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**The Meanings of Ability Utterances  
with Applications to Dialog Understanding**

John K. Myers

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# The Meanings of Ability Utterances with Applications to Dialog Understanding

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## Abstract

This paper investigates the ontology of *ability*. A taxonomy of the various types of ability is presented. Each ability is marked by the features *control* and *changeability*. Literal meanings of ability utterances correspond to the ability classes. The pragmatics of ability utterances varies with the literal meaning, and can be used in understanding. The pragmatics of "recovery action" responses also varies with the type of ability, and whether it is changeable or not. In English, ability utterances can represent almost all speech act types. The ability taxonomy and associated pragmatics should be language-independent, while using ability utterances for speech acts may be language-dependent. Understanding ability is important for understanding dialogs with ability utterances and problem-solving dialogs.

The Messages of Ability to Understand  
with Applications to Higher Understanding  
John H. Miller

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Abstract

This paper investigates the nature of ability to understand. It is argued that ability to understand is a complex of abilities, each of which is itself a complex of abilities. The most important of these abilities are: (1) the ability to understand the meaning of words and phrases; (2) the ability to understand the meaning of sentences; (3) the ability to understand the meaning of paragraphs; (4) the ability to understand the meaning of books; (5) the ability to understand the meaning of the world. The ability to understand the meaning of words and phrases is the most basic of these abilities. It is the ability to understand the meaning of words and phrases that allows us to understand the meaning of sentences, paragraphs, books, and the world. The ability to understand the meaning of sentences is the next most basic of these abilities. It is the ability to understand the meaning of sentences that allows us to understand the meaning of paragraphs, books, and the world. The ability to understand the meaning of paragraphs is the next most basic of these abilities. It is the ability to understand the meaning of paragraphs that allows us to understand the meaning of books and the world. The ability to understand the meaning of books is the next most basic of these abilities. It is the ability to understand the meaning of books that allows us to understand the meaning of the world. The ability to understand the meaning of the world is the most complex of these abilities. It is the ability to understand the meaning of the world that allows us to understand the meaning of the world.

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## Summary

This paper investigates the ontology of *ability*. A taxonomy of the various types of ability is presented. Each ability is marked by the features *control* and *changeability*. Literal meanings of ability utterances correspond to the ability classes. The pragmatics of ability utterances varies with the literal meaning, and can be used in understanding. The pragmatics of “recovery action” responses also varies with the type of ability, and whether it is changeable or not. In English, ability utterances can represent almost all speech act types. The ability taxonomy and associated pragmatics should be language-independent, while using ability utterances for speech acts may be language-dependent. Understanding ability is important for understanding dialogs with ability utterances and problem-solving dialogs.

The corresponding literal meanings of “can” ability questions and statements, and the resulting implications for dialog processing and action modeling are investigated. The ability to perform an action includes: required knowledge, mental skill, physical capability, temporal resources, material resources, enabling situations, sufficient fortune, permission, and subaction ability; any of these can be meant by an utterance. Abilities are marked by the features *control* and *changeability*. Utterances are marked by tense, person, positive/negative polarity, and question or statement. The pragmatics of differently marked utterances varies with the ability meanings and is detailed. When agents are unable to perform actions, they and other sympathetic agents take *recovery actions*. The pragmatics of recovery actions are examined. Speech acts able to be represented by ability utterances are also examined.

Applications of the theory to dialog understanding and plan inference are discussed. Pragmatically ill-formed utterances interpretations are disallowed. In some cases, the pragmatics permits disambiguation of unsupplied person. Different meanings can also generate expectations for the content of the next utterance.

## 1 Introduction

Recently, much research has been done on the temporal and aspectual common-sense characteristics of actions [MS88][Nak88][Pas88]. However, before a particular action can be executed, an agent must be *able* to perform that action; previously this has not been investigated fully. This paper explores the phenomenon of ability, and utterances that express ability in their surface form. An ontological model of the different types of ability is presented. The ability modal is important not only for understanding isolated sentences describing specific situations, but also for dialog understanding. In particular, problem-solving dialogs are archtypically centered around the inability to perform a desired action. When the person with the problem is rendered *able* to perform the action, the problem disappears, and the dialog concludes; it is not necessary for the person to actually perform the desired action. A good theory of ability is thus an important first step toward a plan-recognition system that can understand problem-solving dialogs.

The theory is designed to assist an understanding system that will be used in a Japanese/English automatic telephone interpretation system.<sup>1</sup> Although this work analyzes English ability utterances, it is believed that at least Sections 3, 4, and 5 are language-independent, and should therefore apply to Japanese as well.

Section 2 discusses the overall concept of ability, and defines an ability utterance. Section 3 presents a taxonomy of different kinds of abilities, and the corresponding different possible literal meanings of an ability utterance. Section 4 discusses the pragmatics of the literal meanings of the ability utterances themselves. Section 5 discusses the pragmatics of possible classes of responses to negative ability utterances, known as *recovery actions*. Section 6 discusses the possible speech act types that ability utterances can communicate. Section 7 outlines the application of the theory to dialog understanding. Section 8 offers a brief discussion of the extensibility of the theory to covering other languages, such as Japanese. Section 9 gives a short comparison with previous works. A brief discussion of future work and the conclusion follow.

## 2 What is ability?

The ability to perform an action is (1) a description of a particular state or situation, in which (2) an agent is currently not performing that specified action, but (3) if the agent chooses to endeavor to execute the action, (4) that action will become an actuality. (If the agent is currently performing the action, naturally the agent is able to perform the action; however, the ability concept is cognitively and lexically blocked by the performance of the action itself.) Note specifically that ability is disjoint from volition (choosing to act). Ability, like time or action, is a fundamental concept.

An *ability utterance* is one in which ability is explicitly mentioned. Thus, in English, ability utterances contain “can” or “able to”. Although implicit ability utterances (e.g. “I don’t know how to X”, “I need to X”, or “I want to X” all implicitly mean “I can’t X (yet)”) are significant, they are beyond the scope of this paper.

Ability as discussed in this work deals mostly with the ability of animate subjects to execute process- or accomplishment/achievement-type actions [Pas88]. Simple possibility statements, and ability statements with inanimate subjects, or where the modal argument is a stative verb or a state, are classified but not explored fully.

## 3 A Taxonomy of Ability

When an agent sets out to perform an action, there are always a number of prerequisites that must be satisfied for the performance to be successful. These include having the appropriate mental skill, personal morals, physical capability, required knowledge, enabling situations, temporal resources, material resources, sufficient fortune, permission, and sub-action ability. These prerequisites will be termed the *abilities*. If required abilities are

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<sup>1</sup>Most of the examples will be taken from hypothetical conversations where a researcher is trying to register to attend a conference.

lacking, either the agent is unable to commence the action, or the action will not be completed successfully. Any one particular action may require only one or a subset of the listed abilities (for instance, “seeing a bird” only requires abilities number 3, 5, and 8). Usually, agents do not attempt to perform actions that they believe they are not yet able to do (but see [Mye88]). Ability is important for understanding intentions, future actions, plans, and cooperation.

Each ability type is marked by the *control* and *changeability* features. An ability that is known by a person, or is in the domain of a person, is under a person’s control. Control can belong to the speaker (SELF), the hearer (SECOND PERSON), a THIRD PERSON, or it can be SHARED. “Changeability” refers to whether the ability can be changed “in the short run”, e.g. within the time-frame of a single conversation. An ability’s changeability value can be YES or NO.

### 3.1 The Abilities

1. **Mental Skill.** The agent must have sufficient mental resources, action knowledge, and practice, to be able to perform the action. This category does not include “knowing how” to do an action. Strictly speaking, knowing how to do an action is separate from having the mental skill to do something. E.g., “I can’t bowl a 300 point bowling game”. Control: SELF; Changeable: NO (not in the short term).

2. **Conscience, Feelings, Personal Morals.** The agent must feel that he or she has the “right” to perform the action. E.g., “I can’t talk on the experts’ panel.” Control: SELF; Changeable: NO (not usually, in the short term).

3. **Physical Capability.** The agent must possess sufficient actuators, coordination, stamina, strength and power to be able to perform the action. E.g., “I cannot turn green (but a chameleon can)”. Control: SELF; Changeable: NO (unless tools are used).

4. **Required Knowledge.** It is necessary for the agent to know the referents of all the required variables in an action. This includes knowing their “identity”, and knowing their location (if the action is position-dependent). This includes “knowing how” to do the action. E.g., “I can’t register, I don’t know how.” Control: SELF; Changeable: YES.

5. **Enabling Situation.** The agent must have all required resources “at hand”, be at the place where the action is to take place, and not be otherwise constrained (e.g. by physical restraint, threats of reprisal, having something more important to do, etc.). In other words, the agent must be “all ready” to do the action. (Having a resource “at hand” is distinguished from simply having a material resource (7).) E.g., “I can’t register, I left my form at home.”

This category also includes the special case of “spontaneous” forms using verbs of perception or conception (“I can hear you.” “I can’t understand the announcement.”) or concerning the innate ability of inanimate objects (“This form can answer your questions.”) [Gak73]. Control: SELF; Changeable: YES.

6. **Temporal Resources.** The agent must have enough time to be able to perform the action. E.g. “We can’t send you the form by tomorrow”. Control: SHARED; Changeable: Sometimes, depends on situational constraints.



7. **Material Resources.** The agent must have all the instruments and objects that are required for performing the action. "I can't register, I don't have the form." Control: SHARED; Changeable: YES

8. **Sufficient Fortune.** This ability deals with the stochastic or uncertain nature of actions. An action must have a sufficient probability, or chance of certainty, such that it can be actualized within a reasonable amount of time. ("I can't roll a 6 with dice five times in a row.") Actions that are not considered uncertain or stochastic in the large grain can ignore this ability.

This category also includes simple possibility: "It is possible that", e.g. "Even a monkey can fall."

Control: SHARED; Changeable: YES, if the action is repeatable.

9. **Permission.** The agent must be "allowed" to do the action by the person or entity controlling the action. This entity could be a corporation, society, customs, an agreement, laws, etc. E.g., "Mormons can marry two wives." Action execution without permission does not count as successful execution. Note that there are two kinds of permission requests. The first is a simple request for information on the status of the permission; the second is a request to be granted the permission. Control: SECOND PERSON; or, THIRD PERSON (two types); Changeable: YES.

10. **Subaction Ability.** This is a special ability, different in kind from the previous ones. If a named action (by definition) consists of a conjunction of subactions, then in order to be able to perform that action, the agent must be able to perform all of the subactions. E.g. "I can't register, because I can't send in the money". Control: Special; Changeable: Special.

### 3.2 The Literal Meaning of Ability Utterances

The intended literal meaning of an ability utterance will correspond to one, or rarely more than one, of the types of abilities presented here. Thus, to understand an utterance (e.g., "I can't register"), an understanding system can posit an interpretation from each of the appropriate ability classes, and choose possible meanings from those that are consistent.

### 3.3 Discussion of Abilities

In general, the specific abilities required to perform an action are a function of the action itself. Actions can be broken down and classified using many different categories. One of the simplest classifications is physical vs. mental. Physical actions (such as "attend conference") will in general require most or all of the listed abilities in order to be performable. Mental actions (such as "give instructions"), on the other hand, typically do not require any physical capability nor physical material resources. In addition, mental actions do not normally require enabling-situation readiness, as everything (to a first approximation) that a person knows is already at hand (this discounts taking time to remember something forgotten, looking things up in a reference, or asking an expert), and usually do not require

appreciable temporal resources. Naturally, more explicit classifications (e.g., perceptual verbs, physical transfer verbs, etc.) will enable the required ability types for an action class to be fixed with more precision.

In many cases, analysis can be simplified by ignoring the abilities of conscience/personal morals, physical capability, and temporal resources. Permission and mental skill can also usually be ignored, except in cases where it is obviously relevant (e.g. attending a conference, or listening to foreign-language talks). In all cases, analysis should proceed based on a priori probabilities, as to which literal meaning is most likely.

## 4 Literal-Meaning Pragmatics

The pragmatics of an ability utterance vary with the literal meaning and the form of the utterance. Simple ability utterances should be marked by *tense*, *person* of the subject/agent [1ST/2ND/3RD], positive/negative *polarity* [+/-], and syntactic *question/statement* [Q/S].

Two general rules of speech act pragmatics are that one does not ask questions that one already knows the answer to, and that one does not tell another person something that one thinks that that person already knows [Sea85]. In general, (1) most adults know their own capabilities and abilities pertaining to *known* things under their control. Also, (2) this fact is common known—that is, it can safely be assumed by an understanding system to be *common knowledge* [GN87] or *shared knowledge* [All87]. Thus, under normal circumstances, first-person questions about abilities with a control of SELF, (“Can I breathe?”) and statements about abilities with a control of 2ND, are pragmatically ill-formed. However, it is possible to make first-person statements about abilities with a control of 3RD or SHARED.

Second-person statements about second-person-controlled abilities are questionable. They are permitted as encouragement, in case the action is unknown (see 4.1), as convincing statements, or during hypnotism.

Third-person ability statements are always well-formed (but presuppose that the second person does not otherwise know the stated assertion), except in the rare case where the third person’s ability is under the second person’s control. Third-person ability questions about first-person-controlled abilities are ill-formed.

Second- and third-person questions under the speaker’s control are normally ill-formed, but are permitted if they are rhetorical questions. (“Can you use my car tonight? I think not.”) The pragmatics of this class also varies with tense and aspect. It is acceptable to ask questions in the past, perfect, or past perfect, if it is presumed that the speaker has forgotten some event (“Could you use my car?”). Similarly, it is permitted to make past, perfect, or past perfect first person statements about second person control, if these are used as explanations/negotiations or it is assumed that the second person has forgotten an event (“I have been able to use your car.”) Also, first-person statements of second- or third-person-controlled ability phrased in the future tense that are used as threats are well-formed. (“I will be able to use your car!”)

## 4.1 Unknown arguments

All of these analyses assume that both the speaker and the hearer know and are familiar with the referents used in the ability phrase. If it is assumed that one of the people is unfamiliar with a referent, phrases that are normally pragmatically ill-formed are permitted. (For instance, "Can I understand the lecturer?" is normally a strange question—unless the speaker does not know who the lecturer is. )

## 5 Recovery-Action Pragmatics

A problem occurs when an agent is unable to perform a desired action. The agent may communicate the problem by using a negative first-person ability statement. That agent, and other agents cooperating with that agent, will attempt to *recover* from the ability failure by taking *recovery actions* to enable performance of the desired action[Mye88]. These also will usually take the form of communications. The class of recovery action taken depends on the specific ability or abilities that are causing the problem. Recovery actions must come from a class appropriate to the type of inability; other types of recovery actions do not make sense, and their corresponding utterances are pragmatically ill-formed. This class of restrictions can therefore be used to predict the type of utterances that will occur after the statement of a problem in a dialog, and can be used to exclude disambiguation candidates when they are pragmatically ill-formed.

1. **Mental Skill.** Since mental skill cannot be changed in the short term, the agent must get someone else who has the skill to do the task for the agent. In the long term, mental skill can be augmented by learning and practice.

2. **Conscience, Feelings, Personal Morals.** Morals also are usually not changeable. The agent must search for someone the agent feels "has the right" to perform the action. Another agent may try to convince the agent with the problem to change his or her mind, or the agent may try to establish reasons to convince himself or herself that the action is self-permissible.

3. **Physical Capability.** This cannot be changed without using tools. The agent must search for a tool capable of performing the action, or search for another agent that can perform the action.

4. **Required Knowledge.** The agent must find out the required knowledge. Although this can be done by consulting a reference, it is usually done by asking questions of an agent believed to know the required knowledge.

5. **Enabling Situation.** The agent must reach the correct location, procure and have all required tools and resources ready, and get rid of all obstructing constraints. Spontaneous perceptual problems are resolved by changing the physical situation, i.e. the physical relationship between the perceiver and the perceived object. Spontaneous conceptual problems are resolved by having another agent explain justifications and reasonings concerning the problem. Spontaneous innate ability problems are resolved by modifying the object, or by procuring a different object.

6. **Temporal Resources.** Temporal resources can only be changed by extending deadlines, rearranging schedules, or modifying the importance of scheduled items.

7. **Material Resources.** The agent must procure all instruments and objects required for performing the action. (Note again that even if the agent "has" a required instrument, it might not be "at hand"—thus the separate category of Enabling Situation.)

8. **Sufficient Fortune.** The agent must continue to endeavor to perform the action, i.e. keep trying.

9. **Permission.** The agent must ask for and obtain permission from the controlling entity. If denied permission, the agent must obtain permission from another entity, or repudiate the power situation [Ben83].

10. **Subaction Ability.** The agent must take the repair action appropriate for the particular subaction(s) that is (are) presenting a problem.

## 5.1 Discussion of Recovery-Action Pragmatics

In general, the abilities that are marked as changeable are usually taken care of by some action of the agent having the problem; whereas, those that are marked as unchangeable must be taken care of by asking another agent to perform an action for the first agent.

Recovery actions are complicated by the fact that sometimes agents change a problem into a new problem, rather than attempting to find a solution for the old one. For example, if a researcher needs a form in order to register for a conference, rather than send the form out the registration office could redefine the problem by granting permission to attend the conference without registering. Problem redefinition is beyond the scope of this paper.

A few examples are presented of statements of problems and pragmatically ill-formed responses (these are keyed by their classification):

1. "I can't understand Japanese."
- 2.\* "Oh, it's all right, just try it once and you'll like it."
3. "I use a wheelchair, and can't get up the stairs to the conference."
- 8.\* "Well, keep trying."
4. "I can't register, I don't know how."
- 3.\* "We'll send someone to register for you."
2. "I'm only a freshman, I can't talk at the conference!"
- 5.\* "We'll make sure that everything you need will be ready."
7. "I can't register, I lost my form."
- 6.\* "We'll give you more time. Hope you find it."
9. "Can I come to the conference?"
- 4.\* "I don't know. Do you know where it is?"

## 6 Speech Act Types

At first glance, it might appear that ability utterances in English are used to perform only a limited number of conventionalized speech acts<sup>2</sup>: ability statements/questions, permission requests/grantings, and action requests. However, this is incorrect. Ability utterances in English can readily be used to perform all but a small group of speech act types, including 28 out of the 37 classes presented by [Wie87].<sup>3</sup> In fact, it is easier to list the speech act types that have a hard time being represented by ability utterances, or basically cannot be represented. The marginal speech acts are: ordering-booking, accusing, attacking, promising, cursing, proving, naming, and betting. The speech acts that basically cannot be represented using ability utterances alone are: calling, thanking, forgiving, swearing, counting-as, count-enumerating, and baptizing. This information can be used to help determine the type of speech act of an ability utterance.

## 7 Applications of the Theory

In order to understand the flow of dialogs about actions and problems, it is important to understand the ability or lack of ability of the dialogs' subjects to perform actions. This is usually done by modeling the actions and their preconditions in the understanding system. However, previously the preconditions to performing an action have been determined and modeled in an ad hoc manner. Using the ability taxonomy presented here, a researcher can check the action to be modeled against the ability classes (1-10), and use these as guidelines to determine the appropriate preconditions required for the specific action. Each precondition should then be tagged with the type of ability requirement it represents; this can then be used for pragmatic-based understanding, disambiguation, prediction, etc.

It may be possible that certain particular classes of actions (e.g. communicating) will always require a particular subset of abilities. In this case, if a rich thesaurus of action classes can be determined and the upper levels classified as to required abilities, then new actions could be added into the thesaurus and their preconditions could be determined automatically or semi-automatically. This would be a first step towards automatic learning.

Alternatively, a default-based understanding system could assume that only standard abilities are needed for known actions, until a person in a dialog under observation presents a novel problem (inability) as a special case. That problem could then be classified according to this taxonomy, yielding a better understanding of the new problem, control and changeability information, predictions as to general recovery actions, etc. Thus an understanding system could start to deal with situations that had not been previously anticipated, using a default-based approach.

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<sup>2</sup>This assumes a normal simple sentence, without the inclusion of any speech-act performative verbs. Naturally, "I bet you I can do it" is a betting ability-utterance. The problem is, can "I can do it" represent a betting speech act by itself?

<sup>3</sup>These are listed in Appendix A.

## 8 Extending the analysis to other languages

It is claimed that the different abilities detailed in Section 3 are fundamental concepts, and that therefore they should be language-independent. In other words, all languages should have lexical or grammatical constructs to express ability, with the possibility of a general ability construct being partially or fully blocked by a specialization of one of the particular ability meanings (as permission is in English, with “may”). The literal-meaning and recovery-action pragmatics discussed in Sections 4 and 5 should therefore hold in an equally valid manner. A cursory analysis of the Japanese ability verb “dekiru” indicates that it can express all of the detailed literal-meaning abilities. So, given the literal meaning of a zero-pronoun utterance, the pragmatics can help disambiguate the agent person [1st/2nd/3rd].

The use of ability utterances to embody speech acts is less well-founded. It is unclear whether the speech act meanings are somehow fundamentally linked to the literal meanings of ability utterances, or whether they are linked mostly by convention (and are therefore culture- and language-dependent). For Japanese, although a preliminary investigation of “dekiru” shows that it can express at least offers, suggestions, requests, explanations, etc., a full analysis has yet to be performed.

## 9 Comparison with previous works

Dictionaries (e.g., [Mer76]) list some of the abilities detailed here, but do not distinguish execution-oriented abilities such as enabling situation, resources, or sufficient fortune. In addition, a dictionary does not distinguish control and its associated pragmatics, nor changeability and recovery-action pragmatics. Quirk et al. [QGLS85] classifies possibility and permission as separate from ability in “can” utterances, but again does not discuss a full breakdown of the abilities nor their pragmatics. Pollack [Pol87] discusses some concepts that fit under the classifications of abilities and recovery actions presented here, but does not describe ability categories. Moore [Moo80] distinguishes mental skill and required knowledge, and defines a CAN modal operator, but falls short of a full investigation. A large body of work in the logic literature has investigated *possible-world semantics* (e.g., [Moo80] [GN87]). Possible worlds conflate possibility with ability and typically ignore fortune and permission altogether; although they usually have a CAN operator that can represent possibility, they do not distinguish *why* it is possible, as represented here by the different abilities.

## 10 Future work

This paper has explored the meanings of explicit ability utterances where the subject is animate and the verb is a process or an accomplishment/achievement. There are a number of other senses of ability, represented in English by “can” and “able”, that have not been explored [Mer76]. These include:

- Uncertain low probability: “might”, or “may perhaps”, e.g. “Can the library book still be there after 20 years?”

- Logical or axiological ability, e.g. "One plus one can give two."
- State and stative arguments: "Olives can be green or black."

The difference between simple possibility and ability also needs to be explored more deeply. The current paper has assumed that action instances correspond directly to action archetypes with respect to abilities. This is not always correct. Also, although for simplicity ability has been presented here as binary, in reality it is a graded quality: partial ability is possible.

Specific future extensions of the theory include applying the CAN modal operator to plan recognition of problem-solving dialogs, extending ability recognition to cover implicit ability utterances, and integrating CAN with the operators WANT, DECIDE, WILL, INTEND, PROMISE, and CHOOSE-TO. The paradox of how an agent can PROMISE to do something the agent knows at present it CAN'T do must be explained. (For example, see the following pragmatically-ill-formed dialogue:

Office: I will send you the form.

Caller: Thank you very much. I have every confidence in you.

Office: Thanks. Please give me your name and address. NO, DON'T HANG UP--

Caller: <Click>

)

## 11 Conclusion

This paper has discussed the ontology of ability. A taxonomy of the different classes of abilities has been proposed. Each ability is marked by the features *control* and *changeability*. Literal meanings of ability utterances correspond to the ability classes. The pragmatics of ability utterances varies with the literal meaning, and can be used in understanding. The pragmatics of "recovery action" responses also varies with the type of ability, and whether it is changeable or not. In English, ability utterances can represent almost all speech act types. The ability taxonomy and associated pragmatics should be language-independent, while using ability utterances for speech acts may be language-dependent. Understanding ability is important for understanding dialogs with ability utterances and problem-solving dialogs.

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## A Speech Acts that can be communicated using Ability Utterances

The types of speech acts that ability utterances can readily express in English include the following categories:

1. Informing (telling, stating, reporting, asserting, etc.) or querying (guessing, etc.) concerning the abilities (ability, capability, requisite knowledge, possibility, or the *status* of permission, etc.);
2. Informing of wanting, desiring, deciding, planning, or intending to perform the action;
3. Informing of problem, complaining;
4. Explaining;
5. Confirming/denying-truth, assuring, reassuring, or answering;
6. Requesting-, denying-, declaring-, and granting-permission to use temporal or material resources, or perform an action;
7. Advising, suggesting, discussing, calling-attention-to, scene-setting (for someone else), chatting, or complaining, bragging (for oneself);
8. Requesting, pleading, wishing, inviting, negotiating, summoning, recommending, or ordering (someone else) to perform an action;
9. Acceptance or rejection of request/.../order etc.;
10. Offering or negotiating to perform an action oneself;
11. Question-suspecting, arguing and convincing;
12. Mocking, blaming, exclaiming-about, or praising;
13. Hinting, implying, insinuating;
14. Admitting, confessing;
15. Reprimanding and rebuking;
16. Warning and threatening;
17. Conclude-summing-up, conclude-deducing, inferring, comparing.

Speech act types (except 2,3,8) are paraphrased from [Wie87]. Grouping was by this author.

As discussed in the paper, these can be distinguished by using the tense, subject person, polarity, and question/statement of the utterance. However, the pragmatics required is typically pragmatics due to the speech act, not due to the nature of the ability utterance, and so is not discussed here.

## B The Different Types of Present-Tense Simple Ability Utterances

This table presents all the permutations of simple ability utterances in the present tense. Utterances are marked by the features Person, Polarity, and Question/Statement, in addition to Tense. The meanings of these utterances are discussed in the body of the paper.

Utterance	Person / Polarity / Question or Statement
I can X.	1st / + / S
You can X.	2nd / + / S
S/He can X.	3rd / + / S
I can't X.	1st / - / S
You can't X.	2nd / - / S
S/He can't X.	3rd / - / S
Can I X?	1st / + / Q
Can you X?	2nd / + / Q
Can s/he X?	3rd / + / Q
Can't I X?	1st / - / Q
Can't you X?	2nd / - / Q
Can't s/he X?	3rd / - / Q
I can X?	1st / + / SQ
You can X?	2nd / + / SQ
S/He can X?	3rd / + / SQ
I can't X?	1st / - / SQ
You can't X?	2nd / - / SQ
S/He can't X?	3rd / - / SQ

Table 1: The Different Types of Present-Tense Simple Ability Utterances