Beliefs About a Speaker Affect Feeling of Another's Knowing

Lisette Mol (l.mol@tilburguniversity.edu)[1]
[1]Tilburg center for Cognition and Communication (TiCC), School of Humanities, Tilburg University
P.O. Box 90135, NL-5000 LE Tilburg, The Netherlands

Anna K. Kuhlen (anna.kuhlen@bccn-berlin.de)[2, 3, 4]
[2] Bernstein Center for Computational Neuroscience, Charité – Universitätsmedizin Berlin, Berlin, Germany
[3] Berlin School of Mind and Brain, Humboldt-Universität zu Berlin, Berlin, Germany
[4] Berlin Center of Advanced Neuroimaging, Charité – Universitätsmedizin Berlin, Berlin, Germany

Ruben van der Steen (r.p.vdrsteen@tilburguniversity.edu)[1]

Mike Obbens (m.p.obbens@tilburguniversity.edu)[1]

Abstract

People's estimations of how certain speakers are of their knowledge (FOAK) match speakers' own estimation (FOK) of how certain they are (Brennan & Williams, 1995). This is because others can interpret the verbal and nonverbal cues of (un)certainty that a speaker displays (Brennan & Williams, 1995; Swerts & Krahmer, 2005). Estimating another's certainty thus seems to be driven by the bottom-up processing of speaker-displayed cues. In this paper, we explore the top-down influence of beliefs about a speaker on judgments of a speaker's certainty. In a perception study, we varied whether a speaker's proclaimed profession would make him an expert or a novice on the topic he was questioned on. Such beliefs were shown to influence participants' ratings of the speaker's certainty, in addition to speaker-displayed cues. Thus, next to the bottom-up processing of speaker-displayed cues, the top-down processing of beliefs about a speaker influences judgments of others' certainty.

Keywords: FOK, FOAK, top-down processing, bottom-up processing, speaker-displayed cues, person perception.

Introduction

When watching the news on television or online, we often are informed by so-called 'experts' on the current topic, for example, an economist may comment on the Euro crisis and an architect may be interviewed on the progress of a construction site. Often, the person's expertise is displayed in a header once their contribution starts, or announced upfront by the newsreader conducting the interview. Does such knowledge of people's expertise affect our judgment of their certainty? And if so, does this effect depend on whether the expert displays certain or uncertain behavior?

This study assesses the influence of knowing another person’s expertise, on the judgment of their certainty when answering questions. We thereby test the influence of this factor relative to the verbal and nonverbal cues of uncertainty displayed by the person answering the questions (henceforth referred to as the 'respondent'). In the following, we first provide an introduction on the production and perception of cues of (un)certainty. Then we discuss the different types of processing involved in utilizing speaker-displayed cues, and in making use of beliefs about the speaker. This leads to our research question and hypotheses.

Displaying (Un)certainty

Sometimes, when unable to remember the answer to a particular question, we have a strong intuition that we do know the answer, despite our momentary inability to retrieve it from memory. This meta-cognitive phenomenon is known as feeling-of-knowing (FOK), (Hart, 1965). Participants' FOK has been shown to be a reliable predictor of whether they can later recognize the sought-after answer in a multiple-choice test (Blake, 1973; Hart, 1965). This shows that people's intuition on whether particular knowledge is stored in their memory or is absent from it, tends to be correct.

When sharing our knowledge with others, we tend to share our intuition on the certainty of this knowledge as well, by displaying auditory and visual cues of (un)certainty (Brennan & Williams, 1995; Goffman, 1967, 1971, 1978; Smith & Clark, 1993; Swerts & Krahmer, 2005). This may be done to save face in case of being incorrect, or to be as informative as needed, in accordance with Grice's maxim of quantity (Grice, 1989). FOK-ratings can be obtained by asking respondents how certain they are of their answer to particular knowledge questions (Hart, 1965). By matching such ratings to the auditory and visual behavior respondents exhibit while answering, characteristic cues of displays of (un)certainty have been identified. Auditory cues of uncertainty were shown to include: rising intonation, an initial pause, the use of fillers ("um", "uh"), hedging ("I think", "Most likely"), and self-talk ("Let's see, what was that again..."), (Goffman, 1978; Smith & Clark, 1993). Certainty, on the other hand, is displayed auditorily by the absence of such cues, and a falling intonation.

Visually, uncertainty can be displayed by rising the eyebrows, smiling (when recognizing the answer should be known), producing a marked facial expression (a 'funny-face'), and diverted gaze (Swerts & Krahmer, 2005).

Certainty is displayed visually by the absence of such cues (e.g., not diverting gaze), although particularly easy questions can also elicit smiles, which then signal certainty.

If these auditory and visual cues serve to convey a level of certainty to an interaction partner, it is expected that people can correctly interpret them.

Perceiving (Un)certainty

People are indeed sensitive to the cues of (un)certainty others display. The intuition we have of whether another person is likely to know the correct answer to a question, is known as feeling-of-another's-knowing (FOAK), (Brennan & Williams, 1995). FOAK-ratings can be elicited by presenting participants with other's answers and asking them how certain they are that the respondent gave the correct answer. This way, answers with rising intonation and longer response latencies were found to elicit lower FOAK-ratings than answers with falling intonation and shorter latencies (Brennan & Williams, 1995). Also, adding filled pauses to answers led to lower FOAK-ratings than adding unfilled pauses. Participants' FOAK-ratings were found to match respondents' own FOK-ratings (Brennan & Williams, 1995). Therefore, it seems that people can correctly interpret the auditory cues of (un)certainty others display.

When participants had access to both visual and auditory cues displayed by respondents, the accuracy of their FOAK-ratings increased as compared to when they had access to either auditory or visual information (Swerts & Krahmer, 2005). Thus, people can reliably estimate how certain others are of their knowledge, by interpreting their auditory and visual displays of (un)certainty.

Top-down vs. Bottom-up Processing of Cues

Next to speaker-displayed cues, more global information about a person's expertise can also inform inferences about this person's knowledge and credibility (for an overview, see Pornpitakpan, 2004). Along these lines, expectations concerning another person's knowledge can be guided by that person's presumed gender (Fussell & Krauss, 1992), age (Newman-Norlund, et al., 2009), or geographic origin (Isaacs & Clark, 1987). Also, previous experiences with the person shape expectations about what they are likely to know (Galati & Brennan, 2010; Metzing & Brennan, 2003). Beliefs about a person's expertise may therefore influence metacognitive assessments of that person's knowing in a top-down fashion.

In fact, global information may influence the interpretation of locally available verbal and nonverbal displays of (un)certainty. Along these lines, people have been shown to interpret a person's speech disfluencies differently if they can attribute them to a cognitive impairment (Arnold, Kam, & Tanenhaus, 2007). And speakers interpret their addressees' verbal and nonverbal feedback behavior based on the expected involvement of the addressees in the interaction (Kuhlen & Brennan, 2010; Kuhlen, Galati, & Brennan, 2012). Bottom-up processes informed by locally available verbal and nonverbal displays of knowing may therefore be shaped by top-down processes informed by global information about the respondents' expertise. Investigating how these two processes inform complex social judgments, such as assessing another person's knowledge, will contribute to our understanding of human social cognition.

Present Study

The present study assesses whether the top-down processing of global information affects judgments of others' certainty, *in addition to* the bottom-up processing of locally available cues. To this aim, we manipulated participants' belief about a respondent's expertise, as well as the locally available verbal and nonverbal cues, displayed by the respondent. Based on previous work (Brennan & Williams, 1995; Swerts & Krahmer, 2005), we expect the respondent's verbal and nonverbal displays of certainty to influence participants' FOAK-ratings in a bottom-up fashion. In addition, we expect that the interpretation of these displays is influenced top-down by participants' beliefs about the respondent's expertise. Lastly, since displays of certainty have been primarily described by the absence of cues of uncertainty, bottom-up processes may be less important when judging high-FOK as compared to low-FOK displays. Therefore, the top-down processing of global cues may affect FOAK-ratings differently for each type of display.

Below, we first describe how we created stimuli in which a respondent clearly displays verbal and nonverbal cues of high and low FOK. Then follows a description of the main experiment, in which we manipulated participants' beliefs about the respondent's profession, and thereby his expertise.

Method

Material

Selecting Knowledge Domains To elicit high- and low-FOK answers, a 30-year-old male tax advisor was interviewed on two domains relating to his interests: gardening and Dutch literature. In two separate pretests, participants were presented with a picture of the respondent and asked how likely it was that he was of certain professions. Ten professions were tested on either pretest, including gardener and Dutch teacher. Each pretest included 16 participants. On a six-point scale, participants rated the possibility that the respondent was a gardener (M = 3.50, SD = 1.14) equally likely to the possibility that he was a Dutch teacher (M = 3.50, SD = 1.41), $t(31)$ = .00, p = 1.00.

Participants also rated the professions (ten per test) for how knowledgeable someone of this profession would be in gardening and Dutch literature. A paired samples t-test revealed that on a six-point scale, a gardener was indicated to be more knowledgeable in gardening (M = 5.75, SD = .68) than a Dutch teacher (M = 2.69, SD = 1.35), $t(15)$ =

7.42, $p < .001$. Vice versa, a Dutch teacher was rated more knowledgeable in Dutch literature ($M = 5.89$, $SD = .34$) than a gardener ($M = 2.00$, $SD = .63$), $t(15) = 31.00$, $p < .001$.

Eliciting Audiovisual Displays of High and Low FOK The respondent was asked 40 multiple-choice questions on gardening, followed by 40 multiple-choice questions on Dutch literature. Multiple-choice questions were used to avoid non-answers (e.g., "I don't know") and to manipulate the difficulty of the questions. Each question had four alternatives, see examples (1) and (2). The respondent was instructed to say the answer out loud, e.g., "Blauwe regen". The experimenter asking the questions was located behind the respondent, such as not to give the respondent any cues of the answer being correct or incorrect. Answers were captured with a video camera situated in front of the respondent. After answering, the respondent indicated on a six-point scale how certain he was of his answer being correct, '6' indicating 'definitely correct' and '1' indicating 'definitely incorrect'. Following Hart (1965), this was taken as a measure of the respondent's feeling-of-knowing (FOK).

(1) Welke plant is giftig? (Which plant is toxic?) *A: Blauwe regen*, B: Geranium, C: Orchidee, D: Waterlelie

(2) Wie schreef in 1947 de roman 'De avonden'? (Who wrote the novel 'De avonden' in 1947?) A: Jan Cremer, B: Herman Bursselmans, C: Harry Mulisch, *D: Gerard Reve*.

This way, 40 answers were collected in each domain. Since the respondent never indicated a FOK-score of 1, answers with a FOK-score of 2 or 3 were regarded low-FOK and those with a FOK-score of 5 or 6 were regarded as high-FOK. Answers with a score of 4 were few and were disregarded. Sometimes, the respondent's answer contained information about the question being a multiple-choice question, for example "the first one". These responses were disregarded as well. For each domain, ten high- and ten low-FOK answers were then selected, based on their intelligibility and on how clear the displayed cues seemed to be. Whether these clips indeed included clear displays of high- and low-FOK was assessed in a third pretest.

Selecting FOK Displays In the third pretest, 20 native Dutch participants (ten female) watched clips of the 40 selected answers and indicated on a six-point scale how certain they were of the respondent's answer being correct. Following Brennan and Williams (1995), this was taken as a measure of participants' feeling-of-another's-knowing (FOAK). Since participants were only presented with the respondent's answers and not the questions asked, they had to rely on their estimation of how certain the speaker was (FOAK), to tell whether the answer was correct or not.

A 2 x 2 ANOVA with within-factors FOK (levels: high, low) and Domain (levels: gardening, Dutch literature) revealed a main effect of FOK on participants' FOAK-ratings, $F(1, 18) = 157.85$, $p < .001$, $\eta_p^2 = .90$, see Table 1.

Table 1: Mean (SD) FOAK-ratings in the pretest.

FOK:	Domain:	FOAK (*SD*):
High ($N = 20$)	Gardening ($N = 10$)	4.32 (.46)
	Dutch Literature ($N = 10$)	4.64 (.60)
	Total ($N = 20$)	4.48 (.11)
Low ($N = 20$)	Gardening ($N = 10$)	3.09 (.66)
	Dutch Literature ($N = 10$)	2.78 (.49)
	Total ($N = 20$)	2.93 (.10)

There was no main effect of Domain, $F(1, 18) = .001$, $p = .91$. Domain and FOK did interact, $F(1, 18) = 17.41$, $p < .001$, $\eta_p^2 = .49$. The difference in FOAK-ratings on high-FOK and low-FOK clips was larger for the Dutch literature than for the gardening domain, see Table 1. These results evidence that the clips contained speaker-displayed cues.

For each domain, those sets of clips were selected that participants rated most consistently as portraying either high- or low-FOK answers (assessed by Cronbach's alpha). This way, we could be most certain that our selected FOK displays contained informative cues about the respondent's feeling of knowing. Our final set of stimuli contained seven high-FOK clips for both domains, seven low-FOK clips for the literature domain and five low-FOK clips for the gardening domain. Unfortunately, we did not obtain more suitable low-FOK clips from the gardening domain.

Task

Participants' task in the main experiment was to judge the respondent's answers in the selected clips, indicating on a six-point scale how certainly the respondent's answer was correct: '1' indicating 'certainly incorrect' and '6' indicating 'certainly correct'. This way, we elicited participants' FOAK-judgments of the respondent's answers.

Design

The factors FOK (levels: low, high) and Domain (levels: gardening, literature) were manipulated within participant. The factor Profession (levels: gardener, Dutch teacher, profession not mentioned) was manipulated between-participants. An equal number of men and women participated in each condition. The order in which the two domains were presented was counterbalanced across each condition and across sex. Each participant saw the clips within a domain in a different, randomly generated order.

Procedure

The main experiment was conducted as an online survey. Participants received a link through email, which led them to the website of the experiment. Clips were grouped by domain. A short instruction, which announced the domain that the questions were in, preceded the clips in either domain. This instruction also included a description of the respondent, mentioning his age (30) and city of residence (Spijkenisse), along with, depending on the experimental

Table 2: Mean (SD) FOAK-ratings for answers in the Gardening domain.

Clips:	Profession:	FOAK
Gardening, Low FOK (N = 5)	Gardener (N = 24)	3.41 (.68)
	Not mentioned (N = 22)	3.16 (.93)
	Dutch Teacher (N = 22)	2.88 (.53)
	Total (N = 68)	3.15 (.75)
Gardening, High FOK (N = 7)	Gardener (N = 24)	5.37 (.58)
	Not mentioned (N = 22)	4.99 (.64)
	Dutch Teacher (N = 22)	5.08 (.57)
	Total (N = 68)	5.15 (.61)

Table 3: Mean (SD) FOAK-ratings for answers in the Literature domain.

Clips:	Profession:	FOAK
Literature, Low FOK (N = 7)	Dutch Teacher (N = 22)	2.41 (.58)
	Not mentioned (N = 22)	2.40 (.49)
	Gardener (N = 24)	2.35 (.47)
	Total (N = 68)	2.38 (.51)
Literature, High FOK (N = 7)	Dutch Teacher (N = 22)	5.11 (.50)
	Not mentioned (N = 22)	5.09 (.62)
	Gardener (N = 24)	4.93 (.67)
	Total (N = 68)	5.04 (.60)

condition, his profession. The experiment was self-paced and participants could view each clip as often as they wished. They indicated their answer by clicking a radio-button on a horizontally laid-out six-point scale, before proceeding to the next clip. After all clips had been rated, participants were asked for the respondent's profession (as a manipulation check) and for their own knowledge of gardening and Dutch literature.

Analyses

Data of participants who did not correctly remember the respondent's profession (five cases), or who mentioned a profession in the condition in which no profession was mentioned (four cases) were excluded from our analyses. Data from any non-native speakers of Dutch were excluded as well (four cases). Subsequently, data from a minimal number of participants were removed from the sample to ensure counterbalancing of sex, and order of presentation of the domains (seven cases). For this purpose, data from participants who participated last were eliminated first.

Participants

Our final sample contained data of 68 native Dutch participants (34 female). They were aged between 17 and 37 years old (M = 22.85, SD = 3.33) and did not take part in any of our pretests.

Results

Initially, we conducted a 3 x 2 x 2 ANOVA, with between-factor Profession (levels: not mentioned, gardener, Dutch teacher), and within-factors: Domain (levels: gardening, literature) and FOK (levels: high, low). This revealed a main effect of FOK, such that participants' FOAK-ratings were higher for high-FOK clips (M = 5.10, SD = .53) than for low-FOK clips (M = 2.71, SD = .44), $F(1,65) = 726.14$, $p < .001$, $\eta_p^2 = .92$. We also found a main effect of Domain, such that FOAK-ratings were higher for the gardening domain (M = 4.32, SD = .50) than for the Dutch literature domain (M = 3.71, SD = .05), $F(1, 65) = 42.47$, $p = .001$, $\eta_p^2 = .40$. Domain and FOK interacted, $F(1, 65) = 34.46$, $p < .001$, $\eta_p^2 = .35$. The difference in rating between high- and low-FOK clips was larger for the Dutch literature domain than for the gardening domain, see Tables 2 and 3.

Profession did not exert a main effect on participants' FOAK-ratings, $F(2, 65) = 1.01$, $p = .37$, $\eta_p^2 = .03$, revealing no overall differences in FOAK-ratings between the three conditions. As expected, Profession and Domain interacted, $F(2, 65) = 6.05$, $p = .004$, $\eta_p^2 = .16$. Because of the differential influence of domain on our main variables of interest (Profession and FOK), we analyzed each domain separately, by means of a 2 x 3 ANOVA with FOK as within-factor and Profession as a between factor. Pairwise comparisons were performed using least square differences.

Results for the Knowledge Domain Gardening

Table 2 provides an overview of the mean FOAK-ratings in the gardening domain. There was a main effect of FOK on FOAK, such that high-FOK clips (M = 5.15, SD = .61) were rated as more certainly correct than low-FOK clips (M = 3.16, SD = .75), $F(1, 65) = 316.78$, $p < .001$, $\eta_p^2 = .83$. Profession showed a main effect on FOAK, $F(2,65) = 4.56$, $p = .014$, $\eta_p^2 = .12$. Pairwise comparisons revealed that the respondent was rated as more certainly correct when he was labeled a gardener, than when he was labeled a Dutch teacher ($p = .005$), or when no profession was mentioned ($p = .033$). Ratings between the latter two did not differ significantly ($p = .499$). The factors FOK and Profession were not found to interact, $F(2,65) = .89$, $p = .416$.

Results for the Knowledge Domain Literature

Table 3 provides an overview of the mean FOAK-ratings in the Dutch literature domain. There was a main effect of FOK on FOAK, such that high-FOK clips (M = 5.04, SD = .60) were rated more certainly correct than low-FOK clips (M = 2.38, SD = .51), $F(1, 65) = 811.92$, $p < .001$, $\eta_p^2 = .93$. We did not find a main effect of Profession ($F < 1$, *n.s.*), nor an interaction between Profession and FOK ($F < 1$, *n.s.*).

To see if the null-result for Profession should be interpreted as evidence against our hypothesis, we conducted a Bayesian analyses on the difference between the Dutch teacher and gardener condition. In the gardening domain, an independent samples t-test showed higher FOAK-ratings for the gardener (M = 4.55, SD = .44) than for the Dutch teacher condition ($M = 4.16$, $SD = .37$), $t(44) = 3.26$, $p = .002$. In the literature domain, no difference was found between the gardener ($M = 3.64$, $SD = .44$) and Dutch teacher condition ($M = 3.76$, $SD = .42$), $t(44) = .961$, $p = .342$. Modeling the predicted effect in the literature domain as a normal distribution, with its mean equal to the effect in the gardening domain (.39), and a standard deviation of half this effect (also see Dienes, 2011), rendered Bf = .45. This indicates that the results from the literature domain do not discriminate between the null-hypothesis and the hypothesis of an effect of Profession on FOAK.

Results for Participants' Expertise

A paired samples t-test showed that on a 7-point scale, participants reported to be more knowledgeable in Dutch literature ($M = 3.90$, $SD = 1.56$) than in gardening ($M = 2.69$, $SD = 1.25$), $t(67) = 5.35$, $p < .001$, 95% CI = (.76, 1.66). Adding self-reported expertise as a covariate did not reveal an effect of this factor on participants' FOAK-ratings.

Discussion

Our results showed strong effects of the respondent's feeling of knowing (FOK) on participants' feeling of another's knowing (FOAK). Following the hypothesis that people make use of verbal (Brennan & Williams, 1995) and non-verbal (Swerts & Krahmer, 2005) cues when judging someone's certainty, this indicates that our clips contained clear speaker-displayed cues, which participants used to judge the respondent's certainty.

Going beyond the results of earlier studies, we found that beliefs about the respondent, specifically about the respondent's expertise, influenced participants' judgment of the respondent's certainty as well. When asked questions about gardening, the same respondent was rated as more certainly correct when participants were told he was a gardener, compared to when they were told he was a Dutch teacher, or when no information on the respondent's profession was provided. This shows that, in addition to the information that could be obtained from cues displayed by the respondent, participants' beliefs about the respondent's expertise influenced their judgment of how certain the respondent was of his answers. Therefore, top-down processes informed by global information about a speaker can influence assessments of another person's feeling of knowing too. This top-down effect held both for clips in which the respondent was uncertain of his answer (low FOK) and for clips in which he was certain (high FOK).

Our between-subjects manipulation of expertise allowed us to use the same clips in each condition, ensuring identical speaker-displayed cues and speaker attributes. Participants were randomly assigned to conditions, and our analyses did not show evidence for an overall difference in FOAK-ratings between the conditions. Hence, we are confident that our results cannot be ascribed to a priori differences between the three groups of participants.

People sometimes use their own knowledge to estimate others' knowledge (Fussell & Krauss, 1991; Jameson, Nelson, Leonesio, & Narens, 1993; Nickerson, Baddeley, & Freedman, 1987). In our study, participants reported having more knowledge on Dutch literature than on gardening. Nevertheless, they rated the speaker to be more certain in the gardening domain than in the Dutch literature domain. Entering participants' self-reported knowledge as a covariate did not render any significant results. Hence, reported effects seem unaffected by participants' own knowledge.

Follow-up studies need to assess if our results generalize to different respondents, domains, and beliefs. In this study, we only found evidence for an additional effect of beliefs about the respondent's expertise in one domain: gardening. We did not find this effect for the literature domain. However, a Bayesian analyses indicated that the results from the literature domain should not be interpreted as evidence against, nor in favor of our hypothesis. It seems that more factors are at play still, which attenuated the effect of beliefs about a speaker in this domain. One difference between the two domains was that the effect of speaker-displayed cues was even stronger in the literature than in the gardening domain. It may be the case that the role of beliefs diminishes when speaker-displayed cues are very clear. Future studies are needed to uncover what factors moderate the effect of beliefs about a speaker.

Our findings have important implications for our understanding of the social and cognitive processes involved in person perception. From a social perspective, it is striking that simple information, such as labeling someone as being an expert by assigning them a certain profession, can sway perceivers towards judging them to be more knowledgeable in their domain of expertise. This is in line with social psychological literature on persuasion, which shows that perceived experts are expected to provide information that is valid (e.g., Clark, Wegener, Habashi, & Evans, 2012; Hovland & Weiss, 1951). Our study thereby contributes to a better understanding of the mechanisms behind perceiving expertise and taking advice from experts (see e.g., Jungermann & Fischer, 2005). From a cognitive perspective, our study contributes to a growing literature on social cognition showing that the interpretation of social cues cannot be separated from global attributions about the person displaying these cues (Teufel, Fletcher, & Davis, 2010).

Previous work has suggested that the processing of nonverbal cues is shaped by top-down expectations about the person (Kuhlen & Brennan, 2010; Kuhlen et al., 2012). In these studies participants responded differently to similar nonverbal behavior of their conversational partners depending on how they had expected their partners to behave. In the present study, it is difficult to disentangle how exactly nonverbal cues are integrated with global beliefs about the respondent. Possibly, evidence from both top-down and bottom-up cues accumulates additively, swaying the perceiver's judgments in one or the other direction. Future work will investigate further how these two sources of information interact.

Conclusion

Our study showed that next to speaker-displayed cues of (un)certainty, beliefs about a speaker can also affect FOAK-ratings. This shows that people's feeling of another's knowing is affected both by the bottom-up processing of local cues displayed by the speaker and the top-down processing of global beliefs they have about this speaker.

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