Focus and the interpretation of quantifiers in face-threatening contexts

TANJA GULAN, PAVLE VALERJEV and IGOR BAJŠANSKI

Politeness theory defines face as a sense of positive identity or desired public image that people are motivated to maintain during social interaction. Many actions or utterances are possible threats to the face, so speakers often use linguistic politeness strategies that mitigate these threats. One of politeness strategies is hedging, or weakening a statement that a speaker knows to be true and which could present a threat to the face of the hearer. Bonnefon, Feeney, & Villejoubert (2009) showed that in face-threatening contexts expression *some X-ed* may be interpreted as *all X-ed*. The study aimed to investigate the interpretation of quantifiers *some*, *few*, and *a few* in face-threatening contexts. We expected that interpretation of *few* would differ from interpretations of *some* and *a few* due to the property of focus. One hundred and seventy-one participants read three scenarios and judged the appropriateness of quantifier use in different contexts. We replicated the results reported by Bonnefon et al. (2009): participants were more likely to endorse the inference from *some X-ed* to *all X-ed* in a face-threatening context than in a face-boost context. Similarly, *few X-ed* was more likely to be interpreted as *no one X-ed* in a face-threatening context. For *a few* there were no differences between the two contexts.

Key words: quantifiers, focus, politeness, face-threatening contexts

Natural language quantifiers (e.g., *few*, *many*, *not much*) and probability expressions (e.g., *likely*, *possible*, *not probable*) are used to communicate information about quantities, frequencies, and probabilities. A great deal of psychological research addressed the role of these expressions in communication and thinking. Some of the problems addressed include how quantifiers and probability expressions are mentally represented, the range of quantitative values they can convey in different contexts, how speakers choose appropriate expressions, how listeners interpret their meaning, and how they are used in reasoning and decision making (Geurts, 2003; Moxey & Sanford, 2000; Sanford & Moxey, 2004; Teigen & Brun, 1999, 2003). Empirical evidence suggests that these expressions are more than just vague expressions of quantities. In this paper we will focus on two functions of quantifiers: first, perspective effects due to quantifier focus, and second, the use of quantifiers as face-managing devices.

An important property of quantifiers which was studied in a series of studies by Sanford and Moxey (Moxey, 2006; Moxey & Sanford, 2000; Sanford, Dawydiak, & Moxey,

2007; Sanford & Moxey, 2003, 2004; Sanford, Moxey, & Paterson, 1996) is quantifier focus. Quantified sentences may bring to mind different sets that constitute logical representations of quantified sentences. For example, the sentence *some of the football fans went to the game* may refer to two sets: (a) the set of all fans who went to the game (*reference set*) and (b) the set of all fans who didn't go to the game (*complement set*). In this example, the reference set is more prominent than the complement set. In other words, it is in focus, and it can be referred to by pronouns. The sentence *they enjoyed the game* is acceptable as a continuation of the previous sentence, but *they watched it on TV instead* is not. However, the sentence *they watched it on TV instead* is acceptable as a continuation of the sentence *not all of the fans went to the game*. Moxey and Sanford have analyzed the focusing patterns of many natural language quantifiers with different methods, including the continuation task, reading time measures, and eye-tracking procedures. They concluded that quantifiers differ in focusing: quantifiers like *hardly any*, *few*, *not many*, *not all*, and *less than half* induce complement set focus, while quantifiers like *a few*, *many*, and *more than half* induce reference set focus. It is important to note that quantifiers which may refer to a similar range of quantities (*few* and *a few*; *almost all* and *not quite all*) can have different focusing properties. For example, *they watched it on TV instead* is a more appropriate continuation of *few of the fans went to the game* than of *a few of the fans went to the game*. Bajšanski and Valerjev (2011)

Tanja Gulan, Linguistics Department, University of Zadar;

Pavle Valerjev, Department of Psychology, University of Zadar, Obala kralja Petra Krešimira IV, 23000 Zadar, Croatia.
E-mail: pavle.valerjev@gmail.com (the address for correspondence);

Igor Bajšanski, Department of Psychology, University of Rijeka.

demonstrated similar patterns of sentence continuations for Croatian quantifiers *malo* (*few*) and *nekoliko* (*a few*).

The perspective effect comparable to the focusing patterns of quantifiers was demonstrated for verbal probability expressions and it was labeled as the directionality of probability expressions (Budescu, Karelitz, & Wallsten, 2003; Teigen & Brun, 1999, 2003). Positive probabilistic phrases (for example *probable*, *possible*, *likely*) differ from negative phrases (*improbable*, *doubtful*, *unlikely*) in the focusing of attention to the occurrence or non-occurrence of a described event.

The second function of quantifiers and their use as face-management devices was investigated by Bonnefon, Feeney, and Villejoubert (2009). Their research was motivated by politeness theory (Brown & Levinson, 1987). According to the politeness theory, each individual has a social face which is defined as a sense of positive identity or desired public image. People are motivated to maintain face during social interaction. Face includes two components: positive face and negative face. Positive face is the need to be liked and to maintain a positive self-image, and negative face is the need for autonomy and for the freedom of thought or action. Any action or utterance that threatens positive or negative face is called a face-threatening act. Acts that can be interpreted as impositions or restrictions are threats to negative face, and acts that can be interpreted as criticisms or disapprovals are threats to positive face. Many actions or utterances are possible threats, so speakers often use linguistic politeness strategies that mitigate those threats. Making offers, joking, giving sympathy, avoiding disagreement, and seeking agreement are some of the forms of positive politeness, or expressing friendliness and admiration. Apologizing and giving deference are examples of negative politeness, or avoiding impeding or imposing on others (Holtgraves, 2002).

One of the politeness strategies is hedging, or weakening a statement a speaker knows to be true and which could present a threat to the face of the hearer. Bonnefon and Villejoubert (2005) argue that when verbal probability expressions like *probably* or *possibly* modify face-threatening sentences they perform a face-management function of communication. Such probability phrases are used in these contexts not for communicating a judgment of likelihood but as politeness markers. Examples of the use of verbal probability phrases for hedging are: *it is possible that you are wrong* and *you will probably have to pay much more*.

Bonnefon and Villejoubert (2005) tested this assumption by analyzing the properties of membership functions of the probability expressions *possibly* and *probably* in neutral and face-threatening contexts. This approach is based on the assumption that probabilistic phrases are vague concepts which can cover a range of numeric probabilities. Wallsten, Budescu, Rapoport, Zwick, and Forsyth (1986) analyzed the meaning of probability expressions using membership functions, and this method was used in many later studies (e.g., Budescu et al., 2003). The membership function of a probability phrase (e.g., *likely*, *not probable*) assigns a real number to each numeric probability value between 0 and 1. This number represents the degree of membership of numeric probability in the concept defined by the phrase. The degree of membership is represented as a number between 0 and 1. A membership of 0 denotes numeric probabilities that are not in the concept of a probability phrase, whereas a membership of 1 refers to probabilities which are perfect exemplars of this concept, and other values between 0 and 1 denote intermediate membership. How are membership functions obtained? In a typical study, participants are asked to rate the combinations of numeric probabilities and verbal probability phrases. For example, they may be asked to rate how well the phrase *likely* describes the numeric probability 0.1, and this procedure is then repeated for other phrases and for the range of numeric values (0, 0.1, 0.2 ... 1). The ratings obtained are then scaled between 0 and 1.

Bonnefon and Villejoubert (2005) demonstrated that verbal probability phrases had different membership functions in face-threatening contexts than in neutral contexts. Their participants judged that sentences like *You will probably have to pay for the cinema tickets* (face-threatening context) refer to higher probabilities than sentences like *Next week Scotland will probably experience a major snow storm* (neutral context), as it was revealed by membership functions.

Bonnefon and Villejoubert (2006) showed that when a medical condition is qualified by a probability phrase, hearers assign higher numerical probabilities to more severe conditions. Participants were asked to imagine being told by the doctor that it might be possible that they will suffer from insomnia or deafness. Possible deafness was associated with higher probabilities than possible insomnia. Furthermore, 60% of the participants judged that the doctor was qualifying deafness as possible because she wished to be tactful, compared to 17% when the doctor was predicting possible insomnia. Thus, greater severity increases the chance that the probability phrase will be interpreted as a politeness marker rather than as an expression of uncertainty.

Juanchich, Sirota, and Butler (2012) proposed that in addition to likelihood communication and hearer face-management, verbal probabilities can also serve the speaker's interest by decreasing the chance of being blamed for an incorrect prediction. In five experiments they showed that different probability terms are often used as a speaker face-management device. In order to avoid being criticized for the wrong prediction, the speaker may use a verbal probability phrase to communicate a lower degree of certainty.

In addition to the politeness functions of verbal probabilities, Bonnefon et al. (2009) proposed that the quantifier *some* can also perform a face-management function. Sentences of the form *some A are B* are typically understood to mean that *not all A are B*. This inference is an instance of

scalar inference: when a speaker is not in the position to use a stronger item from an ordered scale (for example <*some, all*>), the speaker will then use a weaker item. Bonnefon et al. were interested in identifying the contexts in which people are not likely to endorse such an inference. They argue that the inference from *some X-ed* to *not all X-ed* is made less available when X threatens the face of the listener, and illustrate this with the following example:

A: What impression did I make during dinner?

B: Some thought you drank too much.

They tested this hypothesis in three experiments, and their results supported the hypothesis that *some X-ed* could be interpreted as *all X-ed* in face-threatening contexts. For example, 83% of the participants judged that the sentence *some people loved your poem* implied that not all loved the poem, compared to 58% when the sentence was *some people hated your poem*. Thus, in a face-threatening context people are less likely to endorse the inference from *some* to *not all*. Therefore, Bonnefon et al. (2009) demonstrated that speakers tend to construe the quantifier *some* as a hearer face-management device, in situations in which *all* implies a threat to the face of the listener.

Our hypothesis is that the opposite could be expected for negative quantifiers. In particular, we expected that *few* in face-threatening contexts could actually mean zero. For example, *few people liked your poem* could be interpreted to mean *no one liked your poem*. For the positive quantifier *a few*, similar interpretations were expected as for *some*.

This hypothesis is based on the Sanford and Moxey (2004) analysis of the problem of whether the meaning of quantifiers includes the null set. Some quantifiers, for example *less than five*, should include the null set. However, whether the semantics of quantifiers, such as *few* or *hardly any*, include the null set is not clear. They proposed that the inclusion of the null set may be tested with sentences such as *hardly anybody went to the meeting, if anybody did*. To the degree to which this seems acceptable, it is possible that the null set is included in the meaning of the sentence. Sanford and Moxey (2004) report on the unpublished data by Majid and Sanford, who investigated the acceptability of the sentence frame *(QUANTIFIER) of the people went to the meeting, if any*. Their results revealed a high acceptability for the quantifiers *few*, *hardly any*, *not many*, and *less than 30 per cent*, and low acceptability for positive quantifiers such as *all*, *many*, and *more than 80 per cent*. Contrary to their expectations, a relatively high acceptance was revealed for the quantifiers *some* and *a few*. The empirical question is which contextual factors influence the null set interpretation of different quantifiers. Following the results of Bonnefon et al. (2009), we propose that face-threatening contexts could influence the interpretation of the quantifier *few* in a way that they make the null-set interpretation more prominent.

The design of the following study was based on Bonnefon et al. (2009) second experiment in which they adopted the membership function approach for the analysis of the meaning of the quantifier *some*. Their scenarios described groups of six people. Participants read the critical sentences which referred to the described groups. These sentences were in the form *some people X-ed* in a face-boost context (*some people loved your poem*) and in a face-threatening context (*some people hated your poem*). The participants were asked to judge how likely it was that the speaker would use the word *some* if she knew that the number of people who loved/hated the poem was actually one, and this question was repeated for all values up to six. This approach allowed them to compute membership functions for *some* in different contexts. For the value of 6, membership ratings were higher in face-threatening than in face-boost context. We adopted the same approach, but we wanted to analyze membership functions for the quantifiers *few* and *a few* as well, and we included the value of 0 (*Zero people loved your poem*). In particular, we expected membership ratings for the quantifier *few* to be higher in a face-threatening context compared to the face-boost context for the value of zero. For the quantifier *a few*, we expected the same pattern as for the quantifier *some*.

METHOD

Participants

One hundred and seventy-one psychology students participated in the study for course credit. All participants were Croatian native speakers and the experiment was conducted in Croatian.

Materials and design

Three scenarios adapted from Bonnefon et al. (2009) were used in the study: poem, trip, and speech. For example, the poem scenario describes the situation in which a participant has to imagine joining a poetry club and that her poem is discussed by six other members of the club. After the discussion, one of the members states: *some people liked your poem*. Each scenario was combined with one of the six forms of critical sentences, obtained by combinations of three quantifiers and two conditions: positive and negative. Thus, critical sentences were in the following form: *(QUANTIFIER) people liked/didn't like your poem*. Two other scenarios and the ensuing critical sentences were created in a similar way. Half of the participants read three stories in a positive (*liked*) condition, and half in the negative condition (*didn't like*). Each story contained a sentence with one of the three quantifiers: *malo* (*few*), *nekoliko* (*a few*), and *neki* (*some*). Quantifiers were counterbalanced across these different stories. Each participant read each story with one quantifier. There were six experimental conditions, re-

sulting from the combination of the condition (positive vs. negative) and the quantifier. It should be noted that for the quantifier *malo* (*few*) positive conditions are face-threatening, while for the quantifiers *nekoliko* (*a few*) and *neki* (*some*) negative conditions are face-threatening.

Procedure

The study was conducted in small groups of participants. Within each group, approximately half of the participants were assigned to the positive group and half to the negative group. The participants were instructed to read three scenarios and to answer questions for each scenario. Membership judgments were collected after participants read each scenario. Participants rated on 11-point scale (anchored at *totally unlikely* and *totally likely*) how likely it would be that the speaker would utter a critical sentence if he knew exactly that the number of people who liked (or didn't like in negative condition) the poem was zero. This question was then repeated for each number of people up to six.

RESULTS

Membership judgments were assigned numeric values between 0 and 10, and membership functions were computed by averaging membership judgments across participants. Two groups of dependent measures were analyzed by the analysis of variance. The first group consisted of average membership ratings, and the second group consisted of peaks of membership functions. Average membership ratings were computed for each response option, i.e., for each size of the group between 0 and 6, as an average rating across all participants. Second, peaks of the membership functions were calculated for each participant and each quantifier as an average response option (group size) that were given the highest ratings.

First, we analyzed membership ratings for the group of six and zero separately for each quantifier. Figure 1 presents the function values for the quantifier *neki* (*some*) in the positive and negative condition. Critical analyses were carried out for the membership of 0 and 6 people. We expected that for the six people average membership ratings would be higher in the negative ("some people didn't like your poem") than in the positive condition ("some people liked your poem"), because the negative condition is face-threatening. No difference was expected for zero people. A two way ANOVA was conducted with average membership ratings as a dependent variable with group size (zero and six) and condition (positive and negative) as independent variables. A significant main effect of group size was obtained, $F(1, 169) = 44.75$, $p < .01$: ratings were higher for the group of six ($M = 2.62$, $SE = 0.27$) than for the group of zero ($M = 0.66$, $SE = 0.14$). The main effect of context was not significant, $F(1, 169) = 3.06$, $p > .05$. However, the interaction between two factors was significant, $F(1, 169) = 4.75$, $p < .05$. Post-hoc analysis (Duncan test) revealed a significant difference for the membership of six: the ratings were higher in the face-threat condition ($M = 3.21$, $SE = 0.37$) than in the face-boost condition ($M = 2.04$, $SE = 0.38$). Thus, we replicated the results of Bonnefon et al. (2009): participants judged that it was more likely that the speaker would utter *some people didn't like your poem* when the speaker knew that all six people didn't like the poem than
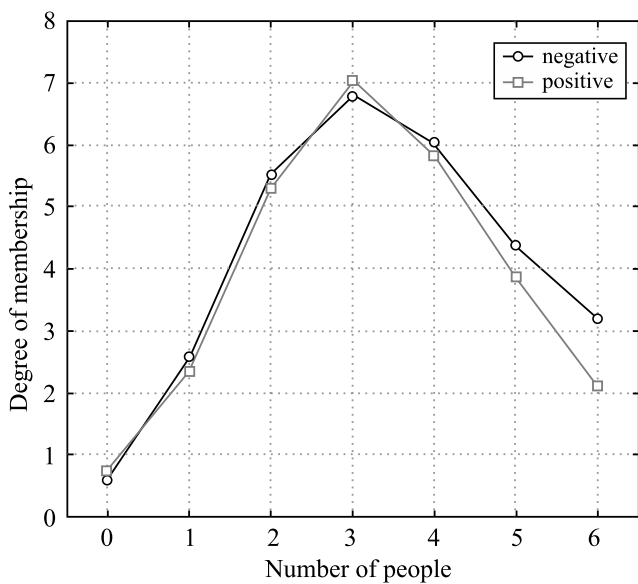

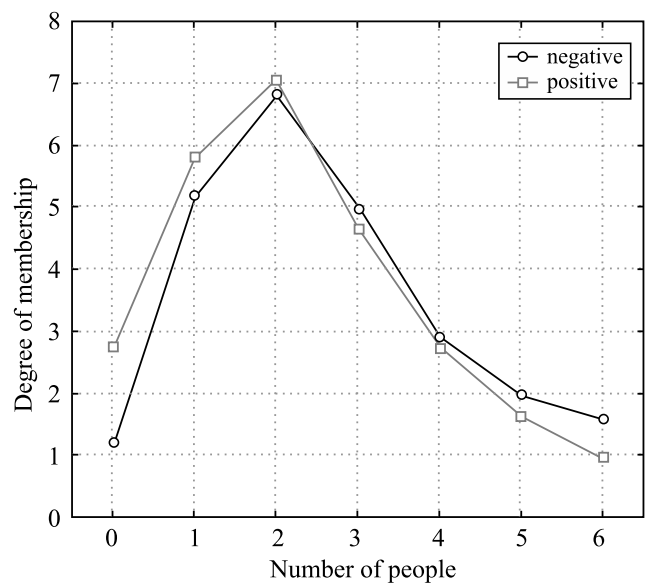*Figure 1*. Membership functions for the quantifier *neki* (*some*).

Figure 2. Membership functions for the quantifier *malo* (*few*).

if she would uttered *some people liked your poem* when she knew that all six people liked the poem. For the membership of 0, there was no significant difference between the face-threat ($M = 0.61$, $SE = 0.19$) and the face-boost context ($M = 0.71$, $SE = 0.20$).

Figure 2 presents the membership functions for the quantifier *malo* (*few*). We hypothesized that for zero people average membership ratings would be higher in the positive (*few people liked your poem*) than in the negative condition (*few people didn't like your poem*), and no difference was expected for six people, because the positive condition represents a face-threatening context. A two-way ANOVA revealed a significant main effect of the group size, $F(1, 169) = 4.53$, $p < .05$. Ratings were higher for the group of zero ($M = 1.95$, $SE = 0.24$) than for the group of six ($M = 1.23$, $SE = 0.20$). Although the main effect of condition was not significant, $F(1, 169) = 3.16$, $p > .05$, the interaction effect was significant, $F(1, 169) = 10.34$, $p < .01$. Post-hoc analysis revealed a significant difference between the positive and negative condition: membership of zero was 2.75 ($SE = 0.34$) in a face-threatening context and 1.15 ($SE = 0.34$) in a face-boost context. Participants judged that it was more likely that the speaker would utter *few people liked your poem* when she knew that zero people liked the poem than if she would uttered *few people didn't like your poem* when she knew that zero people didn't like the poem. For the group of six there was no significant difference.

Membership functions for the quantifier *nekoliko* (*a few*) are shown in Figure 3. Similar patterns of differences were expected as for quantifier *some*. A significant main effect of the group size was detected, $F(1, 169) = 32.95$, $p < .01$: rat-
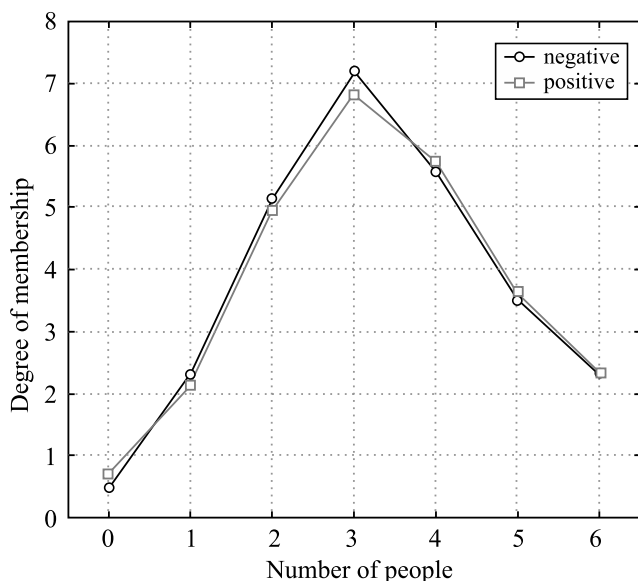
ings were higher for the group of six ($M = 2.33$, $SE = 0.26$) than for the group of zero ($M = 0.59$, $SE = 0.14$). Neither the main effect of context, $F(1, 169) = 0.19$, $p > .05$, nor the interaction between context and group size was significant, $F(1, 169) = 0.09$, $p > .05$. Therefore, contrary to our expectations, the quantifier *nekoliko* showed different membership patterns than the quantifier *neki*.

Second, we analyzed differences in the peaks of membership functions for each quantifier. The peak of the membership function is the average of the response values that were given the highest membership ratings. It was calculated for each participant, for each of the three quantifiers, as an average among all numerical values (0-6) that received the highest ratings. Thus, values obtained were used as dependent variables in three analyses of variance.

A two-way ANOVA was carried out with quantifier and condition as independent variables. The main effect of the quantifier was significant, $F(2, 338) = 261.37$, $p < .01$. The peak of the membership function was lower for the quantifier *malo* ($M = 2.23$, $SE = 0.10$) than both for *neki* ($M = 4.48$, $SE = 0.10$) and *nekoliko* ($M = 4.39$, $SE = 0.10$). Neither the main effect of condition, $F(1, 169) = 3.68$, $p = .06$, nor the interaction, $F(2, 338) = 2.20$, $p > .05$, was significant.

DISCUSSION

In this study we investigated the interpretation of the quantifiers *some*, *few*, and *a few* in face-threatening contexts. We expected that the interpretation of *few* would differ from the interpretations of *some* and *a few* due to the property of focus. The results of this study supported the hypothesis of Bonnefon et al. (2009) about the use of the quantifier *some* as a face-management device. We replicated their results, and obtained similar membership functions for the statements in the form of *some X-ed*. Participants judged that it was more likely that the speaker would say *some people didn't like your poem* when in fact each member of the group did not like it, than they would say *some people liked your poem* when all did. In a face-threatening context the quantifier *some* is not used to communicate information about the proportion of the people who liked the poem, or to implicate that some people did not like the poem, but to mitigate the threat to the face of the hearer.

We proposed that similar considerations could be applied to other natural language quantifiers as well. If this were the case, other quantifiers would be used also for politeness purposes. However, different interpretations were expected for quantifiers with different focusing properties. The results obtained for the quantifier *few* supported those claims: *few people X-ed* can be used to express that *no one X-ed* in a polite way when *no one X-ed* threatens the face of the hearer. It was expected that the quantifier *a few* would show similar membership functions as the quantifier *some*. However, our hypothesis was not confirmed. Membership

Figure 3. Membership functions for the quantifier *nekoliko* (*a few*).

functions for *a few* were almost identical in positive (face-boost) and in negative contexts (face-threat). A probable explanation is that *a few* cannot be used to denote zero or all, and is thus unsuitable for hedging statements of the form *all people X-ed*, or *no one X-ed*.

The results obtained in this study contribute to the growing evidence that quantifiers and verbal probability phrases play an important role in everyday communication as expressions of politeness (Bonnefon et al., 2009; Bonnefon, Fenney, & De Neys, 2011; Bonnefon & Villejoubert, 2006). Face-threatening acts may be modified with those expressions in order to soften their potential effects on the hearer. By using them the speaker reduces clarity and avoids directness, and as a result decreases the risk of offending the hearer. This lack of clarity and directness is a fundamental feature of language communication (Lee & Pinker, 2010). However, reducing clarity in favor of politeness in some situations may lead to misunderstandings with serious consequences (Bonnefon et al., 2011).

Further research should address the question of how other quantifiers are used in face-threatening contexts. Furthermore, the ways in which quantifiers and probability phrases modify other expressions that present a potential threat to both the positive and negative face of the hearer should also be the subject of further investigation. According to politeness theory, the magnitude of face threat depends on several dimensions: (a) the culturally influenced degree of the imposition of a particular act, (b) the social distance between the speaker and the hearer, and (c) the relative power of the hearer over the speaker (Holtgraves, 2002; Lee & Pinker, 2010). It can be hypothesized that these dimensions influence the interpretation of quantifiers and verbal probability phrases in face-threatening contexts. Finally, Juanchich et al. (2012) suggested that besides hearer face-management, verbal probabilities are often used as a speaker face-management device. Using verbal probability phrases like *probable* and *possibly* and thus communicating a lower degree of certainty decreases the risk of being criticized for a prediction which may prove wrong. Quantifiers such as *some* and *few* might also perform speaker a face-management function.

REFERENCES

Bajšanski, I., & Valerjev, P. (2011, September). *Fokus kvantifikatora i vjerojatnosnih izraza u hrvatskom jeziku* [Quantifier focus and directionality of probability expressions in Croatian]. Paper presented at the Experimental psychology days in Rijeka, Croatia.

Bonnefon, J. F., Feeney, A., & De Neys, W. (2011). The risk of polite misunderstandings. *Current Directions in Psychological Science, 20,* 321-324**.**

Bonnefon, J. F., Feeney, A., & Villejoubert, G. (2009). When some is actually all: Scalar inferences in face-threatening contexts. *Cognition, 112,* 249–258.

Bonnefon, J. F., & Villejoubert, G. (2005). Communicating likelihood and managing face: Can we say it is probable when we know it to be certain? In B. G. Bara, L. Barsalou, & M. Buciarelli (Eds.), *Proceedings of the 27th annual conference of the cognitive science society* (pp. 316–321). Mahwah, NJ: Erlbaum.

Bonnefon, J. F., & Villejoubert, G. (2006). Tactful or doubtful? Expectations of politeness explain the severity bias in the interpretation of probability phrases. *Psychological Science, 17,* 747–751.

Brown, P., & Levinson, S. C. (1987). *Politeness: Some universals in language usage.* Cambridge, England: Cambridge University Press.

Budescu, D. V., Karelitz, T. M., & Wallsten, T. S. (2003). Determining the directionality of probability words from their membership functions. *Journal of Behavioral Decision Making, 16*, 159–180.

Geurts, B. (2003). Reasoning with quantifiers. *Cognition, 86,* 223-251.

Holtgraves, T. M. (2002). *Language as social action*. Mahwah: Lawrence Erlbaum.

Juanchich, M., Sirota, M., & Butler, C. L. (2012). The perceived functions of linguistic risk quantifiers and their effect on risk, negativity perception and decision making. *Organizational Behavior and Human Decision Processes, 118*(1), 72-81.

Lee, J., & Pinker, S. (2010). Rationales for indirect speech: The theory of the strategic speaker. *Psychological Review, 117,* 785-807.

Moxey, L. M. (2006). Effects of what is expected on the focusing properties of quantifiers: A test of presupposition-denial account. *Journal of Memory and Language, 55*, 422-439.

Moxey, L. M., & Sanford, A. J. (2000). Communicating quantities: A review of psycholinguistic evidence of how expressions determine perspective. *Applied Cognitive Psychology, 14*, 237-255.

Sanford, A. J., Dawydiak, E. J., & Moxey, L. M. (2007). A unified account of quantifier perspective effects in discourse. *Discourse Processes, 44*(1), 1–32.

Sanford, A. J., & Moxey, L. M. (2003). New perspectives on the expression of quantity. *Current Directions in Psychological Science, 12*(6), 240-243.

Sanford, A. J., & Moxey, L. M. (2004). Exploring quantifiers: Pragmatics meets the psychology of comprehension. In I. A. Noveck & D. Sperber (Eds.), *Experimental pragmatics* (pp. 116-137). Basingstoke: Palgrave.

Sanford, A. J., Moxey, L. M., & Paterson, K. B. (1996). Attentional focusing with quantifiers in production and comprehension. *Memory and Cognition, 24*(2), 144-155.

Teigen, K. H., & Brun, W. (1999). The directionality of verbal probability expressions: Effects on decisions, predictions, and probabilistic reasoning. *Organizational Behavior and Human Decision Processes, 80*(2), 155-190.

Teigen, K. H., & Brun, W. (2003). Verbal expressions of uncertainty and probability. In D. Hardaman & L. Macchi (Eds.), *Thinking: Psychological perspectives on reasoning, judgment and decision making* (pp. 125-146). Chichester, UK: Wiley.

Wallsten, T. S., Budescu, D., Rapoport, A., Zwick, R., & Forsyth, B. (1986). Measuring the vague meanings of probability terms. *Journal of Experimental Psychology: General, 115,* 348–365.