Strength in Deontic Modals as Acceptability and Optimality[*]

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This paper investigates the empirical landscape of deontic modals with particular reference to their strength. I discuss the semantic properties of the expression *you-liyou* 'have-reason' in Mandarin Chinese, which is often excluded from the discussions on modality. Following recent work by Beddor (2017, "Justification as faultlessness" *Philos. Stud.*, 174:901-926), I argue that *you-liyou* 'have-reason' illustrates a logical possibility that falls out from the two dimensions on deontic modals: the quantificational force and the relative strength. On one hand, I show that *you-liyou* 'have-reason' is a possibility modal, contrasting with necessity modals like *bixu* 'must'; on the other hand, it is distinguished from *keyi* 'may' by encoding what is taken to be *optimal* (not just *acceptable*). I suggest that *you-liyou* 'have-reason' should be recognized as a *strong possibility modal*, mirroring what has been more commonly identified in the discussion of necessity modals: the *weak necessity modal* (e.g. *should*/*ought to* in English).

1. Introduction

This paper investigates the empirical landscape of deontic modals. In addition to the quantificational force and modal flavor, the notion of modal strength has attracted much attention in both philosophical and linguistic literature (for the former, see Sloman 1970, Wedgwood 2006, Swanson 2008, Yalcin 2016, Beddor 2017, Silk 2019; for the latter, see Kratzer 1991, von Fintel and Iatridou 2008, Lassiter, 2011, 2017, Rubinstein 2012, 2014, 2017, Vander Klok and Hohaus 2020, among many others). With an aim to contributing to the discussion on modal strength, I discuss the semantic properties of the expression *you-liyou* 'have-reason' in Mandarin Chinese, which is often excluded from the discussions on modality. An example is given below in (1):

(1) Zhangsan **you-liyou** qu Meiguo.
    Zhangsan have-reason go US
    'Zhangsan has reason to go to US.'

Following recent work by Beddor (2017) and his notion of "faultlessness", I show that *you-liyou* 'have-reason' illustrates a logical possibility that falls out from the two dimensions on deontic modals: the quantificational force and their relative strength. In particular, I show that, on one hand, *you-liyou* 'have-reason' is a possibility modal, contrasting with necessity modals like *bixu* 'must'; on the other hand, it is distinguished from *keyi* 'may' by encoding what is taken to be *optimal* (not just *acceptable*). I suggest that *you-liyou* 'have-reason' should be recognized as a *strong possibility modal*, a subtype of possibility modal with a different strength, mirroring what has been more commonly identified in the discussion of necessity modals: the *weak necessity modal* (e.g. *should/ought to* in English).

The rest of the paper consists of four sections, organized as follows: §2 overviews the two parameters of modal expressions and points out a missing logical possibility; §3 argues that *you-liyou* 'have-reason' is a *strong possibility modal* by showing that it is logically independent from other deontic modals and that it displays properties of possibility modal but comes with an additional strength. §4 touches on the distributional properties of *you-liyou* 'have-reason' and the morphological make-up of modal expression in Mandarin. §5 concludes with remarks.

A few notes are in order. First, I will focus on deontic or teleological readings (or moree generally the "prioritizing" reading in Portner's (2009) terms); other modal flavors will be ignored in the discussion. I leave the extension to epistemic modals to future work. Second, this paper does not aim at a unified account on or a precise formalization on modal strength. For recent works on this topic, see Rubinstein (2012, 2014), Lassiter (2017) Silk (2019) and Vander Klok and Hohaus (2020), among others.

2. Two parameters of modal verbs

A well-received dichotomy of modal expressions concerns their quantificational force: necessity modals involve universal quantification while possibility modals existential quantification. Two properties follow from this dichotomy. First, necessity modals and possibility modals stand in *dual* relations, illustrated in (2) with English *must* and *may*. The Mandarin counterpart is given in (3). The symbol ⇔ indicates symmetric entailment relations.

(2) You **must** go. ⇔ It is not the case that you **may** [not go]. $(\forall \Leftrightarrow \neg \exists \neg)$

(3) ni **bixu** qu ⇔ binfei ni **keyi** bu qu $(\forall \Leftrightarrow \neg \exists \neg)$
    You must go   not   you may not go
    'You must go' ⇔ '(It is) not that you may not go.'

Second, possibility modals, but not necessity modals, are compatible with conjunction of mutually exclusive propositions. The English examples are taken from von Fintel and Iatridou (2011:31).

(4) a. You **must** stay, and/but also, you **must** leave. (leave = not stay).   [contradictory]
    b. You **may** stay, but also, you **may** leave.   [consistent]

(5) a. ni   **bixu** liuxia, ni   ye   **bixu** likai   [contradictory]
       you must stay   you also must leave
       'You must stay; also, you must leave.'
    b. ni   **keyi** liuxia, ni   ye   **keyi** likai   [consistent]
       you may stay,   you also may   leave.
       'You may stay; also, you may leave.'

Another dimension concerns modal strength. Among necessity modals, *must/have to* is regarded as the strong necessity modals, since it asymmetrically entails the weak necessity modals *should/ought to* (examples modified from von Fintel and Iatridou 2008:117). The same contrast is also observed with Mandarin *bixu* 'must' and *yinggai* 'should/ought'. Both (6) and (7) show that the weak modals are compatible with the negation of the strong modals, but not vice versa.

(6) a. You **ought to** do the dishes but you don't **have to**.
    b. #You **must** do the dishes but it is not the case that you **ought to**.

(7) a. ni   **yinggai** qu, danshi binfei ni   **bixu** qu
       you should go   but   not   you must go
       'You should go, but it is not the case that you must go.'
    b. #ni   **bixu** qu, danshi binfei ni   **yinggai** qu
       you must go   but   not   you should   go
       'You must go, but it is not the case that you should.'

Additionally, it follows from the asymmetrical entailment relation that the weak necessity modal can be reinforced/strengthened by a follow-up strong necessity modal, but not vice versa (English examples from von Fintel and Iatridou 2008:117).

(8) a. You **ought to** wash your hands—in fact, you **have to**.
    b. ??You **have to** wash your hands—in fact, you **ought to**.

(9) a. ni   **yinggai** xishou,   qishi,   ni   **bixu**
       you should wash.hand in.fact   you must
       'You should wash (your) hands. In fact, you must.'
    b. ??ni   **bixu** xishou,   qishi, ni   **yinggai**
         you must wash.hand in.fact you should

'You must wash (your) hands. In fact, you should.'

Against these backgrounds, Beddor (2017) critically observes that the two parameters (i.e. the force and the strength) entails a logical possibility with regard to possibility modals (depicted in Figure 1). Particularly, it seems legitimate to ask whether there is a possibility modal that displays a different from strength from MAY, i.e. English *may* and Mandarin *keyi*.
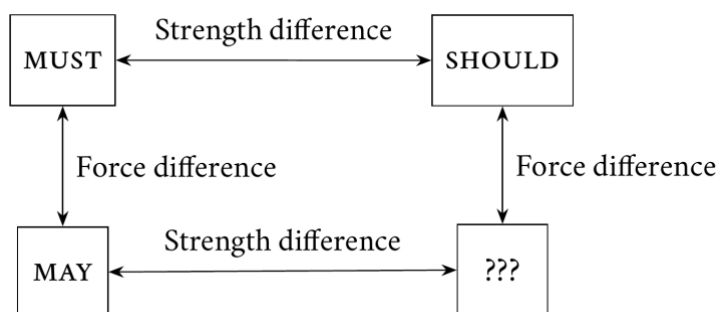

Figure 1: A taxonomy of modal expressions (Beddor 2017)

Beddor (2017) proposes that there *is* such modal expression in natural languages and he argues that the English expression *be justified in* is what qualifies as the strong version of possibility modals, mirroring the split in necessity modals. He suggests that this modal expression captures the notion of "faultlessness" which is in contrast to permission and obligation. For the details of this notion in the deontic ontology, I refer interested readers to the original paper. In what follows, I suggest that the Mandarin expression *you-liyou* 'have-reason' also fit comfortably into this missing box, lending further support to Beddor's proposal.

3. A strong possibility modal

I suggest that *you-liyou* 'have-reason' is the strong possibility modal in the sense that it represents a stronger version of possibility modal (i.e. it is logically stronger than *keyi* 'may'). In §3.1, I first discuss the logical independence of this expression with regard to its "relatives", especially its relevance to *yinggai* 'should' and *keyi* 'may'. In §3.2, I adopt the diagnostic tests discussed in §2 to show that *you-liyou* 'have-reason' stands in dual relation with *yinggai* 'should' and it displays asymmetrical entailment relation to *keyi* 'may'.

3.1. Logical independence

To illustrate the truth-conditional differences between *you-liyou* 'have-reason' and the other three (namely, *bixu* 'must', *yinggai* 'should', *keyi* 'may'), let us fix on a discourse context where the interlocuters are discussing transportation means to get to

Paris (i.e. a teleological conversational background). Consider the following schematized sentence in (10), where the blank is supposed to be occupied by one the four modal expressions. I show that the use of *you-liyou* 'have-reason' depicts a particular context that is distinct from the rest of the modals.

(10) <u>A schematized sentence</u>
    ruguo ni   qu Bali, ni   _____   zou   huoche.
    If   you go Paris you   take train
    'If you go to Paris, you _____ take a train.'

       Let us start with the *bixu* 'must' and *keyi* 'may'. For (11) and (12), the corresponding contexts are given in (a), and the target sentences in (b). The context specifies what the speaker knows about the transportation means to Paris.

(11) a. Context: *the speaker knows that trains are the only possible way to go to Paris.*
    b. ruguo ni   qu Bali, ni **bixu** zou   huoche.
       If   you go Paris you must take train
       'If you go to Paris, you must take a train.'

(12) a. Context: *the speaker knows that trains are one possible way to go to Paris, but there are other options, e.g. planes and ferries.*
    b. ruguo ni   qu Bali, ni **keyi** zou   huoche.
       If   you go Paris you must take train
       'If you go to Paris, you may take a train.'

In both examples, taking trains is a possible way to achieve the goal of "getting to Paris", the use of the two modals differs in terms of available options: *bixu* requires trains to be the *unique* means, whereas *keyi* requires trains to be the *non-unique* means.

       Let us then turn to the other two modals. While *yinggai* 'should' also involves universal quantification like *bixu* 'must', but the felicitous use of *yinggai* does *not* require trains to be the only means to go to Paris (i.e. the context in (11a) favors *bixu* over *yinggai*). In this regard, *yinggai* is similar to *keyi* 'may'. Crucially, what is particular to *yinggai* is that the speaker is adding some implicit assumption/ consideration (i.e. unknown/ not shared by the hearer) to the option of taking trains to Paris (*cf.* von Fintel and Iatridou 2008, Rubinstein 2012 and Silk 2012). For example, the speaker may assume that the hearer wants to go to Paris in a *comfortable* way (or the speakers wants the hearer to do so). In such a case, while taking trains is not the only option to Paris, but it is the only option to go to Paris *in a comfortable way* (at least from the perspective of the speaker. The context in (13a) is so constructed to illustrate this intuition, and (13b) with *yinggai* can be felicitously uttered. The additional (implicit) considerations in (13aii)

and (13aiii) distinguish *yinggai* from *keyi*. Note that it is also because of these considerations that make *yinggai* a necessity modal, as it points to a unique option. But it also sounds less forceful than *bixu* 'must', since the additional considerations seem to be more *negotiable* in the discourse (see also Rubinstein 2012).

(13) a. Context:
   (i) *the speaker knows that trains are one possible way to go to Paris, but there are other options, e.g. planes and ferries.*
   (ii) *the speaker wants the hearer to take a comfortable means to go to Paris.*
   (iii) *the speaker also knows that only trains are comfortable, among other options.*
    b. ruguo ni qu Bali, ni **yinggai** zou huoche.
      If   you go Paris you should   take train
      'If you go to Paris, you should take a train.'

Lastly, for *you-liyou* 'have-reason', it patterns with *keyi* and *yinggai* in terms of having the non-unique options (i.e. it does not require taking trains to be the only way to Paris). I suggest that it also involves some additional assumption/ consideration on a par with *yinggai*, which gives rise to the impression that *you-liyou* sounds somewhat subjective in the discourse. Crucially, *you-liyou* differs from *yinggai* in the sense that with the additional assumptions, there are still non-unique options. Consider now a context minimally different from (13a) in (14a). (14aiii) specifies that there are more than one option to go to Paris in a comfortable way, i.e. trains and planes, hence *you-liyou* sounds weaker than *yinggai*. Note that with the use of *you-liyou*, the speaker sounds more forceful or involved than *keyi*, as it concerns multiple options to a more "specified" goal.

(14) a. Context:
   (i) *the speaker knows that trains are one possible way to go to Paris, but there are other options, e.g. planes and ferries.*
   (ii) *the speaker wants the hearer to take a comfortable means to go to Paris.*
   (iii) *the speaker also knows that trains and planes are both (equally) comfortable, but not, e.g., ferries.*
    b. ruguo ni qu Bali, ni **you-liyou**   zou huoche.
      If   you go Paris you have-reason take train
      'If you go to Paris, you have reason to take a train.'

Here, I suggest that the above observations can be re-described with the notions of "acceptability" and "optimality", following Fintel and Iatridou (2008) and Beddor (2017). Concerning "acceptability", the dual of *bixu* 'must' and *keyi* 'may' represents the simpler cases, where they specify contexts where only acceptability is taken into consideration (from the speaker's perspective). In other words, the proposition associated with the

modal expressions concerns whether the proposition is within the (accessible) worlds that are acceptable. In our cases above, we have assumed a teleological conversational background which is explicitly expressed in the conditional clause (i.e. 'if you go to Paris…'). Any proposition that fails to achieve this goal is not acceptable. If taking trains to Paris is the only option, then all acceptable worlds are train-taking worlds, giving (11). If taking trains is one of the options, then (at least) some acceptable worlds are train-taking worlds, giving (12).

As for "optimality", I suggest that both *yinggai* 'should' and *you-liyou* 'have-reason' concern worlds that are not just *acceptable*, but also *optimal* (where the optimal worlds must be acceptable worlds, but not vice versa). The proposition associated with them is thus evaluated according to whether the proposition is within the (accessible) worlds that are optimal. These worlds are not only acceptable (i.e. going to Paris), but are optimal at least from the speaker's perspective (see also the "best-of-the-best worlds" in von Fintel and Iatridou 2008 or the "Optimality Interpretation" in Beddor 2017). In our examples (13) and (14), those worlds are worlds where one goes to Paris in a comfortable way. As such, *yinggai* and *you-liyou* differ only in whether there is more than one option to achieve this optimality: if no, then one 'should' take trains to Paris; if yes, then one 'has reason' to do so. Note that this is consistent with the observation that both of them do not require taking trains to be the only option to go to Paris.

The above discussion can be summarized in (15) in terms of accessible worlds, where the four modal expressions are distinguished from each other with regard to quantificational force and strength (i.e. acceptability and optimality). The idea is also visualized in Figure 2, following Beddor (2017). Note that by definition, an optimal world is always an acceptable world, and that the set of all acceptable worlds always include all optimal worlds (roughly represented by the size of circles in Figure 2).

(15) a. *bixu* p is true iff *all* **acceptable** worlds in the modal base are p-worlds.
    b. *keyi* p is true iff *some* **acceptable** worlds in the modal base are p-worlds.
    c. *yinggai* p is true iff *all* **optimal** worlds in the modal base are p-worlds.
    d. *you-liyou* p is true iff *some* **optimal** worlds in the modal base are p-worlds.
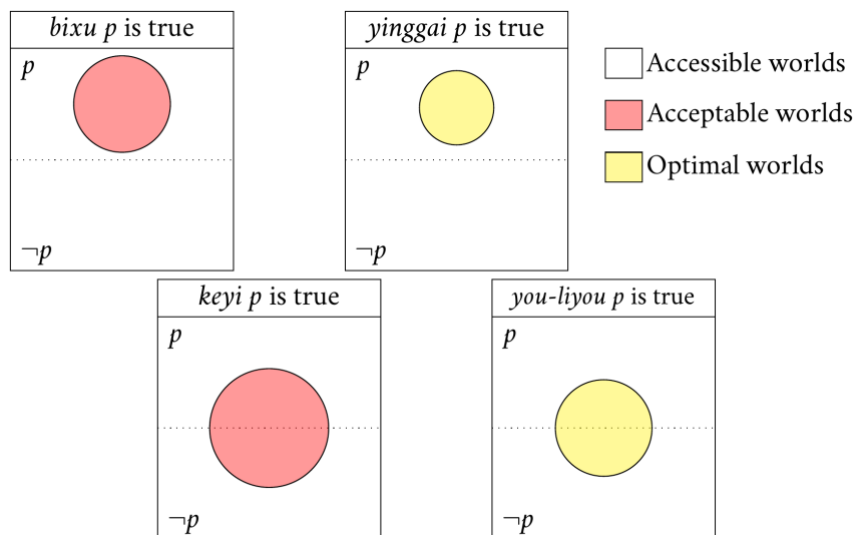
Figure 2: Logical impendence of the four modal expressions (cf. Beddor 2017)

3.2. Diagnosing the modal force and strength

In this subsection, I apply diagnostic tests for the quantificational force and the relative strength to *you-liyou* 'have-reason', the results of which is entirely consistent with the discussion in §3.1. Concerning the quantificational force, first, we see that *you-liyou* stands in dual relation to *yinggai* 'should', as illustrated in (16). Note that both sentences can be felicitously uttered in the context in (13a).

(16) *ni* **yinggai** *zuo huoche* ⇔ *ni* *mei-**you-liyou*** *bu-zuo huoche* (∀ ⇔ ¬∃¬)
    you should take train   you not-have-reason not-take train
    'You should take a train' ⇔ 'You have no reason not to take a train.'

Additionally, *you-liyou* in (17a), but not *yinggai* (17b), is compatible with conjunction of mutually exclusive propositions (assuming that one can take either trains or planes), suggesting its force being existential, instead of universal. Note that (17b) may sound less degraded if the speaker is shifting the contexts for the two conjuncts, rendering a train is a unique option (with respect to some consideration) in the first conjunct and a plane is also a unique option (with respect to some other consideration) in the second conjunct; but no such context shifting is required for (17a).

(17) a. ni **you-liyou** zuo huoche, ni (ye) **you-liyou** zuo feiji
        you have-reason take train, you (also) have-reason take plane
        'You have reason to take a train. You also have reason to take a plane.'
    b. #ni **yinggai** zuo huoche, ni (ye) **yinggai** zuo feiji

you should take train,　you　(also)　should　take　plane
'You should take a train. You should also take a plane.'

As for the relative strength of *you-liyou*, it asymmetrically entails *keyi* 'may', hence expressing a (logically) stronger possibility. (18) illustrates this property. In (18a), *keyi* is compatible with the negated form of *you-liyou*; however, in (18b), *you-liyou* is not compatible with the negated form of *keyi*. This follows from the suggestion that *you-liyou* is the stronger form, so negating the weaker form entails the negation of the stronger form, hence infelicity. Note that (18a) is felicitous in the context in (14a), where taking ferries is possible, but it is not "optimal" (for not being comfortable, from the perspective of the speaker).

(18) a. ni　　(shi) **keyi** zuo chuan, dan ni　　mei-**you-liyou**　　zuo chuan
　　　　you FOC may　take ferry,　but　you not-have-reason　take ferry
　　　　'You may take a ferry, but you don't have reason to take a ferry.'
　　b. #ni　(shi)　**you-liyou**　　zuo huoche, dan ni　　bu-**keyi**　zuo huoche
　　　　 you FOC　have-reason　take train　　but　you not-may　take train
　　　　'You have reason to take a train, but you may not take a train.'

Lastly, *you-liyou* can be used to reinforce/strength *keyi* with the aid of *shenzhi* 'if not'. The reverse pattern does not go through, resulting in a sense of inconsistency.

(19) a. ni　　**keyi**, shenzhi **you-liyou**,　zuo　huoche
　　　　you　may, if.not　　have-reason　take train
　　　　'You may, if not have reason, to take a train.'
　　b. #ni　**you-liyou**,　　shenzhi **keyi**, zuo huoche
　　　　you　have-reason, if.not　　may　take train
　　　　'You have reason, if not may, take a train.'

The results of these tests are consistent with the observations in §3.1. I therefore conclude that the modal expression *you-liyou* is best recognized as *a strong possibility modal*. It mirrors the split in the necessity modals and fills the missing gap entailed by the two parameters (i.e. the force and strength) discussed in §2.

4. A note on the external and internal syntax of *you-liyou*
Before I conclude this paper, I briefly discuss the external and internal syntax of *you-liyou*. As is obvious, the morphological makeup of *you-liyou* is substantially different its relatives: it consists of the possession verbs you 'have' and an (abstract) noun *liyou* 'reason'. In spite of this, two aspects on *you-liyou* suggests that it deserves a modal analysis on its own instead of the one derived from possession verbs.

First, *you-liyou* is distributionally similar to other modal expressions in the sense that it does not impose a selectional requirement on the surface subject (unlike the possession verbs *you*). It thus syntactically functions as a raising predicate, on a par with other modal expressions (independently argued for in Lin and Tang 1995; Huang, Li and Li 2009). (20) gives an example where the surface subject is inanimate and is thematically selected by the embedded predicate instead of *you-liyou*.

(20) zhe-xie shouji   **you-liyou**   ran ni   tao   yaobao
       these   cell.phone have-reason let   you take.out fanny.pack
    'These cell phones have reason to let you pay (for them).'
                          accessed on Dec 27, 2020: https://www.cnmo.com/guide/539996.html

Additionally, it is not uncommon for a synthetic modal expression to have an analytical counterpart. This is at least the case for *bixu* 'must' and *keneng* 'be.possible' (an epistemic possibility modal), giving *you-xuyao* 'have-necessity' and *you-keneng* 'have-possibility', respectively. Incidentaly, *keyi* and *yinggai* happen to lack an analytical counterpart. In this regard, *you-liyou* is only "special" in the sense that it lacks a synthetic form, but the availability of the synthetic/analytic form for different modal expressions seems to be largely idiosyncratic in Mandarin.

5. Conclusions

In this paper, I have discussed the semantic properties of the expression *you-liyou* 'have-reason' and argues that it is best regarded as *a strong possibility modal*, suggesting a split within possibility modals that mirrors the one in the more discussed necessity modals. Following the core idea in Beddor (2017), the empirical landscape for (at least) deontic modals can be represented in Figure 3, where *you-liyou* is filling the missing bottom-right concern.
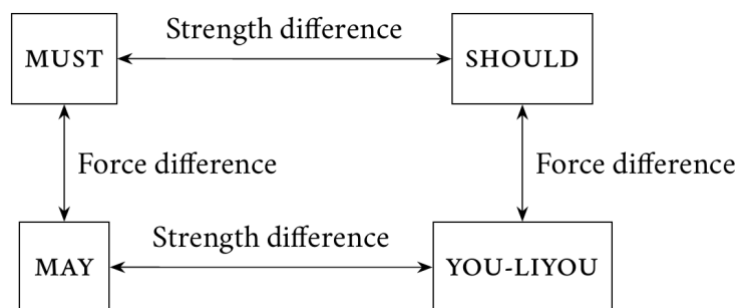

Figure 3: A taxonomy of modal expressions

Many issues deserve further investigation. For example, existing theories on modal strength build particularly on the distinction between strong and weak necessity

(e.g. von Fintel and Iatridou 2008, Rubinstein 2012, Silk 2019, i.a.). The identification of a strong possibility modal requires that a theory on modal strength should be general enough to apply to modals with varying quantificational force. Also, the precise nature of a strong possibility modal under an epistemic construal remains to be seen. Its relevance to epistemic possibility seems particularly interesting in the growing literature on graded modality (Lassiter 2017, i.a.).

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