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***Indirect request processing, sentence types and illocutionary forces***

**Abstract**

According to the literalist view, morpho-syntactic sentence types are associated directly at the semantic level with an illocutionary force. By contrast, according to contextualist theories illocutionary force emerges from contexts of use. To date, however, there is little experimental evidence relevant to this debate. We propose two experimental, eye-tracking studies to test two predictions of the literalist view: First, unlike for the highly conventionalised *Can you?*, whenever a non-conventionalised construction such as *Is it possible to?* is interpreted as a request, its question interpretation should also be activated. Second, the directive interpretation of modal *You must* declaratives should activate the statement interpretation and, therefore, be costlier than that of imperatives. In Study 1, we show, first, that, in contexts where both the non-directive and directive interpretation of indirect requests are available, the latter are processed as fast as the corresponding imperatives, independently of the conventionalisation degree of the indirect request at hand. Second, eye fixation data show that the comprehension of indirect requests does not activate their direct meaning. Study 2 shows that modal *You must* declaratives are understood as imperatives and do not activate a statement interpretation; this supports the view that obligation modal requests are as direct as imperative requests.

**1 Introduction**

According to what can be called the ‘literalist’ conception of speech acts, the semantics of the (major) morpho-syntactic sentence types — imperative, declarative and interrogative — determines the major illocutionary force types — directive, assertive and question (e.g., Sadock & Zwicky, 1985). This conception is at the core of traditional speech act theory (Searle, 1969, 1975b; Vanderveken, 1990), and has enormous impact on semantic-pragmatic theorising. Speech act literalism threads, under one guise or another, several prominent contemporary theories of sentential mood (see Kissine, 2012, 2013; Recanati, 2013 for detailed discussions). For instance, authors such as Han (2000), Barker (2004), Boisvert & Ludwig (2006) and Isac (2015) all posit that the interpretation of the imperative sentence (1) as a request, viz., its directive illocutionary force, is determined by the meaning of the imperative mood (for a detailed overview, see Jary & Kissine, 2014).

(1) Close the window.

Of course, while literalist theories bind directive force with the imperative mood, they also acknowledge that directive speech acts may be performed with a non-imperative sentence, as in (2)-(4).

(2) Can you close the window?

(3) Is it possible to close the window?

(4) It’s cold in here.

The simplest (literalist) analysis is that such requests are indirect, in that they are performed by means of and in addition to the direct speech act encoded by the sentence type (Searle, 1975a). It is plausible, indeed, that the directive force of (4) (inferentially) follows from its being understood as an assertion that it is cold. However, interpreting (2) as a request is probably not mediated by its being understood as a question about the addressee's ability to open the door. For this reason, since the early days of speech act theory, constructions such as (2) were treated as conventionalised ways to perform requests (Bach, 1998; Morgan, 1978; Searle, 1975a). Accordingly, a request such as (2) involves a convention concerning 'the wording of indirect speech acts'; as a linguistic construction directly associated with the directive force, it thus instantiates a 'convention of form' (Clark, 1979).

To insist, according to the literalist view the direct illocutionary force of an utterance is determined by the semantics of its sentence type. Consequently, conventionalisation of an indirect request should result in the construction at hand acquiring the directive illocutionary force as part of (one of) its encoded meaning(s). This position has been explicitly endorsed by Sadock (1974) and more recently by Stefanowitsch (2003). Another consequence of literalism, then, is that any request that is non-imperative and non-conventionalised entails the derivation of a primary illocutionary force, determined by the utterance sentence type. For instance, the directive interpretation of the conventionalised (2) should be as direct as that of (1). But the literalist is also compelled to posit that, by contrast, any directive interpretation of the non-conventionalised (3) should necessarily be mediated by the derivation of the force of assertion.<sup>1</sup> That is, even though under their interrogative interpretation (2) and (3) are semantically very similar, since the latter is not a conventionalised indirect request, its directive interpretation should necessarily involve the derivation of the interrogative meaning.

An alternative to literalism consists in defining the encoded meaning of sentence types without invoking illocutionary force, but using semantic features that would predict the kind of speech act these sentences are prototypically used to perform (Kissine, 2012, 2013; Recanati, 2013). Restricting the discussion to the semantics of imperative sentences, one such feature that has often been invoked (under one form or another) to explain their association with directive force is potentiality, viz., the fact that the content is neither ruled in nor ruled out by the common ground (Davies, 1986; Jary & Kissine, 2016a, 2016b; Kaufmann, 2012, pp. 155-157; Kissine, 2013; Wilson & Sperber, 1988). Another important feature is that imperative sentences are inherently addressee-oriented, thus not resulting in a predication of a property of a subject (Mastop, 2005; Zanuttini, 2008; Zanuttini, Pak, & Portner, 2012).

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<sup>1</sup> Unless, of course, interrogatives such as (3) are also conventionalised indirect requests. Below we provide evidence that this, arguably counter-intuitive position, lacks empirical support.

Of course, the way these semantic features are implemented, as well as how they are said to conspire with the context in order to give rise to a directive reading vary greatly author from author. For instance, Kaufmann (2012) assigns a declarative semantics to the imperative mood, analysing it as a necessity modal, whose use in directive speech acts is explained through presupposition mechanisms that result in an unchallengeable update of the common ground. In a very different framework, Ruytenbeek (2017, chap. 1-2) models both imperative sentences and directive speech acts in terms of force dynamics (in the sense of Talmy, 2000). In his view, the former correspond to a pattern, represented on the left side of Figure 1, where only the addressee is represented as an agonist of a force interaction, whereas the latter, represented on the right side of Figure 1, include the speaker as the antagonist exerting a force on the addressee, the outcome of this force interaction left undetermined.

Our aim here is obviously not to review and compare different accounts of imperative mood (see, for instance, Jary & Kissine, 2014). Rather, we are interested in the different predictions non-literalist theories entail relative to the processing of non-imperative requests. Since they do not directly include illocutionary forces within sentence type semantics, accounts of this kind are open to the possibility that non-imperative sentences may, on certain occasions, receive directive force without any other force being activated. More precisely, unlike in literalist theories, a non-imperative sentence may receive only the directive illocutionary force without the directive interpretation being attached to its form by a process of conventionalisation. That is, even though the interrogative in (3) is not a construction that can be said to be conventionally associated with directive force, it may nevertheless be interpreted as a request without also being interpreted as a question, just as the conventionalised (2). This is all the more so, as both (2) and (3) may be said to relate to directive force via the same 'convention of means': both explicitly evoke the addressee's ability to carry out the requested action (see Clark, 1979, pp. 432-433). That is, while only (2) is a surface construction that bears strong idiomatic association with directive force, both (2) and (3) instantiate the same kind of strategy, by exploiting the preparatory conditions required for the successful performance of directive speech acts (for a discussion, see Ruytenbeek 2017, chap. 4).

To put it in a slightly different way, in a non-literalist theory of illocutionary force processing, a request can be *indirect*, in the sense of not being of an (imperative) sentence type prototypically associated with directive force, without necessarily being *secondary*, i.e., without being associated with the activation of a non-directive illocutionary force (Kissine, 2013, pp. 111-122; Recanati, 1987, pp. 165-167). By contrast, in literalist theories any non-conventional indirect request is necessarily secondary. At this stage, then, it becomes clear that these two families of theories make diametrically opposite predictions as to the processing of indirect requests. For a non-literalist, an interrogative sentence, such as (3), may

be interpreted as a request without the force of questioning be activated. By contrast, literalist theories ought to predict that whenever a non-conventionalised interrogative construction, such as (3), is interpreted as request, the interpretation as a question is also activated.

Non-literalist theories entail another clear empirical prediction. Since the association between the imperative sentence type and directive speech acts is explained by the semantic (non-illocutionary) features of the former, it follows that any other sentence with a similar semantics should be as readily and directly assigned directive force as imperatives. As just mentioned, Ruytenbeek (2017) analyses imperatives as expressing a force interaction involving the addressee. Interestingly, in cognitive linguistic frameworks, exactly the same analysis could be applied to deontic modals such as (5) (e.g., Sweetser, 1990, pp. 52-54).

(5) You must close the window.

Under such a force-dynamic analysis, it makes sense to assume that — just as is the case with imperatives — when *You must VP* is used as a directive, the force exertion pattern is specified with the speaker (S) as the source of the force exerted on the addressee (Fig. 1).

*Insert Figure 1 about here*

**Figure 1** Ruytenbeek's (2017) account. The left side represents the force-dynamic pattern associated with the semantics of imperative sentences; the right side represents the specification of the source of the force exertion when the imperative or a deontic modal is interpreted as a directive speech act.

Accordingly, directives performed with *You must VP* forms should be as direct as the imperative ones.

Interestingly, the same prediction follows from Kaufmann's (2012) semantics of imperatives as a necessity modal. She explicitly assumes that imperatives have exactly the same semantics as deontic modals in cases such as (5), predicting that their favoured interpretation is a directive one (a claim initially made by Ninan, 2005).

The mechanism underlying the processing of indirect requests thus constitutes another empirical test for the validity of non-literalist conceptions of the interface between the pragmatics of illocutionary forces and the semantics of sentence types. To repeat, these theories predict, first, that even in non-conventionalised indirect requests the directive force may be primary, and, second, that deontic modals are as closely associated with directive force as imperatives.

Now, the debate concerning whether literalist theories make plausible predictions as to the processing of IRs is not new. However, to the best of our knowledge no clear-cut empirical evidence, similar to the two predictions just mentioned, has ever been adduced to solve this, arguably 'old' debate (see Ruytenbeek, in press; Terkourafi, 2009 for detailed overviews of the existing experimental literature on indirect speech acts). Empirical research carried out in the late seventies show that people sometimes answer yes to conventionalised

indirect requests for information, such as (6), which suggests that the interrogative meaning is processed at some level (Munro, 1979; Clark, 1979; see also Abbeduto et al., 1989).

(6) Could you tell me the time?

However, it is unclear whether in such cases the request for information is genuinely secondary or whether answering *yes* results from the activation of a formulaic question-answer pair (see Schegloff, 1988; Gibbs & Mueller, 1988). Furthermore, studies carried out by Gibbs (1979; 1983) provide evidence that understanding expressions such as (7)-(8) as indirect requests does not take longer than understanding the same expressions as direct questions. In fact, in a context that primes directive interpretations, the direct question uses of these expressions even took longer than their indirect uses.

(7) Must you close the window? [meaning: Do not close the window]

(8) Can't you be friendly? [meaning: Please be friendly to other people]

It thus plausible that conventionalised indirect requests may be understood as fast as the direct question uses of the same expressions, which has led researchers to conclude that they do not entail extra processing costs relative to their direct counterparts (see also Shapiro and Murphy, 1993). Note, however, that this conclusion is limited to contexts that prime the indirect force, which, arguably, falls short from actually comparing the two readings. In addition, to genuinely show that no inherent cost is associated with indirect requests, they should be compared to imperatives. Finally, these studies have used highly conventionalised indirect requests, so that nothing is known yet as to the directive interpretation of non-conventionalised interrogatives, such as (3), and the directive interpretation of deontic modals, such as in (5).

In sum, what is challenged by previous research on indirect speech act is that the 'so-called' Standard Pragmatic Model (SPM), according to which the 'literal' interpretation of an IR occurs systematically prior to the IR interpretation, does not apply to conventionalised IRs. This conclusion is certainly plausible, but it is not terribly controversial. As discussed above, literalism can accommodate conventionalised IRs by posing a 'convention of form'. The genuine issue, however, is whether the processing of any IR results in the activation of the so-called 'literal' meaning of the utterance. In what follows, we report two experimental studies that address these questions.

## **2 Study 1: Conventionalised vs. non-conventionalised indirect requests**

The aim of our first study is to determine whether a non-conventionalised request can be both indirect and primary. If this is the case, the directive interpretation of both conventionalised and non-conventionalised indirect requests should not differ from that of imperative requests. Importantly, imperative and indirect requests should be compared in a context that allows both direct and indirect interpretations of the latter, in order to make sure that what is measured are the processing correlates of the choice of an indirect illocutionary force and not that of a directive interpretation forced by the context. In particular, when designing our experiments, we ensured that half of the 'IR expressions', such as *Can you VP* and *Is it possible*

to VP?, can be appropriately interpreted both as yes-no questions and as IRs. In that respect, our design is very different from that of the early experimental studies by Munro (1979) and Gibbs' (1979, 1983), which compared the comprehension of IRs in contexts that either facilitate or hinder their IR interpretations (see also, more recently, Coulson & Lovett 2010; Tromp et al. 2016, who compare the processing of negative state remarks in 'direct' vs. 'indirect' contexts). Another important difference between our study and most available studies on IRs is that in the latter, the utterances are rarely addressed to the participants of the experiments (a notable exception is Holtgraves' 2008 Experiment 4). The two experiments reported in this paper also address this shortcoming of previous studies. Thus we specifically test the processing of utterances addressed to participants, rather than the metalinguistic assessment of illocutionary forces.

## 2.1 Materials

The studies reported in this paper are carried out in French, and the French equivalents of (2)-(3) appear to be perfect candidates of conventionalised and non-conventionalised indirect requests:

(9) Pouvez-vous VP ?

Can you VP

(10) Est-il possible de VP ?

Is=it possible to VP

Their literal meaning is very close, and in a context where the only plausible interpretation of *pouvez* and *possible* is that of an ability modal, almost equivalent.

However, the only measures of conventionalisation of speech acts available in the literature are certain surface properties. For instance, Sadock (1974) and Stefanowitsch (2003) argue that the felicity of *please* or of the vocative *someone* in *Could you VP?* constructions reveals that they are conventionally associated with the directive force, in exactly the same way as imperative sentences.

(11) Could you please close the window?

(12) Could you close the window, someone?

Unfortunately, such formal criteria are not entirely reliable (see also Pérez Hernández, 2013 for a recent criticism of Stefanowitsch's approach). On the one hand, some uses of the imperative clearly disallow *please* and *someone* (Jary & Kissine, 2014, p. 18).

(13) Be glad that we are leaving, (# please /# someone).

On the other hand, *please* and *someone* are perfectly acceptable in certain non-imperative sentences that clearly cannot be classified as conventionalised indirect requests (Davies, 1986, p. 21):

(14) I'd appreciate if you would please be quite.

(15) The phone is ringing, someone.

(16) Where are my slippers, someone.

Instead of relying on surface properties, we used a corpus exploration to ensure that *Can you VP?* and *Is it possible VP?* in French differ as to their degree of conventionalisation as indirect requests. All *Pouvez-vous VP ?* with a singular addressee ( $n = 365$ ) and *Est-il possible de VP ?* ( $n = 63$ ) were selected from the texts dated after 1900 in the French written corpus Frantext (*Base textuelle Frantext*). Each token was analysed in its context and coded as (a) an indirect request, (b) a genuine question or (c) a rhetorical question. For *Pouvez-vous VP ?* forms directive uses were the most frequent (71%), followed by direct questions (25%) and rhetorical questions (4%), while for *Est-il possible de VP ?* direct questions represented the most frequent use (70%), followed by directive uses (16%) and rhetorical questions (14%). The difference of distribution between the two types of forms was statistically significant ( $\chi^2(2, N = 428) = 66.75, p < .001$ ). The results of this corpus search clearly indicate that, at least in written French, the construction *Pouvez-vous VP ?* (*Can you VP?*) is much more frequent than *Est-il possible de VP ?* (*Is it possible to VP?*). More importantly, the predominant use of the former construction is the performance of indirect requests rather than questions, while the latter is mostly used for asking questions.

To be sure, it remains possible that these conclusions do not extend to other registers or contexts of use, where — one may speculate — the *Est-il possible de VP?* construction would be more closely associated with directive force. First, however things may turn out to be in other registers or corpora, it seems unlikely to us that the directive interpretation of *Est-il possible de VP ?* (*Is it possible to VP?*) would more frequent than that of the *Pouvez-vous VP?* (*Can you VP?*) construction. At the very least, then, it is the case that the directive interpretation is entrenched deeper within the meaning of the of *Pouvez-vous VP ?* (*Can you VP?*) construction relative to *Est-il possible de VP ?* (*Is it possible to VP?*). Second, our only aim here is to support a preliminary intuition relative to the status of our experimental items. If, as we hypothesise at this point, *Pouvez-vous VP ?* (*Can you VP?*) is more conventionalised, as a directive construction, than *Est-il possible de VP ?* (*Is it possible to VP?*), we expect that *ceteris paribus* the former should generate more directive interpretations than the latter.

This brings us to another crucial methodological aspect of our studies. As already mentioned, in order to compare the processing of directive interpretations of different forms, it is crucial to design a task that does not a priori bias the interpretation towards the directive reading. Our task consisted in 24 combinations of an audio presentation of a sentence with a video display of a grid containing coloured shapes and, beneath it, two buttons, *yes* and *no*. The sentences were of the four following types:<sup>2</sup> 6 control imperatives, such as (17), 6 control interrogatives, such as (18), 6 *Can you VP?* interrogatives, such as (19), and 6 *Is it possible to VP?* interrogatives, such as (20).

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<sup>2</sup> The sentences were spoken by two female native speakers of French and recorded using Praat (Boersma & Weenink 2015). We thank Amandine Colson and Philippine Geelhand de Merxem for their vocal recordings (Studies 1-2).

- (17) Mettez le cercle rouge à gauche du rectangle jaune.  
‘Move the red circle to the left of the yellow rectangle.’
- (18) Le cercle rouge est-il à gauche du rectangle jaune ?  
‘Is the red circle on the left of the yellow rectangle?’
- (19) Pouvez-vous mettre le cercle rouge à gauche du rectangle jaune ?  
‘Can you move the red circle to the left of the yellow rectangle?’
- (20) Est-il possible de mettre le cercle rouge à gauche du rectangle jaune ?  
‘Is it possible to move the red circle to the left of the yellow rectangle?’

Control imperatives could be responded to only by moving a shape in the instructed position in the grid, while control interrogatives could be responded to only by answering *yes* and *no*. For all the grids, the two objects referred to by the sentences could only be singled out if both their shape and their color were taken into account. Moving a colored shape was possible if the position in the grid, which was referred to by the sentence, was empty so that the object could be moved to that position; it was impossible otherwise (this rule was implicit to the task). For the imperative sentences, it was always possible to move the shape as indicated in the sentence. For all the interrogative sentences, there was an equal number of trials where the movement was possible (and the correct answer to the corresponding question was *yes*) and those where it was not (and the correct answer to the corresponding question was *no*). Therefore, it was possible to respond to the sentence by moving the shape only for half of the target *Can you* and *Is it possible* stimuli. In this way, we ensured that the directive interpretation of these sentences did not reflect the fact that no other reading was contextually possible.

*Insert Figure 2 about here*

**Figure 2** Example of a screen associated with a sentence (area of interest for the *yes/no* response buttons in pink).

The presentation of each sentence was associated with a grid consisting in a different arrangement of 8 geometrical shapes (2 triangles, 2 circles, 2 squares, and 2 rectangles) of 4 possible colors (yellow, red, green, and blue). Each trial consisted in the combination of a spoken sentence and a grid. 5 lists were created, in which the order of the 24 trials was randomized; the participants were randomly assigned to a list. All the participants saw all the items, but in a different order corresponding to the list they were assigned to.

A short training consisted in 4 combinations of a spoken sentence and a grid, involving 2 explicit performatives such as (21), and 2 interrogatives such as (22). For both explicit performative sentences, it was possible to move the shape as indicated in the sentence. For one interrogative, the correct answer was *yes*; for the other one, the correct answer was *no*.

- (21) Nous vous demandons de mettre le cercle rouge à gauche du rectangle jaune.

'We are asking you to move the red circle to the left of the yellow rectangle.'

(22) Y a-t-il un cercle rouge dans cette grille ?

'Is there a red circle in this grid?'

## 2.2 Participants and procedure 3

41 students at the Université libre de Bruxelles, native French speakers, participated in this, and another, not reported here, experiment in exchange for a payment of 8 € (29 female, mean age = 21.7 years, standard deviation = 2.83 years, range = 17–29 years). 6 of them were left-handed, but all of them were used to handling the computer mouse with their right hand and they did so during the experiment. All the participants had normal hearing, normal or corrected-to-normal vision and none of them had language disorders. None of them had graduated in linguistics or had previous experience with the experimental design. A signed informed consent was obtained for each participant.

The participants were seated in a small office, in front of an ASUS laptop computer (screen resolution 1920 x 1080). To present the stimuli, a script was created using Adobe Flash with ActionScript 2.0. This script allowed the participants to move the object inside the grid or click the *yes/no* button. It was run in Tobii Studio software (version 3.4.6) as the screen recording media element. Five different versions of the script were created, corresponding to the five lists of participants. The sentences were presented through Sennheiser MM 550–X circumaural headphones. Before the onset of the experiment, each participant underwent a calibration procedure. The participants' eye movements and fixations were measured with a Tobii Studio eye-tracker X2–60 (sampling at 60Hz). Mouse clicks and eye movements were recorded by Tobii Studio.

Each trial was initiated by clicking a black circular button in the centre of a blank screen. Clicking the button immediately launched the audio file containing a recorded spoken sentence and the video display of a grid with colored shapes and, beneath it, a *yes/no* button. The task for the participants was to listen to each sentence and to respond to it either by answering with *yes/no* or by displacing a shape within the grid. To answer with *yes* or *no*, they clicked the *yes/no* buttons at the bottom of the screen. Only one response per item was allowed. The participants moved automatically to the next trial after clicking the *yes/no* buttons or after they had dropped a shape in a box of the grid. In all the trials, the grid was located in the upper part of the screen, and the *yes/no* buttons at the bottom, with *yes* on the left and *no* on the right. The positions of the *yes* and *no* buttons were not counterbalanced.

Before the onset of the experiment, the participants were presented with the instructions on the screen of the computer. First, they were told that the experiment would consist in a situation test in which they would interact with a grid and *yes/no* buttons, and that the grid would contain colored geometrical shapes. Next, they were informed that they

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<sup>3</sup> The full instructions for this and the next study, as well as the audio files containing the recorded utterances, are available on the Open Science Framework (<https://osf.io/s9mq8/>).

would hear sentences displayed in the headphones and that, for each spoken sentence, a grid would be displayed on the screen, with the *yes/no* buttons at the bottom of the screen. They were told to use the buttons to answer with *yes* or *no* and, to comply with an instruction, to move the shape as indicated by the sentence. They were also told that, for each sentence they would hear, only one response would be allowed (either a *yes/no* answer or moving a shape). They were also asked to avoid making mistakes while trying to respond as fast as possible.

### 2.3 Results

All the reported analyses were carried out with the R software version 3.2.2 for Windows (R development core team, 2015). The data for this and the next experiment are available on the Open Science Framework (<https://osf.io/s9mq8/>). For this and the next study, all mixed regression models were fitted using the lme4 package (Bates et al. 2015). The significance of a factor was tested by comparing a model with this factor to a null model that excluded it but had an otherwise identical random factor structure. All pairwise post-hoc comparisons were carried out using the lsmeans function with Tukey adjustment for multiple comparisons from the lsmeans package (Lenth, 2016).

First, we assessed whether conventionalised *Can you move\_?* interrogative sentences gave rise to more directive interpretations than the non-conventionalised *Is it possible to move\_?*. Responses to the spoken sentences were classified into answers (*yes* or *no*) and moves (moving a shape in the grid). Evidence that an interrogative sentence is interpreted as a question (request for information) would be a *yes* answer to the question expressed. Evidence for a directive, ‘request for action’ interpretation of an interrogative would be that, upon hearing the sentence, the participant moves the shape as indicated by the sentence instead of answering *yes* to the question. We restricted the analysis to those stimuli for which the correct response was *yes*, and hence, for which it was possible to respond by moving the shape mentioned in the sentence. A binomial logistic mixed effects model, with by-participant intercepts as random factor revealed a significant effect of sentence-type ( $\chi^2(1)=4.09$ ,  $p = .043$ ). The number of directive interpretations was higher for conventionalised *Can you move\_?* than for non-conventionalised *Is it possible to move\_?* interrogative sentences ( $\beta = 0.79$ ;  $z = 2.031$ ;  $p = .043$ ; see Figure 3).

*Insert Figure 3 about here*

**Figure 3: Responses per type of ability question. Only those *Can you* and *Is it possible* sentences for which the move response is possible are included. Vertical bars represent standard error.**

Second, we compared response times to different sentences, defined as the length of time comprised between the moment when the first colored shape was spoken out in the sentence (computed with Audacity 2.0.6 and coded in Tobii Studio) and the mouse click on the *yes/no* buttons (for *yes/no* answers) or the first mouse click on a shape in the grid (for ‘move in the grid’ responses). The mean response times by sentence and response are summarised in Figure 3. We built a linear mixed effects model with by-participant and by-item

intercepts, and type of sentence per participant slope as random factors, and type of sentence as predictor; errors ( $n=59$ ) were excluded. The model revealed a significant effect of sentence (*Imperative vs. Can vs. Possible vs. Interrogative*;  $\chi^2(3)=27.89$ ,  $p < .001$ ), as well as an interaction between sentence and response (*Move vs. yes/no*;  $\chi^2(2)=52.6$ ,  $p < .001$ ). Post-hoc analyses revealed no difference in response times between imperatives ( $\beta= 2833$ , 95% CI = [2500; 3165]) and the directive interpretations (move responses) of *Can you* ( $\beta = 2990$ , 95% CI = [25345; 3635]) and *Is it possible* sentences ( $\beta= 2878$ , 95% CI = [2237; 3518]; all  $p$ 's  $> .99$ ). Relative to control interrogatives for which the correct response was *yes* ( $\beta=3707$ , 95% CI = [3194; 4221]), response times were longer for the question interpretations (*yes* responses) of *Can you* sentences ( $\beta = 4729$ , 95% CI = [4162; 5296];  $t(29.34)= 3.49$ ,  $p = .03$ ), but not for *Is it possible* sentences ( $\beta = 4409$ , 95% CI = [3903, 4916];  $t(19.84) = 2.77.31$ ;  $p = .15$ ). However, there was no difference in response times for *yes* between the question interpretations of *Can you* and *Is it possible* sentences ( $p = .91$ ).

*Insert Figure 4 about here*

**Figure 4: Responses per type of sentence and type of response. Vertical bars represent standard error. Only those *Can you*, *Is it possible* and interrogative sentences for which the *yes* response is correct are included.**

Third, we measured the total durations of the fixations on the area of interest (AOI) encompassing the *yes* and *no* buttons and the small area in-between. Like for the response times measures, the segments started when the first coloured shape was spoken out in the sentence and ended as soon as the first left mouse click occurred (either to select a shape or to click on the *yes/no* buttons). Longer fixations on the buttons were interpreted as related to the illocutionary force of questioning. As can be seen from Figure 5, control imperatives, and directive interpretations of both *Can you* and *Is it possible* sentences were associated with almost no fixation in the *yes/no* AOI. Additionally, a linear mixed effects model, with by-participant and by item intercepts and type of sentence per participant slopes as random factors revealed no difference between control interrogatives and question interpretations of *Can you* and *Is it possible* sentences ( $\chi^2(2)=1.66$ ,  $p = .43$ ).

*Insert Figure 5 about here*

**Figure 5: Mean duration of fixation on the *yes-no* buttons per type of sentence and type of response. Vertical bars represent standard error. Only those *Can you*, *Is it possible* and interrogative sentences for which the *yes* response is correct are included.**

## 2.4 Discussion

To begin with, *Can you* sentences triggered significantly more directive interpretations than *Is it possible* ones. This difference confirms that, as suggested by our corpus exploration, the former construction is more conventionally associated with directive interpretation than the latter. It is true that even *Can you* sentences elicited many non-directive interpretations. Recall, however, that nothing in the context of the task forced this directive interpretation,

and, furthermore, that for the half of both *Can you* and *Is it possible* sentences this reading was impossible (viz., the correct answer to the question was *no*).

In spite of the fact that the directive meaning was not made salient, judging from response times, directive interpretations of interrogative sentences did not seem to be more taxing than those of imperatives. Importantly, this is so independently of the conventionalisation parameter, as the directive interpretations of both *Can you* and *Is it possible* sentences did not elicit longer response times than imperatives. In other words, assigning directive force to a non-imperative sentence does not require additional processing effort, even if this sentence is not a token of a construction conventionally associated with requests. Fixation duration measures confirmed that, independently of conventionalisation, requests can be indirect but primary. Fixation on the *yes/no* area is clearly linked to the interpretation of the sentence as a question, and no such fixation was evidenced for imperatives and for the directive interpretations of *Can you* and *Is it possible* alike. Behavioural and eye-tracking results thus strongly confirm the predictions made by non-literalist theories of illocutionary force attribution.

Finally, interpreting *Can you* — but not *Is it possible* — as a question when a directive interpretation is available is perhaps even more taxing, as evidenced by longer response times relative to control interrogatives. This result is particularly striking given the fact that nothing in the experimental design biased the interpretation towards the directive force. These longer reaction times may be seen as a further indication of the conventionalisation of *Can you* indirect requests. That said, there was no significant difference in response times for ‘yes’ responses to *Can you* and *Is it possible* sentences. Recall that, even though they are not equally associated with directive interpretation, under their directive reading both constructions may be seen as questioning the addressee’s ability to perform an action, viz., as evoking a preparatory condition for the performance of the request. In that sense, they both instantiate the same strategy for the performance of indirect requests, which, when available, may introduce some structural ambiguity.

### **3 Study 2: imperatives, modals and declaratives**

As evoked in the Introduction, non-literalist theories explain the close association between directive speech acts and imperative sentences by the semantic structure of the latter. Accordingly, directive force should also be the privileged interpretation of a non-imperative structure whose semantics shares with imperatives those features that render their directive interpretation salient. More particularly, we saw that at least two non-literalist theories (Kaufmann 2012 and Ruytenbeek 2017) predict that deontic modal constructions, such as *You must VP*, should be as direct a request as the corresponding imperative.

We thus expect that *You must VP* sentences, such as (23), should receive a directive interpretation to the same extent and in the same way as the corresponding imperative, e.g., (24). In that respect they should differ from declaratives with existential modals *can/may* (25)

or *it is possible* (26) which can be interpreted both as a statement — just as a control declarative, e.g., (27) — and, perhaps less straightforwardly, as indirect requests.

- (23) Vous devez mettre le cercle rouge à gauche du rectangle jaune.  
'You must move the red circle to the left of the yellow rectangle.'
- (24) Mettez le cercle rouge à gauche du rectangle jaune.  
'Move the red circle to the left of the yellow rectangle.'
- (25) Vous pouvez mettre le cercle rouge à gauche du rectangle jaune.  
'You can/may move the red circle to the left of the yellow rectangle.'
- (26) Il est possible de mettre le cercle rouge à gauche du rectangle jaune.  
'It is possible to move the red circle to the left of the yellow rectangle.'
- (27) Le cercle rouge est à gauche du rectangle jaune.  
'The red circle is on the left of the yellow rectangle.'

The hallmark of statements is being amenable to truth-valuation. The task we used to test our hypothesis is thus identical to that in Study 1, except that this time the alternative to moving a shape was to click on a *true/false* button.

### 3.1 Materials

We created 24 French test sentences: 3 *You must*, 3 control imperatives, and 6 *You can/may*, 6 *It is possible* and 6 control declaratives. Like in Study 1, the audio presentation of each sentence was associated with a grid consisting in a different arrangement of 8 colored geometrical shapes, accompanied, on the lower part of the screen, by two buttons *TRUE* and *FALSE*. As in Study 1, it is important not to bias the context towards a directive interpretation. For this reason, for all types of items, except the imperative and the *You must* sentences, there was an equal number of trials that could be responded to by *true* and by *false*. For the imperative and *You must* sentences, it was always possible to move the shape as indicated in the sentence. 5 lists were created, in which the order of the 24 trials was randomized; the participants were randomly assigned to a list. As in Experiment 1, all the participants saw all the items, but in a different order corresponding to the list they were assigned to.

### 3.2 Participants and procedure

40 students at the Université libre de Bruxelles, native French speakers, participated in the experiment in exchange for a payment of 5 € (28 female, mean age = 21.4 years, standard deviation = 2.7 years, range = 17-28 years). 4 of them were left-handed, but all of them were used to handling the computer mouse with their right hand and they did so during the experiment. All participants had normal hearing, normal or corrected-to-normal vision and none of them had language disorders. None of them had graduated in linguistics or had previous experience with this experimental design. A signed informed consent was obtained for each participant.

The procedure was identical to that of Study 1, with the exception that the *yes/no* button was replaced by a *true/false* button. A short training consisted in 4 combinations of a spoken sentence and a grid, involving 2 explicit performatives, such as (28), and 2 declaratives, such as (29). The correct response to one of the training declaratives was *true*, and it was *false* for the other one.

(28) Nous vous demandons de mettre le cercle rouge à gauche du rectangle jaune.

‘We are asking you to move the red circle to the left of the yellow rectangle.’

(29) Il y a un cercle rouge dans cette grille.

‘There is a red circle in this grid.’

Because there was only one possible interpretation for each training sentence, the participants’ responses could not be biased either towards the direct statement or towards the indirect directive interpretation of the sentences used later on in the experiment.

### 3.3 Results

As can be seen from Figure 6, *You must* sentences elicited almost only directive interpretations, viz., move responses. By contrast, in those *You can* and *It is possible* sentences for which such a response was possible (hence for the assertive meaning of which *true* was the correct answer), interpretation as statements was dominant. A logistic binomial mixed effects model with participant intercept as random factor revealed an effect of sentence ( $\chi^2(2) = 216.91, p < .001$ ). As expected, *You must* sentences prompted significantly less *true/false* responses ( $\beta = -3.33, 95\% \text{ CI } [-4.32; -2.34]$ ) than *You can* ( $\beta = 1.19, 95\% \text{ CI } [0.49; 1.89; z = -8.11, p < .001]$ ) and *It is possible* sentences ( $\beta = 2.52, 95\% \text{ CI } [1.66; 3.38]; z = -8.994, p < .001$ ). Additionally, *You can* sentences prompted more directive interpretations than *It is possible* ones ( $z = -3.29, p = .0028$ ). The response patterns thus confirm that *You must* sentences receive almost exclusively directive interpretations. In the subsequent analyses, which focus on processing correlates, we exclude the *true/false* responses to *You must* ( $n = 21$ ), along with the *true/false* responses to imperatives ( $n = 9$ ) and other errors ( $n = 18$ ).

*Insert Figure 6 about here*

**Figure 6: Responses per type of sentence. Only those *You can* and *It is possible* sentences for which the move response is possible are included. Vertical bars represent standard error.**

We compared response times between imperatives, declaratives, *You must* and those *It is possible* and *You can* sentences for which a move response was possible (see Figure 7). As in Study 1, response times were computed from the length of time comprised between the moment when the first coloured shape was spoken out in the sentence and the mouse click on the *true/false* buttons (for *true/false* answers) or the first mouse click on a shape in the grid (for ‘move in the grid’ responses).

*Insert Figure 7 about here*

**Figure 7: Response times per type of sentence and type of response. Only those *You can*, *It is possible* and declarative sentences for which the *true* response is correct are included. Vertical bars represent standard error.**

A linear mixed effects model with participant slopes and intercepts as random factors revealed a significant effect of sentence ( $\chi^2(4) = 21.63, p < .001$ ), as well as an interaction of sentence and response ( $\chi^2(2) = 28.87, p < .001$ ). Response times for *You must* sentences ( $\beta = 3133, 95\% [2675; 3591]$ ) did not differ from those for imperatives ( $\beta = 2953, 95\% CI [2509; 3397], p > .99$ ), and from move responses to *You can* ( $\beta = 3146, 95\% CI [2590; 3701], p = 1$ ) and *It is possible* sentences ( $\beta = 3184, 95\% CI [2570; 3797], p = .095$ ). In addition, there was no difference between move responses to *You can* and *It is possible* (all  $p$ 's  $> .09$ ). As for *true/false* responses, there was no difference between *true/false* responses to *You can* and *It is possible* sentences (and control declaratives for which the response was *yes* (all  $p$ 's  $> .3$ )).

Finally, Figure 8 displays the total duration of fixation on the *true/false* buttons. Virtually no such fixation was evidenced for imperatives, *You must* sentences and directive interpretations of *You can* and *It is possible* sentences.

*Insert Figure 8 about here*

**Figure 8: Mean duration of fixation on the *true/false* buttons per type of sentence and type of response. Only those *You can*, *It is possible* and declarative sentences for which the *true* response is correct are included. Vertical bars represent standard error.**

### 3.4 Discussion

The results of Study 2 further support non-literalist models of illocutionary force attribution. First, conforming to their predictions, deontic *You must* sentences are assigned directive force to virtually the same extent and in the same primary way as imperatives. Second, *You can* and *It is possible* declaratives are sometimes interpreted as requests, even though the context does not mandate this directive interpretation. As in Study 1, such interpretations do not entail longer processing or fixations on the *true/false* area, which would be indicative of the activation of the assertive force. That is, we confirm that a request can be indirect but primary. Finally, *You can* declaratives trigger more directive readings than *It is possible* ones. One of the most salient readings of the French *pouvoir* (can) is that of a permission. Even though the status of permission relative to other directive speech acts is somehow special (e.g., Jary & Kissine, 2014, pp. 64-65), it is understandable that granting permission may sometimes be interpreted as a reason to act.

## 4 General discussion

A widely held view in contemporary semantics and philosophy of language is that sentence structure encodes an illocutionary force component. According to this literalist view, the major sentence types, such as the imperative, are associated at the semantic level with an illocutionary force, such as a directive. What the processing models based on these literalist

theories have in common is the prediction that the interpretation of any utterance of an interrogative or declarative sentence should activate the illocutionary force of questioning or asserting, respectively. To date, however, there has been little discussion of empirical evidence relevant to the validity of literalism.

The two studies reported in this paper strongly support non-literalist models, according to which illocutionary forces are not encoded within the semantics of sentence types. We showed that conventionalization was not required for an interrogative sentence to be interpreted as a request, without the question meaning being activated. That is, we confirmed that indirect requests involving constructions that are conventionally associated with the directive force (*Can you VP?*) and those that are not (*Is it possible to VP?*) are not secondary: directive interpretations of *Can you VP?* and *Is it possible to VP?* interrogatives — or, for that matter, of *You can VP* and *It is possible to VP* declaratives — do not elicit longer response times than corresponding imperatives. In addition, indirect directive interpretations are not associated with fixations on *yes/no* (Study 1) or *true/false* (Study 2) buttons that would have constituted evidence of the activation of a non-directive force.

Importantly, this effect cannot be assigned to a contextual bias, as our experiments were structured in a way that did not favor directive interpretations. In that respect, our experimental paradigm constitutes a major improvement over previous experimental studies that draw a binary distinction between the contexts that prime the indirect vs. the direct illocutionary force (e.g., Gibbs 1979; 1983; more recently Coulson & Lovett 2010). Our design allows insights into the processing correlates of illocutionary force attribution to different sentence types while keeping contextual factors constant.

Our results thus show that indirect interpretations of interrogative and declarative sentences do not require the activation of the questioning or assertive force. As such, they provide support to theories that conceive of the relationship between sentence types and the speech acts they are prototypically associated with in terms of arrays of semantic features that make the former particularly suited for the latter. While our paper does not directly address the issue of the semantic features that are required for making directive force salient, we do provide one empirical indication in that direction. In our Study 2, we confirmed that directive illocutionary force is prototypically associated not only with imperatives, but also with second person deontic necessity modals. Directive interpretations of deontic modal sentences of the form *You must VP* appear to be as natural as for the corresponding imperatives, and entirely similar in terms of response times. This is not to say, of course, that deontic modals are entirely closed to an assertoric reading. In the following examples, from Jary and Kissine (2014, p. 240), the privileged interpretation seems to be one of an assertion about the addressee deontic obligation.

- (30) A: Jesus can save you...but you must believe it! All you have to do is accept him as your saviour and learn from his teachings...only that way will you be saved in the coming end...you must listen!...

B: Oh no I must not. Stop pushing rubbish down other people's reading space.

(<http://www.politicalforum.com/religion/219052-jesus-can-save-you-but-you-must-believe.html>)

To be sure, in the design of our Study 2, this kind of assertive interpretation was more difficult to come by. Our contention, however, is neither that non-directive interpretation of deontic modals is impossible nor that their semantics is indistinguishable from that of modals. What our results do indicate is that imperatives and deontic modals have a sufficiently similar semantic structure to make their directive interpretation equally natural. In other words, directive force can be directly associated with non-imperative sentence forms.

Finally, our results associated with conventionalized indirect requests provide further evidence for a non-literalist conception of illocutionary forces. Both the corpus-based validation of the test items of Study 1 and the behavioural results confirmed that constructions such as *Can you VP?* are clearly conventionalised for the performance of directive speech acts. Recall that it is customary to think of the *Can you VP?* construction as a meaning-form pair, conventionally associated with the directive force (Stefanowitsch, 2003). At a first glance, this position seems supported by the fact that the response times for directive interpretations of *Can you VP?* sentences were indistinguishable from those elicited by the imperatives, as well as the absence of fixations on the *yes/no* area associated with the activation of the compositional, question meaning. However, in a context that did not prime the directive interpretation, *Can you VP?* sentences gave rise to more question than directive interpretations, which may be somehow problematic for such a position. In addition, directive interpretations of the non-conventionalized constructions *Is it possible to VP?* and *It is possible to VP* were behaviorally identical to those of more conventionalized *Can you VP?* and *You can VP* constructions.

That said, non-directive, question interpretations of *Can you VP?* appeared costlier, as they were associated with longer response times than control interrogatives, for which no indirect directive interpretation was possible. It is possible, however, that the source of the interference of directive force should not be sought within patterns of conventionalization of particular constructions — of ‘meaning-form’ pairs —, but rather at the level of conventions of means. That is, directive force is perhaps made salient by a certain type of strategy, such as evoking *A*’s ability to act. This, however, is very different from including it within the semantics of a sentence type. Recall that question readings of *Can you* were behaviorally indistinguishable from those of the non-conventionalised *Is it possible*. By virtue of their lexical semantics, expressions such as *Can you VP?/You can VP* and *Is it possible to VP?/It is possible to VP* encode a force dynamic pattern of ‘enablement’ (Johnson, 1987, pp. 52-53; Sweetser, 1990, pp. 52-53; Talmy, 2000, pp. 444-447). However, unlike for imperatives and *You must VP* declaratives, the force dynamic pattern referring to the addressee’s internal ‘power’ to act cannot directly be specified with force exertion at the pragmatic level (Ruytenbeek, 2017,

chap. 3). This hypothesis, which may explain not only why IR expressions were often responded to with a *yes* or *true* answer, but also the intuition that these sentences are an unmarked polite form (cf. Terkourafi 2015), will be investigated in our further research.

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