(w)$, then D_Q is universally quantified. The partition picks out the complete set of the accessible worlds in the modal base, and the quantifier placeholder Q has to be filled by a universal quantifier.

An individual expresses indifference to the actions of the addressee in all worlds in the modal base. An indifference (invariant) reading of an imperative is a case that expresses an equivalence relation between ordered propositions. The universal quantifier in a quantification with an invariant ordering means that the quantifier is invariant to the validity of the representation that it governs. In other words, an imperative with an invariant quantification comes out true under all interpretations of the imperative; whatever the addressee chooses, the imperative proposition is satisfied. The crucial difference between this and (39) is the *Selection*. In the case of an imperative interpreted as an order, the individual requires the actions to be taken by the addressee in a strict order according to the individual's preferences. In contrast, the *Selection* in (40) contains an invariant ordering source, which means that the individual does not care how the addressee chooses to act:

(40)   **Imperatives with an Invariant Ordering**

Pighene   spiti.
Go-**2sg.IMP**   home.
Go home.
$D_{INQ} = \sigma^*$Go home$(w) \wedge \exists D_Q [[D_Q \prod \cap f(w) \wedge (Selection^{g_{invariant}}_{D_{(N)}} (D_Q)] \wedge (D_Q \subseteq \cap f(w))]$

(40) states that the partition $\prod$, based on the $Selection^{g_{invariant}}_{D_{(0)}}$, yields $D_Q \subseteq \cap f(w)$, then D_Q is universally quantified with an invariant ordering source. The partition picks out the complete set of the accessible worlds in the modal base, and the quantifier placeholder Q has to be filled with a universal quantifier.

The semantic contribution of the imperative operator is the following (41):

(41)   a. Nonveridicality of the imperative

$[\![IMP(p)]\!]^{c,f,w} = 1$ iff $\lambda f \lambda p \lambda w. (\mathbf{Q}w' \in \cap f(w)) [w' \in p]$

b. $Selection_{D_{(N)}}^{g(i)}$

c. Non-homogeneity of modal base in imperatives:

(i) A modal base $f(w)$ relative to an individual is nonveridical with respect to a   proposition p iff $f(w)$ is partitioned into p and ¬ p worlds.
(ii) A modal base $f(w)$ features competing and non-equivalent possible worlds.

d. Ordering source in imperatives (creating the bias based on preferences)

(i) g_{strict} (w) = !∀w (Aw > Bw)
(ii) g_{weak}(w) = !∃w (Aw ≥ Bw)
(iii) $g_{invariant}$ (w) = !∀w (Aw ≡ Bw)

e. δ_{nec}: A → $S_{g_{(i)}}^c$ where   c = contextual normative standard
                                                    $g_{(i)}$ = individual's ordering source
                                                    A = action prescribed

5.   Comparison with related approaches

I briefly consider some representative accounts relating to the proposal at hand. An important distinguishing feature of my account is its concern with establishing more precisely the conversational background and introducing degrees of necessity (based on preferences) so that we can explain the quantifier variability in imperatives.

5.1   Han (1998, 1999a,b,c, 2001)

Han (1998) argues in detail that imperatives is an operator which is a set of morphosyntactic features, including a feature that encodes directive force, and another feature that encodes irrealis modality (unrealized interpretation). Imperatives, according to Han (1999a,b,c), are instructions updating the plan set of a hearer and have the direction force of the speech act they perform (order, wish, permission, etcetera). Han's approach and mine agree in treating imperatives as modal operators and as having a conversational background (modal base, ordering source) as parameters of their interpretation.

An essential conceptual difference between Han's approach and mine, though, is that in her account imperatives are treated on a par with deontic modals. Han (1999c) argues that imperatives are similar to the deontic modality expressed by modal verbs like *must* and *may*, and offers a formal analysis of imperatives based on Kratzer's (1986, 1991) semantics of modality and conditionals. Like Han (1999c), Kaufmann (2012) argues that imperatives denote modalized propositions similar to modalized declaratives, and the only difference is that, while modalized declaratives have both descriptive and performative use, imperatives have only performative use.

Kaufmann (2012) further argues that a presuppositional component restricts the operators use to contexts and performative effects. In Han's (1999c) and Kaufmann's (2012) approaches a parallel between imperatives and deontic modal verbs is supported, for example:

(42)   Sit! ≈ You must/should sit!

(42) is based on the assumption that imperatives can be paraphrased as a performative *should φ* (Kaufmann 2011: 60, Hypothesis 2.2). Intuitive right as it may seem, this assumption sets the incorrect premises in the analysis of imperatives for two reasons. First, imperatives and modal verbs do not denote the same semantic object (Staraki 2014). Imperatives unlike performative modal verbs have the assertoric force to present a proposition as true (for the assertoric force Frege 1892: 150, 1897: 140; Kissine 2008; for the assertoric force of imperatives Kaufmann 2012; Staraki 2013, 2014, 2017), For example, in Greek, while imperatives assert something as true, modal propositions evaluate the truth:

(42)   a. Sevasou.2sg.IMP   ta   dikaiomata   ton   alon

           Respect   the   rights   of the   others!

        b. # Sevasou ta dikaiomata ton allon!   Ala   min   to kanis.

           # Respect the rights of the others!   But   don't   do it.

In example, with the imperative (42a) the speaker asserts the truth of a necessity, disallowing inconsistencies on the part of a speaker, thus becoming infelicitous, if negated (42b). For putting an imperative forward as true, for example (00), is not the predication of 'true' (Staraki 2014). On the contrary, with a modal verb a speaker assesses the degree of the truth of a necessity or permission. In Greek, a deontic modal expression can be negated, without resulting into a contradiction (see Staraki 2013, 2014, 2017), while in English it is acceptable by some speakers, for example:

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(43)   Context: You accidentally killed your friend's cat.

        Prepi   na   zitisis   sighnomi   apo   to   filo   su,   ala min to kanis!
        Must   SUBJ   ask   sorry   from   the   friend   yours   but not it do
        ? # You must apologize to your friend, but don't do it.

Second, the fact that imperatives express similar meaning to that of modal verbs does not mean that imperatives are equivalent to modalized declaratives (Kaufmann 2012). For instance, an imperative does not mean that there is in fact a norm that licensed it, for example:

(44)   a. Pighene   sto   dhiaolo   ≠ Prepi na pas sto dhiaolo

           go.2sg.IMP   to-the   hell   *curse*

           Go to hell   ≠ You must/might go to hell

        b. Dhiaskedhase   sto   parti   ≠ Prepi/bori na dhiaskedhasis sto parti

           Have fun.2sg.IMP   to-the   parti   *wish*

           Have fun at the party   ≠ You must/might have fun at the party

        c. Endaksi!   Fighe,   tote!   ≠ Prepi/bori na fighis tote

           OK   go.2sg.IMP   then   *concessive*

OK, go, then!   ≠ You must/might have at the party

One objection, though, is that examples in (44) do not seem to assert the truth of a proposition. What truth do we assert when, for instance, we swear? This seems to be a reasonable question. However, recall that in a decision-making model, imperatives involve the evaluation of various alternatives available. Thus, even in the case of *Go to hell*, the imperative constitutes a necessary or possible option one considers as the best alternative in a situation, i.e., instead of well-wishing or staying indifferent. In this respect, (44) is asserted and not predicated as true.

As for the semantics of imperatives, Han (1998, 1999c) assumes that imperatives are by default universal. We have seen, however, that treating imperatives as default universal quantifiers cannot be generalized, as shown in Greek imperatives. The quantifier variability we examined in the examples (9) suggests that imperatives in Greek are sensitive, as a modal operator, to the range (number of worlds) of the quantificational domain in which something is prescribed. Specifically, (8a) is prescribed in ALL worlds and can be formally represented by a universal quantifier, while (8b) is prescribed in SOME worlds and can be represented by an existential quantifier. Moreover, indifference-imperatives indicate that a default universal quantifier cannot efficiently capture their semantic contribution implying an equivalence relation on preferences (section 2.4). Thus, imperatives are nonveridical operators as they feature a non-homogenous modal base and an ordering source relative to an individual.

Turning now more specifically to what constitutes a modal base in imperatives, Han (1999c) proposes that their modal interpretation is based on a totally realistic modal base $f(w)$ which contains all the facts known to the speaker in w. A totally realistic modal base is tantamount to assign to every possible world a set of propositions which are true in that world. It is a universal quantification in reverse. It is not clear, then, how a totally realistic modal base could deal with cases (see section 2.2) where the content of a modal base might be absent or unknown to an individual as illustrated and explained in the example (9).

The ordering source $g(w)$ is the set of obligations or permissions issued by the speaker (Han 1999c). This assumption is problematic in the face of the driver example in (6) in section 2.3. In cases like (6), an ordering source, as argued by Han (1999c), is incompatible with the role of imperatives in understanding how individuals decide what to do and how individuals guide actions. Thus, the assumption that imperatives feature an ordering source that contains obligation or permissions is not warranted, and this undermines Han's account of imperatives. This problem does not arise for the account offered here, because I consider the ordering source to signal an individual's preference relation over a set of alternative propositions (see also Starr 2012) and that these preferences can be precisely represented by introducing degrees of necessity (section 2.3). In fact, an agent-relative ordering source can effectively represent and predict the case of indifference-imperatives (section 2.4) as an equivalence on actions.

5.2   Kaufmann (2012)

Kaufmann's work on interpreting imperatives has served as an inspiration to the approach I have developed here. A fundamental insight I take over from her work is the distinction between the contribution of clause type (imperative) and performativity (order, advice, permission, etcetera). A major conceptual difference, however, is that Kaufmann's account relies crucially on the presuppositional component, while my account divides the analytical burden between semantics and the context of use.

Kaufmann assimilates the modalized propositions with imperatives (see section 5.1 for counterarguments), arguing that imperatives are a particular type of sentence-level form type

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associated with the prototypical function ORDER. Kaufmann (2012) argues that imperatives express propositions and hence, have truth values, however, they come with an additional presuppositional meaning. Kaufmann (2012: 4.2.4), then, argues that the semantic contribution of the imperative operator amounts to the following three presuppositional ingredients: (a) the epistemic authority condition, (b) the epistemic uncertainty, and (c) the ordering source restriction. The first presupposition is justified in the epistemically privileged position of an authority. The second presupposition pertains to the intuition that with imperatives we cannot allow the veridical inference (commitment) to the truth of a proposition. The third presupposition concerns the issue of whether there is a salient decision problem in the context or not. Although, non explicitly These presuppositions constitute a set of constraints on the parameters of interpretation (conversational background and context). The set of presuppositions for imperatives, Kaufmann (2012) argues, should be met, if an imperative is to be felicitous. I think these presuppositions are generally correct but misleading in that, as a rule, they make general features of communication into particular semantic features of imperatives.

Whereas, therefore, these distinctions have influenced my account of analyzing the quantifier variability in imperatives, the approach I propose departs from them. Instead of considering a set of presuppositions as part of the semantic contribution of the imperative operator, I rely on the notion of a decision-making context as presented in section 3.2, which allows us to capture cases where the property of authority (via (29) *choice allocation*) shifts (or not) from participant to another participant, as in the filming scenario in example (9), the allergic reaction example in (13), the lieutenant-soldier example in (14), and the curse example in (41). Instead of epistemic uncertainty, I assume that imperatives are nonveridical operators that do not allow the veridical inference to the truth of p like any other modal (see Giannakidou 1998; Staraki 2013, 2017). Instead of Kaufmann's ordering source restriction, I have argued in section 3.2 , and I repeat here, that the decision-making context is the context where an individual identifies and chooses among alternatives based on the values of his/her preferences as a decision maker (authority). An imperative, can be considered as a solution, yet, as Kaufmann (2012) also argues, it does not constitute an answer to a problem, at least not always. When, thus, I argue that imperatives are borne within a decision-making context, I mean that imperatives pertain to a choice among alternatives. Moreover, I have proposed that the ordering source is personal, relating to an individual's preferences and their respective degree of necessity in order to capture that imperatives convey necessity with respect to some individual.

5.3   Grosz (2014)

The approach I discuss in this section was first proposed as a treatment of ambiguous epistemic modals in St'át'imcets (Lillooet Salish) by Rullmann et al. (2008), and later adopted as the appropriate theoretical framework for deontic modal particles and imperatives in Grosz (2014). Although Grosz (2014) does not intend to give a specific treatment for imperatives, he nevertheless mentions that imperatives contain a covert modal operator, similarly to Han (1998, 2001) and Kaufmann (2012). This covert modal is by default universal and combines with a modal choice function *f*, which selects a subset of the set of accessible worlds to be quantified over by the covert modal operator. If the modal choice function selects the complete set of accessible worlds (identity function), it returns a necessity interpretation; otherwise, if it selects a proper subset of the accessible worlds, a possibility interpretation rises. Thus, the variability of imperatives' quantificational force is the result of an indefinite modal interpretation through a choice function (for choice functions see Reinhart 1997 and subsequent literature).

I would like to point to a range of conceptual problems that this approach encounters, which are, in my opinion, overcome by the analysis offered here. First, the problem of renaming a solution: when

Grosz (2014) assimilates imperatives into indefinites following Rullmann et al. (2008), he assumes that imperatives, like indefinites, have a non-specific, generic reading. In other words, the indefinite covert modal, by default universal, covers a generic set of possible worlds (like plural indefinites). Thus, the universal quantifier Grosz (2014) postulates is in fact a silent unselective generic quantifier GEN, and not a proper universal quantifier as he suggests. Genericity overlaps ambiguity. Ambiguity, though, violates one of Grice's maxims: "*Senses are not to be multiplied beyond necessity*." In this paper, I argue that imperatives are not ambiguous, but underquantified. I propose an underquantified semantic representation that captures the semantic information contained in an utterance context via its components. In this approach, a conversational participant P_1 computes the semantic information that the utterance context contributes to the contextual knowledge of a conversational participant P_2.

Another problematic issue in Grosz (2014) is this. If the covert modal is always a proper universal quantifier (not GEN), this means that its modal base is always deontic. In fact, this is what Rullmann et al. (2008) propose when modeling modal particles as indefinites, and what Grosz (2014) implicitly adopts, especially when he remains silent on the properties of that specific interpretational parameter. Even if we want to accept that a modal choice function solves the quantifier variability problem in imperatives, Grosz (2014) does not mention anything about the various readings. Certainly, a modal choice function f seems to capture the intuition of restricting the accessible worlds over which an operator will quantify. However intuitively right this may seem, it suffers from a major drawback in terms of the description and analysis of the quantifier variability in imperatives. Grosz (2014) does not mention what the determining parameters are; hence, a modal choice function f goes from the identity function (universal quantification, necessity reading) to a proper subset (existential quantification, possibility reading) of the accessible worlds. Since, as Grosz (2014) states, he follows Rullmann et al.'s (2008) proposal, we can safely assume that he also adopts the position that a modal base is contextually fixed and that the ordering source (absent in Grosz 2014), replaced now by a modal choice function f, simply does not exist as a parameter of interpretation. The conceptual similarity between a modal choice function and an ordering source is obvious. One last thing to add here is Portner's (2009) criticism of Rullmann et al. (2008) in comparison with Kratzer's theory: "It would be possible for them to have the same semantic analysis simply by adopting Kratzer's theory and employing the ordering source to identify the relevant subset of the set of worlds compatible with the modal base. Since both a choice function and an ordering source are contextually determined, there is no obvious pragmatic difference between the two approaches." Hence, Grosz (2014) fails to correctly capture the problem of imperatives, modality in conjunction with intentionality, and the relevant parameters. What I focus on in this paper is a novel take on the ordering source and how this turns into an even more effective semantic tool not only by ordering, but also by selecting the relevant possible worlds for quantification. The role of the individual in this process is essential.

6.   Conclusion

The main contributions of this paper are three. First, I showed that in Greek at least, imperatives are not ambiguous, but feature a non-homogenous modal base and an ordering source based on the preferences of an individual. Imperatives are about an individual's preferences on alternative states - an observation in line with Starr (2012), expressing the result of a comparison among preferable states. Second, I argued that the meaning of imperatives is richer than mere ORDER (SHOULD underlying logical form; see Rivero & Terzi 1995, Rizzi 1997, Kaufmann 2012) in containing an underquantified quantifier-placeholder. This by itself challenges those analyses in which imperatives are universal quantifiers by default. The quantifier placeholder of imperatives gets its interpretation based on the gradable preferences of an individual. The *Selection* partition-function represents the effect of an individual's preferences in determining the quantificational force of imperatives. In other

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words, *Selection* outputs the quantificational force of an imperative by partitioning the modal base based on the individual's ranked preferences. Third, in this account *indifference* was not an oddball in the analysis of imperatives but a kind (subtype) of the ordering source denoting preference equivalence on ordered actions. *Indifference* represents an ordering relation in which the corresponding outcomes of the permutations of the required actions are equally good or invariant according to the individual. The proposed formal analysis, then, implies a meaning of imperatives richer than mere $[\![IMP\,(p)!]\!]^c = [\![You\ have\ to/should\ do\,(p)!]\!]^c$, and by capitalizing on the underquantification and degrees of necessity (ranked preferences) in imperatives, the analysis enables a principled explanation of the quantifier variability without positing ambiguity or default semantic properties.

However, there are a few issues that I have not discussed. First, I have not discussed the possible effectiveness of the proposed account in relation to imperatives under connectives, though I assume that the analysis I agued would allow such an extension. Second, I have not discussed conditional imperatives and their ramifications to the account I offered. All I hope, though, is that I have argued convincingly about a new analysis of quantificational variability in imperatives to merit investigating these questions further.

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