Title

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Permalink

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 39(0)

Authors

Concannon, Shauna

Healey, Patrick G. T.

Purver, Matthew

Publication Date

2017

Opening Up and Closing Down Discussion: Experimenting with Epistemic Status in Conversation

Shauna Concannon (shauna.concannon@qmul.ac.uk),

Patrick G. T. Healey (p.healey@qmul.ac.uk) & Matthew Purver (m.purver@qmul.ac.uk)
Cognitive Science Research Group
Queen Mary University of London, United Kingdom

Abstract

Managing disagreement in conversation requires subtle linguistic and pragmatics skills. One key dimension is the degree of 'knowingness' with which people present their stance on an issue. It has been hypothesised that framing stances as 'knowing', i.e. with higher implied levels of speaker certainty limits the potential for challenge by others. We present the first experimental test of this hypothesis. Using a text based chat-tool paradigm and a debating task we are able to systematically manipulate how 'knowing' people's turns appear to one-another. The results show that 'knowing' stances tend to close off discussion leading to less carefully formulated, truncated turns, but do not reliably affect the range of solutions considered. Unknowing stances, by contrast, do not affect turn length or formulation but do encourage more deliberation and include more signals of certainty in the message contents.

Keywords: Dialogue; Interaction; Disagreement; Stance; Deliberation.

Introduction

During a debate people have choices about how they present their contributions. Amongst other things they can simply assert their position, they can modify it with a propositional attitude verb such as 'know' or 'think' or they can turn an assertion into a question rephrasing "'I think X" as "Do you think X?". These choices of attitude and modality all help to establish what a person's stance is and, in combination with the choices made by their interlocutor, set the tone and direction of a debate. One of the most important hypotheses about the impact of different stance markers on dialogue relates to expressions of epistemic certainty; framing of a stance as 'knowing' or 'unknowing' appears to significantly alter the deliberative quality of a discussion Heritage (2012a).

Although the interactional dimensions of stance have been discussed in some detail (Du Bois, 2007; Englebretson, 2007; Kärkkäinen, 2003), this work is based on case studies and corpus analyses. The causal *effects* of adopting different stance markers on the subsequent trajectory of a dialogue has not, as far as we are aware, been directly tested. One key reason for this is the practical difficulty of manipulating stance markers in a live dialogue. Here we use a technique introduced by Healey et al. (2003) that takes advantage of the potential of text-chat for enabling selective manipulation of people's turns, including the addition of stance markers, without their awareness. We use this technique to to assess how the epistemic status of a stance, i.e. whether it is framed as either *unknowing* or *knowing*, impacts on the quality of the joint action and deliberation in discussion dialogues.

Knowing vs *unknowing* epistemic status

Heritage (2012a) defines 'epistemic status' as the relative positioning in which "persons recognize one another to be more or less knowledgeable concerning some domain of knowledge". Knowing all (K+) is typically conveyed through declaratives, while interrogative grammatical format is the most explicit way that a speaker can embody an 'unknowing' (K-) epistemic status. For example, the question 'what time is your appointment' positions the speaker in request of information, where as 'your appointment is at 3pm' positions the speaker in a K+ position. However, as highlighted by Drew (2012), how much speakers know relative to one another is not only encoded in the grammatical format, but also in incongruities between epistemic status and grammatical format, for example in posing a question to which you already know the answer (e.g. 'Aren't you going to be late?'). Speakers' relative positioning can alter from moment to moment, and be "disassembled by persons who deploy epistemic stance to appear more, or less knowledgeable than they really are" (Heritage, 2012a). There are significant potential social and interactional implications of positioning ourselves or others as either knowing or unknowing (Levinson, 2012).

In issuing a question the requester assumes an unknowing epistemic status and positions the recipient in a knowing one (Heritage, 2012a), creating an obligation for the recipient to respond (Levinson, 2012). Levinson (2012) observes that people prefer polar questions to other forms that require more knowledge-rich responses and often disguise them as assertions, thus demonstrating an unwillingness to locate oneself in an unknowing position, nor to impose too greatly upon an interlocutor by demanding a response. However, in a discussion context, in which individual contributions on the topic under discussion are warranted and expected, the ways in which requests are made could be influential to the deliberative quality of the discussion.

Furthermore, between the most explicit formats of K+ and K- constructions (i.e. declaratives and interrogatives), there are a range of other ways that speakers can encode epistemic stance, such as modals, hedges and epistemic adverbs, which can convey levels of speaker certainty, e.g. 'It was definitely red', and commitment 'I absolutely think...' and evidential markings which convey the source of a knowledge claim (i.e. direct evidentials based on sensorial/ visual evidence and indirect evidentials, such as inference and hearsay). Particularly within a discussion context the management of imbal-

ances in epistemic status is particularly pertinent as participants' contributions must necessarily negotiate alternative stance positions.

Stance and Disagreement

Work in the emergent field of interactional linguistics posits that stance-taking is a fundamentally intersubjective process, with stance positions being co-constructed through interaction (Englebretson, 2007; Du Bois, 2007). This process of stance co-construction relies upon the expression of oppositions and alternatives. Disagreement is one perspicuous social activity which denotes the negotiation of differing stances and a potential process by which a shift in stance can occur. Disagreement is generally minimised in conversation (Pomerantz, 1984; Concannon et al., 2015a), and tends to be problematic when issued without mitigation (Chiu, 2008; Concannon et al., 2015b). However, in certain contexts, such as problem solving and discussion tasks, it can be important for advancing the deliberative quality of a dialogue and encouraging novel contributions (Chiu, 2008).

There is thus a delicate balance between mitigating the socially problematic aspects of disagreement while still being able to identify and resolve differences of opinion. This balance can be achieved in many different ways. Resources such as 'well'-prefacing (Pomerantz, 1984), stance markers such as 'I think' (Kärkkäinen, 2003) and reported speech (Holt & Clift, 2007; Concannon et al., 2015b) all provide less explicit ways of marking what follows as potentially incongruous or in opposition to what went before.

Marking Stance in the Balloon Task

The task chosen for the experiment reported below is the Balloon Task. Participants are presented with a fictional scenario in which an hot air balloon is losing altitude and about to crash. The only way for any of three passengers to survive is for one of them to jump to a certain death. The three passengers are: Dr. Nick Riviera, a cancer scientist, Mrs. Susie Derkins, a pregnant primary school teacher, and Mr. Tom Derkins, the balloon pilot and Susie's husband. The advantages of this task are that it is effective at generating debates between subjects and there is good scope for deliberation. To ensure we chose a relatively natural manipulation of epistemic stance for this task an initial analysis was conducted using control condition transcripts from previous balloon task discussions. Twelve transcripts were analysed for markers that conveyed 'knowing' or 'unknowing' states in relation to stance marking. 'I think' was frequently used as a resource to mark a stance position. 'I think' has been attributed a dual function, and can can also act as a hedge (Holmes, 1990), however in the discussion context it was used most frequently to convey a knowing stance, particularly when at the beginning of a turn.

(1) a. *I think* Tom should definitely stay in the balloon

   b. *I think* Nick should definitely be the one to go

c. *I think* because there's an element of risk with whether Nick will actually end up coming up with a cure for cancer ... There's no point taking two risks by then letting go of Tom

d. *i think* we have a couple mins left

e. A: so tom has to jump?
   B: *i think* so

In 1a, 1b and 1c the marker 'I think' serves to accentuate the propositional content and emphasise the speaker's commitment to their proposition and focuses on a substantive aspect, namely, who should be sacrificed. In 1d and 1e, however, the marker performs the opposite effect and suggests a lack of speaker commitment and acts as a hedging marker. There were 44 instances of 'I think' in the transcripts, 34 instances (77.27%) served to emphasise the propositional content it was associated with, eight instances (18.18%) acted in a 'hedging' or *unknowing* capacity, and the two remaining instances made manifest the cognate processes (e.g."whenever i think that nick should go, i think 'Are susie and tom really that important?'"). Of the 44 instances, 25 were turn-initial (56.82%), 19 of which served to emphasise the speaker's ownership and commitment to the content that followed. Four instances of turn-initial 'I think' (20%) were constructed in such a way that 'I think' functioned as a hedging marker and two instances were not possible to classify due to insufficient context (e.g. 'I think overall'). Closer inspection of the use cases showed that all instances of turn-initial 'I think', in which the proceeding content featured a character from the scenario, conveyed a 'knowing' stance. As such, using 'I think' as a turn-initial insertion for turns which contain a mention of one of the scenario's characters, should increase the likelihood of a consistent effect of framing the utterance as 'knowing', rather than performing a hedging effect.

While looking for markers which served to downgrade the epistemic strength of assertions, 'do you think' was one such 'unknowing' device that was used in the transcripts.

A: do you think the married couple would gang up on the doctor and throw him out
B: maybe. he is their friend though

'Do you think' makes a minimised contrast pair with 'I think' and can be inserted at a turn-initial position without changing the content of the turn. Consequently, 'I think' and 'do you think' were selected as our turn-initial inserts, to perform the role of framing the proceeding content as more or less 'knowing'.

Hypothesis

Following Heritage (2012b) our general hypothesis is that framing a proposition as *unknowing* invites elaboration, sequence expansion and further discussion of the topic at hand (Heritage, 2012b). Conversely, a more *knowing* epistemic

stance, creates pressure for confirmation and sequence closing. As such, we predict that inserting 'knowing' and 'unknowing' stance markers will have different impacts on the course of a conversation even where, counterfactually, nothing about the content of the modified assertions is changed.

The analysis of previous dialogues enables us to operationalise our general hypothesis about the level of knowingness with which opinions are presented and inform the following predictions:

1. Fewer possible solutions will be considered when contributions are framed as knowing and responses will be less considered; this should affect turn formulation, with shorter typing times and less editing of turns. Framing contributions as knowing will close down the dialogue, as indicated by shorter and fewer turns.

2. Framing contributions as unknowing will open up dialogues, leading to longer turns and more possible solutions considered.

3. More possible solutions will be considered and more care will be taken in the construction of turns, as evidenced by slower typing times and more edits when contributions are introduced with an unknowing preface ('do you think X').

4. Framing contributions as unknowing will lead to higher frequencies of certainty and uncertainty markers.

Method

In this experiment, to see how the epistemic framing of a contribution affects levels of deliberation in dyadic text-based conversations, participant contributions were manipulated using the DiET chat tool.

The DiET chat tool

The participants communicate via a specially programmed chat tool, similar to other instant messenger interfaces they may have used previously. The Dialogue Experimental Toolkit (DiET) chat tool is a text-based chat interface facilitating real time manipulations of the dialogue. It is possible to programme several different types of interventions using the chat tool: turns may be altered prior to transmission, turns may not be relayed, and additional turns may be added, (e.g. Healey et al. (2003), insertion of spoof clarification requests). These manipulations occur as the dialogue progresses, thus making them minimally disruptive to the sequence of dialogue.

Design

The experiment was conducted in pairs, with 10 dyads per condition. Pairs of participants were presented with a discussion task and instructed to discuss for 30 minutes and attempt to come to an agreement. Each pair of participants was assigned at random to one of three conditions; i) *Control* ii) *Knowing* iii) *Unknowing*. In the Control condition there were no interventions performed by the server; participants

received the dialogue turns exactly as they were typed. In the Knowing condition turn-Initial 'I think' insertions were made and in the Unknowing condition 'Do you think' insertions were added turn-initially. Manipulations were carried out every four turns, if and only if the turn included a reference to one of the characters in the scenario (e.g. Doctor, Susie, etc.). Interventions are not visible to the individual whose turn has been manipulated, only the recipient, so that there is no awareness that turns are being intercepted before being relayed. A pilot study was conducted to establish the acceptable frequency of interventions.

Subjects and materials

The experiment was carried out on thirty pairs of students (41 females and 19 males) from the University of London who each received £7.50 or course credits for providing an hour of their time. They were invited to attend with someone they already knew to increase the likelihood that inter-pair participants were acquainted. All subjects were native speakers of English. Pairs of participants were seated at separate computers, at opposite ends of shared office[1] and given an instruction sheet detailing the balloon task (see above for a description). Participants were told to take as much time as they needed to read the summary of the situation and then discuss with their partners via a chat tool set up on the computer at which they were seated.

Analysis

The DiET chat tool records all interventions and key presses, including edits made before participants press ENTER. For a simple measure of authorial commitment counting frequencies of epistemic adverbials, modals and hedges were collected. Epistemic adverbials are separated into two categories (adapted from Biber et al. (1999); Biber & Finegan (1988)): those which express certainty (e.g., surely, obviously) and those which express anything less than certainty, such as possibility or probability (e.g., maybe, probably). Our separation between those that express certainty and possibility is to acknowledge that through probability there is less authorial commitment. *Uncertainty Markers* therefore include uncertainty adverbials as well as modals ('may', 'might' and 'could') and hedges ('quite', 'sort of', etc.), but certainty and uncertainty adverbials are also presented individually for comparison[2] Obvious typographical errors were corrected to

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[1]The experiment took place in an open plan office and there were other colleagues working quietly in the room. Participants were made aware of this before the experiment started, so that they were not distracted by this.

[2]The full list of words and phrases used for each category, are as follows:- Certainty adverbials: *absolutely, actually, certainly, clearly, plainly, definitely, evidently, indeed, obviously, really, surely, undoubtedly, unquestionably, for certain, for sure, of course*; Uncertainty adverbials: *allegedly, apparently, arguably, conceivably, inexplicably, likely, maybe, perhaps, possibly, potentially, presumably, probably, reportedly, seemingly, supposedly*; Uncertainty modals: *may, might, can, could* and Hedges: *quite, sort of, kind of , might, a bit, a little bit, just, at least, approximately, about, around, something like, almost, pretty, sometimes*.

increase the accuracy of the frequency counts (e.g. possibiliyt –> possibility). The inserted fragments were also removed from the transcripts before frequency counts were conducted, to ensure that the figures reflected only what the participants actively contributed.

The decision processes were hand labelled for each conversation to detect the decision patterns for each participant. The transcripts were hand coded for the solutions being considered (for example, Undecided, Kill Tom, Kill Susie, Kill Nick) and the number of shifts from one solution to another during the conversation (e.g. Kill Susie –> Undecided –> Kill Tom). Furthermore, turns were counted in which participant A and B had matching or opposing stance states. Time spent in an undecided state, even if both participant A and B both were undecided is not counted as a matching stance as it is unclear what their current stance is. A matching stance would only be A: Tom B: Tom; A: Nick B: Nick or A: Susie B: Susie.

Results

Table 1 provides the means for total number of words typed, turns and average words per turn per participant, the mean typing time in milliseconds, the speed of typing and details of the various self-edits participants made during turn construction, such as deletion and insertion of characters before pressing send to relay the message to their partner. Standard Deviations are provided in parentheses.

Table 1: Message construction data, per participant

	Control	Unknowing	Knowing
Total Words	618.30 (182.12)	641.95 (160.28)	649.05 (196.08)
Total Turns	81.05 (35.91)	74.35 (34.57)	94.65 (37.50)
Words/Turn	8.71 (4.43)	9.45 (3.62)	6.65 (1.87)
Type Time	16005.50 (8118.06)	17279.88 (10793.22)	12988.29 (5300.58)
Type Speed	3.09 (0.88)	3.71 (1.17)	3.26 (0.81)
Self-edits(Ins)	0.25 (3.79)	0.31 (0.68)	0.03 (0.10)
Self-edits(Del)	53.32 (125.10)	73.38 (169.25)	20.41 (49.01)

Word counts A nonparametric Kruskal Wallis independent samples test shows that there is a significant omnibus effect of condition on the number of words typed per turn ($H_{(2)}$ = 7.475 , p= 0.02). A post hoc pairwise comparison using Dunn's test shows that there is a significant difference in the number of words per turn between the Knowing and Unknowing cconditionondition, with Knowing dialogues containing fewer words per turn and Unknowing dialogues containing more words per turn (p= 0.02). There is no significant difference between the number of words typed per turn in the

Control and Unknowing conditions (p= 0.74), nor Knowing and Control conditions (p= 0.35). A nonparametric Kruskal Wallis independent samples test shows that the total number of words typed was not significantly affected by the condition ($H_{(2)}$ = 0.283, p= 0.87) and there is no significant effect of condition on the number of turns per dialogue ($H_{(2)}$ = 3.556 , p= 0.17).

Typing time Typing time averaged by participant was analysed using a Generalised Linear Mixed Models analysis (GLMM) with a Gamma distribution because the timing data was positively skewed. Participants was included as a random factor and condition as a fixed factor. This shows a clear main effect of condition (F(2,59)=13.18, p<0.00). The estimated marginal means are: Control: 12,139, Unknowing: 13,404 and Knowing: 8,813. Pairwise Contrasts show that the Knowing condition has shorter typing times than Control (t = -3.606, p<0.00) and shorter than the Unknowing condition (t = -4.87, p<0.00) but Unknowing and Control are not reliably different (t = 1.16, p=0.25).

Self-edits The mean number of self-edit insertions per turn is substantially lower in the Knowing condition than the Control and Unknowing conditions. A Kruskal Wallis test shows that there is a significant omnibus effect of condition on the number of Self-edits (Inserts) per participant ($H_{(2)}$ = 7.761, p=0.02). A post hoc pairwise comparison using the Dunn's method shows that there are significantly fewer Self-edits (Inserts) in the Knowing condition than the Unknowing condition (p=0.04), but no significant difference between Knowing and Control (p=0.06), nor Unknowing and Control condition (p=1.0). The mean number of self-edit deletions per turn is higher in the Unknowing condition than the Control and Knowing conditions. However, a non-parametric Kruskal Wallis test shows that there is no significant effect of condition on the number of Self-edits (Deletions) ($H_{(2)}$ = 4.560, p=0.10).

Epistemic Strength Table 2 provides mean frequencies of epistemic markers, adverbials of certainty, adverbials of uncertainty and combined uncertainty markers (adverbials,hedges,modals) per 100 words. A non-parametric

Table 2: Epistemic marker mean frequencies

Condition	Certainty Adverbials	Uncertainty Adverbial	Uncertainty Markers
Control	0.28 (0.25)	0.54 (0.32)	4.69 (1.12)
Knowing	0.33 (0.34)	0.55 (0.21)	4.60 (1.19)
Unknowing	0.67 (0.35)	0.65 (0.39)	4.69 (0.88)
Total	0.43 (0.35)	0.58 (0.31)	4.66 (1.04)

Kruskal Wallis test shows that there is an omnibus effect of condition on the frequency of certainty adverbs ($H_{(2)}$ = 7.501 p=0.02). A post-hoc pairwise comparison Dunn's test shows that there are significantly more certainty adverbs in

the Unknowing condition compared to the Control condition (p=0.04), but no significant difference in frequencies between the Control and Knowing (p=1.00), nor Knowing and Unknowing conditions (p=0.08). A non-parametric Kruskal Wallis test shows that there is no omnibus effect of condition on the mean frequencies of uncertainty adverbials ($H_{(2)}$ = 0.742 p=0.690) or combined uncertainty markers ($H_{(2)}$ = 0.148 p=0.93).

Deliberation quality Table 3 details the mean number of changes from a given stance position to another per participant over the course of the dialogue for each condition, as well as the total number of possible alternatives considered.

Table 3: Mean stance shifts during dialogue and possible solutions considered per participant by condition

Condition	Shifts in Stance	Solutions Considered
Control	4.85 (1.84)	3.10 (0.97)
Unknowing	6.80 (2.63)	3.30 (0.66)
Knowing	4.55 (1.61)	2.75 (0.55)
Total	5.40 (2.27)	3.05 (0.77)

There are a third more stance shifts in the Unknowing condition than the Control and Knowing conditions. A Kruskal Wallis non-parametric test shows that there is a significant omnibus effect of condition on the number of stance shifts traversed by a participant ($H_{(2)}$ = 9.559 p=0.008). A planned pairwise post hoc comparison using the Dunn's test shows that there are significantly more stance shifts in the Unknowing condition than the Knowing condition (p=0.01) but no confirmed significant effect between Unknowing and Control (p=0.06). There is an omnibus effect of condition on number of possible solutions considered ($H_{(2)}$ = 6.146 p<0.05). There are more possible solutions considered in the Unknowing condition than the Knowing condition (p=0.044). There is no significant difference between Knowing and Control (p=0.33) and nor Control and Unknowing (p=.1.00).

Table 4 provides details of the mean percentage of turns in which participant A and B had matching and opposing stance states across conditions.

Table 4: Mean percent of dialogue in which participant A and B had matching and opposing stances

Condition	Turns: Matching	Turns: Opposing
Control	39.42%	60.58%
Unknowing	48.27%	51.73%
Knowing	32.74%	67.26%
Total Mean	40.15%	59.85%

Although, the distributions show approximately 16% difference in the ratio of opposing and matching stances between Knowing and Unknowing conditions, with more turns covered with opposing stances in the Knowing condition and more matching stances in the Unknowing condition. A non-parametric Kruskal Wallis test find no significant effect of condition on the distribution of oppositional and matching stance states amongst participants ($H_{(2)}$ = 3.850 p=0.15).

Discussion

In line with our prediction, the results show that framing statements as unknowing led to more deliberation in the dialogues. Not only was there a higher numbers of shifts in stance, indicating a thorough deliberation going back and forth over the possible solutions, there was also a fuller exploration of the total possible solutions (i.e. participants in the Unknowing condition were more likely to consider all of the four possible outcomes, and consider each person to be ejected rather than just sticking to one or two).

The results show that the introduction of the knowing stance marker 'I think' leads to fewer words per turn, i.e. shorter, or more terse responses. In part this may be so to the declarative format, compared to the question format of 'do you think', which obligates a reply. The greater efficiency in the construction of dialogue turns suggests that the introduction of the knowing stance marker leads to more direct exchange of opinions, which is supported by the fewer edits during turn construction in this condition. Less care is taken in the Knowing condition to alter the message prior to relaying it to a conversational partner, perhaps leading to less delicately constructed or polite turns, but more direct and less guarded opinion exchange. The results show that prefacing statements with a knowing preface (i.e. 'I think') forecloses the conversation, while the framing of the contribution with do you think leads to more considered and extended responses.

Counter to our predictions there was no significant effect of condition on the frequency of expressions of uncertainty. However, significantly more certainty adverbials are employed by participants in the Unknowing condition compared to the Control condition. This suggests that framing contributions as unknowing creates an environment in which participants are more likely to make manifest their commitment to a stance by upgrading the epistemic strength of a statement through certainty adverbials; as solutions are discussed more and potentially co-constructed, once a stance is established it can be committed to with greater conviction by participants in the Unknowing condition. So, although the Knowing condition features less guarded and more direct messages as indicated in the manner in which they are constructed, it is in the Unknowing condition that participants commit more firmly to the substantive essence of their utterance.

Interpreting these results together suggests that the introduction of 'Do you think' opens up the dialogue, inviting further elaboration of the topic at hand, while introducing 'I think' closes down the dialogue and limits the deliberative quality of the discussion. 'Do you think' positions the speaker in a position of unknowing epistemic status, and also directly invokes the hearer to collaborate in the co-construction of a

joint stance. In the Unknowing condition stance positions are more explicitly emphasised through certainty adverbials, i.e. when something is important, participants take care to make clear the focus of their stance and their strength of commitment to a given proposition. In part this may be due to the fact that 'do you think' directly invites input and therefore greater care is taken to make clear exactly what the opinion to which they are attaching themselves is. The interactive negotiation of the stance is more exaggerated. Conversely, the introduction of 'I think' to the dialogue has the opposite effect: the presentation of a knowing stance, leads to less consideration and more conviction among participants, demonstrated through fewer edits when constructing responses and more terse and direct turns. Opinions are expressed plainly and without additional specification.

Conclusion

In this paper the causal effects of epistemic status, as expressed through particular stance markers, on the deliberative quality of a dialogue were investigated using an experimental approach. Framing a statement as unknowing has a significant impact on the deliberative quality of a dialogue and increases the likelihood that participants will consider multiple possible solutions, shifting their opinion more times before reaching a concluding stance. Furthermore, participants in the Unknowing condition, spent a larger proportion of dialogues considering one another's stance. This suggests that, within a discussion dialogue, the framing of a statement in a unknowing way can lead to a more flexible deliberation process and a greater willingness to engage with alternative viewpoints. Furthermore, while being more considerate of one another's views, this was not to the detriment of expressing a position with conviction, and actually led to greater displays of speaker commitment to a stance through certainty adverbials.

Framing a statement as knowing affects the ways in which individuals produce messages; specifically, they construct shorter and less edited responses. This suggests that there is less care taken in the construction of messages, and less conscientious effort put into producing polite, or considered turns. Shorter messages are typically more direct and the lack of editing may reflect decreased guardedness. By prefacing statements with 'I think', the context is set for the exchange of opinions; by introducing a stance with a knowing marker, the appropriateness for a response which is equally direct is established. Overall it seems that marking stances with a knowing preface leads to more direct and unguarded exchanges, but does not improve the deliberative quality of the dialogues. Conversely, prefacing statements with the unknowing preface 'do you think' encourages a more collaborative deliberation, in which more possible solutions are considered in turn before a final decision is reached.

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